PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA"), hereby gives notice pursuant to Article 80, Section 80A-2 of the Boston Zoning Code ("Code"), that on November 5, 2015 an Institutional Master Plan Notification Form ("IMPNF"), filed pursuant to Section 80D-5 of the Code, has been received from Emmanuel College ("Emmanuel") for purposes of amending the Emmanuel College Institutional Master Plan ("Emmanuel IMP"). Additionally, a Project Notification Form ("PNF") was filed pursuant to Section 80B-5 of the Code by Emmanuel on the same date for the proposed institutional project, known as Julie Hall, a dormitory/student residence project, as described below ("Proposed Project"). The IMPNF initiates a process for the revision of the Emmanuel IMP by a minor amendment to allow Emmanuel to build the Proposed Project. Both the IMPNF and PNF describe the removal of the existing Julie Hall dormitory building and the construction of a new Julie Hall containing approximately 267,500 sf of gross floor area for approximately 691 beds (including 2 resident director suites), 220 of which will be replacement beds from the existing Julie Hall, a portion of the building will be rented to a third party institutional tenant, with below grade parking for up to 30 vehicles. The Proposed Project will be six stories along Brookline Avenue, and nineteen stories on the eastern portion of the site adjacent to Marian Hall. The ground floor will include space for a variety of additional student life and academic uses, including meeting space for student organizations, student lounges and study rooms, a convenience store to support the apartment style living and a function room space on the top floor of the building. The Proposed Project was included in the Emmanuel IMP, which received BRA Board approval on May 15, 2012 and Boston Zoning Commission ("BZC") approval on June 27, 2012, as amended by the First Amendment approved by the BRA Board on June 12, 2012 and by the BZC on July 12, 2012.

Approvals are requested of the BRA pursuant to Article 80B and 80D of the Code as follows: (1) issuance by the BRA director of a Scoping Determination pursuant to Section 80B-5.3(d), waiving further review if, after reviewing public comments, the BRA finds that the PNF adequately describes the Proposed Project's impacts, (2) review and approval of the IMPNF as the amended Emmanuel IMP pursuant to the provisions of Section 80D-9 and Section 80D-5.2(e), Waiver of Further Review of Unchanged Plans, and (3) issuance of Certifications of Compliance and Consistency by the Director of the BRA for the Proposed Project. The IMPNF and PNF may be reviewed or obtained at the Office of the Secretary of the BRA, Room 910, Boston City Hall, Boston, MA 02201, between 9:00 A.M. and 5:00 P.M., Monday through Friday except legal holidays. Public comments on the IMPNF and the PNF, including the comments of public agencies, should be submitted in writing to Ms. Katelyn Sullivan, Project Manager, BRA, Boston City Hall, Boston, MA 02201, on or before December 7, 2015.

BOSTON REDEVELOPMENT AUTHORITY

Teresa Polhemus, Executive Director/ Secretary

November 5, 2015

PROJECT NOTIFICATION FORM

Emmanuel College

New Julie Hall

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

Submitted by:
Emmanuel College
400 The Fenway
Boston, MA 02115

Prepared by:
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, Massachusetts 01754

In Association with:
Elkus Manfredi Architects
Rubin and Rudman LLP
VHB, Inc.
Nitsch Engineering
McPhail Associates
RWDI
Kyle Zick Landscape Architecture, Inc.

November 4, 2015

Epsilon
ASSOCIATES INC.

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November 4, 2015

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Chapter 1.0

Introduction/ Project Description

1.0 INTRODUCTION/ PROJECT DESCRIPTION

1.1 Introduction

Emmanuel College (the Proponent) proposes to construct a new residence hall (the Project, or the New Julie Hall) on the site of the existing Julie Hall (the Project site), on Brookline Avenue on the Emmanuel College campus. Planning for this Project was initially articulated in the western corner of the Emmanuel College Institutional Master Plan (2012 IMP) that was submitted in revised form to the Boston Redevelopment Authority (BRA) on May 12, 2012. The New Julie Hall will include approximately 691 beds[1], which will increase the bed count on the campus by 471 beds, thus reducing the total number of students that seek off campus housing. A portion of the building will be leased to a third party institutional tenant for student housing.

In addition to allowing Emmanuel College to continue to achieve its housing goals, the Project will reduce student housing impacts on Boston neighborhoods. The Project will improve the character and quality of Brookline Avenue by introducing interior spaces that display activity through a significant amount of transparent façade area, and improved landscaping between the façade and the sidewalk.

The proposed Project exceeds 50,000 square feet of gross floor area, and the Project is therefore subject to the requirements of Large Project Review pursuant to Article 80 of the Boston Zoning Code (the Code). This Project Notification Form (PNF) is being submitted to the Boston Redevelopment Authority (BRA) to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code (the "Code"). In addition, an Institutional Master Plan Project Notification Form (IMPNF) is being submitted for a Waiver of Further Review under Section 80D-5.2(e) related to the IMP and in accordance with Section 80A-6 of the Code.

1.2 Description of Emmanuel College

Emmanuel College, founded by the Sisters of Notre Dame de Namur in 1919, is a coeducational, residential, Catholic, liberal arts and sciences college located in the Longwood Medical and Academic Area (LMA) of Boston. Its unique location allows students and faculty opportunities to explore real world experiences through internships, research and strategic partnerships within the LMA and the city of Boston. Since becoming coed in 2001, the College's traditional undergraduate enrollment has nearly tripled and full-time faculty has doubled.

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[1] Room layout and design would allow for a potential increase, if required due to enrollment demand, of up to approximately 190 additional beds, which would be available to the College to house students from Emmanuel and other area colleges.

For the past 96 years, Emmanuel College has offered students an excellent education in the liberal arts and sciences. Emmanuel's mission is "To educate students in a dynamic learning community rooted in the liberal arts and sciences and shaped by strong ethical values and a Catholic academic tradition." From 1919 through the close of the academic year in the spring of 2001, Emmanuel College pursued its unique mission as a Catholic women's college. In September 2000, Emmanuel reached the conclusion that being a women's college had been impeding Emmanuel's efforts to attract more women. In response, Emmanuel decided that it could provide an excellent education to more young women by also educating young men. Beginning with the class of 2005, Emmanuel broadened its mission to include educating traditional-aged male undergraduates.

Since becoming coeducational in 2000, Emmanuel has experienced an 11-fold increase in applications for admission and its enrollment has more than tripled to 1,775 full-time undergraduate students. Emmanuel plans to increase the percentage of undergraduate students housed on campus from the current 73 percent to approximately 84 percent. To accomplish this, the College plans to construct a new approximately 267,500 sf, 691-bed residence hall of which 220 beds will be replacement beds from the existing Julie Hall.

1.3 Project Identification

Address/Location:	300 Brookline Avenue
Developer:	Emmanuel College 400 The Fenway Boston, MA 02115 (617) 735-9822 Sr. Anne M. Donovan SND
Architect:	Elkus Manfredi Architects 25 Drydock Avenue Boston, MA 02210 (617) 426-1300 David Manfredi Rayford Law Peter Lofgren
Landscape Architect:	Kyle Zick Landscape Architecture, Inc. 36 Bromfield Street, Suite 202 Boston, MA 02108 (617) 451-1018 Kyle Zick

Legal Counsel:
Rubin & Rudman LLP
50 Rowes Wharf
Boston, MA 02110
(617) 330-7000
James H. Greene, Esq.

Permitting Consultants:
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, MA 01754
(978) 897-7100
Cindy Schlessinger
Talya Moked

Transportation and Parking Consultant:
Vanasse Hangen Brustlin
99 High Street, 10th floor
Boston, MA 02110
(617) 728-7777
Sean Manning

Civil Engineer:
Nitsch Engineering
2 Center Plaza, Suite 430
Boston, MA 02108
(617) 338-0063
John Schmid

MEP Engineer:
R.W. Sullivan Engineering
529 Main Street, #203
Boston, MA 02129
(617) 523-8827
Paul D. Sullivan
Quy Vu

Wind Engineering Services:
RWDI, Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada
(519) 823-1311
Derek Kelly, M. Eng., P. Eng.

Geotechnical Consultant:
McPhail Associates, LLC
2269 Massachusetts Avenue
Cambridge, MA 02140
(617) 868-1420
Chris Erikson, P.E.

Structural Engineer:
McNamara/Salvia, Inc.
160 Federal Street
Boston, MA 02210
(617) 737-0040
John Matuszewski

Construction Manager:
John Moriarty & Associates, Inc.
3 Church Street, Suite 2
Winchester, MA 01890
(781) 729-2900
John Moriarty

1.4 Project Description

1.4.1 Project Site

The Project site is located on Brookline Avenue on the Emmanuel College campus, and is bounded by Brookline Avenue to the Northwest, Beth Israel Deaconess Medical Center (BIDMC) to the Southwest, and the Emmanuel College campus to the northeast and southeast. The site is occupied by the existing Julie Hall, which contains 220 beds. There is currently no parking on the site. An aerial locus of the Project site is shown in Figure 1-1, and an existing site plan is shown in Figure 1-2.

1.4.2 Area Context

The Project site is located on the Emmanuel College campus, which is in the heart of the LMA. Emmanuel is situated on a contiguous 17-acre campus in Boston's Fenway neighborhood. The campus is bounded by Brookline Avenue on the northwest, The Fenway on the northeast, Avenue Louis Pasteur on the east, and property belonging to other institutions (including BIDMC and Harvard University) on the south. The existing campus is shown in Figure 1-3.

1.4.3 Project Background and Proposed Changes Since the IMP

The New Julie Hall as currently proposed is similar in size to the one proposed in the 2012 IMP. As shown in Table 1-1 below, the overall gross square footage of the currently proposed Project will be approximately 7,550 sf smaller than the IMP project, with 29 less beds. A dining hall is no longer being proposed as part of the Project. While the revised Project is taller in height, it will occupy a smaller footprint.

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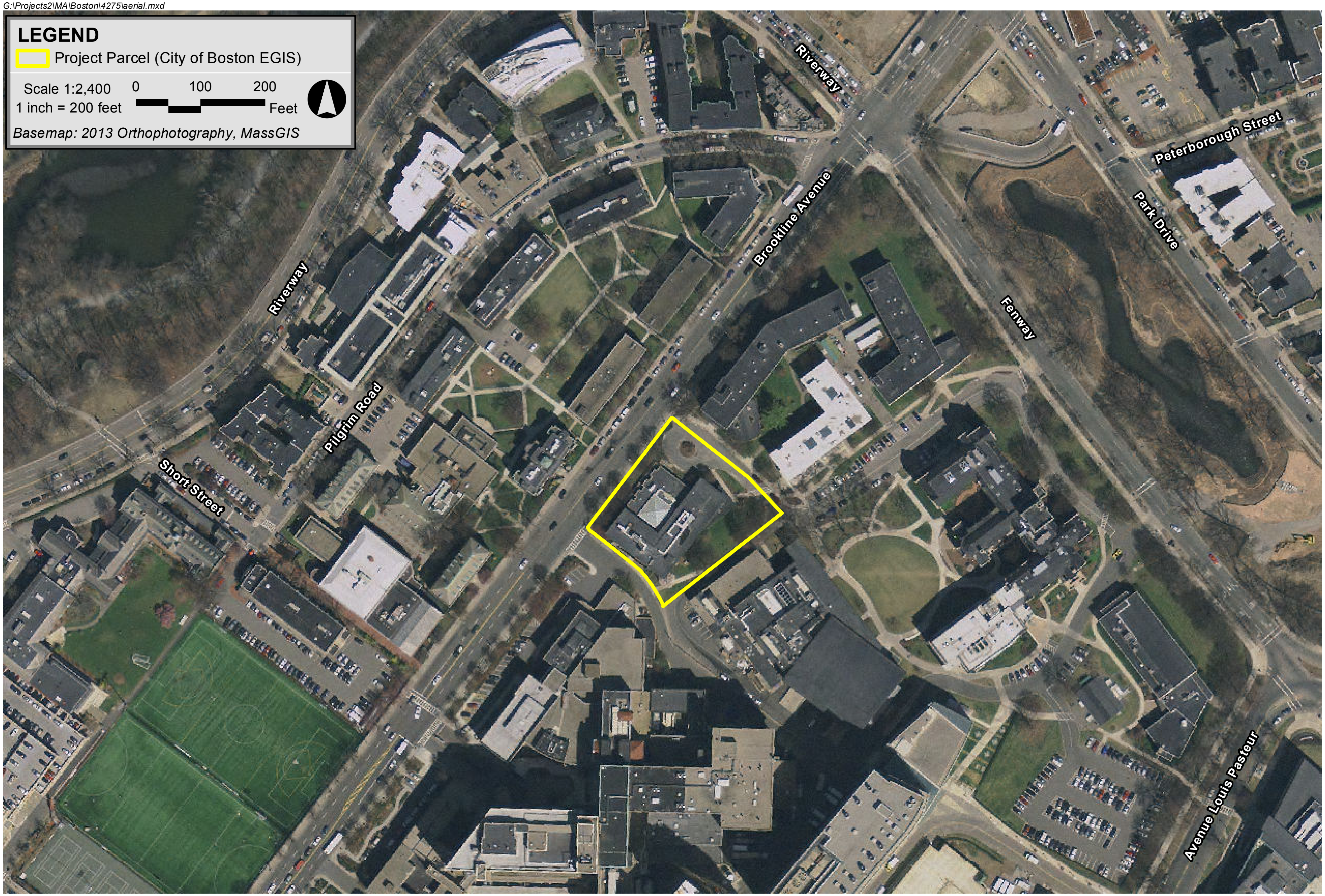

Emmanuel College Boston, Massachusetts

EMMANUEL COLLEGE

Epsilon
ASSOCIATES INC.

Figure 1-1

Aerial Locus Map

Emmanuel College Residence Hall **Boston, Massachusetts**

Emmanuel College

ELKUS | MANFREDI ARCHITECTS

Figure 1-2

Existing Site Plan

G:\Projects2\MA\Boston\4275\campus_area.mxd

Emmanuel College **Boston, Massachusetts**

Emmanuel College Epsilon Associates Inc.

Figure 1-3

Existing Campus

Table 1-1 Proposed Changes to New Julie Hall Since the IMP

Category	2012 IMP	Revised Project
Height	185 feet	205 feet
Stories	16 stories	19 stories
Dining Hall	500 seats	None
Beds	720 (500 net new)	691 (471 net new) [1]
Parking Spaces	200 spaces	15 spaces [2]
Building Footprint	36,000 sf	27,900
Floor Area	275,000 SF	267,500 SF

1 Room layout and design would allow for a potential increase, if required due to enrollment demand, of up to approximately 190 additional beds, which would be available to the College to house students from Emmanuel and other area colleges.

2 The layout of the below-grade parking allows for the installation of stackers at a later date, which could increase the number of spaces to approximately 30 spaces.

1.4.4 Proposed Project

The New Julie Hall, as shown in Table 1-2, is an approximately 267,500 sf dormitory building that will include approximately 691 beds, 220 of which will be replacement beds from the existing Julie Hall. A majority of the rooms will be two bedroom suites (approximately 162 suites) with double occupancy in each bedroom, emphasizing appeal to junior and senior-year students. The remaining 39 suites will be one-bedroom suites for Residence Assistants or special needs students. There will also be two two-bed apartments on the first floor for the Resident Directors. A portion of the building will be leased to a third party institutional tenant for dormitory use. Below grade, the building will accommodate parking for up to 15 vehicles.

Table 1-2 Project Program

Project Element	Approximate Dimension
Dormitory Rooms	691 beds (471 net new) [1]
Amenity Space	25,600 sf
Total	**267,500 sf**
Parking	15 spaces[2]

1 Room layout and design would allow for a potential increase, if required due to enrollment demand, of up to approximately 190 additional beds, which would be available to the College to house students from Emmanuel and other area colleges.

2 The layout of the below-grade parking allows for the installation of stackers at a later date, which could increase the number of spaces to approximately 30 spaces.

The Project will be six stories along Brookline Avenue, and nineteen stories on the eastern portion of the site adjacent to Marian Hall. The ground floor will include space for a variety of additional student life and academic uses. Anticipated uses include meeting space for student organizations, lounges for students, and student study rooms. Also on the ground

The Project will improve the character and quality of Brookline Avenue by introducing interior spaces that display activity through a significant amount of transparent façade area, and improved landscaping between the façade and the sidewalk. This activity, visibility and landscape will not only promote the appeal and safety of walking along Brookline Avenue by adding "eyes on the street," lighting, visual interest and aesthetic appeal, but will also help convey Emmanuel's culture of scholarship as an important theme enhancing the image of the LMA and Boston.

1.4.5 Consistency with the LMA Interim Guidelines

In 2002, the BRA and the Office of Jobs and Community Services (OJCS), in conjunction with the Boston Transportation Department (BTD), initiated a master planning process for the LMA. In 2003, the BRA adopted a set of LMA Interim Guidelines to inform the BRA's considerations while reviewing proposed projects pursuant to Article 80 of the Boston Zoning Code.

The Interim Guidelines are designed to accomplish the following:

- Require institutions and developers contemplating development in the LMA to comply with certain fundamental principles of good planning in the areas of transportation, urban design and workforce development as described herein;
- Accommodate near-term institutional growth while addressing residents' concerns for quality of life and employment opportunities by overlaying specific development guidelines regarding transportation, urban design and workforce development;
- Control growth in the LMA to create a better physical environment and an improved quality of life through improvements in the public realm and an enhanced transportation infrastructure;
- Set a new standard in how development will improve Boston residents' opportunities for jobs, housing, education and business development;
- Provide the immediate context within which a long-term master plan for the LMA will be developed through an approximately 18-month public process; and
- Protect the viability of the LMA for the future by managing growth in the near-term, while encouraging institutional growth and opportunities in other locations suitable to accommodate and benefit from these industries.

Emmanuel College has adhered to the Interim Guidelines in its planning efforts since they were adopted in 2003. The Project will be consistent with the Guidelines in the following ways:

Emmanuel College Residence Hall **Boston, Massachusetts**

EMMANUEL COLLEGE

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Figure 1-4

Proposed Site Plan

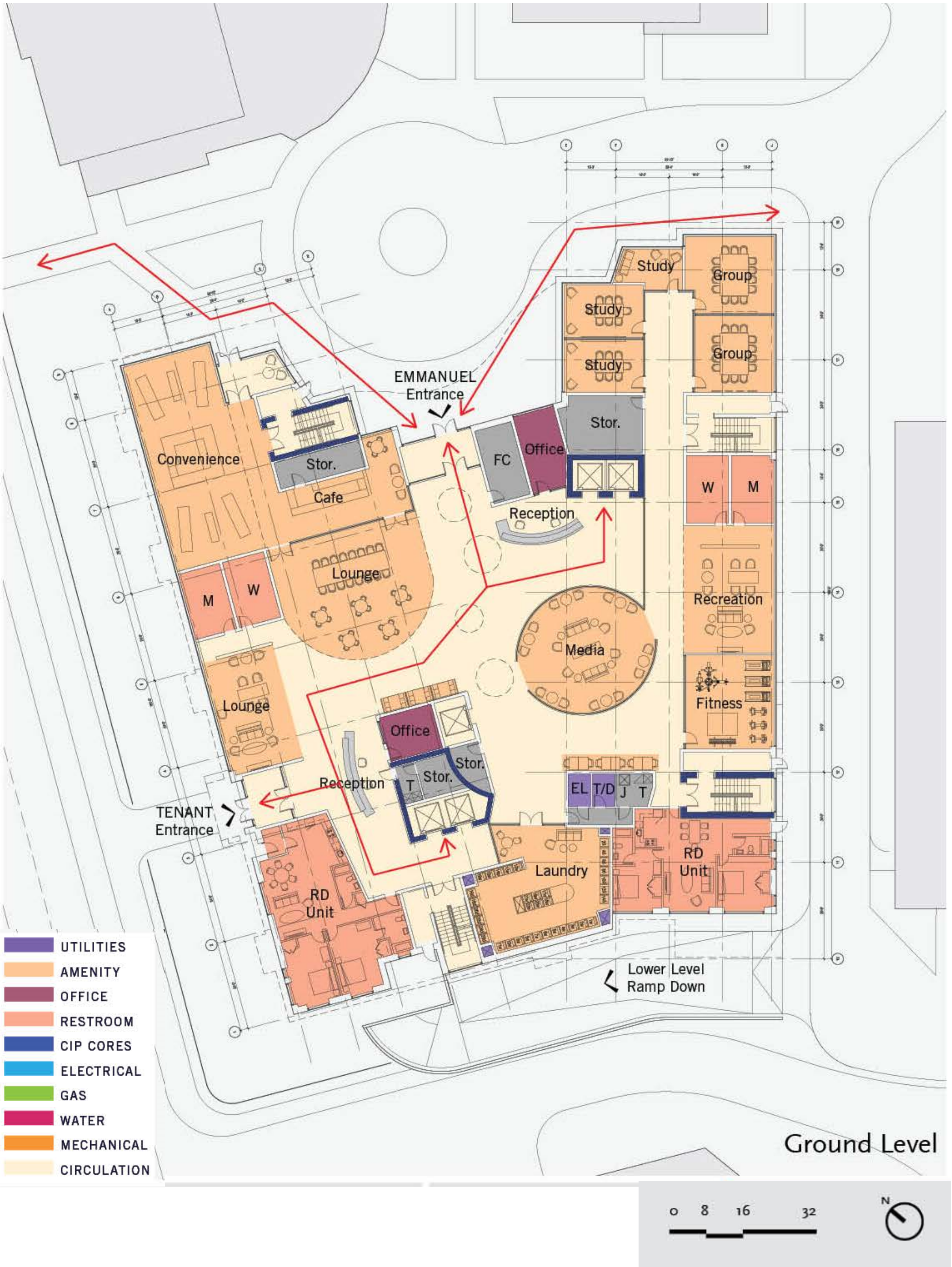


Figure 1-5
Ground Floor Plan

Figure 1-6
Level 2-6 Floor Plan

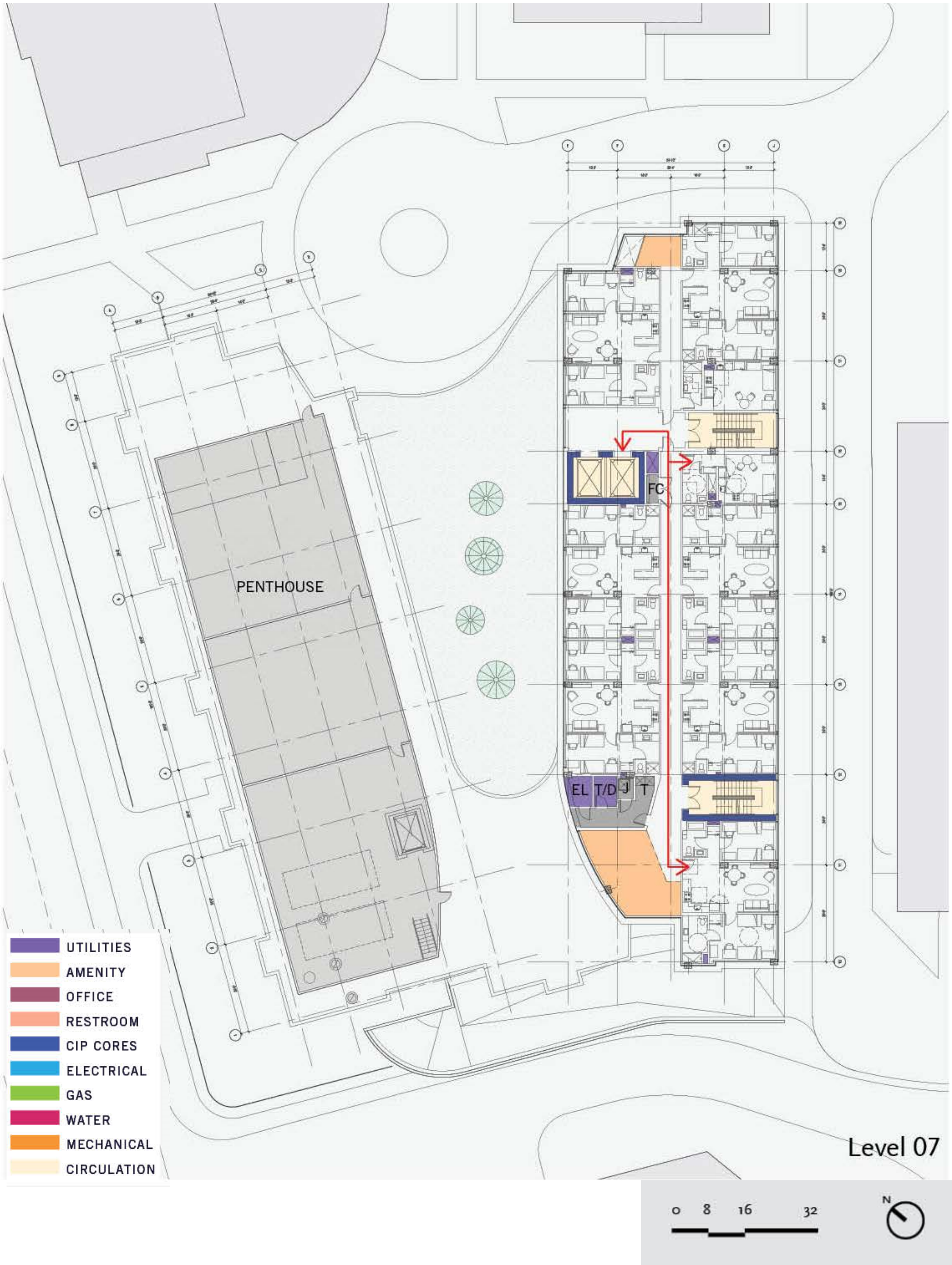
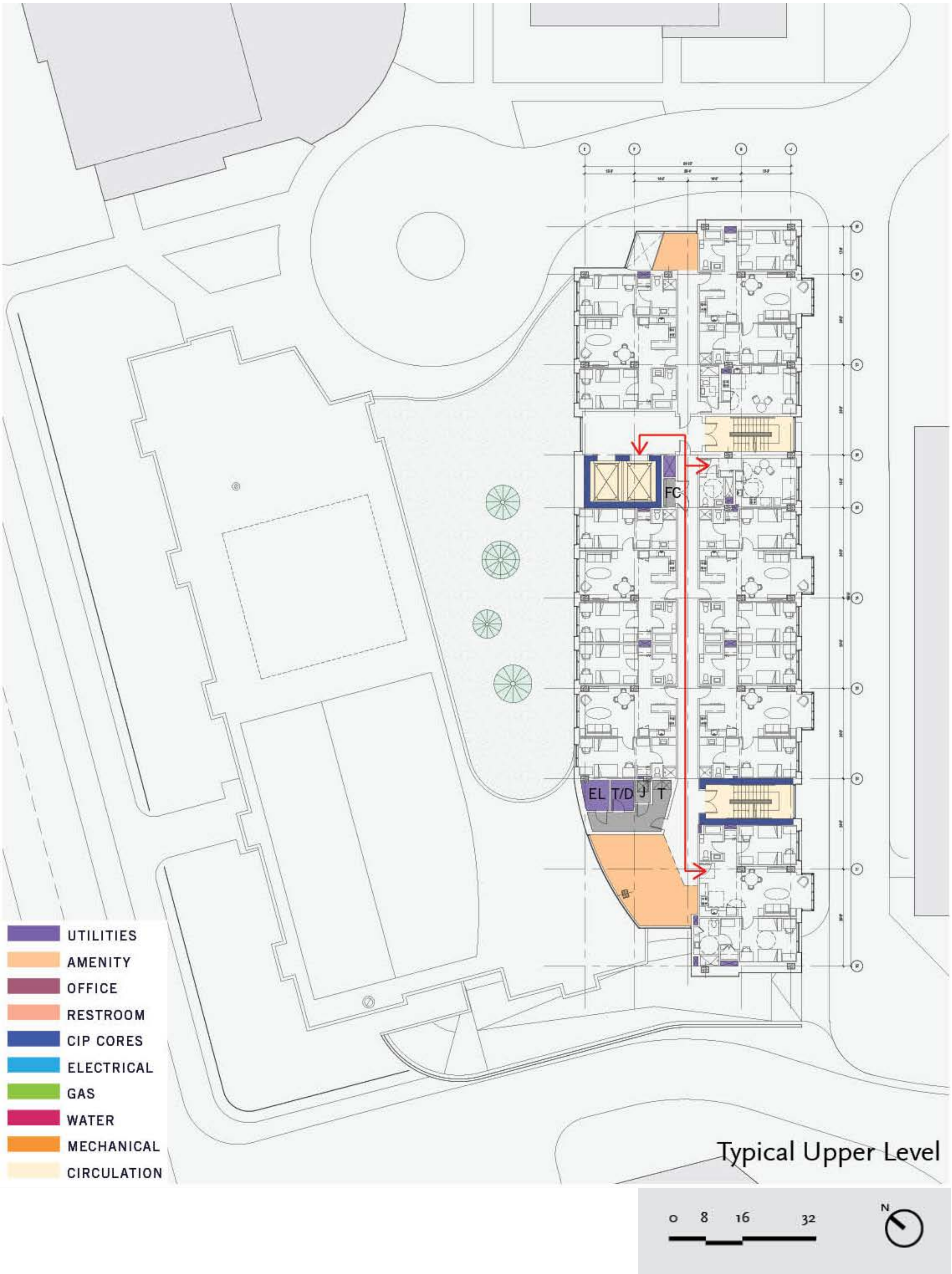


Figure 1-7

Level 7 Floor Plan



New Julie Hall Boston, Massachusetts

Figure 1-8

Level 8-17 Floor Plan

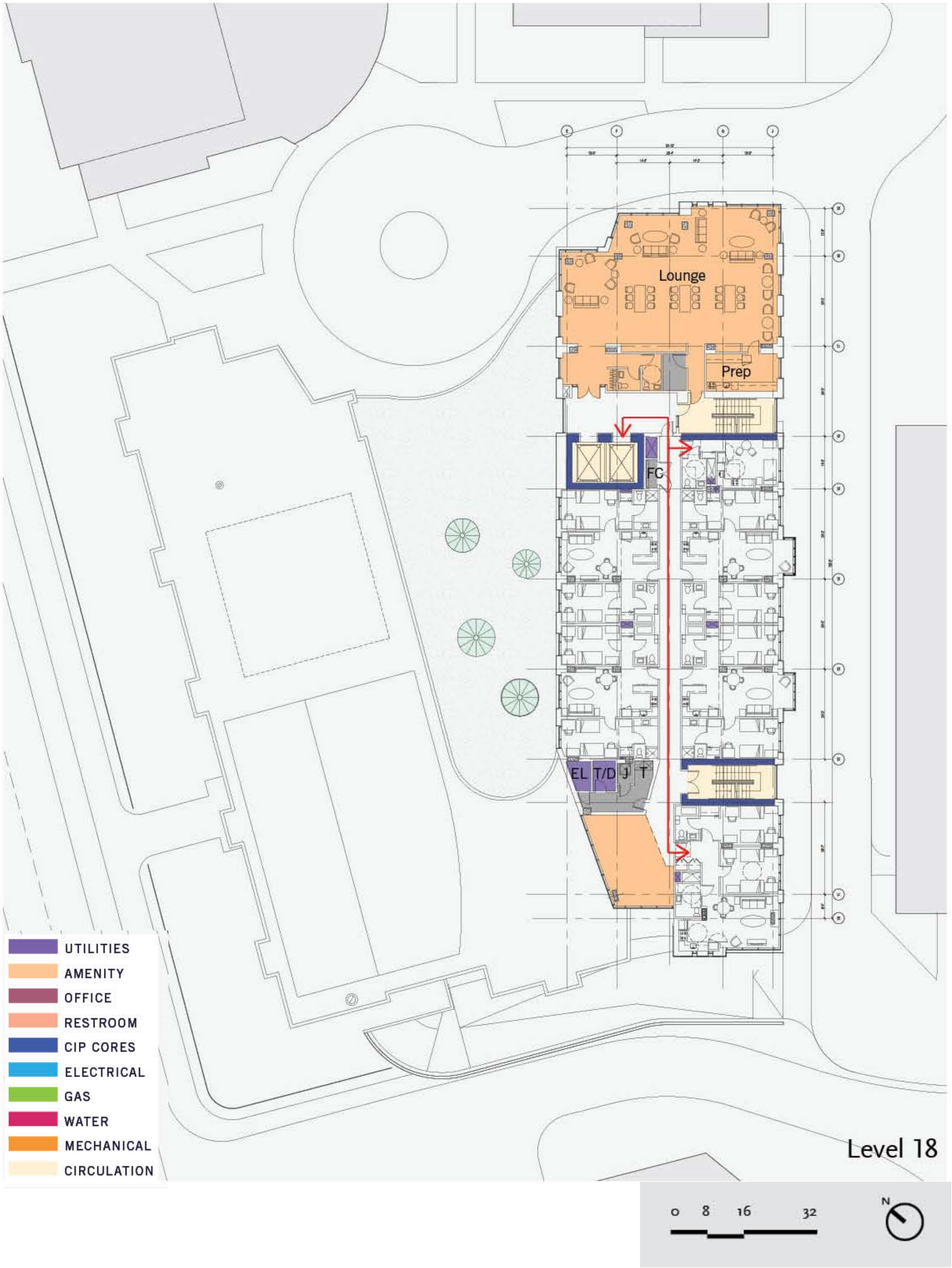
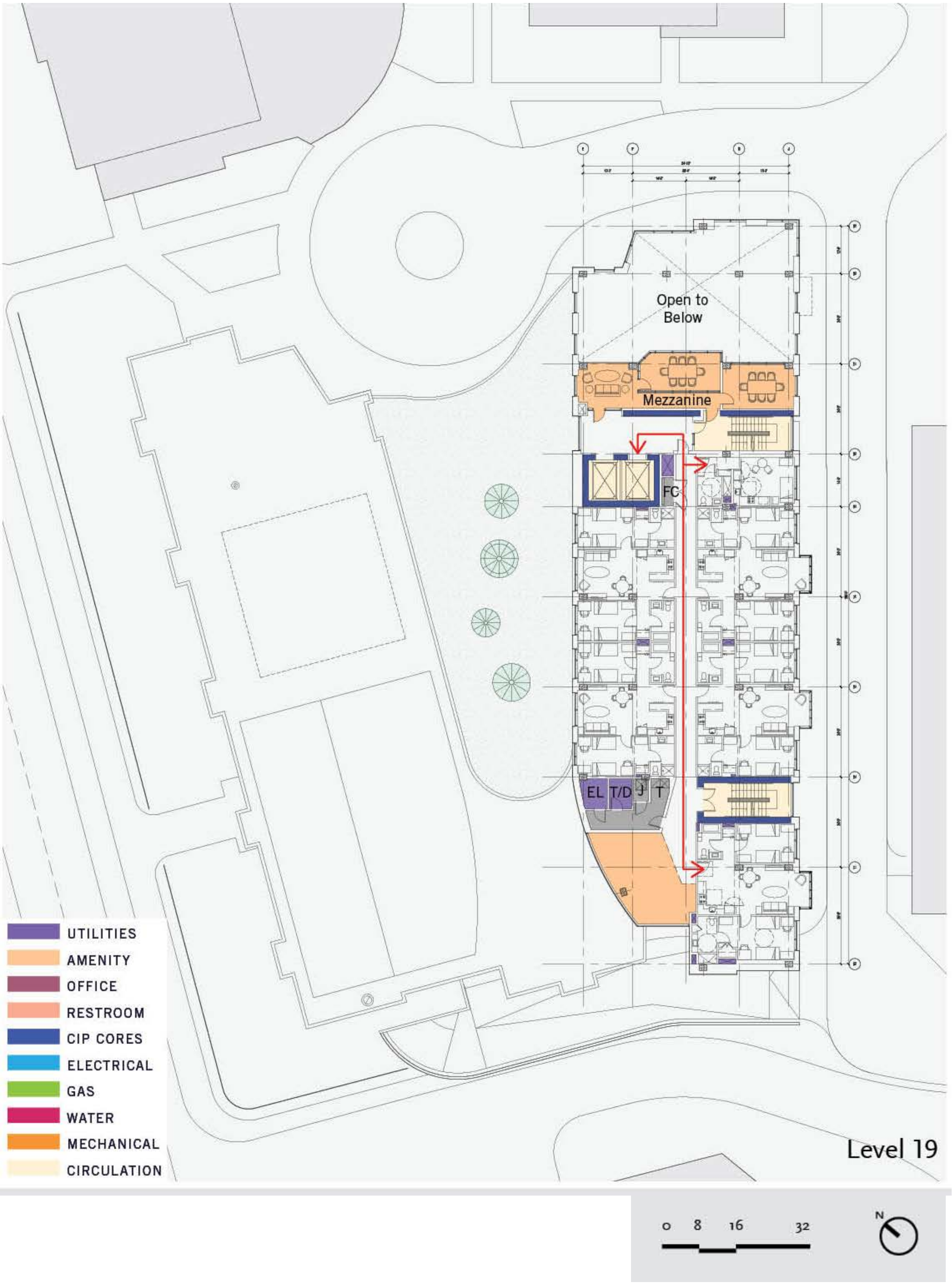


Figure 1-9

Level 18 Floor Plan



New Julie Hall Boston, Massachusetts

Figure 1-10
Level 19 Floor Plan

Figure 1-11

Building Elevations

Assets

The taller portion of the proposed New Julie Hall features a slender profile facing The Fenway and faceting that reduces its profile when viewed from Brookline Avenue from the west. The building has been located toward existing taller buildings—Merck Research Laboratories-Boston and BIDMC East Campus in particular—and away from The Fenway in accordance with the LMA Interim Guidelines to achieve a stepped transition in height up to the LMA's taller structures. The New Julie Hall has also been placed at a sufficient interval from the Merck Research Laboratories to maintain significant direct sun and sky plane views from Emmanuel's Main Quadrangle. The massing has been designed to avoid impacting the Emerald Necklace with new shadows on the vernal equinox. The location and height of the New Julie Hall causes its shadow to largely fall within the existing shadow cast by Emmanuel's Administration Building.

Dimensional Guidelines

As indicated in the LMA Interim Guidelines, a portion of the New Julie Hall site is allowed a height of 150' with a potential maximum of 205 feet with the provision of exceptional benefits. With a portion of the Project having a maximum height of 205 feet, Emmanuel will provide exceptional public benefits including the provision of student housing, thus reducing the total number of students that seek off campus housing and therefore increasing the housing supply in the area. In addition, in accordance with the LMA Guidelines, the maximum building height along Brookline Avenue will be 75 feet (see Figure 1-12).

Transportation

As described in Chapter 2, the New Julie Hall will generate very little traffic. The College pursues a robust Transportation Demand Management (TDM) program, which includes subsidies for public transportation for both faculty and students, as well as carpooling and bicycling incentives.

Character

The ground floor of the New Julie Hall will emphasize visual transparency to enliven the adjacent streets and celebrate learning activity at Emmanuel. This will improve the walking experience entering and leaving Emmanuel's campus at Brookline Avenue. The upper portion of the New Julie Hall, rising above lower campus buildings and visible to people entering the LMA along Brookline Avenue, will continue this theme of transparency as a signature campus building, while also integrating opaque elements that relate to the Administration Building's tower and mark a distinction from the predominantly glazed research buildings along Blackfan Street.

Figure 1-12

Zoning Diagram

Workforce Development

Emmanuel has a number of programs offered through the Carolyn A. Lynch Institute, the Jean Yawkey Center, the Campus Ministry Office and the Center for Science Education that provide Boston residents with enhanced educational opportunities that help to prepare them for future employment. In addition, Emmanuel's nursing and executive education programs complement the LMA medical institutions by providing a component of the workforce training necessary to build the skill sets of some employees. These programs are described in further detail in the public benefits section below.

1.5 Public Benefits

1.5.1 Job Training and Community Service

At the core of Emmanuel's mission is a focus on service. The College challenges its students, as well as faculty and staff, to become critical thinkers, ethical decision makers and contributing members of the local community and the global society. Emmanuel students truly embrace this challenge, as 85 percent of them participate in community service during their time here. They recognize the importance of giving back and volunteer 47,200 hours annually to helping others.

The College offers many opportunities for Emmanuel students, faculty, staff and alumni to serve through outreach with the Jean Yawkey Center for Community Leadership, the Carolyn A. Lynch Institute, the Campus Ministry Office and the Center for Science Education.

The Jean Yawkey Center for Community Leadership. The Jean Yawkey Center for Community Leadership is dedicated to developing service opportunities and leadership skills for Emmanuel students and providing programs for young people in Boston area schools and community organizations. The Center also awards scholarships, paid internships, and summer fellows, to students involved in the greater community. Programs include the Cultural Competence Peer Educator Training Program, a comprehensive training program designed to create an understanding of issues regarding racism, culture, socio-economic status, gender bias and other issues of oppression that exist in today's society; and Service Learning Courses, distinctive courses that further connect a student's sense of commitment and action, encouraging them to impact positive change in the community through service-oriented curriculums. Among other programs for young people, the Center also sponsors college access and success programs through Kids to College visits.

Carolyn A. Lynch Institute. Established in 2002 by a generous founding grant from the Lynch Foundation, the Carolyn A. Lynch Institute provides a range of collaborative programs and services that enhance the professional development of urban teachers and enrich the education of PK–12 students in the city of Boston and other urban areas. The

Institute addresses the shortage of highly qualified elementary and secondary mathematics and science teachers with a focus on and support for urban and Catholic schools. A major focus for professional development has centered on Mathematics, Science, Technology and SEI (Sheltered English Immersion) workshops. Emmanuel has served over 300 teachers and principals during this past academic year alone.

Campus Ministry Office. The mission of the Campus Ministry Office provides opportunities for members of the Emmanuel community to grow in their civic commitments to service, especially service to the poor and neglected. Through Campus Ministry, the College has an extensive and long term partnership with Mission Grammar School. Additionally, the Office organizes volunteer programs to ABCD Fenway Parker Hill, Project Hope, Community Servings, Saint Mary of the Angels Parish, Nazareth Residence, and Brigham & Women's Eucharistic Ministry Program, among others. Emmanuel students work with more than 35 agencies throughout the City of Boston, volunteering more than 43,800 service hours specifically to Boston, and more than 47,000 overall hours, which includes trips to areas outside of Boston for Alternative Spring Break and Habitat for Humanity. The Office also organizes Saturday and Sunday Service Group, which is service to the City of Boston every Sunday and one Saturday per month with various agencies including: Sunday's Bread, Pine Street Inn, St. Francis House and Franciscan Food Center. The Office also organizes student volunteers to participate and raise money for walks such as Making Strides Against Breast Cancer and Get Your Rear in Gear/ Colon Cancer Coalition Walk. Community Service Federal Work Study under the auspices of Campus Ministry includes work study opportunities for students at Mission Grammar, Sociedad Latina, St. Katharine Drexel Parish, and Jumpstart. Three large scale days of service organized by the Office, include one in September (New Student Day of Service), one in January (MLK Jr. Day of Service), and one in April (Spring Day of Service). The Office sponsors various charity drives including: Blood & Bone Marrow Drive (on campus 2 times per year), Boston CANshare (City of Boston annual food drive), Annual Toy Drive (benefitting Julie's Family Learning Program), Belle of the Ball (prom dress drive), Lenten Charity Drive (benefitting Nazareth Residents), and Reusable Treasures (end of the year items such as clothes, food, furniture, books, and office supplies, etc., that students do not wish to take home), are donated to St. Ambrose Family Shelter, Good Will and/or other agencies.

Also, under the direction of Campus Ministry, the Urban Food Project has been established by Emmanuel College to provide nutrition education and information, as well as urban gardening strategies to families in Boston, specifically in Roxbury. The project targets three main areas: gardening, education, and outreach. Working closely with community residents and partner organizations, Emmanuel students plan and maintain an urban garden at Emmanuel's Notre Dame Campus. Students offer workshops, cooking classes and other programming tips on nutrition and healthy lifestyles for families. The urban garden is designed to demonstrate techniques and provide the skills for community residents to develop their own urban gardens. An existing greenhouse at Emmanuel's main campus allows for year-round gardening and gardening education, as well as helps support the

Notre Dame Campus garden. As part of its education and outreach efforts, students have established relationships with homeless mothers and children at Nazareth Residence and fourth-grade students at OLPH Mission Grammar School. Programming is designed to enable families to eat nutritiously in the urban food desert that is the Roxbury section of Boston. We intend for the Urban Food Project to foster a long-term partnership with the community.

The Center for Science Education. The Greater Boston community has also benefited from the upgraded science facilities at the College. In response to studies showing a lack of sufficient inquiry-based science education in K–12 programs across the nation, as well as a number of teachers instructing without proper certification, Emmanuel established the Center for Science Education. Through access to facilities and resources in the new Maureen Murphy Wilkens Science Center and Emmanuel's science faculty, The Center for Science Education promotes scientific literacy and provides quality professional development for elementary and secondary science teachers. The Center promotes scientific literacy, inspires students to pursue careers in science and provides leadership in science education in Massachusetts. Science outreach programs continue to provide service to the Greater Boston community with special focus on serving the College's urban neighbors.

The following programs continued throughout 2014-15:

- Friday Science for Girls
- Science Technology Engineering Art and Music
- Content Courses for Secondary School Science Teachers
- Saints Science Buddies After-School Program (Science Buddies)
- Saints Science Ambassador Program
- Science, Engineering and Technology in the City (S.E.T)
- Biotechnology Research Institute
- Science Colloquium

Brief descriptions of two of the programs noted above are S.E.T. (Science, Engineering and Technology) in the City, a daylong event for Boston-area high-school girls whereby students visit the Emmanuel campus and engage in hands-on science activities led by professionals and interact with women working in S.E.T. fields, and the "Science Buddies" program, in which Emmanuel education majors provide after-school programming for urban elementary students and engage them with science and engineering curricula. Emmanuel students also facilitate a Saturday morning science program.

1.5.2 Financial Contributions

Since the adoption of the Emmanuel 2000 IMP, the College has increased its community benefits each year. The list below compiles some of the contributions that Emmanuel provides to the city of Boston annually but it is by no means all-inclusive of the impact the

College has on the community. The College believes that Emmanuel's presence in the city, through the ambassadorship of its students and faculty, cannot be measured in dollar values.

Table 1-3 Financial Contributions

Fenway High School Dual Enrollment Program Use of Emmanuel's gymnasium and classrooms Hosting Fenway High School's Commencement	$250,000
City of Boston Scholarships	$1,131,500
Graduate and Professional Programs tuition discounts for city of Boston teachers	$115,000
Mayor's Summer Works Program (ABCD Mission Hill)	$11,000
Sociedad Latina Two year-round paid interns Mission Possible! College Access Program Three Kings Day Celebration	$40,000
Annual Clemente Field maintenance	$70,000
Emmanuel College gymnasium use by community organizations (724 hours annually x $200 an hour)	$148,000
Community Service (43,860 hours x minimum wage)	$394,740
Mission Hill Scholarship	$36,284
Total	**$2,196,524**

1.5.3 Project Benefits

In addition to the many community benefits provided by Emmanuel College, the New Julie Hall will include numerous benefits to the neighborhood and the City of Boston, including but not limited to:

- Creation of approximately 471 net new dormitory beds, which will reduce the number of students that seek off-campus housing and the student housing impacts on Boston neighborhoods.

- Creation of approximately 330 construction jobs and five permanent and part-time jobs.

The Project will provide a variety of urban design benefits to the surrounding neighborhood, including:

- Improve the character and quality of Brookline Avenue by introducing interior spaces that display activity through a significant amount of transparent façade area, and improved landscaping between the façade and the sidewalk. This activity, visibility and landscape will not only promote the appeal and safety of walking along Brookline Avenue by adding "eyes on the street," lighting, visual interest and aesthetic appeal, but will also help convey Emmanuel's culture of scholarship as an important theme enhancing the image of the LMA and Boston.

- A convenience store will be provided on the ground floor to provide residents with access to groceries and quick meals. This will support the apartment style living that is integral to the desire to house upper class students on campus.

- Comply with Article 37 of the Boston Zoning Code by being Leadership in Energy and Environmental Design (LEED) certifiable anticipated at the Silver level.

1.6 City of Boston Zoning

The Project will be undertaken pursuant to and consistent with the Emmanuel Institutional Master Plan (IMP). The Emmanuel ten year IMP was approved by the Boston Redevelopment Authority (BRA) on May 15, 2012 and by the Boston Zoning Commission on June 27, 2012 with an effective date of June 27, 2012.

Subsequent to the May 15, 2012 approval, the BRA approved the First Amendment of the Emmanuel IMP on June 12, 2012, which was approved by the Boston Zoning Commission on July 12, 2012. The First Amendment was submitted to the Authority pursuant to Article 80D for Emmanuel's proposed use of the Society of St. Margret Convent at 125 Highland Street in the Fort Hill section of Roxbury's Highland Park neighborhood. The property is now known as Emmanuel's Notre Dame Campus. Emmanuel purchased the property for use for programs related to Emmanuel's mission, including programs for retreats, reflection and prayer, spiritual direction, social justice, service learning as well as offices to support these programs on site. The acquisition enabled Emmanuel to initiate a living/learning community for Emmanuel students, especially for students who give service in the area.

The IMP included two Proposed Institutional Projects which are intended to be undertaken by Emmanuel during the term (2012-2022) of the new IMP. The two Proposed Institutional Projects, subject to further Article 80D and Article 80B review, are:

- New Julie Hall.

- Cardinal Cushing Library.

The IMP also included a rezoning of part of Emmanuel's Endowment Campus as a Planned Development Area and an Institutional Master Plan. Emmanuel has leased Parcel C to the Brigham and Women's Hospital, Inc. ("BWH") for a long-term lease and development of a 360,000 square foot research facility with approximately 355 parking spaces. BWH filed an amendment to its 2010 IMP to include the Parcel C development project as a BWH IMP project. Additionally, Merck & Company, Inc., the ground lessee of Emmanuel and the developer and owner of Merck Research laboratories-Boston on Parcel B of the Endowment Campus has received approval of its existing facility through a Planned Development Area Development Plan. At the same time, Parcel A of the Endowment Campus was rejoined with the remaining areas of Emmanuel's campus.

The New Julie Hall Building is to be constructed on the site of Julie Hall, which is adjacent to the existing dormitory buildings on Brookline Avenue.

The New Julie Hall was included in the IMP, and was reviewed only under Section 80D of the Code. The minor changes in project size meet the criteria for Waiver of Further Review under Section 80D-5.2(e) of the Code. This proposal does not constitute a new institutional project, nor does it require changes in the IMP, which would constitute a change in use, dimensional, parking or loading elements, other than de-minimus changes which, in this case, are a reduction in the building size and modification of height elements. There are no significantly greater impacts that would result from the continued implementation of the approved IMP than were originally projected. The applicability of Section 80D-5.2(e) of the Code to the Project is appropriate and results in an "amendment" of an IMP under Section 80D-9 of the Code. The Project's compliance with the criteria for waiver of further review under 80D-5.2(e) of the Code supports a finding of "de minimus" change or minor modification of the IMP.

1.7 Legal Information

1.7.1 Legal Judgments Adverse to the Proposed Project

There are no legal judgments or actions pending against Emmanuel College, which would adversely affect the ability of the College to undertake the New Julie Hall.

1.7.2 History of Tax Arrears on Property

Emmanuel College is a non-profit educational institution and is exempt from real estate tax in the City of Boston and does not owe any taxes to the City of Boston.

1.7.3 Site Control/ Public Easements

Emmanuel College owns Julie Hall which is identified as Lot C containing approximately 40,454 square feet of lot area on the plan entitled: "Subdivision Plan of Land in Boston Massachusetts Suffolk County, Scale 1" = 600' dated 21 November 2001 and recorded at Suffolk Registry of Deeds, Plan Book 28300, End. Emmanuel College developed the present Julie Hall but had conveyed the property to Beth Israel Hospital, which had owned the site from 1975 to 2002, until Emmanuel re-acquired Julie Hall in September of 2002. There are certain reserved rights and easements between Emmanuel and Beth Israel, which are set forth in the deed recorded at Suffolk County Registry of Deeds, Book 29344, Page 059, which relate to drainage systems. These rights will not impact the development of the Project. See Appendix A for a site survey.

1.8 Anticipated Permits

Table 1-4 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 1-4 Anticipated Permits and Approvals

Agency	Approval
Local	
Boston Redevelopment Authority	Article 80 Large Project Review IMP Amendment Approval
Boston Civic Design Commission	Design Review
Boston Employment Commission	Construction Employment Plan
Boston Public Works Department	Street Opening Permit/Sidewalk Permit
Boston Public Improvement Commission	Various Permits for work in public ways, License and Maintenance Agreements
Boston Landmarks Commission	Article 85 Demolition Delay Approval
Boston Water and Sewer Commission	Site Plan Review; Water and Sewer Connection Permits
Boston Transportation Department	Construction Management Plan; Transportation Access Plan Agreement
Boston Fire Department	Approval of Fire Safety Equipment; Permit for Safe Access to Site for Fire Department
Boston Groundwater Trust	Groundwater Recharge Program
City of Boston Inspectional Services Department	Building and Occupancy Permits
Boston Parks Commission	Approval of Building within 100 feet of Parkland (Municipal Code 7-4.11)
State	
Massachusetts Historical Commission	Issuance of no adverse effect under MHC regulations

1.9 Public Participation

Emmanuel is committed to engaging in an open and collaborative public review of the proposed New Julie Hall. Since beginning this process, Emmanuel has had meetings and/or conversations with the BRA, neighboring institutions, community groups, and the Emmanuel Task Force to inform them about the College's plans and the Emmanuel process.

1.10 Schedule

The Proponent anticipates that the Project will commence construction in May of 2016 and last for approximately 23 months.

Chapter 2.0

Transportation Component

2.0 TRANSPORTATION COMPONENT

2.1 Introduction

This section presents an evaluation and summary of the transportation elements of the Project, including a comparison of the expected transportation impacts of the Project to the approved 2012 IMP. This section includes an analysis of estimated trip generation characteristics for the Project, and qualitatively describes on-site parking conditions, loading and service activities, pedestrian/bicycle amenities and other transportation mitigation and improvements that will be provided in connection with the Project.

2.2 Project Description and Changes since the IMP

The proposed Project represents a reduction in student beds and parking, and the elimination of dining and academic spaces as presented in Table 2-1.

Table 2-1 Proposed Program Changes

Program	Proposed Project	Previously Approved Project*	Net-Change
Student Beds	691**	720	(-39)
Dining/Student Life (GSF)	25,600 (student life only)	35,000	(-9,400)
Academic (GSF)	0	20,000	(-20,000)
Total GSF	**267,500**	**275,000**	**(-7,500)**
Parking	15***	200	(-185)

*2012 Emmanuel College Institutional Master Plan, Julie Hall residence hall program

** Room layout and design would allow for a potential increase, if required due to enrollment demand, of up to approximately 190 additional beds, which would be available to the College to house students from Emmanuel and other area colleges. Future analysis was conducted assuming 879 beds

*** The layout of the below-grade parking allows for the installation of stackers at a later date, which could increase the number of spaces to approximately 30 spaces.

The existing Julie Hall building is a dormitory providing 220 student beds on-campus. This building will be replaced by the Project, which will provide approximately 691 on-campus beds (471 net new beds taking into consideration the replacement of the 220 existing Julie Hall beds). Room layout and design would allow for a potential increase, if required due to enrollment demand, of up to approximately 190 additional beds, which would be available to the College to house students from Emmanuel and other area colleges. The following analysis conducted for the Project uses the maximum bed count of 879 beds to provide a "worst case" trip generation analysis for the Project, understanding this will not be the typical case year–to-year.

The Project will also provide only 15 parking spaces in a single, below grade parking level to accommodate the slight increase in staff that is expected during the term of the IMP, including this Project. This is a substantial reduction in new on-site parking; approximately 185 less spaces than the 200 spaces that were approved in the 2012 IMP.

2.2.1 Trip Generation

To assess the impact of the Project, trip generation estimates were based on standard Institute of Transportation Engineers (ITE) rates for the land use code (LUC) LUC 220 – Apartment. Dormitory is not a use in the ITE Code, therefore the closest use – Apartment – was used to estimate the trips associated with the new student beds.

Mode share, to account for alternative modes of transportation, were applied to the ITE trip results. Mode share for the residence hall was calculated using existing campus mode data. Emmanuel College only allows students to have cars on campus in very special circumstances. Less than one percent of all on-campus residents have a car today. This same low-vehicle dependency was applied to new residents of the Project, and is the same methodology that was used to calculate trip generation for the dormitory in the 2012 IMP. The mode shares for students at Emmanuel College are presented in Table 2-2.

Table 2-2 Peak Hour Mode Share

Project	Walk/Bike	Transit	Vehicle
New Julie Hall	89.7%	10%	0.3%

Table 2-3 presents the trip generation estimate for the proposed Project. The Project will provide 691 beds with the ability to add an additional 190 beds as enrollment fluctuates year-to-year. The analysis uses the "worst case" trip generation program of 879 beds to provide a conservative analysis. In addition to vehicular trips, person trips are estimated by applying a vehicle occupancy rate of 1.2 persons per vehicle. Person trips account for all individuals choosing to walk, bike or take public transportation to the campus.

Table 2-3 Trip Generation Summary

	Person Trips	Walk/Bike	Transit	Vehicle
Daily Total	3,576	2,851	715	9
Morning Peak Hour				
In	55	49	6	0
Out	219	197	21	1
Total	274	246	27	1
Evening Peak Hour				
In	217	193	22	2
Out	117	105	11	1
Total	334	298	33	3

The proposed Project is anticipated to generate approximately 1 new vehicle trip (0 in, 1 out) during the morning peak hour and 3 new vehicle trips (2 in, 1 out) during the evening peak hour. The residence hall is expected to generate very few vehicle trips due to the characteristics associated with Emmanuel College's existing on-campus student housing (as described previously), where very few students living on campus have vehicles, as shown in the mode split distribution.

2.2.2 Trip Generation Comparison

The proposed Project represents an overall reduction of 41 student beds, elimination of the dining hall and reduction in new parking spaces compared to the approved 2012 IMP. The dormitory will provide 691 new on-campus beds with the potential to increase the number of beds to 879 due to high enrollment years. It is expected that there will be a slight increase in vehicle trips compared to the approved 2012 IMP as shown in Table 2-4.

Table 2-4 Comparative Vehicle Trip Generation Analysis

	Proposed Project	Previously Approved Project*	Estimated Change
Daily Total	9	9	0
Morning Peak Hour			
In	0	0	0
Out	1	1	0
Total	1	1	0
Evening Peak Hour			
In	2	1	+1
Out	1	1	0
Total	3	2	+1

*2012 Emmanuel College Institutional Master Plan, Julie Hall residence hall

The Project is expected to have a nearly identical vehicle trip generation characteristic compared to the previously approved Julie Hall project, as studied and described in the approved 2012 IMP. The dormitory building is expected to generate very few vehicle trips, nine daily trips total, which is consistent with the 2012 IMP and one additional trip during the evening peak hour. This is assuming the most conservative analysis with a maximum bed count of 879 beds. It is expected that the occupancy of the building will generally be less than the analyzed condition, and over a typical year the bed count for the Project is expected to be 691 beds.

The Project will generate less loading and service deliveries as there will be no new dining hall services offered with this Project. The trip generation associated with this Project will be similar to the previously approved project and will have a similar impact on the transportation network within the campus and the surrounding LMA area.

2.3 Traffic Impact Assessment

The transportation study that was prepared and submitted in support of the previously approved 2012 IMP project conducted a comprehensive and thorough analysis of the transportation impacts as required by the Transportation Access Plan Component of the IMP. The study clearly articulated the transportation impacts of the previously approved project and documents many of the vehicle, bicycle, pedestrian, loading and service and construction management practices that this Project will follow. The following sections discuss these aspects of the 2012 IMP and the impacts the Project will have on these transportation components.

2.3.1 Vehicle Access and Circulation

As shown in Table 2-4, the Project is expected to generate a slightly higher (one more trip in the evening peak hour) number of vehicle trips compared to the 2012 IMP. The Project will also result in an overall reduction in new parking spaces. Only 15 new spaces are proposed, compared to the previously approved 200 space garage (a 185 space reduction). This reduction in parking will deter students, faculty, and visitors from driving to the campus.

Access to the Project and garage parking will be consistent with the previously-approved project. The garage will be accessed off of the main internal access drive through campus which connects to the existing main entrance off of the Fenway. No new access point to the campus will be created; existing infrastructure and curb cuts will be used to provide access to the Project.

2.3.2 Bicycle Storage

Emmanuel College proposes to include approximately 102 new bicycle spaces as part of the proposed Project, consistent with the previously approved 2012 IMP. This supply is consistent with the on-campus supply that is provided today, which provides bicycle storage for six percent of the on-campus population.

Bike racks will be located in a covered environment adjacent to Project to encourage cycling and provide a bike-friendly campus.

2.3.3 Pedestrians

Emmanuel has a compact campus which encourages walking as the primary mode of transportation within the campus for students, faculty/staff and visitors. To accompany the new construction and increased student population, improvements in pedestrian circulation and green space throughout the campus will be a priority. Improvements to enhance pedestrian access within the campus, including updates in landscaping and lighting along key pedestrian walkways will continue to encourage walking. Another major feature of the pedestrian corridor is the number of landscaped areas that will provide places for passive recreation and contemplation.

2.3.4 Loading

Due to the change in the Project program from the previously approved 2012 IMP, the program does not include additions of dining hall services, new loading needs are expected to be minimal and will be similar to current loading operations at the existing Julie Hall residence. The Project will be serviced entirely from internal on-campus driveways, making use of the existing service drive that also supports the adjacent Jean Yawkey Center. There will be no impact to the public street systems as a result of service or loading. Move-in and move-out operations will continue to be handled proactively as discussed in the 2012 IMP.

2.3.5 Construction Management

Emmanuel College will develop a detailed evaluation of potential short-term construction-related transportation impacts during the course of this Project, including construction vehicle traffic, parking supply and demand, and pedestrian access to the campus. It is anticipated that, whenever feasible, construction activities will be scheduled during the summer when students are away, so that some previously identified portions of the campus can be used for construction staging and lay-down areas. A detailed Construction Management Plan will be developed and submitted to the Boston Transportation Department (BTD) for its approval.

2.3.5.1 Construction Vehicle Traffic

Construction vehicles will be necessary to move construction materials to and from the campus and Project site. Emmanuel College recognizes that construction traffic is a concern to area residents, other institutions and Emmanuel College itself. Every effort will be made to reduce the noise, control fugitive dust and minimize other disturbances associated with construction traffic. It is anticipated that Brookline Avenue, The Fenway and Avenue Louis Pasteur will serve as the principal construction traffic routes to the Emmanuel College campus. Appropriate permits will be obtained for temporary use of The Fenway by construction vehicles. Trucks will be routed to avoid nearby residential areas. Every effort will be made to provide truck staging and lay-down area on-campus. The need for street occupancy along roadways adjacent to the project site is not known at this time.

2.3.5.2 Construction Parking Issues

Contractors will be encouraged to devise access plans for their personnel that discourage auto use (such as seeking off-site parking, providing transit subsidies, etc.) Construction workers will also be encouraged to use public transportation to access the project site because no new parking will be provided for them. Emmanuel College will work with the BTD and the Boston Police Department to ensure that parking regulations in the area are enforced.

2.3.5.3 Pedestrian Access during Construction

During the construction period, pedestrian access on Emmanuel's campus may need to be re-routed around the construction site. A variety of measures will be considered and implemented to protect the safety of pedestrians traversing those portions of the campus affected by construction. Where necessary protective barriers placed around the construction site, replacement of walkways, appropriate lighting and new directional and informational signage to direct pedestrians around the construction site will be provided. After construction is complete, finished pedestrian sidewalks will be permanently reconfigured around the new building to connect to other parts of the Emmanuel College campus and the neighborhood. This reconfiguration of pedestrian paths will be carefully considered as the design of the Project proceeds.

2.3.5.4 Construction Monitoring

As the Project progresses, Emmanuel will work with representatives of the City of Boston to develop and ensure the effectiveness of the program of measures to minimize short-term, construction-related transportation impacts.

2.4 Transportation Demand Management

As documented in the 2012 IMP, this Project will continue to implement and promote the transportation demand management (TDM) measures outlined below.

Emmanuel College campus is well-situated in relation to the regional roadway network, rapid transit, commuter rail, and bus systems. These amenities enhance opportunities to reduce vehicle trips and encourage alternative modes of travel through aggressive transportation demand management programs. Emmanuel College actively supports efforts to reduce auto use for both faculty/staff and commuter students traveling to the campus. Many actions to support this goal are actively employed by Emmanuel College, including the following:

- Employee Transportation Advisor. Emmanuel has a dedicated commuter services advisor who provides employees with commuter services and works with MASCO's CommuteWorks TMA to improve existing TDM measures and devise and implement new programs.

- Employee carpool parking discount. For faculty/staff that choose to travel to campus via automobile, the College offers a carpooling incentive. Employees who choose to carpool with other employees receive a 40 percent discount on their shared parking pass, resulting in considerable savings.

- Employee transit pass subsidy. Emmanuel faculty/staff regularly purchase monthly T passes and choose public transportation as their primary mode of transportation. Emmanuel College offers a subsidy of 65 percent on the purchase of all monthly MBTA passes for full-time employees.

- Student transit pass subsidy. An 11 percent transit discount is offered to students through the MBTA's Semester Pass program. This 4- or 5-month pass allows for unlimited travel on the full range of MBTA services, at a discount. In addition, information on transit pass sales is provided in the Student Handbook.

- Bicycling incentives and amenities. Emmanuel provides centrally located bicycle racks on campus as described in Section 2.3.2.

- Guaranteed Ride Home Program. Emmanuel provides a guaranteed ride home program through CommuteWorks. Taxi service or car rental vouchers for emergency trips home may be obtained up to five times per year for employees commuting on public transportation.

- Information dissemination. Dissemination of a regular Commuter Bulletin to faculty (through CommuteWorks) and bus schedules/transit schedules posting.

- Active CommuteWorks membership. Participation in and support of MASCO's extensive transportation mitigation efforts whose focus is to encourage commuting to work via transit and other ride-sharing programs.

Emmanuel will continue to promote and improve its TDM program to benefit its faculty members and students and reduce traffic impacts to roadways and parking facilities in the vicinity of the campus.

2.4.1 Campus Mitigation

Reiterating the 2012 IMP, Emmanuel seeks to build enhanced academic and residence space for its students and faculty through the development of 2012 IMP Cardinal Cushing Library Expansion Project and the New Julie Hall. The new beds at the New Julie Hall will help Emmanuel College to meet its objective to increase the percentage of undergraduate students housed on-campus from the current 73 percent to approximately 84 percent. By accommodating new students on campus, the growth will encourage increased pedestrian, bicycle and transit activity for not only the campus, but also the surrounding neighborhoods.

Specific mitigation measures to promote alternative travel modes include:

- Increasing monthly employee parking rates on campus to discourage parking on campus and to make the parking rates competitive with other local garages;

- Installing approximately 102 covered bicycle spaces at the New Julie Hall; and
- Planting street trees and other landscape amenities around the campus perimeter.

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

3.1.1 Introduction

A pedestrian wind study was conducted for the proposed New Julie Hall at Emmanuel College. The objective of the study was to assess the effect of the Project on local conditions in pedestrian areas around the study site and provide recommendations for minimizing adverse effects, where necessary.

The study involved wind simulations on a 1:300 scale model of the proposed building and surroundings. These simulations were then conducted in RWDI's boundary-layer wind tunnel at Guelph, Ontario, for the purpose of quantifying local wind speed conditions and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by the BRA were used in this study. The following sections include a discussion of the methods and present the results of the wind tunnel simulations.

Wind conditions are similar in both the Existing and Build conditions with winds generally suitable for sitting, standing, or walking. Of the 79 locations studied, 76 locations are suitable for walking or better in the Existing condition annually, compared to 75 locations in the Build condition.

Under both the Existing and Build configurations the effective gust criterion was met annually at all locations.

3.1.2 Background

Major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian level. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper level winds, resulting in no significant changes to the local pedestrian level wind environment. The most effective way to assess potential pedestrian level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

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.

3.1.3 Methodology

Information concerning the site and surroundings was derived from: information on surrounding buildings and terrain; site plans and elevations of the Project provided by the design team. The following configurations were simulated:

- Existing Configuration: includes all existing surrounding buildings; and,
- Build Configuration: includes the proposed New Julie Hall at Emmanuel College and all existing surrounding and BRA approved buildings.

With respect to the prevailing wind directions, the BRA approved buildings are located downwind (i.e., east and south) and as a result are generally unlikely to have significant impact on the wind conditions at the site.

As shown in Figures 3.1-1 and 3.1-2, the wind tunnel model included the Project and all relevant surrounding buildings and topography within a 1,200 foot radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 79 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full scale height of five feet above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in 10 degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long term meteorological data, recorded during the years 1981 to 2011 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 3.1-3 through 3.1-5 present "wind roses", summarizing the seasonal and annual wind climates in the Boston area, based on the data from Logan Airport. The left-hand side wind rose in Figure 3.1-3, for example, summarizes the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year are from the west northwest, northwest, west, south-southwest and southwest. In addition to these directions, strong winds are also prevalent from the northeast direction as indicated by the red and yellow color bands on the wind rose.

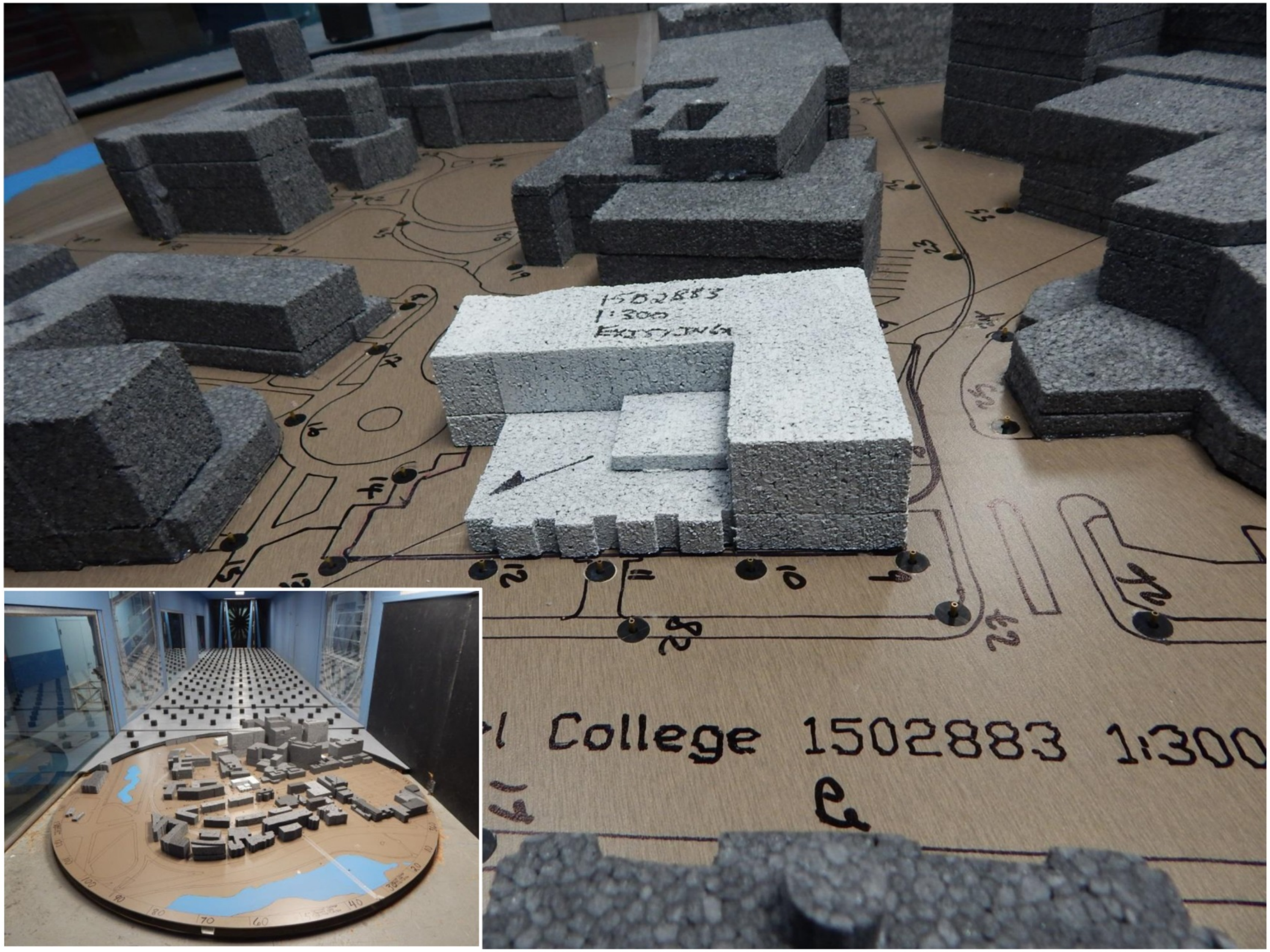


Figure 3.1-1

Wind Tunnel Study Model – Existing

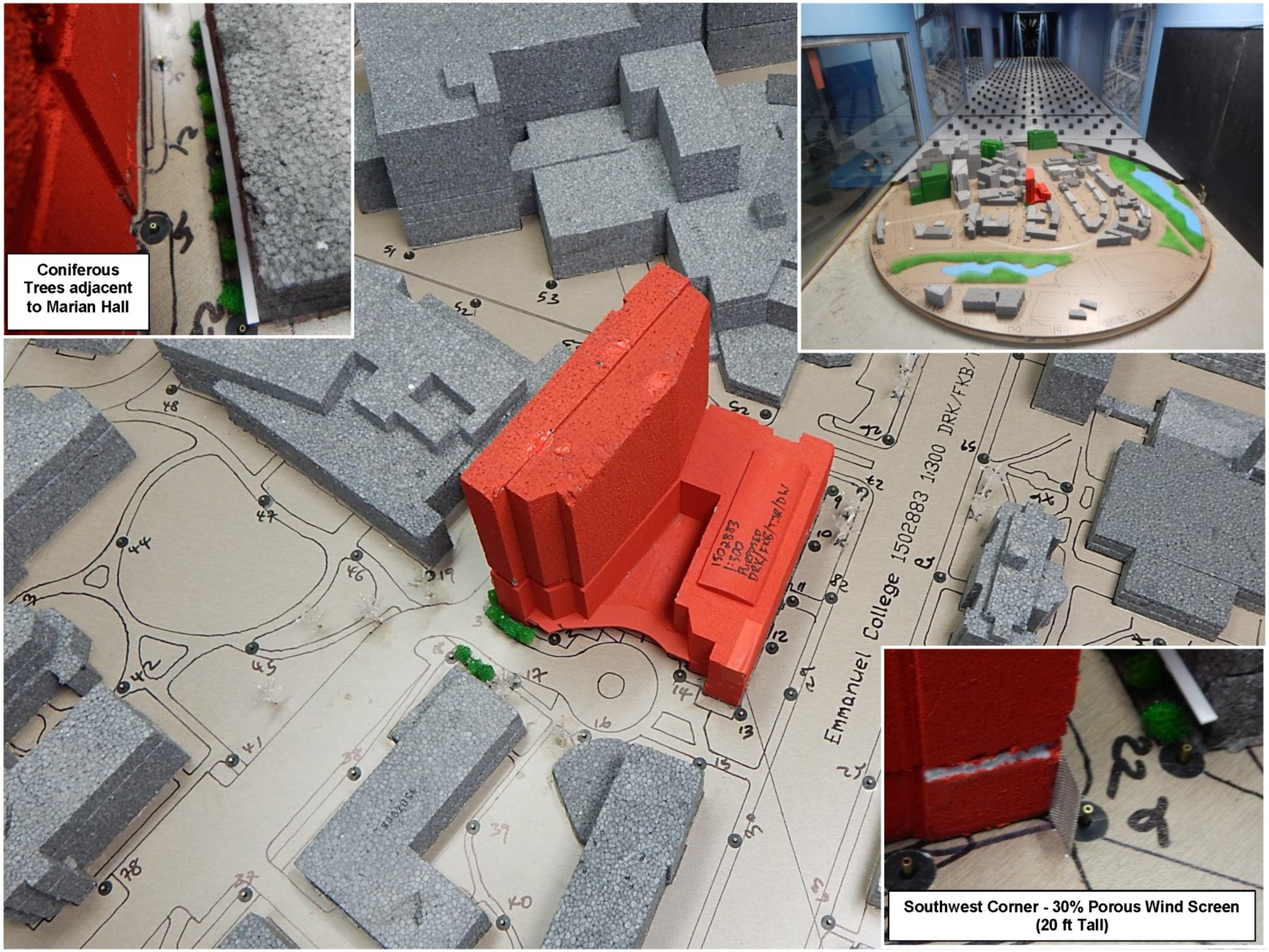


Figure 3.1-2

Wind Tunnel Study Model – Build

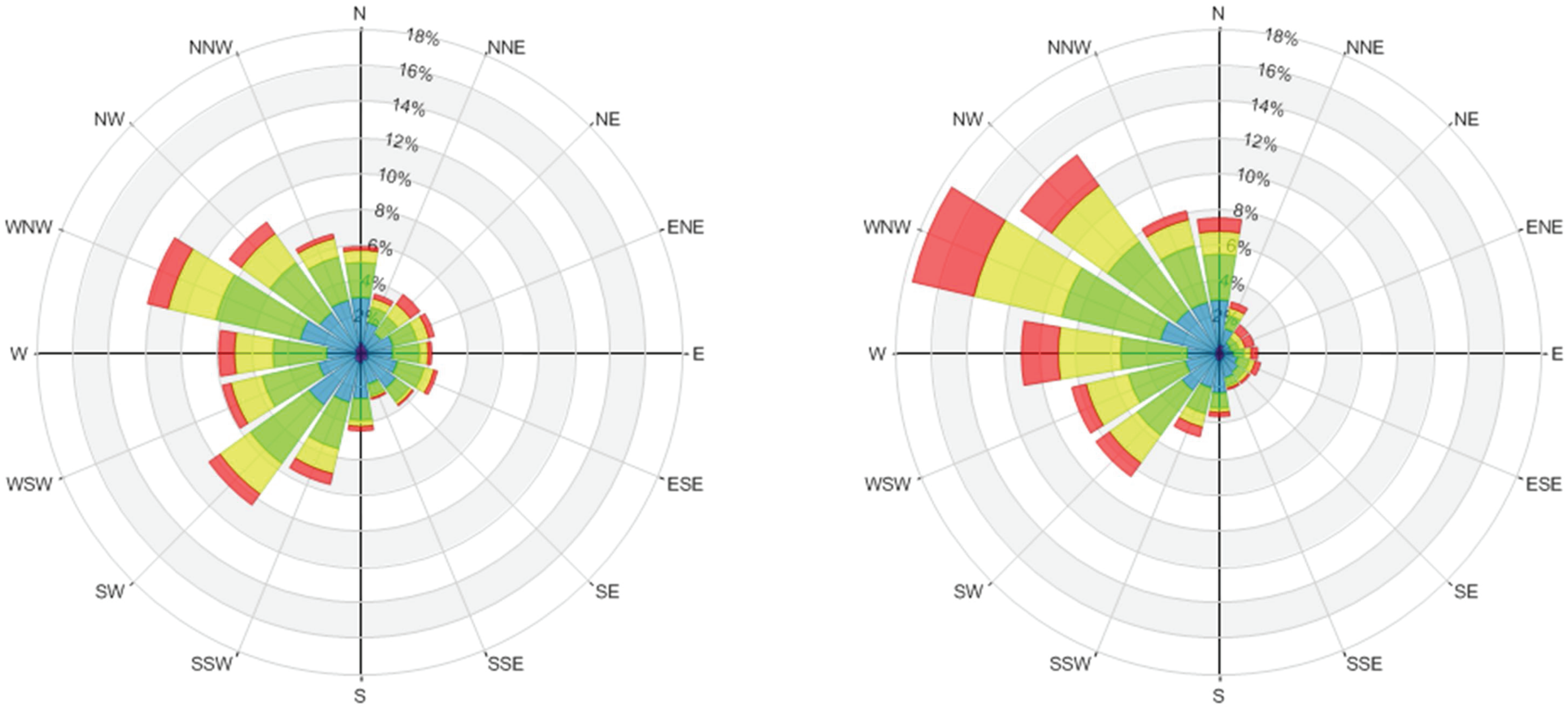
Spring
(March - May)

Summer
(June - August)

	Wind Speed (mph)	Probability (%) Spring	Summer
	Calm	1.4	1.5
🟪	1-5	5.7	8.0
🟦	6-10	26.8	36.1
🟩	11-15	33.5	36.4
🟨	16-20	21.4	15.0
🟥	>20	11.3	2.9

Figure 3.1-3

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1973-2011)



Fall
(September - November)

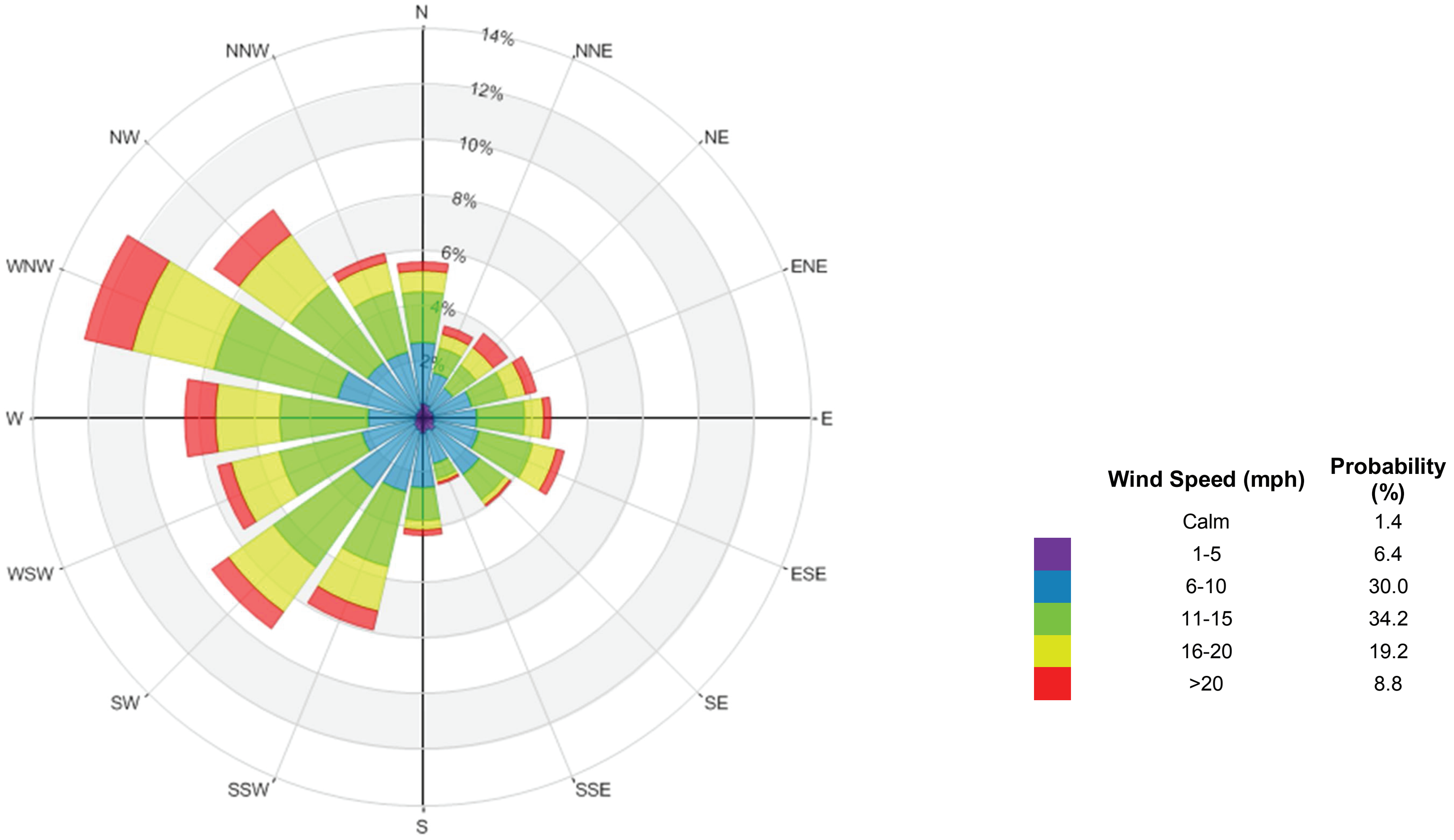
Winter
(December - February)

	Wind Speed (mph)	Probability (%) Fall	Winter
	Calm	1.6	1.2
🟪	1-5	6.9	5.2
🟦	6-10	32.0	25.1
🟩	11-15	34.7	32.1
🟨	16-20	17.7	22.6
🟥	>20	7.2	13.7

New Julie Hall Boston, Massachusetts

Figure 3.1-4

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1973-2011)



	Wind Speed (mph)	Probability (%)
	Calm	1.4
🟪	1-5	6.4
🟦	6-10	30.0
🟩	11-15	34.2
🟨	16-20	19.2
🟥	>20	8.8

Annual Winds

Figure 3.1-5

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1973-2011)

On an annual basis (Figure 3.1-5), the most common wind directions are those between southwest and northwest. Winds from the east-southeast are also relatively common. In the case of strong winds, northeast, west, west-northwest and northwest are the dominant wind directions.

This study involved state of the art measurement and analysis techniques to predict wind conditions at the study site. 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 used in this report represent an average for the total population. Also, unforeseen changes in the Project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (one percent of the time). Higher wind speeds will occur but on a less frequent basis.

3.1.4 Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root mean square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne[1]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are as follows:

Table 3.1-1 Boston Redevelopment Authority Mean Wind Criteria*

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

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

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

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

3.1.5 Results

Table 1 in Appendix B presents the mean and effective gust wind speeds for each season as well as annually. Figures 3.1-6 through 3.1-9 graphically depict the wind comfort conditions at each wind measurement location based on the annual winds. Typically the summer and fall winds tend to be more comfortable than the annual winds while the winter and spring winds are less comfortable than the annual winds. The following summary of pedestrian wind comfort is based on the annual winds for each configuration tested, except where noted below in the text.

Based on exploratory wind tunnel testing in the early stages of the design process, wind control measures such as a wind screen, a canopy and landscaping such as coniferous and deciduous trees were included in selected areas of the site to improve the wind conditions at those locations (see Figures 3.1-2, 3.1-7 and 3.1-9). Specific wind control measures, however, will be determined through the design process.

3.1.5.1 Existing Configuration

A wind comfort categorization of walking is considered appropriate for sidewalks. Lower wind speeds conducive to standing are preferred at building entrances.

As shown in Figure 3.1-6, winds at most grade level locations are comfortable for walking, standing or sitting annually, which is considered appropriate. However, marginal uncomfortable wind speeds exist at a localized area on Brookline Avenue and at two offsite areas to the southeast and northeast of the site on an annual basis (Locations 55, 23 and 78 in Figure 3.1-6).

The effective gust criterion was met annually at all grade level locations in the Existing configuration (see Figure 3.1-8).

3.1.5.2 Build Configuration

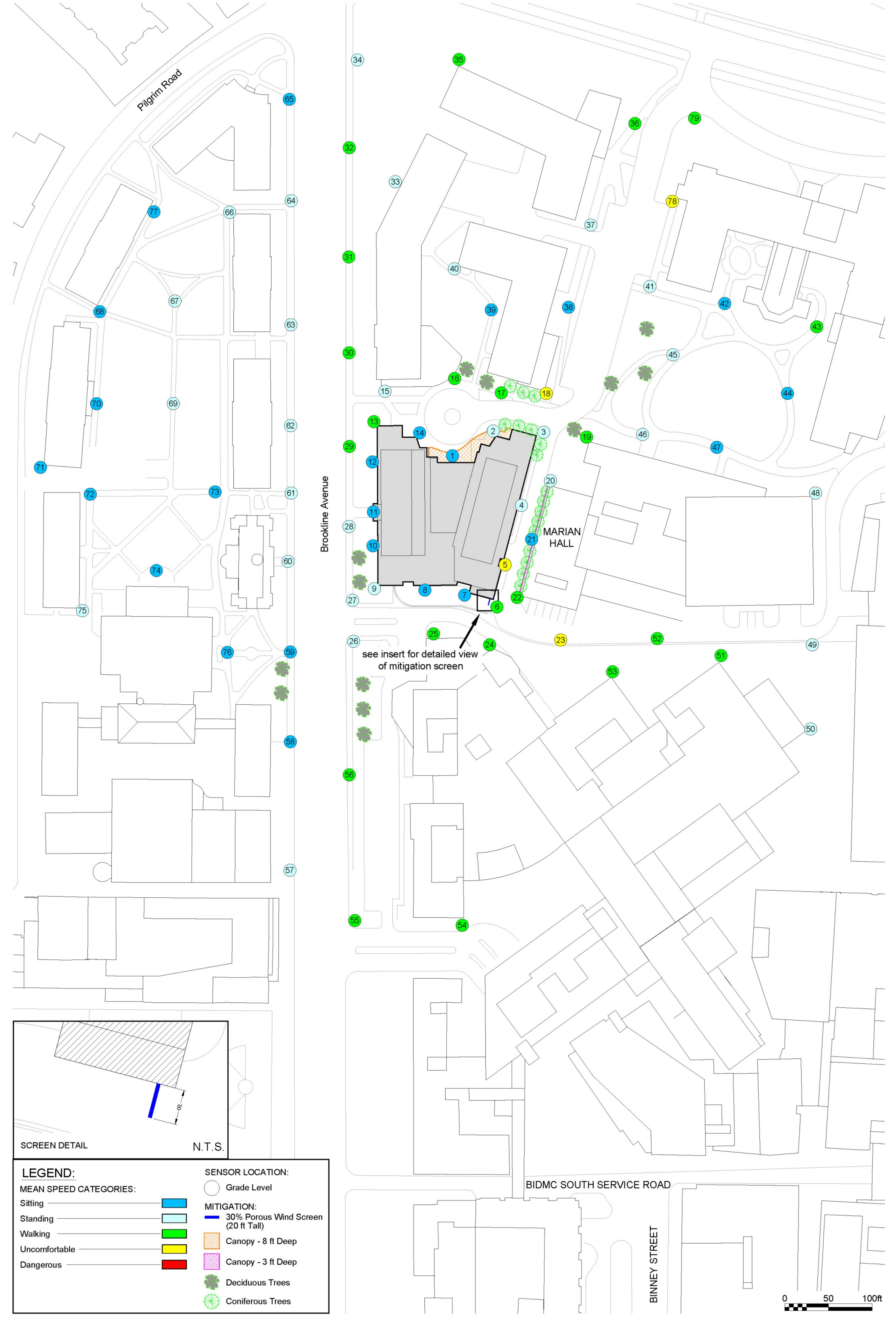
Main Building Entrances (Locations 1, 4, 5, 8 and 11)

The mean wind speeds at the main entrances to the Project are expected to range between categories comfortable for sitting and standing annually (Locations 1, 4, 8 and 11 in Figure 3.1-7), which is considered appropriate. The only exception is the southeast entrance, where uncomfortable wind speeds are predicted on an annual basis (Location 5 in Figure 3.1-7); which is higher than desired for an entrance location. As the design progresses measures to further improve wind conditions in this location will be considered.

True North

Figure 3.1-6

Pedestrian Wind Conditions – Mean Speed – Existing

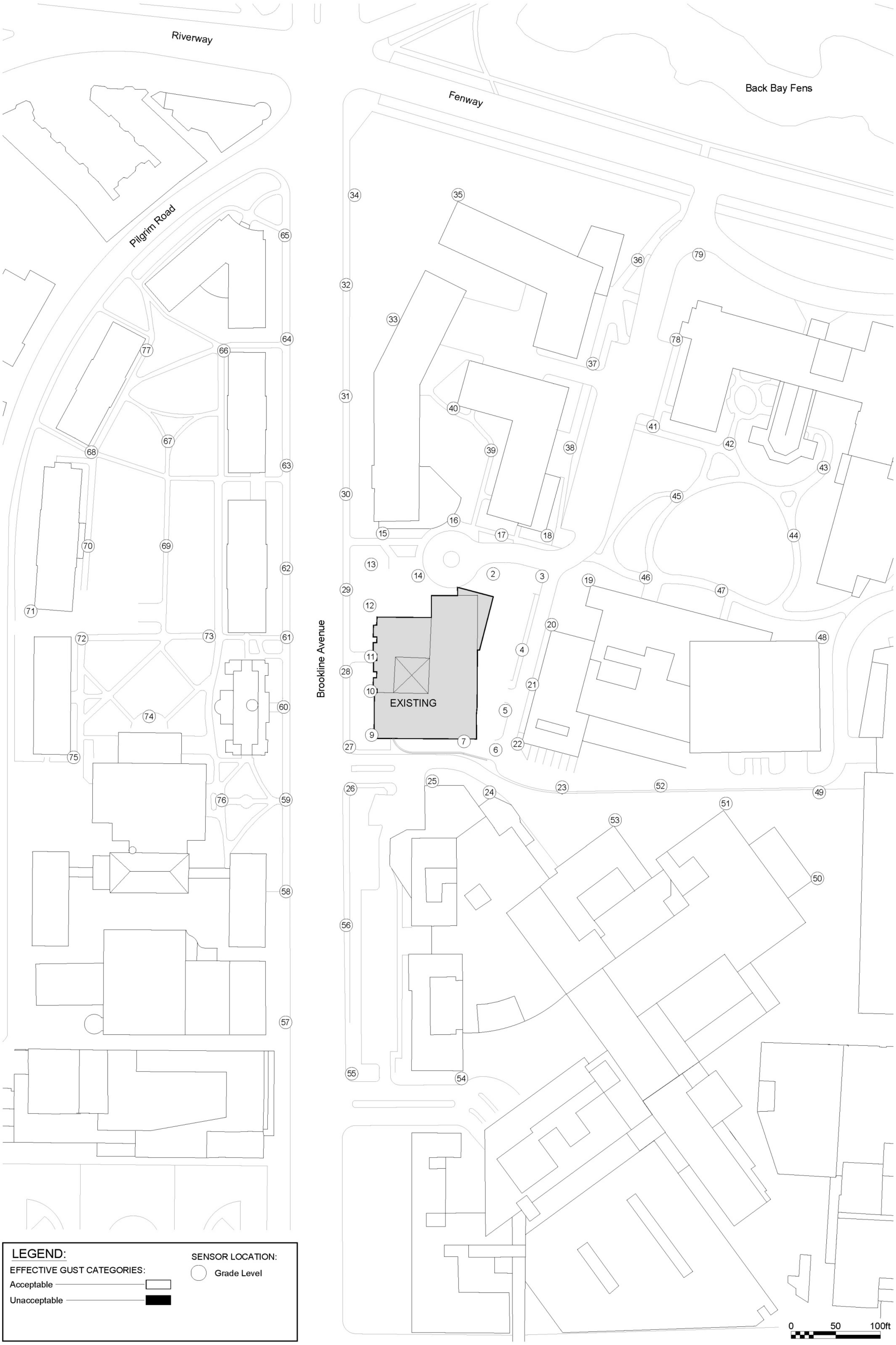


New Julie Hall Boston, Massachusetts

True North

Figure 3.1-7

Pedestrian Wind Conditions – Mean Speed – Build

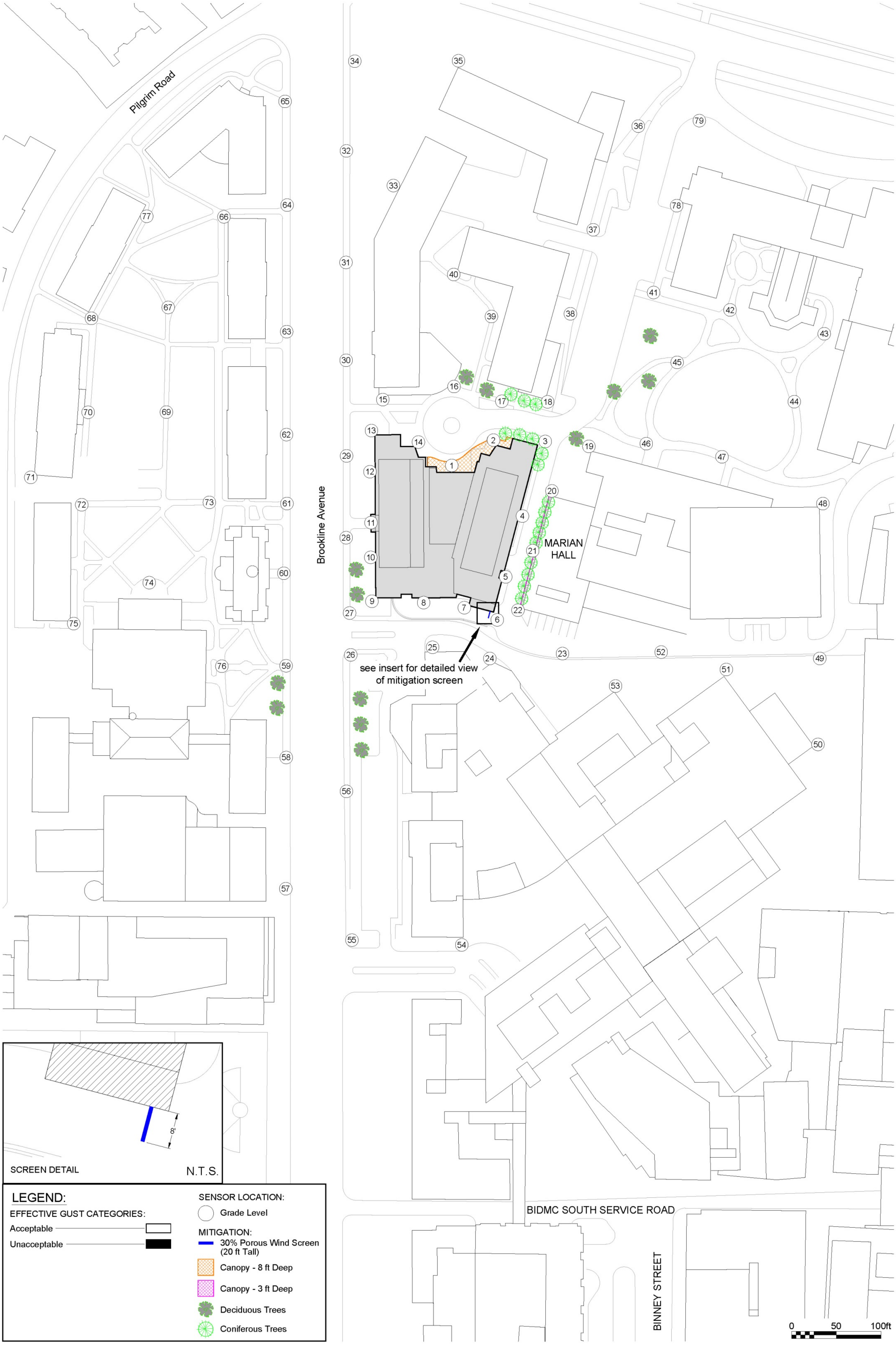


New Julie Hall **Boston, Massachusetts**

True North ↖

Figure 3.1-8

Pedestrian Wind Conditions – Effective Gust Speed – Existing



New Julie Hall Boston, Massachusetts

Figure 3.1-9

Pedestrian Wind Conditions – Effective Gust Speed – Build

The effective gust criterion was met annually at all entrance level locations (see Figure 3.1-9).

On-site and Offsite Sidewalks and Walkways (Locations 2, 3, 6, 7, 9, 10, 12 through 79)

Wind conditions at most on-site and off-site locations are expected to remain unchanged or similar to the Existing conditions on an annual basis, which is considered appropriate (Figure 3.1-7). Wind tunnel testing at Location 6 included possible wind control measures as indicated on Figure 3.1-7 resulting in wind conditions suitable for walking. Although the specific wind control measures have not been determined, as the design of the building progresses, the Project will be refined to incorporate design solutions that result in similar wind conditions as those indicated in Figure 3.1-7. In addition, the mean wind speeds at a localized sidewalk location to the northeast of the site is predicted to be uncomfortable annually (Location 18 in Figure 3.1-7). It should be noted that the predicted mean wind speeds at this location exceeds the criterion for walking by only two mph (see Location 18 in Table 1 in Appendix B) and as a result, may be considered acceptable for the intended use. The effective gust criterion was met annually at all grade level locations (see Figure 3.1-9).

3.1.6 Conclusion

The wind analysis shows that the overall wind conditions are similar in both the Existing and Build conditions with winds generally suitable for sitting, standing, or walking on an annual basis. Of the 79 locations studied, 76 locations are suitable for walking or better in the Existing condition annually, compared to 75 locations in the Build condition.

Under both the Existing and Build configurations the effective gust criterion was met annually at all locations.

3.2 Shadow

3.2.1 Introduction and Methodology

As typically required by the BRA, 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 net 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.

The results of the analysis show that new shadow from the Project is generally limited to nearby streets and sidewalks. During six of the 14 time periods studied, shadow from the Project will be limited to the area internal to the Emmanuel College campus. No new shadow will be cast onto the Emerald Necklace during 12 of the 14 time periods studied. The new shadow cast onto the Emerald Necklace during the time periods studied will be limited to the winter months (December 21 at 9:00 a.m. and December 21 at 3:00 p.m.). The Project does not cast new shadow on the Emerald Necklace on March 21, and is in compliance with the LMA Interim Guidelines. No new shadow is cast onto bus stops in the vicinity of the Project.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox (Figure 3.2-1), new shadow from the Project will be cast to the northwest onto Brookline Avenue and its sidewalks, and onto a portion of Simmons College. Limited new shadow will be cast onto Simmons College open space and no new shadow will be cast onto nearby bus stops.

At 12:00 p.m. (Figure 3.2-2), no new shadow will be cast onto nearby bus stops or open spaces. Shadow will be cast to the north onto a portion of Brookline Avenue and its eastern sidewalk.

At 3:00 p.m. (Figure 3.2-3), new shadow from the Project will not be cast onto nearby streets, sidewalks, bus stops or open spaces. Shadow will be cast to the northeast and is entirely within the Emmanuel College campus.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice (Figure 3.2-4), no new shadow will be cast onto nearby bus stops or open spaces. New shadow from the Project will be cast to the northwest onto a portion of Brookline Avenue and its sidewalks.

At 12:00 p.m. (Figure 3.2-5), new shadow from the Project will not be cast onto nearby streets, sidewalks, bus stops or open spaces. Shadow will be cast to the northwest and is entirely within the Emmanuel College campus.

At 3:00 p.m. (Figure 3.2-6), new shadow from the Project will not be cast onto nearby streets, sidewalks, bus stops or open spaces. Shadow will be cast to the northeast and is entirely within the Emmanuel College campus.

At 6:00 p.m. (Figure 3.2-7), shadow is cast to the west and is entirely within the Emmanuel College campus. New shadow from the Project will not be cast onto nearby streets, sidewalks, bus stops.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the autumnal equinox (Figure 3.2-8), new shadow from the Project will be cast to the northwest onto Brookline Avenue and its sidewalks, and onto a portion of Simmons College and its open space. No new shadow will be cast onto nearby bus stops.

At 12:00 p.m. (Figure 3.2-9), no new shadow will be cast onto nearby bus stops or open spaces. Shadow will be cast to the north onto a portion of Brookline Avenue and its eastern sidewalk.

At 3:00 p.m. (Figure 3.2-10), new shadow from the Project will not be cast onto nearby streets, sidewalks, bus stops or open spaces. Shadow will be cast to the northeast and is entirely within the Emmanuel College campus.

At 6:00 p.m. (Figure 3.2-11), most of the area is under existing shadow. New shadow from the Project will be entirely within the Emmanuel College campus and will not be cast onto nearby streets, sidewalks, or bus stops.

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. (Figure 3.2-12), most of the area is under existing shadow. New shadow from the Project will be cast to the northwest onto a small portion of Brookline Avenue and its western sidewalk, a portion of Pilgrim Road and its sidewalks, portions of Colchester and Carlton Streets, a portion of the Emerald Necklace adjacent to the Muddy River, and onto a portion of the Wheelock College Brookline campus. No new shadow will be cast onto nearby bus stops.

At 12:00 p.m. (Figure 3.2-13), shadow will be cast to the northwest onto Brookline Avenue and its sidewalks, and onto a portion of Simmons College and its open space. No new shadow will be cast onto nearby bus stops.

At 3:00 p.m. (Figure 3.2-14), shadow will be cast to the northeast onto the Emmanuel campus and a small portion of Higginson Circle. No new shadow will be cast onto nearby bus stops.

3.2.6 Consistency with the LMA Interim Guidelines

The LMA Interim Guidelines state that "no project will be approved if it casts any new shadow for more than one hour on March 21st on the Emerald Necklace, Joslin Park or Evans Way Park" (page 3). The Project is in full compliance with the Guidelines. As shown in Figures 3.2-1 through 3.2-3 and 3.2-15 through 3.2-17, there is no new shadow from the Project on the Emerald Necklace during the periods studied.

3.2.7 Conclusions

The results of the analysis show that new shadow from the Project is generally limited to nearby streets and sidewalks. During six of the 14 time periods studied, shadow from the Project will be limited to the area internal to the Emmanuel College campus. No new shadow will be cast onto the Emerald Necklace during 12 of the 14 time periods studied. The new shadow cast onto the Emerald Necklace during the time periods studied will be limited to the winter months (December 21 at 9:00 a.m. and December 21 at 3:00 p.m.). The Project does not cast new shadow on the Emerald Necklace on March 21, and is in compliance with the LMA Interim Guidelines. No new shadow is cast onto bus stops in the vicinity of the Project.

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.

Because the Project site is currently occupied by a low-rise building, the proposed Project will increase daylight obstruction; however, the resulting conditions will be typical of the area.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[2]. The 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.

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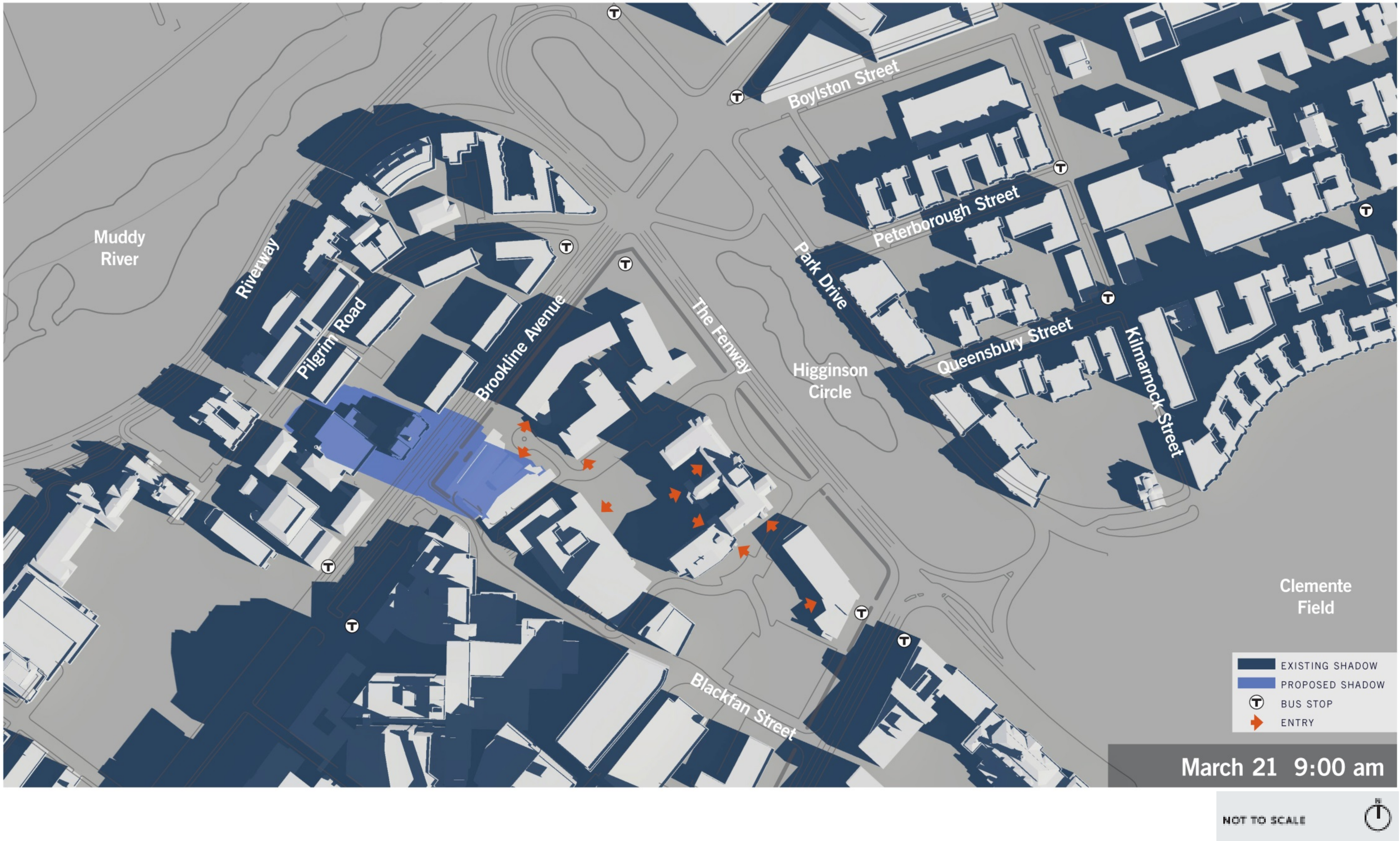
[2] Method developed by Harvey Bryan and Susan Stuebing, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1984.



Emmanuel College Residence Hall Boston, Massachusetts

EMMANUEL COLLEGE

ELKUS | MANFREDI ARCHITECTS

Figure 3.2-1

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

Emmanuel College Residence Hall Boston, Massachusetts

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Figure 3.2-2

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

Emmanuel College Residence Hall **Boston, Massachusetts**

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Figure 3.2-3

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

Emmanuel College Residence Hall **Boston, Massachusetts**

Figure 3.2-4

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

Emmanuel College Residence Hall **Boston, Massachusetts**

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Figure 3.2-5

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

Emmanuel College Residence Hall **Boston, Massachusetts**

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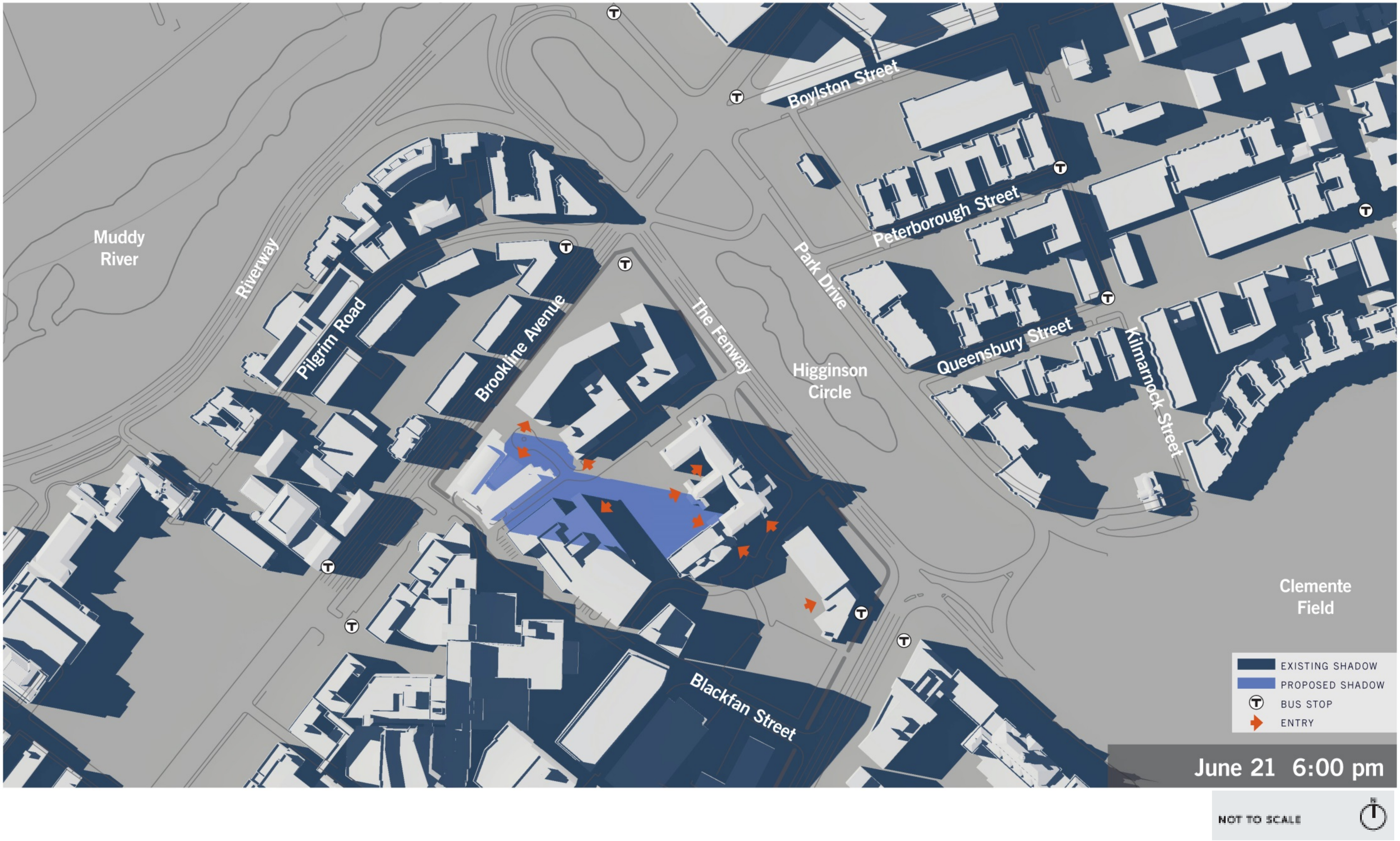
Figure 3.2-6

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



Emmanuel College Residence Hall **Boston, Massachusetts**

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Figure 3.2-7

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

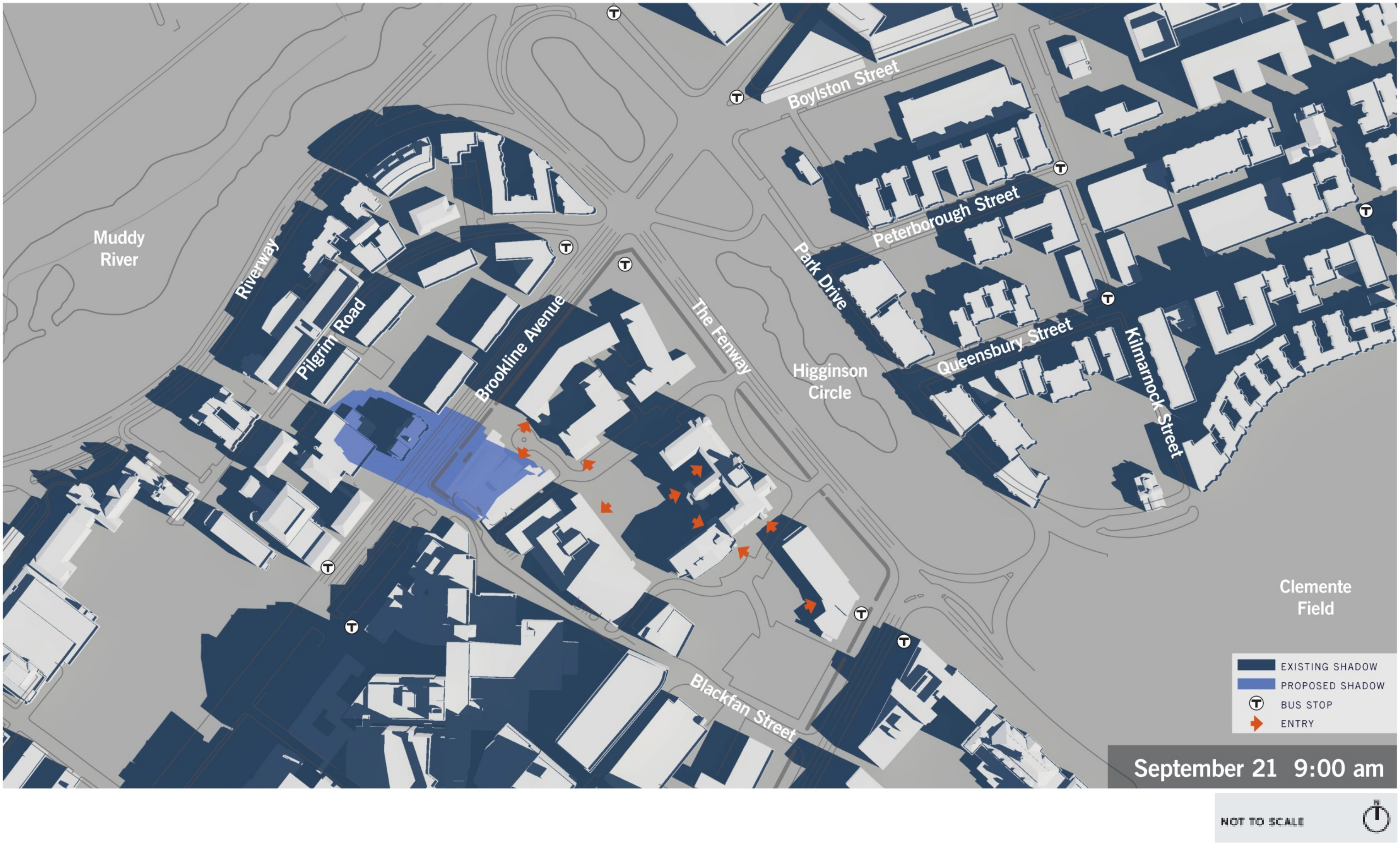

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Figure 3.2-8

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

Emmanuel College Residence Hall **Boston, Massachusetts**

Emmanuel College

ELKUS | MANFREDI ARCHITECTS

Figure 3.2-9

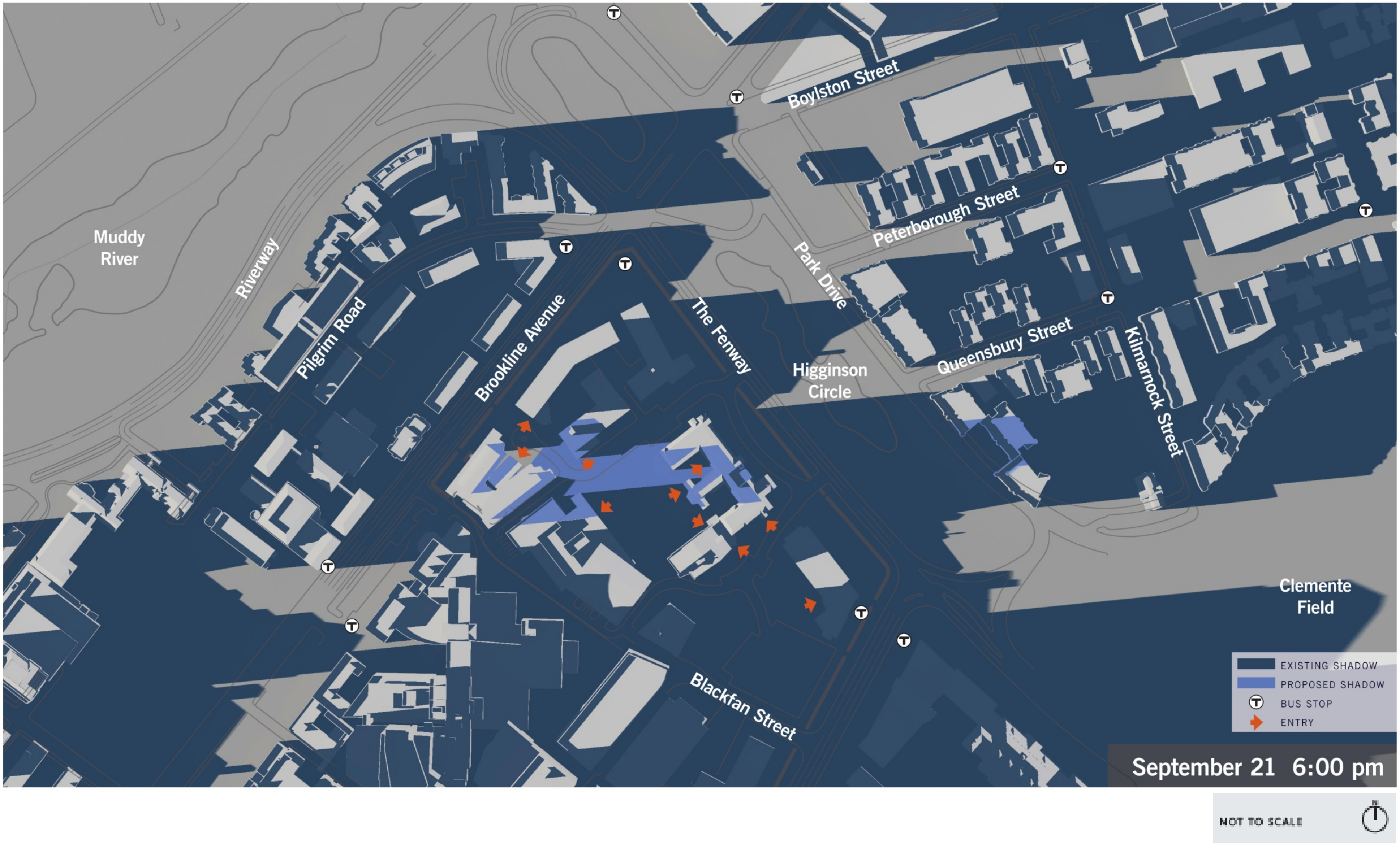
Shadow Study: September 21, 12:00 p.m.

Emmanuel College Residence Hall **Boston, Massachusetts**

EMMANUEL COLLEGE ELKUS | MANFREDI ARCHITECTS

Figure 3.2-10

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



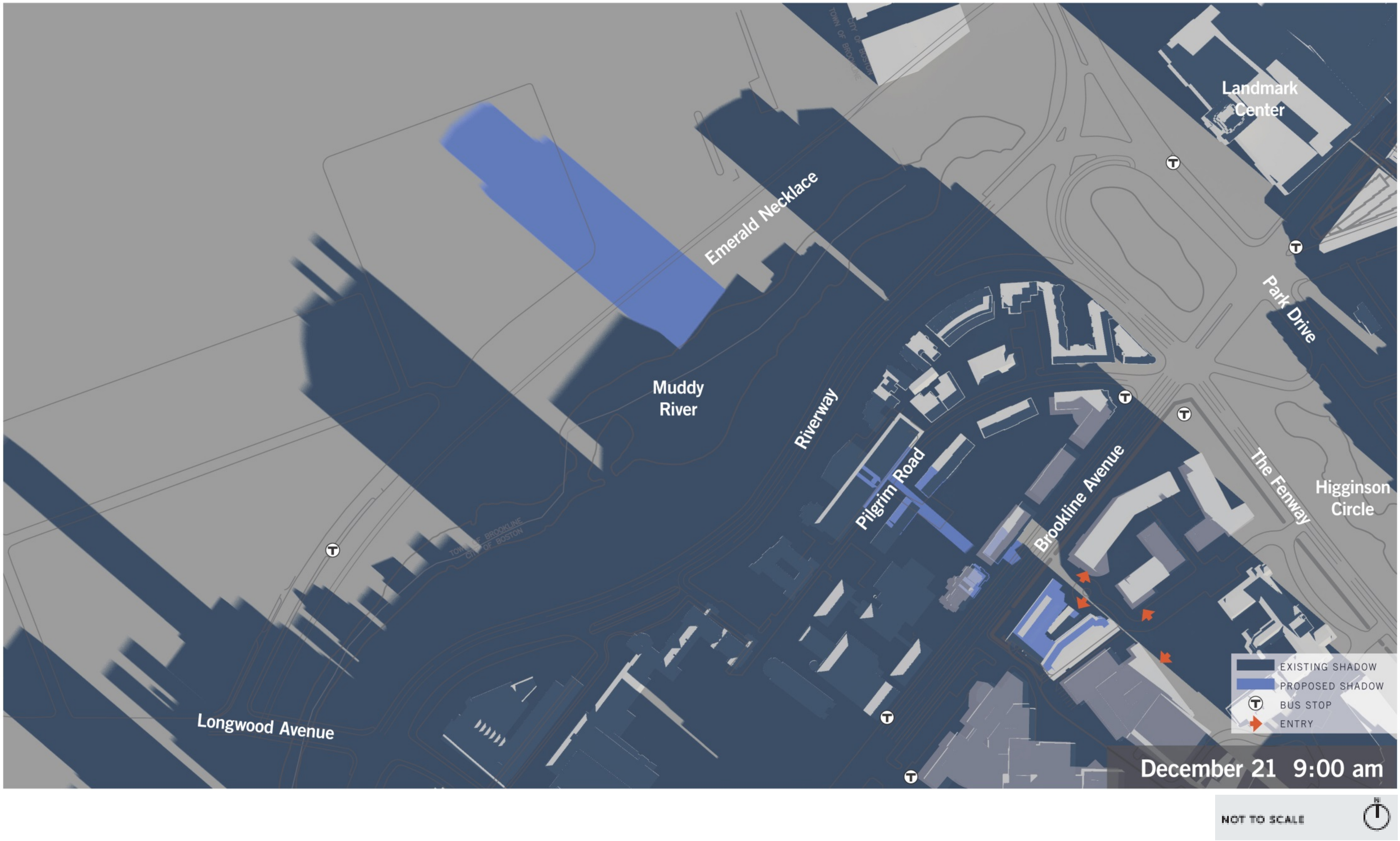
Emmanuel College Residence Hall **Boston, Massachusetts**

EMMANUEL COLLEGE

ELKUS | MANFREDI ARCHITECTS

Figure 3.2-11

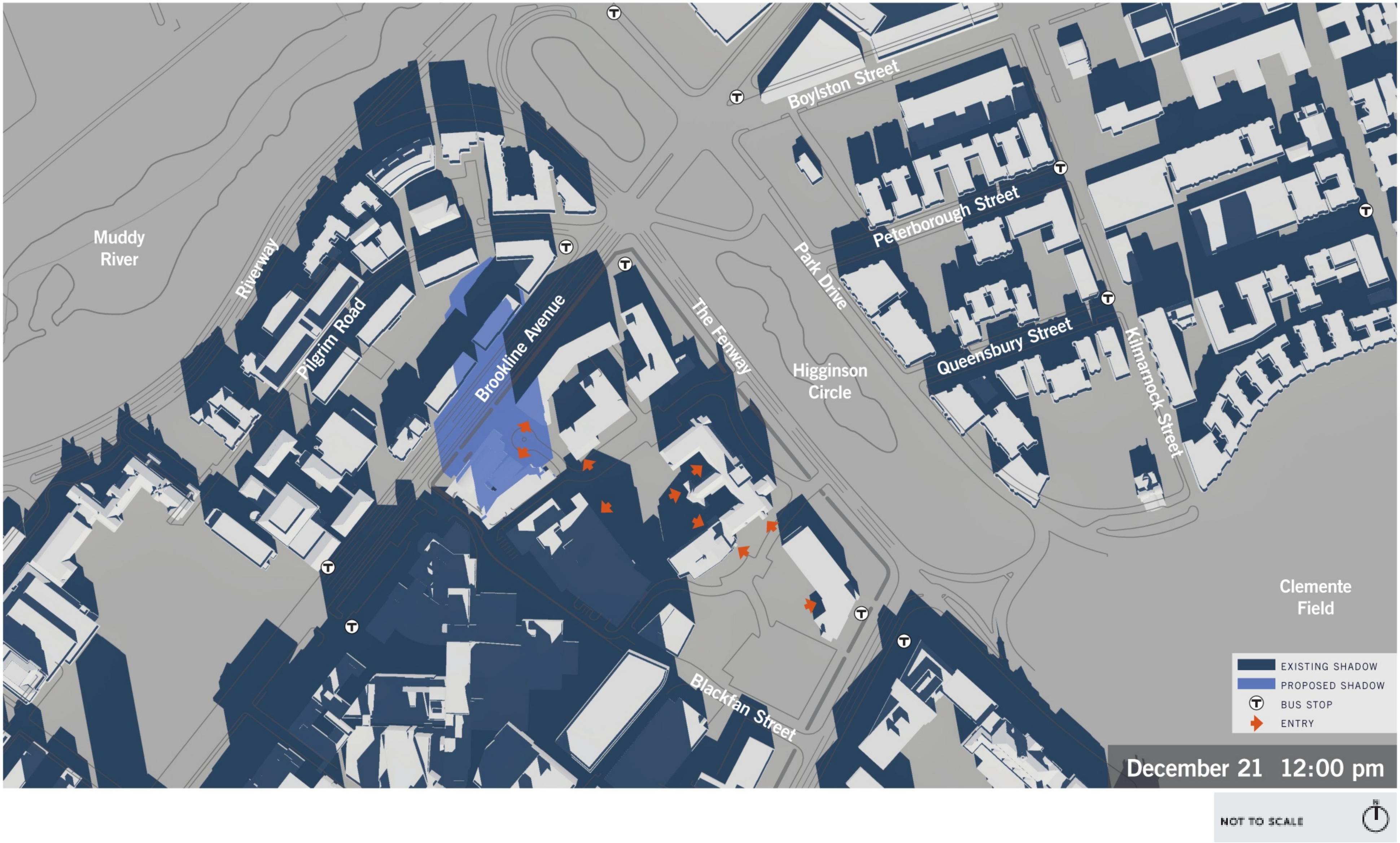
Shadow Study: September 21, 6:00 p.m.



Emanuel College Residence Hall **Boston, Massachusetts**

Figure 3.2-12

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

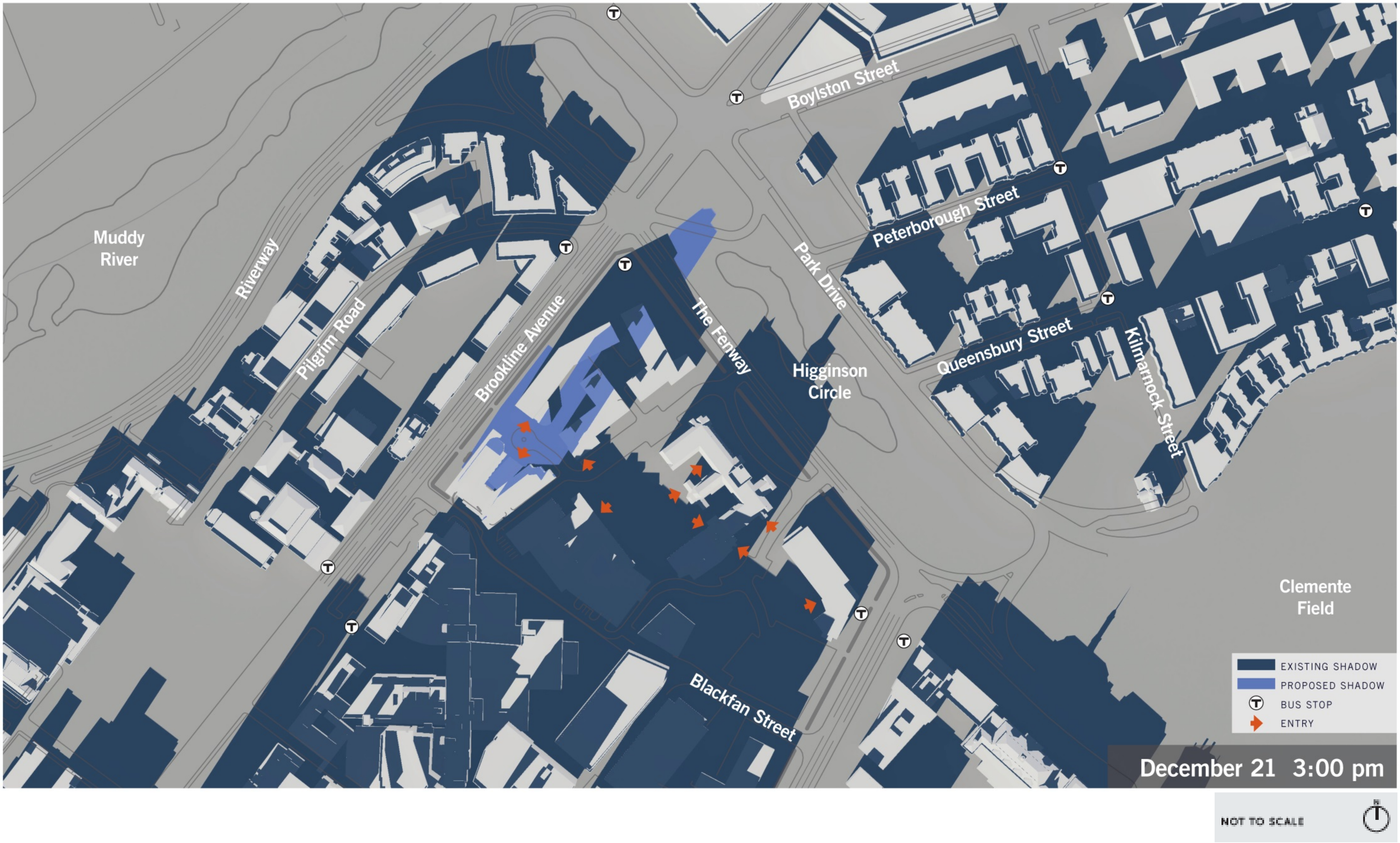


Emmanuel College Residence Hall **Boston, Massachusetts**

EMMANUEL COLLEGE ELKUS | MANFREDI ARCHITECTS

Figure 3.2-13

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



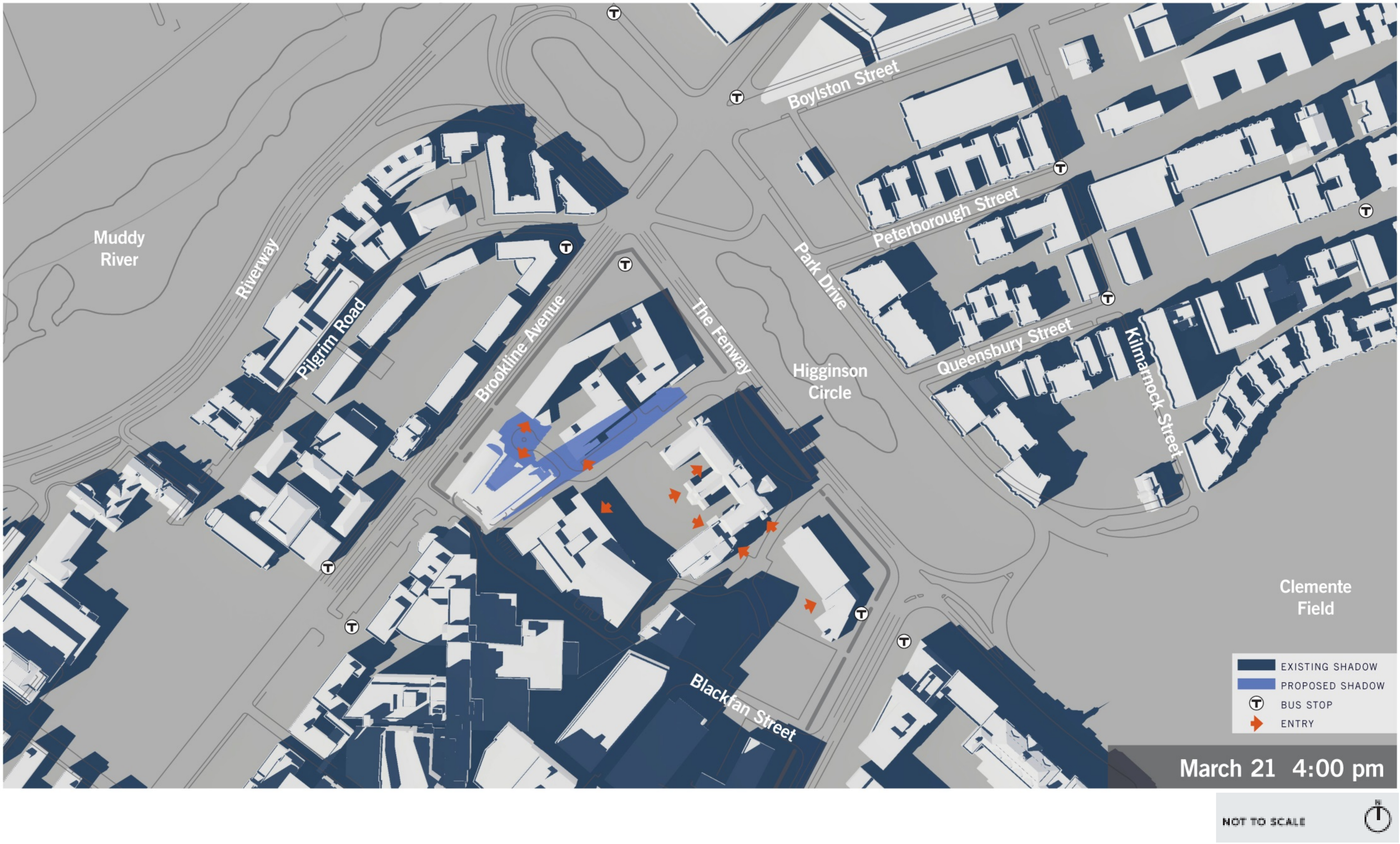
Emmanuel College Residence Hall **Boston, Massachusetts**

EMMANUEL COLLEGE

ELKUS | MANFREDI ARCHITECTS

Figure 3.2-14

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

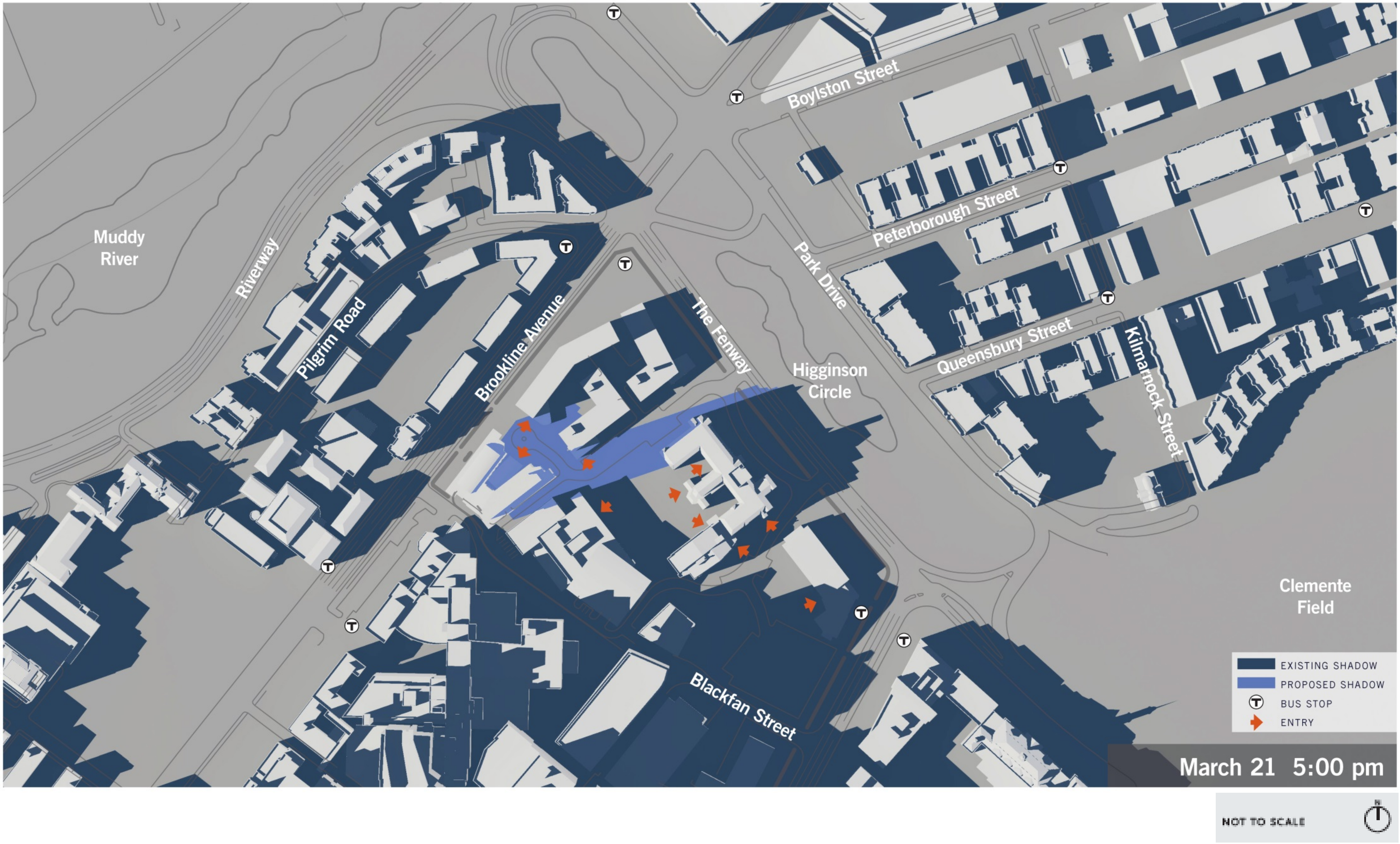


Emmanuel College Residence Hall **Boston, Massachusetts**

EMMANUEL COLLEGE ELKUS | MANFREDI ARCHITECTS

Figure 3.2-15

Shadow Study: March 21, 4:00 p.m.



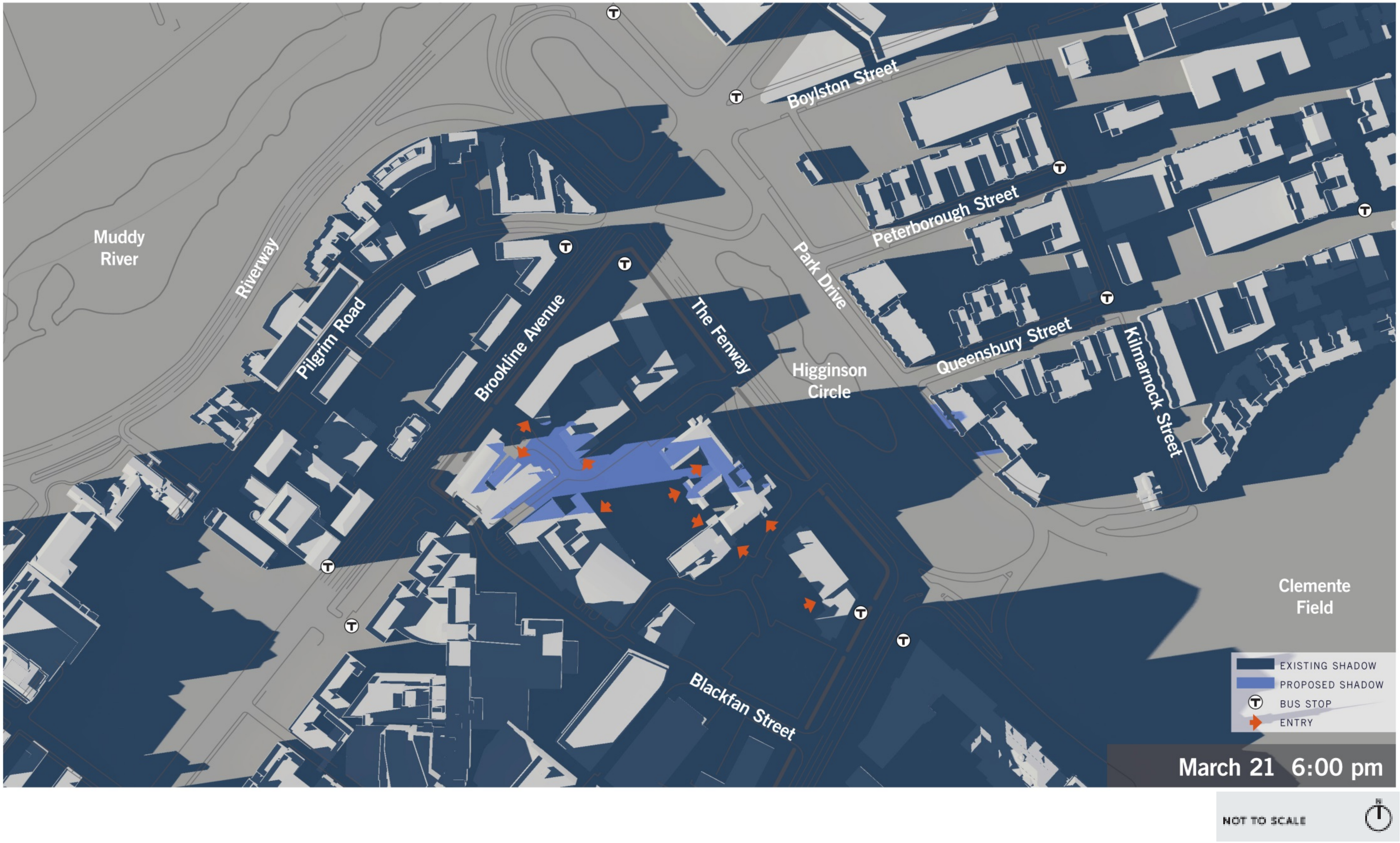
Emmanuel College Residence Hall Boston, Massachusetts

EMMANUEL COLLEGE

ELKUS | MANFREDI ARCHITECTS

Figure 3.2-16

Shadow Study: March 21, 5:00 p.m.



Emmanuel College Residence Hall **Boston, Massachusetts**

Emmanuel College Elkus | Manfredi Architects

Figure 3.2-17

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

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.

One viewpoint was chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions, as it is the only public way from which the Project is visible. Daylight obstruction values from within the Emmanuel College facing south toward the Project site will be minimal as the tallest component of the Project will be narrow in width from this viewpoint. Two area context points were considered in order 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.

- **Viewpoint 1:** View from Brookline Avenue facing southeast toward the Project site.
- **Area Context Viewpoint AC1:** View from Brookline Avenue facing northwest toward Evans Residence Hall at Simmons College.
- **Area Context Viewpoint AC1:** View from Brookline Avenue facing southeast toward St. Joseph Hall at Emmanuel College.

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 and 3.3-3 illustrate the BRADA results for each analysis.

G:\Projects2\MA\Boston\4275\viewpoints.mxd

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

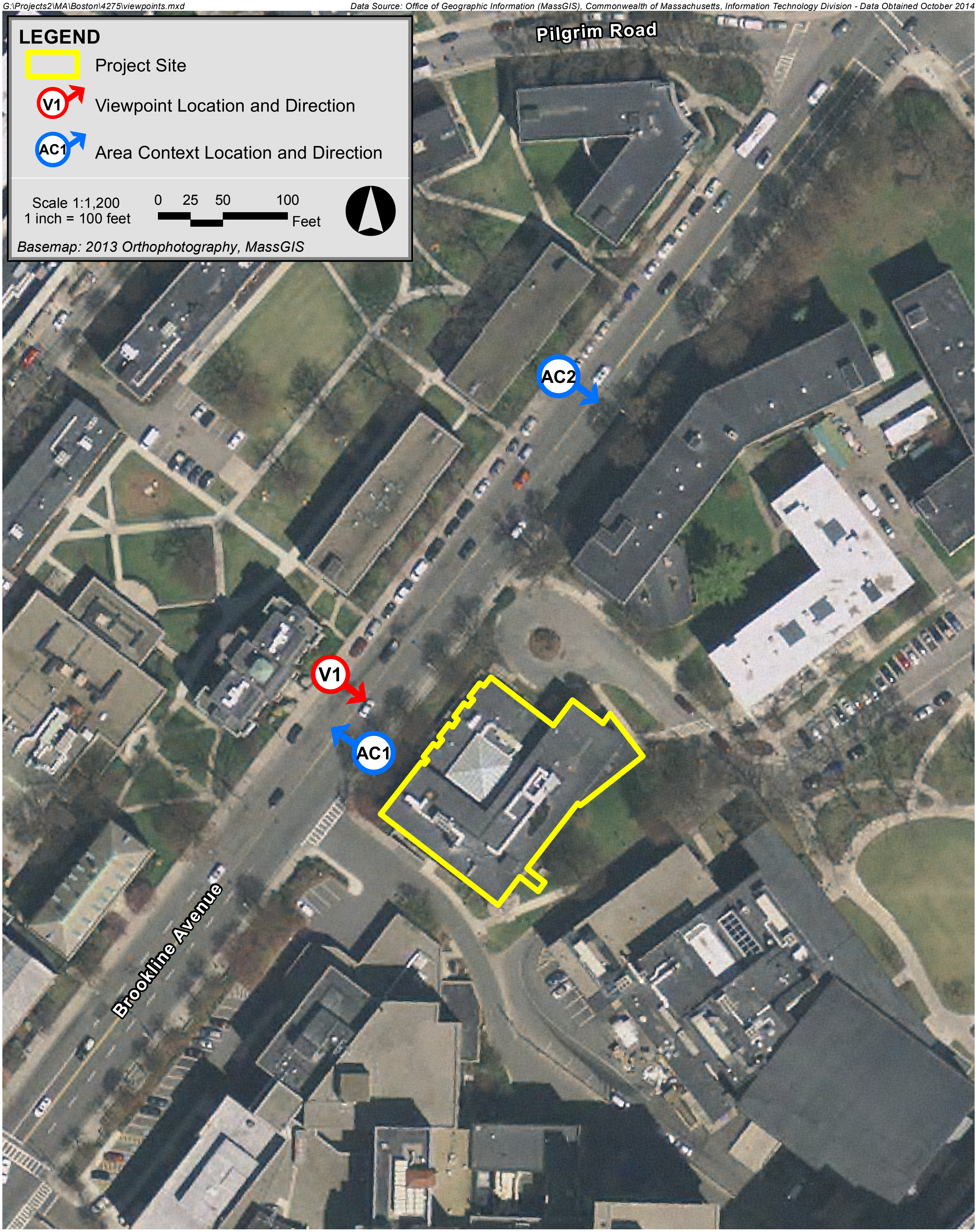


Figure 3.3-1
Viewpoint Locations

Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	View from Brookline Avenue facing southeast toward the Project site.	17.6%	45.2%
Area Context Points			
AC1	View from Brookline Avenue facing northwest toward Evans Residence Hall at Simmons College.	48.1%	N/A
AC2	View from Brookline Avenue facing southeast toward St. Joseph Hall at Emmanuel College.	36.1%	N/A

Brookline Avenue

Brookline Avenue runs along the northwestern edge of the Project site. Viewpoint 1 was taken from the center of Brookline Avenue looking directly southeast toward the Project site. The Project site is currently occupied by a low-rise building, and has an existing daylight obstruction value of 17.6%. The Project will increase the daylight obstruction value to 45.2%. While this is an increase over existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

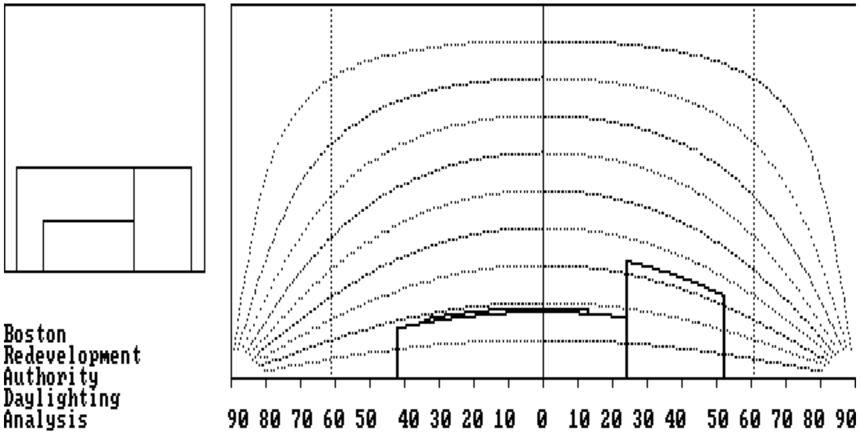
Area Context Views

The Project area currently consists of low-rise and mid-rise residence halls and hospital buildings. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the two Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 36.1% for AC2 to 48.1% for AC2. Daylight obstruction for the Project is generally consistent with the Area Context values.

3.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to the daylight obstruction values within the surrounding area.

Existing Condition



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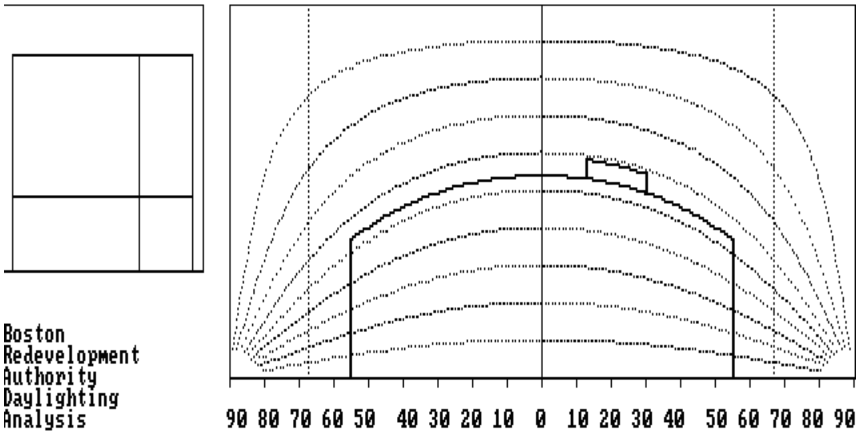
Obstruction of daylight by the building is 17.6 %
```

Proposed Condition



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Obstruction of daylight by the building is 45.2 %
```
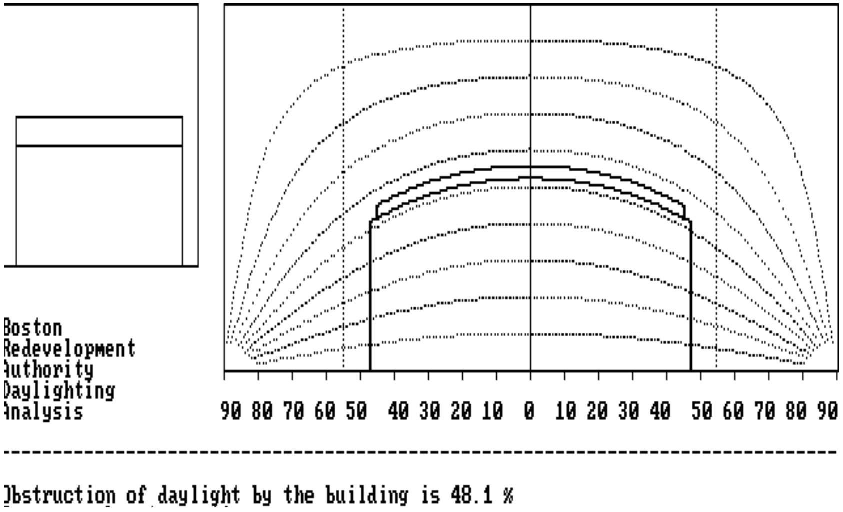

View from Brookline Avenue facing southeast toward the Project site

Figure 3.3-2

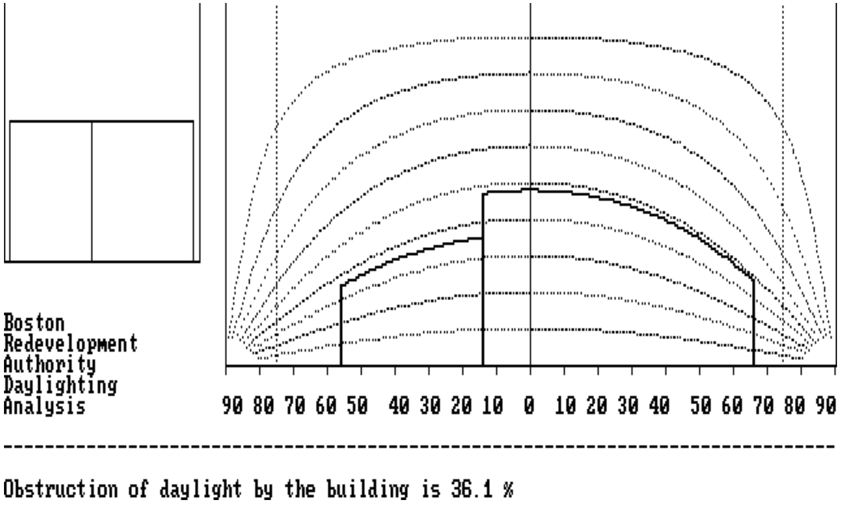
Daylight Analysis: Existing and Proposed Conditions

AC1: View from Brookline Avenue facing northwest toward Evans Residence Hall at Simmons College.



```
Obstruction of daylight by the building is 48.1 %
```

AC2: View from Brookline Avenue facing southeast toward St. Joseph Hall at Emmanuel College.



```
Obstruction of daylight by the building is 36.1 %
```

Figure 3.3-3

Daylight Analysis: Area Context Viewpoints

3.4 Solar Glare

The Project materials are still being studied and glazing of the windows will be determined as the design progresses. Due to the type of potential glass and glazing used, solar glare impacts are not currently anticipated.

3.5 Air Quality Analysis

The Boston Redevelopment Authority requires that project-induced impacts to ambient air quality be addressed. A microscale analysis is used to determine the effect on air quality of the increase in traffic generated by the Project. This microscale analysis may be required for a project at intersections where 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 (ADT) on roadways providing access to a single location.

The proposed Project does not generate 3,000 ADT, nor does it increase traffic volumes by 10 percent or 100 vehicles per hour. As discussed in Chapter 2, Project-generated trips will be minimal and will not impact local area roadways. Therefore, no quantitative analysis is required. It is expected that there would be no violations of the NAAQS for CO at any intersections associated with Project-related traffic.

3.6 Stormwater/Water Quality

Please see Section 7.3 for a discussion of stormwater and water quality.

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 25025C0078G indicates the FEMA Flood Zone Designations for the site area. The map shows that the Project is located in a Zone X, "Areas determined to be outside the 0.2% annual chance floodplain."

The site does not contain wetlands.

3.8 Geotechnical Impacts

3.8.1 Subsurface Soil and Bedrock Conditions

Historically, the Project site is located along the banks of the Muddy River in the Fens area of Boston. Thus, the site is underlain by an 8.5- to 14-foot thick fill deposit associated with the former reclamation of the site. The fill typically consists of a very loose to dense, brown to black silty sand with some to trace amounts of clay and containing various amounts of brick, concrete, glass, asphalt, ash and cinders.

The fill deposit is directly underlain by natural inorganic deposits of sand, clay and/or sand and clay that extend to depths ranging from 103.5 to 111 feet below ground surface. The granular natural soil deposits vary from compact to very dense and the cohesive soil deposits range from firm to hard.

Underlying the natural deposits of sand and/or clay are subsequent deposits of glacial till and bedrock. The glacial till deposit ranges from 3 to 17 feet in thickness. Bedrock consists of Roxbury Conglomerate and was encountered at depths varying from 118 to 125 feet below the existing ground surface.

3.8.2 Groundwater

The groundwater level recorded in an observation well installed at the site was measured at a depth of 12.6 feet below the existing ground surface, corresponding to about Elevation +9.6. Groundwater levels recorded in observation wells surrounding the Emmanuel College campus and maintained by the Boston Groundwater Trust (BGwT) generally range from about Elevation +8.5 to Elevation +10.5. It is anticipated that future groundwater levels across the site may vary from those reported herein due to factors such as normal seasonal changes, periods of heavy precipitation, and alterations of existing drainage patterns.

The proposed Project is located within the Groundwater Conservation Overlay District (GCOD) which is governed by Article 32 of the Code. The proposed Project shall comply with the standards and requirements set forth in Article 32 of the Code. The Proponent shall obtain a written determination from the Boston Water and Sewer Commission (BWSC) as to whether the proposed Project meets the standards and requirements of Article 32. In addition, the Proponent shall demonstrate that the proposed Project meets the requirements of Section 32-6 of the Code by obtaining a stamped certification from a Massachusetts registered engineer that the requirements of Section 32-6 of the Code are met. The Proponent shall provide both a copy of the written determination from BWSC and a copy of the stamped certification from a Massachusetts registered engineer to the BRA and the Boston Groundwater Trust prior to the issuance of a Certification of Consistency. As such, the proposed Project shall be deemed to be in compliance with Article 32 of the Code and shall not need a conditional use permit from the Board of Appeal for Article 32 purposes.

3.8.3 Proposed Foundation Construction Methodology

The site is currently occupied by the brick three-story Julie Hall. Ground surface across the site gradually rises from the northwest to the southeast, ranging from about Elevation +20 to Elevation +25.

The proposed V-shaped structure is planned to have a 19-story east wing tower and a 6-story west wing. At least one level of below grade parking and mechanical space is currently planned below the wings as well as the interstitial space between. The below grade level is understood to occupy a footprint of approximately 28,000 square feet. The existing Julie Hall will be demolished as part of the proposed development.

Based on the anticipated structural loads and subsurface conditions, the proposed building will likely be supported on a waterproofed mat foundation system bearing on the natural inorganic sand and/or clay deposits. The perimeter foundation wall will also be waterproofed to prevent groundwater intrusion into the proposed basement space.

Construction of the mat foundation and below-grade parking level is anticipated to require an excavation in the range of approximately 12 to 15 feet deep below the building footprint. To limit potential adverse excavation-related impacts to the adjacent streets, sidewalks, utilities and adjacent buildings, temporary excavation support will be required along the perimeter of the site. The temporary excavation support system is anticipated to consist of a cantilevered steel sheetpile cofferdam or a soldier pile and wood lagging wall.

It is anticipated that temporary construction dewatering will be required during construction of the proposed mat foundation. It is anticipated that groundwater and surface water can generally be controlled using conventional sumping in combination with strategic use of trenches. Off-site discharge of groundwater will be performed in accordance with a construction dewatering permit, which will be obtained from the appropriate agency.

3.8.4 Potential Impacts During Excavation and Foundation Construction

Since the adjacent streets, sidewalks, and buildings will be supported by a temporary excavation support system, the depth of excavation and foundation construction will have limited impacts to the area.

Noise and ground vibrations will be produced during installation of the excavation support system. Impacts from vibrations during foundation installation are not anticipated to cause damage to adjacent structures, streets and utilities, however, the noise and vibrations may be of sufficient magnitude to cause annoyance to abutters. Vibration monitoring will be conducted during sheetpile or soldier pile installation to document that the pile driving is not adversely impacting adjacent structures, streets and utilities.

3.9 Solid and Hazardous Waste

3.9.1 Hazardous Waste

Based upon the results of a chemical analyses performed on soil samples at adjacent site locations, levels of total petroleum hydrocarbons (TPHs), polynuclear aromatic hydrocarbons (PAHs) and lead are anticipated to be encountered that are generally attributable to the presence of coal/wood ash and cinders contained within the historic urban fill material present across the site. These would be considered exempt from reporting to DEP pursuant to Section 40.0317 of the Massachusetts Contingency Plan (MCP). However, pursuant to the provisions of the MCP and applicable DEP soil management policies, it is anticipated that the existing on-site fill material will be regulated for off-site disposal. The estimated quantity of soil and the specific facilities for off-site disposal will be based on an extensive pre-construction soil characterization program. Off-site reuse and/or disposal of the excavated fill soils will require the use of Material Shipping Records to track the disposition of the excavated material. Materials will be disposed of in accordance with applicable regulations.

3.9.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of residential 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 496 tons of solid waste per year.

With the exception of household hazardous wastes typical of residential 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. Emmanuel has converted its recycling program from source separated to single-stream across campus. This allows users to conveniently place recyclable items, such as newspaper, cardboard, mixed paper, magazines, aluminum and plastic, all in one bin.

3.10 Noise Impacts

3.10.1 Introduction

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

This analysis, which is consistent with BRA requirements for noise studies, indicates that predicted noise levels from the Project with appropriate noise controls will comply with applicable regulations and is not anticipated to substantially impact the existing acoustical environment.

3.10.2 Noise Terminology

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

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

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

The sound level meter used to measure noise is a standardized instrument.[3] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various conditions. One network is the A-weighting network (there are also B- and C-weighting networks), which most closely approximates how the human ear responds to sound as a function of frequency, and is the accepted scale used for community sound level measurements. Sounds are frequently reported as detected with the

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[3] *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.

A-weighting network of the sound level meter in dBA. A-weighted sound levels emphasize the middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies.

Because the sounds in our environment vary with time, they cannot simply be represented with a single number. In fact, there are several methods used for quantifying variable sounds which are commonly reported in community noise assessments, as defined below.

- L_{eq}, the equivalent level, in dBA, is the level of a hypothetical steady sound that would have the same energy (i.e., the same time-averaged mean square sound pressure) as the actual fluctuating sound observed.
- L_{90} is the sound level, in dBA, exceeded 90 percent of the time in a given measurement period. The L_{90}, or residual sound level, is close to the lowest sound level observed when there are no obvious nearby intermittent noise sources.
- L_{50} is the median sound level, in dBA, exceeded 50 percent of the time in a given measurement period.
- L_{10} is the sound level, in dBA, exceeded only 10 percent of the time in a given measurement period. The L_{10}, or intrusive sound level, is close to the maximum sound level observed due to occasional louder intermittent noises, like those from passing motor vehicles.
- L_{max} is the maximum instantaneous sound level observed in a given measurement period.

By employing various noise metrics, it is possible to separate prevailing, steady sounds (the L_{90}) from occasional louder sounds (L_{10}) in the noise environment. This analysis treats all noise sources from the Project as though the emissions will be steady and continuous, described most accurately by the L_{90} exceedance level.

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 octave 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 (APCC) has adopted regulations based on the city's ordinance - "Regulations for the Control of Noise in the City of Boston", which distinguish among residential, business, and industrial districts in the city. In particular, APCC Regulation 2 is applicable to the sounds from the proposed Project and is considered in this noise study.

Table 3.10-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the APCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. 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 located within the Fenway/Kenmore neighborhood of Boston. Existing noise sources in the immediate Project vicinity currently include: vehicular traffic along Brookline Avenue, pedestrian traffic, mechanical exhaust noise from Beth Israel Deaconess Medical Center, and the general city soundscape.

3.10.4.1 Noise Monitoring Methodology

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Tuesday, July 21, 2015 during the daytime (11:00 a.m. to 12:30 p.m.) and on Thursday, July 23, 2015 during nighttime hours (12:00 a.m. to 1:30 a.m.). All measurements were 20 minutes in duration.

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

3.10.4.2 Noise Monitoring Locations

Based upon a review of zoning and land use in the Project area, three representative noise monitoring locations were selected to obtain a sampling of background noise levels. These measurement locations are depicted on Figure 3.10-1 and described below.

- **Location 1** is located on the sidewalk of the southwest edge of the Project site, representative of Beth Israel Deaconess Medical Center to the south of the Project.

- **Location 2** is located on the sidewalk adjacent to 305 Brookline Avenue, representative of the closest dormitories on the Simmons College Campus to the west of the Project, Evans Hall and Mesick Hall.

- **Location 3** is located on the southwest end of Saint Anne Hall and to the east of Saint Joseph Hall on the Emmanuel College campus, representative of the closest residential receptors to the north of the Project.

3.10.4.3 Noise Monitoring Equipment

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

3.10.4.4 Measured Background Noise Levels

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

- The daytime residual background (L_{90} dBA) measurements ranged from 58 to 62 dBA;
- The nighttime residual background (L_{90} dBA) measurements ranged from 54 to 60 dBA;
- The daytime equivalent level (L_{eq} dBA) measurements ranged from 61 to 72 dBA;
- The nighttime equivalent level (L_{eq} dBA) measurements ranged from 56 to 69 dBA

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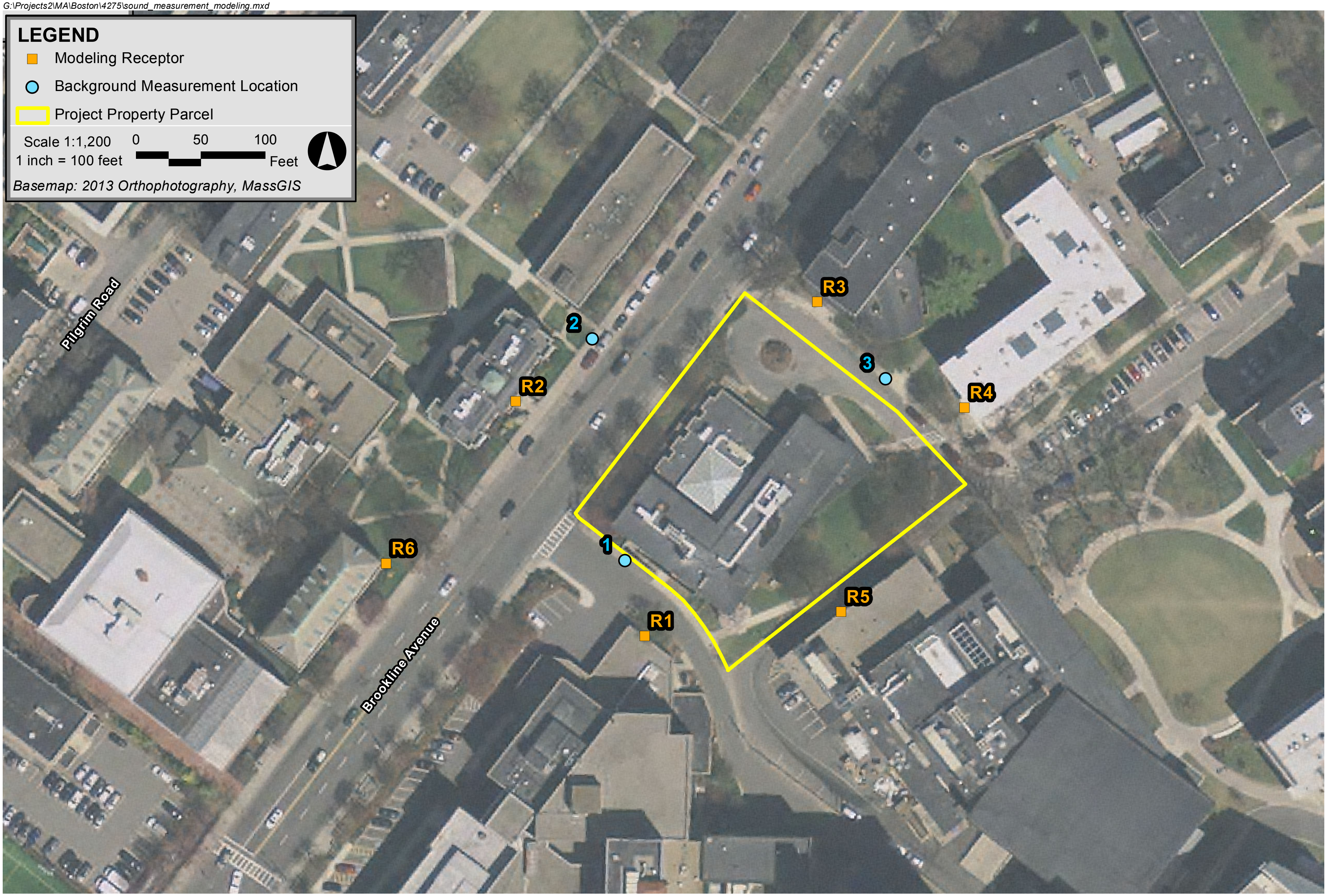

Emmanuel College **Boston, Massachusetts**

Figure 3.10-1

Sound Level Measurement and Modeling Locations

Table 3.10-2 Summary of Measured Background Noise Levels – July 21, 2015 (Daytime) & July 23, 2015 (Nighttime)

Location	Period	Start Time	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{90} Sound Pressure Levels by Octave-Band								
								31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	11:06 AM	67	79	69	66	62	67	67	64	61	58	58	53	43	31
2	Day	11:32 AM	72	90	75	70	61	68	69	64	59	56	57	52	43	31
3	Day	11:57 AM	61	70	63	60	58	66	66	63	57	55	53	48	39	29
1	Night	12:00 AM	66	87	68	61	60	63	64	61	59	56	57	52	40	26
2	Night	12:22 AM	69	92	71	59	55	63	62	61	55	52	51	46	36	26
3	Night	12:45 AM	56	69	58	54	54	59	60	58	54	51	49	44	34	23

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Tuesday, July 21, 2015	89 °F	37%	Overcast	calm
Nighttime	Thursday, July 23, 2015	74 °F	53%	Partly cloudy	calm

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	3753
Microphone	Larson Davis	377B20	142956
Preamp	Larson Davis	PRM831	029564
Calibrator	Larson Davis	Cal200	7147

3.10.5 Future Conditions

3.10.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the proposed Project will consist of rooftop heating, ventilation, and air conditioning equipment including air handling units, chillers, and exhaust fans housed within mechanical penthouses on the upper and lower roofs. One 550 kW standby diesel generator set is proposed to be located on the upper roof. Other secondary noise sources, including boilers and mechanical room equipment, will either be enclosed within the basement, or are assumed to have sound levels 10 dBA lower than the primary sources of noise, and were not considered in this analysis to contribute significantly to the overall outdoor sound levels. It is assumed for this analysis that the mechanical room ventilation fans will terminate at-grade along the southeastern building façade and the garage exhaust fans will be ducted to the lower roof.

Mitigation will be applied to sources as needed to ensure compliance with the applicable noise regulations. The noise control features assumed in this analysis consist of an emergency generator sound attenuating enclosure (SA canopy) which includes an accompanying exhaust silencer. It is also assumed that the 20-foot high northern, western, and southern penthouse screening walls along the lower roof will provide adequate acoustical transmission loss achieved either by a noise barrier wall or sound curtain. A tabular summary of the modeled mechanical equipment proposed for the Project is presented below in Table 3.10-3. Sound power level data for each unit, as provided by the manufacturer or calculated from provided sound pressure level data, is presented in Table 3.10-4. Sound power levels of those units for which data was not provided were assumed based on data for similar or representative equipment. The approximate locations of the mechanical equipment were provided by the Project team in a preliminary roof plan.

Table 3.10-3 Modeled Noise Sources

Noise Source	Quantity	Anticipated Location	Size/Capacity per Unit
Air Handling Unit	2	Lower Roof (x1) 70' AGL, Upper Roof (x1) 205' AGL	~250,000 BTU/hr
Chiller	2	Upper Roof (x2) 205' AGL	250 ton
Garage Exhaust Fan	2	Lower Roof (x2) 70' AGL	5,000 CFM
Mechanical Room Fan	2	At Grade	3,000 CFM
Dryer Exhaust Fan	1	Lower Roof (x1) 70' AGL	10,700 CFM
Trash-JC Exhaust Fan	1	Lower Roof (x1) 70' AGL	2,250 CFM
Emergency Generator	1	Upper Roof (x1) 205' AGL	550 ekW

Table 3.10-4 Modeled Sound Power Levels per Unit

Noise Source	Broadband	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
Air Handling Unit – Supply Inlet[1]	96	84[8]	84	84	92	95	88	88	85	82
Air Handling Unit – Supply Outlet[1]	96	94[8]	94	96	94	95	91	84	80	78
Air Handling Unit – Return Inlet[1]	89	80[8]	80	76	94	85	79	79	78	75
Air Handling Unit – Return Outlet[1]	90	86[8]	86	84	94	86	84	80	79	76
Chiller[2]	105	101[8]	101	108	107	101	98	95	94	97
Garage Exhaust Fan – Inlet[3]	82	75[8]	75	76	79	80	76	74	70	64
Garage Exhaust Fan – Outlet[3]	85	84[8]	84	82	80	81	81	78	73	66
Mechanical Room Fan[4]	79	74[8]	74	74	79	79	71	67	62	58
Dryer Exhaust Fan[5]	96	89[8]	89	89	92	93	92	87	83	83
Trash-JC Exhaust Fan[6]	76	71[8]	71	73	81	74	67	60	60	56
Emergency Generator[7]	108	124[8]	124	113	110	106	100	97	92	94

Notes:

1. Energy Labs Optiline Fan
2. Multistack Maglev ASP300F, 275 tons, Calculated from Lp @ 30ft
3. Greenheck Model QEI-16-I-50 Mixed Flow Fan
4. Greenheck Model SQ-160-VG Direct Drive Centrifugal Inline Fan
5. Assumed Greenheck QEI-20 Class I Mixed Flow Fan, 10,700 CFM
6. Greenheck Model CUE-141-VG Direct Drive Upblast Centrifugal Roof Exhaust Fan
7. Caterpillar C18 550 kW C18DE6D Standby Diesel Generator, SA Canopy, Calculated from Lp @ 49.2ft; includes mechanical (enclosed) and exhaust (silenced) noise
8. No data available in 32 Hz band. Assumed equal to 63 Hz band.

3.10.5.2 Noise Modeling Methodology

Noise impacts from mechanical equipment associated with the Project were predicted using Cadna/A noise calculation software (DataKustik Corporation, 2005). This software, which uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation), offers a refined set of computations accounting for local topography, ground attenuation, drop-off with distance, barrier shielding, diffraction around building edges, reflection off building facades, and atmospheric absorption of sound from multiple noise sources.

An initial analysis considered all of the mechanical equipment without the emergency generator running to simulate typical nighttime operating conditions at nearby receptors. A second analysis combined the mechanical equipment and the emergency generator to reflect worst-case daytime conditions during brief, routine, testing of the generator when ambient levels are higher.

3.10.5.3 Noise Modeling Results

Six modeling locations with a height of 1.5 meters above-grade were included in the analysis representing the nearest noise-sensitive receptors. Figure 3.10-1 shows the locations of each modeled receptor as well as the monitoring locations selected for background measurements.

The predicted sound levels, presented in Table 3.10-6, from all mechanical equipment operating simultaneously (except the emergency generator) at rated load are expected to range from 43 to 51 dBA at nearby receptors (no greater than 47 dBA at the closest residences). Table 3.10-7 presents predicted sound levels from all mechanical equipment including the emergency generator during routine daytime testing periods which are expected to range from 45 to 52 dBA at nearby receptors (no greater than 49 dBA at the closest residences).

Results of this evaluation demonstrate that sound levels from Project operation are anticipated to fully comply with the City of Boston nighttime broadband and octave-band noise limits described in Table 3.10-1, as shown in Table 3.10-6. Additionally, Project-only sound levels are predicted to remain well below the existing background sound levels in the area shown in Table 3.10-2, which already exceed many of the City of Boston limits without any contribution from the Project. At several modeling locations, mitigation designed to meet the City of Boston octave-band limits resulted in A-weighted broadband levels lower than the City of Boston A-weighted broadband limits. As such, this analysis indicates that the proposed Project can operate without substantial impact on the existing acoustical environment.

Table 3.10-5 Modeled Project-Only Sound Levels – Typical Nighttime Operation (No Emergency Generator)

Modeling Location ID	Zoning / Land Use	Evaluation Period	Broadband (dBA)	Sound Pressure Level (dB) per Octave-band Center Frequency								
				32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
R1	Hospital	Night	44	51	48	49	47	42	38	33	28	22
R2	Residential	Night	47	50	49	54	51	45	38	33	28	20
R3	Residential	Night	45	50	48	52	49	42	36	31	27	22
R4	Residential	Night	43	50	47	49	46	41	36	31	26	21
R5[1]	Educational	Day	51	51	49	52	53	52	44	40	35	30
R6	Residential	Night	45	49	48	52	49	43	37	32	25	15
City of Boston Limits	**Residential**	**Night**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**
	Business	**Night**	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**
	Industrial	**Night**	**70**	**83**	**82**	**77**	**73**	**67**	**61**	**57**	**53**	**50**

1. Daytime use only. Nighttime limits not applicable.

Table 3.10-6 Modeled Project-Only Sound Levels – Typical Daytime Operation + Routine Emergency Generator Testing

Modeling Location ID	Zoning / Land Use	Evaluation Period	Broadband (dBA)	Sound Pressure Level (dB) per Octave-band Center Frequency								
				32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
R1	Hospital	Day	50	71	68	56	52	47	41	36	30	25
R2	Residential	Day	49	68	66	56	52	46	39	34	28	21
R3	Residential	Day	46	65	62	54	50	43	36	32	27	22
R4	Residential	Day	45	67	62	51	47	42	36	31	27	21
R5	Educational[1]	Day	52	69	66	55	53	52	44	40	35	31
R6	Residential	Day	49	68	68	56	52	45	39	33	26	17
City of Boston Limits	**Residential**	**Day**	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**
	Business	**Day**	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**
	Industrial	**Day**	**70**	**83**	**82**	**77**	**73**	**67**	**61**	**57**	**53**	**50**

2. Compared to daytime 'residential' limits

3.10.6 Conclusions

Baseline noise levels were measured in the vicinity of the Project site and were compared to predicted noise levels based on information provided by the manufacturers of representative mechanical equipment or estimated from the equipment's capacity. With appropriate mitigation (as described in Section 3.10.5.1), the Project is not expected to introduce substantial outdoor mechanical equipment noise into the surrounding community.

Results of the analysis indicate that typical nighttime noise levels from the Project as well as noise levels from routine daytime testing of the emergency generator are expected to remain well below the City of Boston Noise Zoning requirements. It should be noted that the existing ambient background levels at many locations immediately surrounding the

Project already exceed the City of Boston limits without any contribution from the Project. The results presented in Section 3.10.5.3 indicate that the Project is not anticipated to significantly impact the existing acoustical environment.

At this time, the mechanical equipment and noise controls are conceptual in nature and, during the final design phase of the Project, will be specified to meet the applicable City of Boston noise limits. Additional mitigation may include the selection of quieter units, screening walls, mufflers, or equipment enclosures as needed.

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 April of 2016 and last for approximately 23 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.

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 330 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50% of the total employee work hours be for Boston residents, at least 25% of total employee work hours be for minorities and at least 10% 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. 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 the 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

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

4.1 Campus Wide Sustainability Practices

Emmanuel shares the City of Boston's strong commitment to the principles of sustainable development, and has a strong environmental program to conserve energy, reduce waste, conserve water and reduce its overall environmental footprint. The concept of sustainability is incorporated into the College's curriculum across all disciplines. Below is a description of some of Emmanuel's recent sustainability initiatives.

Energy Use

Between October 2014 and January 2015, Emmanuel worked with Bluestone Energy Services to upgrade approximately 2,000 lighting fixtures across the campus to the latest LED technology. These upgrades will reduce annual usage by 60%, or more than 665,000 kilowatt hours (kWh). Not only will Emmanuel's students, faculty and staff benefit from the cleaner, whiter light, but the College will see reductions in energy and maintenance costs as well as a reduced carbon footprint.

Additionally, Emmanuel has complied with the City of Boston's Building Energy Reporting and Disclosure Ordinance for the past two calendar years. Through this ordinance, the College reports annual energy and water use for the eight buildings on campus. This process has prompted Emmanuel to more actively review monthly energy and water reading to identify and address possible issues.

Recycling

In July 2014, Emmanuel began a partnership with Casella Waste Systems to revamp its existing waste and recycling program. This transition was made as part of a joint contract opportunity with three of the other Colleges of the Fenway institutions.

The College converted its recycling program from source separated to single-stream across campus. This allows users to conveniently place recyclable items, such as newspaper, cardboard, mixed paper, magazines, aluminum and plastic, all in one bin.

To prepare for this transition, the Facilities Department standardized the waste and recycling bins within offices, classrooms and conference spaces as well as the residence halls and exterior locations; and centralized trash bins for faculty and staff office spaces.

Clear marketing materials were created to let the College community know which items go where and are consistent across campus. Similar signage is placed next to waste and recycling stations in public locations.

The Facilities Department teamed up with Residence Life and Housing to help raise student awareness about Emmanuel's new single-stream program in November 2014. Within the four on-campus residence halls, each floor competed to see which could achieve the highest recycling rate. The recycling totes from the kitchen on each floor were weighed weekly and recorded. Resident students recycled over a ton of recyclables (2,425 pounds) in four weeks and the winning floor received a pizza party.

Emmanuel receives monthly tonnage reports that allow it to assess the impact of the new program and has experienced tremendous success in its first year with Casella. As shown in Table 4-1 below, comparing July 2014 through June 2015 to the same period last year, the College has seen a 36% decrease in solid waste tonnage and a 60% increase in recycling.

Table 4-1 Change in Solid Waste Recycle

Commodity (tons)	Jul 2014-Jun 2015	Jul 2013-Jun 2014	% change
Waste	285.6	443.9	-36%
Recycling	60.5	37.7	60%
Composting	46.9		
Total Waste	**393.0**	**481.6**	**-18%**

RecycleMania

Emmanuel continues to participate in RecycleMania, a competition among college and university recycling programs in North America and Canada. During eight weeks in the spring of 2016, Emmanuel will compete in different categories to see which institution can collect the largest amount of recyclables per capita, the largest amount of total recyclables, generate the least amount of waste per capita or have the highest recycling rate.

EC Print

In Spring 2014, Emmanuel's IT Department partnered with Toshiba to implement a new print and imaging program called EC Print. This not only created more printing locations for students, faculty and staff but also created three sustainability standards: high-efficiency devices that conserve power and toner, double-sided printing capability and scan to e-mail functionality.

Over the first year of EC Print usage, Emmanuel students' paper consumption was reduced by over 38%. Including faculty and staff printing, the College realized a paper savings of 815,215 pages over the previous print infrastructure. This is the equivalent of 4 tons or 163 cases of paper. These savings can be attributed to double-sided printing and deletion of unreleased print jobs.

Emmanuel has also partnered with Toshiba and Habitat for Humanity to recycle all toner cartridge waste for use in building new homes and installing benches in parks around the United States.

Water Refill Stations

In August 2014, the Facilities Department installed a water refill station in the Jean Yawkey Center as part of a pilot program. The Emmanuel College community diverted over 38,000 20-ounce bottles from landfills by using the unit in the 2014-2015 academic year.

Due to its overwhelming success, the College expanded the program in June 2015 so chilled, filtered water is available in the Administration Building, Cardinal Cushing Library and all residence halls. These new locations include:

- **Administration Building** – retrofitted five existing water fountains by adding push button filler;
- **Cardinal Cushing Library** – replaced existing fountain with new unit complete with a bottle filler; and
- **Residence Halls** – installed pedestal-style fillers in each kitchen, plus St. Joseph's game room and basement lounge.

Dining Practices

Bon Appétit Management Company (BAMCO) is the onsite dining service provider for Emmanuel. Bon Appétit has made additional strides to be more eco-friendly through the removal of trays and use of reusable plates, cutlery, and drinkware. At Emmanuel, the Marian Hall Dining Room operates as an all-you-can-eat facility, which enables individuals to take more than he or she will actually eat. By removing the trays, people can only take what they can carry thus cutting down on the amount of wasted food. Also, by reusing dishware, Emmanuel is able to curb the amount of waste generated from single-use products. The Muddy River Café is a to-go dining facility and Bon Appétit has worked hard to select paper products that can be recycled after use.

The Massachusetts Department of Environmental Protection expanded its existing waste bans to include organics back in October 2014. This new ban requires any institution that generates at least one ton of organic food waste each week to divert these materials from the solid waste stream. In an effort to comply with this new regulation, Emmanuel launched a composting program in the Marian Hall Dining Room in the fall.

Bon Appétit staff has been capturing food scraps during meal preparation. This is known as back-of-the-house composting and takes place behind the scenes. Between September 2014 and March 2015, 63,000 pounds of food waste was diverted from landfills through these efforts. In order to further increase the diversion rate and engage the College community, Emmanuel plans to expand the composting program over the next two academic years to include front-of-the-house, which captures post-consumer food waste, in the Marian Hall Dining Room (Fall 2015) and the Muddy River Café (Fall 2016).

To prepare for the introduction of front-of-the-house composting, the Facilities Department and Bon Appétit ran a 5-day pilot between April 13th and April 17th. Diners were asked to scrape left over food and napkins into a compost bin rather than the traditional trash bin. Paper and plastic disposable products were either thrown into a single-stream recycling or a trash bin. Dishes, silverware and reusable drink cups were still placed on the dish return to be cleaned. Volunteers, known as "bin monitors," and signage were used to help guide diners in the new system.

This was a relatively easy transition for diners and after the five days, the College estimates that the students, faculty and staff diverted approximately 730 pounds of food waste from landfills. Instead of ending the pilot, Emmanuel kept the system running through the remainder of the Spring 2015 semester. The full program was launched in August 2015, and in September approximately 4.9 tons of food waste was diverted from landfills.

4.2 Sustainable Design

To comply with Article 37, the Proponent intends to measure the results of their sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system. The Project will use the LEED for New Construction v2009 as the rating system to show compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation in Design.

A LEED checklist is included at the end of this section, and shows the credits the Project anticipates achieving. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. Presently the Proponent is striving to be certifiable at the Silver level with 53 points targeted, not including any of the potential Boston Zoning Code Article 37 points.

Sustainable Sites

Prerequisite 1: Construction Activity Pollution Prevention. The Project will create and implement an erosion and sedimentation control plan for all activities associated with the Project.

Credit 1: Site Selection. The Project site has been previously developed with a residence hall that will be replaced with the new residence hall.

Credit 2: Development Density and Community Connectivity. The Project meets the Community Connectivity criteria by being located on a previously developed site, within ½ mile of a neighborhood that meets the density requirements and has at least ten basic services, and has pedestrian access between the building and the services.

Credit 4.1: Alternative Transportation – Public Transportation Access. The Project site is within a ½ mile walking distance of the Green Line stops at Longwood and Fenway on the D line as well as the Longwood Medical and Academic Area and Museum of Fine Arts on the E line. It is also served by the C2 and C3 Buses on Brookline Avenue at Beth Israel Deaconess Medical Center and the C3 Bus on Avenue Louis Pasteur.

Credit 4.2: Alternative Transportation – Bicycle Storage and Changing Rooms. The Project will provide bicycle parking and bicycle storage for 15% of 691 beds. The bike storage provided will be for residents of the building and will be located in the garage level of the building in a secure bike storage room. Residents will be able to use the showers in their apartments. There will be an additional shower on the garage level that will be able to be used by employees who work in the building.

Credit 4.3: Alternative Transportation - Low Emission & Fuel Efficient Vehicles. The Project will provide designated preferred parking spaces for low-emitting and fuel-efficient vehicles for 5% of the total parking capacity.

Credit 4.4: Alternative Transportation – Parking Capacity. The Project will provide new parking which will likely not exceed minimum zoning requirements.

Credit 5.2 Site Development: Maximize Open Space. As the design develops, providing open space will be considered.

Credit 6.1: Stormwater Design—Quantity Control. The Project will implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year 24-hour design storm.

Credit 6.2: Stormwater Design—Quality Control. The Project will meet the criteria for storm water quality control by capturing and treating 90% of the average annual rainfall using acceptable best management practices (BMPs). The BMPs used to treat the runoff will remove 80% of the total suspended solids (TSS).

Credit 7.1: Heat Island Effect—Non-roof. Reducing the heat island effect has been categorized as a regional priority for Boston. A minimum of 50% of the parking spaces will be under cover. The Project will also plant shade trees along the hardscaped elements on the site.

Credit 7.2: Heat Island Effect—Roof. The Project will utilize roofing materials with a solar reflective index (SRI) equal to or greater than the minimum SRI values for at least 75 percent of the roof surface.

Water Efficiency

Prerequisite 1: Water Use Reduction—20% Reduction. The Project will comply with the minimum potable water consumption reduction of 20% less water used when compared to a baseline case by using low-flow and efficient plumbing fixtures.

Credit 1: Water Efficient Landscaping. The Project will reduce potable water consumption used for irrigation by using native or adapted plant species and an efficient irrigation system.

Credit 3: Water Use Reduction. Through the specification of low-flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that will target an overall potable water use savings of 30% from the calculated baseline use.

Energy and Atmosphere

Energy efficiency is central to the Project's design. The Project will comply with the Commonwealth's Stretch Energy Code and as such, will reduce energy use from the established baseline by 20%. High-efficiency mechanical systems, Energy Star rated equipment, and a hydronic management system are among the energy efficiency strategies that will be employed. The Project's building envelope has been designed to exceed ASHRAE 90.1 performance standards.

Prerequisite 1: Fundamental Commissioning of the Building Energy Systems. The Project will engage a commission agent for the commissioning process and to verify that the building's related systems are installed and performed as intended.

Prerequisite 2: Minimum Energy Performance. Architectural and engineering systems will be designed to meet the mandatory requirements of ASHRAE 90.1-2007 and to achieve approximately 20-22% energy cost performance improvement beyond that defined by ASHRAE 90.1-2007 Appendix G. Energy use will be demonstrated using a USGBC-approved whole building energy simulation software package such as Trace 700. Energy performance is highly dependent on ultimate system selection and operational parameters.

Prerequisite 3: Fundamental Refrigerant Management. The Project will use refrigerants that are chlorofluorocarbon (CFC) free in the HVAC&R systems.

Credit 1: Optimize Energy Performance. The Project will follow Option 1, Whole Building Energy Simulation. Savings will be achieved by improved efficiency of exterior envelope, lighting, heating and cooling, energy efficient pumps and fans, and water heating.

Credit 4: Enhanced Refrigerant Management. Where applicable and feasible, the Project will utilize heating, ventilation, air conditioning, and refrigeration that minimize or eliminate the emission of pollutants and compounds that contribute to ozone depletion and global climate change.

Credit 5.1: Measurement and Verification. The Project will incorporate additional kW/kWH metering equipment and power consumption/trending software to be installed on-site.

Credit 6: Green Power. The owner will engage in at least a two-year renewable energy contract to provide at least 35% of the Project's electricity from renewable sources.

Materials and Resources

Prerequisite 1: Storage and Collection of Recyclables. The Project will provide an easily accessible dedicated area for the collection and storage of materials for the entire building.

Credit 2: Construction Waste Management. The construction management team will develop and implement a Construction Waste Management plan for waste generation on site. The construction manager will endeavor to divert as much demolition debris and construction waste from area landfills as possible, with a goal to achieve 75% diversion.

Credit 4: Recycled Content. The Project will specify materials to require a minimum of 20% recycled content materials (combination of pre-consumer and post-consumer recycled content) based on the calculation of cost against total value of materials.

Credit 5: Regional Materials. The Project will specify that a minimum of 10% of materials be sourced (with respect to extraction, harvesting, recovery and manufacture) within a 500 mile radius of the Project site.

Credit 6: Certified Wood. The Project will specify a minimum of 50% of wood-based materials and products that are FSC certified.

Indoor Environmental Quality

Prerequisite 1: Minimum IAQ Performance. The building mechanical systems will be designed to meet the minimum requirements of ASHRAE Standard 62.1-2007 sections 4 through 7 and/or applicable building codes. Any naturally ventilated spaces will comply with the applicable portions of ASHRAE 62.1 as well.

Prerequisite 2: Environmental Tobacco Smoke (ETS) Control. The Project will prohibit smoking in the building and prohibit on-property smoking within 25 feet of entries, outdoor air intakes and operable windows.

Credit 3.1: Construction IAQ Management Plan – During Construction. The Project will implement a Construction Indoor Air Quality Management Plan (CIAQMP) per LEED requirements to improve the indoor air quality during the construction and preoccupancy phases of the project.

Credit 3.2: Construction IAQ Management Plan – After Construction. The Project will provide an IAQ plan prior to occupancy.

Credit 4.1: Low-Emitting Materials – Adhesives and Sealants. The Project will specify low-emitting interior adhesives and sealants that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 and Green Seal Standard to maintain air quality and ensure a healthy environment for construction workers and building occupants.

Credit 4.2: Low-Emitting Materials – Paints and Coatings. The Project will specify low-emitting paints and coatings applied inside the building envelope to maintain air quality and ensure a healthy environment for construction workers and building occupants.

Credit 4.3: Low-Emitting Materials – Flooring Systems. Flooring products will be selected to comply with FloorScore certification in order to reduce indoor air contaminants and to ensure there are no odors or irritants that are harmful to the well-being of installers or occupants.

Credit 4.4: Low-Emitting Materials – Composite Wood and Agrifiber Products. Composite wood and agrifiber products that will be used on the interior of the building will be selected to reduce the quantity of indoor air contaminants and to ensure there are no odors or irritants that are harmful to the well-being of installers or occupants. These products will not contain added urea-formaldehyde resins.

Credit 5: Indoor Chemical and Pollutant Source Control. The Project will use permanent entry way walk off mats or grilles to minimize the amount of pollutants entering the building. All rooms that contain chemicals or generate hazardous gases will be ventilated. All exterior air supplied to the building will be through a Minimum Efficiency Reporting Value of 13 or better.

Credit 6.2: Controllability of Systems—Thermal Comfort. The Project will provide comfort system controls for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences as described in ASHRAE Standard 55-2004.

Credit 7.1: Thermal Comfort – Design. Where HVAC systems are needed onsite they will be designed to meet ASHRAE Standard 55-2004 and to promote the comfort of building occupants.

Credits 8.1 and 8.2: Daylight and Views. In order to provide the building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views, Option 1 for IEQ 8.1 will be followed to ensure daylight levels and effectiveness are achieved. In order to meet credit 8.2 the goal is set to be that at least 90% of all regularly occupied spaces have a direct line of sight to the exterior.

Innovation in Design

The team has identified several possible ID credits listed below, (limited to five ID credits total):

Credit 1.1: Exemplary Performance for SS 4.1. The Project site is located on several bus routes and rail lines with a frequency of service that includes over 200 transit rides per day.

Credit 1.2: Innovation in Design: Exemplary Performance for SS 7.1. 100% of the parking is below grade.

Credit 1.3: Innovation in Design: Exemplary MR Credit. Goal is to increases total amount of recycled content of regional materials.

Credit 1.4: Innovation in Design: Green Housekeeping. The project will implement a plan to use green cleaning products and practices in cleaning the common spaces and public areas of the residence hall.

Credit 1.5: Tenant Education. Education of the Building Users: There will be an educational component that presents building-specific sustainable strategies to the residents as well as a case study or newsletter component that will educate residents on sustainable living and Emmanuel's sustainable policies.

Credit 2 LEED Accredited Professional. A LEED AP is part of the Project team.

Regional Priority

Regional Priority Credits, (RPC) 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: SSc3, SSc6.1, SSc7.1, SSc7.2, EAc2(1%) and MRc1.1(75%). This Project anticipates three RPCs for: SSc6.1 Stormwater Design, Quality Control; SSc7.1 Heat Island Effect, Non-roof; and SSc7.2 Heat Island Effect, Roof.

4.3 Climate Change Preparedness

4.3.1 Introduction

Projects subject to Article 80, Large Project Review are required to complete the Climate Change Preparedness Checklist. Climate change conditions considered include sea level rise, 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.

The Project team examined two areas of concern related to climate change: drought conditions and increased number of high-heat days. Due to the Project's location, elevation and topography, sea level rise will not impact the Project site, and the Project has been designed to withstand impacts from heavy rain events. A copy of the preliminary Climate Change Checklist is included in Appendix C.

4.3.2 Drought Conditions

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. Various water conservation measures such as low-flow toilets and urinals, restricted flow faucets, and sensor operated sinks, toilets, and urinals will be incorporated into the Project.

4.3.3 High Heat Days

The Intergovernmental Panel on Climate Change (IPCC) has predicted that in Massachusetts the number of days with temperatures greater than 90°F will increase from the current five-to-twenty days annually, to thirty-to-sixty days annually[1].

The Project design will incorporate a number of measures to minimize the impact of high temperature events, including:

- Installing operable windows where possible;
- Specifying high reflective paving materials and high albedo roof tops to minimize the heat island effect; and
- Planting new trees where possible to shade areas of hardscape around the site.

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

Energy modeling for the Project has not yet been completed; however, as indicated on the LEED Checklist, the Proponent will strive to reduce the Project's overall energy demand and greenhouse gas emissions. The Project's proposed TDM program described in Section 2.4 will also help to lessen fossil fuel consumption.

LEED 2009 for New Construction

Project Checklist : Emmanuel College Residential Hall
LEED 2009 New Construction
Project / # 15034
Elkus Manfredi Architects
Date 11/4/2015
Status: Schematic Review

53	36	21	**Total**	Possible Points:	**110**		
Y	?	N	Certified 40-49 Silver 50-59 Gold 60-79 Platinum 80-110				

20	4	2	**Sustainable Sites**	Possible Points:	**26**		
Y	?	N				Team	Strategy
Y			Prereq 1	Construction Activity Pollution Prevention	0		
1			Credit 1	Site Selection	1		
5			Credit 2	Development Density and Community Connectivity	5		
		1	Credit 3	Brownfield Redevelopment	1		
6			Credit 4.1	Alternative Transportation - Public Transportation Access	6		
1			Credit 4.2	Alternative Transportation - Bicycle Storage and Changing Rooms	1		
3			Credit 4.3	Alternative Transportation - Low-Emitting and Fuel-Efficient Vehic	3		
	2		Credit 4.4	Alternative Transportation - Parking Capacity	2		parking not to exceed min zoning requirements
		1	Credit 5.1	Site Development - Protect or Restore Habitat	1		
	1		Credit 5.2	Site Development - Maximize Open Space	1		zoning open space requirement? Possibly since shifting cul de sac
1			Credit 6.1	Stormwater Design - Quantity Control	1		Should design to this as part of climate change preparedness
1			Credit 6.2	Stormwater Design - Quality Control	1		Should design to this as part of climate change preparedness
1			Credit 7.1	Heat Island Effect - Non-roof	1		100% parking under cover
1			Credit 7.2	Heat Island Effect - Roof	1		High albedo - white TPO or green roof
	1		Credit 8	Light Pollution Reduction	1		Safety/campus standards may override this

4	3	3	**Water Efficiency**	Possible Points:	**10**		
Y	?	N				Team	Strategy
Y			Prereq 1	Water Use Reduction - 20% Reduction	0		use dual flush or low flow 1.28gpf and pint flush urinals, aerators on
2	2		Credit 1	Water Efficient Landscaping	2-4		use native planst 50% watering reduction or use captured rainwater
		2	Credit 2	Innovative Wastewater Technologies	2		
2	1	1	Credit 3	Water Use Reduction	2-4		showers 1.5 gpm

7	19	9	**Energy and Atmosphere**	Possible Points:	**35**		
Y	?	N				Team	Strategy
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	0		
Y			Prereq 2	Minimum Energy Performance	0		10% improvement
Y			Prereq 3	Fundamental Refrigerant Management	0		
5	5	9	Credit 1	Optimize Energy Performance	1-19		Using LED's on campus - should aim for highest savings 20-30% at
	7		Credit 2	On-Site Renewable Energy	1-7		ACUP buy or produce 15% of electricity consumption f/ renewable s
	2		Credit 3	Enhanced Commissioning	2		
	2		Credit 4	Enhanced Refrigerant Management	2		no cfcs or meet formula for refrigerants- should be a goal
	3		Credit 5	Measurement and Verification	3		If this is a part of Facility best practices already
2			Credit 6	Green Power	2		ACUP buy atleast 15% from renewable source

4	3	7	**Materials and Resources**	Possible Points:	**14**		
Y	?	N				Team	Strategy
Y			Prereq 1	Storage and Collection of Recyclables	0		http://www.emmanuel.edu/discover-emmanuel/campus/sustainability
		3	Credit 1.1	Building Reuse - Maintain Existing Walls, Floors, and Roof	1-3		
		1	Credit 1.2	Building Reuse - Maintain 50% of Interior Non-Structural Element	1		
1	1		Credit 2	Construction Waste Management	1-2		Recycle 50% demolition/construction debris
		2	Credit 3	Materials Reuse	1-2		
2			Credit 4	Recycled Content	1-2		typically targeting 30-40% w/ this construction type
1	1		Credit 5	Regional Materials	1-2		
		1	Credit 6	Rapidly Renewable Materials	1		have to reach 2.5% threshold bamboo/cork/etc.
	1		Credit 7	Certified Wood	1		dependant on extent of wood specified

11	4	0	**Indoor Environmental Quality**	Possible Points:	**15**		
Y	?	N				Team	Strategy
Y			Prereq 1	Minimum Indoor Air Quality Performance	0		
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	0		
	1		Credit 1	Outdoor Air Delivery Monitoring	1		applicable to the uses?
	1		Credit 2	Increased Ventilation	1		cost associated?
1			Credit 3.1	Construction IAQ Management Plan - During Construction	1		should be best practice
1			Credit 3.2	Construction IAQ Management Plan - Before Occupancy	1		
1			Credit 4.1	Low-Emitting Materials - Adhesives and Sealants	1		
1			Credit 4.2	Low-Emitting Materials - Paints and Coatings	1		
1			Credit 4.3	Low-Emitting Materials - Flooring Systems	1		
1			Credit 4.4	Low-Emitting Materials - Composite Wood and Agrifiber Products	1		
1			Credit 5	Indoor Chemical and Pollutant Source Control	1		10' walk off matt/entry system/vestibule/merv 13 filters
	1		Credit 6.1	Controllability of Systems - Lighting	1		Question for Facilties and main floor study/lounge spaces
1			Credit 6.2	Controllability of Systems - Thermal Comfort	1		Question for Facilties and main floor study/lounge spaces
1			Credit 7.1	Thermal Comfort - Design	1		
	1		Credit 7.2	Thermal Comfort - Verification	1		Does Facilities Dept already have measurement system in place?
1			Credit 8.1	Daylight and Views - Daylight	1		
1			Credit 8.2	Daylight and Views - Views	1		

4	2	0	**Innovation and Design Process**	Possible Points:	**6**		
Y	?	N				Team	Strategy
1			Credit 1.1	Innovation in Design: Exemplary Performance SS 4.1	1		
1			Credit 1.2	Innovation in Design: Exemplary Performance SS 7.1	1		100% parking underground
1			Credit 1.3	Innovation in Design: Exemplary MR Credit	1		possibly recycled content or regional materials
	1		Credit 1.4	Innovation in Design: Green Cleaning	1		does the College have an existing Green Housekepeing Plan?
	1		Credit 1.5	Innovation in Design: Tenant Education	1		tenant education - monthly newsletters-postings-
1			Credit 2	LEED Accredited Professional	1		

3	1	0	**Regional Priority Credits**	Possible Points:	**4**		
Y	?	N				Team	Strategy
1			Credit 1.1	Regional Priority: Stormwater design: quantity control	1		
1			Credit 1.2	Regional Priority: Heat island effect - non roof	1		
1			Credit 1.3	Regional Priority: Heat Island effect - roof	1		
	1		Credit 1.4	Regional Priority: On-site renewable energy	1		
			Not Used	Regional Priority: Brownfield redevelopment			
			Not Used	Regional Priority: Building Reuse			

53	36	21	**Total**	Possible Points:	**110**		
Y	?	N	Certified 40-49 Silver 50-59 Gold 60-79 Platinum 80-110				

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Project Context

Emmanuel College is located in the heart of the LMA. It is adjacent to the Beth Israel Deaconess Medical Center and near the Harvard Medical School, School of Dental Medicine and School of Public Health. It is next to the Merck Research Facility which anchors the Emmanuel Endowment Campus. Emmanuel College is a founding member of the Colleges of the Fenway (COF), a group of six neighboring schools including Simmons College, the Massachusetts College of Pharmacy and Health Sciences, Massachusetts College of Art and Design, Wentworth Institute of Technology and the Wheelock College. The Boston Museum of Fine Arts and the Isabella Stewart Gardner Museum are cultural institutions also nearby Emmanuel College. Neighborhoods that surround the school include The Fenway, Audubon Circle and Mission Hill. The Emerald Necklace and the Back Bay Fens are a significant amenity to the institutions located in the Longwood Medical and Academic Area and is adjacent to the northern front of Emmanuel College's campus.

The New Julie Hall will be located on the southwestern corner of the Emmanuel College campus to the north of the Beth Israel Deaconess Medical Center, and to the east of the Simmons College Residence Campus. The massing is designed in conformance with the LMA Interim Guidelines, with a maximum height of 75 feet along Brookline Avenue and increasing to 205 feet further east.

5.2 Architecture and Landscape Design

The design of the New Julie Hall will create a signature building for Emmanuel College, while also improving the character and quality of Brookline Avenue by introducing interior spaces that display activity through a significant amount of transparent façade area. The taller portion of the proposed New Julie Hall features a slender profile facing The Fenway and faceting that reduces its profile when viewed from Brookline Avenue from the west. The building has been located toward existing taller buildings—Merck Research Laboratories-Boston and BIDMC East Campus in particular—and away from The Fenway in accordance with the LMA Interim Guidelines to achieve a stepped transition in height up to the LMA's taller structures (see Figure 5-1). The New Julie Hall has also been placed at a sufficient interval from the Merck Research Laboratories to maintain significant direct sun and sky plane views from Emmanuel's Main Quadrangle.

The ground floor will be predominately glass, and will include space for a variety of student life and academic uses along the eastern portion of the site that will enliven the adjacent streets and celebrate learning activity at Emmanuel. The building will be composed of masonry and glass with contrasting masonry elements used to further articulate the façade (see Figure 5-2). The punched windows on the façade and the articulation in the masonry

Emmanuel College Residence Hall   Boston, Massachusetts

EMMANUEL COLLEGE

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Figure 5-1

Aerial Rendering

Figure 5-2

View from Brookline Avenue

will maintain a residential scale to the facades and be consistent with the masonry on other campus buildings. The upper portion of New Julie Hall, rising above lower campus buildings and visible to people entering the LMA along Brookline Avenue, will continue the theme of transparency as a signature campus building, while also integrating opaque elements that relate to the Administration Building's tower and mark a distinction from the predominantly glazed research buildings along Blackfan Street. There will be a landscaped plaza on the east side of the building facing the Marian Dining Hall.

The front entry drop off will be reconfigured to provide better access to the New Julie Hall as well as the dormitories to the north. The grounds around the building we be landscaped to enhance the pedestrian experience in this section of the campus (see Figure 5-3). The intent is to create a landscape design that maintains the functionality of the circular vehicle drop off while treating the space as a landscaped plaza rather than a circular road. At the northwest corner of the Project, there will be an area set aside for outdoor dining tables that will allow students who frequent the ground floor café/market to eat outside. The landscape will be enhanced by plantings and raised planting beds with integral seating. The Project will maintain the connection to Brookline Avenue on the western side of the site. The landscape strip along the Brookline Avenue side of the building will be restored and replanted after the construction of the Project is completed.

Emmanuel College Residence Hall **Boston, Massachusetts**

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Figure 5-3

View Facing South Towards the Project

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

6.1 Introduction

The proposed Project includes the removal of the existing Julie Hall and the construction of New Julie Hall. The Project site on Brookline Avenue is bounded by Brookline Avenue to the northwest, Beth Israel Deaconess Medical Center to the southwest, and the Emmanuel College campus to the northeast and southeast.

The existing Julie Hall is located on Brookline Avenue within the 17-acre campus of Emmanuel College on the edge of the Longwood Medical and Academic Area. Founded in 1919 by the Sisters of Notre Dame de Namur as the first Catholic College in New England for women, Emmanuel College today is a coeducational, Catholic, liberal arts and science college.

6.2 Emmanuel College Campus

The Emmanuel College campus encompasses nine buildings constructed between 1914 and 2009. The centerpiece of the campus is the 1914 Administration Building. Designed by the noted Boston architectural firm of Maginnis & Walsh, the building is an excellent example of the English Collegiate Gothic style. Since its construction, the Administration Building has been the College's main classroom building. Constructed in 1949, Alumnae Hall located on Parcel C of the Endowment Campus, continued the Gothic Revival style of the College's original building in a simplified manner. The remainder of the six original campus buildings, including Julie Hall (1958/2003), were built between 1954 and 1966 and are all executed in a more minimalist contemporary design, in contrast to the rich Gothic Revival style of the 1914 Administration Building and 1949 Alumnae Hall.

The Emmanuel College campus is included in the Massachusetts Historical Commission's (MHC) *Inventory of Historic and Archaeological Assets of the Commonwealth* (the Inventory). An MHC Area Form (Form A) for the campus was prepared as a component of the College's 2000 Institutional Master Plan (IMP). At the time of the 2000 IMP, the campus was not recommended for listing in the National Register of Historic Places. In the ensuing years, the MHC has indicated in their review of other Emmanuel College projects that the campus may be eligible for the National Register listing, though no formal determination of eligibility has been made. The Boston Landmarks Commission (BLC) has recommended the Administration Building for individual listing on the National Register and for potential Boston landmark designation. The northern half of the campus, including the Administration Building and the Cardinal Cushing Library, is located within the Southwest Fenway Historic Area, which has also been recommended for listing in the National Register by the BLC.

Table 6-1 below lists the nine buildings on the Emmanuel College campus and identifies their dates of construction.

Table 6-1 Emmanuel College Campus Buildings

Building	Date of Construction
Administration Building	1914
Marian Hall	1954
Julie Hall	1958/2003
Saint Ann Hall	1962
Loretto Hall	1964
Cardinal Cushing Library	1965
St. Joseph Hall	1966
The Jean Yawkey Center	2004
Wilkens Science Center	2009

The existing four-story Julie Hall is located on the east side of Brookline Avenue in the southwest corner of Emmanuel College. Emmanuel College opened in 1919, operating as a day school until the mid-1950s. Four student dormitories were constructed between 1957 and 1967 including: Julie Hall (1957-1958), St. Ann Dormitory (1961-1962), Loretto Hall (1963-1964) and St. Joseph Hall (1966-1967). These buildings were designed the by Boston architectural firm Maginnis, Walsh & Kennedy; the successor firm of the designers for the original 1914 Administration Building. Julie Hall stands at the southern end of the four residential buildings. The general scale and red brick exterior walls laid in Flemish bond of the residential buildings continue the precedent established by the Administration Building and Alumnae Hall. Their minimalist contemporary design contradicts the rich Gothic Revival style detail of the earlier buildings. The interior of the existing Julie Hall houses approximately 220 upper-class students.

In 1974 the College sold Julie Hall to Beth Israel Deaconess Medical Center who reconfigured the interior for office use. The building was sold back to Emmanuel College in 2002 and renovated again, back to residential use.

6.3 Historic Resources in the Vicinity

As noted above, the Emmanuel College campus is included in the MHC's Inventory, but is not listed in either State or National Registers. The northern half of the campus, including the Administration Building and the Cardinal Cushing Library, is located within the Southwest Fenway Historic Area, which has also been recommended for listing in the National Register by the BLC. Several historic resources listed in the National Register are located within the vicinity of the Emmanuel College campus, including the Olmstead Park System/Emerald Necklace Historic District, the Sears Roebuck and Company Building at 309 Park Drive, and the Longwood Historic District in nearby Brookline. National Register listed properties and historic districts within a quarter-mile of the Emmanuel College campus are listed in Table 6-2 below and their locations are identified in Figure 6-1.

Table 6-2 Historic Resources in the Project Vicinity

Map	State & National Register-listed Properties & Historic Districts	Address	Designation
1	Longwood Historic District	Roughly bounded by Chapel, St. Mary's, Monmouth and Kent Streets	National Register Historic District
2	Olmstead Park System	(Boston/Brookline) Back Bay Fens, Muddy River, Olmsted (Leverett) Park, Jamaica Pond, Arborway and Franklin Park	National Register Historic District
3	Emerald Necklace Parks	The Riverway, Omsted Park and Jamaica Pond	National Register Historic District
4	Back Bay Fens	Bounded by The Fenway, Brookline Avenue, Park Drive, Boylston Street and Evans Way	National Register Historic District
5	Sears Roebuck and Company Mail Order Store	309 Park Drive and 201 Brookline Avenue	National Register Property
6	Massachusetts School of Art	364 Brookline Avenue	National Register Property

6.4 Archaeological Resources

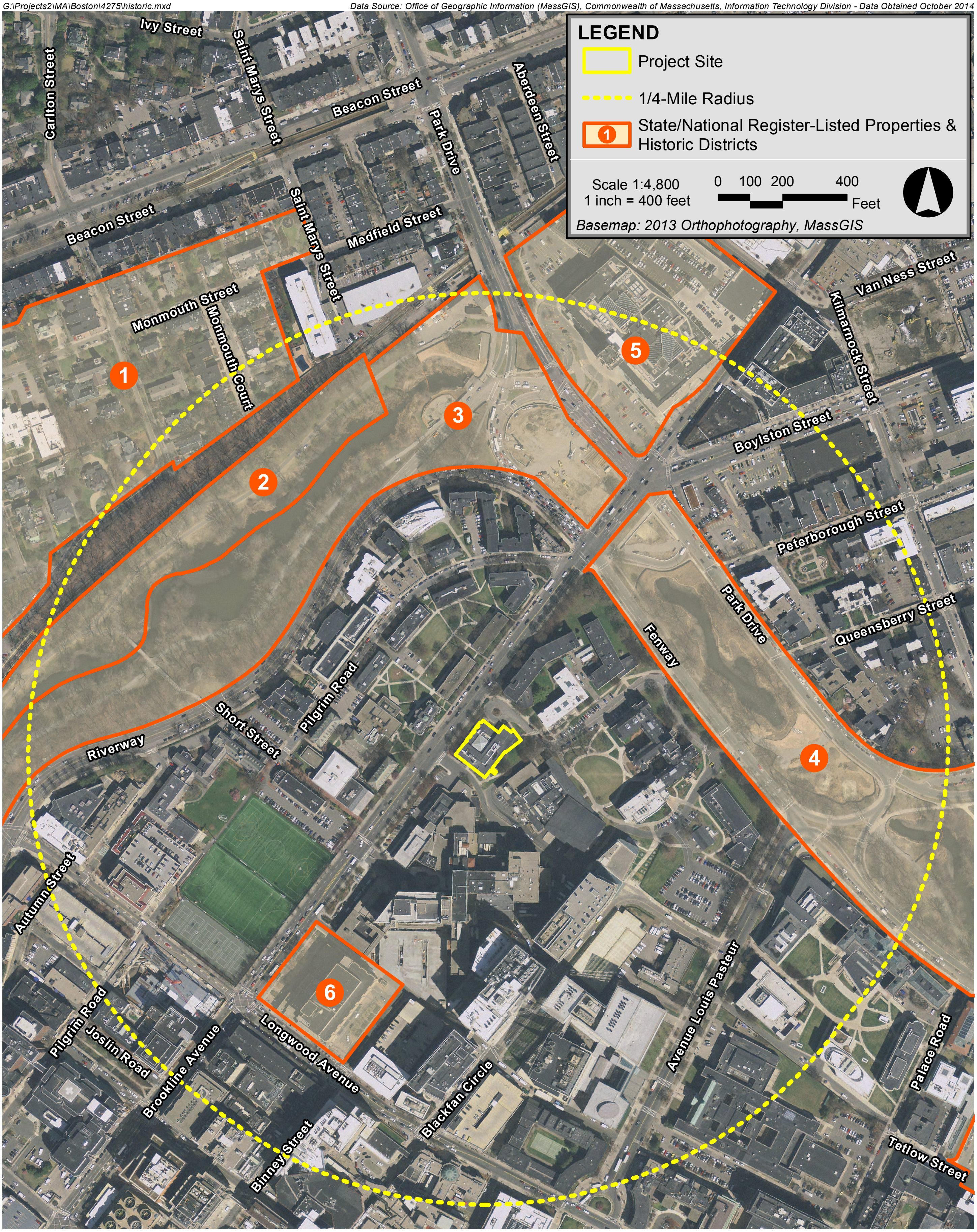
The Emmanuel College campus was developed and largely constructed on filled land created in the late nineteenth century when the Muddy River was improved. In addition, because the new construction will occur on land previously disturbed by the construction of the existing Julie Hall, there is little potential for the Project site to yield significant archaeological resources.

6.5 Impacts to Historic Resources

6.5.1 Design Visual Impacts

The Project will include the demolition of the existing Julie Hall. The proposed New Julie Hall will be located on the site of the existing building in the southwest corner and edge of the Emmanuel College campus on Brookline Avenue. The massing is designed in conformance with the Longwood Medical and Academic Area Interim Guidelines, with a maximum height of 75 feet along Brookline Avenue and increasing to 205 feet further east. The building will be composed of masonry and glass with contrasting masonry elements. The ground floor will be predominantly glass and on the upper portion, rising above lower campus buildings, will continue the theme of transparency while also integrating opaque elements that relate to the Administration Building's tower. The taller portion of the

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014



Emmanuel College **Boston, Massachusetts**

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Figure 6-1

Historic Resources

proposed building will feature a slender profile facing The Fenway that reduces its profile when viewed from Brookline Avenue. The building will be located near other existing taller buildings, including the Merck Research Laboratories-Boston and the Beth Israel Deaconess Medical Center. The New Julie Hall will also be placed at an interval from the Merck Research Laboratories to maintain significant direct sun and sky plane views from Emmanuel's main quadrangle.

6.5.2 Shadow Impacts

As discussed in greater detail in Section 3.2, shadow studies were conducted to investigate 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. As illustrated in Figures 3.2-1 to 3.2-14, new shadow from the Project is generally limited to nearby streets and sidewalks. New shadow cast onto the Emerald Necklace during the time periods studied will be limited to the winter months.

New shadow will be cast onto portions of Emmanuel's Administration Building and on The Fenway. The Project does not cast new shadow on the Emerald Necklace on March 21, and is in compliance with the LMA Interim Guidelines. However, shadow on the Administration Building will be limited to the building's roof and secondary elevations and will not be cast onto the primary façade of the building. Where impacts occur to the roof and secondary elevations they will be limited to early evening hours during the months of September, June and March.

6.6 Status of Project Reviews with Historical Agencies

6.6.1 Massachusetts Historical Commission review

The Project will not require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state or federal licenses, permits, approvals or funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project.

6.6.2 Boston Landmarks Commission review

Originally constructed in 1958, the existing Julie Hall is over 50 years of age; therefore, the proposed demolition of the building is subject to review by the Boston Landmarks Commission (BLC) under Article 85 of the Boston Zoning Code. At the appropriate time, the Proponent will submit an Article 85 application with the BLC for its review and consideration.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

The Infrastructure Systems Component outlines the existing utilities surrounding the Project site, the connections required to provide service to the Project, and any impacts on the existing utility systems that may result from the construction of the Project. The following utility systems are discussed herein:

- Wastewater
- Water Supply
- Natural gas
- Electricity
- Telecommunications

The Project includes the demolition of the existing Julie Hall. The new building will be six stories along Brookline Avenue, and nineteen stories on the eastern portion of the site adjacent to Marian Hall. The Project will include 15 below grade parking spaces. The Project site is located on Brookline Avenue on Emmanuel College's campus, and is bounded by Brookline Avenue to the Northwest, Beth Israel Deaconess Medical Center to the Southwest, and Emmanuel College campus to the northeast and southeast. Because the proposed Project is anticipated to have fewer beds than the 2012 IMP, the Project's sewage generation and water use is expected to be lower than what would have been generated by the 2012 IMP Project.

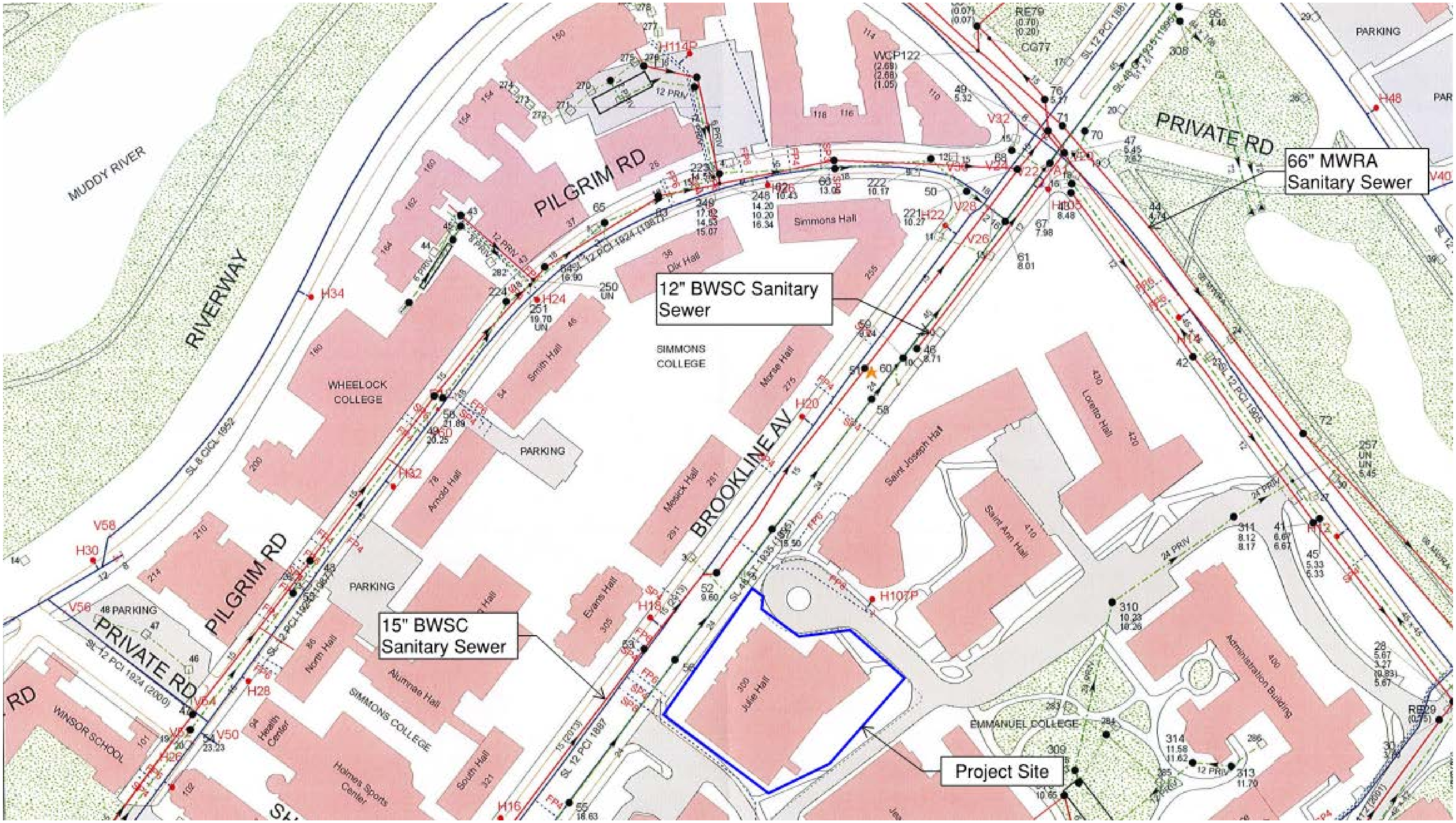
7.1 Wastewater

7.1.1 Existing Sewer System

There is an existing 12-inch and 15-inch Boston Water and Sewer Commission (BWSC) sanitary sewer main located in Brookline Avenue. The existing 15-inch sanitary sewer main flows north in Brookline Avenue and was constructed in 2013. The sanitary sewer main appears to flow into a 66-inch Massachusetts Water Resources Authority (MWRA) sewer main in Fenway. The sanitary sewer main ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. There is an existing 6-inch sewer service that exits Julie Hall in the southwest corner and connects to a sewer main in Brookline Avenue. The existing sewer system is illustrated in Figure 7-1.

7.1.2 Project Generated Sanitary Sewer Flow

The Project's sewage generation rates were estimated using the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program from 310 CMR 15.00 and the proposed building program. 310 CMR 15.00 lists typical sewage generation values for the proposed building use, as shown in Table 7-1. Typical generation



Emmanuel College Residence Hall **Boston, Massachusetts**

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Figure 7-1

Existing Sanitary Sewer System Map

values are conservative values for estimating the sewage flows from new construction. 310 CMR 15.00 sewage generation values are used to evaluate new sewage flows or an increase in flows to existing connections. The existing site consists of a dormitory building, which will be demolished and replaced with a new, larger residence hall. Table 7-1 describes the increased sewage generation in gallons per day (gpd) due to the Project.

Table 7-1 Proposed Wastewater Generation

	Room Use	Size	310 CMR Value (gpd/unit)	Total Flow (gpd)
Existing	Dormitory Building	117 Bedrooms	110/ Bedroom	12,870
			Total	**12,870**
Proposed	Dormitory Building	365 Bedrooms	110/ Bedroom	40,150
			Total	**40,150**
			Net New Flow	**27,280**

The total increase in sanitary flow as a result of the Project is estimated to be 27,280 gpd.

7.1.3 Sewage Capacity and Impacts

The Project's impact on the existing 15-inch BWSC sanitary sewer main in Brookline Avenue was analyzed. The existing sewer system capacity calculations are presented in Table 7-2. The minimum hydraulic capacity is 3.42 million gallons per day (MGD) or 5.30 cubic feet per second (cfs) for the 15-inch system.

Based on an average daily flow estimate for the Project of 40,150 GPD or .040 MGD, an increase of 27,280 GPD or .027 MGD from the existing building; and with a factor of safety of 10 (total estimate = 0.027 MGD x 10 = 0.27 MGD), no capacity problems are expected within the Brookline Avenue system.

Table 7-2 Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	Distance (feet)	Invert Elevation (up)	Invert Elevation (down)	Slope (%)	Diameter (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Brookline Ave								
54 to 53* (NE)	247	12.06	10.40	0.7%	15	0.013	5.29	3.42
53* to 52 (NE)	120	10.40	9.60	0.7%	15	0.013	5.29	3.42
52 to 51* (NE)	277	9.60	7.74	0.7%	15	0.013	5.30	3.42
51* to 50 (NE)	272	7.74	5.91	0.7%	15	0.013	5.30	3.42
50 to 49 (NE)	54	5.91	5.32	1.1%	15	0.013	6.75	4.36
						Minimum Flow Analyzed:	5.29	3.42

Note:
1. Manhole numbers taken from BWSC Sewer system Map
2. Flow Calculations based on Manning's Equation
* Invert interpolated between upstream and downstream manholes

7.1.4 Proposed Conditions

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The Project is expected to generate an increase in wastewater flows of approximately 27,280 gallons per day. Approval for the increase in sanitary flow will come from BWSC.

At least one new sanitary sewer service connection will be installed as part of this Project. The new sanitary sewer service(s) will connect to the 15-inch BWSC sanitary sewer main in Brookline Avenue.

Improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process for the Project. This process will include a comprehensive design review of the proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

7.2 Water System

7.2.1 Existing Water Service

There are five water systems within the City, and these provide service to portions of the City based on ground surface elevation. The five systems are Southern Low (commonly known as low service), Southern High (commonly known as high service), Southern Extra High, Northern Low, and Northern High. There is a 12-inch Southern Low Main and a 48-inch Southern Low Main in Brookline Avenue.

There is an existing 4-inch domestic water service and a 6-inch fire protection service which both exit Julie Hall in the southwest corner. Both connect to a water main in Brookline Avenue. The existing water system is illustrated in Figure 7-2.

7.2.2 Anticipated Water Consumption

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above, and the billing history for the existing building account, provided by BWSC.

The increase in average daily water demand associated with the Project is based on the Project's increase in estimated sewage generation. A conservative factor of 1.1 (10%) is applied to the increase in estimated average daily wastewater flows calculated with 310 CMR 15.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project is estimated to increase water demand for the building by 20,008 gpd [27,280 gpd x 1.1 = 30,008 gpd].

The existing Julie Hall has two existing BWSC water accounts. The historical water use for the two services to the existing building combined is estimated to be between 1,261 gpd and 8,053 gpd. This estimate is based on the water meter billing history provided by BWSC for the existing accounts located at 300 Brookline Avenue from February 2013 to July 2015. The billing history for the existing building water meter account (Account #182570001 and #182570002), is summarized in Table7-3.

Table 7-3 Existing Building Water Use

	Time Period	Water Use (cubic feet - cf)	Total Days Metered	Water Use (cf/day)	Water Use (gpd)
Minimum Water Use Recorded	1/6/15-2/4/15	4,889	29	168.6	1,261
Maximum Water Use Recorded	4/3/15-5/5/15	34,452	32	1,076.6	8,053
Average Water Use for 2014	1/2/14-1/2/15	296,346	365	811.9	6,073
Average Water Use for 2013	1/2/13-1/2/14	300,785	365	824.1	6,164

Note: Billing History for Account #18257001 and 18257002 provided by BWSC on July 17, 2015

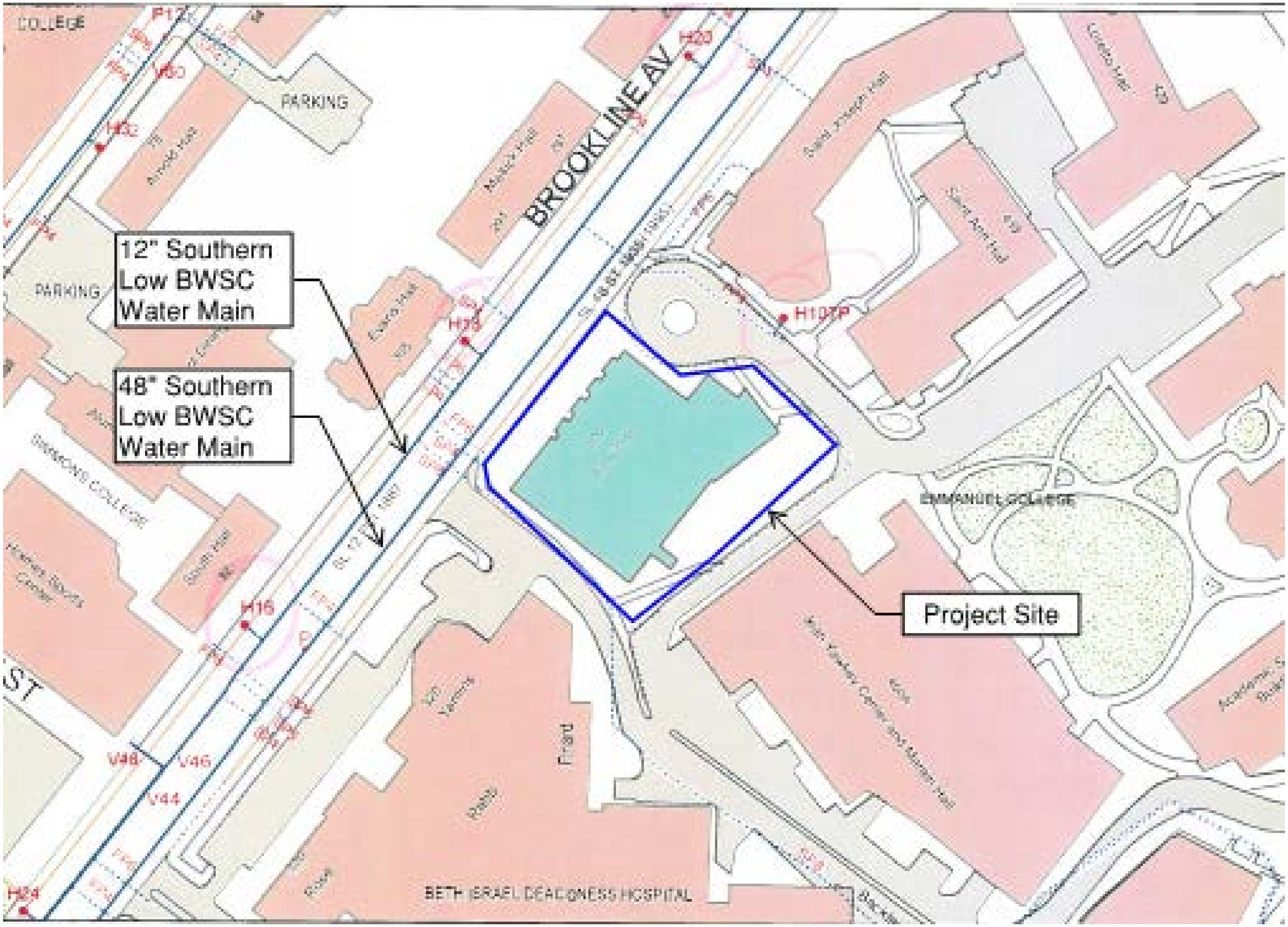

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Figure 7-2

Existing Water System Map

7.2.3 Existing Water Capacity and Impacts

BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the Project site was requested by the Proponent. Hydrant flow data was available for one hydrant near the Project site. The existing hydrant flow data is shown in Table 7-4. As the design progresses, the Proponent will request hydrant flows be conducted by BWSC adjacent to the Project. Water capacity problems are not anticipated within this system as a result of the Project's construction

Table 7-4 Existing Hydrant Flow Data

Flow Hydrant Number	Date of Test	Static Pressure (psi)	Residual Pressure (psi)	Total Flow (gpm)	Flow (gpm) at 20 psi	Flow (gpm) at 10 psi
H20 (Brookline Avenue)	11/30/2010	68	65	1,186	5,300	5,871

Note: Data provided by BWSC on July 20, 2015

7.2.4 Proposed Water System

New fire protection and domestic water services will be required for the Project. The services will connect to one of the existing BWSC water mains in Brookline Avenue.

New services will meet the applicable City and State codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's Site Plan Review Process. This review will include sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and siamese connections that conform to BWSC and Boston Fire Department requirements.

7.2.5 Water Supply Conservation and Mitigation Measures

Measures to reduce water consumption will be incorporated into the Project Design. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed. If new water services are required, new water services will be installed in accordance with the latest local, state, and federal codes and standards. Backflow preventers will be installed at both domestic water and fire protection service connections. New meters will be installed with Meter Transmitter Units ("MTU's") as part of the BWSC's Automatic Meter Reading (AMR) system.

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The installation of sensor-operated sinks with water conserving aerators and sensor-operated toilets in all non-residential restrooms will be incorporated into the design plans for the Project.

7.3 Storm Drainage System

7.3.1 Existing Storm Drainage System

There is an existing BWSC storm drain main in Brookline Avenue. The BWSC main in Brookline Avenue is a 24-inch main flowing north to a 45-inch drain main in Brookline Avenue which then flows north into the 108″x132″ Muddy River Conduit which eventually discharges into the Charles River.

The existing building appears to be serviced by a 12-inch storm drain service connecting to the 24-inch drain main Brookline Avenue. The existing storm drain system is illustrated in Figure 7-3.

7.3.2 Proposed Storm Drainage System

The existing site is covered by impervious roof area, impervious pavement, and landscaping. The Project will increase the impervious cover on site. The Project will infiltrate one-inch of stormwater runoff from impervious areas into the ground to the greatest extent possible.

The proposed stormwater management system will include groundwater recharge systems. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition. Treatment will be required for runoff from impervious pavement; however, stormwater runoff from the roof area will be considered ‘clean’ and will therefore not require treatment prior to discharging to the municipal storm drain system.

The existing storm drainage service to the existing building will be demolished and a new drain connection will be installed, which will be serviced by the 24-inch drain main in Brookline Avenue. The improvements and connections to the BWSC main in Brookline Avenue will be reviewed as part of BWSC’s site plan review process. The process will include a comprehensive design review of the proposed service connections, and assessment of Project demands and system capacity.

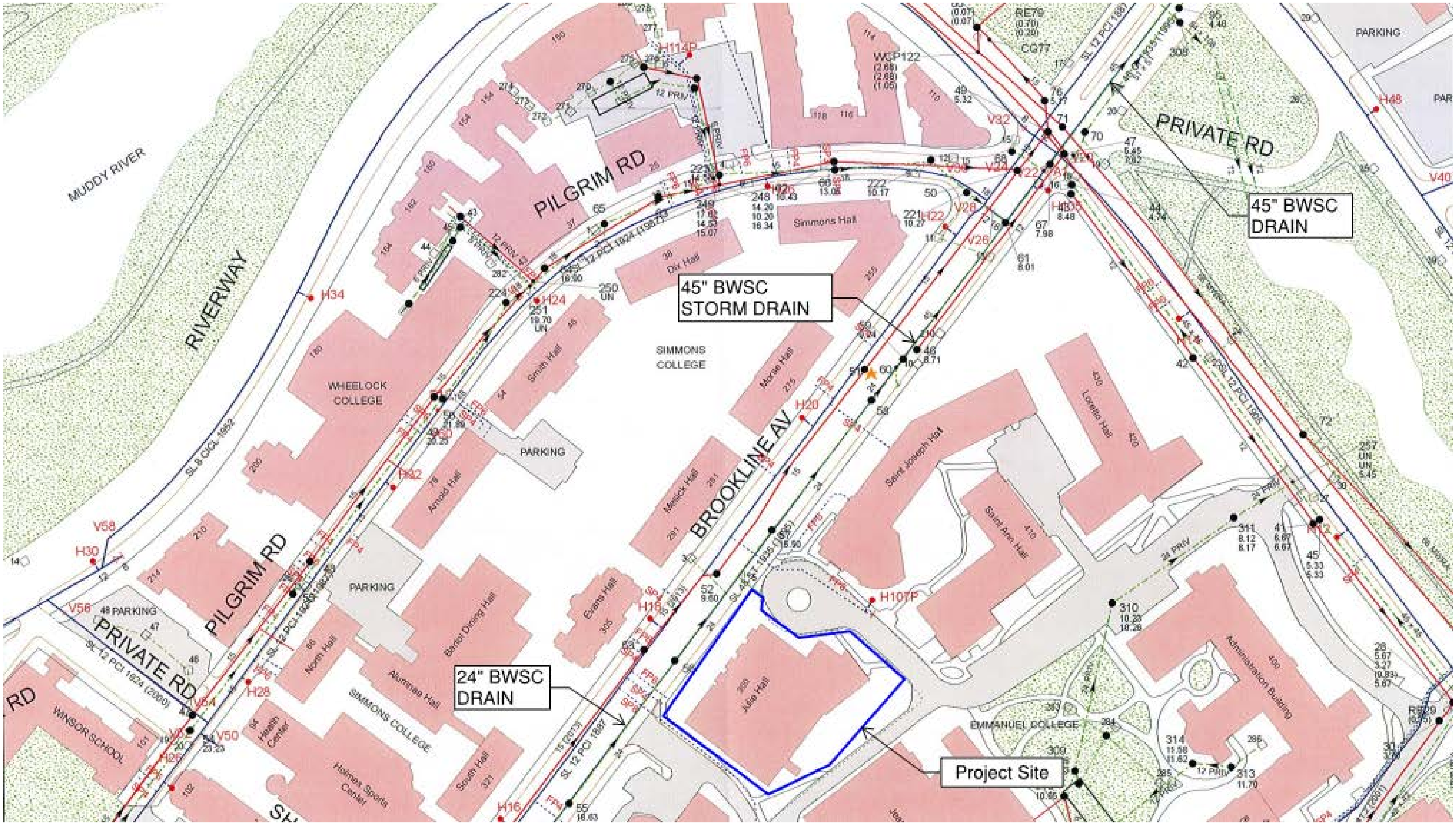


Figure 7-3

Existing Storm Drain System Map

7.3.3 Water Quality Impact

The Project will not affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Project will be in compliance with local and state stormwater management policies, as described below.

7.3.4 Groundwater

The proposed Project is located within the Groundwater Conservation Overlay District (GCOD) which is governed by Article 32 of the Code. The proposed Project shall comply with the standards and requirements set forth in Article 32 of the Code. The Proponent shall obtain a written determination from the Boston Water and Sewer Commission (BWSC) as to whether the proposed Project meets the standards and requirements of Article 32. In addition, the Proponent shall demonstrate that the proposed Project meets the requirements of Section 32-6 of the Code by obtaining a stamped certification from a Massachusetts registered engineer that the requirements of Section 32-6 of the Code are met. The Proponent shall provide both a copy of the written determination from BWSC and a copy of the stamped certification from a Massachusetts registered engineer to the BRA and the Boston Groundwater Trust prior to the issuance of a Certification of Consistency. As such, the proposed Project shall be deemed to be in compliance with Article 32 of the Code and shall not need a conditional use permit from the Board of Appeal for Article 32 purposes.

7.3.5 State Stormwater Standards

In March 1997, MassDEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for development projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The Policy is administered locally pursuant to MGL Ch. 131, s. 40.

A brief explanation of each Policy Standard and the system compliance is provided below:

Standard #1: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance: The proposed design will comply with this Standard. No new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the Project.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.

Compliance: The proposed design will comply with this Standard. A stormwater management system will be installed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmental sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Compliance: The Project will comply with this standard. A stormwater management system will be installed to provide the required recharge volume for the Project site.

Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Compliance: The proposed design will comply with this standard. The Project will not have an impact on stormwater runoff quality. The Project storm drain service will not discharge to a combined sewer.

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Compliance: The proposed design will comply with this standard. The Project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-6).

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Compliance: The proposed design will comply with this Standard. The Project will not discharge untreated stormwater to a sensitive area or any other area.

Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Compliance: The Project will result in an increase in impervious area, therefore will not be considered a redevelopment. The Standard does not apply to the Project.

Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

Compliance: The Project will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of the Project and employed during construction.

Standard 9: A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Compliance: The Project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the Project and will assure proper maintenance and functioning of the stormwater management system.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

Compliance: The Project will comply with this standard. There will be no illicit connections associated with the Project.

7.4 Electrical Service

Eversource Energy owns the electrical system in the vicinity of the Project site. It is expected that adequate service is available in the existing electrical systems in the surrounding streets to serve the Project. The Proponent will work with Eversource to confirm adequate system capacity as the design is finalized.

7.5 Telecommunication Systems

The Proponent will select private telecommunications companies to provide telephone, cable, and data services. There are several potential candidates with substantial downtown Boston networks capable of providing service. Upon selection of a provider or providers, the Proponent will coordinate service connection locations and obtain appropriate approvals.

7.6 Gas Systems

National Grid has gas services in the vicinity of the Project site. The Proponent will work with National Grid to confirm adequate system capacity as design is finalized.

7.7 Utility Protection During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during Project construction. The installation of proposed utility connections within public ways will be undertaken in accordance with BWSC, Boston Public Works Department, the Dig-Safe Program, and applicable utility company requirements. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process. All necessary permits will be obtained before the commencement of work.

The Proponent will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Project.

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 and will be designated to comply with the standards of the Americans with Disabilities Act. See Appendix D for the Accessibility Checklist.

8.2 Massachusetts Environmental Policy Act (MEPA)

The Proponent does not expect that the Project will require review by the Massachusetts Environmental Policy Act (MEPA) Office of the Massachusetts Executive Office of Energy and Environmental Affairs. Current plans do not call for the Project to receive any state permits, state funding or involve any state land transfers.

8.3 Massachusetts Historical Commission

The Proponent does not anticipate that the Project will require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state or federal licenses, permits, approvals or funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project.

8.4 Boston Landmarks Commission

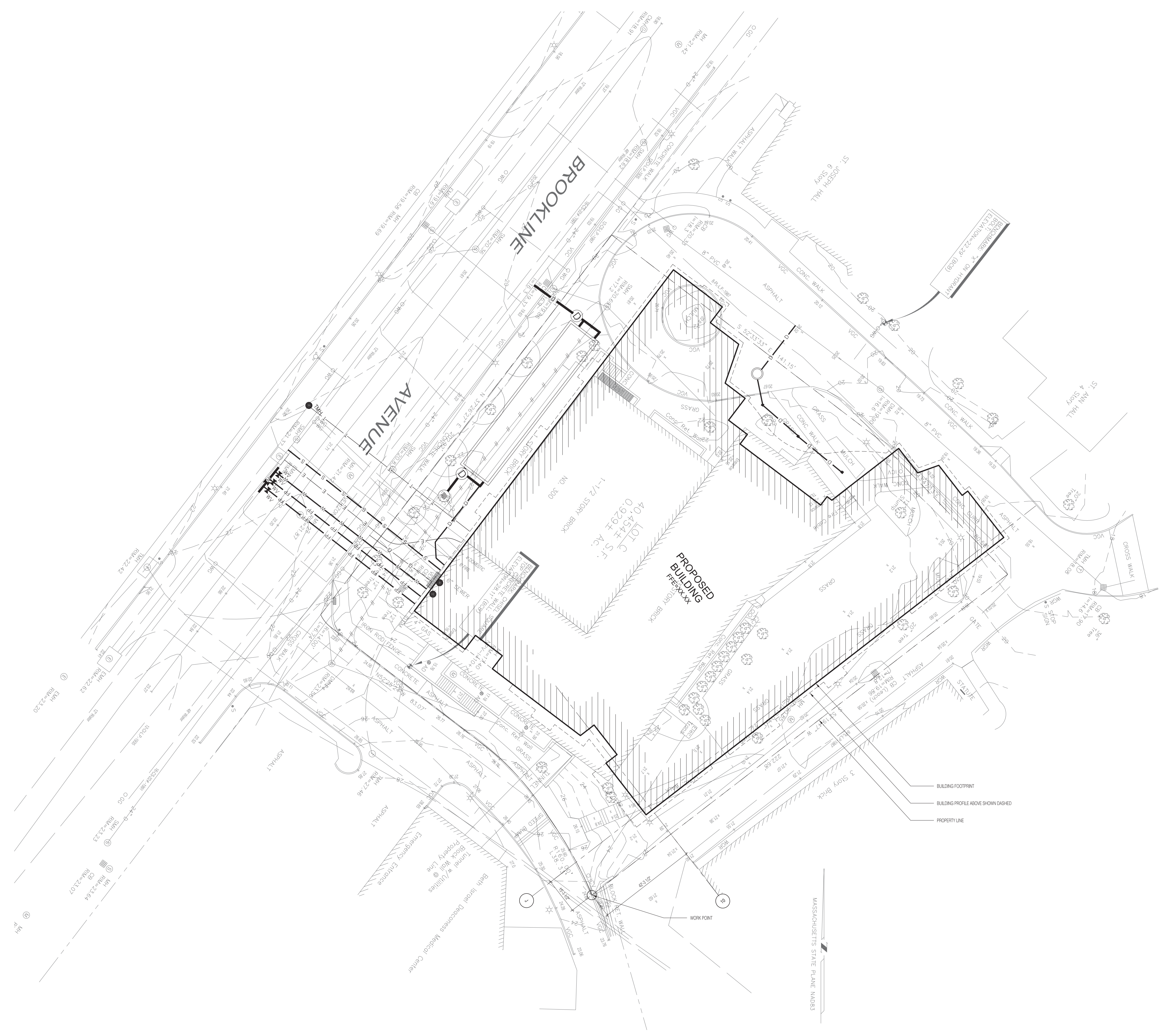
Originally constructed in 1958, the existing Julie Hall is over 50 years of age; therefore, the proposed demolition of the building is subject to review by the Boston Landmarks Commission (BLC) under Article 85 of the Boston Zoning Code. At the appropriate time, the Proponent will submit an Article 85 application with the BLC for its review and consideration.

8.5 Boston Civic Design Commission

The Project will comply with the provisions of Article 28 of the Boston Zoning Code. This PNF will be submitted to the Boston Civic Design Commission by the BRA as part of the Article 80 process.

Appendix A

Site Survey



1 **OVERALL SITE SURVEY**

SCALE: AS NOTED

ELKUS | MANFREDI
ARCHITECTS

[address] 25 DRYDOCK AVENUE
BOSTON MASSACHUSETTS 02210
[tel] 617.426.1300

EMMANUEL COLLEGE RESIDENCE HALL

Owner
Emmanuel College
400 The Fenway
Boston, MA 02115

Mechanical, Electrical, Plumbing,
& Fire Protection Engineers
R.W. Sullivan Engineering
529 Main Street, Suite 203
Boston, MA 02129-1107

Structural Engineer
McNamara/Salvia, Inc.
160 Federal Street
Boston, MA 02210

Civil Engineer
Nitsch Engineering
2 Center Plaza, Suite 430
Boston, MA 02108

Landscape Architect
Kyle Zick Landscape Architecture, Inc.
36 Broomfield Street, Suite 202
Boston, MA 02108

Code Consultant
Jensen Hughes
1661 Worcester Road, Suite 501
Framingham, MA 01701

Geotechnical Consultant
McPhail Associates, LLC
2269 Massachusetts Avenue
Cambridge, MA 02140

Lighting Design
Lam Partners, Inc.
84 Sherman Street
Cambridge, MA 02140

SCHEMATIC DESIGN

10.05.15
DRAFT
NOT FOR CONSTRUCTION

N

PROJECT NUMBER: 15034.01

DATE: OCTOBER 9, 2015

REVISIONS:

SCALE: 1/16" = 1'-0"

DRAWING NAME:
OVERALL
SITE SURVEY

DRAWING NUMBER:
C100

Appendix B

Wind

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
1	A	Data Not Available						
	B	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
2	A	Spring	9		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	14	+56%	Standing	22	+38%	Acceptable
		Summer	11	+38%	Sitting	18	+38%	Acceptable
		Fall	13	+44%	Standing	21	+40%	Acceptable
		Winter	15	+50%	Standing	24	+50%	Acceptable
		Annual	14	+56%	Standing	22	+47%	Acceptable
3	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	16	-16%	Walking	23	-18%	Acceptable
		Summer	13	-13%	Standing	18	-14%	Acceptable
		Fall	15	-17%	Standing	22	-15%	Acceptable
		Winter	17	-19%	Walking	24	-20%	Acceptable
		Annual	15	-21%	Standing	23	-15%	Acceptable
4	A	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	15	-21%	Standing	24	-11%	Acceptable
		Summer	13	-13%	Standing	20		Acceptable
		Fall	14	-22%	Standing	23		Acceptable
		Winter	16	-24%	Walking	25	-14%	Acceptable
		Annual	15	-21%	Standing	23	-15%	Acceptable
5	A	Spring	19		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	21	+11%	Uncomfortable	29	+12%	Acceptable
		Summer	17	+21%	Walking	23	+15%	Acceptable
		Fall	20	+18%	Uncomfortable	28	+12%	Acceptable
		Winter	23	+15%	Uncomfortable	32	+14%	Unacceptable
		Annual	21	+17%	Uncomfortable	29	+12%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – Existing
B – Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
6	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	17		Walking	25		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	28		Acceptable
	B	Spring	20		Uncomfortable	26	-10%	Acceptable
		Summer	17		Walking	22	-12%	Acceptable
		Fall	17	-11%	Walking	23	-15%	Acceptable
		Winter	19		Walking	26	-13%	Acceptable
		Annual	18		Walking	25	-11%	Acceptable
7	A	Spring	12		Sitting	18		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	11		Sitting	16	-11%	Acceptable
		Summer	9	-18%	Sitting	13	-19%	Acceptable
		Fall	10	-17%	Sitting	15	-12%	Acceptable
		Winter	12		Sitting	17	-11%	Acceptable
		Annual	11		Sitting	16	-11%	Acceptable
8	A	Data Not Available						
	B	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	16		Acceptable
		Annual	9		Sitting	14		Acceptable
9	A	Spring	19		Walking	29		Acceptable
		Summer	15		Standing	23		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	18		Walking	28		Acceptable
	B	Spring	15	-21%	Standing	25	-14%	Acceptable
		Summer	13	-13%	Standing	21		Acceptable
		Fall	14	-22%	Standing	23	-15%	Acceptable
		Winter	16	-20%	Walking	26	-16%	Acceptable
		Annual	15	-17%	Standing	24	-14%	Acceptable
10	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	12	-14%	Sitting	19		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12	-20%	Sitting	20		Acceptable
		Annual	12	-14%	Sitting	19		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
11	A	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	10	-17%	Sitting	16	-11%	Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	10	-17%	Sitting	17	-11%	Acceptable
		Annual	10		Sitting	16	-11%	Acceptable
12	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	9	-25%	Sitting	14	-22%	Acceptable
		Summer	7	-22%	Sitting	12	-14%	Acceptable
		Fall	8	-27%	Sitting	14	-18%	Acceptable
		Winter	9	-25%	Sitting	15	-21%	Acceptable
		Annual	8	-33%	Sitting	14	-22%	Acceptable
13	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	17	+31%	Walking	26	+30%	Acceptable
		Summer	13	+30%	Standing	20	+25%	Acceptable
		Fall	16	+33%	Walking	24	+26%	Acceptable
		Winter	18	+29%	Walking	28	+33%	Acceptable
		Annual	17	+42%	Walking	25	+32%	Acceptable
14	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10	+11%	Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
15	A	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	14	+27%	Standing	21	+11%	Acceptable
		Summer	12	+33%	Sitting	17	+13%	Acceptable
		Fall	13	+18%	Standing	20	+11%	Acceptable
		Winter	15	+25%	Standing	22		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – Existing	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Annual	14	+27%	Standing	21	+17%	Acceptable
16	A	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	19		Walking	25		Acceptable
17	A	Spring	9		Sitting	15		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	9		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	16	+78%	Walking	25	+67%	Acceptable
		Summer	13	+62%	Standing	20	+54%	Acceptable
		Fall	15	+67%	Standing	24	+60%	Acceptable
		Winter	17	+89%	Walking	27	+69%	Acceptable
		Annual	16	+78%	Walking	25	+67%	Acceptable
18	A	Spring	19		Walking	25		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	21	+11%	Uncomfortable	30	+20%	Acceptable
		Summer	16		Walking	23	+15%	Acceptable
		Fall	20	+11%	Uncomfortable	27	+12%	Acceptable
		Winter	23	+15%	Uncomfortable	32	+19%	Unacceptable
		Annual	21	+17%	Uncomfortable	29	+16%	Acceptable
19	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	17	+21%	Walking	27	+29%	Acceptable
		Summer	14	+27%	Standing	21	+31%	Acceptable
		Fall	16	+23%	Walking	26	+30%	Acceptable
		Winter	19	+36%	Walking	30	+36%	Acceptable
		Annual	17	+31%	Walking	27	+29%	Acceptable
20	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	15	+15%	Standing	22		Acceptable
		Summer	12	+20%	Sitting	18	+12%	Acceptable
		Fall	14	+17%	Standing	21	+11%	Acceptable
		Winter	16	+14%	Walking	24		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – Existing
B – Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Annual	14		Standing	22		Acceptable
21	A	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	7	-59%	Sitting	11	-56%	Acceptable
		Summer	6	-57%	Sitting	9	-55%	Acceptable
		Fall	7	-56%	Sitting	10	-57%	Acceptable
		Winter	8	-58%	Sitting	12	-54%	Acceptable
		Annual	7	-59%	Sitting	11	-54%	Acceptable
22	A	Spring	14		Standing	20		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	17	+21%	Walking	23	+15%	Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16	+23%	Walking	22		Acceptable
		Winter	18	+29%	Walking	26	+24%	Acceptable
		Annual	16	+23%	Walking	23	+15%	Acceptable
23	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	29		Acceptable
24	A	Spring	17		Walking	24		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	17		Walking	24		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
25	A	Spring	17		Walking	24		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	19		Walking	25		Acceptable
		Annual	17		Walking	23		Acceptable
	B	Spring	21	+24%	Uncomfortable	28	+17%	Acceptable
		Summer	17	+13%	Walking	24	+20%	Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Annual	19	+12%	Walking	26	+13%	Acceptable
26	A	Spring	18		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	14	-22%	Standing	22	-19%	Acceptable
		Summer	12	-20%	Sitting	18	-18%	Acceptable
		Fall	13	-24%	Standing	21	-16%	Acceptable
		Winter	14	-26%	Standing	23	-21%	Acceptable
		Annual	13	-28%	Standing	22	-15%	Acceptable
27	A	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	14	-12%	Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15	-17%	Standing	25		Acceptable
		Annual	14	-12%	Standing	23		Acceptable
28	A	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
29	A	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	17	+21%	Walking	26	+18%	Acceptable
		Summer	14	+17%	Standing	21	+17%	Acceptable
		Fall	16	+14%	Walking	25	+19%	Acceptable
		Winter	19	+19%	Walking	28	+17%	Acceptable
		Annual	17	+21%	Walking	26	+18%	Acceptable
30	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	18	+12%	Walking	28	+12%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Annual	16		Walking	25		Acceptable
31	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	15		Standing	23		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	19		Walking	28		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	21		Uncomfortable	31		Acceptable
		Annual	19		Walking	28		Acceptable
32	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	17		Walking	26	+13%	Acceptable
		Summer	13		Standing	20	+11%	Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18	+12%	Walking	28	+17%	Acceptable
		Annual	16		Walking	25		Acceptable
33	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	14		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	13	-13%	Standing	22		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
34	A	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14	-12%	Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
35	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	19		Walking	28		Acceptable
	B	Spring	18		Walking	23	-18%	Acceptable
		Summer	14		Standing	18	-18%	Acceptable
		Fall	17		Walking	22	-15%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	18		Walking	25	-17%	Acceptable
		Annual	17	-11%	Walking	23	-18%	Acceptable
36	A	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	16		Walking	25		Acceptable
37	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	13	-19%	Standing	21		Acceptable
		Summer	10	-17%	Sitting	16	-11%	Acceptable
		Fall	13	-13%	Standing	20		Acceptable
		Winter	14	-18%	Standing	23		Acceptable
		Annual	13	-13%	Standing	21		Acceptable
38	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	10	-17%	Sitting	16	-16%	Acceptable
		Summer	8	-20%	Sitting	13	-13%	Acceptable
		Fall	9	-18%	Sitting	15	-17%	Acceptable
		Winter	11	-15%	Sitting	17	-15%	Acceptable
		Annual	10	-17%	Sitting	16	-11%	Acceptable
39	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
40	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	11	-15%	Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – Existing	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
41	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	13	-13%	Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12	-14%	Sitting	20		Acceptable
		Winter	14	-12%	Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
42	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
43	A	Spring	17		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	12	-14%	Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17	-11%	Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
44	A	Spring	11		Sitting	18		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	9	+12%	Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
45	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – Existing
B – Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

<u>Effective Gust Criteria</u>

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
46	A	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	15	+36%	Standing	24	+26%	Acceptable
		Summer	12	+33%	Sitting	19	+27%	Acceptable
		Fall	14	+27%	Standing	22	+22%	Acceptable
		Winter	16	+33%	Walking	25	+25%	Acceptable
		Annual	15	+36%	Standing	23	+28%	Acceptable
47	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	11	-15%	Sitting	18	-14%	Acceptable
		Summer	9		Sitting	14	-12%	Acceptable
		Fall	10	-17%	Sitting	17	-11%	Acceptable
		Winter	11	-15%	Sitting	19		Acceptable
		Annual	10	-17%	Sitting	17	-15%	Acceptable
48	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	13	-13%	Standing	21		Acceptable
		Summer	10		Sitting	16	-11%	Acceptable
		Fall	12	-14%	Sitting	20		Acceptable
		Winter	14	-12%	Standing	22	-12%	Acceptable
		Annual	13	-13%	Standing	20	-13%	Acceptable
49	A	Spring	16		Walking	26		Acceptable
		Summer	13		Standing	21		Acceptable
		Fall	15		Standing	25		Acceptable
		Winter	17		Walking	28		Acceptable
		Annual	16		Walking	26		Acceptable
	B	Spring	16		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	17		Walking	28		Acceptable
		Annual	15		Standing	25		Acceptable
50	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	13	-13%	Standing	21		Acceptable
		Summer	10	-17%	Sitting	16	-11%	Acceptable
		Fall	12	-14%	Sitting	19		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
51	A	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
52	A	Spring	14		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	16	+14%	Walking	24		Acceptable
		Summer	12	+20%	Sitting	18	+12%	Acceptable
		Fall	15	+15%	Standing	22		Acceptable
		Winter	17	+21%	Walking	25	+14%	Acceptable
		Annual	16	+23%	Walking	23		Acceptable
53	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	17	+13%	Walking	25		Acceptable
		Summer	14	+27%	Standing	19	+12%	Acceptable
		Fall	16	+14%	Walking	23		Acceptable
		Winter	18	+12%	Walking	26		Acceptable
		Annual	17	+21%	Walking	24		Acceptable
54	A	Spring	20		Uncomfortable	27		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	19		Walking	26		Acceptable
	B	Spring	17	-15%	Walking	25		Acceptable
		Summer	15	-12%	Standing	22		Acceptable
		Fall	16	-16%	Walking	24		Acceptable
		Winter	17	-15%	Walking	26		Acceptable
		Annual	17	-11%	Walking	24		Acceptable
55	A	Spring	21		Uncomfortable	28		Acceptable
		Summer	18		Walking	24		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	22		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	27		Acceptable
	B	Spring	17	-19%	Walking	25	-11%	Acceptable
		Summer	14	-22%	Standing	21	-12%	Acceptable
		Fall	16	-20%	Walking	24	-11%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	17	-23%	Walking	26	-10%	Acceptable
		Annual	17	-15%	Walking	24	-11%	Acceptable
56	A	Spring	19		Walking	27		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	16	-16%	Walking	24	-11%	Acceptable
		Summer	13	-19%	Standing	20		Acceptable
		Fall	15	-17%	Standing	23	-12%	Acceptable
		Winter	17	-15%	Walking	26		Acceptable
		Annual	16	-11%	Walking	24		Acceptable
57	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	20		Acceptable
58	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	13	-13%	Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12	-14%	Sitting	19		Acceptable
		Winter	13	-13%	Standing	20		Acceptable
		Annual	12	-14%	Sitting	19		Acceptable
59	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12	-14%	Sitting	19		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	11	-15%	Sitting	18		Acceptable
		Winter	12	-14%	Sitting	19		Acceptable
		Annual	11	-15%	Sitting	18		Acceptable
60	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	12		Sitting	19		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
61	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
62	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	17	+13%	Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
63	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
64	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
65	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	8	-11%	Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	10		Sitting	16		Acceptable
		Annual	10		Sitting	16		Acceptable
66	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
67	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
68	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	10		Sitting	17		Acceptable
		Summer	8	-11%	Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
69	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
70	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	8	-11%	Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – Existing	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	16		Acceptable
71	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
72	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
73	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	21		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
74	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	10	-17%	Sitting	16	-11%	Acceptable
		Summer	8	-11%	Sitting	12	-14%	Acceptable
		Fall	9	-18%	Sitting	15	-12%	Acceptable
		Winter	11	-15%	Sitting	17	-15%	Acceptable
		Annual	10	-17%	Sitting	16	-11%	Acceptable
75	A	Spring	18		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16	-11%	Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	15		Standing	21		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – Existing
B – Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
		Winter	16	-11%	Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
76	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	10	-17%	Sitting	17	-15%	Acceptable
		Summer	8	-20%	Sitting	13	-19%	Acceptable
		Fall	9	-25%	Sitting	16	-16%	Acceptable
		Winter	10	-23%	Sitting	18	-18%	Acceptable
		Annual	10	-17%	Sitting	17	-15%	Acceptable
77	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
78	A	Spring	21		Uncomfortable	31		Acceptable
		Summer	17		Walking	25		Acceptable
		Fall	20		Uncomfortable	30		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	21		Uncomfortable	31		Acceptable
	B	Spring	21		Uncomfortable	33		Unacceptable
		Summer	16		Walking	25		Acceptable
		Fall	19		Walking	31		Acceptable
		Winter	23		Uncomfortable	36		Unacceptable
		Annual	21		Uncomfortable	31		Acceptable
79	A	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	31		Acceptable
		Annual	19		Walking	28		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – Existing
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Appendix C

Climate Change Preparedness Questionnaire

Climate Change Preparedness and Resiliency Checklist for New Construction

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

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

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

Climate Change Analysis and Information Sources:

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

Checklist

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

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

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

A.1 - Project Information

Project Name:	**New Julie Hall**
Project Address Primary:	**304 Brookline Avenue**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	

A.2 - Team Description

Owner / Developer:	**Emmanuel College**
Architect:	**Elkus Manfredi**
Engineer (building systems):	**RW Sullivan Engineering**
Sustainability / LEED:	**Elkus Manfredi**
Permitting:	**Epsilon Associates**
Construction Management:	**John Moriarty & Associates**
Climate Change Expert:	

A.3 - Project Permitting and Phase

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

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

A.4 - Building Classification and Description

List the principal Building Uses:	Student dormitory
List the First Floor Uses:	*Lobby, study/meeting rooms*

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

☐ Wood Frame	☐ Masonry	☐ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*27,900 SF*	Building Area:	*267,500 SF*
Building Height:	*205 Ft.*	Number of Stories:	*19 Flrs.*
First Floor Elevation (reference Boston City Base):	*21.5 Elev.*	Are there below grade spaces/levels, if yes how many:	*1* *Number of Level*

A.5 - Green Building

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

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

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

Registered:	*Yes / [✓ No]*	Certified:	*Yes / [✓ No]*

A.6 - Building Energy-

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

Electric:	*1500 (kW)*	Heating:	*12,000 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*50-60 (kBTU/SF/YR)*	Cooling:	*550 (Tons/hr)*

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

Electric:	*430 (kW)*	Heating:	*6,000 (MMBtu/hr)*
		Cooling:	*10 (Tons/hr)*

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

Electrical Generation:	*550 (kW)*		Fuel Source:	*Diesel*
System Type and Number of Units:	☑ 1 Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*(Units)*

B - Extreme Weather and Heat Events

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

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

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

Select most appropriate:	☐ 10 Years	☑ 25 Years	☐ 50 Years	☐ 75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

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

7/91 Deg.	Based on ASHRAE Fundamentals 2013 99.6% heating; 0.4% cooling

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

95 Deg.	*5 Days*	*6 Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	*0.2 Events / yr.*

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

45 Inches / yr.	*4 Inches*	*0.5 Events / yr.*

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

130 Peak Wind	*10 Hours*	*0.25 Events / yr.*

B.2 - Mitigation Strategies

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

Building energy use below code:	*20% with a target of 25%*
How is performance determined:	Energy Model

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

Select all appropriate:	☑ High performance building envelop	☑ High performance lighting & controls	☐ Building day lighting	☑ EnergyStar equip. / appliances
	☐ High performance HVAC equipment	☐ Energy recovery ventilation	☐ No active cooling	☐ No active heating
Describe any added measures:				

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

Roof:	*R = 25*	Walls / Curtain Wall Assembly:	*R = 13BATTS + R8 continuous insulation*
Foundation:	*R = 15*	Basement / Slab:	*R =10*
Windows:	*R = / U =0.4*	Doors:	*R = / U =0.7*

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

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

	PV	Thermal		
Describe any added measures:	Lighting will be dimmed in common areas, corridors, parking garage and stairs when they are unoccupied			

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

Select all appropriate:	☐ Connected to local distributed electrical	☐ Building will be Smart Grid ready	☐ Connected to distributed steam, hot, chilled water	☐ Distributed thermal energy ready

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

	Yes / [✓ *No*]	If yes, for how long:	*Days*
If Yes, is building "Islandable?			
If Yes, describe strategies:			

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

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

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

Select all appropriate:	☐ High reflective paving materials	☑ Shade trees & shrubs	☑ High reflective roof materials	☐ Vegetated roofs
Describe other strategies:				

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

Select all appropriate:	☐ On-site retention systems & ponds	☑ Infiltration galleries & areas	☐ Vegetated water capture systems	☐ Vegetated roofs
Describe other strategies:				

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

Select all appropriate:	☐ Hardened building structure & elements	☑ Buried utilities & hardened infrastructure	☐ Hazard removal & protective landscapes	☐ Soft & permeable surfaces (water infiltration)
Describe other strategies:				

C - Sea-Level Rise and Storms

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

C.1 - Location Description and Classification:

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

Yes / [✓ No]

Describe site conditions?

Site Elevation – Low/High Points: *19.0/21.9 Boston City Base Elev.(Ft.)*

Building Proximity to Water: *625 Ft.*

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

Coastal Zone: Yes / [✓ No]

Velocity Zone: Yes / [✓ No]

Flood Zone: Yes / [✓ No]

Area Prone to Flooding: Yes / [✓ No]

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

2013 FEMA Prelim. FIRMs: Yes / [✓ No]

Future floodplain delineation updates: Yes / [✓ No]

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

625 Ft.

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

C - Sea-Level Rise and Storms

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

C.2 - Analysis

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

Sea Level Rise: *3 Ft.*

Frequency of storms: *0.25 per year*

C.3 - Building Flood Proofing

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

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

Flood Proof Elevation: *Boston City Base Elev.(Ft.)*

First Floor Elevation: *Boston City Base Elev. (Ft.)*

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

Yes / No

If Yes, to what elevation *Boston City Base Elev. (Ft.)*

If Yes, describe:

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

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

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

Yes / No

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

Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

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

Yes / No

If Yes, describe:

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

Yes / No	If Yes, for how long:	*days*

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

C.4 - Building Resilience and Adaptability

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

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

Select appropriate:	*Yes / No*	☐ Hardened / Resilient Ground Floor Construction	☐ Temporary shutters and or barricades	☐ Resilient site design, materials and construction

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

Select appropriate:	*Yes / No*	☐ Surrounding site elevation can be raised	☐ Building ground floor can be raised	☐ Construction been engineered
Describe additional strategies:				

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

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

Describe any specific or additional strategies:	

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

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

Appendix D

Accessibility Checklist

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

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

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

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

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

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

Accessibility Analysis Information Sources:

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

Article 80 | ACCESSIBILTY CHECKLIST

Project Information

Project Name:	**New Julie Hall**
Project Address Primary:	**304 Brookline Avenue**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	

Team Description

Owner / Developer:	**Emmanuel College**
Architect:	**Elkus Manfredi**
Engineer (building systems):	**RW Sullivan Engineering**
Sustainability / LEED:	**Elkus Manfredi**
Permitting:	**Epsilon Associates**
Construction Management:	**John Moriarty & Associates**

Project Permitting and Phase

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

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

Article 80 | ACCESSIBILTY CHECKLIST

Building Classification and Description

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

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

First Floor Uses (List): *Security Control Points - Laundry – TV | Game Room – Convenience Store – Study Rooms – Resident Director Apartments (2)- Restrooms – RD Offices*

What is the Construction Type – select most appropriate type?

Wood Frame No	Masonry No	Steel Frame **TBD**	Concrete **TBD**

Describe the building?

Site Area:	*27,900 SF*	Building Area:	*267,500 SF*
Building Height:	*205 Ft.*	Number of Stories:	*19 Flrs.*
First Floor Elevation:	*21.50 Elev.*	Are there below grade spaces:	*[✓ Yes] / No*

Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the development neighborhood and identifying characteristics.	The development area is the campus of Emmanuel College which is located in the Longwood Medical Area. It is an area with multiple educational, cultural, hospitals, teaching hospitals and medical research facilities. It has amenities that include the landscaped Emerald Necklace and is located next to the Fenway which provides more retail and commercial properties.
List the surrounding ADA compliant	The Longwood, Fenway and Longwood Medical Neighborhood T stops are ADA

MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	accessible. The Longwood stop on the on the D Line is closest to the building. The CT2 and CT3 bus lines provide ADA accessible buses just south of the building on Brookline Avenue. The MBTA Worcester Line provides the closest Commuter Rail Line to the building and is serviced by the Yawkey Station.
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	Hospitals – Boston Children's Hospital, Brigham and Women's Hospital, Beth Israel Deaconess Medical Center and Dana Farber Cancer Institute. Higher Educational Institutions – Emmanuel College, Simmons College, Wheelock College, Wentworth Institute of Technology, Harvard Medical School, Massachusetts College of Art, Massachusetts College of Pharmacy and Health Sciences, Harvard School of Dental Medicine, Harvard School of Public Health, Museum of Fine Art Museum School and Northeastern University. K-12 Schools – Boston Latin High School and The Winsor School. Museums and Cultural Institutes – Boston Museum of Fine Arts, Isabella Stewart Gardener Museum and Warren Anatomical Museum. Public and Disabled Housing Developments – Alice Taylor 260 Ruggles Street, Roxbury, MA 02120 | Wittier Street Housing 1158 Tremont Street, Roxbury, MA 02119 are Federally-funded Family Development projects and Frawley Delle Apartments located at 11 Frawley Street, Boston, MA 02120 is a Moderate Rehab Family Development.
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	The proposed Project is located north of the Beth Israel Deaconess Medical Center and is adjacent to the Yawkey and Miriam Student Center serving Emmanuel College. Other adjacent facilities include the remaining academic and residential facilities on the Emmanuel College campus.

Surrounding Site Conditions – Existing:

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

Are there sidewalks and pedestrian ramps existing at the development site?	Yes and those that are affected by new construction will be replaced and improved.

If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	All sidewalks are in good physical condition and constructed out of concrete.
Are the sidewalks and pedestrian ramps existing-to-remain? If yes, have the sidewalks and pedestrian ramps been verified as compliant? If yes, please provide surveyors report.	All ramps and sidewalks walks providing access to the new building will be new.
Is the development site within a historic district? If yes, please identify.	The site is not within a historic district.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Brookline Avenue is to the west of the site. There are currently no plans to make modifications to the Brookline Avenue sidewalk.
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Brookline Avenue is a Neighborhood Connector Street
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	The Project will only be providing an internal vehicle turnaround and pedestrian sidewalks that are internal to the project. Design has not advanced enough to provide documentation on site specific features.
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on	Design materials are forthcoming as the design advances.

the City of Boston pedestrian right-of-way?	
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	No
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	No.
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	NA

Proposed Accessible Parking:

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

What is the total number of parking spaces provided at the development site parking lot or garage?	There will be ADA accessible spaces in the basement – quantity still being evaluated through design.
What is the total number of accessible spaces provided at the development site?	There will be at least 1 accessible parking space plus one van space.
Will any on street accessible parking spaces be required? If yes, has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	No
Where is accessible visitor parking located?	In the below-grade parking garage.
Has a drop-off area been identified? If yes, will it be	Yes

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

Circulation and Accessible Routes:

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

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

Provide a diagram of the accessible route connections through the site.	Refer to project site plan
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	All entryways and thresholds are accessible. All conditions are to be flush or with transitions that are ½ inch or less.
Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	NA
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	No
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	No yet

Accessible Units: (If applicable)

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

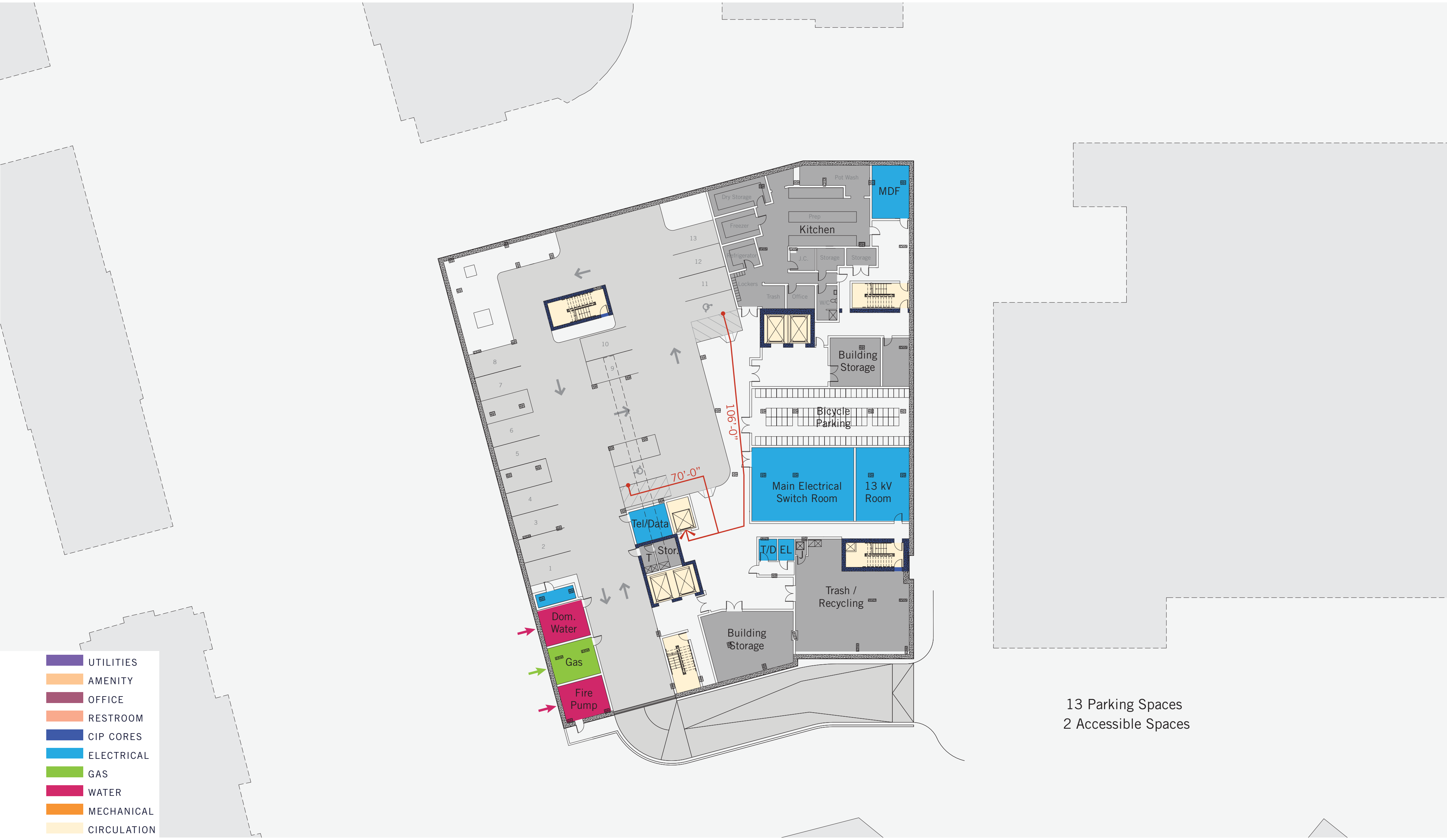
What is the total number of proposed units for the development?	679 Beds in 183 units – 164 quads and 23 Singles

How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	Non are for sale – all are dormitory rooms
How many accessible units are being proposed?	A minimum of 12 Group 2A quads and 2 Group 2A singles
Please provide plan and diagram of the accessible units.	See attached diagram
How many accessible units will also be affordable? If none, please describe reason.	None, units are part of a college residence hall program.
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. If yes, please provide reason.	No – This is barrier free new construction
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	Not at this time.
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	N/A

Thank you for completing the Accessibility Checklist!

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

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



13 Parking Spaces
2 Accessible Spaces

🟪	UTILITIES
🟧	AMENITY
🟫	OFFICE
🟧	RESTROOM
🟦	CIP CORES
🟦	ELECTRICAL
🟩	GAS
🟥	WATER
🟧	MECHANICAL
⬜	CIRCULATION

NEW RESIDENCE HALL -
SCHEMATIC DESIGN
Boston, Massachusetts

ADA Parking Travel Distances - Lower Level Floor Plan

OCTOBER 7, 2015

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EMMANUEL COLLEGE

ELKUS | MANFREDI
ARCHITECTS


Gated Entry
Fenway
Secure Access
Loretto
Cushing Library
Administration
Chapel
St. Ann
Wilkens
Pilgrim Road
St. Joseph
Emmanuel College
Wheelock College
Avenue Louis Pasteur
Simmons College
Brookline Avenue
Blackfan Street
Yawkey Center
Alumnae
Marian
New Residence Hall
P
Merck
Blackfan Circle
Parking
BIDMC
Legend
Vehicular Circulation
Pedestrian Circulation
Accessible Building Entrance / Exit
P
Below Grade Parking
(Staff and Accessible Parking Only)
Bicycle Storage for 106 Bicycles