January 2012

NEC NEW ENGLAND CONSERVATORY

Institutional Master Plan Notification Form/ Project Notification Form

Boston, Massachusetts

PREPARED FOR
New England Conservatory
290 Huntington Avenue
Boston, Massachusetts 02115

PREPARED BY
VHB *Vanasse Hangen Brustlin, Inc.*
99 High Street, 10th Floor
Boston, Massachusetts 02110

In association with:
Colliers International
Ann Beha Architects
Gensler
Howard/Stein-Hudson Associates, Inc.
Nitsch Engineering
Epsilon Associates, Inc.
Brennan, Dain, Le Ray, Wiest, Torpy & Garner, P.C.
Haley and Alderich
AltieriSeborWieber LLC

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Executive Summary

1.1 Introduction

This chapter summarizes the significant project background, features, and impacts presented in New England Conservatory's Institutional Master Plan Notification Form/Project Notification Form (IMPNF/PNF). Included is a history of New England Conservatory (hereinafter referred to as "NEC" or the "Proponent"), its current status as a world renowned school of music, and its need to update and modernize its facilities. The chapter presents highlights of the proposed building projects, the Student Life and Performance Center Project (the "SLPC Project"), Interim renovation of the existing 57,000+/- square foot residence hall and library buildings concurrent with the SLPC Project (the "Interim Renovation Project") and the Learning Center Project (the "LC Project") (together, the "IMP Projects" or the "Proposed Projects") and reviews both the public benefits and impacts associated with the construction of these projects. Also summarized herein are the urban design strategies that have guided the design of the IMP Projects, as well as the IMP Projects' relationships to the surrounding physical environment, historic resources, and infrastructure systems.

1.2 NEC Background

NEC was founded by Eben Toujee in 1867. The opening of the school, one of America's first conservatories, allowed Americans the opportunity to pursue excellence in musical education and performance in their own country rather than needing to travel to Europe to study. The school originally opened at the current site of the Orpheum Theatre on Tremont Street. After its initial opening, the Conservatory experienced much success and popularity, and in the early 1900's, identified the need to move to a new location to accommodate its growing student base. After a temporary relocation to Boston's South End, the school moved to 290 Huntington Avenue in 1903, the building now known as Jordan Hall. This building was purpose-built to meet the specialized needs of musical education and performance and today is the spiritual, cultural, and educational heart of NEC's campus. 290 Huntington Avenue contains classrooms, administrative offices, the Firestone recording library, and several smaller performance facilities such as Brown Hall and Williams Hall. Most importantly, the building houses Jordan Hall, a 1,051-

seat performance hall that is widely recognized as one of the great performance spaces of the world due to its intimacy, beauty, and exceptional acoustics.

Over the past century, the NEC campus has expanded modestly to its current footprint. **Figure 1-1** illustrates the configuration of the NEC campus today. An existing conditions land survey is shown in **Figure 1-2**.

Today, NEC continues to provide an outstanding, world-renowned musical education to students of all ages. NEC has broadened its programming to include affiliation with both Tufts University and Harvard University, allowing students the opportunity to pursue a dual-degree – both at NEC and these other prestigious institutions. As shown in **Figure 1-1**, the NEC campus includes just 4 buildings, which house academic spaces, practice and performance spaces, faculty studios and administrative spaces, student housing, dining commons, and common spaces. The need for modernized and additional student life and educational spaces is required to maximize the educational potential of the Conservatory and to maintain facilities that will continue to attract the caliber of student that NEC is renowned for accommodating over the past 145 years.

1.3 Project Summary

NEC proposes to construct two new buildings on two adjacent parcels presently occupied by a surface parking lot, a small two-story pavilion building used for maintenance storage, and 33 Gainsborough Street, the existing NEC residence hall and print library. The Proposed Projects are designed to be constructed in two phases during the term of the Institutional Master Plan (IMP). Phase I includes the construction of the Student Life and Performance Center Project on the surface parking lot and pavilion building site along St. Botolph Street. As currently planned, the SLPC is programmed to include the following uses:

- 252-bed student residence with common living amenities
- Dining commons with a performance stage
- Student common areas on all levels
- Library resource center housing collections and collaboration study spaces
- Three rehearsal and performance spaces, including a 200-seat Black Box Theater, Orchestra Rehearsal Room, and a Large Ensemble/Recording Room.

After completion of the SLPC, existing spaces in 33 Gainsborough and the Firestone Library (currently housed in Jordan Hall) will be temporarily vacated for renovations. As currently planned, existing dormitory rooms will be converted into

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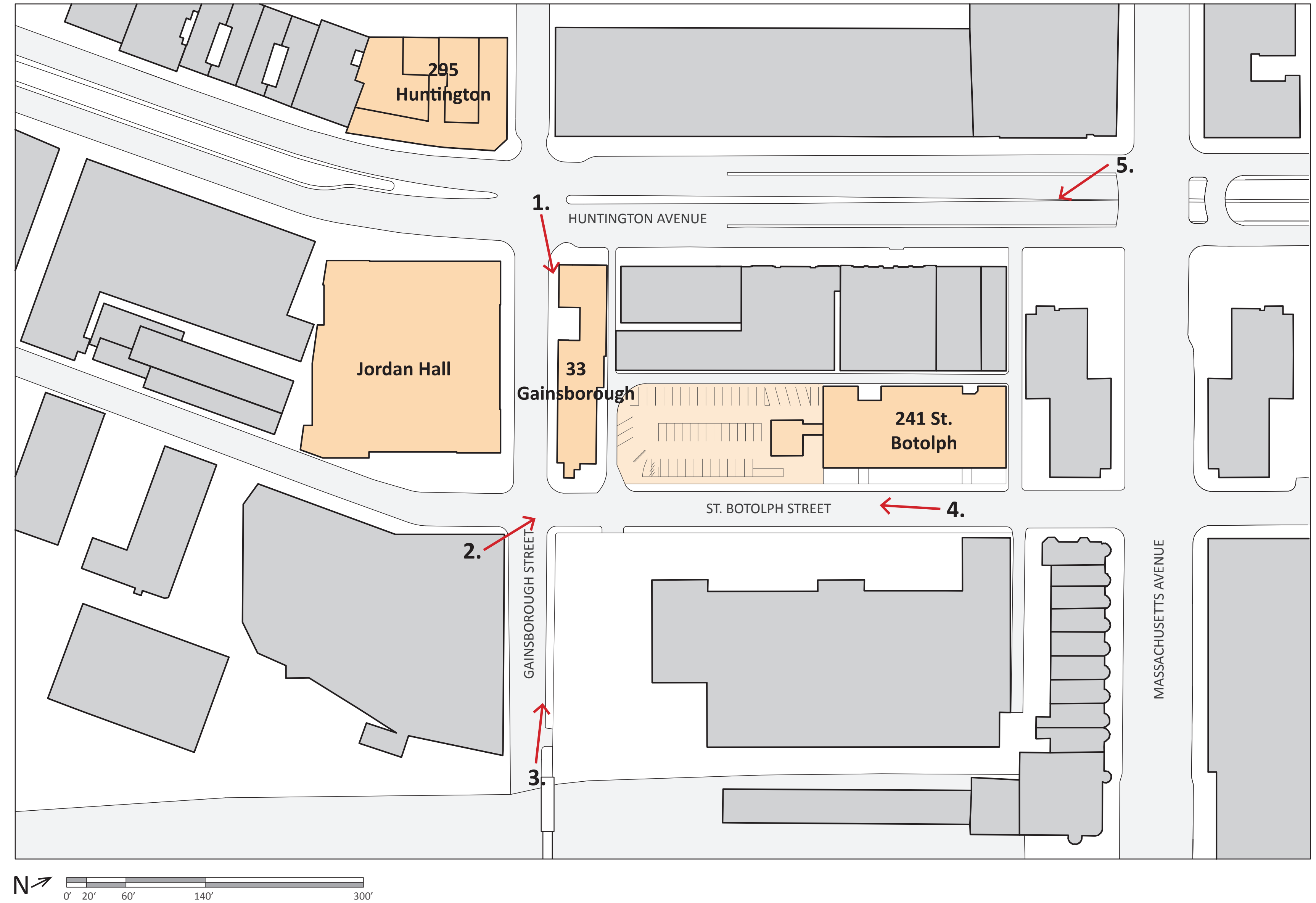

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Figure 1-1 - Existing NEC Campus

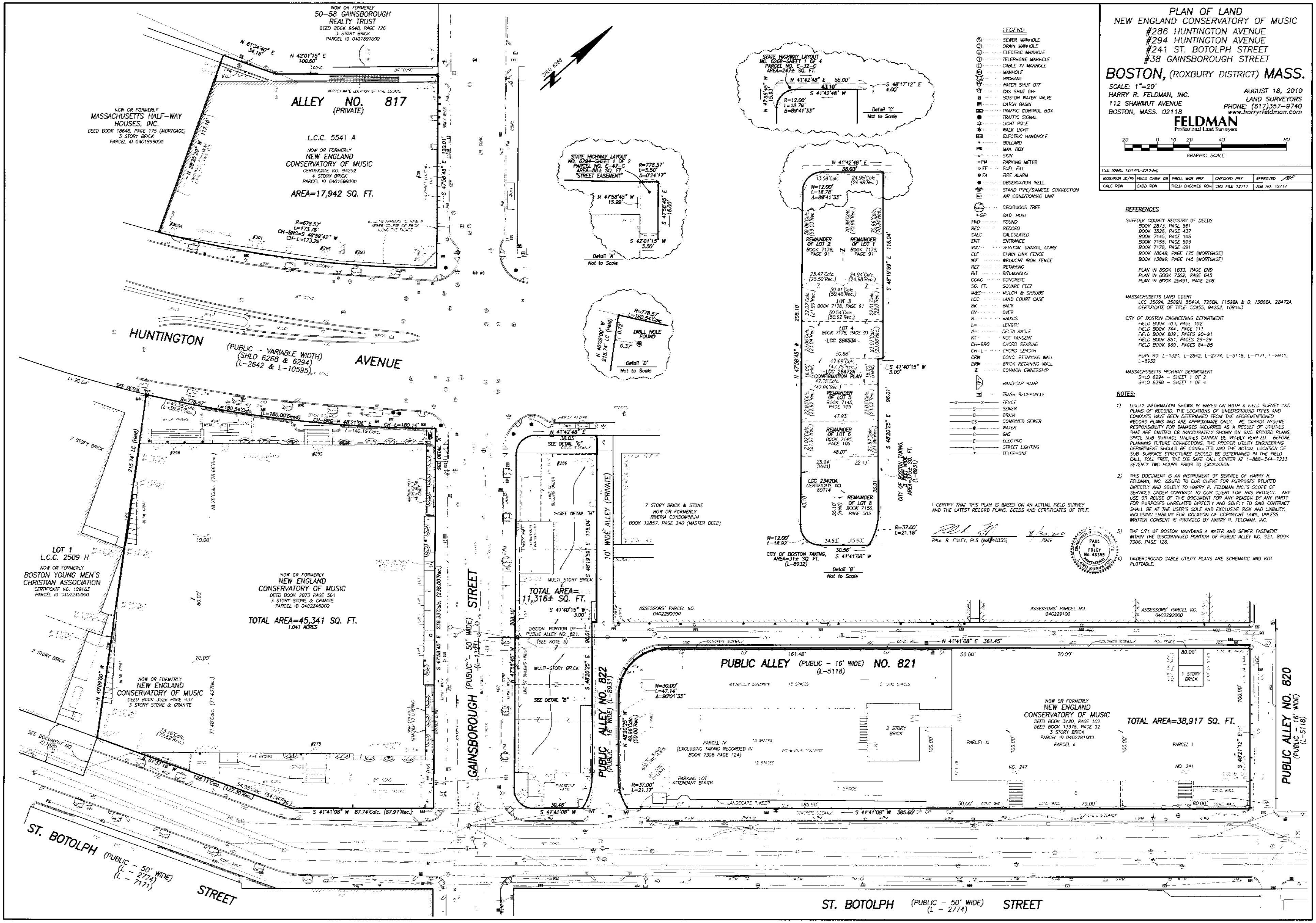

Figure 1-2
Survey Plan

practice rooms and faculty studios on an interim basis. The existing library and cafeteria will be retrofitted for other interim academic purposes.

The future removal of the existing 33 Gainsborough Building will allow for the construction of the proposed Learning Center Project – the second phase of the IMP, which will include a new 7-story, 65,000 square foot building devoted primarily to student learning and practice spaces. As currently planned, this facility will include academic spaces, practice spaces for students, faculty studios, various student services – including Admissions, Financial Aid, Continuing Education, and Preparatory School offices, expansion space for the library resource center, a public coffeehouse opening onto Huntington Avenue, and other student commons that will interconnect this building to the adjacent Student Life and Performance Center.

Connecting the two buildings will be a student commons "spine", envisioned as a linear space that both connects the various campus functions along Gainsborough and St. Botolph Streets and functions as a student gathering space at key nodes along its length. This spine will also connect the Learning Center and Student Life and Performance Center with the 241 St. Botolph building, making it possible for students, faculty, and visitors to travel inside from Gainsborough Street to within a half a block of Massachusetts Avenue during winter months and inclement weather.

In addition to the creation of this interior connectivity, the pedestrian realm surrounding the Proposed Projects will be dramatically improved over existing conditions with widened sidewalks, seating, and green plantings along Gainsborough Street and St. Botolph Street. Pedestrian safety will also be increased with the implementation of a raised paved crosswalk connecting the Learning Center Project to Jordan Hall on Gainsborough Street, the major pedestrian axis of the NEC campus.

1.4 Public Review and Outreach

The Proposed Projects are at the early stages of the public review process. A Letter of Intent to develop the Proposed Projects was submitted to the BRA on December 16, 2011. NEC has met with BRA staff and the staff of other City Departments to review specific aspects of the development proposal in advance of this filing, which begins the Proposed Projects' formal public review process.

The Conservatory looks forward to working with its longtime neighbors and other stakeholders through the course of the Article 80 Development Review process for NEC's first major capital program in over 50 years. NEC understands that a Task Force has been formed, and has met with the Task Force to share information about NEC's rich history and exciting plans for its future in the Fenway. NEC expects that the Task Force will be an important forum for community review and comment on the Proposed Projects and the Institutional Master Plan.

NEC has also held briefings for many of its neighboring property owners and other nearby stakeholders in advance of making this filing. A more comprehensive community outreach program will be implemented in connection with the continued development of the Institutional Master Plan and the Article 80 review process. NEC is looking forward to engaging area community organizations, elected officials, and others as part of their ongoing public outreach related to the school's IMP and Article 80 filing.

1.5 Summary of Benefits

The development of the Proposed Projects will generate numerous public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction and on an ongoing basis upon its completion. Details of the benefits provided by the Proposed Project are presented in Chapter 2, *General Information*, of this IMPNF/PNF, while a summary of these benefits are presented below:

1.5.1 Financial Benefits

Development of the Proposed Projects will result in significant financial benefits to the City of Boston and its residents, including:

- Approximately $275,000 in housing linkage contributions;
- Approximately $54,000 in jobs linkage contributions;
- The creation of approximately 10 new full-time jobs at NEC upon completion of both Phase 1 and Phase 2 Projects; and,
- The creation of over 250 construction jobs in connection with the Proposed Projects.

1.5.2 Urban Design Benefits

The development of the Proposed Projects will enhance the public sides of the proposed buildings along Huntington Avenue, St. Botolph Street, and Gainsborough Street. The Proponent proposes to undertake significant streetscape improvements to the pedestrian realm. These improvements, which will be provided on a phased basis as each of the Proposed Projects is undertaken, will include the following (subject to applicable City of Boston approval):

- If feasible, new street trees on public streets adjacent to the Proposed Project sites;

- New street furniture, lighting, and other amenities on public streets adjacent to the Proposed Project sites;
- Installation of public bicycle storage racks in close proximity to the building entrances, in addition to interior on-site protected bicycle storage for building residents, as outlined in Chapter 5 of this IMPNF/PNF;
- A new pedestrian raised crosswalk between Jordan Hall and the proposed Learning Center Project building entrance; and,
- A small outdoor plaza at the corner of Gainsborough Street and St. Botolph Street with plantings and seats.

1.6 Summary of Impacts

This section summarizes the Proposed Projects' impacts, including transportation and environmental protection. Infrastructure impacts and a discussion of sustainable design components are also presented.

1.6.1 Transportation

The evaluation of existing and future transportation infrastructure and operations of the Conservatory is presented in Chapter 5, *Transportation*. A summary of key findings of the transportation component for the Proposed Projects is as follows:

- No increase in vehicular volumes is expected due to the increase in on-campus housing and the removal of the surface parking lot on St. Botolph Street. NEC expects there to be no increase in student enrollment as a result of the future construction of the Proposed Projects;
- As a result of this lack of increase in vehicular volumes, no impacts to area intersections or traffic flow are expected in connection with the Proposed Projects' construction;
- The future construction of the SLPC Project will require NEC to take their existing 53-space surface parking lot at 241 St. Botolph Street out of service. At the end of the term of the IMP, NEC will own only 20 off-street parking spaces, which are all in a single surface parking lot that is located behind Jordan Hall. NEC may lease parking spaces for their faculty and staff at other nearby off-site parking facilities in order to replace the existing surface parking lot that is being taken out of service;

1.6.2 Environmental Impacts

Details of each of these environmental components described below are provided in Chapter 6, *Environmental Protection Component*.

Wind Analysis

A qualitative wind analysis was completed by the project team to better understand the impacts to the pedestrian environment surrounding the Proposed Projects. The analysis shows that wind conditions at the main entrance of both project buildings will be comfortable to pedestrians. Along adjacent sidewalks, the wind conditions are expected to be comfortable for walking or better.

Shadow

Shadow study analysis performed for the Proposed Projects provides insight into potential effects on the streets, sidewalks, and open spaces in the study area. For a large part of the year, the Proposed Projects have a minimal shadow impact on the surrounding area. Impacts are primarily on the roofs of the back of the Huntington Theater and buildings along Huntington Avenue, and/or on the roofs of buildings owned by NEC. The Proposed Projects will not cast shadows onto any areas of parkland or significant public open space. The Proposed Projects will not cast any significant shadows on the facades of the historic Jordan Hall Building.

Daylight

Development of the Proposed Projects will result in a slightly above seventy percent obstruction of daylight on Huntington Avenue and Gainsborough Street. The largest obstruction will occur along Gainsborough Street due to the construction of the Learning Center Project.

Solar Glare

Solar glare impacts on neighbors and adjacent roadways are not anticipated due to the proposed building designs, which do not include highly reflective glass or other reflective materials that would contribute to solar glare.

Noise

Sound levels generated by mechanical equipment, motor vehicle traffic, building operations and emergency/back-up generators associated with the Proposed Projects were evaluated. The analysis determined that the maximum sound level that the Proposed Projects will generate will comply with the City of Boston's Noise criteria. The proponent will specify equipment and mitigation measures that would result in sound levels that do not exceed the maximum threshold set forth in the City of Boston's Noise Ordinance. It should be noted that the most sensitive receptor(s) in the area surrounding the Proposed Projects will be associated with NEC, where world-class musical education, performance, and recording takes place every day.

Air Quality

A microscale analysis was conducted for the Proposed Projects. The air quality evaluation demonstrates that the Proposed Projects will comply with City, State, and Federal air quality requirements. The microscale analysis evaluated impacts from project-generated motor vehicle traffic at the most congested intersections in the Study Area and the emissions associated with the area traffic. State and federal modeling procedures were used to determine worst-case concentrations. The results demonstrated that all existing, no-build, and future build Carbon Monoxide and Particulate Matter concentrations will be below the National Ambient Air Quality Standards.

Solid and Hazardous Waste

NEC is sensitive to minimizing the level of solid waste it generates, both in the construction and operation of its buildings. The Conservatory's proactive recycling initiatives and trash removal procedures will be incorporated within the new buildings once they are built and occupied.

Geotechnical/Groundwater Conditions

No significant impact on adjacent buildings or utilities is anticipated due to foundation construction. Construction procedures for the Proposed Projects will be designed to limit potential adverse impacts to adjacent structures and utilities. The Proposed Projects are located within the Groundwater Conservation Overlay District (GCOD). The Institutional Master Plan will address the recharge requirements set forth in Article 32 of the Boston Zoning Code.

Flood Hazard Zones/Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates the FEMA Flood Zone Designations for the Campus (City of Boston, Community-Panel Number 25025C0079G). The Proposed Project sites are located outside the 0.2 percent annual chance floodplain (commonly referred to as the 500 year flood limit), identifying them as areas of minimal flooding.

Construction Impact

The Proposed Projects are envisioned to occur in phases. The Proponent estimates that construction of the SLPC Project will take approximately 20 months and will be the first phase of construction. The LC Project is anticipated to take approximately 14 months to complete. The Proponent will require its contractors to construct the Proposed Projects in compliance with all applicable City, State, and Federal regulations governing noise, dust, and traffic maintenance. In addition, a Construction Management Plan will be developed with the BTD for each of the projects.

Rodent Control

The City of Boston enforces the requirements established in the Massachusetts State Sanitary Code, Chapter 11, 105 CMR 410.660 and the State Building Code, Section 108.6 Policy Number 87-4 (City of Boston). These regulations specify that extermination of rodents is required for issuance of permits for demolition, excavation, foundation, and basement rehabilitation. A rodent control program will be developed prior to construction of each Proposed Project.

Historic Resources

Massachusetts Historical Commission

The Proposed Projects may require state financial assistance and/or approvals, thereby triggering review by the Massachusetts Historical Commission (MHC) in accordance with Massachusetts General Laws Chapter 9, ss 26-27C as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00). NEC will be filing a MHC Project Notification Form (PNF) to formally notify the MHC of the Proposed Project and to initiate the MHC consultation process.

For many years the MHC has held a Preservation Restriction on the Jordan Hall building. As a result, any interior or exterior work done to the building is subject to review and approval by MHC. Through the on-going review process, NEC has developed a firm understanding of the MHC review process and the agency's requirements and expectations. The Proponent is committed to working with the MHC, and other interested parties including the Boston Landmarks Commission as part of the MHC consultative review process.

Boston Landmarks Commission

Because the 1912 Cotting School pavilion, currently attached to west side of 241-247 St. Botolph Street, is greater than 50 years old, its proposed removal is subject to review by the Boston Landmarks Commission (BLC) in accordance with Article 85 of the Boston Zoning Code. Likewise, the building at 33 Gainsborough Street is also greater than 50 years old and therefore is also subject to Article 85 review by the BLC.

An Article 85 application for the demolition of the two buildings will be submitted to the BLC concurrently with this filing. NEC is committed to working collaboratively with the BLC and the community throughout the Article 85 review process.

1.6.3 Sustainable Design

The City of Boston requires that new development projects that are over 50,000 SF must comply with green building standards and sustainable design features as described in Article 37 of the Zoning Code. The Proponent is committed to incorporating numerous sustainable design elements into the Proposed Projects to comply with these requirements.

NEC and its Project Team are utilizing the LEED for New Construction (LEED-NC) rating system for both IMP Projects. LEED Checklists for the Proposed Projects are included in Chapter 6, *Environmental Protection Component*.

1.6.4 Infrastructure Systems

Utility connections supporting the Proposed Projects will be designed and constructed in accordance with the City, State, and Federal standards. The Proponent will coordinate with the following regulatory agencies throughout the design and construction process:

- The Boston Water and Sewer Commission ("BWSC"), which is responsible for review and approval of proposed changes to water, sewer, and stormwater systems supporting the Proposed Projects. BWSC reviews any modifications of on- and off-site water, sewer, and drainage systems through their site plan review and approval process. This process includes a comprehensive design review of the proposed service connections, assessment of system demands and capacity and establishment or updating of service accounts.
- The Boston Fire Department ("BFD") will review the Proposed Projects with respect to fire protection measures such as siamese connections and standpipes.
- Design of the site access, hydrant locations, and energy systems will also be coordinated with the respective system owners.
- New utility connections will be authorized by the Boston Public Works Department through the street opening permit process, as required.

In all cases, sufficient utility capacity and service to serve the Proposed Projects exists in the surrounding public ways.

2

General Information

2.1 Introduction

This chapter summarizes New England Conservatory's proposed development program, including general project information, a directory of the project team, NEC's mission, and its mission-driven need for additional space and amenities. The chapter presents required legal and financial information, including the tax history of NEC-owned property, information about the ownership of the Proposed Project's site and easements affecting such sites, and a disclosure of beneficial interests. In addition, this chapter outlines the public benefits proposed as part of the Proposed Projects, including estimated linkage payments, Payment-In-Lieu-of-Taxes (PILOT) agreement, construction employment, permanent employment, and NEC's many community benefit contributions, both on-going and proposed. Finally, this chapter discusses the regulatory controls and permits pertaining to the Proposed Projects, including zoning, design review and anticipated permits.

2.2 History of New England Conservatory

Recognized nationally and internationally as a leader among music schools, New England Conservatory offers rigorous training to approximately 782 undergraduate, graduate, and doctoral music students from around the world in an intimate, nurturing community. Its College faculty of 240 boasts internationally esteemed artist-teachers and scholars. Its alumni go on to fill orchestra chairs, concert hall stages, jazz clubs, recording studios, and arts management positions worldwide. Nearly half of the Boston Symphony Orchestra is composed of NEC trained musicians and faculty. The great majority of NEC-trained musicians devote at least some of their professional lives to teaching, sharing their knowledge and skills with children, young people, and adults.

The oldest independent school of music in the United States, NEC was founded in 1867 by Eben Tourjee at a time when post- Civil War society was demanding American-centric musical culture. The Conservatory's curriculum is remarkable for its wide range of styles and traditions. On the college level, it features undergraduate and graduate-level training in classical, jazz, Contemporary Improvisation, world and early music. Through its Preparatory School and School of

Continuing Education, it provides training and performance opportunities for approximately 1,725 children, pre-college students, adults, and seniors. Through its Community Performances and Partnerships projects, NEC offers young musicians the opportunity to engage with community-based audiences in schools, hospitals, community centers and nursing homes, bringing pleasure to new young listeners, the elderly, and other underserved audiences, and enlarging the universe for classical music and many other genres. In 2010/2011, the CPP operated 348 programs and 115 partnerships with schools, senior centers, community centers, hospitals, libraries, museums, and historic landmarks. Over 245 students participated in this endeavor, reaching in a single year 13,700 people, including 7,600 school children and 6,100 public/adult audience members. The majority of these programs and partnerships take place in the City of Boston with Boston-based schools and non-profit organizations.

NEC presents more than 900 free concerts each year, many of them held in its world-renowned Jordan Hall, a National Historic Landmark famous for its superb acoustics and beautifully restored interior. These programs range from solo recitals to chamber music to orchestral programs to jazz, Contemporary Improvisation, and opera scenes. Every year, NEC's Opera Studies department also presents two fully staged opera productions at the Cutler Majestic Theatre and Paramount Theatre in Boston.

NEC is co-founder and educational partner of *From the Top*, a weekly radio program that celebrates outstanding young classical musicians from the entire country. With its broadcast home in Jordan Hall, the show is now carried by National Public Radio and is heard on 250 stations throughout the United States. Among other partnerships, NEC is also a founding partner of Project STEP, Boston Children's Chorus, String Training and Education Program, which for more than 25 years has provided rigorous pre-professional music preparation for minority children.

2.3 New England Conservatory Mission and Core Values

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2.3.1 Mission Statement

New England Conservatory educates and trains musicians of all ages from around the world, drawing on the talent and deep reservoir of experience of our distinguished faculty. NEC is dedicated to inculcating the highest standards of excellence and nurturing individual artistic sensibility and creative growth. Understanding that music is one of the transcendent expressions of human civilization, NEC aspires to ensure it a central place in contemporary society.

2.3.2 Core Values

We believe that the study of music builds human capacity, elevates the soul, and prepares students for lives that enhance the public good.

We believe our students must have a supportive and collegial learning environment that maximizes the individual attention they receive from their teachers, and allows them to explore and develop their unique artistic personalities.

We believe in the critical importance of mutual support among faculty that encourages the highest standards of excellence and accommodates innovation, individual teaching philosophies, and a broad range of disciplines.

We believe that we have a responsibility to reinforce and expand the position of music in society by educating the next generation of music leaders, incubating new work, and sharing our sublime art with the widest possible audience.

We believe that sharing the gifts of our students, faculty, and graduates with the broader Boston community is an essential part of NEC's core mission. The Community Partnerships Program outlined herein is the manifestation of NEC's commitment to enriching the cultural life of all Bostonians.

2.4 Major Programs and Initiatives

Over the past century, New England Conservatory has engaged students from around the world in their renowned musical education. As the school's curriculum has developed, so has the need to provide modern and up to date facilities, albeit without any enlargement of the student enrollment. The following sections describe the programs available to undergraduate, graduate, preparatory, and continuing education students, the strategic plan the Conservatory intends to follow over the next decade, along with the institutional master plan.

2.4.1 College Programs

Undergraduate and/or Graduate Majors or Concentrations

- All orchestral instruments and guitar
- Choral Conducting
- Piano and Collaborative Piano
- Orchestras, wind ensembles, chamber music
- Jazz and Contemporary Improvisation

- Voice and Opera
- Composition
- Historical Performance
- Music History and Theory
- Music-in-Education
- Vocal Pedagogy

Preparatory School programs

- Individual lessons, large and small ensembles, and classes for pre-college students beginning at age 3,
- Certificate offerings for students who follow specified curricula, and
- Large ensemble programs that allow many steps of progression by age and playing ability.

Continuing Education programs

- Certificate offerings in many areas of performance and scholarship, particularly large and small ensemble programs,
- Professional Development Courses for Teachers,
- Summer Institutes that offer concentrated topic studies,
- Distance learning options, and
- Courses for music appreciators.

Performances

- Over 900 free concerts a year, open to the public,
- Wide variety of musical styles—classical, jazz, contemporary improvisation, world—so everyone can find something they like,
- Performers include students, artist faculty, alumni, friends, and ensembles such as the NEC Philharmonia, Symphony, Chamber Orchestra, Wind Ensemble, Contemporary Ensemble, necshivaree, Ensembles-in-Residence,
- Two fully staged operas a year at modest ticket prices, with student/senior discounts,
- Outstanding venues including Jordan Hall, a National Historic Landmark and widely considered one of the great acoustical spaces in the world.

Community Engagement

- Community Performances and Partnerships, through which NEC (as of 2010-11) operates 348 programs and 115 partnerships with schools, senior centers, community centers, hospitals, libraries, museums and other historic landmarks. Over 245 students participate in this endeavor, reaching in a single year 13,700 people, including 7,600 school children and 6,100 public/adult audience members.

- The Abreu Fellows Program at New England Conservatory. Inaugurated in 2009, this program has the goal of training 50 gifted post-graduate musicians, passionate for their art and social justice, who will go out and create/develop music education programs in the US modeled after Venezuela's El Sistema. In this way, NEC can make its strongest possible contribution to a burgeoning movement that has as its goal the social development of at-risk children through music.
- An appealing partner, Jordan Hall, is the preferred venue for many Boston-based arts organizations including celebrity Series, Boston Cantata Series, Boston Children's Chorus.

2.4.2 The Strategic Plan

The goal of New England Conservatory's Strategic Plan is to build and solidify NEC's position as one of the preeminent music schools of the world. Comprising the College, the Preparatory School, and School of Continuing Education, NEC offers musicians elite training in a nurturing, student-centric, and intimate environment. Through their work in the studio, the classroom, and quite importantly, throughout the community and guided by distinguished faculty, students develop their artistry, their leadership, and communication skills so they can take their music out into the world for their own and society's enrichment.

This Strategic Plan was launched by President Tony Woodcock, who felt that it should emanate from and belong to the entire institution rather than be the vision of a single person or small group of Trustees. It is, therefore, the product of a Conservatory-wide planning process that involved more than 200 individuals from all of NEC's constituencies.

Almost every element of the Conservatory came under review, but the planners were adamant that NEC's core ideals remain inviolate. These are: Conservatory's student-centric focus, the need to preserve the intimate size of the College student body and one-on-one studio experience, the open access and enrollment of Preparatory and Continuing Education, and the hands-on, interactive nature of the community programs.

Five Strategic Priorities are described in the Strategic Plan; these are:

Scholarship and Financial Aid. The College and Preparatory discount rates should be increased steadily over time.

Distinctive Faculty and Programs. NEC must attract and retain the best College and Preparatory/Continuing Education faculty throughout the classical performance, composition, jazz, and Contemporary Improvisation studios, and the liberal arts, history and theory classrooms. Following on recent program enhancement in strings, chamber music, and orchestra, NEC is also working to develop the opera and voice programs and other departments. Further, it will initiate a thorough study of its graduate curriculum.

NEC will work to expand programs in both the Preparatory School and School of Continuing Education, also targeting the shortage of space that has constrained growth. Such expansion should increase the institution's community reach and impact, allowing it to enhance the role of our "citizen-artists"— who view and engage with the world around them through an artistic lens, and who often use the arts to respond to social issues. Such expansion will also aid the institution in generating more revenue.

A recently introduced program is Entrepreneurial Musicianship to equip College students with the additional skills they need to pursue a career and to engage with the multiplicity of communities and audiences they will encounter as professionals. NEC is also working to further develop and enhance its community engagement and strategic partnerships, including:

- Community Performances and Partnerships
- The Abreu Fellows Program at New England Conservatory

Student-Centric Campus Redevelopment. NEC will design, restore, and build facilities to improve the student experience, to become more competitive with its peer institutions, to operate with greater environmental efficiency, and to enhance the life of its surrounding communities. The priorities are a new dormitory, library, and performance spaces, including a street level café and music club. The Conservatory will also increase annual investment in facilities maintenance. The Proposed Projects continue the facilities enhancement that has already begun with a $20 million deferred maintenance project implemented in 2010 to safeguard NEC's most significant buildings for the next 50 years.

Technology. Under the Plan, NEC will build its technological capacities including educational and customer service tools, and curriculum and distance learning capabilities.

New Revenue. The Conservatory will study and implement new methods to generate additional income.

Executing the new Strategic Plan is projected to require substantial new investment. NEC has incorporated the cost of all projects into financial scenarios created for the next seven years. Some projects will be executed immediately; others will be phased in over several years. For the Plan to be sustainable, NEC will need to conduct a new capital campaign, with initial gifts being applied to Campus Redevelopment and particularly the new dormitory. The timing of this campaign is contingent upon the national economy, but NEC's position is not if, but when.

The last capital campaign, which concluded highly successfully in June 2008 with $115 million raised, created many essential foundations for development work, and fundamentally repositioned NEC in the philanthropic community.

With its Strategic Plan, NEC envisions this virtuous loop: With even stronger departments and programs, much improved facilities and technological capacity, more competitive tuition discounts, and even broader and deeper roots within our area communities, the finest students and faculty will be attracted to NEC, which in turn will continue to strengthen all departments and programs, enhance the compelling case for contributed funds, and open up new possibilities for additional revenue streams, which in turn will fuel the strengthening of all key aspects of the Conservatory. This loop cements NEC's position as one of the preeminent music schools in the world and an invaluable asset to Boston.

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2.4.3 The Institutional Master Plan

Through an intensive exploratory process that involved all constituencies within the NEC community, including boards, administration, faculty, students, and alumni, the Conservatory has determined that it must enlarge and improve its campus facilities. This is necessary <u>not</u> because NEC intends to increase its enrollment. Indeed, one of our core values is the preservation of a small student body and the one-on-one studio teaching that it makes possible. Rather, campus enhancement will allow the school to better fulfill its student-centric mission and allow NEC to share its gifts more effectively with the surrounding community. The Proposed Projects will provide students with the practice and performance spaces, the residence and student life facilities, and the updated library and technology facilities that are all necessary for educating the world-class musicians of the future. The Proposed Projects will also allow NEC to maintain competitiveness with peer institutions, many of which have undertaken extensive renovation and new construction in recent years. Finally, the Proposed Projects will offer the public, including the many audiences who attend concerts and residents in the surrounding communities, a more attractive, inviting, and convenient venue for listening, studying, and enjoying music.

It is important to note that the plan to enhance the NEC Campus does not entail expansion beyond the existing campus boundaries. All of the improvements proposed in NEC's IMP will be built on NEC's existing land.

It should also be noted that the increase in dormitory accommodations specified in the plan will allow NEC to house all of its first and second year students on campus, which has the doubly virtuous effect of creating a more tightly knit student body and also easing the burden on the housing market in the residential neighborhoods surrounding the NEC campus.

2.4.4 The Institutional Master Plan Team

The Proponent has assembled a development team of experts familiar with the City's substantive requirements and approval process.

Proponent

New England Conservatory
290 Huntington Avenue
Boston, MA 02115
Telephone: (617) 585-1211
Fax: (617) 585-1211

Anthony Woodcock, President
Edward Lesser, Senior Vice President, Finance & Operations
Michael Ryan, Director of Operations

Owner's Representative

Colliers International
160 Federal Street
Boston, MA 02110
Telephone: (617) 330-8151
Fax: (617) 330-8127

Yanni Tsipis, Senior Vice President

Project Architect

Ann Beha Architects
33 Kingston Street
Boston, MA 02111
Telephone: (617) 338-3000
Fax: (617) 482-9097

Ann M. Beha, FAIA, Principal
Thomas M. Hotaling, AIA, Principal
Steven Gerrard, AIA, Senior Associate
Chin Chin Yao, Designer

Associated Architect

Gensler
One Beacon Street, 3rd Floor
Boston, MA 02108
Telephone: (617) 619-5700
Fax: (617) 619-5701

Kenneth Fisher, AIA, Principal
Alexander Fernandez, AIA, Senior Associate

Preconstruction Services Provider

Tishman Construction Corporation
84 State Street
Boston, MA 02109
Telephone: (617) 723-2050

Tom Erickson

Legal Counsel

Brennan, Dain, Le Ray, Wiest, Torpy, Garner
129 South Street
Boston, MA 02111
Telephone: (617) 542-4874
Fax: (617) 542-4808

Donald W. Wiest

Transportation Consultant

Howard/Stein-Hudson Associates, Inc.
38 Chauncy Street, 9th Floor
Boston, MA 02111
Telephone: (617) 482-7080
Fax: (617) 482-7417

Guy D. Busa, Principal
Elizabeth Peart, Senior Transportation Engineer

Environmental Consultant

Vanasse Hangen Brustlin, Inc.
99 High Street, 10th Floor
Boston, MA 02110-2354
Telephone: (617) 728-7777
Fax: (617) 728-7782

Sean M. Manning, PE, Principal
Meghan Miller, PE, Project Engineer
Elizabeth Orlando, Project Engineer

Civil Engineering

Nitsch Engineering
186 Lincoln Street, Suite 200
Boston, MA 02111
Telephone: (617) 338-0063
Fax: (617) 338-6472

John Schmid, PE, Senior Project Manager
Deborah Katzman, PE, Senior Project Engineer

Historical Consultant

Epsilon Associates
3 Clock Tower Place, Suite 250
Maynard, MA 01754
Telephone: (978) 897-7100
Fax: (978) 897-0099

Douglas J. Kelleher

Mechanical/Electrical/Plumbing Consultant

Altieri Sebor Wieber, LLC
31 Knight Street
Norwalk, CT 06851
Telephone: (203) 866-5538
Fax: (203) 866-5243

Michael Freliech, PE, Principal
Mariusz Zakrzewski, EIT, LEED AP

Geotechnical Consultant/Licensed Site Professional

Haley & Aldrich, Inc.
465 Medford Street, Suite 2200
Boston, MA 02129
Telephone: (617) 886-7400
Fax: (617) 886-7600

Steven Kraemer, P.E., D.GE, Senior Vice President

Wind Consultant

RWDI
650 Woodlawn Road West
Guelph, Ontario, Canada N1K 1B8
Telephone: +1 (519) 823-1311
Fax: +1 (519) 823-1316

2.5 New England Conservatory Campus

NEC currently owns and operates four (4) buildings, totaling approximately 346,500 gross square feet (GSF). All of these buildings are located on the NEC campus in Boston (see **Figure 2-1**, and **Table 2-1**).

The centerpiece of the NEC campus is the building located at 290 Huntington Avenue, which contains Jordan Hall. Jordan Hall is internationally known and is sought after by world-class performers for its nearly perfect acoustics and exceptionally high quality design. The building was designed by the eminent Boston architectural firm of Wheelwright and Haven and completed in 1903. It remains the focus and centerpiece of the NEC campus, with the Hall at its core, surrounded by other performance spaces (Brown Hall, Williams Hall, and the Keller Room) as well as administrative offices, 75 practice rooms, teaching studios, and the Firestone Library (recordings). The approximately 150,000 sf building was designed in a Renaissance-Revival style and has three stories plus a basement. While the address is 290 Huntington Avenue, its primary access is through its entrance on Gainsborough Street. The building is a National Historic Landmark. NEC has recently completed a $22 million restoration of the exteriors of all its buildings, including Jordan Hall, and has always been a dedicated steward of its treasured cultural resources.

The only other building on the NEC campus that was purpose-built for NEC is the residence hall and library building located at 33 Gainsborough Street. The residence hall was designed for NEC by the firm of Kilham, Hopkins, Greeley & Brodie Architects and completed in 1959. The approximately 57,000 sf building has eight stories plus a basement, providing single and double occupancy rooms for up to 163 undergraduate and graduate students. It also houses Bistro 33 (a student dining facility), the Spaulding Library (books and scores), as well as 11 practice rooms in the basement. Its main entrance is opposite Jordan Hall on Gainsborough Street. This building has currently outlived its useful life and is in poor condition. Extraordinary dimensional constraints and inefficient building systems make renovation of the existing building to suit NEC's long-range needs impossible. Emergency repairs were made to this building in 2009-2010 to avoid serious structural and systems damage to the building, as part of the campus restoration project cited above.

NEC's other Campus buildings are adaptive re-uses of historic institutional buildings that were acquired over time to house NEC's educational and cultural programs. The St. Botolph Building, 241 St. Botolph Street, was completed in 1884 for the Cotting School, with additions in 1926. This building was purchased by NEC in 1990. Designed in a Federal Revival style, the approximately 65,500 sf building has four stories (the lowest is a raised basement). It houses administrative offices for the Preparatory School, Continuing Education School, and other NEC departmental offices. Pierce Hall and other spaces used for public performances and teaching are also located here. An adjacent two-story pavilion structure houses the NEC facilities department and maintenance shop. The 295 Huntington Avenue building, Annex Building, is located on the north side of Huntington Avenue, directly across from Jordan Hall. The building was purchased by the Conservatory in the 1970's and renovated in the 1980's. With four stories plus a basement, the building has approximately 74,000 sf of space, a portion of which is used for additional NEC administrative offices, with the remaining space leased to non-NEC commercial and professional tenants. While architecturally ornate on the exterior, both 241 St. Botolph Street and 295 Huntington Avenue are both utilitarian structures that have recently undergone extensive exterior restorations and modest interior renovations.

Table 2-1
Existing Campus Buildings

Building Name	Address	Current Use	Year Built	Floor Area (GSF)	Condition
Jordan Hall	290 Huntington Avenue	Performance, Classrooms, Offices, Firestone Music Library	1903	150,000	Good
Residence Hall and Library	33 Gainsborough Street	Residence Hall, Cafeteria, Spaulding Print Library	1959	57,000	Poor
St. Botolph Building	241 St. Botolph Street	Classrooms, Performance, Offices	1903	65,500	Fair
Annex Building	295 Huntington Avenue	Offices, Retail	1886	74,000	Fair
TOTAL				346,500	

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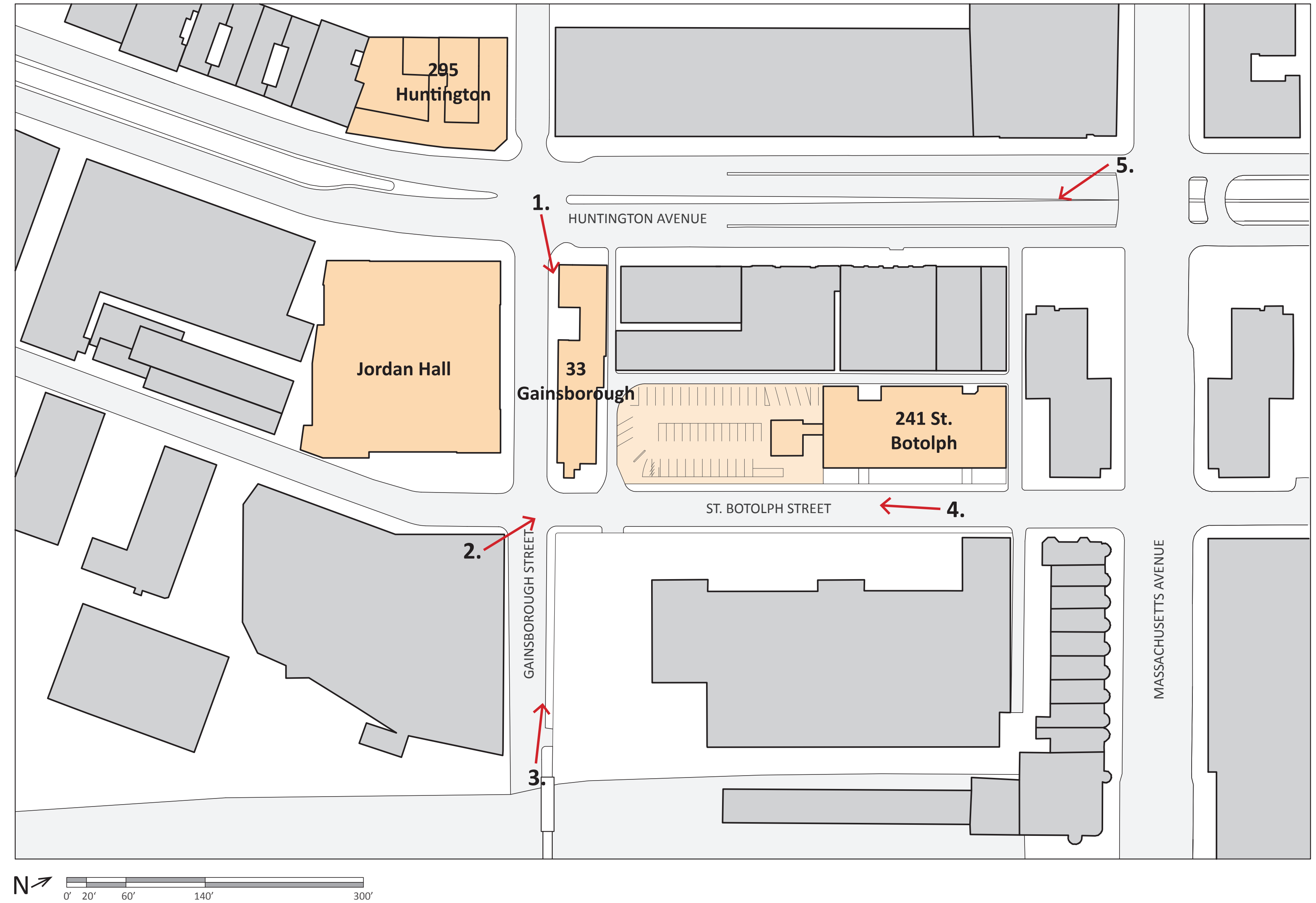

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Figure 2-1 - Existing NEC Campus

2.6 Campus Demographics and Employment

2.6.1 Student Population

As described previously, New England Conservatory provides educational opportunities to a variety of students. The Preparatory School begins classes for students as young as age three and continues through high school. Both majors and concentrations are available in multiple forms to both undergraduate and graduate students, while the continuing education program provides certificate options to those not interested in full degrees, or who need extra preparation before enrolling in the College. The Preparatory School currently enrolls 1,159 students, including those enrolled in NEC at the Walnut Hill School. An additional 213 students are enrolled in the Continuing Education Program. There are currently approximately 782 undergraduate and graduate College students from 46 states and 39 countries.

2.6.2 Student Resident Locations

The single existing NEC Residence Hall is located at 33 Gainsborough Street directly across from Jordan Hall. This Residence Hall provides 163 beds to students. It provides undergraduate and graduate students with single and double occupancy rooms in approximately 57,000 sf. This building also houses Bistro 33 (an obsolete student dining facility), the Spaulding Library, as well as 11 practice rooms in its basement.

2.6.3 Employment

New England Conservatory has 443 full and part-time faculty and 133 staff at the College, Preparatory School and Continuing Education. NEC faculty and alumni make up almost half of the Boston Symphony Orchestra as well as serving as members of other symphony orchestras, opera companies, chamber ensembles, and jazz ensembles. They also teach and serve as arts administrators.

2.7 Legal and Financial Information

This section describes the current legal status of NEC and the proposed development properties, including tax information, site control/easements, zoning, and other information required by the BRA.

2.7.1 Legal Judgments or Actions Pending

The Proponent is not aware of any legal judgments or pending legal actions relating to the Proposed Projects.

2.7.2 History of Tax Arrears on Property Owned in Boston by the Proponent

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

2.7.3 Project Site/Site Control/Easements

The Proponent has control over the entire Campus and currently utilizes the area for its academic purposes. The Campus is comprised of approximately 2.5 acres of contiguous parcels of land, as shown in **Figure 2-2.**

NEC owns its entire Campus in fee. Based on the completed survey of the Campus completed by Harry R. Feldman, Inc. dated August 18, 2010, there are no public easements into, through, or surrounding the Campus, with the exception of a BWSC sewer easement running through the site of the existing NEC residence hall located at 33 Gainsborough Street. None of these rights will affect the development of the Proposed Projects.

2.8 Public Benefits

2.8.1 Introduction

The development of the Proposed Projects will result in numerous public benefits for the surrounding community and the City of Boston as a whole. NEC has long been an outstanding partner with numerous Boston Public Schools and local non-profit social services organizations in providing free access to classical music education, performance, and inspiration. The development of the Proposed Projects will strengthen NEC's commitment to the city of its founding and the many organizations that benefit from NEC's community partnerships programs. The project's new performance spaces will provide performance opportunities for the public and local performance organizations; the project will result in a new neighborhood library for residents and area public schools; the project will create a new dining hall, open for

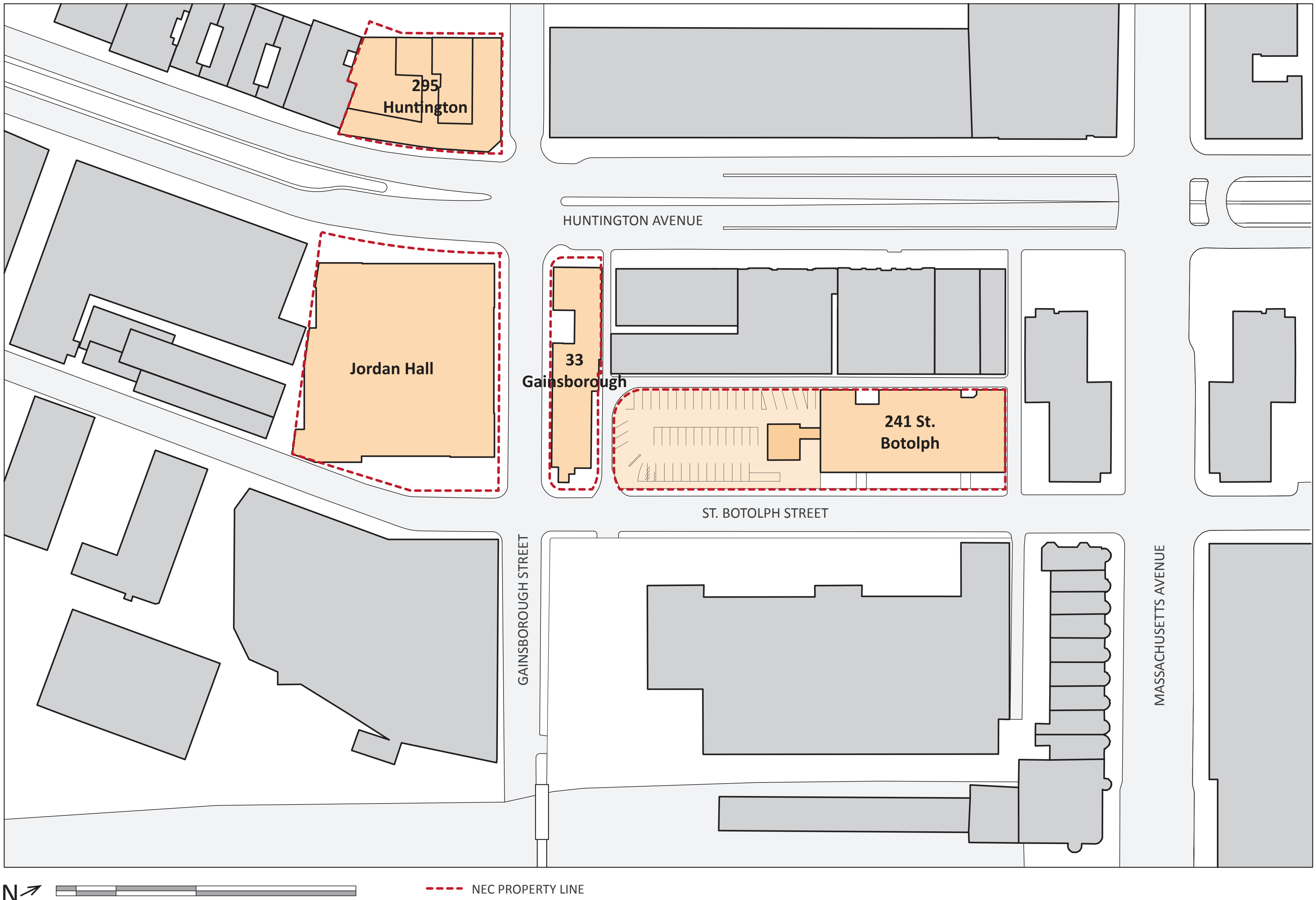


Figure 2-2 - Existing NEC Campus Land Parcels

neighborhood and public use. An outline of the various public benefits that will result from the Proposed Projects' development is provided in this section.

2.8.2 Estimated Linkage Payments

The Proposed Student Life and Performance Center Project (the SLPC Project) will be a Development Impact Project. Under Section 80B-7 of the Zoning Code, such a project is one that (i) requires zoning relief; (ii) will devote more than 100,000 sf to a Development Impact Use; and (iii) involves the creation or substantial rehabilitation of more than 100,000 sf of gross floor area. The Proposed SLPC Project meets all three criteria and thus the Proponent will enter into a Development Impact Project Agreement with the BRA as part of the Article 80 Large Project Review process.

The Proposed SLPC Project is estimated to generate housing exaction payments totaling approximately $275,000.

The Proposed SLPC Project is estimated to generate jobs exaction payments totaling approximately $54,000.

2.8.3 Estimated Annual Property Taxes

NEC currently has a Payment in Lieu of Taxes (PILOT) agreement in place with the City of Boston. NEC anticipates executing an amendment to its PILOT agreement in relationship to these Projects in Phase I and Phase II.

NEC currently owns the property located at 295 Huntington Avenue, which is partially used for commercial purposes such as ground-floor retail uses not affiliated with NEC. NEC pays customary real estate taxes in connection with those portions of the 295 Huntington Avenue used for commercial purposes.

2.8.4 Construction Employment

The construction of the Proposed Projects and associated renovations to the existing 33 Gainsborough Street building during the interim will contribute directly to the economy by providing numerous employment opportunities. It is estimated that approximately 100-150 tradespersons will be employed at peak construction periods. A Boston Residents Construction Employment Plan will comply with the Boston Jobs Policy.

2.8.5 Permanent Employment

Based on its projected employment growth, NEC estimates that this development will create approximately ten (10) new facility employee jobs.

NEC currently employs approximately 576 people, of which 260 are full time and 316 are part time. NEC is also a major employer of Boston residents.

2.8.6 Projected Student Enrollment

No material increase in full-time student enrollment is projected during the term of the IMP. NEC holds as one of its core values the preservation of its intimate and nurturing student body of approximately 782 undergraduate and graduate students. Maintaining current enrollment levels is central to NEC's strategic planning because it allows for the one-on-one studio instruction between student and teacher that is the foundation of conservatory training. An enhanced student life center and residence hall will also allow NEC to house all of its first and second year students on campus, thereby creating greater social cohesiveness and freeing up off-campus housing to community residents.

2.8.7 Urban Design and Streetscape Benefits

The development of the Proposed Projects will enhance the public sides of the proposed buildings along Huntington Avenue, St. Botolph Street, and Gainsborough Street. The Proponent proposes to undertake significant streetscape improvements to the pedestrian realm. As described in more detail in Chapter 4, *Urban Design*, these improvements, which will be provided on a phased basis as each of the Proposed Projects is undertaken, will include the following (subject to applicable City of Boston approval):

- If feasible, new street trees on public streets adjacent to the Proposed Project sites;
- New street furniture, lighting, and other amenities on public streets adjacent to the Proposed Project sites;
- Installation of public bicycle storage racks in close proximity to the building entrances, in addition to on-site protected bicycle storage for building residents, as outlined in Chapter 5 of this IMPNF/PNF;
- A new pedestrian raised stone paved crosswalk between Jordan Hall and the proposed Learning Center Project (the LC Project) building entrance; and,
- A small 'outdoor room' at the corner of Gainsborough Street and St. Botolph Street with plantings and seats.

2.9 Regulatory Controls and Permits

As outlined in greater detail in Chapter 3, *Project Description*, the Proposed Projects consist of several distinct components. These include the following:

1. Phase I: Construction of a new 135,000+/- square foot residence hall, performance, and student life building on the St. Botolph Street site for NEC's use (the "The Proposed Student Life and Performance Center Project");

2. Phase 1A: Interim renovation of the existing 57,000+/- square foot residence hall and library buildings currently located on the Gainsborough Street site concurrent with the construction of the Residence Hall and Student Life project (the "Interim Renovation Project");

3. Phase II: Construction of a 65,000+/- square foot new academic and administrative building on the Gainsborough Street site (the "Learning Center Project").

For purposes of this filing and the Proposed Projects' review process, the Gross Floor Area of components (1), (2), and (3) above are included in our analyses and calculations. Excluded from our analyses are approximately 3,000 square feet that will be partially renovated within the existing NEC building located at 241 St. Botolph Street concurrently with the construction of the SLPC Project, as well as approximately 4,500 square feet that will be partially renovated in the basement of the existing Jordan Hall upon completion of the SLPC Project.

The gross floor area of the existing NEC buildings to remain will not be materially affected by the Proposed Projects, and the existing Educational and Cultural uses housed in these buildings will not change as a result of the Proposed Projects.

None of the existing NEC buildings will be substantially rehabilitated in connection with the Proposed Projects. The existing 33 Gainsborough Street buildings of approximately 57,000 square feet will be demolished to make way for the new LC Project.

■

2.9.1 Existing Uses and Structures

The Proposed Projects' sites are located within an Institutional Subdistrict, which is an institutional use district as defined in Article 66 of the Boston Zoning Code (the "Zoning Code"), as shown on Boston Zoning Map 1Q titled "Fenway Neighborhood District." The Proposed Projects' sites are also located within the Groundwater Conservation Overlay District as established by Article 32 of the Zoning Code, as amended, and the Restricted Parking Overlay District, as established pursuant to

Section 3-1A.c of the Zoning Code. Within the Institutional Subdistrict, the existing Educational and Cultural uses are permitted as-of-right (See Table B to Article 66 of the Zoning Code).

The property located at 295 Huntington Avenue, which is owned by NEC and which is being included within the proposed NEC IMP Area, is located in the Huntington Avenue NS-2 Subdistrict and the Neighborhood Design Overlay District.

The Proposed Projects' sites are currently governed by the use requirements set forth in Table B to Article 66 of the Zoning Code, and the dimensional requirements set forth in Table D to Article 66 of the Zoning Code; such dimensional requirements include a maximum floor area ratio ("FAR") of 8.0 and a maximum building height of 90 feet.

The existing parking and off-street loading requirements for the Proposed Project Sites are set forth in Article 66 of the Zoning Code.

2.9.2 Future Zoning Controls

NEC is proposing that the NEC Campus be designated as an Institutional Master Plan Area ("IMP") pursuant to the provisions of Section 3-1A.a and Section 80D of the Zoning Code, in order to allow for a more flexible zoning approach that also recognizes that development on the Proposed Project's sites will occur over a period of years. The IMP mechanism also provides an appropriate degree of BRA oversight for the multiple phases of development planned for the Campus.

To effectuate creation of the IMP, the Conservatory is concurrently initiating the Article 80D public review process for approval of the IMP designation and an Institutional Master Plan. Upon approval, the IMP will govern the development and use of the Proposed Projects' sites. The IMP and corresponding zoning map amendment designating the Campus as an IMP Area will require BRA and Boston Zoning Commission approval, in each case after a public hearing.

The IMP will address the proposed location, dimensions and appearance of the existing structures and the proposed new structures, open space and landscaping, the uses and density of each of the Proposed Projects, traffic circulation, parking and loading facilities, access to public transportation, and public benefits that will accrue from the development of the Proposed Projects. The IMP will also address the green buildings requirements set forth in Article 37 of the Zoning Code and groundwater recharge requirements set forth in Article 32 of the Zoning Code.

The proposed new zoning parameters for the Proposed Projects' sites (to be set forth in the IMP) are as follows:

Floor Area Ratio
The FAR for the entire Campus is proposed to be 8.0, consistent with the existing zoning for the Proposed Project sites.

Maximum Height
A maximum height (as defined in the Zoning Code) of 150 feet is proposed for the Campus.

Parking
The Campus is proposed to contain approximately 20 parking spaces, as detailed further in this IMPNF/PNF in Chapter 5, *Transportation Access Component*.

Proposed Uses
The permitted uses on the Campus are generally proposed to be Educational and Cultural uses and uses related thereto, including Service and Parking uses.

2.9.3 Anticipated Permits

New England Conservatory anticipates seeking the following federal, state and/or local permits and taking the following actions in relation to the Proposed Projects' development (See **Table 2-2**).

Table 2-2
Anticipated Permits and Approvals

Agency Name	Permit or Action
Federal Government	
US Environmental Protection Agency	NPDES Notice of Intent
Federal Aviation Administration	Determination of No Hazard to Air Navigation
Commonwealth of Massachusetts	
Massachusetts Department of Environmental Protection	Sewer Connection Permit; Air Quality Plan approval; Construction Notice; Asbestos Removal Notice
Massachusetts Water Resources Authority	Temporary Construction Dewatering Permit; Sewer Use Discharge Permit
Massachusetts Historical Commission	Determination of "No Adverse Effect"
City of Boston	
Boston Redevelopment Authority	Article 80 Large Project Review; IMP Plan Review
Boston Civic Design Commission	Schematic Design Review
Boston Inspectional Service Department	Creation of Consolidated Lots; Demolition Permit; Foundation and Building Permit; Certificate of Occupancy
Boston Landmarks Commission	Article 85 Demolition Delay
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Boston Water and Sewer Commission	Site Plan Approval; Water and Sewer Connection Permits; Construction Dewatering Permit
Boston Fire Department	Site Access Plan; Flammable Materials License(s) and other permits
Boston Zoning Commission	IMP Plan Approval; IMP Area Designation
Boston Public Health Commission	Asbestos Removal Notice
Public Improvement Commission	Specific Repair Approval

The table above sets forth a preliminary list of permits and approvals from federal, state and local governmental agencies, which are presently expected to be required for the Proposed Projects, based on project information currently available. It is possible that not all of these permits or actions will be required, or that additional permits or actions may be needed.

2.9.4 Applicability of MEPA

The Proposed Projects are not subject to MEPA review. Although the Proponent may seek tax-exempt bond financing through MassDevelopment or another public or quasi-public source, which constitutes financial assistance that establishes MEPA jurisdiction, the Proposed Projects are not anticipated to exceed any applicable MEPA review thresholds.

2.10 Coordination with Abutters and Other Interested Parties

The Proposed Projects are at the early stages of the public review process. A Letter of Intent to develop the Proposed Projects was submitted to the BRA on December 16, 2011. NEC has met periodically with BRA staff and the staff of other City Departments to review specific aspects of the development proposal in advance of this filing, which begins the Proposed Projects' formal public review process.

The Conservatory looks forward to working with its longtime neighbors and other stakeholders through the course of the Article 80 Development Review process for NEC's first major capital program in over 50 years. NEC understands that a Task Force has been formed, and NEC met with the Task Force on December 13th, 2011 to provide background on NEC's history and its plans for the future. NEC expects that the Task Force will be an important forum for community review and comment on the Proposed Projects and the Institutional Master Plan.

NEC has already held briefings for many of its neighboring property owners and other nearby stakeholders in advance of making this filing. A more comprehensive community outreach program will be implemented in connection with the continued development of the Institutional Master Plan and the Article 80 review process.

3

Project Description

3.1 Introduction

The Proponent plans to build two new campus facilities with related site improvements and connections to existing NEC buildings during the term of its Institutional Master Plan in two distinct phases. Implementation of the Proposed Projects will enable NEC to continue its tradition of world-class musical education and performance that it has been providing in the City of Boston for the past 145 years. The Projects will also greatly enhance NEC's campus appearance and improve the surrounding pedestrian environment. The location of NEC's Proposed Projects is depicted in **Figure 3-1**.

3.2 Project Location and Current Uses

The Proposed Projects are located in the Fenway area of Boston on a single block encompassed by Huntington Avenue, Gainsborough Street, St. Botolph Street, and Massachusetts Avenue. The two Proposed Project sites are currently owned and actively used by NEC for its existing educational programs. The Phase I – Student Life and Performance Center Project (the SLPC Project) site is occupied by an existing surface parking lot with approximately 53 spaces and a small two story pavilion building currently used as a maintenance shed. The Phase II – Learning Center Project (the LC Project) site is currently occupied by an approximately 57,000 square-foot building across from Jordan Hall, and contains dormitory rooms for 163 students, the NEC print library, and the student dining hall called "Bistro 33". This building is functionally obsolete and does not meet the current or future needs of NEC's educational and student life programs.

3.3 Detailed Project Description

Once completed, the SLPC Project (Phase I) will provide approximately 135,000 gross square feet of new space for NEC, and the LC Project (Phase II) will provide approximately 65,000 gsf of new space. As mentioned previously, the Proposed Project site locations are illustrated in **Figure 3-1**.

■

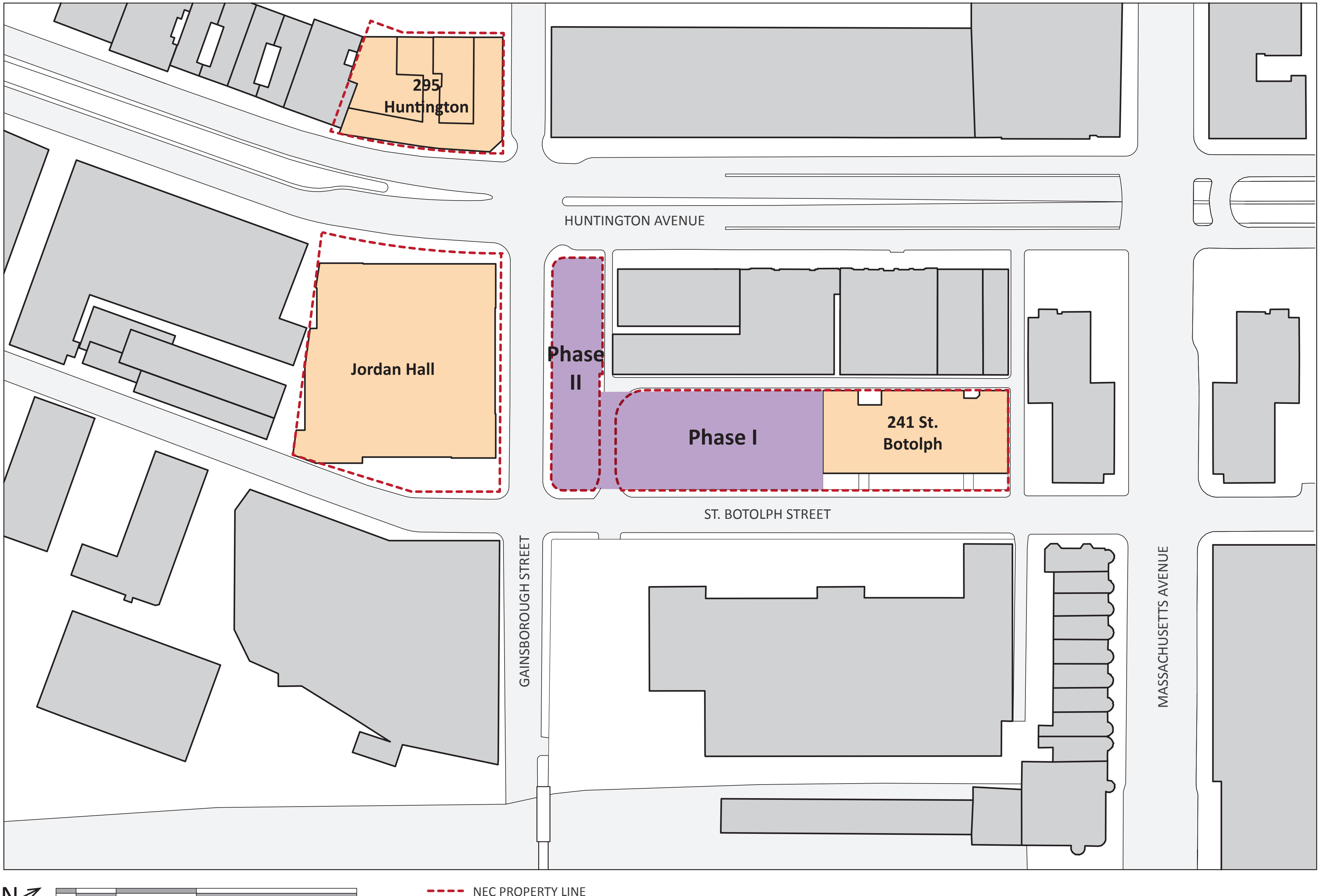
3.3.1 Phase I – Student Life and Performance Center Project

Phase I of the IMP will include construction of the SLPC and limited interim renovations to the 33 Gainsborough Street building and the Firestone Library. As currently planned, the SLPC is programmed to include the following uses:

- Approximately 252-bed student residence with common living amenities
- Dining commons with a performance stage
- Student common areas on all levels
- Library resource center housing collections and collaboration study spaces
- Three rehearsal and performance spaces, including a 200-seat Black Box Theater, Orchestra Rehearsal Room, and a Large Ensemble/Recording Room.

The SLPC will house approximately 252 students, and together with the library and dining commons, will become an exciting new campus center for students, faculty, staff, and visitors, as shown in **Figure 3-2** through **Figure 3-6**. The Center's three modestly scaled new performance spaces – a 200-seat Black Box theater, orchestra rehearsal room, and ensemble/recording room - will be used by students for performances and rehearsals, as well as for public performances. The adjacent dining areas will also serve dual functions as breakout and reception areas for evening and other performance events, in addition to providing modern, affordable dining options to NEC students, faculty and staff, and to members of the public. It is anticipated that community access to these spaces will strengthen NEC's partnerships with the Fenway community organizations and public schools.

After completion of the SLPC, existing spaces in 33 Gainsborough Street and the Firestone Library will be temporarily vacated for renovations. These renovations, which will not constitute a Substantial Rehabilitation as defined in Article 80 of the Boston Zoning Code, will involve the conversion of approximately one-half of the existing dormitory rooms into practice rooms and faculty studios. The existing library and cafeteria will be retrofitted for other interim academic purposes. The objective of these interim renovations to the existing 33 Gainsborough Street building is to provide a near-term solution to the significant need for additional practice facilities and faculty studios before the Phase II LC Project is constructed. These interim renovations will be modest in nature and are intended to extend the useful life of the existing building by a limited number of years. All interim uses within the 33 Gainsborough Street building will continue to be Educational uses associated with NEC, and no third-party occupancy of the building is contemplated during this interim period.



NEC PROPERTY LINE
NEC BUILDING
IMP PROJECT SITES

Figure 3-1 - IMP Projects Sites
Phases I & II

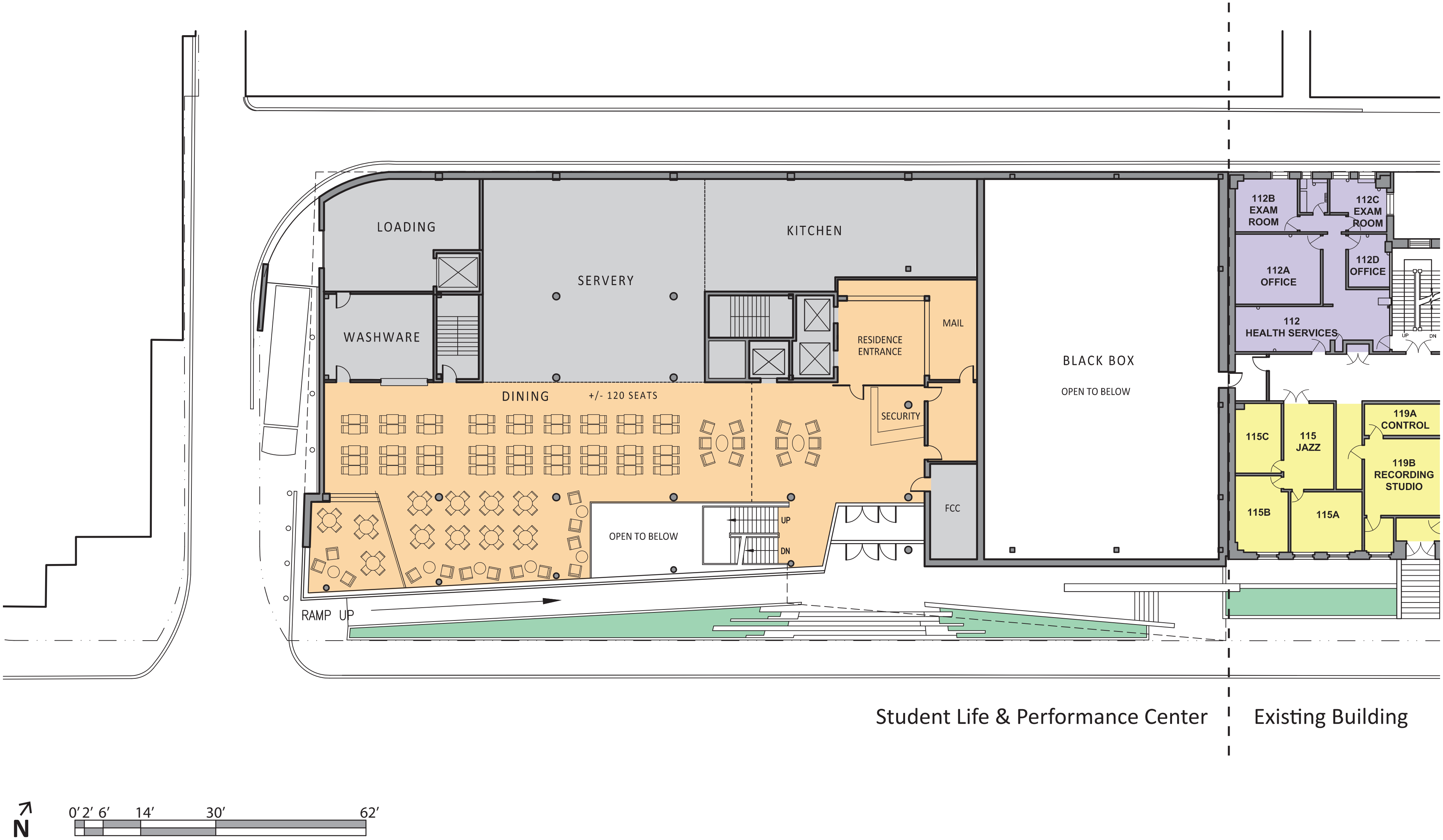


Figure 3-2 - First Floor Plan

Phase I - Student Life & Performance Center Project

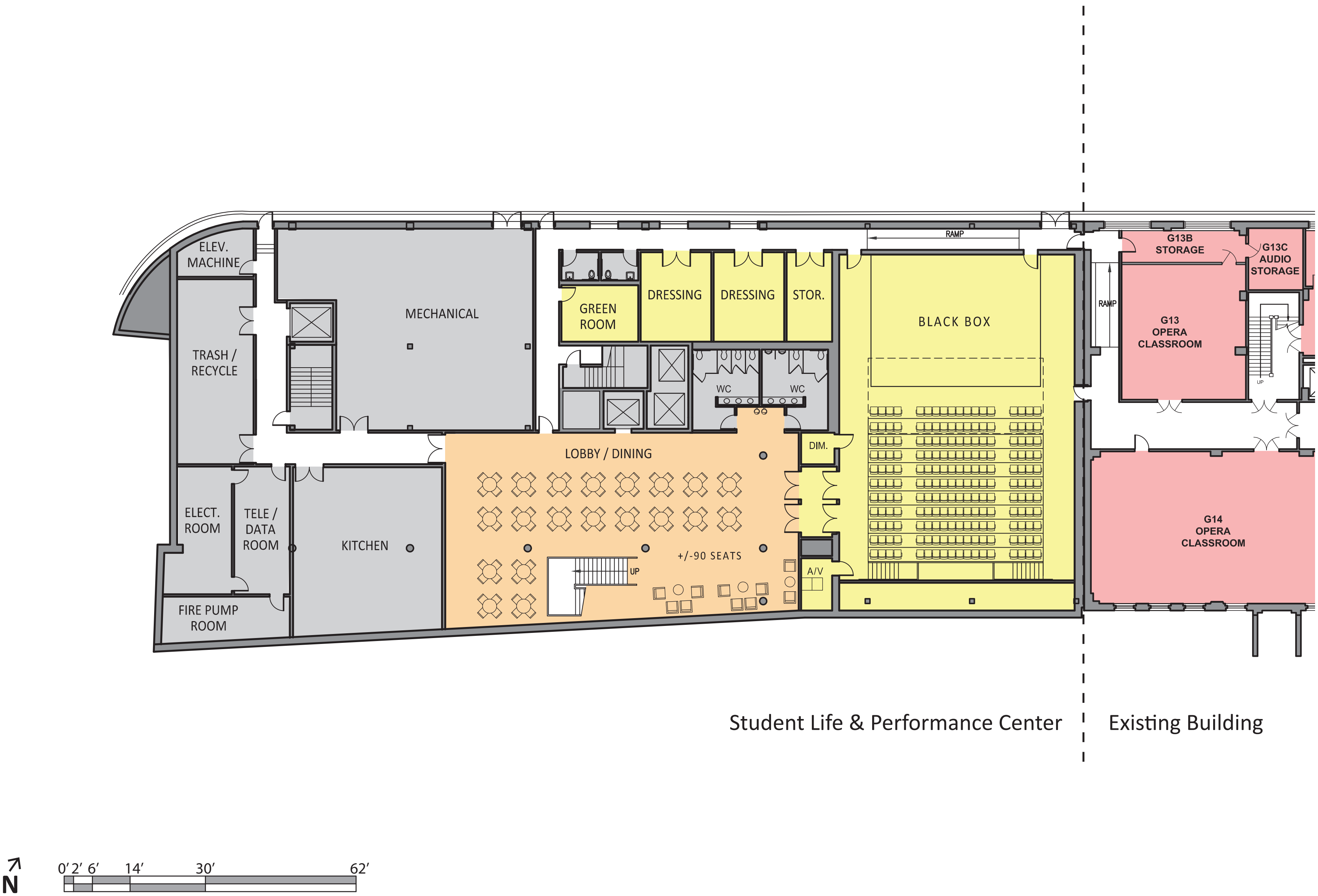


Figure 3-3 - Ground Floor Plan
Phase I - Student Life & Performance Center Project

AnnBehaArchitects
Gensler

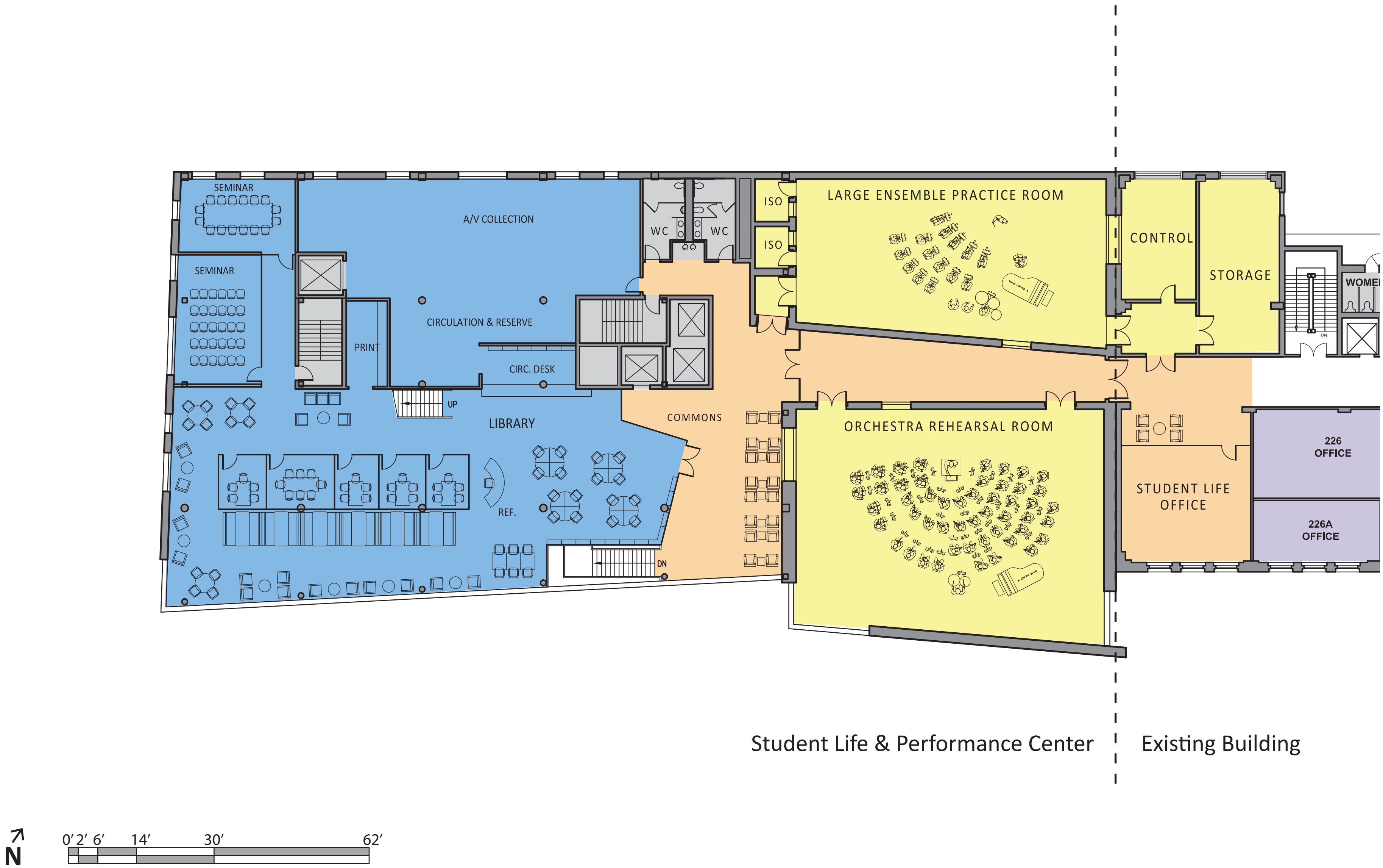


Figure 3-4 - Second Floor Plan

Phase I - Student Life & Performance Center Project

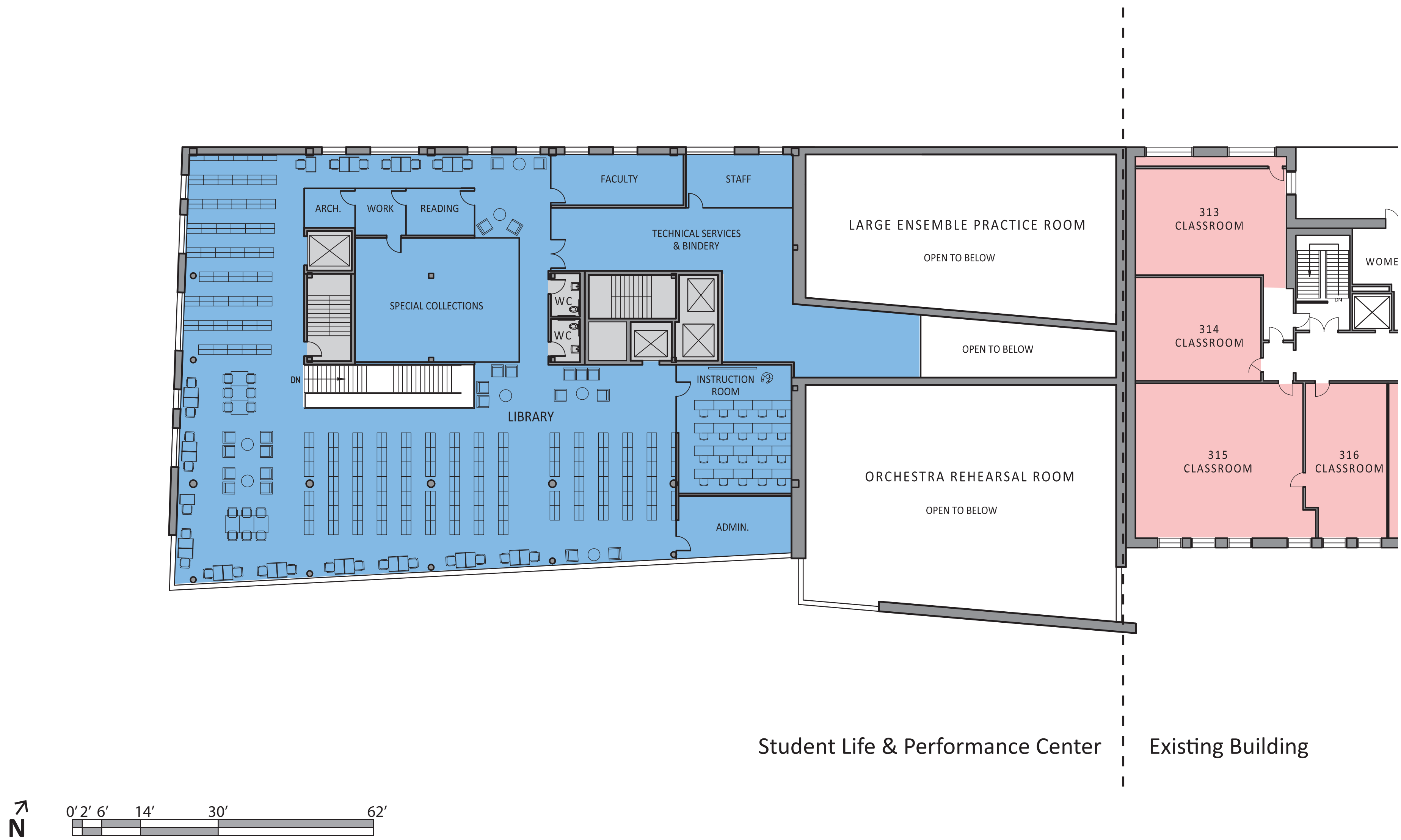
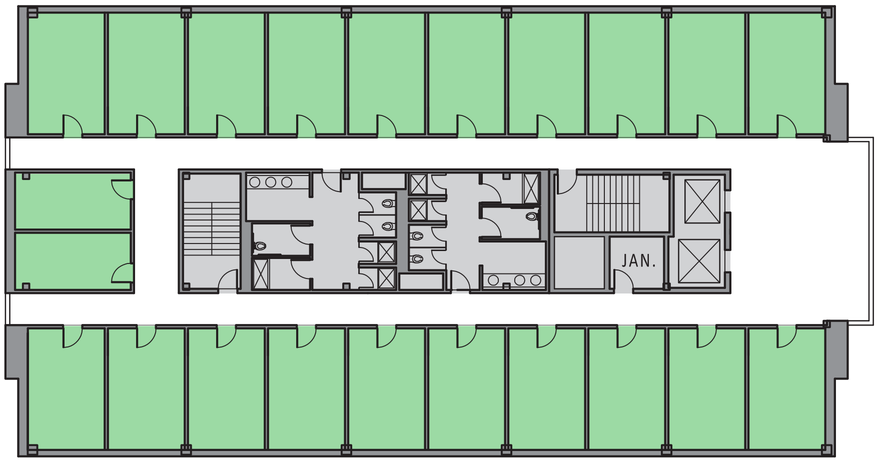
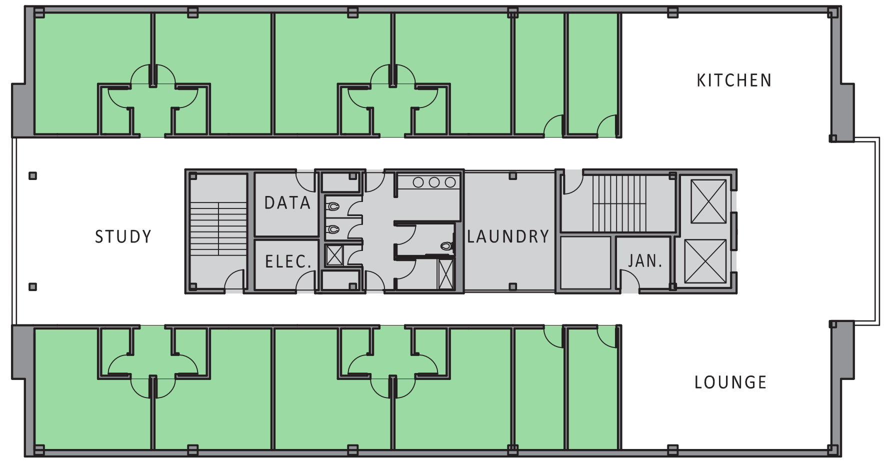


Figure 3-5 - Third Floor Plan

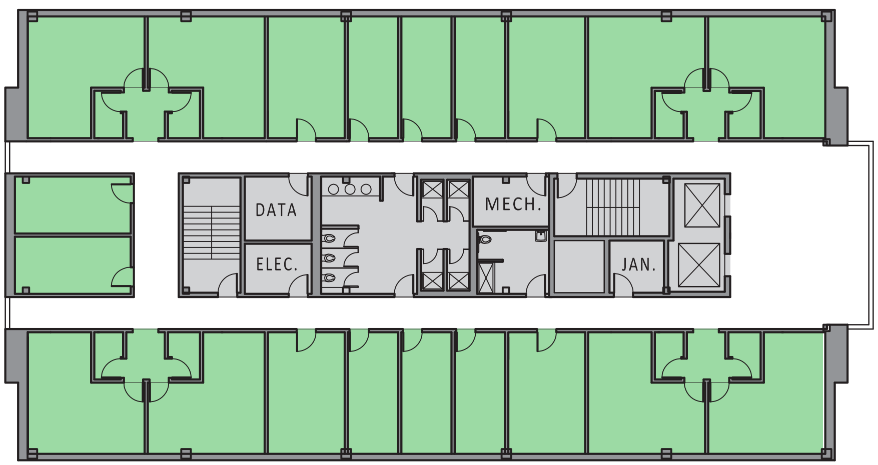
Phase I - Student Life & Performance Center Project



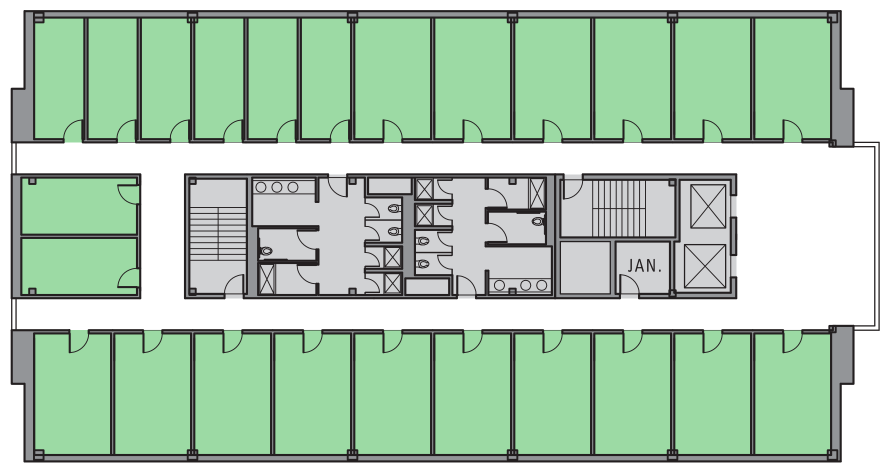
Sixth - Eighth Floors



Tenth Floor



Fourth & Fifth Floors



Ninth Floor

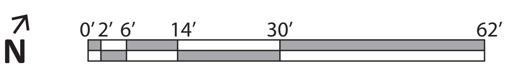


Figure 3-6 - Residence Floor Plans

Phase I - Student Life & Performance Center Project

3.3.2 Phase II – Learning Center Project

The future removal of the 33 Gainsborough Street building will allow for the future construction of the proposed LC Project – a new 7-story, approximately 65,000 square-foot facility devoted primarily to student learning and practice spaces. As currently planned, this facility will include academic spaces, practice spaces for students, faculty studios, various student services and administrative functions – including Admissions, Financial Aid, Continuing Education, and Preparatory School offices, expansion of the library resource center, a public coffeehouse opening onto Huntington Avenue, and other student commons spaces that connect this building to the adjacent Student Life and Performance Center. These Project components are illustrated in **Figure 3-7** through **Figure 3-11**.

Connecting the Learning Center to the SLPC Project will be a student commons "spine," which will also connect the Learning Center and Student Life and Performance Center with the 241 St. Botolph building, making it possible for students, faculty, and visitors to travel inside from Gainsborough Street to within a half a block of Massachusetts Avenue during inclement weather. These connections are shown in the building sections in **Figure 3-12** through **Figure 3-15**.

This two-level connector will cross over Public Alley #822 at the second and third levels of the connected buildings and will maintain full and unimpeded access to Public Alley #822 for loading and service functions, fire and police access, and all other functions for which Public Alley #822 is currently used. A discontinuance will be sought from the City of Boston Public Improvements Commission to enable this connector to be constructed.

3.3.3 Connections to Existing Campus

The Proposed Projects are currently designed to connect the two new buildings to the existing NEC academic and administration building at 241 St. Botolph Street, allowing internal circulation between new student commons spaces, performance spaces, academic and practice rooms, and administrative and support spaces. This type of connectivity and campus continuity has never existed on the NEC campus, and the creation of this sense of connectedness and community was a central premise of the NEC campus master plan. A new raised crosswalk will also connect the entrance of Jordan Hall with the Phase II – LC Project, which will be constructed and maintained by NEC. Among the major goals of the IMP is to improve the entire NEC campus experience by joining buildings together to foster one distinct, unified, and welcoming campus. Along Gainsborough Street and St. Botolph Street, the pedestrian environment will be enhanced and softened with the addition of new street trees and sidewalk plantings to encourage slower vehicle speeds and provide safe zones for pedestrians crossing the street. At the corner of St. Botolph and Gainsborough Streets, a small open/green space will be created as NEC's campus green, a sunny outdoor gathering place for the NEC community and a place where small outdoor public performances will be possible at appropriate times during the year.

3.3.4 Building Design and Massing

As described in more detail in Chapter 4, *Urban Design*, the Proposed Projects have been designed to unify NEC's campus and enhance the public's view of the school and its broad range of activities. The two proposed buildings are designed to enhance connectivity between the two historic NEC buildings, Jordan Hall and 241 St. Botolph Street, while capturing the essence of the school as an evolving and dynamic institution. Building elevations depicting the continuity and architectural unity of the two proposed buildings are shown in **Figure 3-16** through **Figure 3-19**.

The building heights proposed for the SLPC and LC Projects exceed those of the buildings immediately surrounding the sites, but at heights of 134 feet and 110 feet respectively, they will not overpower any of these buildings and will be significantly lower than the nearby Symphony Towers buildings and the approved Northeastern residence hall on St. Botolph Street extension. The existing and proposed building heights are depicted in **Figure 3-20** and **Figure 3-21**, respectively. As shown, the immediate surrounding buildings have heights ranging from 30 to 85 feet; however the nearby Symphony Towers and Northeastern residence hall developments have heights that exceed 150 feet.

3.3.5 Pedestrian Circulation

The IMP's approach to pedestrian circulation to and within the NEC campus is informed by the three primary gateways into the NEC campus: from Huntington Avenue, from Massachusetts Avenue, and from the MBTA Orange Line station exit onto Gainsborough Street. Because the NEC campus is easily accessible from these three major axes of travel, it is essential to consider the NEC campus in a broader context and incorporate pedestrian-oriented streetscape improvements that respond to each of these three gateways into the NEC campus. The construction of the Proposed Projects presents opportunities to dramatically improve the pedestrian experience in this corner of the city, and to lay the groundwork for drawing on the resources and interest of NEC's neighbor, Northeastern University, to help turn these stretches of St. Botolph and Gainsborough Streets into first-class pedestrian environments that serve both campus populations and the general public.

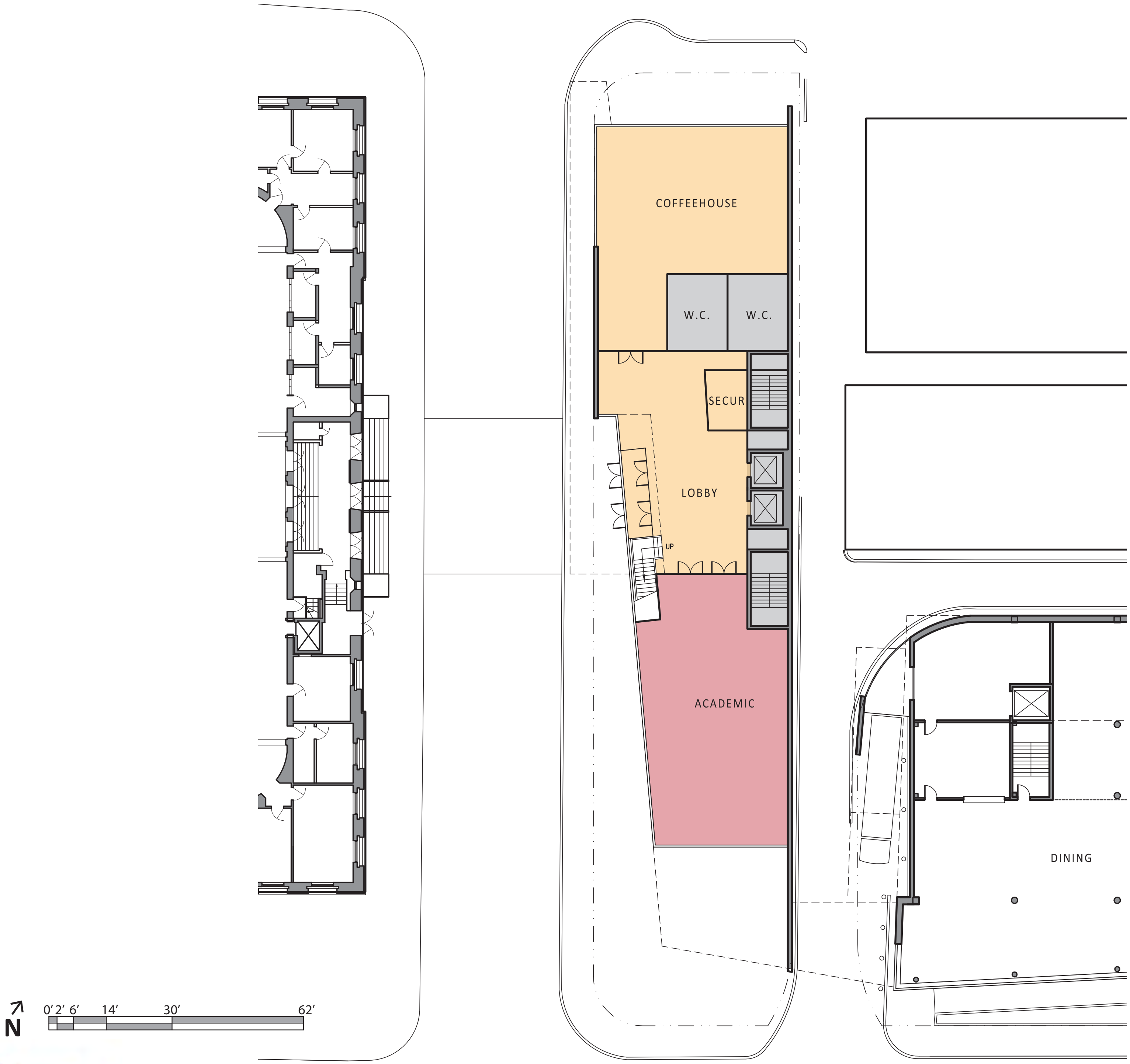


Figure 3-7 - First Floor Plan
Phase II - Learning Center Project

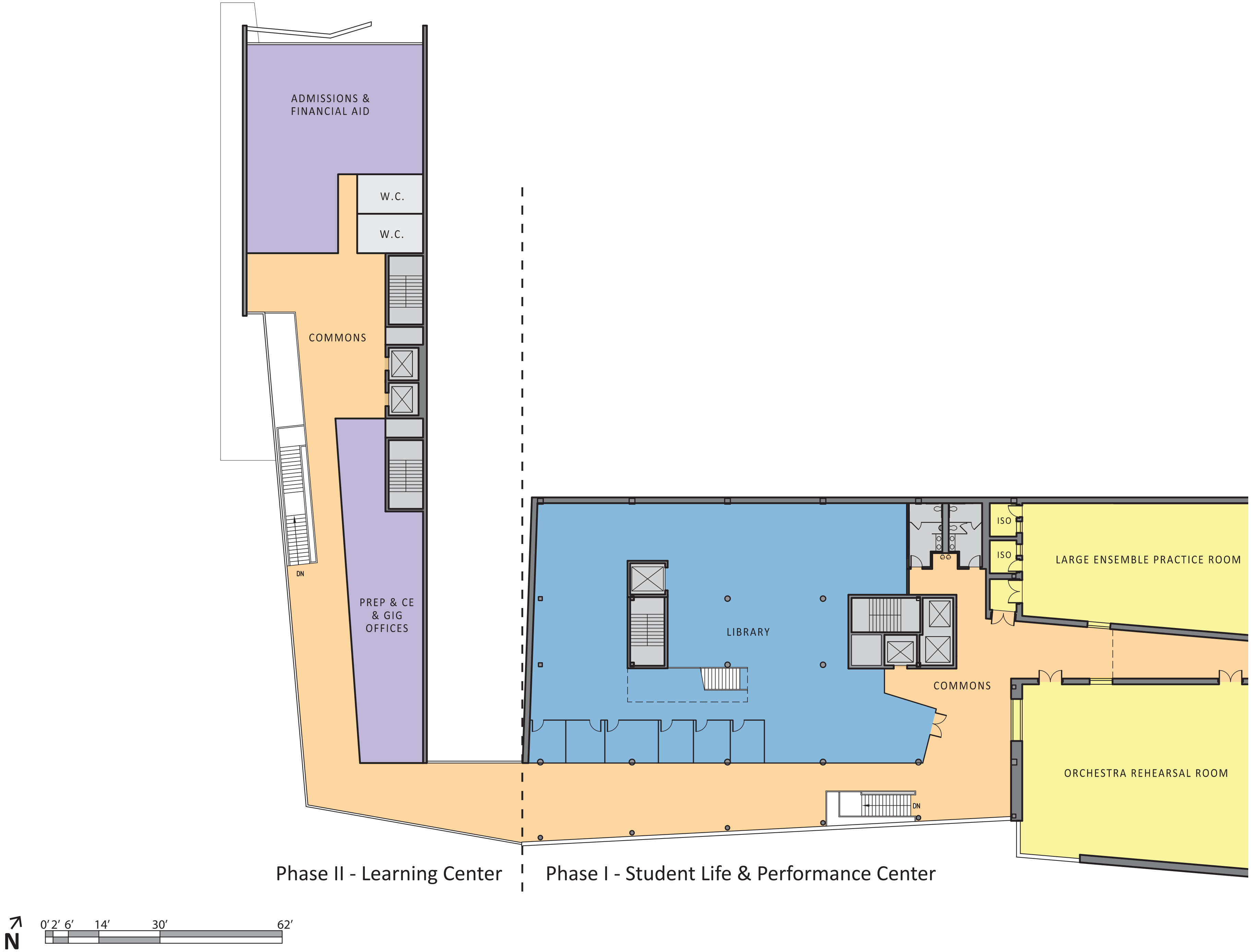


Figure 3-8 - Second Floor Plan
Phase II - Learning Center Project

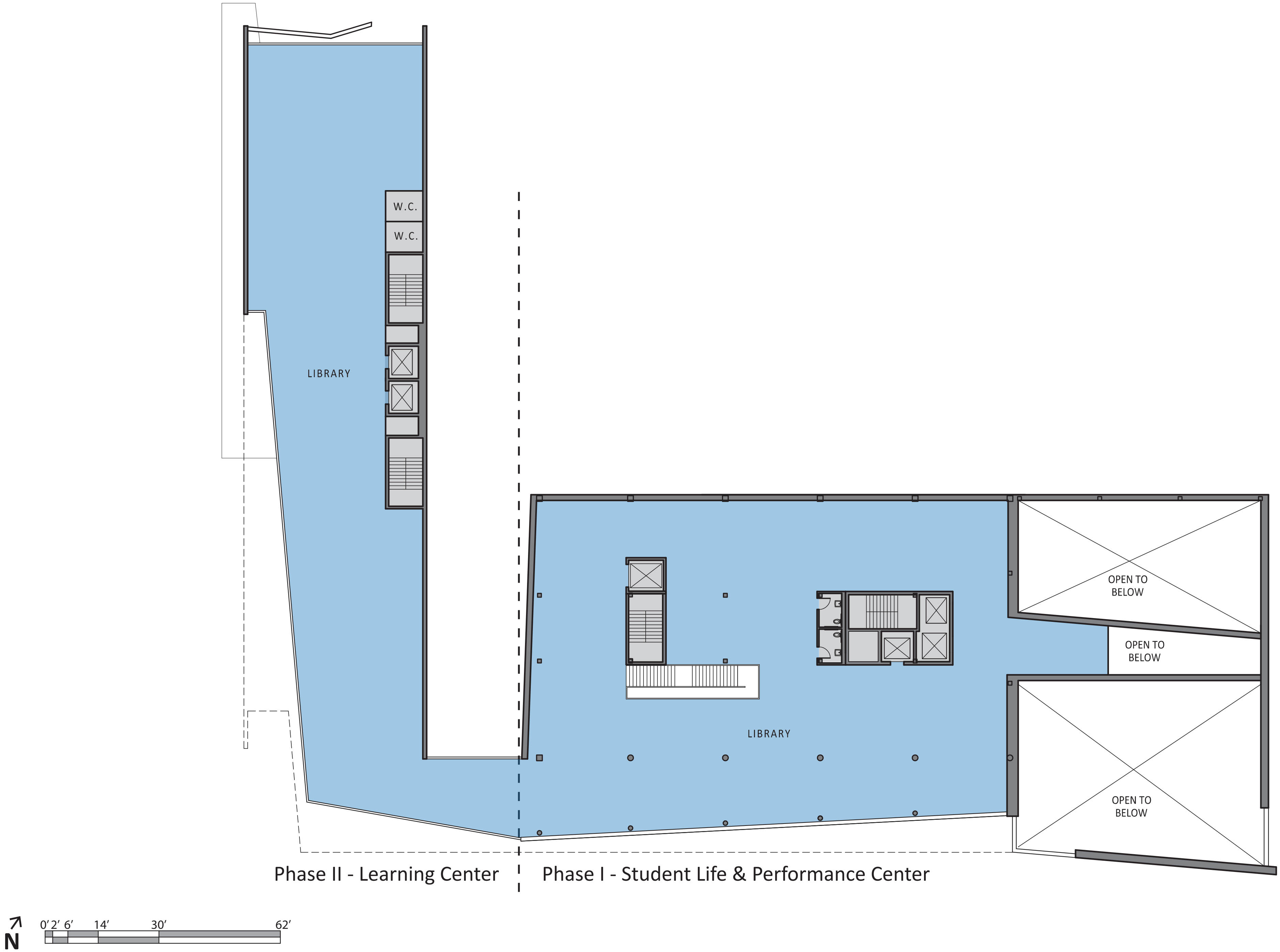
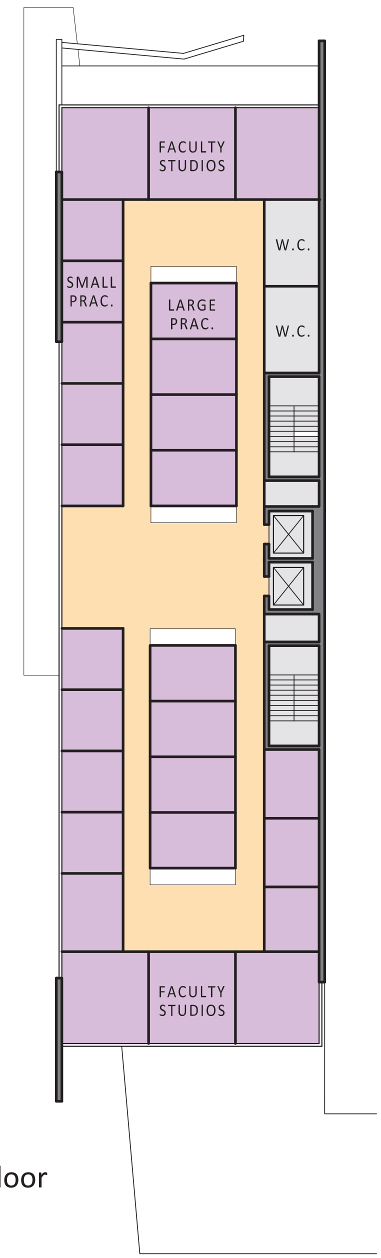
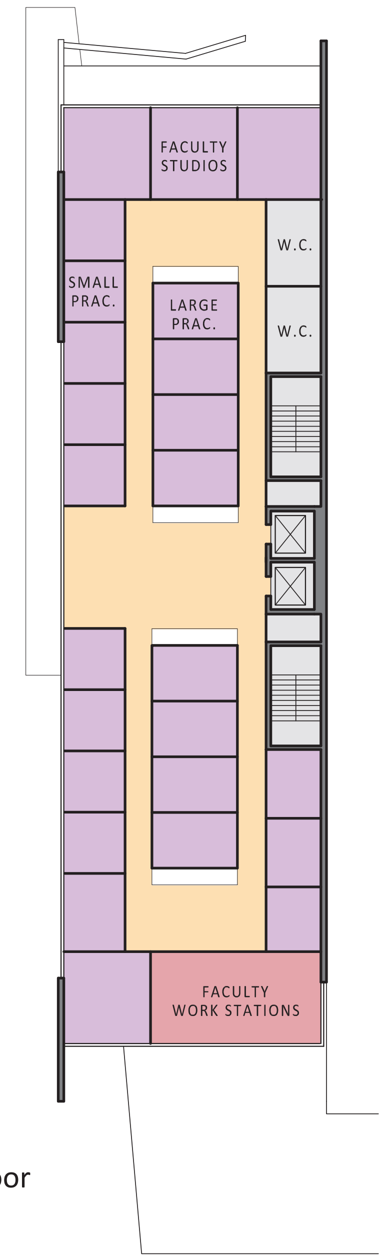


Figure 3-9 - Third Floor Plan
Phase II - Learning Center Project



Fourth Floor



Fifth Floor

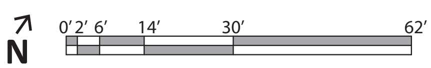


Figure 3-10 - Fourth & Fifth Floor Plans

Phase II - Learning Center Project

Figure 3-11 - Sixth & Seventh Floor Plans

Phase II - Learning Center Project

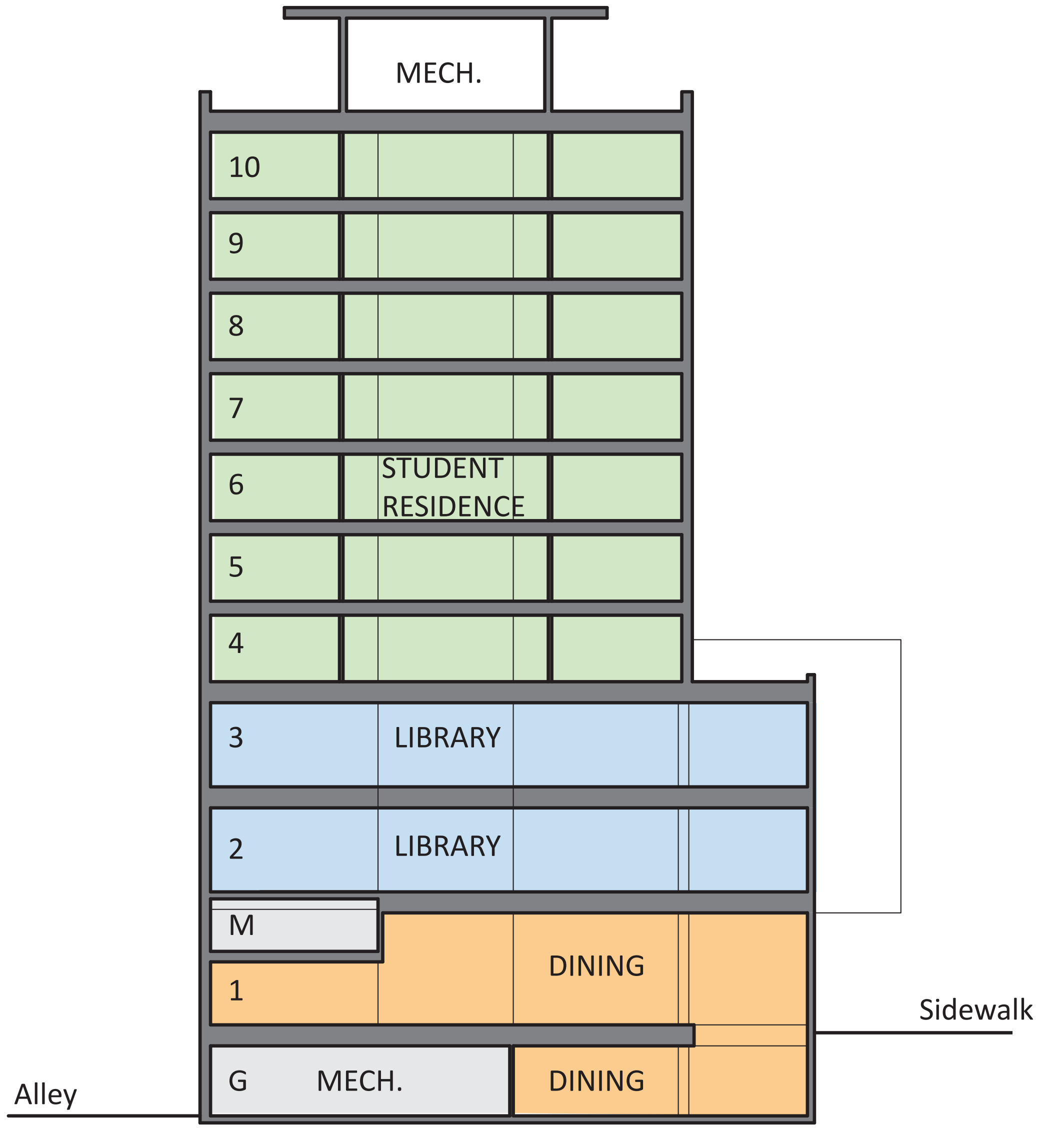


Figure 3-12 - North-South Section
Phase I - Student Life & Performance Center Project

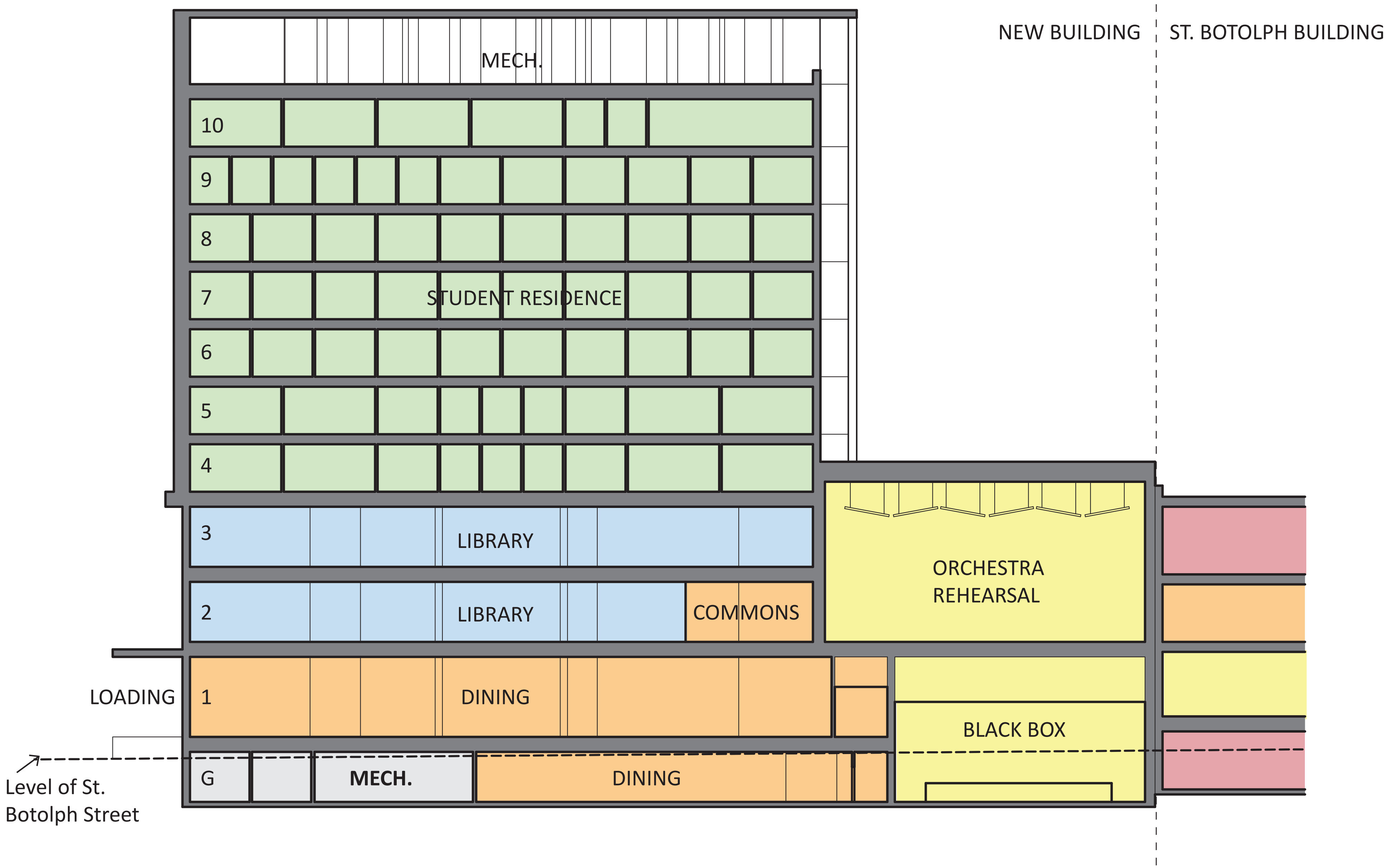


Figure 3-13 - East-West Section
Phase I - Student Life & Performance Center Project

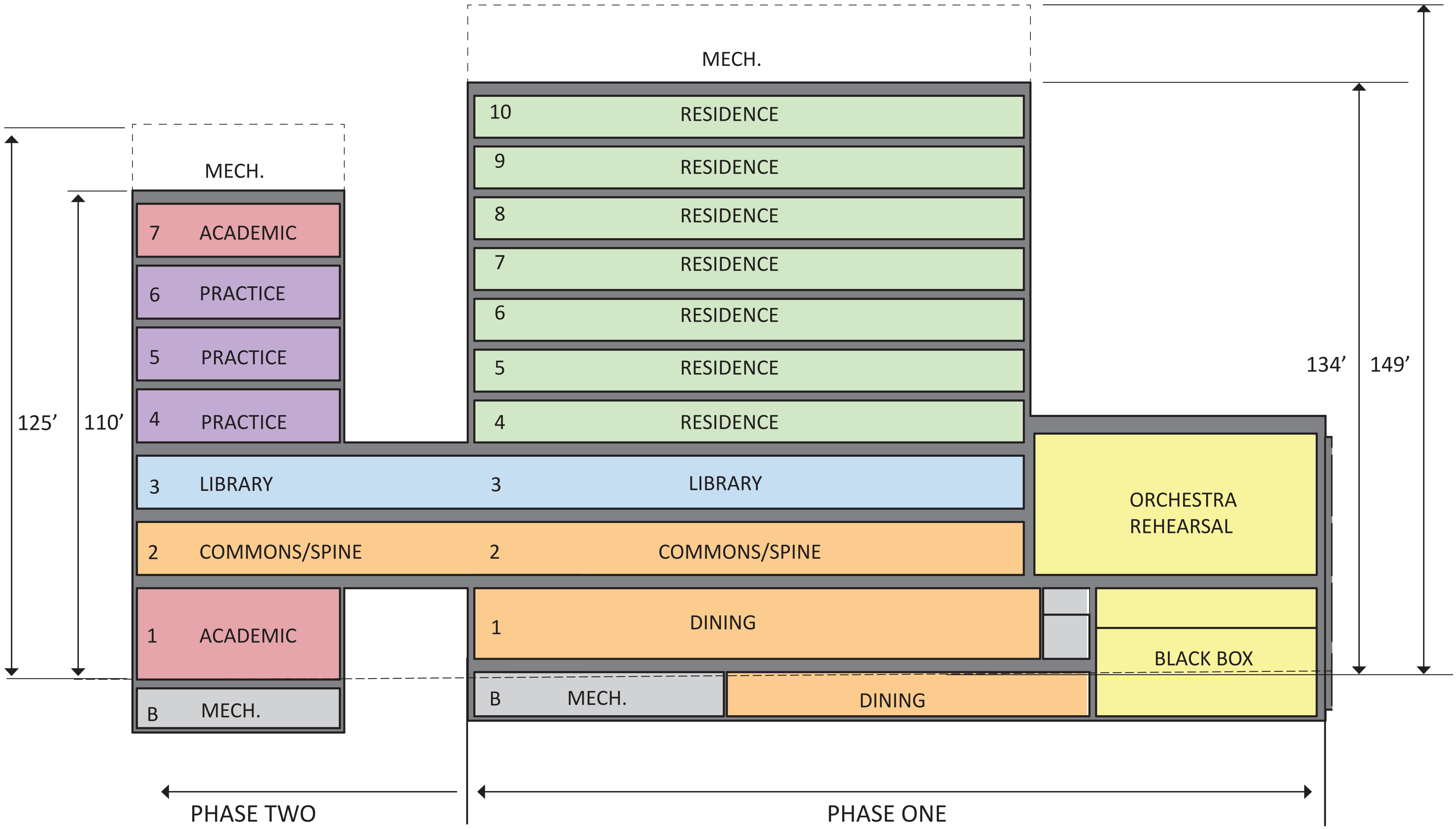


Figure 3-14 - East-West Section
Phases I & II

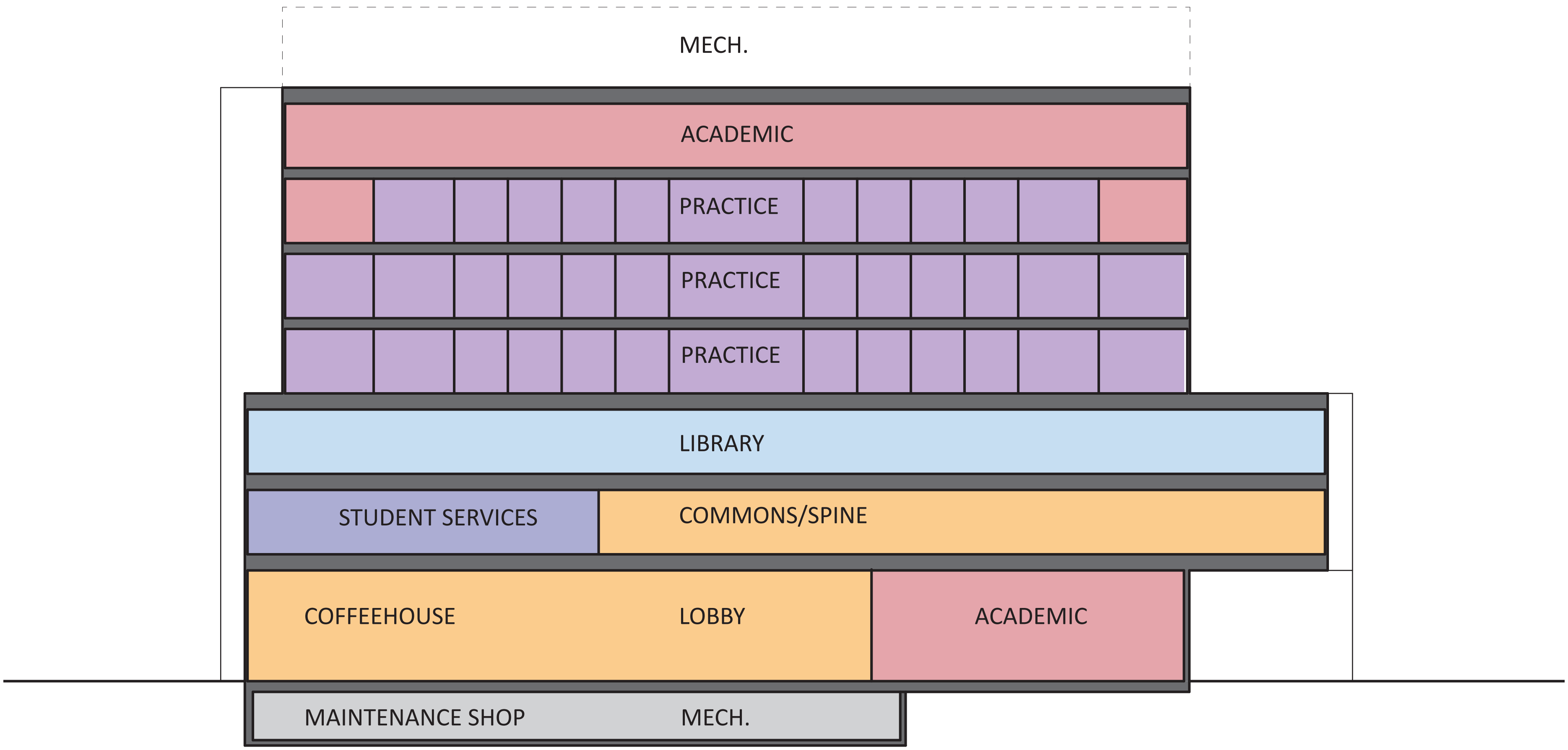


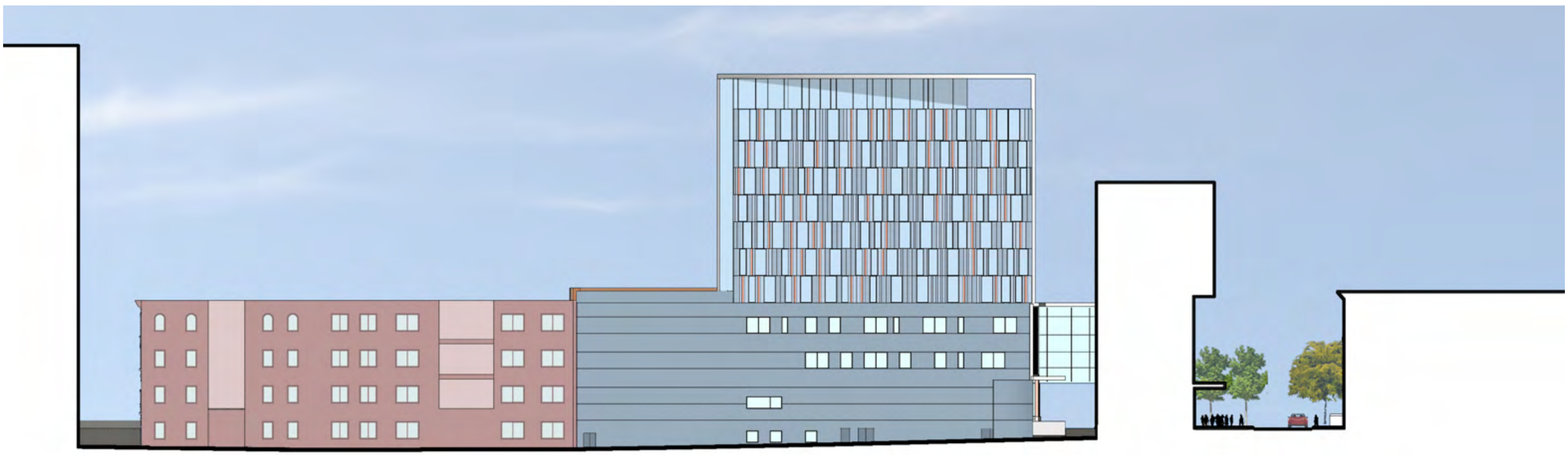
Figure 3-15 - North-South Section
Phase II - Learning Center Project

SECTION THROUGH ST. BOTOLPH STREET LOOKING NORTH

SECTION THROUGH GAINSBOROUGH STREET LOOKING EAST

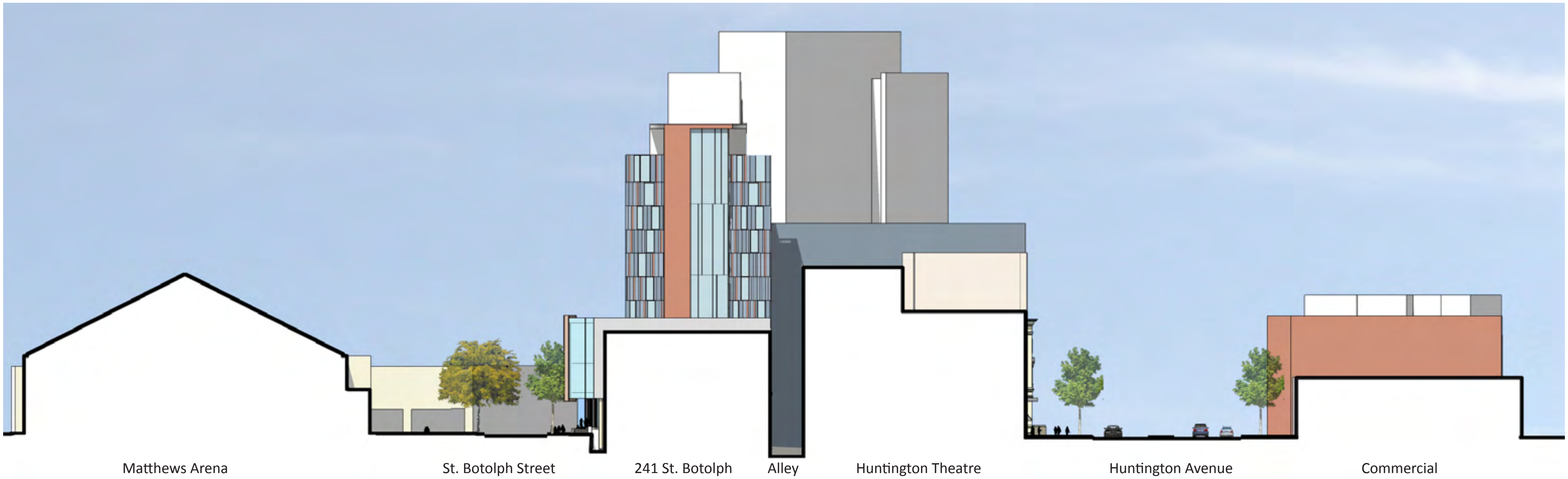
Figure 3-16 - South & West Elevations
Phases I & II

SECTION THROUGH HUNTINGTON AVENUE LOOKING SOUTH

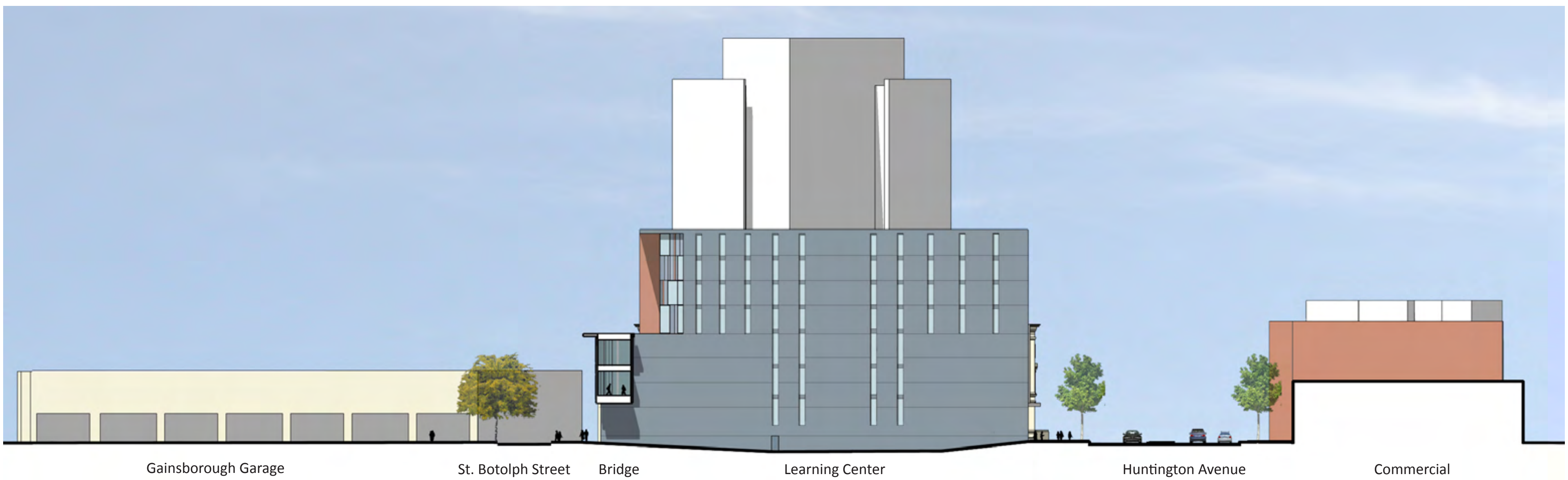


SECTION THROUGH ALLEY LOOKING SOUTH

Figure 3-17 - North Elevations
Phases I & II

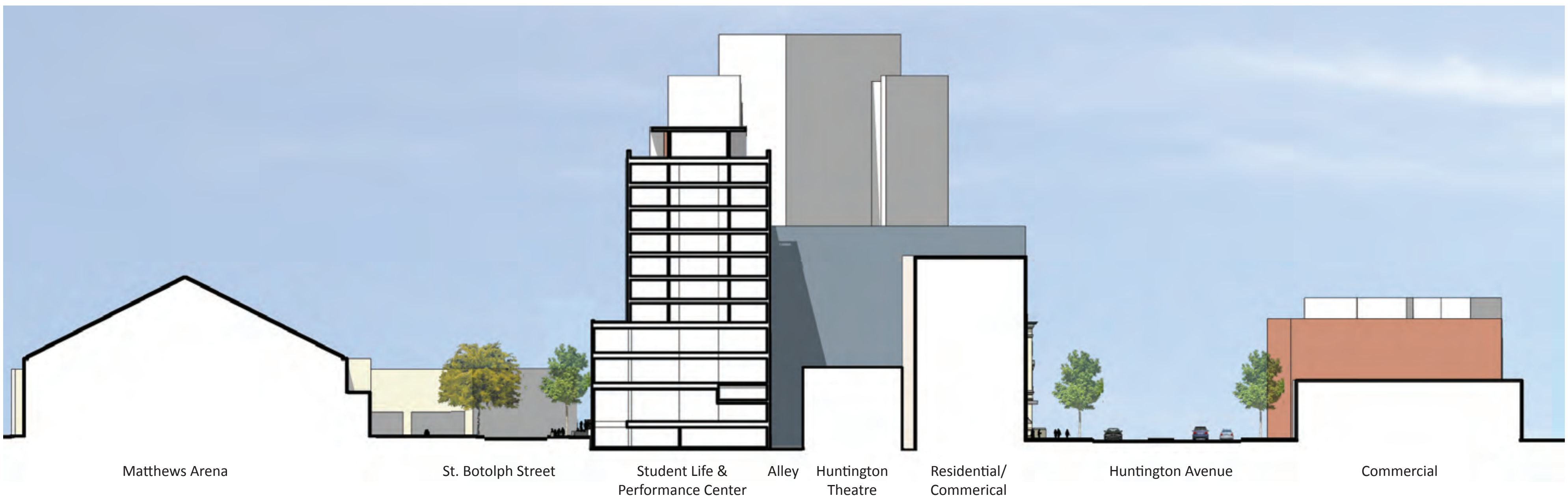


SECTION LOOKING WEST



SECTION THROUGH ALLEY LOOKING WEST

Figure 3-18 - East Elevations
Phases I & II



SECTION LOOKING WEST

Figure 3-19 - Site Section
Phases I & II

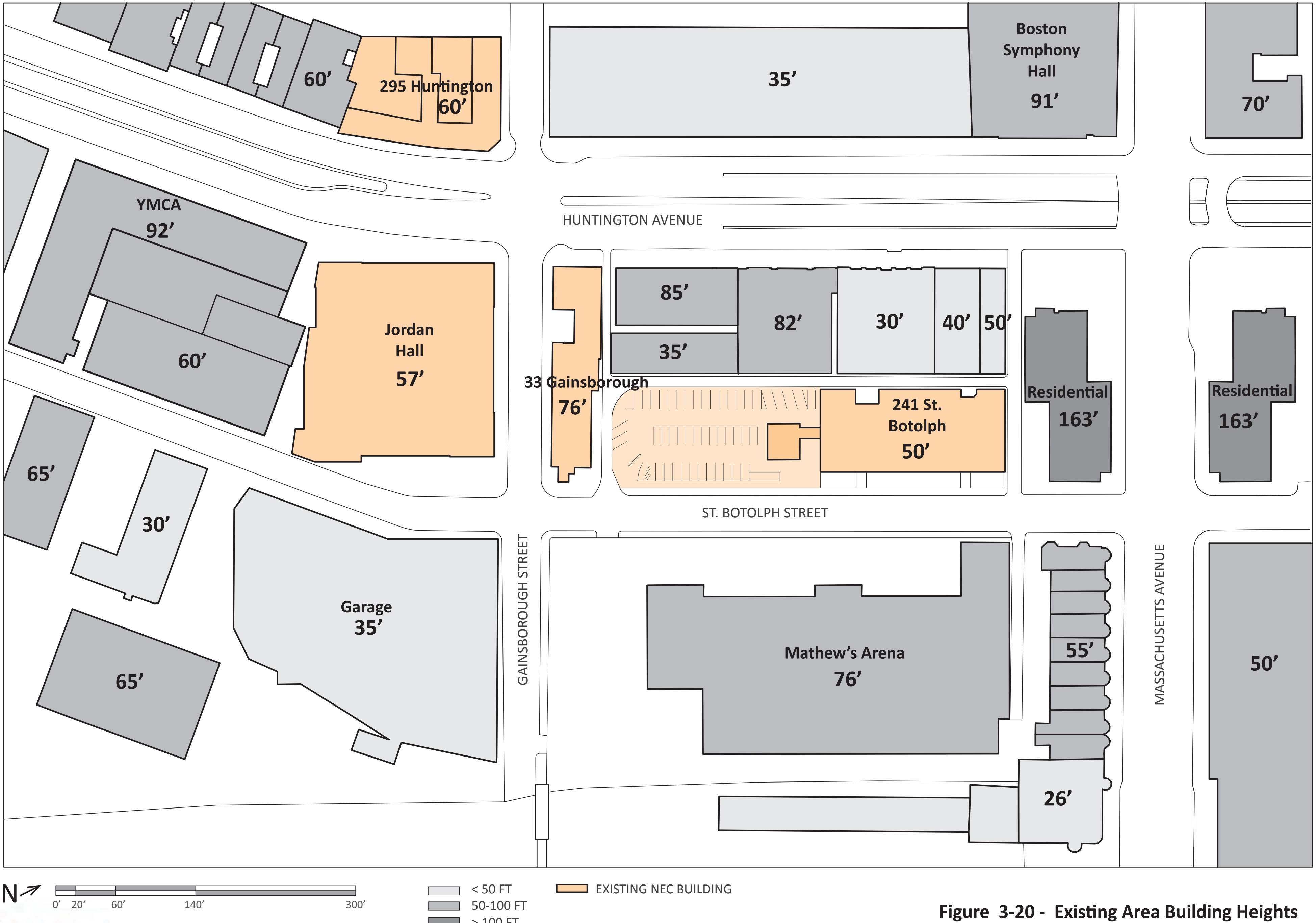


Figure 3-20 - Existing Area Building Heights

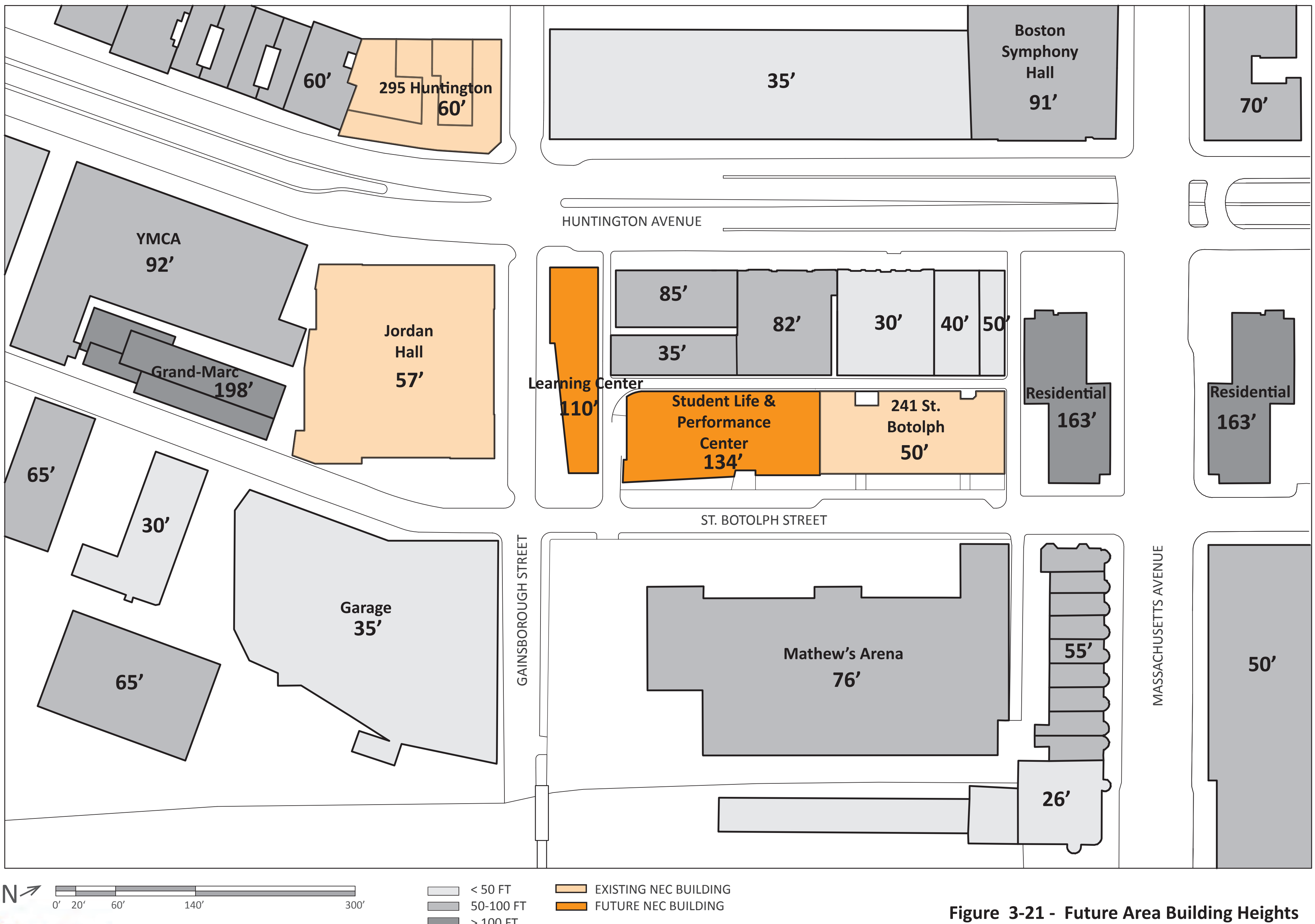


Figure 3-21 - Future Area Building Heights

The pedestrian experience within the NEC campus will be dramatically enhanced as a result of the Proposed Projects' construction. The Proposed Projects are designed to allow pedestrian circulation to occur within the building envelope during the winter months or during inclement weather. This is especially important because NEC students and faculty carry their musical instruments between classes, performances, and residences. Many of these instruments are exceptionally climate- and moisture-sensitive and one of the major logistical difficulties experienced by NEC students and staff today is the amount of climatic exposure to which these instruments are currently subjected during inclement weather.

More importantly, the pedestrian realm created along the exterior edges of the Proposed Projects is designed to be enhanced with the arrangement of new green building edges and widened sidewalks along both Gainsborough Street and St. Botolph Street. The overall streetscape strategy for the Proposed Projects is intended to give the streets defining the NEC campus edges a unified and distinctive identity. Building setbacks and landscaped areas will widen the public realm at the bases of the Proposed Projects, and a small outdoor plaza will be created at the corner of Gainsborough Street and St. Botolph Street. With plantings and seats, this new public realm amenity will create a new campus crossroads and provide a new meeting place for students and visitors to the NEC Campus.

To increase pedestrian safety along Gainsborough Street, which is a highly traveled pedestrian crossing between Jordan Hall and the existing NEC buildings, NEC is proposing to install and maintain a raised crossing directly in front of the front entrance to Jordan Hall as a means of prioritizing pedestrian flow over vehicular traffic on this modestly-traveled stretch of Gainsborough Street.

NEC looks forward to working collaboratively with its neighbor, Northeastern University, to develop a cohesive streetscape and groundplane improvement strategy for this corner of both institutions' campuses.

3.4 Project Schedule

The SPLC Project will commence as early as late 2012 and construction will take place for approximately 20 months. The expected duration of construction period for Phase II is approximately 16 months.

4

Urban Design

4.1 Introduction

New England Conservatory of Music was founded in 1867 and is the oldest independent school of music in the United States. NEC offers undergraduate and graduate degree programs, a continuing education program for adult students, and a preparatory program for students aged 3 through 18. NEC's Jordan Hall is an internationally-known music venue, offering the public premiere performances by students, faculty, and guest performers. NEC's mission notes the broader role of music in today's society:

> *"NEC has a responsibility to reinforce and expand the position of music in society by educating the next generation of music leaders, incubating new work, and sharing our sublime art with the widest possible audience."*

In connection with its Institutional Master Plan, the Conservatory proposes to construct two new buildings to be completed in two separate phases. Phase I, the Student Life and Performance Center Project (the SLPC Project), will provide a student residence with dining, student commons, a library, and performance spaces. Phase II, the Learning Center Project (the LC Project), will provide additional student commons and library spaces, as well as classrooms, faculty offices, administrative offices, practice rooms, and a student coffeehouse open to the public.

The Proposed Projects will create a vibrant new setting for enhanced student learning and academic life, strengthening NEC's sense of community and outreach. The transparency of their design will invite the public to engage in the broad range of activities and programs that NEC offers. The three modestly-scaled new performance spaces created in Phase I will broaden the range of the Conservatory's public programming and provide additional opportunities for community use of the NEC campus facilities. The design strategy for the site of the two new buildings will be expanded to the entire NEC campus on the south side of Huntington Avenue, with the goal of connecting its buildings and outdoor spaces as one very distinct and welcoming place, an urban amenity for both the NEC community and for the public.

4.2 Urban Context

New England Conservatory of Music's campus is located in the East Fenway District of Boston, occupying approximately 2.5 acres of land with frontage on Huntington Avenue, Gainsborough Street, and St. Botolph Street. Its immediate neighbors are: to the north, the Huntington Theater and several commercial and residential properties; to the east, Symphony Towers, a residential property; to the south, Northeastern University; and, to the west, Northeastern University and the YMCA.

The campus is currently comprised of four buildings: Jordan Hall, NEC's landmark building (circa 1903), providing performance spaces, offices, classrooms, audio library and practice rooms; the Residence Hall (circa 1959) providing student rooms, a cafeteria, and the print library; the 241 St. Botolph Street building (circa 1884 with additions in 1926) providing classrooms, performance spaces, offices, and maintenance facilities; and 295 Huntington Avenue, NEC's only building on the north side of Huntington Avenue, providing additional administrative offices and leased office and retail space.

Phase I – the SLPC Project – will be constructed on the site of NEC's current parking lot and annex maintenance building between the existing Student Residence and 241 St. Botolph Street. The current Student Residence on Gainsborough Street will be removed to make way for Phase II of the IMP, the LC Project.

4.3 Building Program

The Student Life and Performance Center (Phase I) will provide approximately 135,000 gross square feet of new space for NEC, and the Learning Center (Phase II) will provide approximately 65,000 gross square feet of new space.

The SLPC Project will house approximately 252 students, and together with the integrated library and dining commons, will become an exciting new campus center for students, faculty, staff, and visitors, as shown previously in **Figure 3-2** through **Figure 3-6**. The Center's three modestly scaled new performance spaces – a 200 seat Black Box theater, orchestra rehearsal room, and ensemble/recording room - will be used by students for performances and rehearsals, as well as for public performances. The adjacent dining areas will also serve dual functions as breakout and reception areas for evening and other performance events, in addition to providing modern, affordable dining options to NEC students, faculty and staff, and to members of the public.

The Learning Center will include a student coffeehouse, additional commons and library space, as well as offices for student organizations and administrative departments on the lower floors. The upper floors will include classrooms, faculty studios, computer labs, and student practice rooms.

Connecting the Learning Center to the SLPC Project will be a student commons "spine," which will also connect the Learning Center and Student Life and Performance Center with the 241 St. Botolph building making it possible for students, faculty, and visitors to travel inside from Gainsborough Street to within a half a block of Massachusetts Avenue.

4.4 Urban Design Concept

The over-arching urban design concepts for the IMP are two-fold: to unify and strengthen the sense of place on NEC's campus, and to engage the public by heightening NEC's public presence and accessibility – both visually and physically. This will be accomplished by creating a new visual and physical permeability of the new buildings and in turn of the broad range of the activities NEC offers. It will also be accomplished by connecting the campus through the unifying effect of a shared landscaping and building treatment along the streets that run by and through it – Huntington Avenue, Gainsborough Street, and St. Botolph Street.

The two historic buildings on the campus – Jordan Hall and 241 St. Botolph– will remain as bookends of the campus, their heritage and fabric preserved and accentuated by the two new contemporary buildings between them. The first of these new buildings, the Student Life and Performance Center, will be placed on the site of NEC's current surface parking lot and maintenance shed, filling and healing a gap in the building frontage of the St. Botolph Street block. The second of the buildings, the Learning Center, will replace NEC's outdated dormitory building, spanning and activating the length of Gainsborough Street from Huntington Avenue to St. Botolph Street. Both buildings will have transparent bases at the street level, with extensive glazing at their base, inviting passers-by to share the excitement of the day-to-day life of NEC, and offering the NEC community a stronger connection with the city life around it. Together the new buildings will enliven the neighborhood and make it a more welcoming and safer place to live, work, and visit.

NEC's campus is a student-intensive one, with significant foot traffic between buildings as classes and programs take place in all buildings throughout the day and evening. This traffic will increase after the completion of the new buildings, as campus activities will be spread among more buildings. Outside of the new buildings, the sidewalks will be widened and enhanced with outdoor seating areas, landscape and hardscape accents, and new signage. Inside, the new spine will offer additional connectivity between the two new buildings and 241 St. Botolph Street.

Visible from Massachusetts Avenue and from Gainsborough Street will be the projecting second floor Orchestra Rehearsal Room with its glazed sides, acting as a guiding beacon to what will be a major new campus entrance at the Student Life and Performance Center. There will also be a striking new vista of Jordan Hall from St. Botolph Street that doesn't currently exist because of the massing of the existing Residence Hall building. This will be made possible by the design of the southwest corner of the Learning Center building, whose recessed and chamfered corner will offer pedestrians and drivers moving west on St. Botolph Street a longer-distance appreciation of the proportion and craft of NEC's National Historic Landmark building.

On Huntington Avenue, the new Learning Center building will replace the closed masonry library structure and offer a new public face for NEC. It will reinforce and strengthen NEC's importance as a cultural icon along the Avenue of the Arts, announcing NEC to passers-by, whether walking, driving, or commuting on the Green Line. The proposed coffeehouse, a new NEC community venue for student performances, will be placed on the Huntington Avenue end of the Learning Center building. With full-height glazing, it will light up the street corner with activity at the sidewalk level in stark but welcome contrast to the closed, opaque corner currently created by the Firestone Library. The design of the Learning Center building also leverages the bend in Huntington Avenue, providing an exciting new visual moment in a streetscape of largely opaque masonry buildings to vehicular and pedestrian traffic traveling east on Huntington Avenue.

From the corner of Huntington Avenue and Massachusetts Avenue at the BSO, the upper floors of the Student Life and Performance building will be clearly visible, reinforcing NEC's presence in the neighborhood. With a multi-windowed north façade, the building will offer an exciting new focus from the BSO corner in an otherwise dark vista southward over the Huntington Theater. Shared student living rooms on the residential floors with wide expanses of glazing will be placed on the east side of these uppers floors, to capture views out over Boston from the inside but also to ensure a lighted and active east façade that will be visible from the surrounding major thoroughfares.

Two new fully accessible portals from the street to the interior of the campus will be created, one to the Learning Center on Gainsborough Street and one to the Student Life and Performance Center on St. Botolph Street. These glazed and light-filled lobby spaces will clearly define the interior building way-finding, through their legible planning and staircases easily visible from outside. They will link the interiors of the new buildings to the streetscape through transparency and activity, and bring natural light deep into the floor plates of each building. The entrance and lobby of the Learning Center will be placed directly across from and on axis with the Jordan Hall entrance and lobby, clearly linking the two buildings across Gainsborough Street. The entrance and lobby of the Student Life Center will be placed at the western end of the building, at a point which is equidistant to all parts of the NEC campus on the south side of Huntington Avenue. The south façade of the building will be angled, to provide a clear and graceful approach to the entrance, made even more welcoming with a gentle access ramp, planting areas, and south-facing seating steps.

4.5 Massing

The Student Life and Performance Center will have ten stories plus a lower ground floor at its base and a mechanical penthouse floor at its top. The first three floors will form a podium element for the new building. They will align vertically at their eastern end with the face of the adjacent 241 St. Botolph building, and share the same cornice line as the historic 241 building. Aligning the new building with the 241 building has been a strategic site planning priority; the new building will be set back 12' from the back of sidewalk and property line to increase the outdoor pedestrian zone and allow a green buffer between the building and the street. This setback area will become part of the NEC campus' public realm, and will be dedicated to pedestrian circulation and enjoyment, especially in light of its southerly exposure.

The lower three floors of the Student Life and Performance Center will house spaces shared by the entire NEC community – the dining and social commons, library, and performance spaces. The second floor orchestra rehearsal room will cantilever in front of these floors to the NEC property line, announcing the entrance to the building and providing glimpses of its interior to those passing by outside. High level windows at the ground floor will provide passers-by a view of the black box theater. The upper residential floors of the Student Life and Performance Project will be set back from the lower three floors to reduce or eliminate visual, wind, daylight, and shadow impacts on the public realm.

The Learning Center will have seven stories plus a single underground basement. The cornice line of the first three floors aligns with that of the historic Jordan Hall Building directly across Gainsborough Street. The building is connected to the Student Life and Performance Center by a two-level crossing, whose roof wraps around both buildings connecting them with a continuous horizontal line to create a unified architectural composition that will define the next century of NEC's presence in the East Fenway.

The new buildings will respect and reflect the proportions of both the historic Jordan Hall building and the 241 St. Botolph building, reinforcing the urban scale of the surrounding neighborhood at street level and bringing a new visual unity to the NEC campus and to the city block that these new compositions occupy.

4.6 Character and Materials

The character of the Proposed Projects is distinctly and purposely contemporary, emblematic of the forward-looking mission of NEC as a world-class music conservatory. The transparency of the new buildings, especially at their base, serves as a complement to the heavy masonry construction of their neighbors, highlighting the early 20th century craft of the nearby historic structures, while setting the new NEC buildings apart and creating a distinctive streetscape identity for NEC.

The new buildings are treated similarly in terms of exterior materials and the rhythm of their fenestration. The lower three floors of the buildings facing the three public thoroughfares – Huntington Avenue, Gainsborough Street, and St. Botolph Street - are clad with a full-height low-E curtain-wall system, taking advantage of their southern and western exposures to offer light-filled interiors and clear views both inward and outward. The cadence of these windows and their horizontal proportion are based on that of the window openings and intermediate brick spandrel panels of NEC's 241 St. Botolph Street building next door, further unifying new and existing structures. A counterpoint to the horizontality of the shared cornice line along St. Botolph Street is the cantilevered Orchestra Performance Room. Projecting in front of the building plane shared by the new and existing buildings, this is glazed on both sides and clad on its street-facing façade with a pleated panel system, reminiscent of a proscenium curtain.

The floors above use a different architectural expression to distinguish themselves from the podium floors, with a combination of opaque and translucent materials, and unitized windows with low-E coated glazing. This expression is unlike that of any other building in the immediate neighborhood. The different window sizes and their rhythms respond to the variety of functions behind them, whether dormitory room, practice room, classroom, or faculty studio. The mechanical penthouse on the top of the Student Life and Performance Center is wrapped top and sides with a combination of opaque and translucent materials, both enclosing mechanical equipment and offering a unique design treatment visible from the surrounding neighborhood. Wide expanses of glazing on the east façade of the upper-level residential floors signal the shared student living spaces on each floor that offer long-distance views eastward over Back Bay and downtown Boston.

4.7 Site Access and Vehicular Circulation

Public transportation access to and from the NEC campus is excellent. The MBTA Green Line 'E' train runs along Huntington Avenue on the north side of the campus, with stops at Massachusetts Avenue/Symphony and also at Northeastern University. The MBTA Orange Line runs along the NEC campus' south side with access from both Massachusetts Avenue and from Gainsborough Street. In addition there is MBTA bus service along Massachusetts Avenue, and commuter rail service at nearby Ruggles Station.

Pedestrian traffic in the area is heavy due to both NEC and Northeastern University students, swelling even more when there is a musical event at NEC or a sports event at Northeastern University. A major goal of the IMP is to make the neighborhood safer and more commodious for pedestrians while not adversely impacting vehicular traffic. Dedicated vehicular drop-off areas are proposed in front of the NEC buildings on both St. Botolph Street and Gainsborough Street. To increase pedestrian safety along Gainsborough Street, which is a highly traveled pedestrian crossing between Jordan Hall and the existing NEC buildings, NEC is proposing to install and maintain a raised crossing directly in front of the front entrance to Jordan Hall as a means of prioritizing pedestrian flow over vehicular traffic on this modestly-traveled stretch of Gainsborough Street.

Vehicular service to the Proposed Projects will continue to occur "behind the scenes" from the public alleys adjacent to the Proposed Project sites as it does currently, with no impact on the servicing of the other buildings on Huntington Avenue that share these alleys. A dedicated off-street loading bay is provided in the SLPC Project, and an interior connection at the basement level through the SLPC Project to the existing 241 St. Botolph Street building will allow both buildings to be serviced for deliveries and trash removal via the newly created off-street loading bay.

4.8 Open Space, Pedestrian Ways, and Amenities

The two Proposed Projects and their associated site improvements provide the opportunity to strengthen the sense of campus at NEC and to create unified, distinct, and welcoming new setting for one of Boston's most important cultural institutions. Whether coming to a performance at NEC or simply passing through the neighborhood, the public at large will benefit from this new urban setting.

Sidewalks along the interior edges of the NEC campus will be widened, making them more generous and welcoming with seating and planted areas. Selected on-street parking spaces will be re-purposed as additional planted and pedestrian zones, interspersed with safe vehicular drop-off areas to improve area-wide traffic flow during peak times for performance drop-off and pick-up.

The first floors of the LC Project will be accessible at grade, and the Student Life and Performance Center accessible via a shallow ADA-compliant ramp as well as with wide south-facing steps that double as a sunny outdoor seating area. By setting back from the sidewalk, the south façade of the Learning Center, a small south-facing 'outdoor room' will be created at the corner of Gainsborough Street and St. Botolph Street. With plantings and seats, this will create a new campus crossroads and a new meeting place for students and visitors to the NEC campus.

As part of the overall streetscape improvement strategy, the existing areaways in front of 241 St. Botolph Street may be partially infilled and planted, providing a new green building edge for St. Botolph Street. New trees will line the NEC sides of both Gainsborough Street and St. Botolph Street, shading sidewalks and softening street edges. These new street trees, along with the new planting areas in front of the new NEC buildings, will improve storm water drainage and help reduce the ambient heat otherwise created by paved surfaces. The proposed streetscape strategy will be implemented in partnership with Northeastern University, whose upcoming Institutional Master Planning process will necessarily include the re-envisioning of this corner of the Northeastern campus as a result of the new Grandmarc residence hall's development.

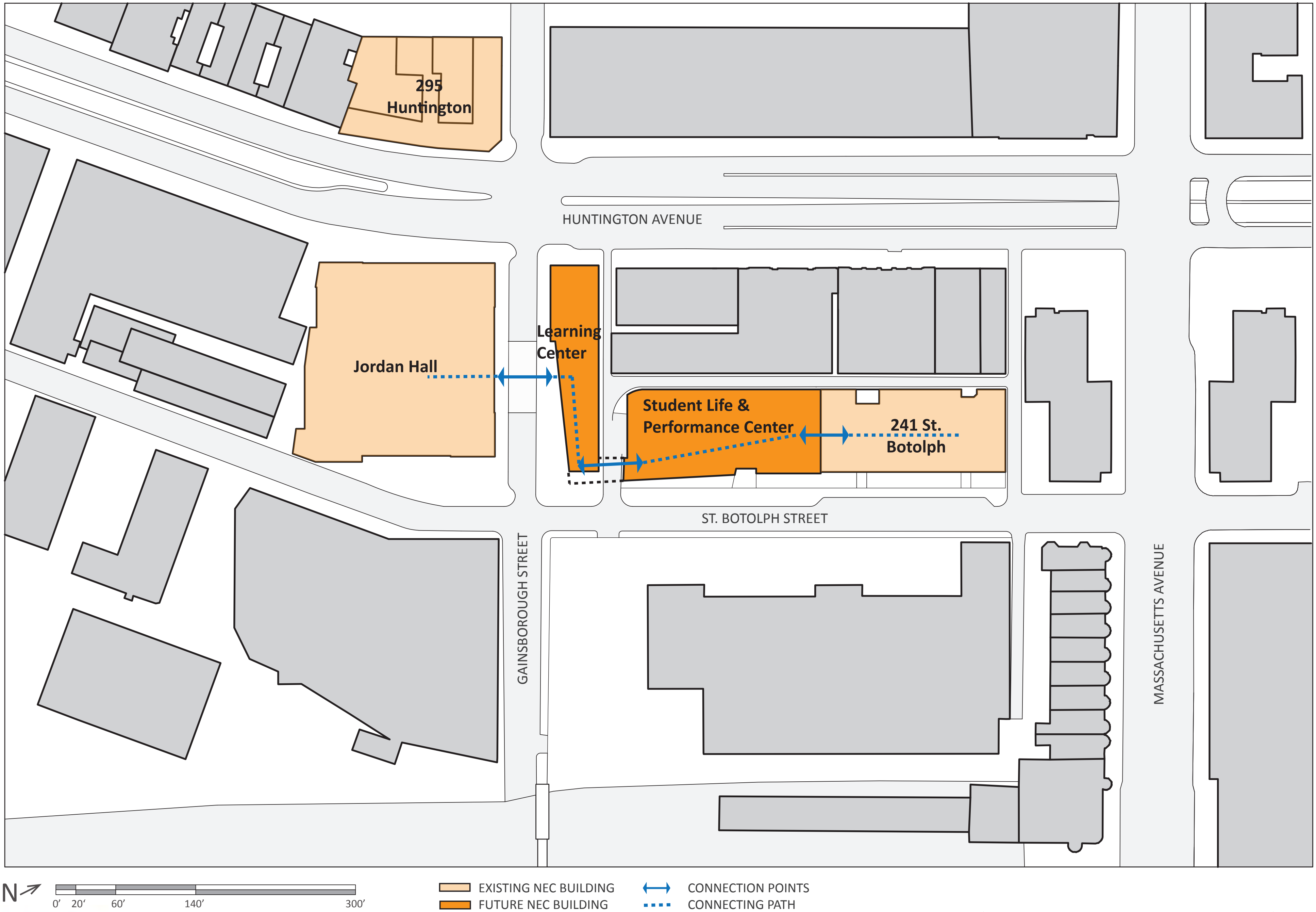


Figure 4-1 - Future Campus Connections
Phases I & II

Figure 4-2 - View of St. Botolph Street from Massachusetts Avenue
Phase I - Student Life & Performance Center Project

Figure 4-3 - View of St. Botolph Street from Gainsborough Street
Phase I - Student Life & Performance Center Project

Figure 4-4 - View from Symphony Hall and Massachusetts Avenue
Phase I - Student Life & Performance Center Project

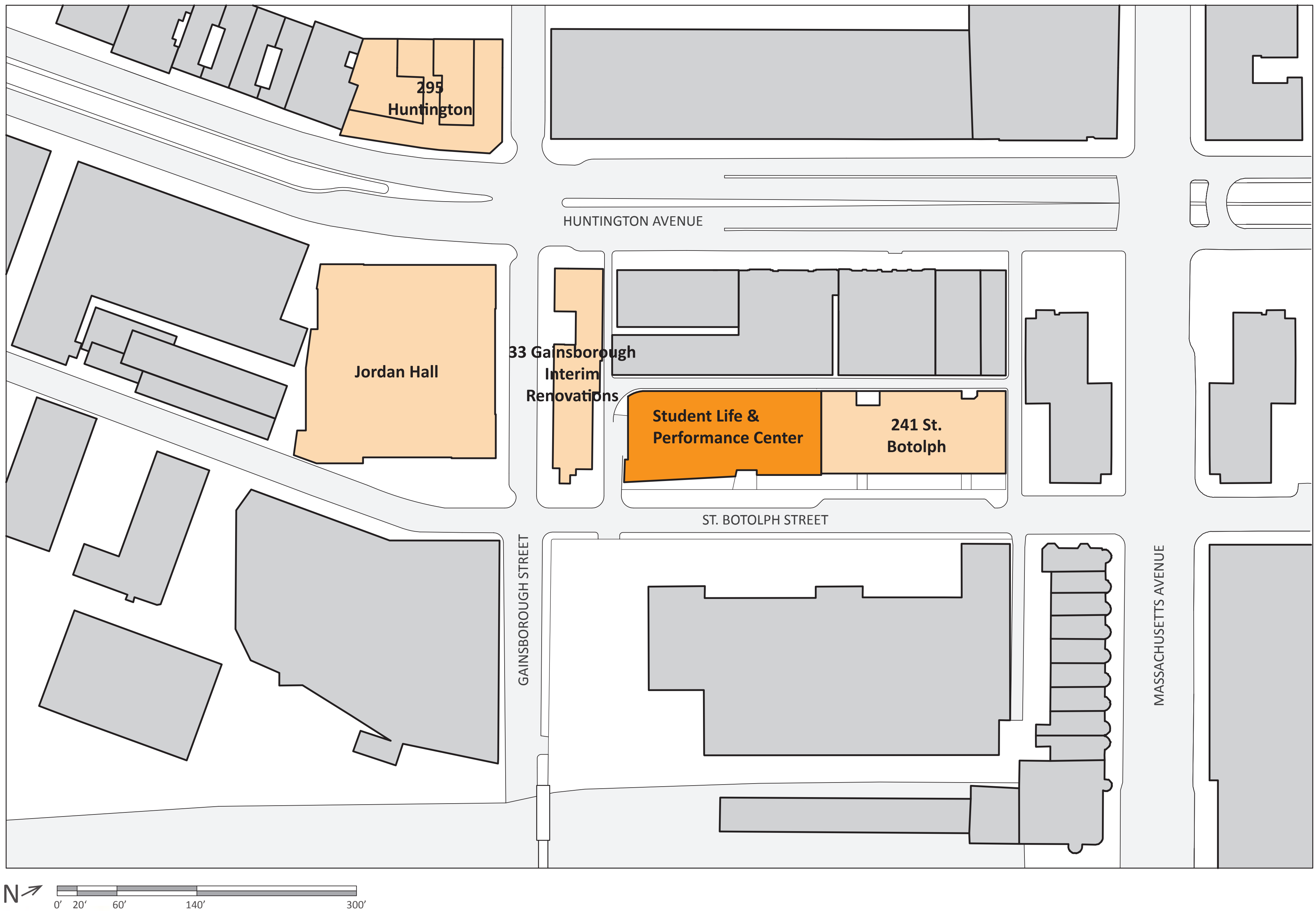


Figure 4-5 - Proposed Site Plan
Phase I - Student Life & Performance Center

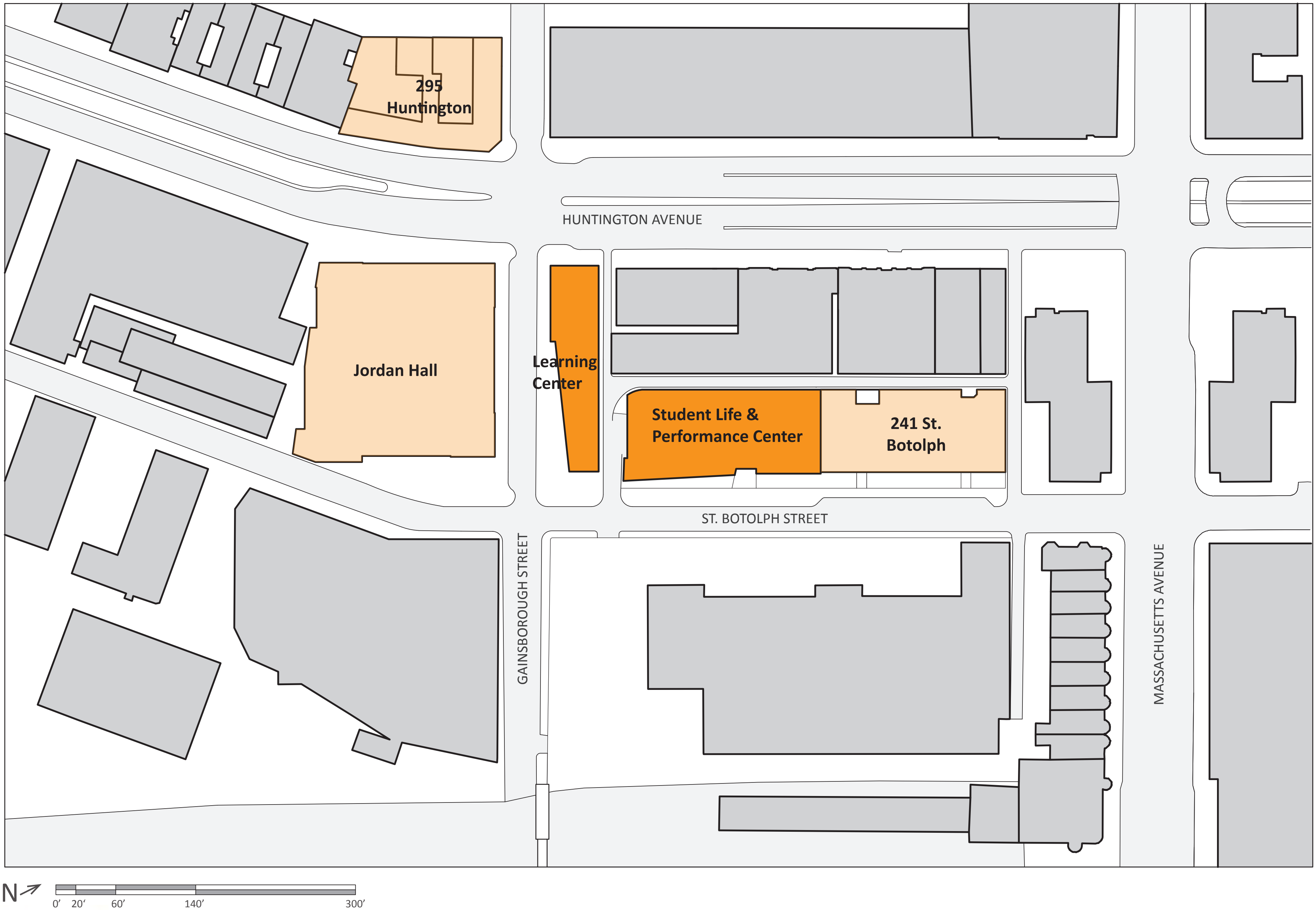


Figure 4-6 - Proposed Site Plan
Phases I & II

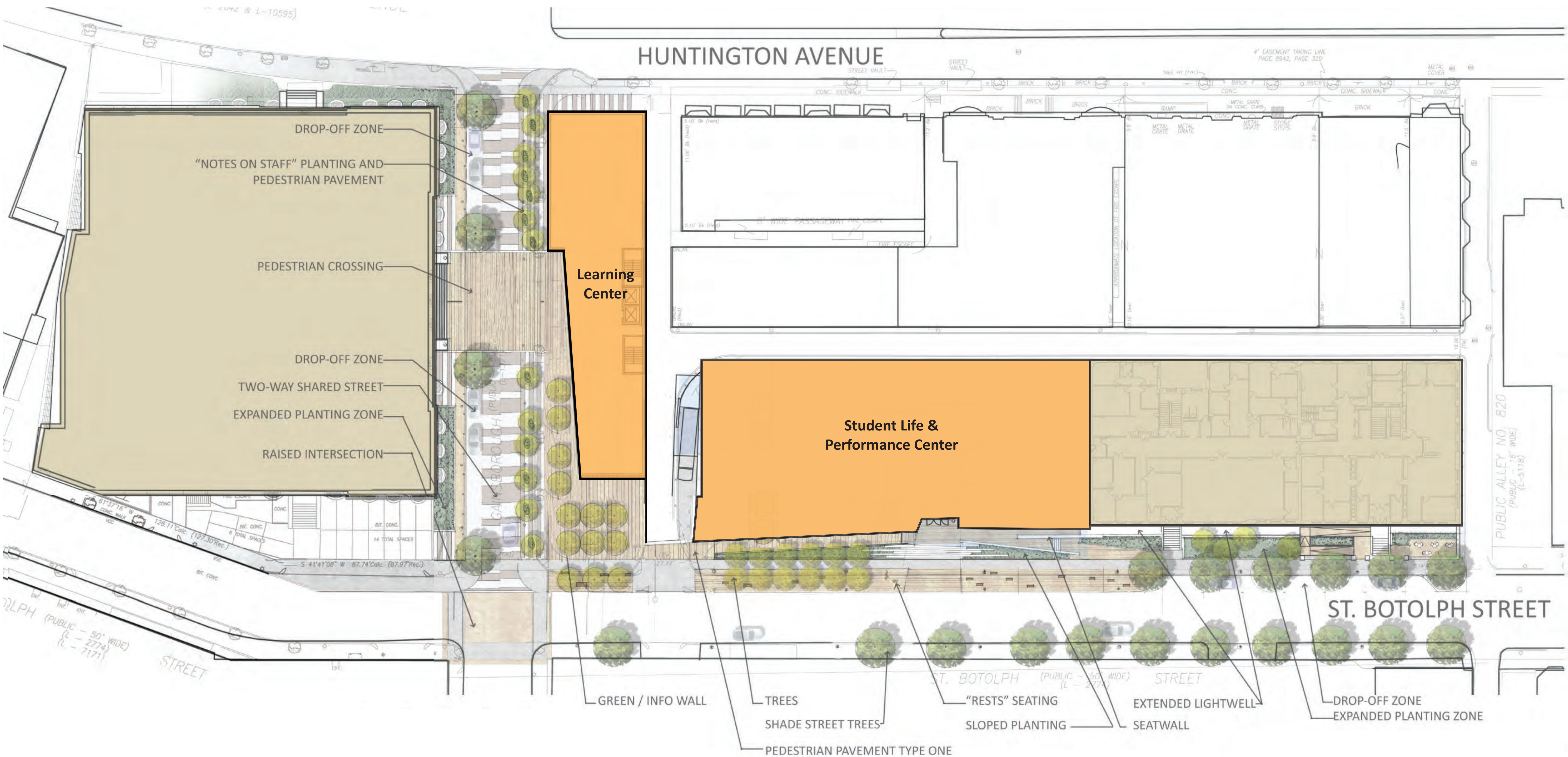
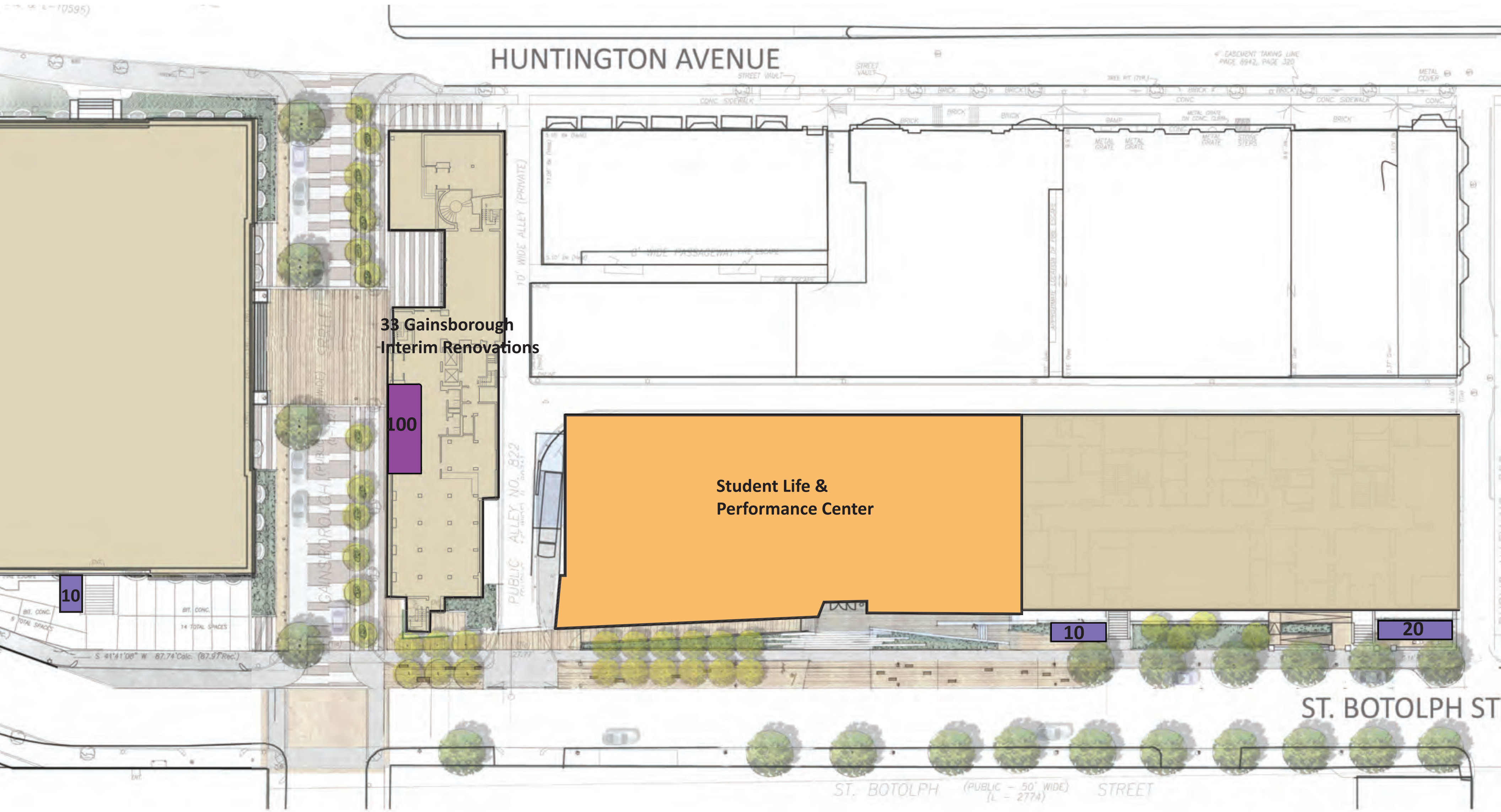


Figure 4-7 - Site Improvements

Figure 4-8 - View from Gainsborough Street
Phase I - Student Life & Performance Center Project

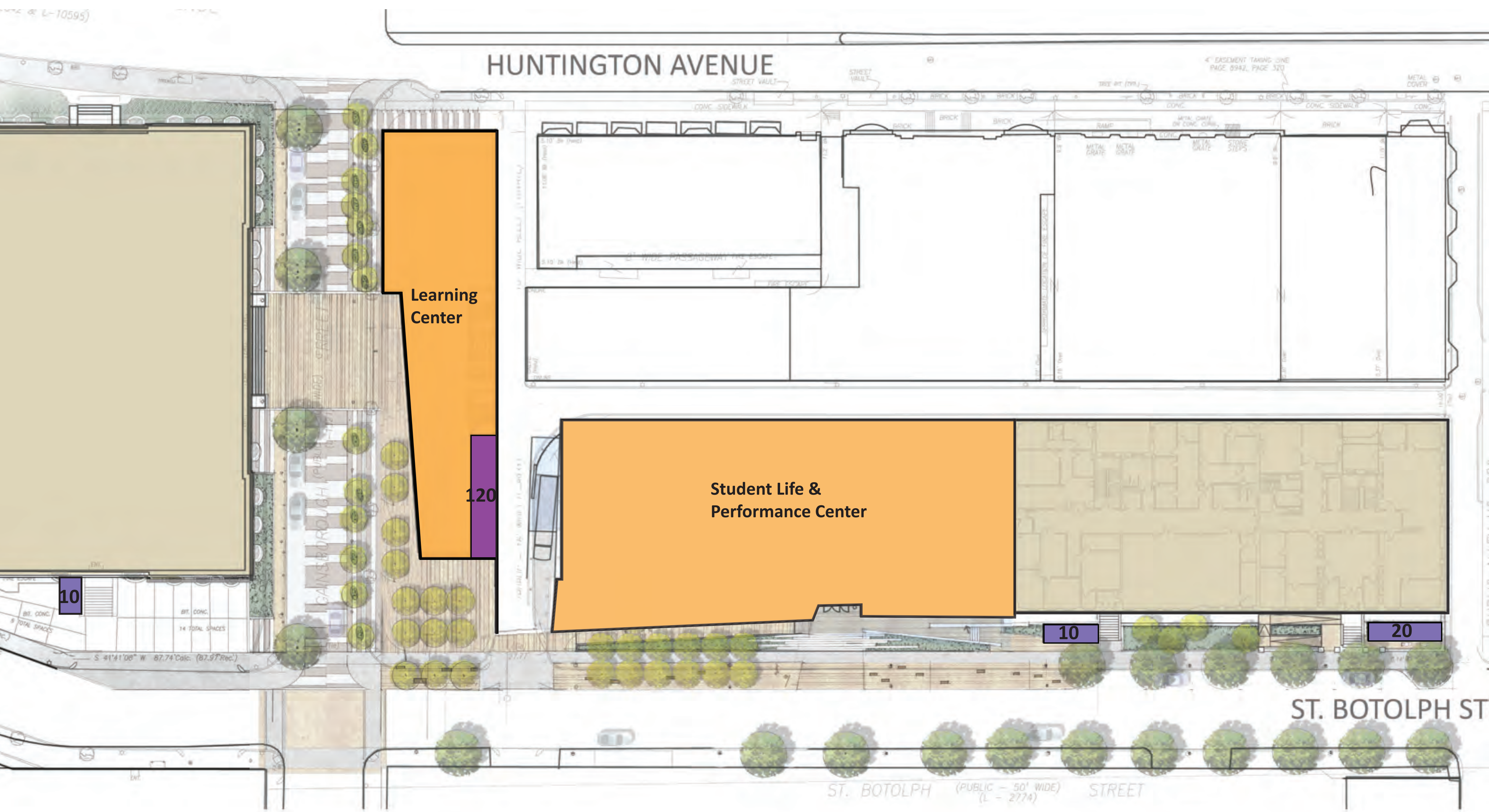
Figure 4-9 - View from Gainsborough Street
Phases I & II

Figure 4-10 - View from Huntington Avenue
Phase II - Learning Center Project



Indoor Bicycle Storage Area
Outdoor Bicycle Storage Area

Figure 4-11 - Bicycle Accomodations
Phase I - Student Life and Performance Center



Indoor Bicycle Storage Area
Outdoor Bicycle Storage Area

Figure 4-12 - Bicycle Accomodations
Phases I & II

5 Transportation

5.1 Introduction

This section presents a comprehensive assessment of the transportation issues related to the New England Conservatory Institutional Master Plan Notification Form/ Project Notification Form (IMPNF/PNF). The IMPNF/PNF covers a ten-year period between 2012 and 2022 and includes two phases of development as outlined in previous sections of this document.

New England Conservatory's IMPNF/PNF includes two major projects. The new Student Life and Performance Center (Phase I) will be built on St. Botolph Street, replacing NEC's existing surface parking lot. The new Learning Center (Phase II) will replace the existing building at 33 Gainsborough Street. Phase I construction is expected to start as early as late 2012 with completion of the Student Life and Performance Center expected as early as 2015. Phase II will follow and the new Learning Center is anticipated to be complete by approximately 2017.

The analysis in this section addresses the transportation impacts associated with both Phase I and Phase II of the IMPNF/PNF.

5.2 Project Overview

As listed below, New England Conservatory's (NEC) campus consists of four buildings abutting Huntington Avenue, Gainsborough Street, St. Botolph Street, the YMCA, and the Northeastern University campus.

Jordan Hall, with an address at 290 Huntington Avenue, has its primary street entrance at 30 Gainsborough Street. This building is the centerpiece of the NEC campus with the Jordan Hall performance space at its core, surrounded by other performance spaces (Brown Hall, Williams Hall, and the Keller Room) as well as administrative offices, practice rooms, teaching studios and the Firestone Library.

The **St. Botolph building**, at 241 St. Botolph Street, houses administrative offices for the Preparatory School, Continuing Education School and other NEC departmental offices. An adjacent outbuilding, the Pavilion, currently houses a workshop and storage for NEC's facilities department.

The residence hall at **33 Gainsborough Street**, across from Jordan Hall, contains dormitory beds for approximately 163 students, the print library, and the student dining hall.

295 Huntington Avenue, located at the northwest side of Huntington Avenue directly across from Jordan Hall, houses additional NEC administrative offices with the remaining space leased to non-NEC commercial tenants. This building is referred to as the "Annex" by the NEC community.

NEC's Institutional Master Plan (IMPNF/PNF) includes construction of two new buildings that will enhance student and academic life in a setting that provides state-of-the-art resources for performance, practice, research, and collaboration. Campus gateways on Huntington Avenue, Gainsborough Street and St. Botolph Street will be more clearly defined to create a more legible and accessible sense of campus. By providing new internal corridors and pathways between the existing St. Botolph Street building, the new Student Life and Performance Center, and the new Learning Center, links between gathering spaces will create more opportunities for collaboration and creativity among the NEC community.

The IMPNF/PNF covers three basic construction phases, as follows:

- **Phase I** of the IMPNF/PNF, the 135,000 square foot (sf) Student Life and Performance Center, will be located on the site of NEC's current parking lot on the northwest side of St. Botolph Street.
- Under **Phase IA,** which will commence after completion of the Student Life and Performance Center, the existing building at 33 Gainsborough Street will be vacated and renovated to support other uses. The 163 existing dormitory rooms and print library will be converted on an interim basis to practice rooms, faculty studios, academic uses, and space for the facilities department. These interim uses will continue until Phase II of the IMPNF/PNF is constructed.
- When construction of **Phase II**, the new Learning Center is ready to commence, the existing 33 Gainsborough Street building will be demolished. The new seven-story building at that address will be devoted primarily to student learning and practice spaces.

The land uses under existing conditions and future IMPNF/PNF phases are summarized in **Table 5-1.**

Table 5-1
NEC Building Size by IMPNF/PNF Phase

	Existing	After Phase I + Phase IA	After Phase II	Net New After Phase II
Existing Buildings				
Jordan Hall	150,000 sf	150,000 sf	150,000 sf	0
St. Botolph Building (241 St. Botolph Street)	65,500 sf	65,500 sf	65,500 sf	0
Residence Hall & Library (33 Gainsborough Street)	57,000 sf	57,000 sf	Replaced with Learning Center	-57,000 sf
Parking Lot and Pavilion [1)]	2,500 sf	Replaced with Student Life and Performance Center	Replaced with Student Life and Performance Center	-2, 500 sf
Annex Building (295 Huntington Avenue)	74,000 sf	74,000 sf	74,000 sf	0
IMPNF/PNF Proposed Projects				
New Student Life and Performance Center (Phase I)	-	135,000 sf	135,000 sf	+ 135,000 sf
New Learning Center (Phase II)	-	-	65,000 sf	+ 65,000 sf
Total All NEC buildings	349,000 sf	481,500 sf	489,500 sf	+140,500 sf
Parking	73 spaces	20 spaces	20 spaces	-53 spaces

The Pavilion, currently used by the Facilities Department, is a small building adjacent to the parking lot and 241 St. Botolph Street. The square footage refers to the Pavilion and does not include the surface area of the parking lot.
sf = square feet

While completion of Phase II will result in a net increase of approximately 140,500 square feet on the NEC campus, student enrollment and the number of faculty are not anticipated to change. Only a small increase (about 10 employees) in support/maintenance staff is expected with the additional space.

With the proposed addition of approximately 89 net new beds as part of the Phase I project, however, the proportion of students living in campus-controlled housing will increase from approximately 20 percent to approximately 31 percent. Since more students will live on-campus, the number of students commuting to and from the campus will decrease correspondingly.

5.3 Methodology

In accordance with the Boston Transportation Department's (BTD) Transportation Access Plan Guidelines, the study team conducted a transportation analysis for the Proposed IMPNF/PNF projects, including an evaluation of existing and future transportation conditions.

To evaluate existing conditions, observations and data collection were conducted on the following transportation elements:

Transportation characteristics of the daily population and activity on campus, including access, parking, loading, and move-in move-out activity;

- Geometric and operational characteristics of the study area roadways and intersections;
- Off-street and on-street parking supply;
- Public transportation service;
- Inventory of sidewalks and crosswalks;
- Pedestrian activity to, from and through the campus;
- Bicycle accommodations and bicycle use; and
- Loading and service.

Future transportation conditions and potential traffic impacts associated with the Proposed Projects and other neighboring projects are discussed. Long-term impacts are evaluated for 2022, based on a ten-year horizon from the 2012 base year. Expected roadway, parking, transit, pedestrian, and loading conditions and deficiencies at that time are identified. Impact analysis is focused on weekday morning and afternoon peak hours.

This comprehensive transportation study will serve as the basis for the Transportation Access Plan Agreement (TAPA) between New England Conservatory and the Boston Transportation Department (BTD) for each phase of the IMP.

5.4 Study Area

The transportation study area for the NEC IMPNF/PNF generally includes the roadway corridors of Massachusetts Avenue, Huntington Avenue, Gainsborough Street, and St. Botolph Street. The study area, as shown in **Figure 5-1,** includes the following four intersections:

- Huntington Avenue/Massachusetts Avenue,

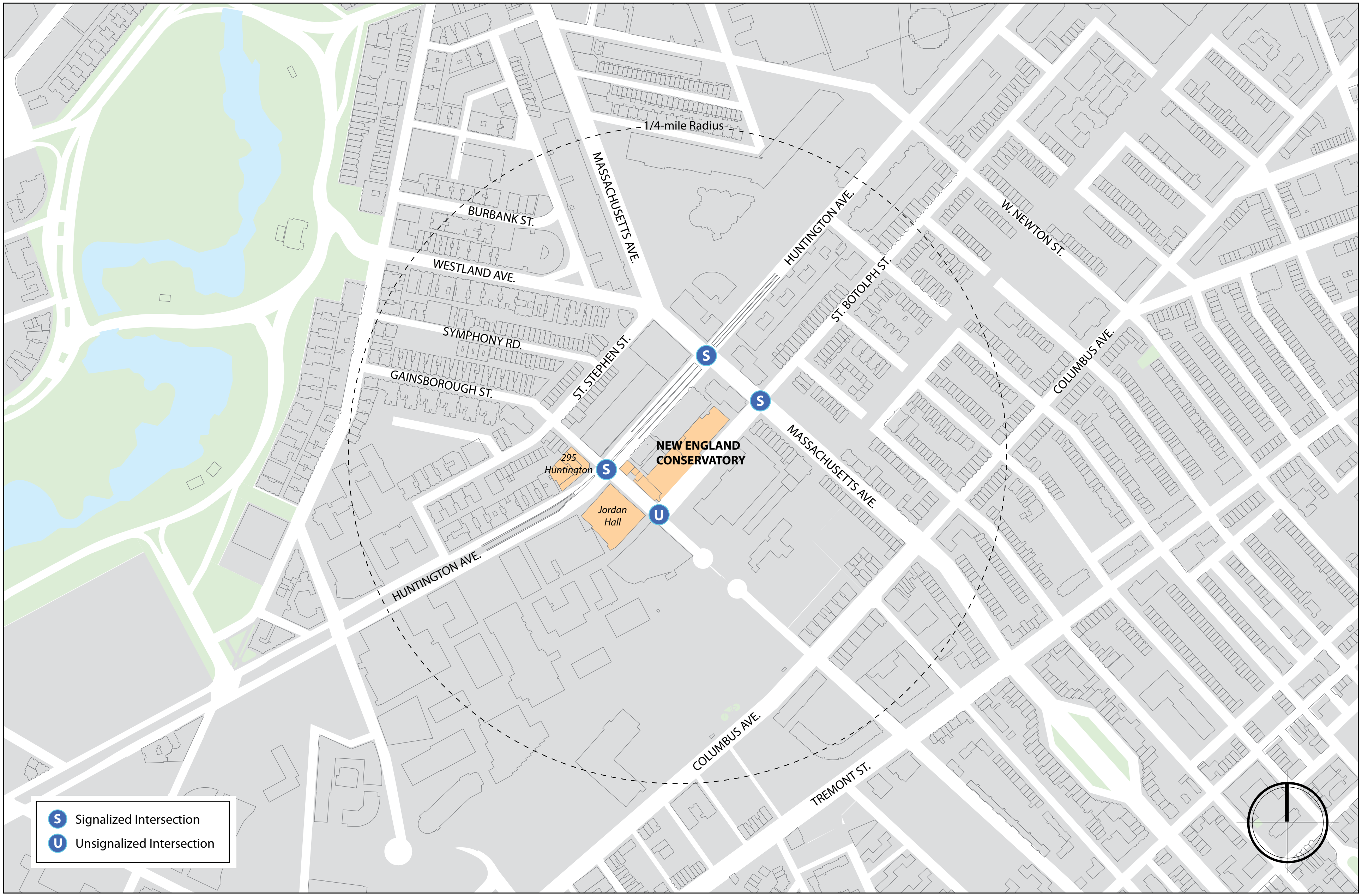


Figure 5-1
Project Study Area Roadways and Intersections

- Huntington Avenue/Gainsborough Street,
- Massachusetts Avenue/St. Botolph Street, and
- St. Botolph Street/Gainsborough Street.

5.5 Existing Conditions

This section describes existing roadway and intersection features, campus pedestrian pathways and connections; status of campus way-finding planning efforts; inventory of public transportation service, and bicycle accommodations.

The NEC campus, as described in detail in Chapter 3, is an urban campus of only 2.5 acres in the East Fenway neighborhood, with frontage on Huntington Avenue, Gainsborough Street, and St. Botolph Street. St. Botolph Street and Gainsborough Street are both used for vehicular access; a parking lot of 53 spaces for faculty and staff is located on St. Botolph Street.

As previously summarized in **Table 5-1**, the overall campus includes 349,000 sf of floor space.

5.5.1 Campus Population

As shown in **Table 5-2**, NEC serves approximately 782 on- and off-campus full-time college students, approximately 213 (part-time) continuing education students, and approximately 1,159 preparatory students. There are 119 full-time and 121 part-time college faculty, 18 full-time and 185 part-time preparatory faculty, and 133 staff.

Table 5-2
NEC Student and Faculty Data (Year 2011)

Category	Full-Time	Part-Time	Total
NEC Faculty	119	121	240
Staff	123	10	133
On-campus students	154	0	154
Off-campus students	628	0	628
Continuing education students	0	213	213
Preparatory school faculty	18	185	203
Preparatory school students	0	1,159	1,159
Total	1,042	1,688	2,730

As shown above, 61 percent of students, faculty and staff visit the campus on a part-time basis. Only the 154 students (20 percent of total full-time students) who currently live on campus do not have to commute. It is estimated by NEC administration that there are typically 955 people on campus between 9:00 AM and 5:00 PM on a typical weekday. On Saturdays, peak population on campus is 1,305, reflecting the influx of preparatory school students and faculty.

While no change in the number of faculty or full-time students is anticipated with completion of the Proposed Projects, a small increase (about 10 employees) in the number of facility staff will occur to provide adequate security, support, and maintenance.

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5.5.2 Study Area Conditions

Roadway Conditions

Primary vehicular access to NEC is provided by the major arterials of Massachusetts Avenue and Huntington Avenue. Local vehicular access to and within the campus is provided via Gainsborough Street and St. Botolph Street.

Massachusetts Avenue, an urban principal arterial, runs northwest–southeast from Cambridge and the northwestern part of the Boston metropolitan area to Columbia Road to the southeast. Within the study area, Massachusetts Avenue provides two travel lanes in each direction. Massachusetts Avenue is separated by a raised median southeast of St. Botolph Street. On-street parking is provided on both sides of the roadway near St. Botolph Street. Bus stops are located regularly on both sides of Massachusetts Avenue. Sidewalks on each side range in width from 10 to 15 feet. Massachusetts Avenue carries about 40,000 vehicles total in both directions on an average weekday.

Huntington Avenue, an urban principal arterial, runs northeast–southwest from Copley Square to the Riverway/Jamaicaway. Within the study area, Huntington Avenue is a divided roadway with two travel lanes in each direction and on-street parking in some locations. Bus stops are located at regular intervals on both sides of the roadway. The tracks of the E Branch of the MBTA Green Line light-rail service emerge from underground on Huntington Avenue southwest of Gainsborough Street and run in the median of the roadway. Northeast of Gainsborough Street, a four-lane underpass allows Huntington Avenue traffic to bypass Massachusetts Avenue. On either side of the underpass, Huntington Avenue is one lane wide with an adjacent parking lane between the entrance to the underpass and Massachusetts Avenue. Northeast of the underpass, the parking lane is a designated tour bus parking area. Huntington Avenue is a major pedestrian route, bounded by dense retail and institutional use within the study area. Wide, decorative crosswalks up to 17 feet in width are provided frequently along the corridor. Sidewalks are generally brick and range in width from eight to 12 feet, but trees, waste receptacles, light poles, sign posts, and other obstructions limit the effective sidewalk width to as little as 4.5 feet within the study area.

Gainsborough Street, a local street, runs northwest–southeast from Hemenway Street to the Southwest Corridor railway, where a pedestrian-only overpass continues across the tracks. Within the study area, Gainsborough Street provides one travel lane in each direction between Huntington Avenue and the southern extent of the roadway. Northwest of Huntington Avenue, Gainsborough Street provides one-lane that runs one-way northbound. On-street parking is allowed on the northeast side of Gainsborough Street southeast of Huntington Avenue and on both sides of the street northwest of Huntington Avenue. Vehicular traffic is modest along Gainsborough Street, but the sidewalks on each side accommodate significant pedestrian volumes. The sidewalks range in width from eight to 11 feet, though trees and light poles limit the effective sidewalk width to as little as five feet in some locations. An exit to the center platform serving both inbound and outbound trains serving the Massachusetts Avenue Orange Line Station is located on the pedestrian overpass south of Gainsborough Street. No station entrance is provided at this location.

St. Botolph Street, a local street, runs northeast–southwest from Harcourt Street to the Northeastern University, where it meets a pedestrian-only path on the Northeastern University campus. In the study area, St. Botolph Street runs two-way with one travel lane in each direction. A combination of on-street metered parking and resident parking are found on both sides of the roadway northeast of Gainsborough Street and on portions of the southeast side southwest of Gainsborough Street. Sidewalks are provided on both sides of the street in the study area between Massachusetts Avenue and Jordan Hall.

Public Alley #822 runs northwest - southeast between Huntington Avenue and St. Botolph Street, just to the northeast of Gainsborough Street; it is part of a network of three alleys that link in an H shape within the block surrounded by Huntington Avenue, Massachusetts Avenue, St. Botolph Street, and Gainsborough Street.

Public Alley #820 runs parallel to Public Alley #822 just to the southwest of Massachusetts Avenue behind Symphony Towers West.

Public Alley #821 generally runs northeast-southwest behind the NEC buildings that front on St. Botolph Street, connecting Public Alleys #822 and #820. The alleys are typically used for loading.

Intersection Conditions

The following descriptions of the study area intersections include lane geometry and intersection traffic control.

Huntington Avenue/Massachusetts Avenue is a four-way, signalized intersection. The northeast bound approach on Massachusetts Avenue consists of two 11-foot through lanes and an 11-foot right-turn lane, with an effective storage length of about 150 feet. The southwest bound approach consists of a 16-foot right lane and a 12-foot left lane. Left turns from either direction are not permitted on Massachusetts Avenue. The northwest bound local traffic approach on Huntington Avenue is one lane with adjacent parking along the curb until about 50 feet southeast of the intersection, where it widens to two 10-foot lanes. The southwest bound approach on Huntington Avenue consists of an 11-foot right lane and a 12-foot left lane. Huntington Avenue features a wide slip U-turn lane at either approach to the intersection. Sidewalks, crosswalks, and handicapped-accessible curb ramps are provided at all approaches. Brick sidewalks on Huntington Avenue vary in width between 9 feet and 16 feet (but are only 4' wide at the entrance to Symphony Hall). On Massachusetts Avenue, sidewalks are concrete varying between 7 and 14 feet in width. The painted crosswalks are 10-feet wide. Pedestrian signals are provided for crossing Massachusetts Avenue, but not Huntington Avenue. However, the large refuge islands, about 13 feet wide and 43 feet long, on each side of Huntington Avenue make the crosswalks across each direction of traffic relatively short (24 feet maximum). The crosswalks are worn but still visible. Lane markings are completely worn on the northbound approach and on each receiving lane on Huntington Ave. Entrances to the Symphony MBTA Green Line station are located at three of the four corners of this intersection. For analysis purposes in this study, the Massachusetts Avenue approaches are assigned to the eastbound/westbound direction and the Huntington Avenue approaches are assigned to the northbound/southbound direction.

Huntington Avenue/Gainsborough Street is a four-way, signalized intersection. Northwest of the intersection, Gainsborough Street is one-way northwest bound, with parking on both sides of the road. The northwest bound approach on Gainsborough Street is a 10-foot travel lane alongside an on-street parking lane. The northeast bound approach on Huntington Avenue consists of a 10-foot left turn lane, a 12-foot through lane, and a 12-foot through/right lane. The right lane accommodates an adjacent parking lane and an MBTA bus stop. The southwest bound approach on Huntington Avenue also consists of a left-turn lane, a through lane, and a through/right lane. The southwest bound approach of the intersection is fed by traffic from both the intersection with Massachusetts Avenue, and the underpass that returns to street level about 200 feet before the intersection. Sidewalks, crosswalks, and handicapped-accessible curb ramps are provided at all approaches. Sidewalks along Gainsborough Street are concrete, ranging in width from eight to 11 feet. Sidewalks along Huntington Avenue are mostly brick, ranging in width from nine to 20 feet near the intersection. The crosswalks are approximately 17 feet in width and composed of both striping and decorative, in-ground print. Pedestrian signals and pushbuttons are provided in each direction, although pedestrian walk indications across Gainsborough Street are also automatically included in each signal cycle. Slight sidewalk bulb-outs are present at all corners of the intersection except the west corner, shortening crossing distances required for pedestrians to clear the intersection. Crosswalks are generally well marked, though some of the lane markings, stop bars, and other striping at the intersection are in poor condition. For analysis purposes in this study, the Gainsborough Street approaches are assigned to the eastbound/westbound direction and the Huntington Avenue approaches are assigned to the northbound/southbound direction.

Massachusetts Avenue/St. Botolph Street is a four-way, signalized intersection. The southeast bound approach on Massachusetts Avenue consists of three 11-foot lanes: an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The through/right-turn lane has a storage length of about 100 feet. The northwest bound approach consists of a 10-foot exclusive left-turn lane, an 11-foot through lane, and a 10-foot through/right-turn lane. The northeast bound approach on St. Botolph Street consists of a single 14-foot lane. The southwest approach on St. Botolph Street features a 10-foot lane with parking along the curb. Sidewalks, crosswalks, and handicapped-accessible curb ramps are provided at all approaches. Pedestrian pushbuttons and pedestrian signals are provided for all crossings. All sidewalks approaching this intersection are concrete, with the exception of brick walkways along St. Botolph Street east of Massachusetts Avenue. The sidewalks are generally in good condition, ranging in width from 10 to 15 feet. Well-marked crosswalks at this intersection are 10 to 11 feet wide. Lane markings on the approaches to the intersection are in good condition, but are not visible on the other side of the intersection. Although the two directions of Massachusetts Avenue are separated by a concrete median south of St. Botolph Street, it is not of sufficient width to function as an effective pedestrian refuge. For analysis purposes in this study, the Massachusetts Avenue approaches are assigned to the eastbound/westbound direction and the St. Botolph Street approaches are assigned to the northbound/southbound direction.

St. Botolph Street/Gainsborough Street is an unsignalized, four-way intersection. The southeast bound approach on Gainsborough Street consists of an 11-foot lane alongside adjacent parking along the curb. The northwest bound approach is 15 feet wide with no adjacent parking. The northeast bound approach on St. Botolph Street is 17 feet wide, with some on-street parking about 50 feet away from the intersection. The southwest bound approach is 15 feet wide, also with on-street parking about 50 feet from the stop line. Sidewalks, crosswalks, and handicapped-accessible curb ramps are provided at all approaches. All the sidewalks are concrete, in very good condition, and approximately eight feet in width. All crosswalks at this intersection are nine feet in width and well marked. For analysis purposes in this study, the Gainsborough Street approaches are assigned to the eastbound/westbound direction and the St. Botolph Street approaches are assigned to the northbound/southbound direction.

Data Collection

Peak period vehicular, bicycle, and pedestrian counts were collected between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM on Wednesday, October 19, 2011 at the intersections of Huntington Avenue/Massachusetts Avenue, Huntington Avenue/Gainsborough Street, and Massachusetts Avenue/St. Botolph Street. **Figure 5-2** and **Figure 5-3** show the existing peak-hour turning volumes for AM Peak and PM Peak hours, respectively. Complete traffic count data are provided in the **Appendix.**

On Wednesday, October 26, 2011, vehicular, bicycle, and pedestrian counts were collected at the St. Botolph Street/Gainsborough Street intersection for the 11-hour period between 7:00 AM and 6:00 PM. During this period, directional pedestrian counts between Jordan Hall and 33 Gainsborough Street were also collected by recording the number of pedestrians traveling along both sidewalks on Gainsborough Street and crossing midblock. Pedestrian count data is presented later in this section.

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5.5.3 Existing Traffic Operations

The criterion for evaluating traffic operations is Level of Service (LOS). LOS is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. The study team calculated average delay and associated levels of service at study intersections using Trafficware's Synchro 6 software, which also evaluates the impact on traffic operations from closely spaced intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM). Level of service and delay (in seconds) are determined based on intersection geometry and available traffic data for each intersection. BTD provided the Intersection signal timing and phasing used in this analysis.

Table 5-3 summarizes the delay and LOS thresholds for signalized and unsignalized intersections, as defined in the HCM. LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition (unacceptable), with significant traffic delay. The threshold at LOS E/LOS F indicates that the intersection, or intersection approach, is theoretically at capacity. LOS D is generally considered acceptable in an urban environment, such as the Project study area, and below theoretical operating capacity.

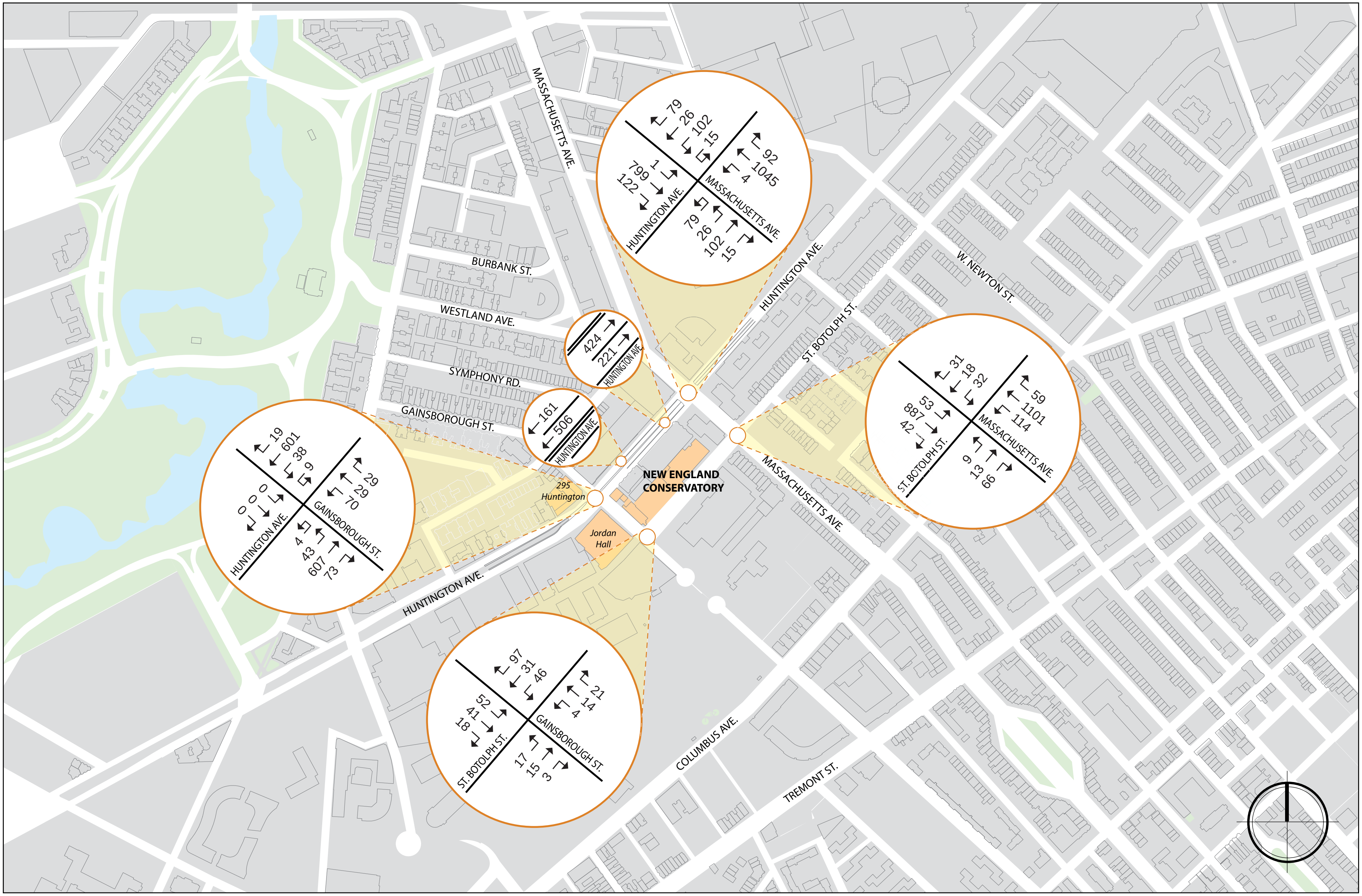

Figure 5-2

Existing Traffic Volumes (2012), AM Peak Hour (7:45-8:45 AM)

NEW ENGLAND CONSERVATORY

INSTITUTIONAL MASTER PLAN NOTIFICATION FORM | PROJECT NOTIFICATION FORM

Figure 5-3

Existing Traffic Volumes (2012), PM Peak Hour (5:00-6:00 PM)

Howard/Stein-Hudson Associates, Inc.

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Table 5-3
Intersection Level of Service Criteria

Level of Service	Average Stopped Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized intersections
A	<10	<10
B	>10 and <20	>10 and <15
C	>20 and <35	>15 and <25
D	>35 and <55	>25 and <35
E	>55 and <80	>35 and <50
F	>80	>50

Table 5-4 and **Table 5-5** summarize the existing AM and PM peak hour intersection operations, including level of service, volume to capacity ratio (v/c) and the 95th percentile queues at the study intersections. This queue represents the maximum distance vehicles typically back up from an intersection. Complete Synchro reports are provided in the **Appendix.**

Table 5-4
Existing Conditions (2012) Level of Service Summary: AM Peak Hour

Intersection/Movement	LOS	Delay (seconds)	V/C ratio	95th percentile queue (feet)
Signalized				
Huntington Avenue/ Massachusetts Avenue	B	18.7		
Mass Ave EB left/thru | thru	C	21.0	0.66	263
Mass Ave EB right	A	4.5	0.26	34
Mass Ave WB left/thru | thru/right	B	13.8	0.85	156
Huntington NB left/thru | thru/right	C	27.6	0.56	61
Huntington SB left/thru | thru/right	C	29.6	0.57	62
Huntington Avenue/ Gainsborough Street	B	15.5		
Gainsborough WB left/thru/right	D	35.7	0.56	80
Huntington NB left	B	15.4	0.21	43
Huntington NB thru | thru/right	B	16.0	0.51	215
Huntington SB left	A	9.1	0.18	m29
Huntington SB thru | thru right	B	10.3	0.40	m162
Massachusetts Avenue/ St. Botolph Street	B	19.4		
Mass Ave EB left	B	17.8	0.41	21
Mass Ave EB thru | thru/right	B	12.4	0.77	106
Mass Ave WB left	C	27.5	0.69	53
Mass Ave WB thru | thru/right	C	25.7	0.81	#514
St. Botolph NB left/thru/right	B	10.9	0.34	34
St. Botolph SB left/thru/right	C	23.9	0.33	57
Unsignalized				
St. Botolph Street/ Gainsborough Street				
Gainsborough EB left/thru/right	A	8.6	0.18	--
Gainsborough WB left/thru/right	A	7.9	0.08	--
St. Botolph NB left/thru/right	A	8.0	0.07	--
St. Botolph SB left/thru/right	A	8.6	0.25	--

Table 5-5
Existing Conditions (2012) Level of Service Summary: PM Peak Hour

Intersection/Movement	LOS	Delay (seconds)	V/C ratio	95th percentile queue (feet)
		Signalized		
Huntington Avenue/ Massachusetts Avenue	B	19.4		
Mass Ave EB left/thru | thru	C	22.5	0.66	334
Mass Ave EB right	A	4.9	0.30	43
Mass Ave WB left/thru | thru/right	A	9.8	0.69	91
Huntington NB left/thru | thru/right	C	34.4	0.66	86
Huntington SB left/thru | thru/right	C	29.7	0.68	126
Huntington Avenue/ Gainsborough Street	C	21.8		
Gainsborough WB left/thru/right	E	64.9	0.91	#303
Huntington NB left	C	26.1	0.53	97
Huntington NB thru | thru/right	B	18.4	0.62	241
Huntington SB left	A	9.9	0.28	m33
Huntington SB thru | thru right	B	11.4	0.53	129
Massachusetts Avenue/ St. Botolph Street	B	17.7		
Mass Ave EB left	A	6.4	0.35	m10
Mass Ave EB thru | thru/right	B	14.5	0.78	226
Mass Ave WB left	C	24.7	0.65	83
Mass Ave WB thru | thru/right	B	19.7	0.66	331
St. Botolph NB left/thru/right	B	13.2	0.39	75
St. Botolph SB left/thru/right	C	27.6	0.40	65
		Unsignalized		
St. Botolph Street/ Gainsborough Street				
Gainsborough EB left/thru/right	B	10.5	0.31	--
Gainsborough WB left/thru/right	A	9.7	0.26	--
St. Botolph NB left/thru/right	A	9.0	0.12	--
St. Botolph SB left/thru/right	B	10.9	0.40	--

Overall, each intersection operates well at LOS C or better. The only individual approach operating below LOS D is the westbound left turn from Gainsborough Street to southbound Huntington Avenue, which operates at LOS E during the PM peak hour. This poor level of service can be attributed to the high volume of vehicles turning left onto Huntington Avenue from Gainsborough Street. It is estimated that about 50% of these left turning vehicles are using St. Botolph Street and Gainsborough Street as a cut-through route to travel between Massachusetts Avenue and Huntington Street, because left turns are not permitted from Massachusetts Avenue onto Huntington Avenue. The high volume of conflicting pedestrians at the Huntington Avenue/Gainsborough Street intersection and the relatively low ratio of the green time for Gainsborough Street vehicles, combine to cause delay to the left turning vehicles to operate at LOS D during the AM peak hour and LOS E during the PM peak hour.

Planned roadway changes on Massachusetts Avenue that will allow northwest bound Massachusetts Avenue left turns onto Huntington Street, as presented in Section 5.6.1, will decrease the cut-through traffic along St. Botolph Street and Gainsborough Street.

5.5.4 Parking

Off-Street parking

There are two parking facilities reserved for NEC campus use: the 53-space lot on Gainsborough Street and a small parking lot with 20 spaces behind Jordan Hall on the corner of St. Botolph Street and Gainsborough Street.

On-campus weekday parking is available to staff who work at least 1,000 hours per year, and faculty who are issued a full-time or a modified full-time contract for the current year. All currently employed NEC staff and faculty are eligible for evening/weekend permits. No parking permits are issued to students.

According to NEC administration, 184 permits are issued to faculty and staff for parking in the St. Botolph St. lot:

- 96 Yellow Faculty Parkers (Monday-Friday 2:45 PM or 4:45 PM to 1:00 AM, Saturday, Sunday 12:00AM to 11:59 PM);
- 44 Green Faculty Parkers (Monday through Sunday 24/7);
- 20 Red Staff Parkers (Monday through Friday 4:45 PM to 1:00 AM, Saturday and Sunday 12:00 AM to 11:59 PM);
- 7 Blue Faculty Parkers (Monday to Sunday 24/7); and
- 17 Blue Staff Parkers (Monday to Sunday 24/7).

The high (over 3:1) ratio of permits to spaces is made possible by the fact that there are many part-time or staggered workday schedules reflected in the types of permits issued. This is borne out by the fact that the lot accommodates only 67 parkers on average per day. In a 2009 survey, occupancy never exceeded 32 vehicles; only the 24 Blue faculty and staff parkers typically stay all day long.

For $192 annually, eligible faculty and staff may purchase specific reserved parking spaces in the St. Botolph lot, subject to availability. Unreserved parking is available for eligible faculty for a monthly rate of $102. Unreserved weekday staff parking is available for $50 per month and unreserved evening and weekend staff permits are available for $34 per month. Pre-tax deduction is available for payment of parking fees.

The Jordan Hall lot provides 20 tandem spaces available for unreserved staff parking, requiring cooperation between staff parkers to ensure that vehicles are not blocked in.

The Gainsborough Street Garage serves as the main parking facility for events at Jordan Hall. It also provides event parking for the Matthews Arena at Northeastern University and for Symphony Hall. During events, NEC parkers are allowed in this garage, but they must pay the full rate. Free parking is available during NEC events in the Camden lot on Columbus Avenue, across the MBTA/Amtrak tracks. This lot is convenient to the footbridge across the tracks.

The Westland Avenue Garage on Westland Avenue offers reduced $10/day parking with a valid NEC ID. Visitors can obtain a pass to park free in this garage (NEC pays the fee). The Westland Garage also serves event parking.

Public and private parking facilities within a quarter-mile radius of the NEC are shown in **Figure 5-4.** **Table 5-6** and **Table 5-7** summarize the location and capacity of local parking garages and lots, respectively. Overall, about 1,431 public parking spaces are provided in nearby garages and lots.

Table 5-6
Off-street Parking Within One Quarter-Mile of the NEC - Garages

Map Key	Address	Parking Facility	Private Capacity	Public Capacity
1	41 Westland Avenue	Symphony Garage	0	262
2	35 Westland Avenue	Westland Avenue Garage	0	307
3	220 Huntington Avenue	Midtown Hotel	145	0
4	150 Huntington Avenue	Greenhouse Apartments	210	0
5	210 Massachusetts Avenue	Christian Science Center	0	550
	Northeastern University			
6	10 Gainsborough Street	Gainsborough Street Garage	0	312
7	795 Columbus Avenue	Columbus Parking Garage	995	0
Subtotal – Parking Garages			1,350	1,431

Table 5-7
Off-street Parking Within One Quarter-Mile of the NEC – Surface Lots

Map Key	Address	Parking Facility	Private Capacity	Public Capacity
A	277 Northampton Street	Stanhope Parking Lot	0	19
	Northeastern University			
B	Opp 10 Gainsborough Street	Gainsborough Lot	33	0
C	238 St. Botolph Street	Arena Parking Lot	59	0
D	Behind Hurtig Hall	Hurtig	23	0
E	Javis Place	North Lot	145	0
F	795 Columbus Avenue	Camden Parking Lot	230	0
Subtotal – Parking Lots			490	19

On-Street Parking

Within the study area, public on-street parking consists of a mix of metered, bus stop, commercial zone, and unregulated spaces. Private parking spaces owned by NEC and the YMCA abut St. Botolph Street. **Figure 5-5** presents an inventory of existing curb use and parking restrictions along streets in the NEC study area. Normal vehicle turnover generally occurred at the parking meters located on St. Botolph Street, Huntington Avenue, Gainsborough Street.

■

5.5.5 Public Transportation

The NEC campus is conveniently located near many public transportation services, as shown in **Figure 5-6**. Public transportation service and peak hour frequencies are shown in **Table 5-8.**

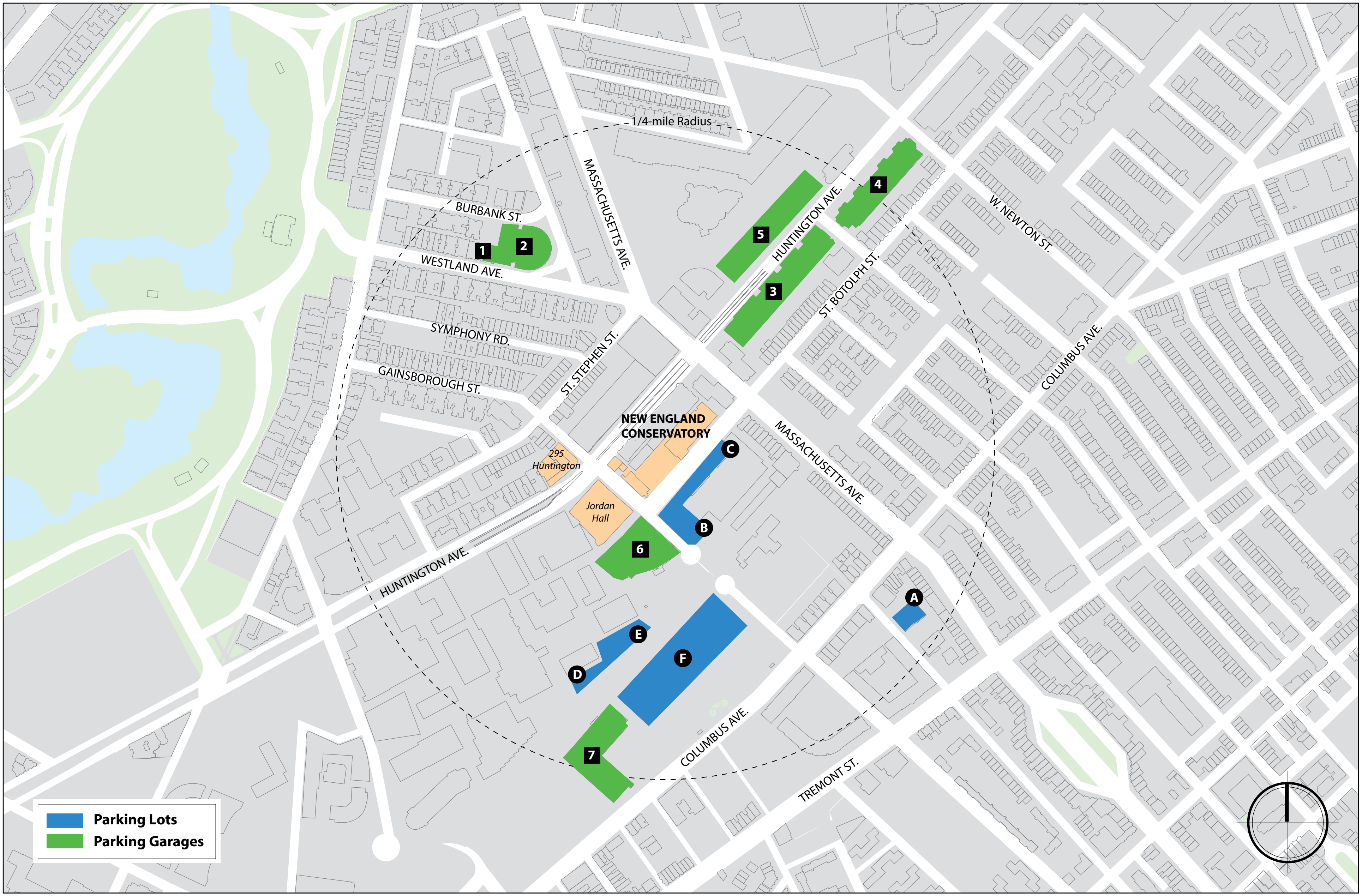

Figure 5-4
Off-Street Parking in the Study Area

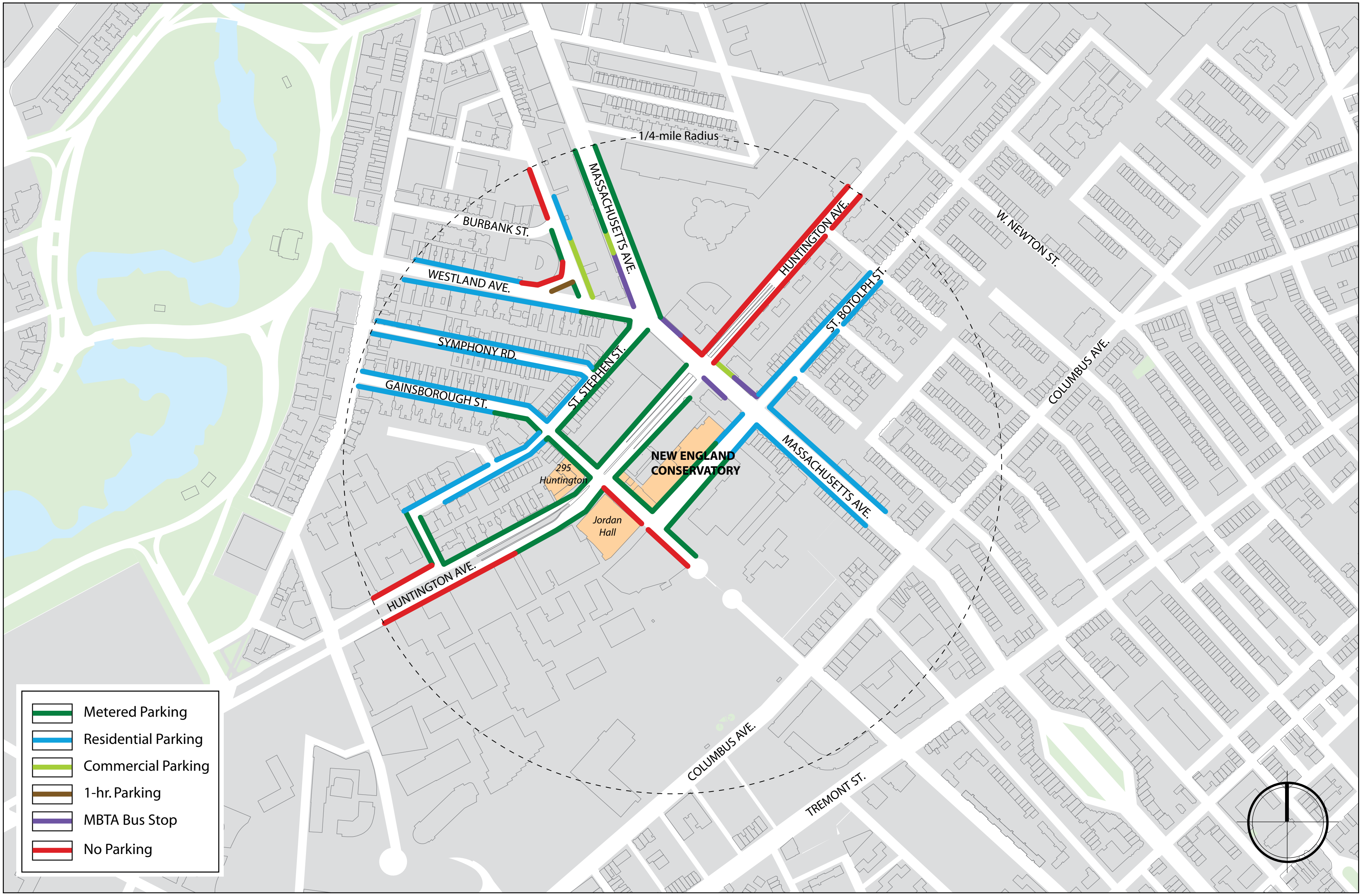

Figure 5-5
Curbside Inventory

Figure 5-6
Public Transportation in the Study Area

Table 5-8
MBTA Transit Service within a Quarter-mile of the Site

Service	Origin/Destination	Rush-hour Headway (minutes)
	Rapid Transit Routes	
Green Line / E Branch	Heath Street–Lechmere	5–7
Orange Line	Forest Hills–Oak Grove	5–7
	Local Bus Routes	
CT1	Central Square, Cambridge–BUMC via MIT	20
CT2	Sullivan Station–Ruggles Station via Kendall/MIT	20
CT3	Beth Israel Deaconess Medical Center–Andrew Station via BUMC	20
Route 8	Harbor Point/UMass–Kenmore Station via BUMC and Dudley Station	20
Route 15	Kane Square or Fields Corner Station–Ruggles Station via Uphams Corner	9
Route 19	Fields Corner Station–Kenmore/Ruggles Station via Grove Hall and Dudley Station	20
Route 22	Ashmont Station–Ruggles Station via Talbot Avenue and Jackson Square	8
Route 23	Ashmont Station–Ruggles Station via Washington Street	7
Route 28	Mattapan Station–Ruggles Station via Dudley Station	8
Route 39	Forest Hills Station–Back Bay Station via Huntington Avenue	6
Route 43	Ruggles Station–Park Street and Tremont Street via Tremont Street	12
Route 44	Jackson Square Station–Ruggles Station via Seaver Street and Humboldt Avenue	12
Route 45	Franklin Park Zoo–Ruggles Station via Blue Hill Avenue	9
Route 47	Central Square, Cambridge–Broadway Station via BUMC, Dudley Square, and Longwood Medical Center	22
Route 55	Queensberry–Copley Square or Park Street Station via Ipswich Street	30

Source: MBTA.com, December 2010.

Two rapid transit lines and a commuter rail station are found within easy walking distance of the NEC campus and the area is served by numerous bus lines. Connections to regional public transportation can easily be made from the campus. The MBTA Orange Line stations at Massachusetts Avenue and Ruggles Street and the MBTA Green Line E Branch Northeastern and Symphony stations are all within convenient walking distance (approximately ¼-mile) of the NEC campus. There is a convenient connection to the campus on Gainsborough Street from the Massachusetts Avenue Orange Line platform (serving both inbound and outbound trains); however, no direct connection is provided to the platform from Gainsborough Street. The Orange Line runs from approximately 5:15 a.m. to 1:00 a.m. on weekdays.

The Green Line E branch runs approximately from 5:00 a.m. to 1:00 a.m. on weekdays, with service every 6 minutes during rush hours and every 8-14 minutes during off-peak hours. Orange Line service runs approximately every 5 minutes during rush hours and every 8-10 minutes during off-peak hours. Both lines provide direct connections to the Blue Line and Red Line rapid transit services, Silver Line, bus rapid transit, and commuter rail.

In addition to the local MBTA bus routes shown in **Table 5-8**, numerous intercity bus services can be reached at South Station and other locations in downtown Boston.

Commuter rail services on the Franklin, Needham, and Providence/Stoughton lines are accessible at the MBTA Ruggles Station, located about three-tenths of a mile from the NEC campus. Other commuter rail lines serving Fitchburg, Haverhill, Lowell, and Newburyport/Rockport terminate at North Station, accessible by the Orange and Green lines. Commuter rail on the Fairmount, Greenbush, Kingston/Plymouth, and Middleborough/Lakeville lines South Station is accessible from the Red Line, which can be reached at Park Street from the Green Line or Downtown Crossing from the Orange Line.

Amtrak intercity rail services to points west and south serve the Back Bay station, which can be reached by the Orange Line. The Amtrak Downeaster service to points north operates from North Station in downtown Boston, also easily accessible via the Orange Line.

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5.5.6 Pedestrian Access

Pedestrian activity adjacent to and near the campus is at a moderate level. NEC itself and neighboring Northeastern University generate pedestrian activity throughout the day as students access the Massachusetts Avenue Orange Line station and walk between classes and other school activities. The immediate study area also has retail shops, small businesses, other institutions, and non-student residents that generate predominantly pedestrian activity.

Pedestrian Environment

To evaluate the pedestrian environment and the quality of the pedestrian experience, the following criteria are used:

- The condition of sidewalks;
- The width of crosswalks and size of storage areas for pedestrians waiting to cross at corners; and
- The effective width of sidewalks, clear of obstructions, to accommodate pedestrians walking along a street.

In general, the sidewalks in the study area are at least eight feet wide, with wider sections along portions of Huntington Avenue and Massachusetts Avenue. One short sidewalk segment at the western end of St. Botolph Street is narrow and experiences some congestion. All of the sidewalks in the area handle moderate amounts of pedestrian traffic. While obstructions such as planted trees, lampposts, and trash receptacles limit the usable space of sidewalks, the effective widths of sidewalks in the study area easily accommodate the pedestrian demand. The following is a description of sidewalk conditions along the streets in the study area:

Huntington Avenue

Sidewalks are especially wide on Huntington Avenue northeast of Gainsborough Street, with 20-foot or wider sidewalks on both sides of the roadway. While this sidewalk space is partially occupied by trees, restaurant patio space, and other obstructions, the effective width of the sidewalk in this area is still a minimum of 11 feet, enough to accommodate heavy pedestrian volumes. On Gainsborough Street toward the YMCA and Northeastern University campus, the sidewalks are less wide, with sidewalk widths ranging from 8 feet to 13 feet. Planted trees, bicycle loops, trash receptacles, and other obstructions limit the effective sidewalk width in this area to approximately 4.5 feet at some locations, an adequate amount of space for moderately heavy pedestrian volumes. The trees and on-street parking from the YMCA eastward provide some buffer for pedestrians from the vehicle travel lanes. Most of the sidewalk along Huntington Avenue in the study area is brick, with some concrete sections east of Gainsborough Street. The sidewalks are generally in good condition.

Gainsborough Street

Between Huntington Avenue and St. Botolph Street, the sidewalk is eight feet wide on the southwest side of the roadway and 11 feet wide on the northeast side. Trees, trash receptacles, and lampposts limit the usable effective width of the sidewalk to approximately 6 feet on the southwest side of the roadway and 6.5 feet on the northeast side. The main entrance to Jordan Hall, a major campus classroom building and performance venue, is located on the southwest side of Gainsborough Street at the middle of the block between Huntington Avenue and St. Botolph Street. The main entrance to the existing NEC residence hall at 33 Gainsborough Street is located mid-block on the northeast side of the roadway. These buildings generate significant pedestrian trips and contribute to a high number of mid-block pedestrian crossings. The sidewalk on the northeast side of Gainsborough Street has a steep slope that may present challenges to disabled persons. Southeast of St. Botolph Street, the sidewalks are eight feet wide on each side of the roadway, with the effective width limited to approximately 5.5 feet. The effective widths of the sidewalks along Gainsborough Street provide ample usable space for pedestrian traffic. All sidewalks are in good condition, with nearly new sidewalks at the intersection with St. Botolph Street and further southeast along Gainsborough Street.

St. Botolph Street

Sidewalks are provided along both sides of the roadway northeast of the YMCA building. From the east edge of the YMCA building to the end of the roadway at the Northeastern University campus, a sidewalk is provided on the southeast side of the roadway. A small area on the northwest side of the roadway in this area may have functioned as a sidewalk in the past but is now completely obstructed from pedestrian use. From Gainsborough Street northeast to Massachusetts Avenue, sidewalks are at least eight feet wide. Between the YMCA and Gainsborough Street, the sidewalk is approximately eight feet wide on the northwest side of the roadway and 10 feet wide on the southeast side. Farther southwest along St. Botolph Street, the sidewalk on the southeast side of the roadway ranges in width from four feet to eight feet. The four-foot section, a short stretch near the southwestern end of the roadway, experiences some congestion during peak hours. With a narrow sidewalk area and low vehicle volumes, pedestrians were frequently observed to walk in the roadway in the area. All other sidewalk segments along St. Botolph Street have a more generous effective width, ranging from 5.5 feet to 25 feet. Sidewalks along this roadway are in good condition.

Massachusetts Avenue

Wide sidewalks are provided on both sides of Massachusetts Avenue near the intersection with St. Botolph Street, ranging in width from 10 feet to 15 feet. Heavily used bus stops are located on both sides of Massachusetts Avenue northeast of the intersection. Bus shelters, lamp posts, signal control equipment, and planted trees limit the effective width of these sidewalks to approximately 10 feet on the northwest side of the roadway and to as little as 5 feet on the northeast side. This amount of usable sidewalk provides enough space to accommodate pedestrian volumes and waiting bus passengers.

Pedestrian Movements

Due to the low vehicular trip generation characteristics of the Proposed Projects, the transportation analysis has focused more on pedestrian issues and potential associated impacts.

Universities are major generators of pedestrian activity, featuring a wide variety of movements over the course of a typical day. Resident students enter and exit their dormitories to travel to and from classes, library facilities, dining facilities (including public restaurants), and other campus buildings.

To assess pedestrian impacts associated with the Proposed Projects, weekday pedestrian counts were conducted at key locations in the study area. The counts were collected on Wednesday, October 19, 2011, and Wednesday, October 27, 2011, when classes were in session at NEC as well as Northeastern University and other area colleges/universities. Pedestrian counts were performed from 7:00 AM-9:00 AM and from 4:00 PM-6:00 PM at the intersections of Huntington Avenue and

Gainsborough Street, Huntington Avenue and Massachusetts Avenue, and at Massachusetts Avenue and St. Botolph Street.

At the intersection of St. Botolph Street, and mid-block between Huntington Avenue and St. Botolph Street on Gainsborough Street (near the entrance to Jordan Hall and 33 Gainsborough Street), counts were performed between 7:00 AM and 6:00 PM in order to capture typical midday pedestrian activity at NEC. The AM and PM peak periods, which were determined by vehicular volumes, were 7:45 AM-8:45AM, and 5:00 PM-6:00 PM, respectively. The mid-day pedestrian peak hour, which was determined by total volume of pedestrians between 9:00 AM and 4:00 PM, was 11:45 AM-12:45 PM. Pedestrian volumes for the three peak periods are shown in **Figure 5-7.**

All-day pedestrian counts were performed on Gainsborough Street at Jordan Hall. A total 209 pedestrians crossed Gainsborough Street from Jordan Hall to the 33 Gainsborough Street building between 11:45 AM and 12:45 PM. Heavy pedestrian volumes were also observed walking on the sidewalk outside of 33 Gainsborough Street during this hour. A peak-hour pedestrian summary is included in **Figure 5-8.**

■

5.5.7 Bicycle Accommodations

Bicycle volumes in the study area were highest on Massachusetts Avenue. Columbus Avenue to the east and Commonwealth Avenue to the west are two connecting streets that have on-street bicycle lanes. Huntington Avenue, a four-lane roadway with a large quantity of metered parking and the transit reservation in the study area, sees significantly lower volumes than Massachusetts Avenue. Gainsborough Street and St. Botolph Street see only local bicycle traffic. Peak hour bicycle volumes are included in **Figure 5-9**.

Currently, 32 of the students living on campus have bicycles and 39 commute by bicycle. One rack accommodating two bicycles was observed on the NEC campus on Huntington Avenue near the intersection with Gainsborough Street, around the corner from the entrance to Jordan Hall. Field observations have evidenced bicycles locked to parking meters and fences in the Gainsborough Street and St. Botolph Street areas of the campus. The bicycle facilities provided in the study area are shown in **Figure 5-10**.

In 2011, the City of Boston launched a citywide bike-sharing program called "Hubway", which currently includes 60 rental stations with 600 bicycles, and has plans to expand the program to other area neighborhoods and communities. The program runs from spring to autumn. See **Figure 5-11** for the six Hubway locations with 96 available bikes in the study area. **Table 5-9** lists the locations and bicycle capacity of each station.

Table 5-9
Hubway Locations in Study Area

Map Key	Hubway Location	Hubway Bicycle Capacity
A	Columbus Avenue/Massachusetts Avenue	11
B	Northeastern University North Parking Lot	15
C	Christian Science Plaza/Massachusetts Avenue	19
D	Prudential Center/Belvidere Street	25
E	Tremont Street/West Newton Street	15
F	Washington Street/Rutland Street	19
Total Hubway Capacity		96

5.5.8 Car Sharing Loading and Service Activities

The increasingly popular car-sharing services provide easy access to vehicular transportation for urban residents who do not own cars. The local car sharing provider, Zipcar, offers short-term rental service for members. Vehicles are rented on an hourly and per-mile basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location. Since parking is not provided for student residents, the nearby Zipcar services provide an important transportation option and reduce the need for private vehicles.

As shown in **Figure 5-11** and summarized in **Table 5-10**, Zipcar already has 16 locations with a combined total of 62 vehicles available within walking distance (1/4-mile radius) of NEC's campus.

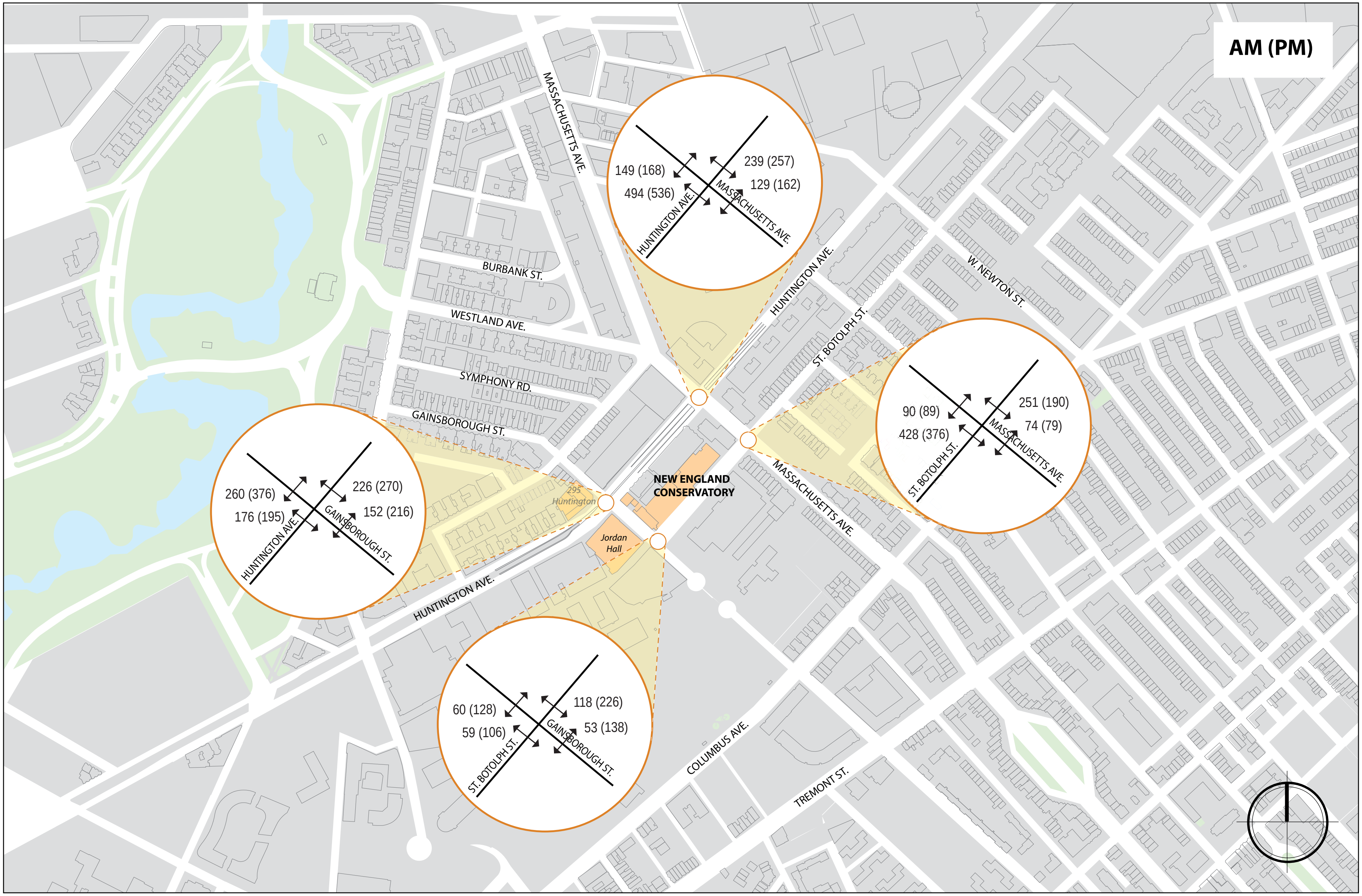

Figure 5-7
Existing Pedestrian Volumes at Study Intersections (2012), AM and PM Peak Hour

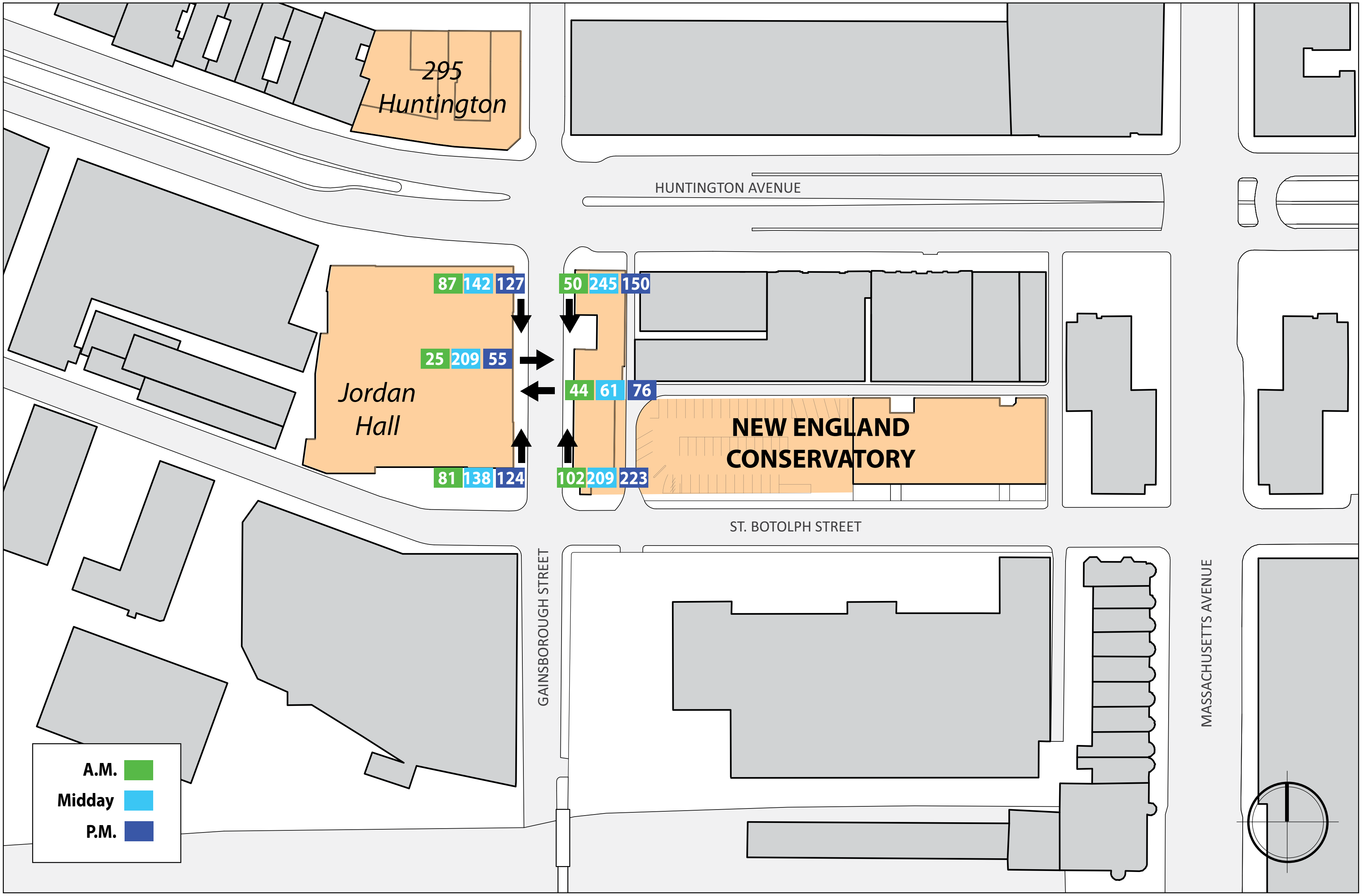

Figure 5-8
Existing Pedestrian Volumes on Gainsborough Street (2012), AM, Mid-day, and PM Peak Hour

Figure 5-9
Existing Bicycle Volumes (2012), AM and PM Peak Hour

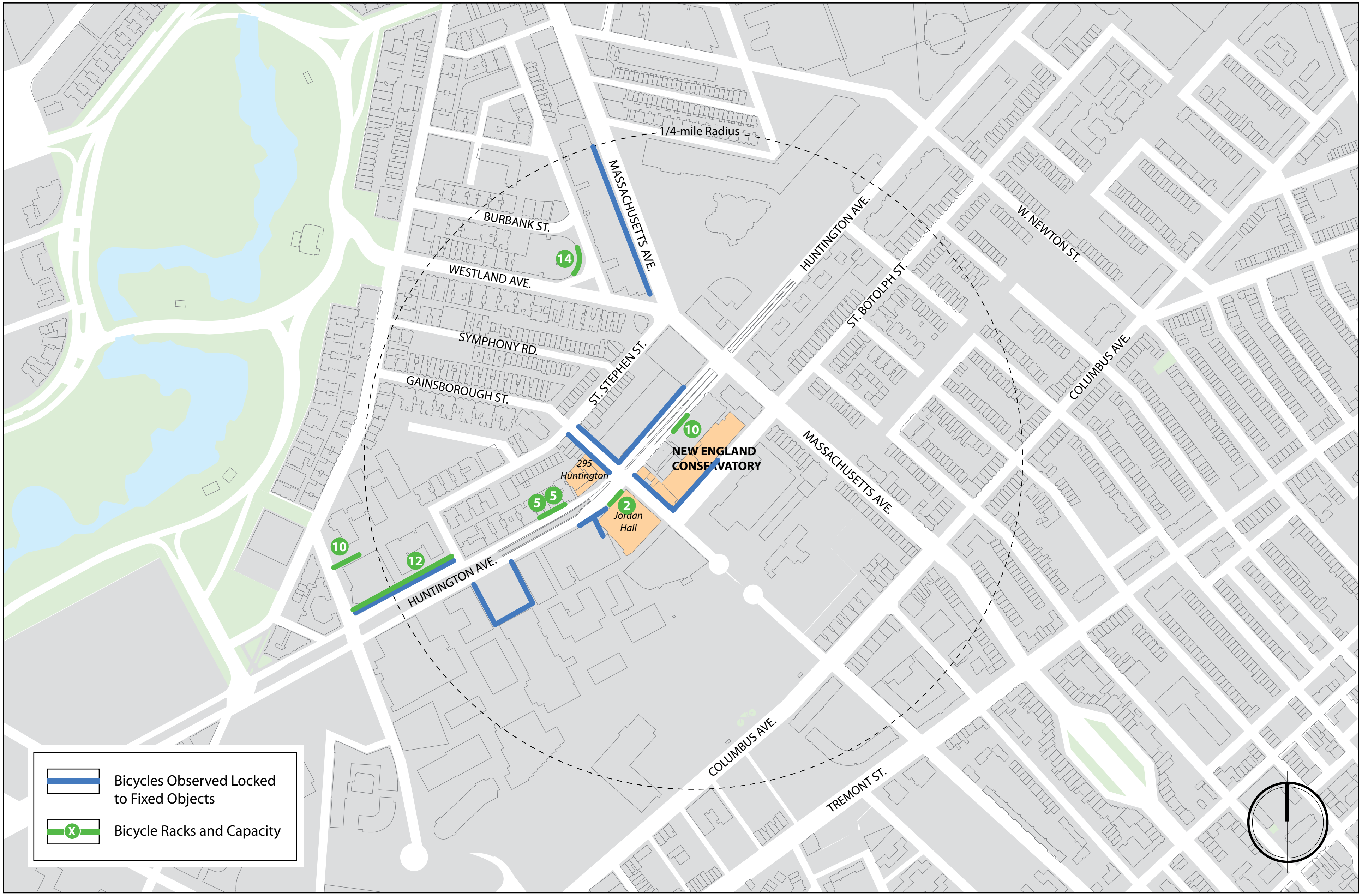

Figure 5-10
Bicycle Accommodations

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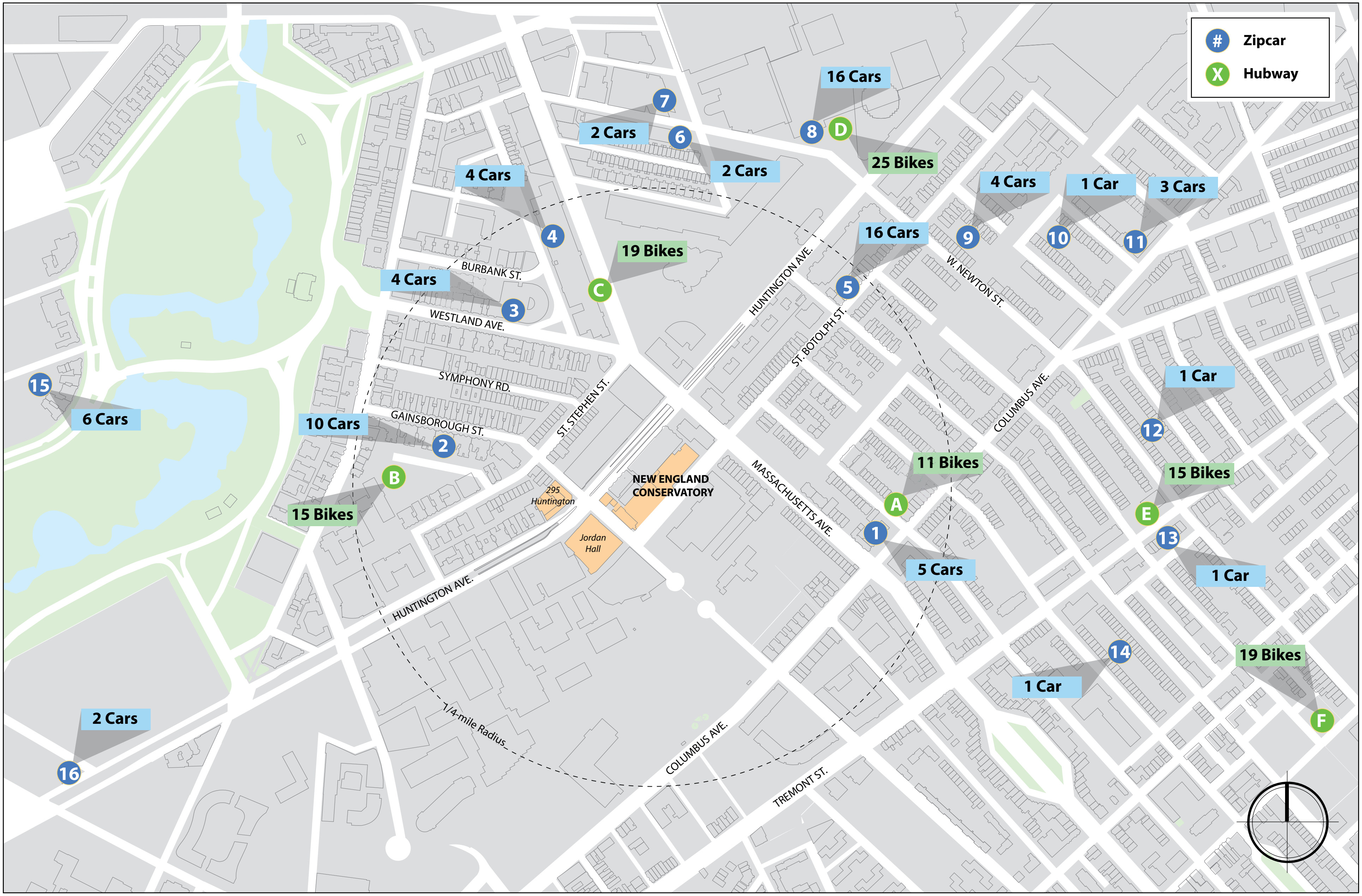

Figure 5-11
Car and Bicycle Sharing Locations

Table 5-10
Zipcar Locations in Study Area

Map Key	Zipcar Location	Number of cars
1	566 Columbus Avenue	5
2	Gainsborough Street	10
3	Symphony Garage	4
4	Edgerly Road/Church Park Apartments	4
5	Huntington Ave/Cumberland Street	3
6	30 Dalton Street/Belvidere Street	2
7	Hilton Hotel-Back Bay	2
8	Belvidere Street/Prudential Center	16
9	235 West Newton Street	1
10	30 Holyoke Street	1
11	Columbus Avenue/210 West Canton Street	3
12	Tremont Street/West Newton Street	1
13	Tremont Street/Rutland Street	1
14	146 West Concord Street	1
15	Park Drive/Jersey Street	6
16	Museum Road/Huntington Avenue	2
Total Zipcars		62

■

5.5.9 Loading and Service Activities

Current loading and building servicing for the NEC campus generally occurs at three different locations. The primary location being 241 St. Botolph Street for all general deliveries, with building specific deliveries occurring at 33 Gainsborough Street and Jordan Hall (including Brown Hall, Williams Hall and the Keller Room). Deliveries directly to NEC's offices at 295 Huntington Avenue (the Annex) are limited to the occasional larger furniture delivery and occur curbside.

All general deliveries for the NEC campus occur at 241 St. Botolph Street. These include general office supplies and overnight delivery packages for the NEC campus and deliveries specific to 241 St. Botolph, such as pianos. Most deliveries are made by small single-unit box trucks and occur in the parking lot adjacent to 241 St. Botolph Street. Deliveries are occasionally made by a tractor-trailer, which are conducted curbside. Trash from 33 Gainsborough Street, 295 Huntington Avenue (the Annex), and 241 St. Botolph Street is collected daily from the parking lot. Recycling is collected separately at each building and not centrally as trash is.

Deliveries for 33 Gainsborough Street occur through a receiving entrance accessed from the Public Alley 822 directly behind the building. Deliveries to this building are predominantly food related to the existing cafeteria located in 33 Gainsborough, with deliveries to the library being much less frequent. Single-unit box trucks back down the alley to make deliveries with the occasional tractor-trailer delivering curbside on

St. Botolph Street and walking deliveries down the alley to the receiving entrance. The alley is occasionally blocked from use by other deliveries occurring at adjoining land uses, particularly the Pizzeria Uno on Huntington Avenue that shares use of the alley. In such instances, deliveries to 33 Gainsborough are made curbside on St. Botolph Street and walked down the alley to the receiving entrance. Recycling materials for 33 Gainsborough Street are stored and picked-up from the alley behind the building.

Jordan Hall has a receiving door on Gainsborough Street near the rear the building. Deliveries to this location involve those specific to performances and events at Jordan Hall (and other performance halls in the building) include instruments, furniture, props, and catering. Most of these deliveries occur in single-unit box trucks. Trash and recycling pick-up also occurs at Jordan Hall. General office deliveries come through loading activities at 241 St. Botolph Street.

5.6 No-Build Conditions

No-Build conditions characterize the future transportation conditions if the Proposed Projects are not built but do include other area development projects and planned infrastructure improvements. The No-Build Condition is used to evaluate the cumulative impacts of other projects and background growth, while providing a baseline of comparison for the Proposed Projects. The No-Build Conditions for this IMPNF/PNF include planned and approved projects anticipated by Year 2022, 10 years into the future.

The study team identified several infrastructure improvements and development projects in the area as detailed in the sections below.

5.6.1 Area Transportation Improvements

Symphony Area Streetscape Project

The City of Boston and MassDOT are currently evaluating improvement to Massachusetts Avenue between Westland Avenue and Huntington Avenue that will improve pedestrian access around the Symphony area and include improvements to traffic signal operation, traffic circulation, bicycle accommodations, sidewalks, landscaping, crosswalks, and other streetscape improvements. The Symphony Area Streetscape Project will improve the pedestrian environment for all residents and visitors in the area. The project is currently at the 75% design stage.

Massachusetts Avenue Roadway Reconstruction Project

This project consists of safety improvements along Massachusetts Avenue from Albany Street to St. Botolph Street. The project will improve the flow of traffic along Massachusetts Avenue, and includes new lighting, landscaping, urban design treatments, new sidewalks and wheelchair ramps. This project was recently completed.

Massachusetts Avenue Bicycle Lanes

The City of Boston has committed to adding designated bicycle accommodations on Massachusetts Avenue between Boston Medical Center and Symphony Hall. Bicycle lanes between Melnea Cass Boulevard and St. Botolph Street have recently been completed. Bicycle accommodations between Westland Avenue and Back Street are currently in the conceptual design phase.

Southwest Corridor – Emerald Necklace Bicycle Connection

The City of Boston is currently evaluating alternatives for providing a connection between the Southwest Corridor Bicycle Path and the Fenway Bicycle Path that runs along the Emerald Necklace. As currently planned, this important connection would provide designated bicycle accommodations along Ruggles Street, Parker Street, and Forsyth Way. The project is currently in the conceptual design phase.

■

5.6.2 Development Projects

The projected vehicle trips expected at study area intersections were obtained from permitting studies for five projects, as listed below.

GrandMarc at Northeastern University

This project, located at 360 Huntington Avenue will include a new dormitory with 720 beds to serve Northeastern students. No increase in vehicle trips is anticipated with the new dormitory because more students will be able to live on-campus, reducing the number of commuting and off-campus students.

Wentworth Institute of Technology

Wentworth's Institutional Master Plan (IMPNF/PNF) includes several new projects for the ten-year period between 2010 and 2020. The IMPNF/PNF was approved in December 2010. The project include a 7,000 sf expansion to the campus center, an increase of 63,000 sf for academic and administration uses, a new student residence building with 305 beds, and a new soccer field. As presented in the IMPNF/PNF no net increase in vehicle trips is expected from these campus projects because the additional faculty/staff vehicle trips will be offset by a reduction in student vehicle trips, because more students will be able to live on campus rather than commuting.

Exeter Residence/888 Boylston Street

These two new mixed-use buildings are part of the Prudential Center Redevelopment Project. The Exeter Residences, located on Exeter Street opposite Blagden Street, will be a 30-story residential building with 188 new units. This building is currently under construction. 888 Boylston Street will be a 19-story building with about 360,000 sf of office space and 40,000 sf of retail space. The new vehicle trips from these projects were added to the Year 2022 No-Build volumes for the NEC IMPNF/PNF evaluation.

350 Boylston Street

This new mixed-use project will replace four existing buildings on the corner of Boylston Street and Arlington Street. The projects consists of 220,000 sf, including eight floors of office space, 15,000 sf of retail and restaurant space, and a 6,000 sf fitness center/spa. The new vehicle trips from this project were incorporated into the background growth factor for the NEC IMPNF/PNF evaluation.

Christian Science Plaza Master Plan

This plan includes two new buildings along Belvidere Street and one near the corner of Huntington Avenue/ Massachusetts Avenue. The new buildings will provide a mix of residential, hotel, and office space, totaling to an estimated 950,000 sf. While the plan was approved by the Boston Redevelopment Authority in August 2011, the development timeline and exact use and design of the buildings will not be determined until developers for each parcel are chosen in the future. To account for the eventual development under this Master Plan, the number of new vehicle trips is assumed to be incorporated in the background growth factor for the NEC IMPNF/PNF evaluation.

5.6.3 Background Growth

In addition to these volumes added from the identified development projects in the area, a general 0.5% per year growth factor was applied to existing volumes along the major arterials of Huntington Avenue and Massachusetts Avenue. The factor was applied for the 10-year period to estimate 2022 No-Build volumes.

5.6.4 Year 2022 No-Build Traffic Conditions

The resulting 2022 No-Build traffic volumes are shown in **Figure 5-12** and **Figure 5-13**, for the AM and PM peak hours, respectively, and the associated intersection operations results are shown in **Table 5-11** and **Table 5-12**.

Complete Synchro reports are provided in the **Appendix**.

Table 5-11
No-Build Conditions (2022) Level of Service Summary: AM Peak Hour

Intersection/Movement	LOS	Delay (seconds)	V/C ratio	95th percentile queue (feet)
Signalized				
Huntington Avenue/ Massachusetts Avenue	C	23.7		
Mass Ave EB left/thru | thru	C	31.8	0.82	340
Mass Ave EB right	A	7.8	0.32	52
Mass Ave WB left/thru | thru/right	C	21.5	0.49	15
Huntington NB left/thru | thru/right	B	16.4	0.87	m142
Huntington SB left/thru | thru/right	B	17.9	0.59	85
Mass Ave EB left/thru | thru	E	56.0	0.75	146
Mass Ave EB right	B	10.9	0.39	25
Huntington Avenue/ Gainsborough Street	B	13.7		
Gainsborough WB left/thru/right	C	29.9	0.41	60
Huntington NB left	B	15.6	0.25	43
Huntington NB thru | thru/right	B	15.1	0.52	210
Huntington SB left	A	8.9	0.17	m22
Huntington SB thru | thru right	A	9.7	0.44	155
Massachusetts Avenue/ St. Botolph Street	C	21.4		
Mass Ave EB left	B	17.9	0.44	m22
Mass Ave EB thru | thru/right	A	9.1	0.81	83
Mass Ave WB left	C	31.4	0.52	38
Mass Ave WB thru | thru/right	C	32.2	0.90	#612
St. Botolph NB left/thru/right	B	10.9	0.34	34
St. Botolph SB left/thru/right	C	23.9	0.33	57
Unsignalized				
St. Botolph Street/ Gainsborough Street				
Gainsborough EB left/thru/right	A	8.4	0.18	--
Gainsborough WB left/thru/right	A	7.8	0.08	--
St. Botolph NB left/thru/right	A	7.9	0.06	--
St. Botolph SB left/thru/right	A	8.4	0.20	--

Table 5-12
No-Build Conditions (2022) Level of Service Summary: PM Peak Hour

Intersection/Movement	LOS	Delay (seconds)	V/C ratio	95th percentile queue (feet)
Signalized				
Huntington Avenue/ Massachusetts Avenue	C	27.3		
Mass Ave EB left/thru | thru	D	41.9	0.90	#456
Mass Ave EB right	B	15.1	0.44	98
Mass Ave WB left/thru | thru/right	D	37.8	0.78	11
Huntington NB left/thru | thru/right	A	8.2	0.70	67
Huntington SB left/thru | thru/right	C	26.0	0.72	82
Mass Ave EB left/thru | thru	E	65.3	0.85	#293
Mass Ave EB right	B	12.5	0.50	30
Huntington Avenue/ Gainsborough Street	B	18.2		
Gainsborough WB left/thru/right	D	42.1	0.71	179
Huntington NB left	C	32.8	0.62	118
Huntington NB thru | thru/right	B	18.2	0.63	257
Huntington SB left	A	9.9	0.29	m31
Huntington SB thru | thru right	B	11.8	0.58	153
Massachusetts Avenue/ St. Botolph Street	B	14.6		
Mass Ave EB left	B	11.5	0.42	m6
Mass Ave EB thru | thru/right	A	5.9	0.75	m85
Mass Ave WB left	B	14.0	0.43	39
Mass Ave WB thru | thru/right	C	22.2	0.75	403
St. Botolph NB left/thru/right	B	13.4	0.39	76
St. Botolph SB left/thru/right	C	27.6	0.41	65
Unsignalized				
St. Botolph Street/ Gainsborough Street				
Gainsborough EB left/thru/right	B	10.0	0.29	--
Gainsborough WB left/thru/right	A	9.3	0.24	--
St. Botolph NB left/thru/right	A	8.7	0.12	--
St. Botolph SB left/thru/right	A	9.8	0.29	--

The 2022 No-Build analysis results are generally similar to the existing conditions results at all intersections. In addition to added volume due to background projects, a proposed project on Massachusetts Avenue will provide a left-turn lane on Massachusetts Ave northwest bound at Huntington Avenue, an approach that currently prohibits left-turning vehicles. As stated above, because these left-turns will be allowed by 2022, 50% of the volume that currently turns left onto St. Botolph Street, right onto Gainsborough Street, and left onto Huntington Avenue were reassigned to turn left onto Huntington Avenue from Massachusetts Avenue, thus reducing traffic on Gainsborough Street. The reduction of left-turning volume from Gainsborough Street thus improves the level of service in the PM peak hour on this approach from LOS E to LOS D.

Another change from the Massachusetts Avenue improvement project is the designation of a right-only lane southbound on Huntington Avenue at Massachusetts Avenue. Currently these unmarked lanes were modeled as a left/thru lane and a thru/right lane in the existing level of service analyses. The right-only lane forces all traffic going through the intersection to use the left lane. The thru volume is significantly higher than the right-turning volume, so the demand on the left/thru lane causes the level of service of the southbound approach to decrease. The existing level of service on Huntington Avenue southbound at Massachusetts Avenue is LOS C, but in the Year 2022 No-Build conditions, the left/through lane operates at LOS E and the right-turn lane operates at LOS C.

The 2022 No-Build levels of service also reflect an increase in bicycle volumes on Massachusetts Avenue and Huntington Avenue. Bicycle volumes on Massachusetts Avenue are assumed to double by Year 2022 because of the new bicycle lanes on Massachusetts Avenue. Bicycle volumes on Huntington Avenue are assumed to increase by 50%, because bikes will be able to access Huntington Avenue more easily. For the purposes of determining levels of service, these bicycle volumes are used only to determine the number of conflicts for turning vehicles.

5.7 Build Conditions

Chapter 3 summarizes the Proposed Projects included in the 10-year Institutional Master Plan period. As shown, at the end of Phase II, the project will result in a net addition of approximately 140,500 square feet, including approximately 89 new dormitory beds, 59 additional practice rooms, 105 additional dining seats, and a new 200-seat performance venue. This section examines the transportation characteristics of NEC's campus and the future impacts expected with the completion of the Proposed Projects.

Figure 5-12

No-Build and Build Traffic Volumes (2022), AM Peak Hour

NEC

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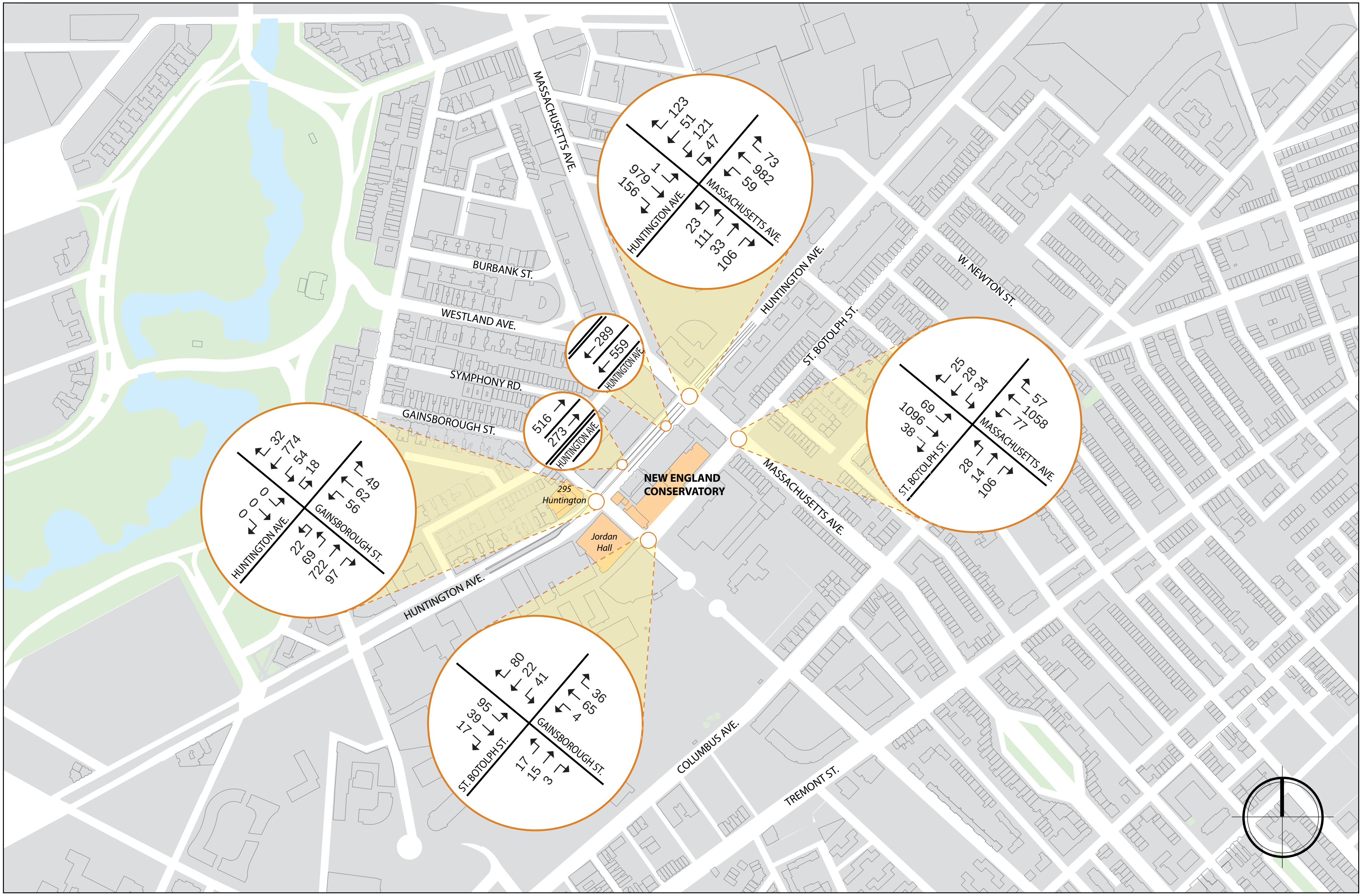

Figure 5-13
No-Build and Build Traffic Volumes (2022), PM Peak Hour

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5.7.1 Campus Population Travel Characteristics

To understand the travel characteristics of NEC faculty and staff, the study team extrapolated the following information from data provided by the NEC:

For the 576 full- and part-time college and preparatory faculty and 133 staff, 184 parking permits are issued, indicating that about 32 percent drive/carpool. Regular vacancies in the current NEC parking lot on weekdays, however, reflect the fact that not all employees are on campus on the same day or at the same time. As such it can be inferred that many of these auto trips are made during the off peak periods.

NEC currently sells 116 MBTA passes to faculty and staff, implying that transit use is about 20 percent. Monthly MBTA passes are not attractive, however, to those with less than full-time schedules.

Since no student parking is available at NEC, off-campus students must walk or ride transit. For off-campus students, zip code addresses were obtained from NEC to further estimate walking and transit use and are shown in **Table 5-13.** Based on this data from NEC, it is estimated that students living in neighborhoods convenient for walking and transit account for 89 percent of commuting students.

Table 5-13
Commuting Students - Place of Residence and Travel Mode

	Commuting Students	
	Number	Percent
Neighborhoods within walking distance		
Fenway	252	40%
Roxbury	49	8%
Fenway/Boston University area	32	5%
South End	13	2%
Total	346	55%
Neighborhoods convenient to transit		
Jamaica Plain	128	21%
Cambridge	29	5%
Allston/Brighton	25	4%
Brookline	13	2%
Medford	12	2%
Total	207	34%
Other	70	11%
Total	623	100%

Place of residence data obtained from NEC. Likely travel modes were assigned to each neighborhood by the study team.

Trips associated with the new Student Life and Performance Center, which will house approximately 252 students (net increase of 89 beds), is expected to have a high walk/transit mode share, similar to data observed at a Suffolk University dormitory in 2006 and adopted for use in Northeastern University's recent IMPNF/PNF Amendment[1].

In the Suffolk University survey at the Nathan R. Miller Residence Hall, all vehicular pick-up/drop-off and loading/service activity were observed in detail for use in estimating daily and peak-hour walk/bike/transit and vehicle mode shares. Based on these observations, 98 percent of daily trips are walk trips, transit trips, or bicycle trips, as summarized in **Table 5-14.**

▼

[1] "Institutional Master Plan Amendment, Fifth Amendment to the Institutional Master Plan", prepared by Northeastern University for the Boston Redevelopment Authority. February 11, 2011.

Table 5-14
Mode Share for Residence Hall

Period	Direction	Walk/Transit/Bike Share	Vehicle Share	AVO
Daily	In	98 %	2 %	1.2
	Out	98 %	2 %	1.2
	Total	98 %	2 %	1.2
AM Peak Hour	In	95 %	5 %	1.2
	Out	95 %	5 %	1.2
	Total	95 %	5 %	1.2
PM Peak Hour	In	99 %	1 %	1.2
	Out	99 %	1 %	1.2
	Total	99 %	1 %	1.2

Source: Person trip rate developed from survey of Nathan R. Miller Residence Hall, 10 Somerset Street, Suffolk University, 2006.
[1] Average vehicle occupancy (AVO) based on 2001 National Household Travel Survey data.

5.7.2 Trip Generation

While it is standard practice to estimate trip generation for a new project based on rates derived from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* (8th edition, 2008) for appropriate land use codes, the Proposed Projects included in the NEC IMPNF/PNF will serve the existing population of students and faculty and not directly generate new weekday peak period trip activity.

The overall square footage of NEC buildings will increase as a result of the Proposed Projects' construction, but full-time student enrollment and the number of faculty members will not increase and NEC forecasts that these volumes will remain steady over the next ten years. In fact, the net increase in dormitory beds will cause a reduction in trip activity to and from NEC, because some students who currently commute to campus will now be able to live on campus.

The new campus spaces under the IMPNF/PNF include new practice rooms, a new campus dining facility, new library space, new academic classrooms, and new student services space. All of these uses will support the students and faculty already on campus and will not generate new trip activity to and from the NEC campus. The new residence hall will house approximately 89 students who currently live off-campus, resulting in a reduction of trip activity to and from the campus. The new 200-seat black box theater, to be built as part of Phase I, is intended to support NEC academic programs, but may have the potential for serving public performances. Any such public performances will occur outside of the peak travel periods and not affect weekday peak hour traffic operations.

NEC anticipates a small number (about 10) of new facility employees will be needed to provide additional security and maintenance of the Proposed Projects. This increase in facility employees, however, is not expected to generate noticeable new peak hour vehicle trips.

Overall, the Proposed Projects will have no negative impacts on area roadways during weekday peak hours.

5.7.3 Build Traffic Conditions

Because the Build volumes are assumed to be the same as No-Build traffic forecasts, the Proposed Projects will not cause any noticeable increase in peak hour vehicle trips. Refer to **Figure 5-12** and **Figure 5-13** for the No-Build (and Build) volumes.

5.7.4 Future Parking

No new parking will be provided as part of the IMPNF/PNF projects. NEC is exploring a number of options for replacing the 53 spaces that will be lost from the St. Botolph Street lot when the Student Life and Performance Center is constructed. These include potential arrangements with operators/owners of local area garages and/or a reduction in the provision of parking opportunities for NEC affiliates. The existing 20-space NEC Jordan Hall lot will remain in operation in order to provide a small number of on-campus parking spaces for essential functions.

5.7.5 Public Transportation

As discussed under campus population travel characteristics and trip generation, the Proposed Projects will not generate new vehicles trips in the Build condition because more students will be able to live on-campus. Similarly, because future NEC enrollment is not anticipated to increase, the net impact to transit services in the area will be negligible. In fact, housing more students on campus should cause a slight reduction in the number of transit trips to and from the NEC campus.

5.7.6 Pedestrian Environment

An important design feature of the IMPNF/PNF is to physically join the two new buildings to the existing building at 241 St. Botolph Street, allowing internal circulation between new gathering places, performance space, academic and practice rooms and administrative and support space. New internal connections will reduce the external pedestrian trips between these uses during inclement weather, although a new park at the corner of St. Botolph and Gainsborough Street will be designated as the NEC campus green and attract students outdoors during pleasant weather.

Another important design initiative is the enhancement of the heavily used pedestrian connection across Gainsborough Street between Jordan Hall and 33 Gainsborough Street, as shown in **Figure 4-6**, Site Improvements. The IMP proposes to enhance the pedestrian crossing directly between Jordan Hall doors and 33 Gainsborough Street doors with a raised crosswalk of contrasting pavement material to encourage slower driving speeds and highlight the pedestrian crossing. Eight existing short-term metered spaces would be removed along the northeast side of Gainsborough Street, allowing passenger drop-off zones to be created along the southwest side of the street, adjacent to Jordan Hall and streamlining event-period drop-off and pick-up operations at the front door of Jordan Hall. Two travel lanes for two-way traffic will be maintained on Gainsborough Street.

The primary entrance for the new Student Life and Performance Center will be located on St. Botolph Street and will be accessed via a ramp and wide south-facing steps. Existing sidewalks will be widened to provide outdoor seating and planting areas. Some existing short-term metered spaces on St. Botolph may be removed in front of the Center to create new sidewalk area and pick-up/drop-off zones to streamline operations during peak event periods.

As the streetscape plans for Gainsborough Street and St. Botolph evolve, NEC will meet and coordinate with Boston Transportation Department and Public Improvement Commission staff. A final plan will be documented in a Transportation Access Plan agreement (TAPA) to be filed with the City.

■

5.7.7 Bicycle Environment

As discussed in Section 5.5.7, bicycles are often locked to parking meters and fences in the Gainsborough Street and St. Botolph Street areas of the campus. The Proposed Projects and associated streetscape improvements will provide extensive new accommodations for on-campus bicycle parking and storage.

Three areas along St. Botolph Street, as shown in **Figure 4-11**, will be designated for outdoor bicycle parking, including two areas in front of the 241 St. Botolph Street building and an area adjacent to Jordan Hall. An indoor bicycle storage room will be incorporated into the existing 33 Gainsborough Street building in the interim condition for use by NEC students. A significant indoor bicycle parking facility will be provided in the new Learning Center (Phase II) project to ensure a permanent, secure indoor bicycle storage facility that will benefit all members of the NEC community. A final plan will be documented in a Transportation Access Plan agreement (TAPA) to be filed with the City.

5.7.8 Loading and Service

The Student Life and Performance Center to be constructed in Phase I will provide a new designated loading dock that will service all general loading, including trash and recycling pick-up, for the NEC campus. Jordan Hall will continue to receive event specific deliveries and trash and recycling pick-up as is current practice. The infrequent delivery of large items, such as office furniture, as well as trash and recycling pick-up will also continue to be curbside at 295 Huntington Avenue (the Annex).

Based on standard truck trip generation rates[2], total delivery activity on the NEC campus upon the completion of Phase II, is expected to be approximately nine (9) deliveries per day. The level of delivery activity is not expected to increase materially over current conditions, because no major new generators of deliveries are being constructed as part of the IMP.

The loading dock proposed as part of the new Student Life and Performance Center will be able to service a single unit box truck of up to 36 feet in length (SU-36). NEC will instruct all vendors to use this size vehicle or smaller for deliveries to the campus. The loading dock is located adjacent to Public Alley 822 and is accessed by backing-in from St. Botolph Street as shown in **Figure 5-14**. Deliveries will be accepted on the first level of the building with elevator access to storage and distribution center on the lower level. From the lower level, access to the alley for hand deliveries to a receiving door at both the existing 33 Gainsborough building and the future new Learning Center will be provided. Trash and recycling from either the existing of the future NEC buildings across the alley will also be moved to the new Student Life and Performance Center for pick-up.

5.8 Transportation Demand Management

NEC offers a variety of Transportation Demand Management (TDM) measures to help reduce single occupant autos commuting to its campus. The Phase I project will house an increasing proportion of the student body on the main campus, combined with a continued no parking policy for students either on- or off-campus. Other TDM efforts include:

- Incentives for MBTA use, including on-site pass sales, participation in the MBTA's student semester pass program, pre-tax purchase of MBTA passes for employees, and posting of MBTA maps and schedules at different locations on the campus.

[2] NCHRP Synthesis 298, Truck Trip Generation Data, Transportation Research Board, Washington DC, 2001.

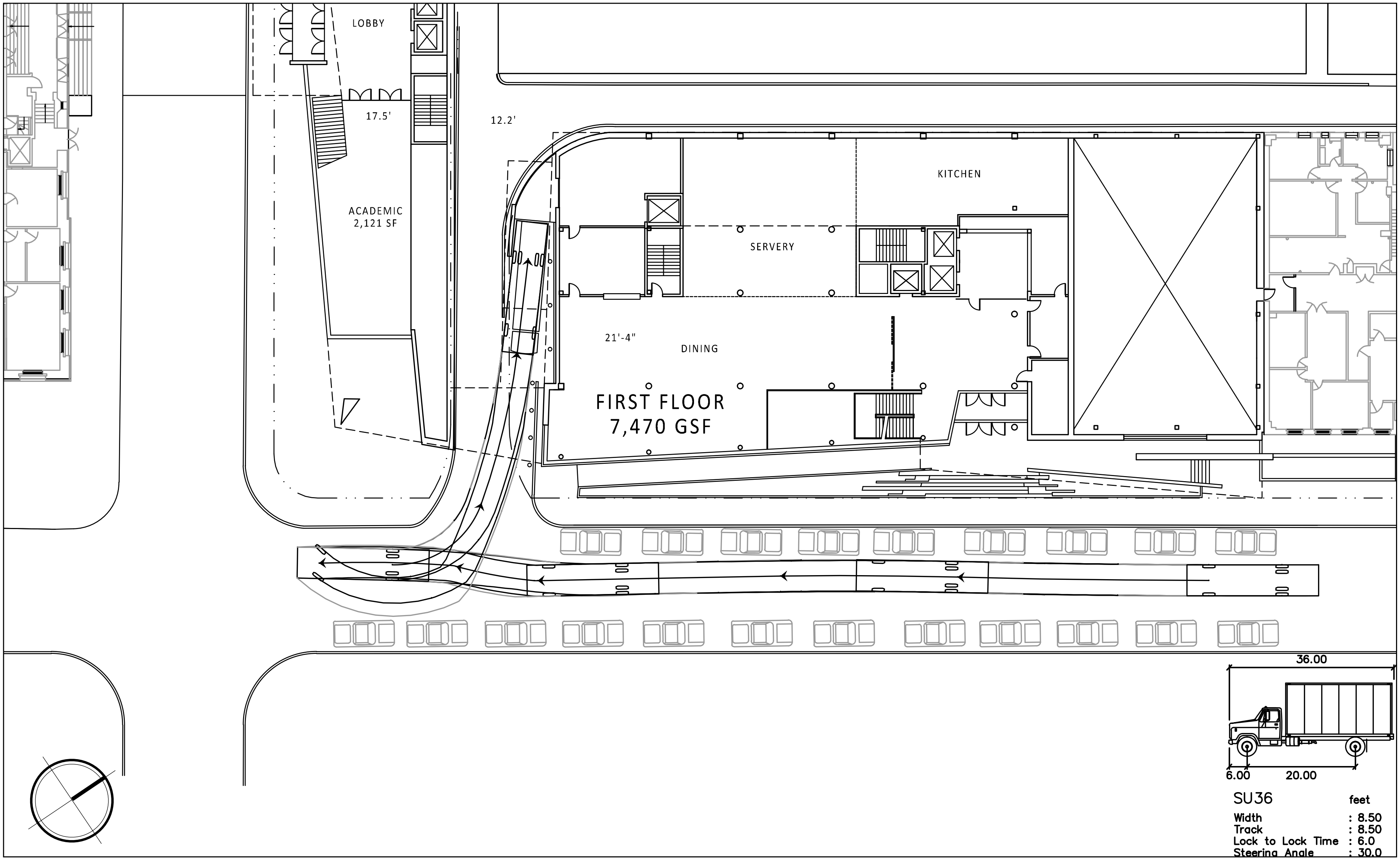


Figure 5-14
Loading Docks

- Designation of a Transportation Coordinator, responsible for providing public transit, ridesharing and other transit information to students, employees and faculty.
- For off-campus students, operation of a Commuter Referral Office in the Student Services Office, providing commuting students information on bus and train schedules and carpool information.
- Prohibition of on-campus parking for all dorm residents.
- Alternative working hours during summer months – i.e. a four-day work week Monday through Thursday, every other week. This reduces transit and parking demand.
- Membership in the Fenway Alliance, an institutional consortium in the area that cooperates on transportation and parking issues.
- Ridesharing program with periodic incentives to encourage carpooling by commuter students, faculty, and staff.
- Cooperation with City agencies each August on a Move-In plan that coordinates student moving with the September 1 peak day for moving in and out of surrounding rental apartments.

NEC is committed to working with BTD to continually update and add to TDM programs through the campus transportation coordinator. Specific commitments with respect to the Proposed Projects will be documented in a Transportation Access Plan agreement (TAPA) to be filed with BTD.

5.9 Construction Impacts and Mitigation

As discussed in Chapter 6, a Construction Management Plan (CMP) will be submitted to the BTD for review and approval prior to issuance of the Building Permit. Construction management and scheduling will minimize impacts on the surrounding environment. The CMP will define truck routes that will help minimize impact of trucks on neighborhood streets. It will address sidewalk and street occupancy requirements necessary for the construction of building, roadway, and utility connections. It will also address construction worker commuting and parking, protection of existing utilities, and control of noise and dust. See Chapter 6 for additional information on construction hours, perimeter protection, public safety, and construction workers.

6
Environmental Protection Component

6.1 Introduction

This chapter presents the results of technical studies that were conducted to determine the direct or indirect impact to the environment reasonably attributable to the Proposed Projects as described in Chapter 3 *Project Description.* The categories of environmental impacts for which studies and mitigation are addressed herein include wind, shadow, daylight, solar glare, noise, air quality, geotechnical, flood hazards/wetlands, construction impacts, rodent control, and historic resources.

6.2 Wind Analysis

The objective of this qualitative analysis is to estimate the pedestrian wind conditions around the Proposed Projects when added to the existing surroundings. This qualitative assessment is based on the following:

- A review of regional long-term meteorological data for the Boston area.
- Design drawings received by RWDI on November 15, 2011.
- RWDI's engineering judgment and knowledge of wind flows around buildings[1].
- RWDI's experience of wind tunnel modeling of various building projects in the area.
- Use of software developed by RWDI (Windestimator)[2] for estimating the potential wind comfort conditions around generalized building forms.

[1] C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999). "Experience with Remedial Solutions to Control Pedestrian Wind Problems". *10th International Conference on Wind Engineering*. Copenhagen, Denmark.

[2] H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004). "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions". ASCE Structure Congress 2004. Nashville, Tennessee.

In the absence of wind tunnel testing, this qualitative approach provides a screening-level estimation of potential wind comfort conditions and identifies anticipated areas of accelerated and uncomfortable wind speeds.

6.2.1 Building and Site Information

The proposed development is located at the northeast corner of St. Botolph Street and Gainsborough Street in Boston. The site currently consists of a parking lot along St. Botolph Street and an eight-story building along Gainsborough Street, which steps down to two stories at Huntington Avenue.

The surrounding buildings around the development site are typically low, except for two residential towers on Massachusetts Avenue to the northeast, as well as several existing and proposed university towers to the southwest. Further surroundings include dense, low to middle-rise buildings in all directions, with tall buildings in the Prudential Area to the north and northeast, the Longwood Medical and Academic Area to the southwest and downtown Boston to the distant northeast.

The development consists of two phases. Phase I will be a 10-story Student Life and Performance Center, and Phase II will be a 7-story Learning Center. They will be approximately 135 ft and 105 ft tall, respectively, with rectangular floor plans.

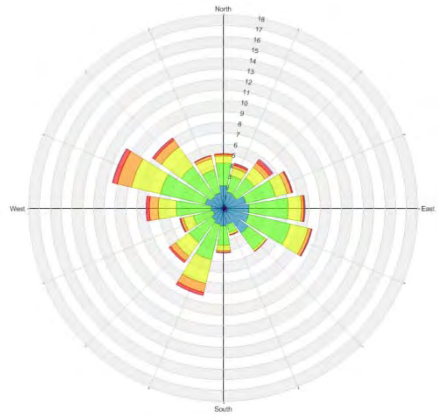
Pedestrian areas on and around the site include building entrances and sidewalks. The following discussion will focus on these areas.

6.2.2 Local Wind Data

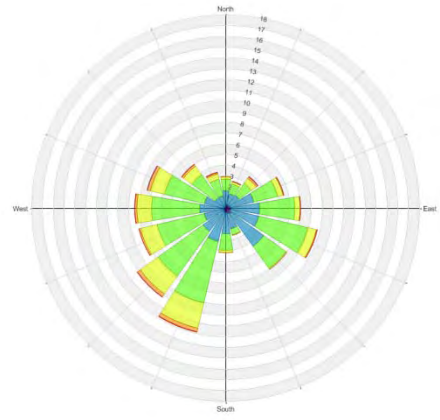
Wind roses in **Figure 6-1** summarize the seasonal wind climates in the Boston area, based on the long-term data from the Boston Logan International Airport. The prevailing winds are from the west-northwest year-round, especially in the spring and winter seasons. Easterly winds are also frequent. In the summer and fall, the prevailing winds are from the southwest direction, but of lower speeds in general.

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

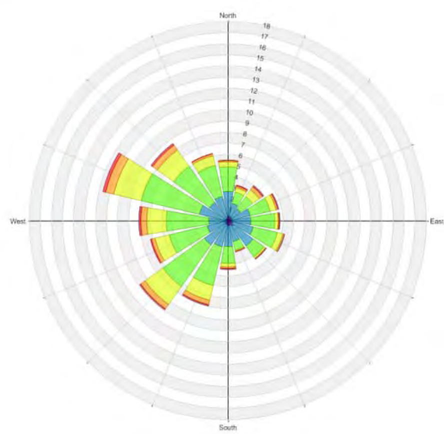
Based on the local wind directionality and the orientation of the buildings and streets in the area, winds from the west-northwest and northeast are considered most important, although winds from all other directions have also been taken into account in the analysis.



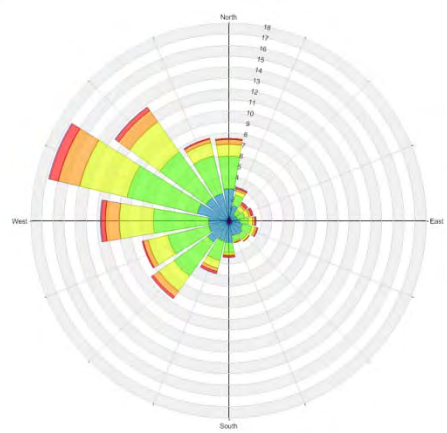
Spring Winds



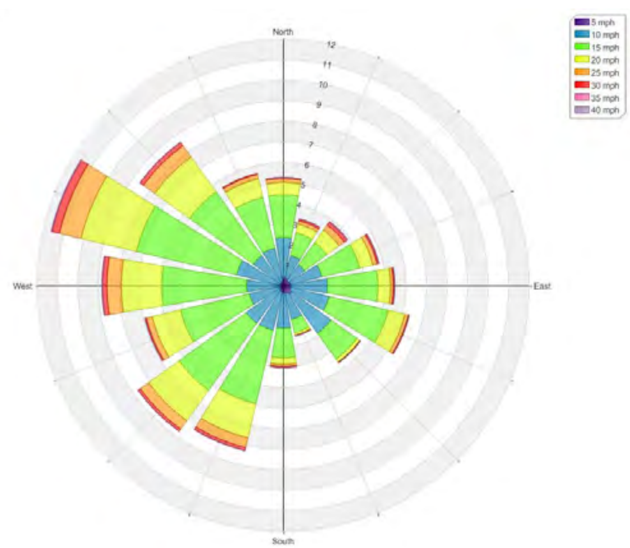
Summer Winds



Fall Winds



Winter Winds



Annual Winds

Figure 6-1
Local Wind Data - Wind Rose Diagrams

Source: RWDI

6.2.3 Wind Comfort Criteria

The Boston Redevelopment Authority (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 plus 1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one (1) 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[3]. 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) as shown in **Table 6-1**.

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

Table 6-1
BRA Mean Wind Criteria*

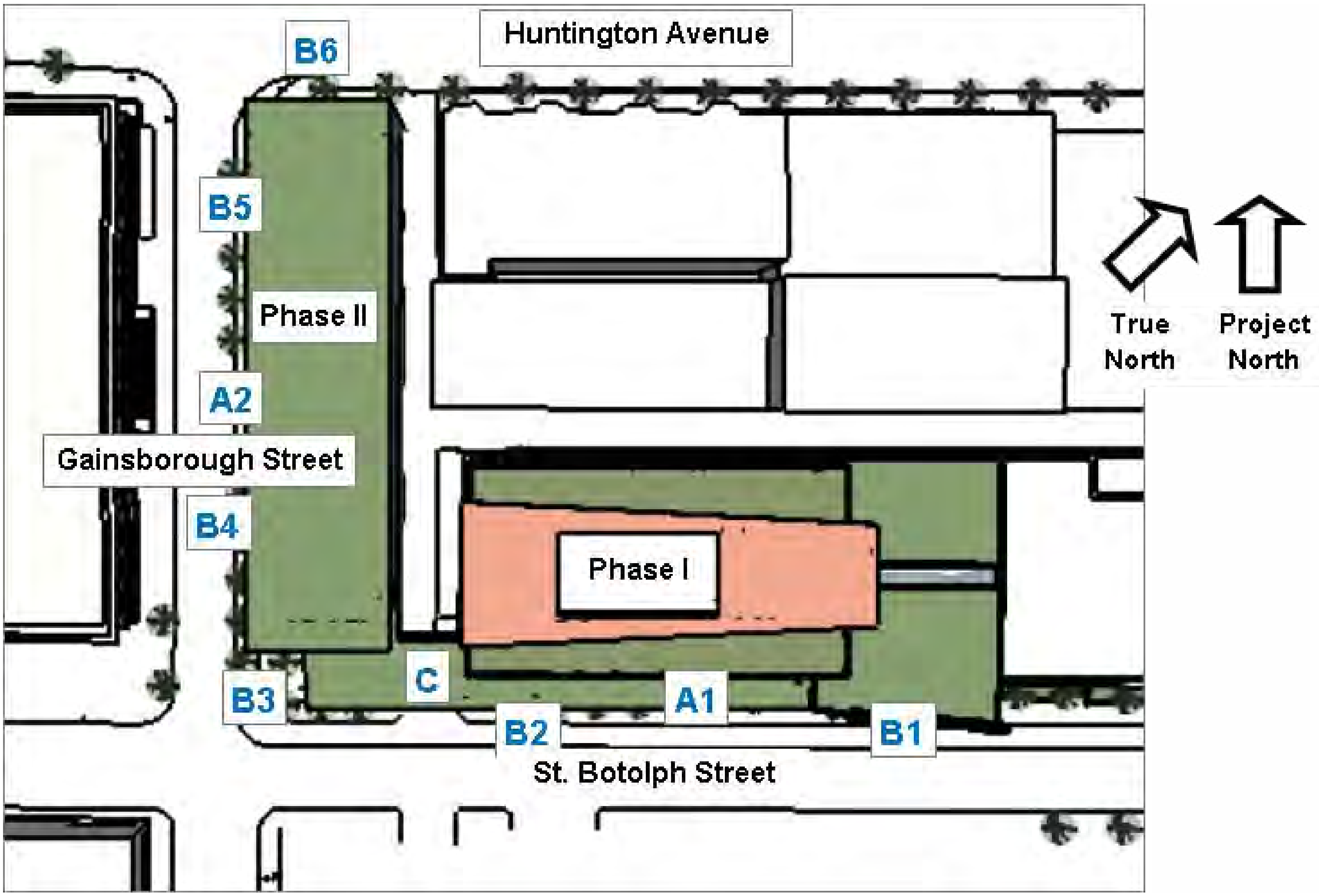
Melbourne Category	Description	Criteria*
1. Comfortable for Sitting	Recommended for outdoor cafes and amenities that promote sitting.	≤12 miles per hour
2. Comfortable for Standing	Appropriate at major building entrances, bus stops or other areas where people may want to linger but not necessarily sit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

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

Discussion of anticipated wind patterns includes reference is be made to two general wind flows. Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to ground level. Such a "Downwashing Flow" is the main cause for wind accelerations around large buildings at pedestrian-level. When two buildings are situated side by side, wind flow tends to accelerate through the gap between the buildings due to a channeling effect. If these buildings/wind combinations occur for prevailing winds, there is an increased potential for even higher wind speeds.

Generally, wind conditions comfortable for walking are appropriate for sidewalks and lower wind speeds comfortable for standing are desired for main building entrances. Typically the summer and fall winds in Boston tend to be more comfortable than the annual winds while the winter and spring winds are less comfortable than the annual winds.

The site plan in **Figure 6-2** identifies key pedestrian areas for the discussion of wind conditions. These areas include the entrances to the Phase I and Phase II buildings (A1 and A2, respectively), sidewalks along St. Botolph Street, Gainsborough Street and Huntington Avenue (Locations B1 through B6), as well as the passageway



Reference Plan

Figure 6-2
Local Wind Data - Pedestrian Areas

Source: RWDI

between the two proposed buildings (Location C). In the following discussion, references to the buildings locations relate to "Project North", while the wind directions are referred to "True North". These differ by approximately 45°.

Student Life and Performance Center Building Entrance (A1)

The entrance to the Student Life and Performance Center building will be located on St. Botolph Street, on the south side of the building. It is recessed from the building facade and sheltered by an entrance canopy.

The proposed Phase I building will shelter the entrance from the prevailing west and northwest winds. The recessed feature will reduce the impact of winds along the street from the northeast and southwest directions.

As a result of these positive design features for wind control, suitable wind conditions are expected around the entrance throughout the year.

Learning Center Building Entrance (A2)

The entrance to the Learning Center building will be on Gainsborough Street, on the west side of the building. The entrance is sheltered by a large canopy and is setback from the building facade to the north.

These design features are beneficial. The canopy will reduce the impact of the prevailing southwest and west winds, which would affect the entrance area after downwashing off of the proposed building. The northwest and west winds are channeled along the street between the proposed and existing buildings, and the setback feature will help in reducing the wind impact.

Wind conditions comfortable for standing are expected around the entrance. We recommend that these positive design features for both entrances be retained through the design.

Sidewalks (B1 through B6)

The proposed SLPC building will be located on the north side of St. Botolph Street and will shelter the adjacent sidewalk (B1 and B2) from the prevailing west and northwest winds. The building will have its narrow facade facing the northeast and southwest winds and, therefore, the potential wind impact will not be significant.

The proposed LC building will have a massing similar to the existing building on site, and wind conditions along sidewalks around the building (B3 through B6) are expected to be similar to the existing conditions. The exception is for the sidewalk on

Huntington Avenue (Location B6), where slightly higher wind speeds are anticipated due to the increased building height along Huntington Avenue. The resultant wind speeds on all the sidewalks around the two proposed buildings are predicted to be comfortable for walking or better throughout the year.

Note that, at the southwest corner of the proposed SLPC building (Location B3), while the wind flow pattern is similar to the existing situation, the wind speeds are expected to be lower, due to the proposed design of this corner area. The SLPC building tower is setback from the corner, creating a three-story podium. This will reduce the ground-level impact of westerly winds that downwash off of the west façade of the proposed building. At the ground level, the podium overhangs the corner area, where a large screen wall is installed. If feasible, trees will be planted along the east sidewalk of Gainsborough Street, which will provide wind protection during the summer and fall.

Passageway (C)

According to the design drawings, there will be a passageway underneath the link between the two proposed buildings (Location C). Due to the arrangement of the two proposed buildings, winds from the north-northwest through north-northeast directions will funnel into the passageway/alley, potentially resulting in uncomfortable wind conditions, especially during the winter and spring seasons. These wind conditions are appropriate if the passageway is planned primarily for vehicular use. If frequent pedestrian use of the passageway/alley is anticipated, wind control solutions will need to be developed. For instance, the proposed canopy on the west side of the LC building could be expanded to cover the entire driveway between the two buildings and connect to the proposed connector to reduce the winds that may funnel into the passageway.

■

6.2.4 Summary and Recommendations

Based on our analysis of the local wind data and the proposed design, together with our past wind tunnel experience for building projects in the area, the following predictions of wind conditions around the Proposed Projects can be provided:

- Suitable wind conditions are predicted at the two main entrances to the proposed development, as they are sheltered by the buildings and protected by several positive wind control design features from prevailing winds;
- Wind conditions are expected to be comfortable for walking or better on sidewalks immediately around the development site, and are expected to be similar to those that currently exist;
- If pedestrian use of the passageway/alley underneath the bridge-link between the two proposed buildings is anticipated, the design team should consider expanding the canopy on the west facade of the LC building to cover the entire gap between the two buildings and connect to the bridge to reduce wind flows that may funnel into the passageway/alley.

6.3 Shadow Analysis

6.3.1 Regulatory Context

As required by Section 80B-2 of the City of Boston Zoning Code for Large Project review, NEC has completed a shadow study to identify the potential new shadow impacts resulting from the Proposed Projects. This study has particular emphasis on sidewalks, parks, and other public open spaces. As contemplated by Section 80B-2(b) of the code, the shadow study for the Proposed Projects compares the No-Build and Build Conditions.

6.3.2 Methodology

The analysis provides a comparison of the No-Build and Build Conditions. It should be noted that the Build Condition presented herein takes into consideration the future construction of both proposed phases of the NEC IMP, including the Phase I Student Life and Performance Center Project (the SLPC Project) and the Phase II Learning Center Project (the LC Project). The shadow analysis was developed via the use of a three-dimensional model of the project area using data provided by the BRA and geo-located with Google Earth, updated as necessary to include recently completed projects and other future planned or approved projects in the area. Existing Conditions are considered equivalent to the No-Build Condition for the purposes of this study. The study was completed using standard sun altitude and azimuth data for each study date and time estimated to occur at latitude and longitude 42.341393N, 71.085920W (42°20'29"N, 71°5'9"W) as summarized in **Table 6-2**.

Table 6-2
Azimuth and Altitude Data

Date	Local Time	Solar Position Altitude	Solar Position Azimuth
March 21	9:00 AM EST	23.33	112.74
	12:00 Noon EST	46.38	161.14
	3:00 PM EST	39.05	223.19
	6:00 PM DST	9.82	261.52
June 21	9:00 AM DST	39.96	93.51
	12:00 Noon DST	68.81	149.53
	3:00 PM DST	56.48	246.35
	6:00 PM DST	23.83	280.73
September 21	9:00 AM DST	26.05	115.22
	12 Noon DST	47.49	166.05
	3:00 PM DST	37.46	227.20
	6:00 PM DST	7.40	264.09
December 21	9:00 AM EST	14.37	141.97
	12:00 Noon EST	24.13	184.42
	3:00 PM EST	10.08	225.01

Times were adjusted for daylight savings time as appropriate. The Existing and Build Conditions were compared for the spring and fall equinoxes and the summer and winter solstices. Shadows were estimated for each study date at 9:00 AM, 12:00 noon, 3:00 PM, and 6:00 PM except for the Winter Solstice, which does not include a study after 3:00 PM as the sun sets before 6:00 PM. [DST starts on 3/11]

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6.3.3 Spring Equinox (March 21)

The predicted shadow conditions for New England Conservatory site during the Spring Equinox (March 21) are shown in **Figure 6-3** through **Figure 6-6**. Net new shadows are cast to the northwest, north, and northeast at the studied time intervals throughout the day.

At 9:00 AM, shadows from the Phase I Student Life and Performance Center are cast onto the roof of the rear ell of the Huntington Theater and part of the adjacent alleys. Shadows from the LC Project are cast across Huntington Avenue to the

Existing Shadows
Net New Shadows
Subway Station
Bus Stop

Figure 6-3 - Shadow Impact Analysis
March 21 - 9AM

Figure 6-4 - Shadow Impact Analysis
March 21 - 12PM

Figure 6-5 - Shadow Impact Analysis
March 21 - 3PM

Figure 6-6 - Shadow Impact Analysis
March 21 - 6PM

northwest, extending the existing shadow of the current NEC dormitory and library to the other side of the street. No new shadows are anticipated on the façade of Jordan Hall. At noon, the shadows point to the north and do not project as far, only covering portions of the Huntington Theater's rear ell, adjacent alley, and the lower roof of the Phase I building. In the afternoon at 3:00 PM, the shadows fall towards the northwest primarily onto the roof of the new Phase I building and the existing NEC St. Botolph building. A small portion of St. Botolph Street will be in shadow, while the pedestrian sidewalk on St. Botolph Street remains in shadow from the existing buildings. Shadows from the Phase II building will cover a small portion of the theater roof. By 6:00 PM, the sun is low enough that the entire area is dark and no new shadows are expected.

6.3.4 Summer Solstice (June 21)

The predicted shadow conditions for New England Conservatory site during the Summer Solstice (June 21) are shown in **Figure 6-7** through **Figure 6-10**. Daylight Saving was factored for this day in the study. Net new shadows are cast to the west, northwest, northeast, and east at the studied time intervals throughout the day.

At 9:00 AM, shadows from the Phase I building are cast to the west onto the roof of the Huntington Theater's rear ell and the adjacent alleys, while shadows from the Phase II building are cast at the intersection of Huntington Avenue and Gainsborough Street. Sidewalks along the south of Huntington Avenue are already in shadow from existing buildings. No new shadows are anticipated on the façade of Jordan Hall. By noon, shadows of the Phase I building are directed northwest covering a small portion of the rear ell of the Huntington Theater and adjacent alleys. Shadows of the Phase II building cover the corner of the sidewalk at the intersection of Huntington Avenue and Gainsborough Street. At 3:00 PM, shadows are primarily cast onto the lower roof of the new Phase I building and a small portion of the Huntington Theater. A sliver of shadow is cast onto the sidewalk along St. Botolph Street. At 6:00 PM, shadows are cast east covering a portion of St. Botolph Street, its sidewalks, and the parking lot of Northeastern University's Mathew's Arena.

6.3.5 Fall Equinox (September 21)

The predicted shadow conditions for New England Conservatory site during the Fall Equinox (September 21) are shown in **Figure 6-11** through **Figure 6-14**. Daylight Saving was factored for this day in the study. Net new shadows are cast to the northwest, north, northeast, and east at the studied time intervals throughout the day.

At 9:00 AM, shadows from the Phase I building are cast over the roofs of the Huntington Theater and a mix-use building along Huntington Avenue, and two adjacent alleys. Shadows from the Phase II building extend toward Gainsborough Street and Huntington Avenue to the northwest covering the sidewalk next to Jordan Hall. No new shadows are anticipated on the façade of Jordan Hall. At noon, the Phase I building is expected to cast shadow on the roof of the rear ell of the Huntington Theater, the adjacent alley and onto its own podium roof. The Phase II building is expected to extend the existing shadow on Huntington Avenue out to the north reaching only the middle of the street. All sidewalks are currently in shadow from existing buildings at noon. At 3:00 PM, shadows from the Phase I building are cast northeast onto its own roofs and NEC's St. Botolph building. A small sliver of shadow is cast on the sidewalk in front of NEC's St. Botolph building. The Phase II building will only extend the existing shadows on the roof of the Huntington Theater's rear ell and the adjacent alley. At 6:00 PM, most of the area, particularly the streets and sidewalks are in shadow as the sun is about to set. The new shadows from the Phase I building are cast mostly onto Northeastern University's Mathews Arena and onto a few residential buildings along Massachusetts Avenue. The new shadows from Phase II are minimal and cover just a small portion of the Huntington Theater's rear ell.

6.3.6 Winter Solstice (December 21)

The predicted shadow conditions for New England Conservatory site during the Winter Solstice (December 21) are shown in **Figure 6-15** through **Figure 6-17**. Net new shadows are cast to the northwest, north, and northeast at the studied time intervals throughout the day.

At 9:00 AM, the new shadows from both Phase I and Phase II buildings reach the roof of the commercial-retail building across Huntington Avenue to the northwest. The Phase I building also casts shadow on the roof of the Huntington Theater's rear ell and the mixed-use building along Huntington Avenue. Most of the sidewalks and streets of Huntington Avenue and St. Botolph are already in shadow due to the longer shadows cast in winter on the existing buildings. At noon, shadows are cast north primarily onto the Phase I building itself, the roofs of adjacent buildings and some portions in the middle of the street on Huntington Avenue. At 3:00 PM in the afternoon, new shadows are very minimal and cover only a sliver of the roof of NEC's St. Botolph building, the southwest face of the residential tower on Massachusetts Avenue, and a portion of the sidewalk along St. Botolph Street. At no time are the Proposed Projects expected to cast shadow on the façade of Jordan Hall or the façade of Symphony Hall.

6.3.7 Conclusion

Based on the shadow studies performed comparing existing shadow conditions with predicted shadow conditions for NEC's Student Life and Performance Center and

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Existing Shadows
Net New Shadows
Subway Station
Bus Stop

Figure 6-7 - Shadow Impact Analysis
June 21 - 9AM

Figure 6-8 - Shadow Impact Analysis
June 21 - 12PM

Figure 6-9 - Shadow Impact Analysis
June 21 - 3PM

Existing Shadows
Net New Shadows
Subway Station
Bus Stop

Figure 6-10 - Shadow Impact Analysis
June 21 - 6PM

Figure 6-11 - Shadow Impact Analysis
September 21 - 9AM

Figure 6-12 - Shadow Impact Analysis
September 21 - 12PM

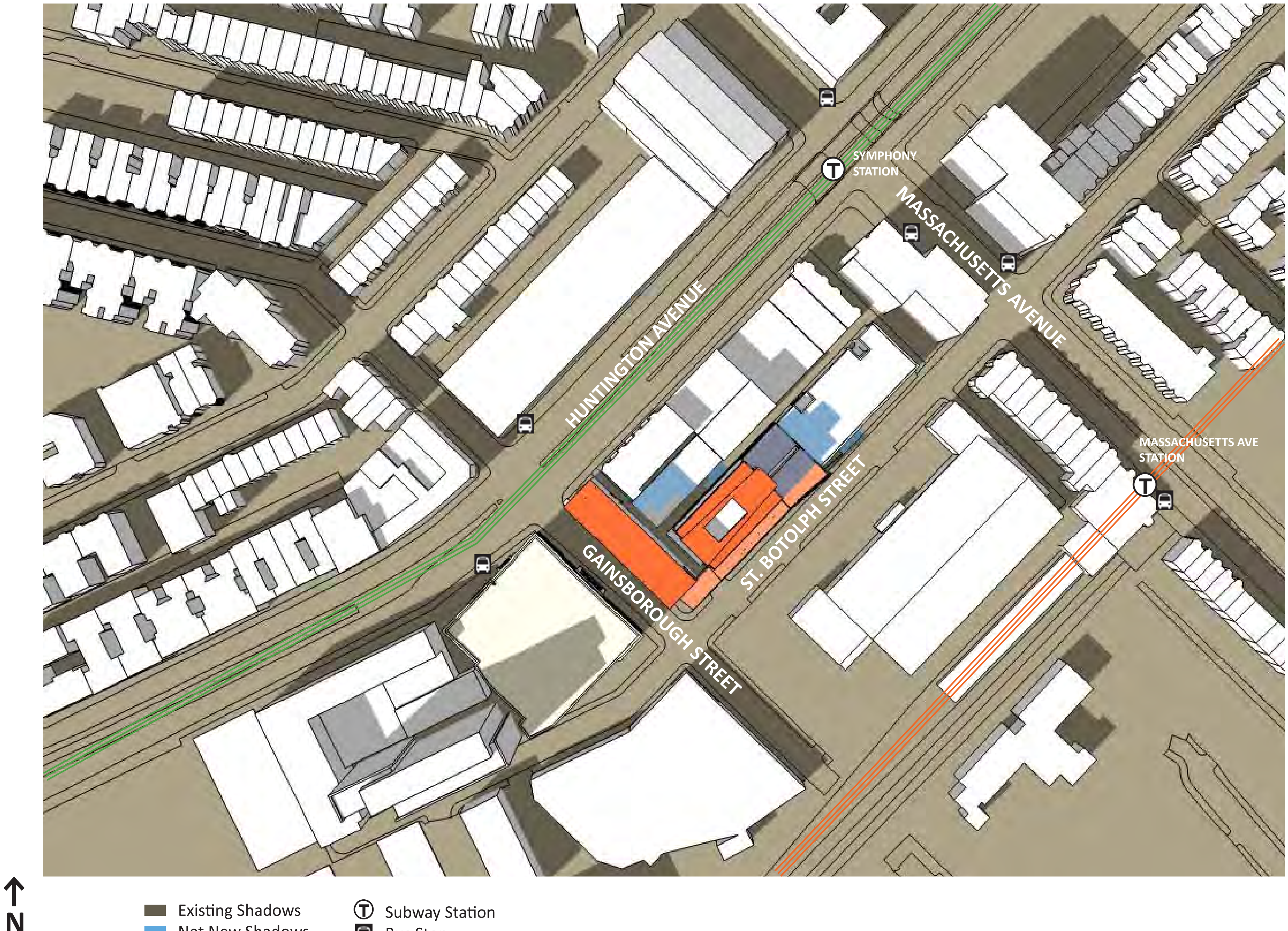


Figure 6-13 - Shadow Impact Analysis
September 21 - 3PM

Figure 6-14 - Shadow Impact Analysis
September 21 - 6PM

Figure 6-15 - Shadow Impact Analysis
December 21 - 9AM

Figure 6-16 - Shadow Impact Analysis
December 21 - 12PM

Existing Shadows
Net New Shadows
Subway Station
Bus Stop

Figure 6-17 - Shadow Impact Analysis
December 21 - 3PM

Learning Center, there are no substantial impacts on the surrounding buildings, sidewalks, and streets. The new shadows primarily fall onto the roofs of the rear ell of the Huntington Theater and buildings along Huntington Avenue, the new buildings themselves, adjacent alleys, and the middle of Huntington Avenue and St. Botolph Street. Shadows cast by the Proposed Projects will not negatively impact pedestrian environments, open spaces, or historic resources.

6.3.8 Methodology

A daylight analysis for the Proposed Projects was performed utilizing the Boston Redevelopment Authority Daylighting Analysis (BRADA) computer program.[4] 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 each of the proposed buildings that abut a public way. 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 each respective viewpoint that is studied.

The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 percent to 100 percent. BRADA calculates this obstruction value based on the width of 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 BRA requires that the daylight analysis study the existing and build conditions. Potential daylight impacts were analyzed from three viewpoints around the project sites. The SLPC project impacts were analyzed from Huntington Avenue and Gainsborough Street. Both the SLPC and LC projects were analyzed from St. Botolph Street.

6.3.9 Analysis Summary

The results of the daylight analysis are presented in **Figure 6-18** through **Figure 6-20** and **Table 6-3** below.

[4] Method developed by Harvey Bryan and Susan Stuebing, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1985.

Table 6-3
Daylight Analysis Results

Viewpoint	Existing	Proposed Project
Huntington Avenue	30.1%	70.2%
Gainsborough Street	62.4%	74.9%
St. Botolph Street	34.8%	38.4%

Source: Vanasse Hangen Brustlin, Inc.

Existing daylight obstructions range from 30.1% on Huntington Avenue directly in front of the existing print library building to 62.4% on Gainsborough Street. The existing site of the SLPC project is a surface parking lot that does not create any daylight obstructions. The adjacent buildings on St. Botolph Street cause 34.8% obstruction to daylight along the street. Development of the Proposed Projects will result in just above seventy percent obstruction of daylight on both Huntington Avenue (limited to the area immediately in front of the proposed LC project) and Gainsborough Street, while only a slight increase of 4.4% will occur along St. Botolph Street.

6.4 Solar Glare

Only minor solar glare impact on the surrounding buildings, streets, and sidewalks is anticipated, based on the proposed materiality of the facades of the new buildings. The facades of the upper levels (above Floor 3) of the new buildings will be constructed with a system of opaque and translucent materials, and unitized non-reflective windows. The lower levels of the buildings (Floor 3 and below) will consist mostly of a glazed curtain wall system using non-reflective glass with standard low-E coating.

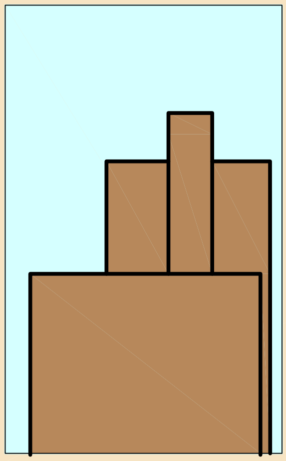
Besides using non-reflective and coated glass, the landscaping strategy proposes new plantings in front of the buildings with new trees in front of the more heavily glazed facade on the lower levels. These trees will serve as a glazing buffer, in particular shading south-facing glazing. The amount of sunlight hitting the glass curtain wall facade during the summer months will also be reduced by the roof overhangs above.

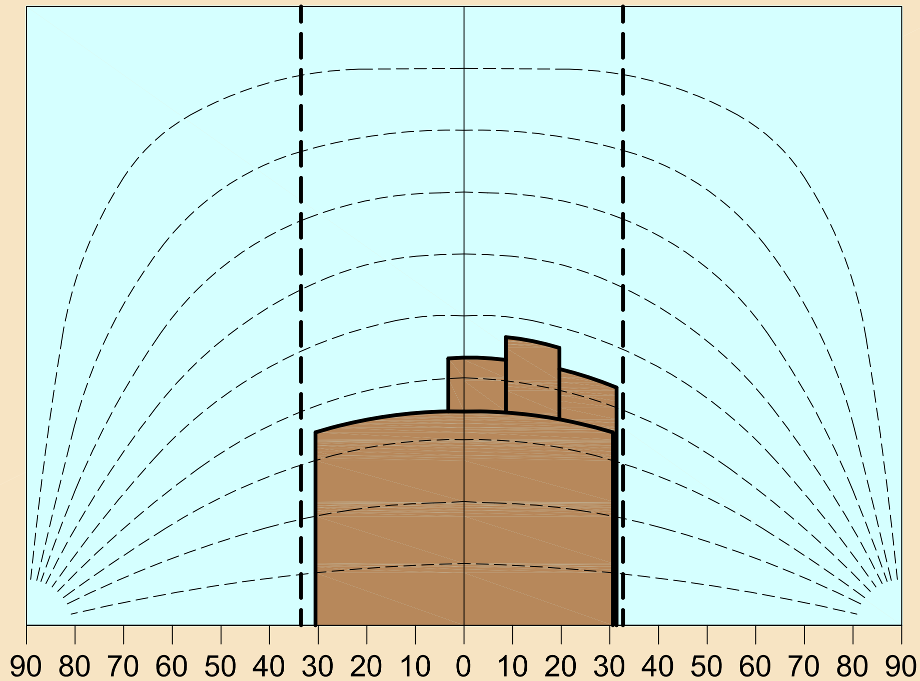
6.5 Noise Analysis

The purpose of this noise analysis is to demonstrate that the NEC's Institutional Master Plan (IMP) Proposed Projects presented in this IMPNF/PNF (referred to herein as the Proposed Projects) satisfies the City and State noise impact criteria. This section presents a noise analysis that evaluates the future sound levels from mechanical equipment and building operations, including chillers, air handling

Existing

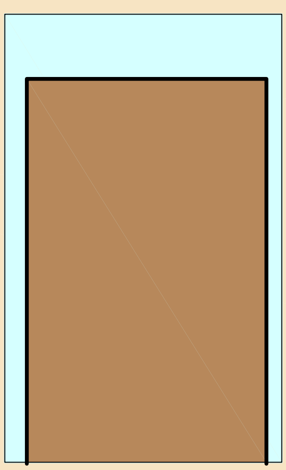
Obstruction of Skyplane = 30.1%

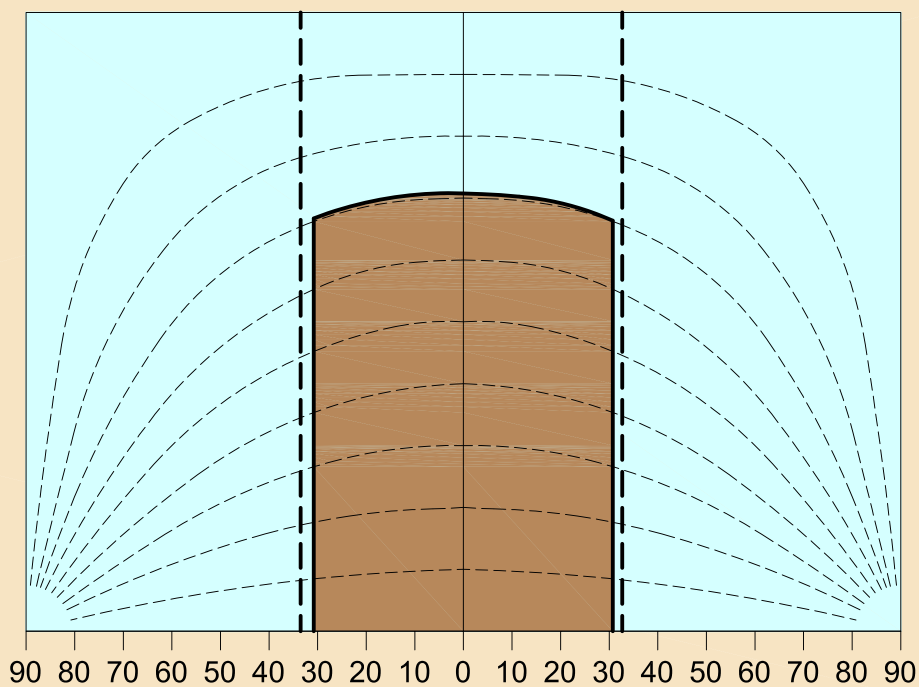




Proposed

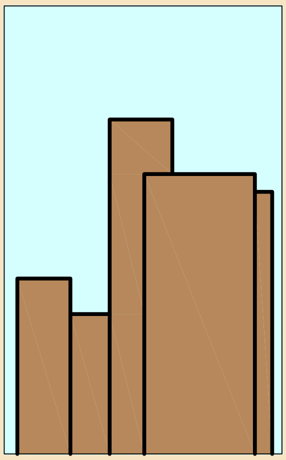
Obstruction of Skyplane = 70.2%

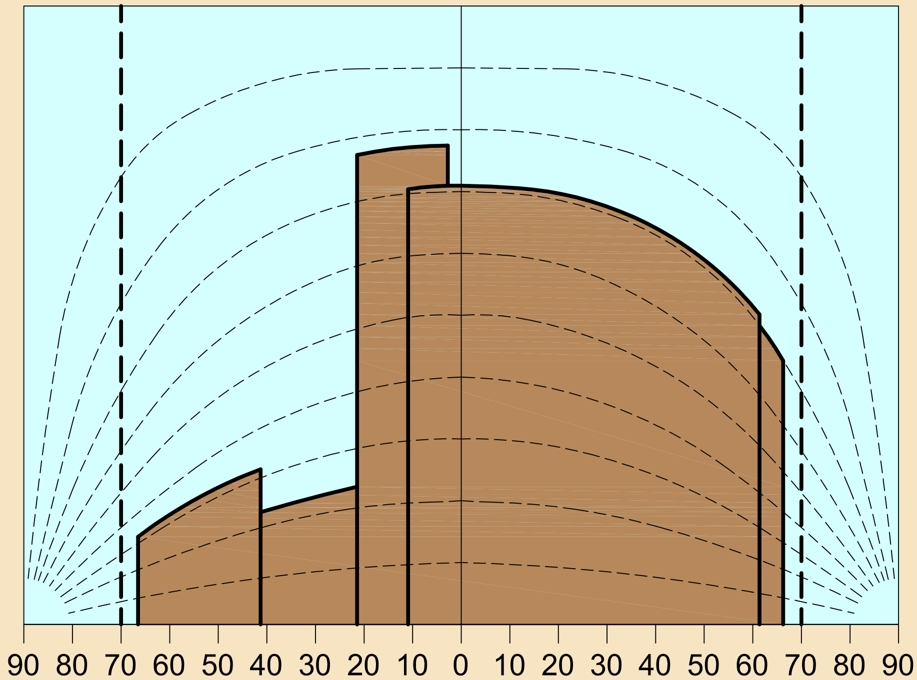




Existing

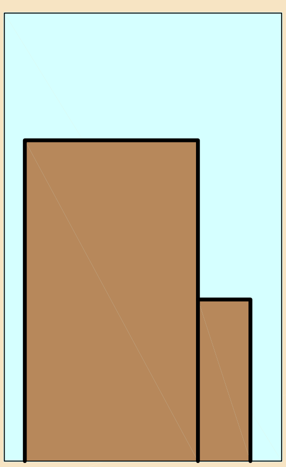
Obstruction of
Skyplane = 62.4%





Proposed

Obstruction of
Skyplane = 74.9%



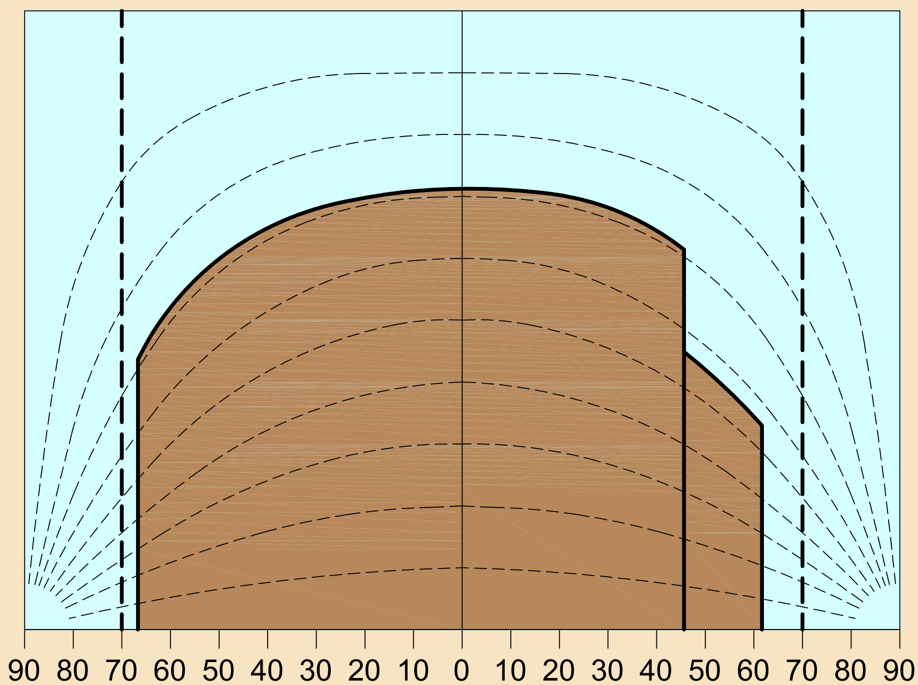
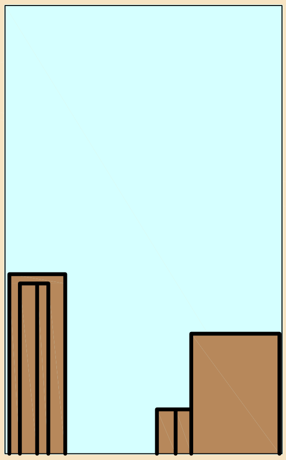
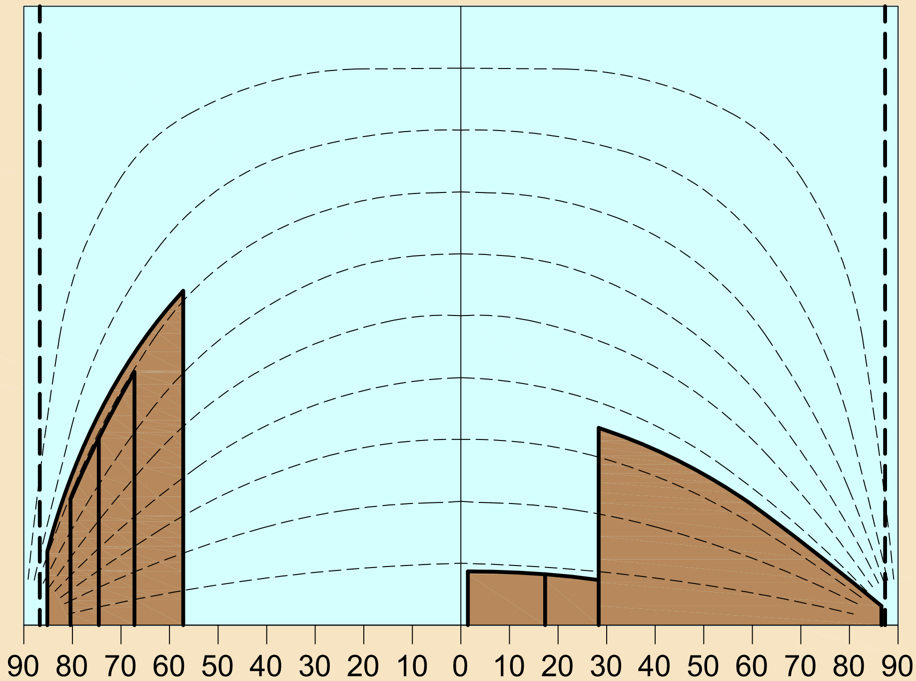


Figure 6-19
Daylight Analysis - Gainsborough Street

Existing

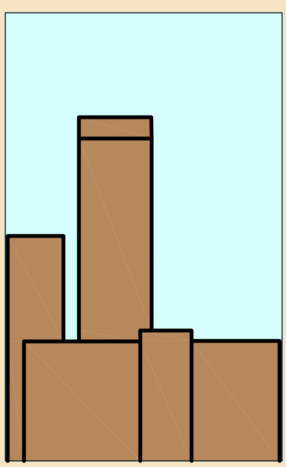
Obstruction of Skyplane = 34.8%





Proposed

Obstruction of Skyplane = 38.4%



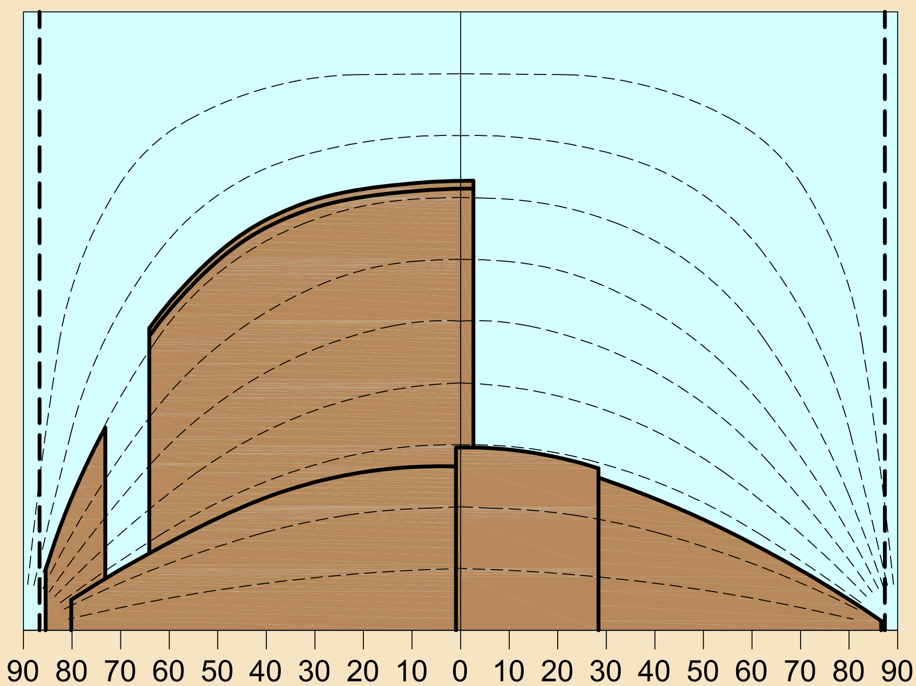


Figure 6-20
Daylight Analysis - Botolph Street

units, and an emergency generator. The noise analysis demonstrates that, once completed, the Proposed Projects will not result in a noticeable change in the existing sound levels. The following sections discuss the noise impact criteria, noise methodology, and results of the noise analysis.

6.5.1 Noise Background

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. The individual human response to noise is subject to considerable variability since there are many emotional and physical factors that contribute to the difference in reaction to noise.

Sound (noise) is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB). For community noise impact assessment, sound level frequency characteristics are based upon human hearing, using an A-weighted [dB(A)] frequency filter.
The A-weighted filter is used because it approximates the way humans hear sound. The duration characteristics of sound account for the time-varying nature of sound sources.

Sound level data can be presented in statistical terms to help describe the noise environment. A near infinite variation in sound levels (various intensities and temporal patterns) can be combined into the same value. The following is a list of other sound level descriptors:

- L_{max} is the maximum A-weighted sound level measured during the time period,
- L_{10} is the sound level which is exceeded for 10 percent of the time during the time period. During a 100 minute period, the L_{10} would be the sound level which was exceeded by other sound levels for 10 minutes, and
- L_{90} is the A-weighted sound level that is exceeded for 90 percent of the time during the time period. The L_{90} is generally considered to be the background sound level since the L_{90} would be the sound level that was exceeded by other sound levels for 90 minutes of the 100-minute period.

The following general relationships exist between noise levels and human perceptions:

- A 1 or 2 dB(A) increase in not perceptible to the average person.
- A 3 dB(A) increase is a doubling of acoustic energy, but is just barely perceptible to the human ear.
- A 10 dB(A) increase is a tenfold increase in acoustic energy, but is perceived as a doubling in loudness to the average person

6.5.2 Noise Impact Criteria

The City of Boston and the Massachusetts Department of Environmental Protection (DEP) have developed noise impact criteria that establish noise thresholds deemed to result in adverse impacts. The noise analysis for the Proposed Projects used these criteria to evaluate whether the proposed development will generate sound levels that result in adverse impacts.

City of Boston Criteria

The City of Boston has established regulations for evaluating sound levels from proposed developments. These regulations establish maximum allowable sound levels based upon the land use of the proposed development. If the proposed development is located in a residential zoning district which includes either residential or institutional uses, as the NEC's Institutional Master Plan (IMP) Proposed Projects presented in this IMPNF/PNF do, the maximum noise level affecting residential uses shall not exceed the Residential Noise Standard. The Residential Noise Standard is 60 dB(A) for daytime conditions (7:00 AM to 6:00 PM) and 50 dB(A) for nighttime conditions (6:00 PM to 7:00 AM). These criteria are applicable to building facility noise sources such as mechanical equipment, and do not apply to operation of any motor vehicle on any public way.

The City of Boston's regulations on construction sound levels state the operation of any construction devices, excluding impact devices, may not exceed 86 dB(A) during any time period.

Massachusetts DEP Criteria

DEP has established a policy (DEP Policy 90—001) for implementing its noise regulations (310 CMR 7.10). This policy states that a source of sound will be considered in violation of the Department's noise regulation under the following conditions:

- If the source increases the broad band sound level by more than 10 dB(A) above ambient (normally defined as L_{90} or the noise level exceeded 90 percent of the time during the hours of noise source operation); or,
- If the source produces a "pure tone" condition.

The DEP noise regulations do not include any specific standards for construction period noise generation.

6.5.3 Noise Analysis Methodology

The noise analysis evaluated mechanical equipment and building operation sound levels from the Proposed Projects. The analysis included noise monitoring of existing sound levels and noise modeling of the project-generated sound levels. The study area was evaluated and sensitive receptor locations were identified. The sound levels for mechanical equipment and building operations were calculated using manufacturer's reference sound levels, properties of sound propagation over distance, and the effects of building geometry. The total build sound levels were calculated by adding together the relevant noise sources using noise addition. The resultant sound levels were compared to the City and State noise criteria for compliance.

Receptor Locations

The noise analysis included evaluation of the study area to identify receptor locations that have outdoor activities and that might be sensitive to noise generated by or related to the proposed development. The noise analysis identified 10 receptor locations in the vicinity of the proposed development. The receptor locations are shown in **Figure 6-21** and include the following:

- 295 Huntington Avenue (residential),
- St. Stephen Street (residential),
- 264 Huntington Avenue (residential),
- Symphony Hall,
- Symphony Plaza West (commercial/residential)
- St. Botolph Terrace (residential)
- Carter Development Center,
- 241 St. Botolph Street (institution),
- New England Conservatory Jordan Hall (institution), and
- YMCA.

6.5.4 Existing Conditions

A noise monitoring program was conducted to establish existing sound levels. The existing sound levels were measured using a Type 1 sound analyzer (Larson Davis 824). Measurements were conducted during the weekday daytime (3:00 PM to 4:00 PM) on November 9, 2011 and nighttime period (2:00 AM to 4:00 AM) on November 4, 2011. The measured sound level data under existing conditions was dominated by noise from local roadways (such as Huntington Avenue) and mechanical equipments from nearby buildings.

The existing measured sound level data are presented in **Table 6-4**. The L_{90} sound levels range from 52 dB(A) to 55 dB(A) during the daytime period and 49 dB(A) to 53 dB(A) during the nighttime period. These sound levels are typical of an urban area. The result of the noise monitoring program indicates that the certain existing sound levels measured within the study area exceed the City of Boston's nighttime standard of 50 dB(A) for Residential Districts.

Table 6-4
Measured Existing Nighttime Sound Levels, L_{90} dB(A)

	City Criteria[2]		Measured Sound Levels	
Monitoring Location[1]	Daytime	Nighttime	Daytime	Nighttime
M1 – St. Botolph Street	60	50	55	53
M2 – St. Stephen Street	60	50	52	49

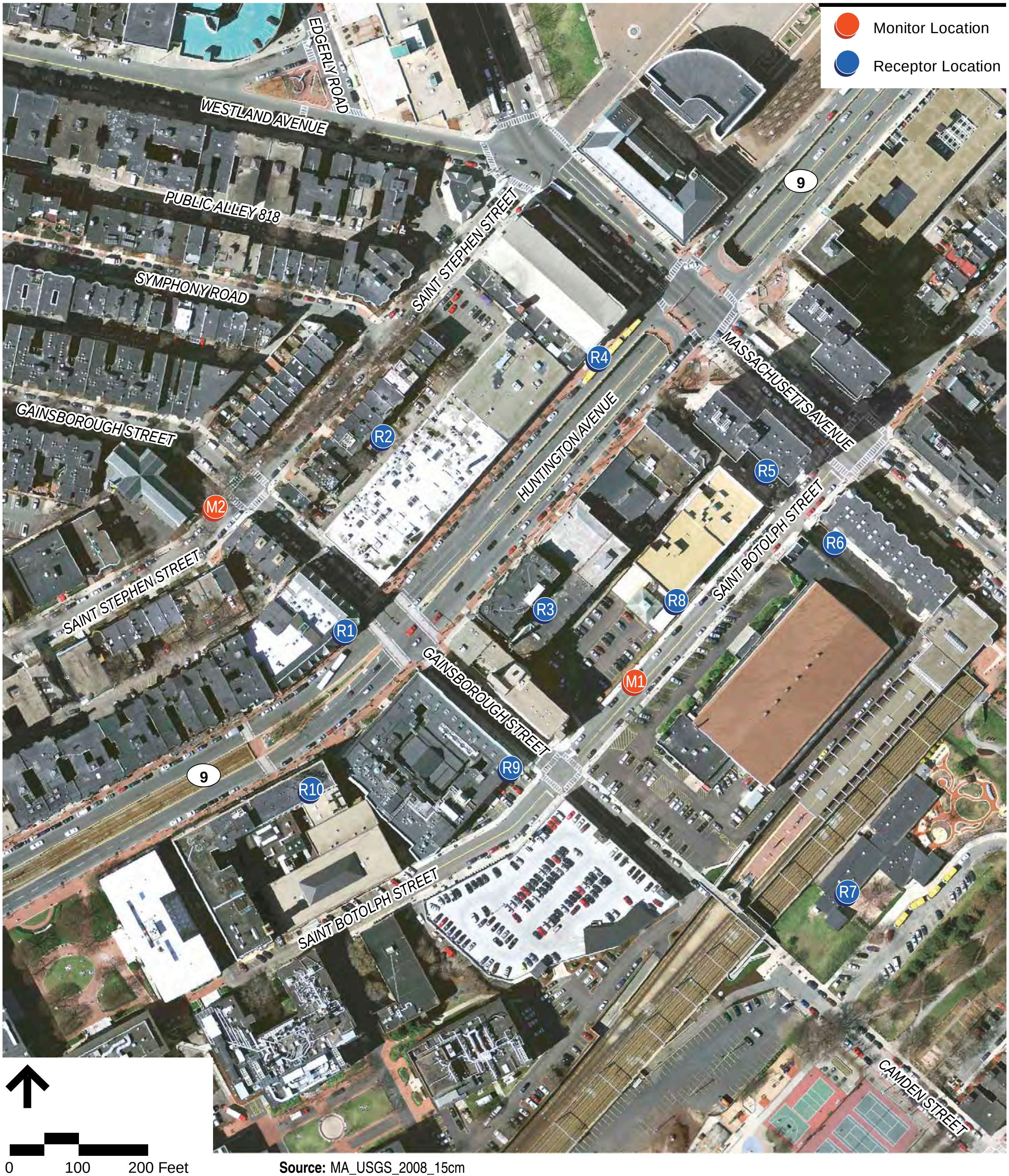
Source: Vanasse Hangen Brustlin, Inc. – conducted in November 2011.
1 See Figure 6-21 for monitoring locations.
2 City of Boston noise criteria for Residential Districts.
Bold values exceed criteria.

6.5.5 Project Impacts

The noise analysis evaluated the potential noise impacts from mechanical equipment and loading activities associated with the Proposed Projects are presented in this IMPNF/PNF. The analysis determined the potential overall maximum sound levels at nearby sensitive receptor locations.

Mechanical Equipment

Because the Proposed Projects are in the early stages of the design process, the specific mechanical equipment technical specifications are not available at the time of this noise evaluation. The noise analysis assumed that the Proposed Projects would each have some combination of water-cooled chillers, air handling units, and an emergency generator. The overall sound levels that the mechanical equipment may



Source: MA_USGS_2008_15cm

Figure 6-21
Noise Receptor Locations

generate were projected to the sensitive receptor locations using the properties of sound propagation over hard terrain. The noise analysis included attenuation due to louvers, location within mechanical rooms, acoustic enclosures, exhaust silencer, and blockage from surrounding buildings in the calculation of the sound levels.

The Proposed Projects will include emergency generators located in rooftop mechanical enclosures on each building. The Project will apply for the appropriate DEP air permits, which include additional noise requirements described in DEP regulations under 310 CMR 7.00. When the details of the emergency generator are developed, the proponent will submit the appropriate permit application to DEP including the noise mitigation measures (such as an acoustic enclosure and exhaust silencer) necessary to meet the DEP's noise criteria.

Loading Activities

Current loading activities for the NEC campus generally occur at three locations. The primary location being 241 St. Botolph Street for all general deliveries, with building specific deliveries occurring at 33 Gainsborough Street and Jordan Hall. Most deliveries are made by small single-unit box trucks and occur in the parking lot adjacent to 241 St. Botolph Street or the Public Alley 822. Deliveries are also occasionally made by a tractor-trailer, which are conducted curbside on St. Botolph Street. Waste removal service from the NEC campus is generally collected daily from the existing surface parking lot.

The proposed buildings will be designed to accommodate service and loading operations to occur off-street. The proposed loading dock as part of the new Student Life and Performance Center will be able to service a single unit box truck of up to 36 feet in length (SU-36). NEC will instruct all vendors to use this size vehicle or smaller for deliveries to the campus. The loading dock is located adjacent to Public Alley 822 and delivery vehicles will access the loading dock via St. Botolph Street. The loading dock area will be managed so that service and loading operations do not impact the abutting streets. Waste removal and recycling from either the existing or future NEC buildings will also be moved to the new Student Life and Performance Center for pick-up. It is expected that the loading dock will handle approximately nine deliveries per day. The level of delivery activity is not expected to increase over current conditions. Since loading activities will not increase and will be surrounded by the proposed buildings, noise impacts to the sensitive receptor locations will be negligible.

6.5.6 Results

The noise analysis calculated the potential sound levels that the noise sources (mechanical equipment with the necessary mitigation measures) will generate at the nearby sensitive receptor locations. The noise analysis assumed that the mechanical equipment will utilized state of the art equipment, louvers, exhaust silencers, be located in penthouse enclosures, and/or acoustical (screen) walls. As shown in **Table 6-4**, the sensitive receptor locations will experience overall sound levels ranging from 52 dB(A) to 56 dB(A) during the daytime period and from 49 dB(A) to 55 dB(A) during the nighttime period. The overall daytime sound levels do not exceed the City's daytime noise criteria of 60 dB(A) for a Residential District. The overall nighttime sound levels do exceed the City's noise criteria of 50 dB(A) for a Residential District. However, these receptor locations currently exceed the City's noise criteria under Existing Conditions. As shown in **Table 6-5**, project-generated sound levels range from 38 dB(A) to 49 dB(A), which are below the City's daytime and nighttime noise criteria. Additionally, the sound level increases due to the mechanical equipments are no more than two decibels during both daytime and nighttime periods, as shown in **Table 6-6**. As mentioned above, a two decibel increase is not perceivable to the average person.

Table 6-5
Build Sound Levels, dB(A)

	City Criteria[2]		Existing Sound Levels		Project Sound Levels		Build Sound Levels	
Receptor Location[1]	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1 - 295 Huntington Avenue	60	50	52	49	40	40	52	50
R2 - St. Stephen Street	60	50	52	49	39	39	52	49
R3 - 264 Huntington Avenue	60	50	55	**53**	48	48	56	**54**
R4 - Symphony Hall	60	50	52	49	39	39	52	49
R5 - Symphony Plaza West	60	50	55	**53**	42	42	55	**53**
R6 - St. Botolph Terrace	60	50	55	**53**	41	41	55	**53**
R7 - Carter Development Center	60	50	55	**53**	39	39	55	**53**
R8 - 241 St. Botolph Street	60	50	55	**53**	50	50	56	**55**
R9 - NEC Jordan Hall	60	50	55	**53**	45	45	55	**54**
R10 - YMCA	60	50	55	**53**	38	38	55	**53**

Source: Vanasse Hangen Brustlin, Inc.
1 See Figure 6-21 for receptor locations.
2 City of Boston noise criteria for Residential Districts.
Bold values exceed criteria.

Table 6-6
Build Sound Levels, dB(A)

	Existing Sound Levels		Build Sound Levels		Difference	
Receptor Location[1]	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1 - 295 Huntington Avenue	52	49	52	50	+0	+1
R2 - St. Stephen Street	52	49	52	49	+0	+0
R3 - 264 Huntington Avenue	55	**53**	56	**54**	+1	+1
R4 - Symphony Hall	52	49	52	49	+0	+0
R5 - Symphony Plaza West	55	**53**	55	**53**	+0	+0
R6 - St. Botolph Terrace	55	**53**	55	**53**	+0	+0
R7 - Carter Development Center	55	**53**	55	**53**	+0	+0
R8 - 241 St. Botolph Street	55	**53**	56	**55**	+1	+2
R9 - NEC Jordan Hall	55	**53**	55	**54**	+0	+1
R10 - YMCA	55	**53**	55	**53**	+0	+0

Source: Vanasse Hangen Brustlin, Inc.
1 See Figure 6-21 for receptor locations.
Bold values exceed criteria.

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6.5.7 Construction Period Noise

Construction period activities may temporarily increase nearby sound levels due to the intermittent use of heavy machinery during the construction of the Proposed Projects. The City of Boston noise control regulations consider construction sound levels to be an impact to residential land uses if the L_{10} is in excess of 75 dB(A) or the L_{max} is in excess of 86 dB(A). Construction activities will occur primarily during normal weekday daytime hours (7:00 AM to 5:00 PM) and will comply with applicable City of Boston noise regulations.

The Proposed Projects will generate typical sound levels from construction activities, including foundation construction, truck movements, heavy equipment operations, and general construction activities. Regulation 3 of the City of Boston Code, Ordinances, Title 7, Section 50, includes specific construction noise limits by land use. The relevant criterion for the project is based on residential or institutional land use. The construction noise at the property line for residential or institutional land use is limited to a maximum level of 86 dB(A), with a limit of 75 dB(A) for the construction noise level exceeded 10 percent of the time (L_{10}). In addition, the City of Boston Code, Ordinances, Title 14, Chapter 11, Section 354 (titled "Unreasonable Noise") also applies to construction activities. This ordinance establishes a noise limit of 50 dB(A) for construction noise measured at residential lot lines between 6:00 PM and 7:00 AM. This ordinance effectively prohibits nighttime construction near residential areas.

Construction activity associated with the Proposed Projects may temporarily increase nearby sound levels due to the use of heavy machinery. Heavy machinery will be used intermittently throughout the Proposed Projects' construction phases.

The Proposed Projects will implement mitigation measures to reduce or minimize noise from construction activities and to maintain compliance with the City's noise ordinances and NEC's much more stringent noise control standards for activities impacting its campus. NEC's Construction Management Program (CMP) specifically addresses noise impacts and mitigation. Specific mitigation measures include:

- Construction equipment will be required to have installed and properly operating appropriate noise muffler systems.
- The construction vehicles and equipment will be required to maintain their original engine noise control equipment.
- All exterior construction activities, such as site excavation/grading and new building construction will typically be limited to normal working hours and off hour work would be minimized, to the extent practicable.
- Appropriate traffic management techniques implemented during the construction period will mitigate roadway traffic noise impacts.
- Proper operation and maintenance, and prohibition of excessive idling of construction equipment engines, will be implemented as required by DEP regulation 310 CMR 7.11.
- The site will be surrounded by safety fencing to provide site security, as well as to mitigate construction noise and fugitive dust.
- Work hours and relevant noise generating activities will be reviewed further with the City of Boston to outline those construction activities which may occur prior to 7:00 AM and after 5:00 PM, Monday through Friday, as well as those activities which may occur during weekend hours.
- Quieter-type (manually adjustable or ambient-sensitive) backup alarms on construction vehicles will be required.
- Additional noise control options will be evaluated during the design process for effectiveness and feasibility.
- Appropriate operational specifications and performance standards will be incorporated into the construction contract documents.

In general, because of NEC's extreme sensitivity to noise both during construction and once the Proposed Projects are in operation, NEC will undertake a detailed program of noise modeling and monitoring to ensure that its world-class musical educational and performance programs are not unduly impacted. NEC's own noise standards are far more stringent than City or State standards due to the unique nature of the activities that take place on the NEC campus at all hours of the day and evening.

6.6 Air Quality Analysis

The purpose of this section is to present the air quality analysis conducted to evaluate any air quality impacts caused by the Proposed Projects presented in this IMPNF/PNF. The IMP includes the proposed Student Life and Performance Center as well as the proposed Learning Center projects (as described in more detail in Chapter 3 *Project Description and Alternatives).* The purpose of the air quality study is to demonstrate that the Proposed Projects satisfy applicable city, state, and federal air quality requirements.

The air quality analysis conducted includes a microscale analysis to evaluate the carbon monoxide (CO) and particulate matter ($PM_{2.5}$ and PM_{10}) impacts from the vehicular traffic generated by the Proposed Projects. The microscale analysis evaluates CO, PM_{10}, and $PM_{2.5}$ concentrations at sensitive receptor locations surrounding the Proposed Projects. The analysis demonstrates that the Proposed Projects will meet the applicable Massachusetts and National Ambient Air Quality Standards (NAAQS) for CO, PM_{10}, and $PM_{2.5}$.

■

6.6.1 Background

The 1990 Clean Air Act Amendments (CAAA) and the Massachusetts State Implementation Plan (SIP) require that proposed projects not cause any new violation of the NAAQS for pollutants of concern, or increase the frequency or severity of any existing violations, or delay attainment of any NAAQS (National Ambient Air Quality Standards). The air quality study includes a "hotspot" (microscale) evaluation of mobile source pollutants. The microscale analysis evaluated CO, PM_{10}, and $PM_{2.5}$ concentrations from roadways and intersections surrounding the Proposed Projects.

The Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (DEP) have established guidance for modeling and review for air quality analysis prepared pursuant to the Massachusetts Environmental Policy Act (MEPA) process. The City of Boston requires that air quality analyses prepared for Project Notification Forms (PNFs) meet EPA and DEP guidelines.

■

6.6.2 Pollutants of Concern and Attainment Status

Air pollution is of concern because of its demonstrated effects on human health, in particular, the respiratory effects of the pollutants and their potential toxic effects, as described below.

Carbon Monoxide

Carbon monoxide is a colorless and odorless gas that is a product of incomplete combustion. Carbon monoxide is absorbed by the lungs and reacts with hemoglobin to reduce the oxygen carrying capacity of the blood. At low concentrations, CO has been shown to aggravate the symptoms of cardiovascular disease. It can cause headaches and nausea and, at sustained high concentration levels, can lead to more serious health risks.

CO Attainment Status

Boston is a CO Maintenance area. A Maintenance area is an area that used to fall below federal air quality attainment standards but that has since improved ambient air quality to these attainment standards. After 20 years of clean air quality, Maintenance areas can be re-designated to Attainment status. Projects located in Maintenance areas are required to evaluate their CO concentrations against the NAAQS.

Particulate Matter

Particulate matter is made up of small solid particles. PM_{10} refers to particulate matter with a nominal aerodynamic diameter of 10 micrometers or less, and $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter of 2.5 micrometers or less. Particulates can enter the body through the respiratory system. Particulates over 10 micrometers in size are generally captured in the nose and throat and are readily expelled from the body. Particles smaller than 10 micrometers, and especially particles smaller than 2.5 micrometers, can reach the air ducts (bronchi) and the air sacs (alveoli) in the lungs. Particulates are associated with a variety of health risks.

PM Attainment Status

Boston currently has attainment/unclassifiable status for PM_{10} and $PM_{2.5}$. An attainment/unclassifiable area is an area for which sufficient data does not exist to determine its attainment status. The EPA and Federal Highway Administration (FHWA) are in the process of developing updated modeling guidance for attainment/unclassifiable areas. This air quality evaluation included a microscale analysis using EPA's CAL3QHC, which is the model that can best demonstrate compliance with the NAAQS at this time.

■

6.6.3 Air Quality Standards

The EPA has established the NAAQS to protect the public health. The NAAQS for CO, PM_{10}, and $PM_{2.5}$ are presented in **Table 6-7**. The predominant source of air pollution anticipated from typical project developments is emissions from project-related motor vehicle traffic. Carbon monoxide, PM_{10}, and $PM_{2.5}$ are directly emitted by motor vehicles. Their concentrations can be calculated and compared to the NAAQS.

Table 6-7
National Ambient Air Quality Standards

Pollutant	Primary Standards Level	Primary Standards Averaging Time	Secondary Standards Level	Secondary Standards Averaging
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour[1]	None	
	35 ppm (40 mg/m^3)	1-hour[1]	None	
Particulate Matter (PM_{10})	150 ug/m^3	24-hour[2]	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15 ug/m^3	Annual (Arithmetic Mean)[3]	Same as Primary	
	35 ug/m^3	24-hour[4]	Same as Primary	

1 Not to be exceeded more than once per year.
2 Not to be exceeded more than once per year on average over 3 years.
3 To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
4 To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

■

6.6.4 Modeling Methodology

The microscale analysis conducted for the Proposed Projects evaluated the emissions of mobile sources at nearby intersections. The mobile source modeling followed the EPA's modeling guidelines.[5] The air quality analysis evaluated the traffic data and determined the intersections that were the most congested and expected to experience an increase in project generated traffic. EPA's mobile source models (MOBILE and CAL3QHC) were used to calculate the worst-case concentrations of CO, PM_{10}, and $PM_{2.5}$.

The impacts of the Proposed Projects were assessed for CO and PM emissions to determine whether the emissions are below (in compliance with) the required standards. The miroscale analysis conducted for the Proposed Projects utilized traffic and emissions data for the following existing and future No-Build and Build conditions:

- 2012 Existing Condition: reflects existing traffic volumes in the Proposed Projects' study area.

▼

5 *Guideline for Modeling Carbon Monoxide From Roadway Intersections*, US Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-006 (Revised); September 1995

- 2022 No-Build Condition: assuming no changes to the Proposed Projects' site, but with background growth associated with other planned projects and general background regional growth;
- 2022 Build Condition: assuming the same 2022 background growth and any impacts related to the Proposed Projects' construction. Because the NEC IMP Proposed Projects will not cause any noticeable increase in peak hour vehicle trips, the Build volumes are assumed to be the same as No-Build traffic forecasts (as discussed in more detail in Chapter 5 *Transportation)*.

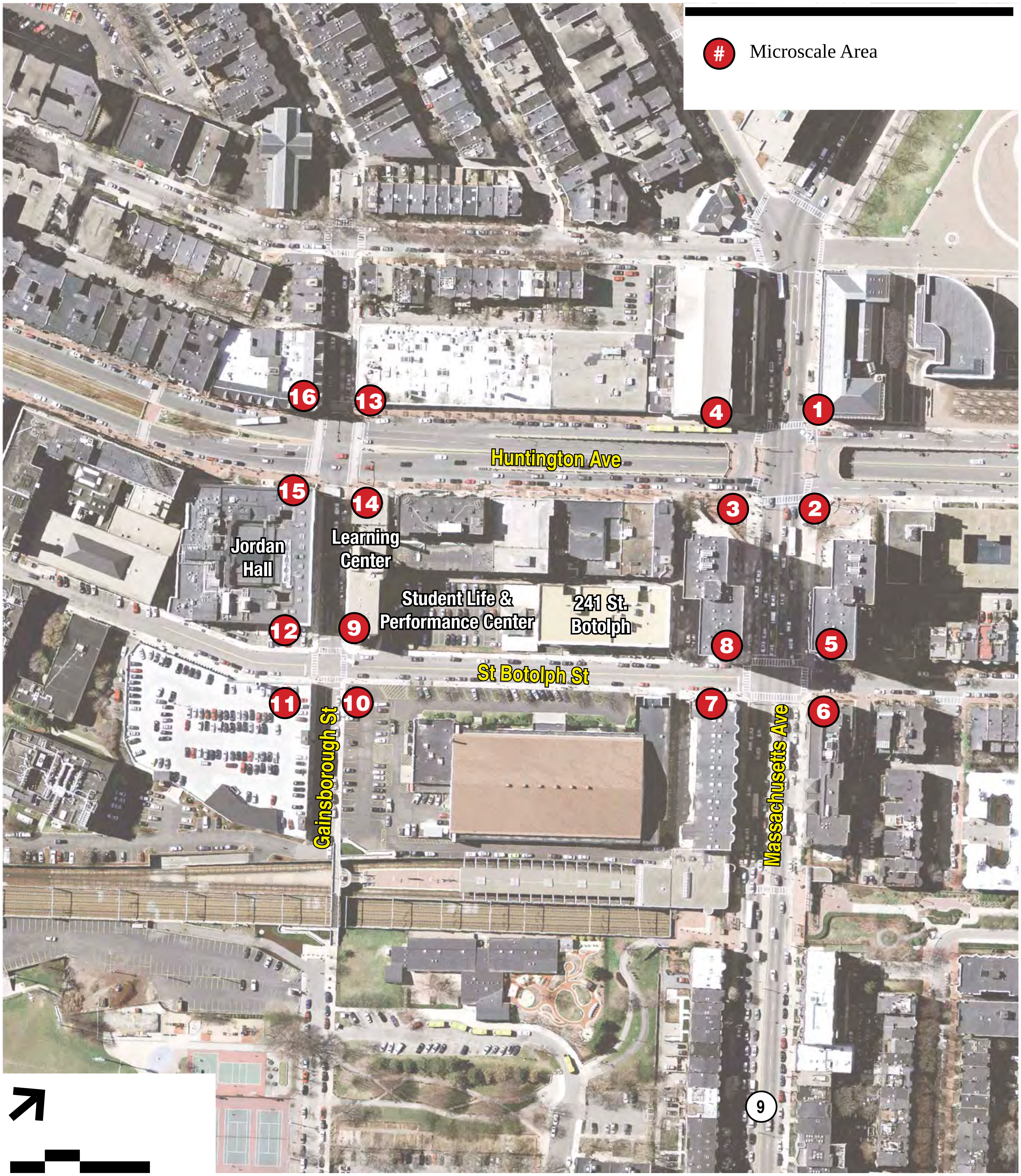
The microscale analysis utilized the traffic (volumes and speeds) and emission factor data for the each analysis conditions. These data were incorporated into air quality models to demonstrate that the Proposed Projects will meet the CAAA criteria. The microscale analysis calculated CO, PM_{10}, and $PM_{2.5}$ concentrations at congested intersections within the study area under Existing, No-Build, and Build conditions.

The objective of the microscale analysis was to evaluate the CO, PM_{10}, and $PM_{2.5}$ concentrations caused by the Proposed Project-related traffic, as applicable, at congested intersections in the Study Area. The intersections in the Study Area were ranked based on traffic volumes and level of service. The following intersections, which are presented in **Figure 6-22**, were selected for analysis:

- Huntington Avenue at Massachusetts Avenue
- Massachusetts Avenue at St.Botolph Street
- St. Botolph Street at Gainsborough Street
- Huntington Avenue at Gainsborough Street

The microscale analysis calculated maximum 1-hour and 8-hour CO concentrations in the Proposed Projects' study area intersections studied during the peak CO season (winter), maximum 24-hour PM_{10} concentrations, and maximum 24-hour and annual $PM_{2.5}$ concentrations for PM summer season. The EPA's computer model CAL3QHC Version 26 was used to predict CO, PM_{10}, and $PM_{2.5}$ concentrations for each intersection studied. Receptor locations were selected near the congested intersections based upon areas where the public has access. The intersection receptors were placed at the edge of the roadway, but not closer than 10 feet (3 meters) from the nearest travel lane, as required by EPA. The results calculated at these receptor locations represent the highest concentrations at each intersections studied. Receptor locations farther away from the intersections will have lower concentrations because of the CO dispersion characteristics. The receptor locations that are along other roadways in the Proposed Projects' study area are also expected to have lower CO concentrations than the receptor locations at the intersection. The

6 *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, US Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-005; November 1992



Source: MA_USGS_2008_15cm

Figure 6-22
Microscale Study Area

emission rates for vehicles traveling along these roadways are much lower than the emission rates for vehicles queuing at intersections. The CO, PM_{10}, and $PM_{2.5}$ concentrations were calculated directly using the EPA computer model. The 1-hour CO concentrations include a 1-hour background concentration of 3.0 ppm. The 8-hour CO concentrations were derived by applying a persistence factor of 0.70 to the 1-hour CO concentrations. Similar to the 1-hour CO emissions, the concentrations are expressed in parts per million (ppm) and include an 8-hour background concentration of 2.1 ppm.

The 24-hour PM_{10} concentrations were derived by applying a persistence factor of 0.40 to the 1-hour PM_{10} concentrations. The persistence factor for PM was obtained from the DEP's modeling guidelines.[7] The background concentrations[8] assumed for the 24-hour PM_{10} was 39.7 ug/m^3.

The 24-hour $PM_{2.5}$ concentrations were derived by applying a persistence factor of 0.40 to the 1-hour $PM_{2.5}$ concentrations. The background concentrations assumed for the 24-hour $PM_{2.5}$ was 22.3ug/m^3. The annual $PM_{2.5}$ concentrations were derived by applying a persistence factor of 0.08 to the 1-hour $PM_{2.5}$ concentrations. The background concentrations assumed for the annual $PM_{2.5}$ was 9.8 ug/m^3.

Emission Rates

All the vehicle emission factors used in the microscale analysis were obtained using the EPA's MOBILE 6.2[9] emissions model. MOBILE 6.2 calculates CO, PM_{10}, and $PM_{2.5}$ emission factors from motor vehicles in grams per vehicle-mile. The emission rates calculated in this study were adjusted to reflect Massachusetts-specific conditions, such as the state vehicle registration age distribution, the statewide Inspection and Maintenance (I/M) Program, and the Stage II Vapor Recovery System.[10] Emission factors for the mobile sources were determined using the DEP-recommended temperatures for the winter (CO) season and summer (PM) season.

Traffic Data

The air quality study utilized motor vehicle traffic data specifically developed for each analysis condition. The microscale analysis used the evening peak hour traffic conditions during the CO season (winter). Vehicle speeds were developed based upon traffic volumes, observed traffic flow characteristics, and roadway capacity.

▼

7 *First Level Screening Guideline for Determining the Air Quality Impact of Stationary Source Air Pollution*, January 1996.

8 *2006-2008 New England Annual Report on Air Quality*, United States Environmental Protection Agency, Region 1, Office of Environmental Measurement and Evaluation North Chelmsford, MA 01863, Ecosystems Assessment Unit, 2007-2009.

5 MOBILE 6.2 (Mobile Source Emission Factor Model), The May 19, 2004 official release from US EPA, Office of Mobile Sources, Ann Arbor, MI.

6 *The Stage II Vapor Recovery System* is the process of collecting gasoline vapors form vehicles as they are refueled. This requires the use of a special gasoline nozzle at the fuel pump.

The traffic data were developed based on the traffic data presented in Chapter 5 *Transportation* of this PNF.

6.6.5 Existing Conditions

The CAAA resulted in states being divided into attainment and non-attainment areas, with classifications based upon the severity of their air quality problems. The Proposed Projects are located in the Boston Metropolitan area, which has been classified as a "Maintenance" area for CO and an attainment/unclassifiable area for PM_{10} and $PM_{2.5}$.

Microscale Concentration Predictions

The microscale analysis determined that the 1-hour CO concentrations for the 2012 Existing Condition ranged from a minimum of 3.1 parts per million (ppm) at the intersection of St. Boltolph Street and Gainsborough Street to a maximum of 4.4 ppm at the intersection of Huntington Avenue and Massachusetts Avenue (only the maximums concentrations for each receptor at each intersection are presented in Tables 6-7 through 6-11) . The corresponding maximum 8-hour CO concentrations ranged from a minimum of 2.2 ppm to a maximum of 3.1 ppm. The microscale CO results are presented in **Table 6-8** and **Table 6-9**. All the 1-hour and 8-hour concentrations are below the CO NAAQS of 35 and 9 ppm, respectively. These values are consistent with the area's designation as a CO Maintenance area.

The microscale analysis determined that the 24-hour PM_{10} concentrations for the 2012 Existing Condition ranged from a minimum of 40.1 micrograms per cubic meter (ug/m^3) at the intersection of St. Boltolph Street and Gainsborough Street to a maximum of 41.3 ug/m^3 at the intersection of Huntington Avenue and Massachusetts Avenue. The microscale PM_{10} results are presented in **Table 6-10**. All concentrations are below the PM_{10} NAAQS of 150 ug/m^3.

The microscale analysis determined that the 24-hour $PM_{2.5}$ concentrations for the 2012 Existing Condition ranged from a minimum of 22.3 ug/m^3 to a maximum of 23.7 ug/m^3. The maximum annual $PM_{2.5}$ concentrations ranged from a minimum of 9.8 ug/m^3 to a maximum of 10.0 ug/m^3. The microscale $PM_{2.5}$ results are presented in **Table 6-11** and **Table 6-12**. All the 24-hour and annual concentrations are below the $PM_{2.5}$ NAAQS of 35 and 15 ug/m^3, respectively.

6.6.6 Project Impacts

Future estimates of the Proposed Project-related emissions are based upon changes in traffic and emission factor data. The traffic data include motor vehicle traffic volumes and signal cycle timing. The emission factor data include the years of analysis and roadway speeds. The following section reports on the findings of the microscale analysis for the Proposed Projects based upon changes in these data.

Microscale : Carbon Monoxide (CO)

The highest CO concentrations for each intersection are presented in **Table 6-8** and **Table 6-9**. The 1-hour CO concentrations for the 2022 No-Build and Build Conditions ranged between 3.1 to 4.5 ppm. The 8-hour CO concentrations for the 2022 No-Build and Build Conditions ranged between 2.2 to 3.2 ppm. The results of the microscale analysis demonstrate that the 2022 No-Build and Build CO concentrations (both 1- and 8-hour values) for the Proposed Projects are below the NAAQS.

Microscale: Particulate Matter (PM_{10})

The 24-hour PM_{10} for 2022 No-Build Conditions ranged between 39.7 to 41.3 ug/m^3. The 24-hour PM_{10} for 2022 Build Conditions also ranged between 39.7 to 41.3 ug/m^3. The results of the microscale analysis demonstrate that the 2022 No-Build and Build PM_{10} concentrations for the Proposed Projects are below the NAAQS. The highest PM_{10} concentrations for each intersection are presented in **Table 6-10**.

Microscale: Particulate Matter 2.5 ($PM_{2.5}$)

The 24-hour $PM_{2.5}$ for the 2022 No-Build and Build Conditions ranged between 22.3 to 23.1 ug/m^3. The annual $PM_{2.5}$ for the 2022 No-Build and Build Conditions ranged between 9.8 to 10.0 ug/m^3. The results of the microscale analysis demonstrate that the 2022 No-Build and Build $PM_{2.5}$ concentrations for the Proposed Projects are below the NAAQS. The highest $PM_{2.5}$ concentrations for each intersection are presented in **Table 6-11** and **Table 6-12.**

Stationary Source Emissions

The Proposed Projects will include heating boilers and emergency generators. The Proponent will apply for any DEP air permits, as required by DEP regulations under 310 CMR 7.00.

Table 6-8
Predicted Maximum 1-Hour CO Concentrations (Parts Per Million)[1]

Intersection	Receptor	2012 Existing	2022 No-Build	2022 Build[2]
Huntington Avenue at Massachusetts Avenue	R1 – Horticultural Hall/Greenline Symphony Station	4.1	4.1	4.1
	R2 – Apartment Building: Symphony Plaza East/ Greenline Symphony Station	3.8	3.9	3.9
	R3 – Apartment Building: Symphony Plaza West/ / Greenline Symphony Station	4.4	4.5	4.5
	R4 – Symphony Hall	4.0	3.9	3.9
Massachusetts Avenue at St.Botolph Street	R5 – Apartment Building: Symphony Plaza East	3.9	4.1	4.1
	R6 – Apartment Building : Susan S. Bailis Assisted Living Community	4.2	4.3	4.3
	R7 – Apartment Building: St. Botolph Terrace	4.1	4.0	4.0
	R8 – Apartment Building: Symphony Plaza West	4.2	4.2	4.2
St.Botolph Street at Gainsborough Street	R9 –Residence Hall:New England Conservatory of Music	3.6	3.6	3.6
	R10 – Northeastern University Mathews Arena	3.4	3.3	3.3
	R11 – Parking Garage	3.4	3.2	3.2
	R12 – Jordan Hall :New England Conservatory of Music	3.4	3.4	3.4
Huntington Avenue at Gainsborough Street	R13 – Mixed Use Building :Burger King	3.9	3.7	3.7
	R14 – Residence Hall:New England Conservatory of Music	3.8	3.6	3.6
	R15 – Jordan Hall :New England Conservatory of Music	3.8	3.7	3.7
	R16 – Symphony Market	3.7	3.6	3.6

Source: Vanasse Hangen Brustlin, Inc.

1 The concentrations are expressed in parts per million (ppm) and include a 1-hour background concentration of 3.0ppm. The 1-hour NAAQS for CO is 35 ppm. The emissions presented represent the highest emissions experienced at each intersection.

2 Based on the traffic assessment presented in Chapter 5 *Transportation* the NEC IMP projects will not cause any noticeable increase in peak hour vehicle trips, therefore the Build traffic volumes are assumed to be the same as No-Build traffic forecasts.

Table 6-9
Predicted Maximum 8-Hour CO Concentrations (Parts Per Million)[1]

Intersection	Receptor	2012 Existing	2022 No-Build	2022 Build[2]
Huntington Avenue at Massachusetts Avenue	R1 – Horticulture Hall/Greenline Symphony Station	2.9	2.9	2.9
	R2 – Apartment Building: Symphony Plaza East/ Greenline Symphony Station	2.7	2.7	2.7
	R3 – Apartment Building: Symphony Plaza West/ / Greenline Symphony Station	3.1	3.2	3.2
	R4 – William Morris Hunt Memorial Library/ Greenline Symphony Station	2.8	2.7	2.7
Massachusetts Avenue at St.Botolph Street	R5 – Apartment Building: Symphony Plaza East	2.7	2.9	2.9
	R6 – Apartment Building : Susan S. Bailis Assisted Living Community	2.9	3.0	3.0
	R7 – Apartment Building: St. Botolph Terrace	2.9	2.8	2.8
	R8 – Apartment Building: Symphony Plaza West	2.9	2.9	2.9
St.Botolph Street at Gainsborough Street	R9 –Residence Hall:New England Conservatory of Music	2.5	2.5	2.5
	R10 – Northeastern University Mathews Arena	2.4	2.3	2.3
	R11 – Parking Garage	2.4	2.2	2.2
	R12 – Jordan Hall :New England Conservatory of Music	2.4	2.4	2.4
Huntington Avenue at Gainsborough Street	R13 – Mixed Use Building :Panera Bread	2.7	2.6	2.6
	R14 – Residence Hall:New England Conservatory of Music	2.7	2.5	2.5
	R15 – Jordan Hall :New England Conservatory of Music	2.7	2.6	2.6
	R16 – Symphony Market	2.6	2.5	2.5

Source: Vanasse Hangen Brustlin, Inc.
1 The concentrations are expressed in parts per million (ppm). 8-Hour CO background of 2.1 ppm and a persistence factor of 0.70 were used. The 8-hour NAAQS for CO is 9 ppm. The emissions presented represent the highest emissions experienced at each intersection.
2 Based on the traffic assessment presented in Chapter 5 *Transportation* the NEC IMP projects will not cause any noticeable increase in peak hour vehicle trips, therefore the Build traffic volumes are assumed to be the same as No-Build traffic forecasts.

Table 6-10
Predicted Maximum 24-Hour PM10 Concentrations (ug/m3)[1]

Intersection	Receptor	2012 Existing	2022 No-Build	2022 Build[2]
Huntington Avenue at Massachusetts Avenue	R1 – Horticulture Hall/Greenline Symphony Station	40.9	40.9	40.9
	R2 – Apartment Building: Symphony Plaza East/ Greenline Symphony Station	40.9	40.9	40.9
	R3 – Apartment Building: Symphony Plaza West/ / Greenline Symphony Station	41.3	41.3	41.3
	R4 – William Morris Hunt Memorial Library/ Greenline Symphony Station	40.9	40.9	40.9
Massachusetts Avenue at St.Botolph Street	R5 – Apartment Building: Symphony Plaza East	40.9	41.3	41.3
	R6 – Apartment Building : Susan S. Bailis Assisted Living Community	40.9	41.3	41.3
	R7 – Apartment Building: St. Botolph Terrace	40.9	40.9	40.9
	R8 – Apartment Building: Symphony Plaza West	41.3	41.3	41.3
St.Botolph Street at Gainsborough Street	R9 –Residence Hall:New England Conservatory of Music	40.1	39.7	39.7
	R10 – Northeastern University Mathews Arena	40.5	40.1	40.1
	R11 – Parking Garage	40.5	39.7	39.7
	R12 – Jordan Hall :New England Conservatory of Music	40.5	40.1	40.1
Huntington Avenue at Gainsborough Street	R13 – Mixed Use Building :Panera Bread	40.9	40.5	40.5
	R14 – Residence Hall:New England Conservatory of Music	40.9	40.5	40.5
	R15 – Jordan Hall :New England Conservatory of Music	40.5	40.5	40.5
	R16 – Symphony Market	40.5	40.5	40.5

Source: Vanasse Hangen Brustlin, Inc.

1 The concentrations are expressed in micrograms per cubic meter (ug/m^3). The background concentrations assumed for the 24-Hour PM_{10} was 39.70 ug/m^3 . The NAAQS for PM_{10} is 150 ug/m3. The emissions presented represent the highest emissions experienced at each intersection.

2 Based on the traffic assessment presented in Chapter 5 *Transportation* the NEC IMP projects will not cause any noticeable increase in peak hour vehicle trips, therefore the Build traffic volumes are assumed to be the same as No-Build traffic forecasts.

Table 6-11
Predicted Maximum 24-Hour PM2.5 Concentrations (Parts Per Million)[1]

Intersection	Receptor	2012 Existing	2022 No-Build	2022 Build[2]
Huntington Avenue at Massachusetts Avenue	R1 – Horticulture Hall/Greenline Symphony Station	23.1	23.1	23.1
	R2 – Apartment Building: Symphony Plaza East/ Greenline Symphony Station	23.1	22.7	22.7
	R3 – Apartment Building: Symphony Plaza West/ / Greenline Symphony Station	23.1	22.7	22.7
	R4 – William Morris Hunt Memorial Library/ Greenline Symphony Station	23.1	22.7	22.7
Massachusetts Avenue at St.Botolph Street	R5 – Apartment Building: Symphony Plaza East	23.1	23.1	23.1
	R6 – Apartment Building : Susan S. Bailis Assisted Living Community	23.1	23.1	23.1
	R7 – Apartment Building: St. Botolph Terrace	23.1	23.1	23.1
	R8 – Apartment Building: Symphony Plaza West	23.1	23.1	23.1
St.Botolph Street at Gainsborough Street	R9 –Residence Hall:New England Conservatory of Music	22.7	22.7	22.7
	R10 – Northeastern University Mathews Arena	22.7	22.3	22.3
	R11 – Parking Garage	22.7	22.3	22.3
	R12 – Jordan Hall :New England Conservatory of Music	22.7	22.7	22.7
Huntington Avenue at Gainsborough Street	R13 – Mixed Use Building :Panera Bread	23.1	22.7	22.7
	R14 – Residence Hall:New England Conservatory of Music	22.7	22.7	22.7
	R15 – Jordan Hall :New England Conservatory of Music	23.1	22.7	22.7
	R16 – Symphony Market	23.1	22.7	22.7

Source: Vanasse Hangen Brustlin, Inc.

1 The concentrations are expressed in micrograms per cubic meter (ug/m3). The background concentrations assumed for the 24-Hour $PM_{2.5}$ was 22.3 ug/m3. The NAAQS for $PM_{2.5}$ is 35 ug/m3. The emissions presented represent the highest emissions experienced at each intersection.

2 Based on the traffic assessment presented in Chapter 5 *Transportation* the NEC IMP projects will not cause any noticeable increase in peak hour vehicle trips, therefore the Build traffic volumes are assumed to be the same as No-Build traffic forecasts.

Table 6-12
Predicted Maximum Annual PM2.5 Concentrations (Parts Per Million)[1]

Intersection	Receptor	2012 Existing	2022 No-Build	2022 Build[2]
Huntington Avenue at Massachusetts Avenue	R1 – Horticulture Hall/Greenline Symphony Station	10.0	9.9	9.9
	R2 – Apartment Building: Symphony Plaza East/ Greenline Symphony Station	10.0	9.9	9.9
	R3 – Apartment Building: Symphony Plaza West/ / Greenline Symphony Station	10.0	10.0	10.0
	R4 – William Morris Hunt Memorial Library/ Greenline Symphony Station	10.0	9.9	9.9
Massachusetts Avenue at St.Botolph Street	R5 – Apartment Building: Symphony Plaza East	10.0	10.0	10.0
	R6 – Apartment Building : Susan S. Bailis Assisted Living Community	10.0	10.0	10.0
	R7 – Apartment Building: St. Botolph Terrace	10.0	10.0	10.0
	R8 – Apartment Building: Symphony Plaza West	10.0	10.0	10.0
St.Botolph Street at Gainsborough Street	R9 –Residence Hall:New England Conservatory of Music	9.9	9.9	9.9
	R10 – Northeastern University Mathews Arena	9.9	9.8	9.8
	R11 – Parking Garage	9.9	9.8	9.8
	R12 – Jordan Hall :New England Conservatory of Music	9.9	9.9	9.9
Huntington Avenue at Gainsborough Street	R13 – Mixed Use Building :Panera Bread	10.0	9.9	9.9
	R14 – Residence Hall:New England Conservatory of Music	9.9	9.9	9.9
	R15 – Jordan Hall :New England Conservatory of Music	10.0	9.9	9.9
	R16 – Symphony Market	10.0	9.9	9.9

Source: Vanasse Hangen Brustlin, Inc.

1 The concentrations are expressed in micrograms per cubic meter (ug/m3). The background concentrations assumed for the annual PM2.5 was 9.8ug/m3. The NAAQS for PM2.5 is 15 ug/m3. The emissions presented represent the highest emissions experienced at each intersection.

2 Based on the traffic assessment presented in Chapter 5 *Transportation* the NEC IMP projects will not cause any noticeable increase in peak hour vehicle trips, therefore the Build traffic volumes are assumed to be the same as No-Build traffic forecasts.

6.6.7 Summary of Findings

The air quality evaluation demonstrates that the NEC Institutional Master Plan Proposed Projects presented in this IMPNF/PNF comply with city, state, and federal air quality requirements. The microscale analysis evaluated impacts from Proposed Projects at the most congested intersections in the study area and the emissions associated with the area traffic. State and federal modeling procedures were used to determine worst-case concentrations. The results demonstrate that all existing and future build and no-build CO, PM_{10}, and $PM_{2.5}$ concentrations will be below the NAAQS.

The air quality study demonstrates that the NEC IMP Proposed Projects conform to the Clean Air Act Amendments because:

- No new violation of the NAAQS will be created,
- No increase in the frequency or severity of any existing violations will occur, and
- No delay in attainment of any NAAQS will result.

6.7 Solid and Hazardous Waste

This section provides a summary of how solid and hazardous waste will be handled and collected in relation to the Proposed Projects.

6.7.1 Contaminated Soils

Requirements for handling, testing, and disposal of the limited volume of excavated materials that will be generated by the Proposed Projects construction in accordance with applicable regulations will be included in the design specifications issued to the Proposed Projects' general contractor and site work subcontractor. Soils on the Proposed Project sites are not anticipated to require disposal as hazardous waste, and is assumed to comprise primarily the type of urban fill customarily encountered in urban excavation projects in Boston. The urban fill that underlies the Proposed Project sites will be taken to a regulated unlined landfill for use as landfill cover material.

6.7.2 Solid Waste Generation/Disposal/Recycling

NEC is sensitive to minimizing the amount of solid waste it generates, both during the construction of these Proposed Projects and in connection with the operation of the projects and the NEC campus. Below are highlights of the programs adopted by NEC that aim to accomplish this goal.

NEC currently maintains a comprehensive recycling program, which provides space and containers campus-wide for the recycling of glass, paper, and plastic for all academic and administrative facilities, including the dining hall operations. NEC proactively educates its students, faculty, and staff about the importance of a strong recycling program. NEC's current proactive recycling initiative and trash removal procedures will be incorporated within the new Proposed Projects once they are built and occupied by NEC. Activities at these new facilities will generate solid waste typical of an academic setting, including waste paper, cardboard, glass and plastic bottles, and other similar materials. Most of these waste materials will be recycled and the remainder will be compacted in accordance with all applicable laws and regulations. A more detailed description of NEC's trash removal and recycling program is described in Chapter 8, *Sustainability.*

With regard to construction, the School is considering the use of building materials and purchase of supplies that are nontoxic, made from recycled materials, and made with low embodied energy for all new projects. Recyclable and recycled materials may be incorporated into the design and construction of the Proposed Projects as much as is reasonably feasible. It will be necessary to verify that recycled materials will be technically acceptable and comparable in quality and cost to the non-recyclable equivalents.

6.7.3 Hazardous Waste Generation/Disposal

Management of hazardous waste is highly regulated for the safety of the public, the environment, and the community. NEC has an existing hazardous waste collection program (e.g. janitorial uses) that will be utilized to handle and dispose of all such wastes in accordance with applicable laws and regulations. Currently, it is not expected that new types of hazardous waste would be generated by these new academic, performance, and student life facilities.

6.8 Geotechnical and Groundwater Analysis

This section addresses the below-grade construction activities anticipated for the Proposed Projects. It discusses site soil and groundwater conditions, earthwork and anticipated foundation construction methods based on available subsurface information and a preliminary foundation design study. This section also addresses potential impacts of the activities and planned mitigation measures.

6.8.1 Project Site and Subsurface Conditions

The proposed Projects include construction of two buildings, the SLPC project (designated Phase I) and the LC project (designated Phase II). Phase I is planned as a 10-story building with one level of partially below-grade space; Phase II is planned as a 7-story with one level of below-grade space finished near the elevation of the lowest Phase I level.

The Phase I building site is currently a bituminous-paved parking lot bordered by St. Botolph Street to the south, Public Alley No. 821 to the north, and Public Alley No. 822 to the west; an existing 2-story brick building occupies a small portion of the proposed building footprint to the east. The Phase II building site is currently occupied by concrete brick buildings at 29 and 35 Gainsborough Street, and is bordered by Gainsborough Street to the west, Huntington Avenue to the North, St. Botolph Street to the south, and the Phase I site and an existing building at 270 Huntington Avenue to the east.

Buildings surrounding the site include the following structures:

- 33 Gainsborough Street, located immediately to the west of the Phase I site, is an 8-story cast-in-place concrete residential building supported on concrete-filed steel pipe pile foundations. The building has a one-level basement.
- 270 Huntington Avenue (the Riviera Building), located approximately 15 ft east of the Phase II building, is a 7-story condominium building with one-level of below-grade space. The building is likely supported on wood pile foundations.
- 264 Huntington Avenue (Huntington Theatre) is a 2 to 6-story high-bay brick building with one below-grade level. The back of the building, which wraps behind 270 Huntington Avenue, is located approximately 16 ft to the north of the Phase I site (immediately across Public Alley No. 822) and 10 ft to the east of Phase II site. The building is likely supported on wood pile foundations.
- 241 St. Botolph Street (The Cotting School), located immediately east of the Phase I site, is a 4-story brick building with one-level of below-grade space reportedly supported by concrete shaft foundations. The lowest floor is positioned at approximately the level of the lowest floor of the proposed Phase I building.
- Jordan Hall, a historic music performance facility, is located across Gainsborough Street from the Phase II site. The building has one-level of below grade space; the portion of the Hall along Gainsborough Street is supported on wood piles.

Ground surface ranges from about El. 17 to El. 18 Boston City base (BCB) along St. Botolph Street, Gainsborough Street and Huntington Avenue adjacent to the Phase I and Phase II sites. Surface grades range from about El. El. 11 to El. 8.5 in the alley along the north side of the Phase I site.

6.8.2 Subsurface Conditions

Located within Boston's Back Bay, the Proposed Project sites are filled land formed in the late 1800s. Test borings have been performed in the site vicinity for several other development projects. Subsurface explorations will be conducted at the subject site to facilitate final project design and construction. Based on available subsurface information, **Table 6-13** provides the generalized subsurface profile is anticipated at the site:

Table 6-13
Anticipated Subsurface Profile

Stratum	Depth to Top of Layer (ft)	Thickness of Layer (ft)
Fill	--	10 to 20
Organic Deposits	10 to 20	5 to 10
Marine Sand and Clay	15 to 30	120 to 140
Glacial Till	135 to 145	5 to 10
Argillite Bedrock	140 to 150	--

Site subsurface conditions are anticipated to be similar to other sites in this area of the Fenway.

6.8.3 Groundwater Conditions

Data on groundwater levels in the vicinity of the Proposed Project sites are available from prior project investigations as well as from wells monitored by the Boston Groundwater Trust (BGwT). Water levels recorded in wells around the site by the BGwT in October 2011 ranged from El. 6 to El. 8 (BCB). Historically, water levels reported by the BGwT have ranged from approximately El. 5 to El. 8 in this area. These levels are consistent with data obtained at other nearby development projects.

6.8.4 Proposed Construction

The two Phases of the proposed development consist of the following:

Student Life and Performance Center (Phase I): a 10-story building with one level partially below grade and a footprint area of approximately 17,000 square feet. The building will serve as a residence hall, library, and dining facility; the building will connect with the adjacent Phase II structure at the second and third levels.

Learning Center (Phase II): a 7-story building with a one-level basement and a footprint area of approximately 10,000 square feet. The building will house a portion of the library as well as academic classrooms and student practice areas.

Construction will include installation of various below-grade utility connections to the new buildings.

6.8.5 Excavation and Foundation Construction

Excavation

Construction of the building foundations and lowest floor levels will require excavations ranging from approximately 5 to 15 feet below existing grades. It is anticipated that temporary lateral excavation support system will be required to limit the lateral extent of the excavations. The systems are anticipated to consist of steel soldier piles installed in drilled holes with timber lagging boards. Excavation for the proposed lowest floors is expected to extend down to slightly above normal groundwater levels (approximately El. 7).

Foundation Support

Although details of the foundation systems have not been finalized, it is anticipated that the new buildings will require deep foundations consisting of end-bearing piles or concrete drilled shafts extending through the overburden soils into glacial soils or bedrock. The system will be selected and designed to limit potential impacts to abutting facilities due to ground disturbance, vibrations and noise. If used, piles would likely be pre-drilled to limit such effects.

Groundwater Control During Construction

As the general excavations for the lowest building floors are anticipated to be at or slightly above normal groundwater levels, only limited dewatering is expected to be required to allow construction to proceed in-the-dry. Localized dewatering will likely be required at deeper sub-structure elements such as pile caps, elevator pits and similar features. The lower portions of the below-grade walls and other elements of the structure that extend below approximately El. 10 will be waterproofed to avoid future groundwater infiltration and potential impacts to surrounding groundwater levels.

Effluent generated during temporary construction dewatering will be infiltrated into the ground where it is possible to do so without adverse impacts to surrounding facilities. Excess discharge will be chemically tested and discharged to the municipal systems in compliance with applicable regulations and discharge permits. Dewatering discharge effluent quality will also be monitored during construction as required by the discharge permit.

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6.8.6 Environmental Conditions

A Phase I Environmental Site Assessment was performed for the subject site in May 2011 by Wheatstone Engineering and Consulting, Inc. The evaluation of the site did not reveal any current recognized environmental condition (REC); however, several properties near the site were determined to have previously reported release of hazardous materials to the Massachusetts Department of Environmental Protection (MADEP). A summary of the releases is as follows:

- RTN 3-01939 (10 Gainsborough Street); Hazardous Material: petroleum; Regulatory Status: closed with MADEP.
- RTN 3-25595 (10 Gainsborough Street); Hazardous Material: petroleum/NAPL; Regulatory Status: closed with MADEP.
- RTN 3-18418 (284 St. Botolph Street); Hazardous Material: petroleum; Regulatory Status: closed with MADEP.
- RTN 3-19256 (252 Huntington Avenue): Hazardous Material: EPH; Regulatory Status: closed with MADEP.
- RTN 3-04060 (122 St. Stephen Street): Hazardous Material: petroleum; Regulatory Status: response ongoing.
- RTN 3-24240 (12 Westland Avenue): Hazardous Material: chlorinated solvent; Regulatory Status: not closed with MADEP.

No site-specific testing has been performed to date regarding site environmental conditions related to presence of oil and hazardous materials. Based on the site's urban location and anticipated subsurface conditions, excavated soils might contain levels of chemical constituents typically encountered in urban fill soils. Specific testing of soil and groundwater will be conducted prior to construction to evaluate conditions and requirements for special handling, transport and off-site disposition of excavated materials from the site. All excavated materials that are not re-used on-site will be managed and disposed of or recycled off-site in accordance with the Massachusetts Contingency Plan and all other applicable regulatory requirements.

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6.8.7 Probable Project Impacts and Mitigation Measures

No significant impact on adjacent buildings, utilities or other off-site facilities is anticipated due to below-grade construction associated with the Proposed Projects.

Measures will be incorporated into the design and construction to avoid and detect potential adverse impacts.

New England Conservatory and its selected contractor will coordinate with the nearby abutters prior to construction, regarding construction methods, potential impacts, monitoring, communication and mitigation. Potential mitigation measures include the following:

- Foundation systems, excavation support systems and construction procedures will be designed to avoid impacts.
- Performance criteria will be established in the construction contract documents relative to movements of lateral excavation support systems, maintaining groundwater levels and other items. The contractor will be required to conform to the performance criteria outlined in the technical specifications, and to take necessary steps during the work to protect nearby facilities and limit temporary impacts to groundwater levels. The contractor will be required to submit contingency plans for remedial measures in the event that unacceptable performance occurs, which will be reviewed by the project team prior to construction;
- Pre-construction condition surveys will be conducted at abutting and nearby structures as permitted by the owners, to document existing conditions;
- A program of geotechnical instrumentation will be implemented at and nearby the site to monitor performance of adjacent buildings, vibrations, noise and groundwater levels.
- The contractors will be required to provide submittals in advance of the work, for review by the project team to assure conformance to the project requirements.

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6.8.8 Groundwater Conservation Overlay District

The Proposed Projects are located within the Groundwater Conservation Overlay District (GCOD) as defined by the Boston Zoning Ordinance Article 32. As a result of the Proposed Project sites' location in the GCOD, the volume of stormwater from a 1-in. rainfall event must be captured and recharged on-site to the extent possible. This requirement will be incorporated into the Proposed Projects' designs and construction. It is anticipated that these systems will consist of a water storage tank and passive infiltration into the site subsoils through recharge galleries (space permitting) or vertical recharge wells.

6.9 Flood Hazards/Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates the FEMA Flood Zone Designations for the Campus (City of Boston, Community-Panel Number 25025C0079G). This designation is illustrated in **Figure 6-23**. The map shows that the Proposed Project Sites are located outside the 0.2 percent annual chance floodplain (commonly referred to as the 500 year flood limit), identifying them as areas of minimal flooding.

6.10 Construction Impacts

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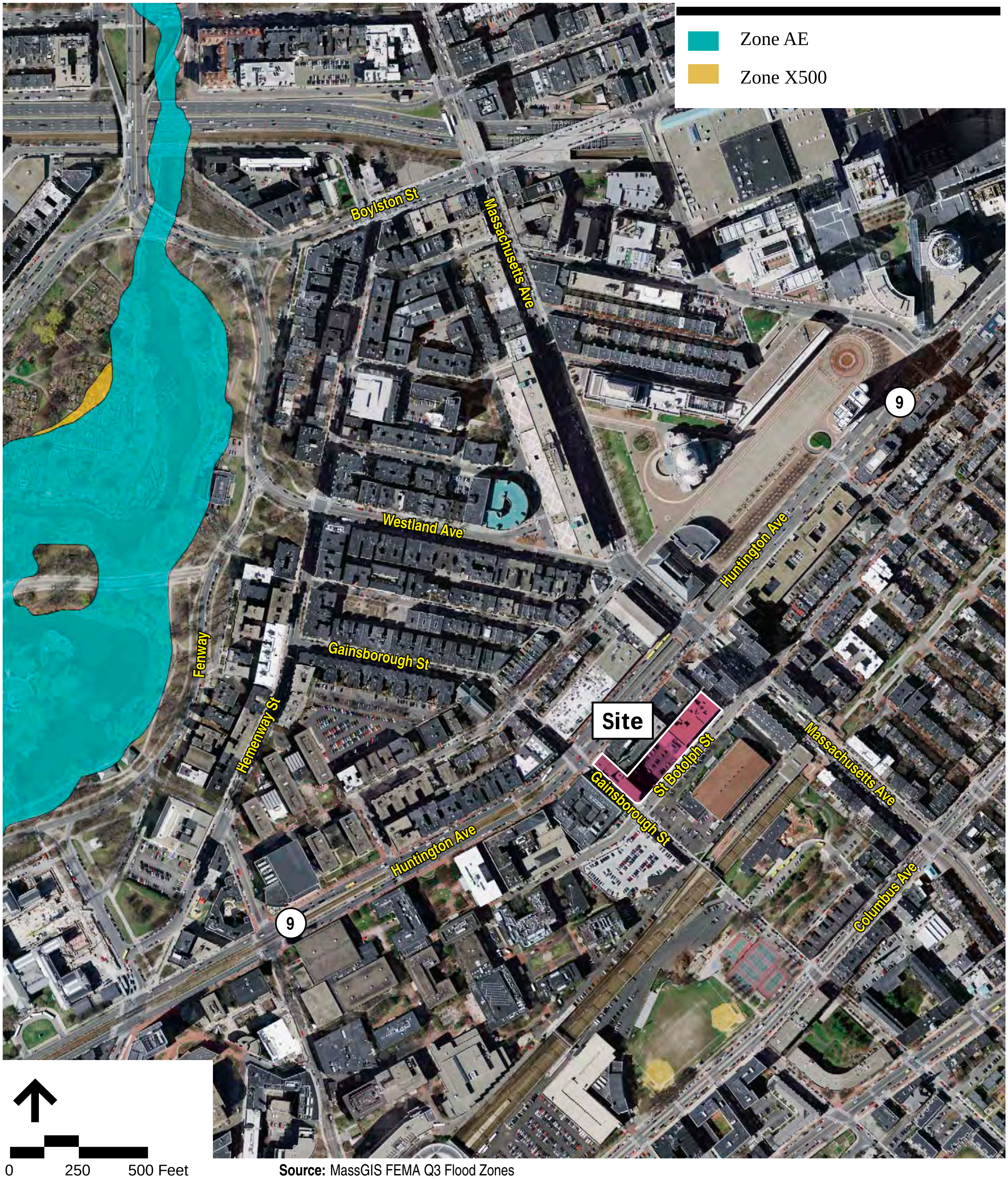
6.10.1 Introduction

This section describes the anticipated methods and impacts of construction related to the Proposed Projects. A Construction Management Plan (CMP) will be submitted to the Boston Transportation Department with respect to the future implementation of each Proposed IMP Project. These plans will comply with the City of Boston's Construction Management Program. The CMPs will include detailed information regarding construction activities, materials management, staging areas, parking, truck routes, air quality and noise impacts and mitigation measures, and other subject matter as it relates to construction. In particular, the CMPs will demonstrate the intent to maintain public safety throughout the construction period. Techniques such as barricades, defined temporary walkways, signage, and other protective measures will be put in place. The CMPs will also highlight truck routes and staging, protection of utilities, and the control of noise and dust.



Source: MassGIS FEMA Q3 Flood Zones

6.10.2 Construction Schedule

The following represents the earliest possible construction schedule for the Proposed Projects:

Student Life and Performance Center Project

➢ Demolition and Remediation	Late 2012 – Early 2013
➢ Site Excavation and Construction	Spring 2013 – Fall 2014
➢ Project Occupancy	2015

Learning Center Project (16 month schedule)

➢ Demolition and Remediation	2 months
➢ Site Excavation and Construction	12 months
➢ Project Occupancy	2 months

6.10.3 Coordination with Other Ongoing Construction Projects

NEC will coordinate with its neighbors and the City of Boston through their regular and ongoing construction coordination meetings to minimize potential scheduling and construction conflicts with other ongoing construction projects. These efforts will also be used to better understand community concerns and to make sure that any important concerns are identified and resolved.

6.10.4 Disposal and Recycling of Construction Debris

NEC plans to proactively reprocess and recycle construction and building demolition waste to the greatest extent that is economically feasible. The Proposed Projects' disposal contracts will include specific provisions for the segregation, reprocessing, reuse, and/or recycling of building materials and demolished debris. Those materials that cannot be recycled on-site will be transported in covered trucks to an approved solid waste facility per Massachusetts DEP's Regulation for Solid Waste Facilities. The construction debris recycling program will be implemented in conjunction with the Proposed Projects' overall LEED certification strategy (see Chapter 8).

6.10.5 Construction Worker Parking

As with every construction project, some level of traffic impact can be anticipated as a result of the Proposed Projects' construction. The construction trip generation due to workers and trucks is described in more detail below.

Construction Trip Generation and Worker Parking

Personnel will arrive at the Proposed Projects' job sites either by public transportation or by personal vehicles. The Proposed Projects' contractors will be required to encourage public transportation to the site. Because the workforce will arrive and depart prior to peak commuter traffic periods, these trips are not expected to have a large impact on the area's transportation system. Various measures will be implemented to promote transit use by construction personnel, including the use of on-site locked toolboxes and trade rooms to avoid the need to transport small personal tools to and from the jobsite each day.

Truck Routes and Volumes

Truck traffic will vary throughout the construction periods, depending on the activity, with the majority of personnel arrivals and material deliveries expected during the morning construction period. It is expected that truck traffic will range on average between 10-15 trucks daily, spread evenly throughout the day. During discrete phases of the Proposed Projects the total number of daily truck trips could be higher – in particular when excavation activities and concrete pours are being conducted on-site. Large truck trips could range between 35 and 50 trips per day when these activities are occurring on-site for limited periods of time.

Truck access for the Proposed Projects will be fully coordinated with BTD and other construction projects in the vicinity of the Campus and memorialized in the related CMP.

Police details will be stationed at active site gates to coordinate traffic flow and assist in supporting safe and efficient pedestrian flow. Mechanical street sweeping will be performed as required, full time during all heavy trucking periods. In addition, gravel wash off areas will be maintained at all exits to limit mud tracking from the sites.

Because NEC will be the Proposed Projects' most directly impacted neighbor, strict measures will be taken to control noise, odor, dust, vibration, and other construction-related impacts to avoid negative effects on NEC's highly sensitive ongoing musical education and performance activities.

6.10.6 Construction Air Quality

Areas of exposed soils will be vegetated or paved as soon as practicable to minimize the length of exposure time. Exposed areas susceptible to wind will be mulched or seeded as early as feasible in the construction process to further reduce dust emissions. Runoff will be controlled to prevent sediments from entering the storm drain system.

Construction activities may generate dust, which could result in localized increase in airborne particle levels. Fugitive dust emissions from construction activities will depend on such factors as the properties of the emitting surfaces (e.g., moisture content and volume of spills), metrological variables, and construction practices employed. To limit the creation of airborne dust and minimize impacts on the local environment, the contractor(s) for the Proposed Projects will be required to employ dust control measures in accordance with applicable local, state, and federal requirements. Dust control measures which may be implemented by these contractors include:

- Use of standard dust control measures such as watering-down any exposed ground surfaces or spreading hygroscopic salts to control and suppress dust that originates from construction related activities.
- Covering of soil subgrades with crushed stone where heavy equipment will be traveling.
- All trucks leaving the sites shall be securely covered.
- The contractor(s) shall clean debris from the construction area and surrounding streets on a routine basis.
- Mechanical sweeping of key access routes by pelican or other similar method will occur as needed.
- Wheel wash locations will be provided as necessary.
- Contaminated soils that are stockpiled onsite (if any) will be securely covered with polyethylene sheeting.
- Areas of exposed soils will be vegetated or paved as soon as practicable to minimize the length of exposure time.
- Actual construction practices will be monitored to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized and to ensure that emissions of dust are limited.
- In addition, all motor vehicles and construction equipment shall comply with all pertinent City, State, and Federal regulations covering exhaust emission control and safety.

- The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter (PM) from diesel-powered equipment shall be accomplished by installing Retrofit Emission Control Devices.
- The use of low-sulfur diesel fuel.

The acceptable Retrofit Emission Control Devices for the Proposed Project shall consist of oxidation catalysts that (1) are included on the Environmental Protection Agency (EPA) Verified Retrofit Technology List; and (2) are verified by EPA or certified by the manufacturer to provide a minimum emissions reduction of 52 percent for VOCs, 31 percent for CO and 20 percent for PM. Attainment of the required reduction in PM emissions can also be accomplished by using less polluting Clean Fuels (e.g. PuriNOx).

In addition to installing the required emission control devices, each contractor will also be required to use methods to control nuisance odors associated with diesel emissions from construction equipment including, without limitation, the following:

- Turning off diesel combustion engines on construction equipment not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more.
- Locating diesel equipment away from the general public and sensitive receptors (e. g., fresh air intakes, air conditioners, and windows).

NEC will provide contractors with information promoting the Clean Air Construction Initiative (CACI). This initiative encourages the use of available, state-of-the-art diesel exhaust control technology on diesel-powered construction and industrial vehicles and equipment in an effort to substantially reduce harmful diesel particulate emissions, oxides of nitrogen (NOx), toxic hydrocarbons, odor, and smoke.

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6.10.7 Construction Noise

The construction activities related to the Proposed Projects will generate noise related to demolition activities, excavation, earth movement, and construction vehicles. Although construction sound levels will be temporarily higher than the existing sound levels, no violations of the City of Boston's Noise Ordinance are expected and the Proponent is committed to mitigating construction-related noise impacts. The Proponent is further committed to minimizing and mitigating construction-related noise impacts because of the proximity of the planned construction to existing academic buildings as well as neighboring buildings.

NEC's musical education and performance activities are extremely sensitive to noise impacts, and extraordinary measures will be taken to ensure that impacts to ongoing NEC activities are minimized. These measures will include work hour restrictions, the use of sound-attenuation equipment, an extensive monitoring and notification program, and other similar measures that will reduce noise impacts of the Proposed Projects to NEC and its neighbors.

Noise Impacts

Moderate increases in noise levels associated with the construction of the Proposed Projects may occur during construction since heavy machinery is expected to be used intermittently throughout each of the Proposed Projects' construction phases. Some equipment may be heard from off-site locations; however, construction work will comply with the requirements of the City of Boston Noise Ordinance and every commercially reasonable effort will be made to minimize the noise impact of construction activities.

The construction phase that will generate the highest sound levels will be the demolition of the existing Gainsborough Street residential building, site excavation, and grading. Construction sound levels, based upon construction equipment noise studies prepared by the Environmental Protection Agency, are expected to range from an L_{10} of 65 dB(A) to 75 dB(A) with an L_{max} of 85 dB(A) The City of Boston Noise Ordinance considers construction sound levels to be an impact to residential land uses if the L_{10} is in excess of 75 dB(A) or the L_{max} is in excess of 86 dB(A). The predicted construction sound levels are below the City of Boston Noise Ordinance requirements for residential areas. A construction management program will be developed with the City of Boston to ensure that the applicable Noise Ordinance requirements are met during the demolition of this building.

As outlined above, NEC will also implement other extraordinary noise control and monitoring measures designed to minimize impacts on NEC's ongoing musical education and performance activities; these measures will further reduce noise impacts on NEC and its neighbors.

City of Boston Requirements

Construction noise associated with the construction of the Proposed Projects is not expected to exceed the limits described in **Table 6-14** below. Regulation 3 of the Regulations for the Control of Noise in the City of Boston, "Restrictions of Noise Emitted from Construction Sites," establishes limits for construction noise. The limits are applied at the property line of the receiving property. In the case where equipment is operated at closer than 50 feet to the applicable lot line, the limits are applied at 50 feet from the equipment. The City of Boston regulations are not applicable to impact devices such as jackhammers, pile drivers, riveters, pavement breakers, etc. In addition, the L_{10} must exceed the ambient L_{10} by at least 5 dB(A) to be considered a violation of the limits. It is the goal of the Project to operate within the criteria set by the City of Boston's Noise Ordinance.

Table 6-14
Summary of Construction Site Noise Limits for Boston, dB(A)

Land Use of Affected Property	Noise Level Limit* L_{10} Level	Noise Level Limit* L_{max} Level***
Residential or Institutional	75	86
Business or Recreational	80	--
Industrial**	85	--

Source: Regulation 3, City of Boston Air Pollution Control Commission, Regulation for the Control of Noise in the City of Boston, adopted December 17, 1976.
* Measured at the lot line of the affected property.
** The industrial noise limit shall apply to public ways.
*** Maximum noise level shall be measured with the sound level meter on "SLOW" response.

Construction Noise Mitigation

Construction period activities may temporarily increase nearby sound levels due to the intermittent use of heavy machinery during construction. These activities include demolition, foundation construction, truck movements, heavy equipment operations, and general construction activities. Regulation 3 of the City of Boston Code, Ordinances, Title 7, Section 50, includes specific construction noise limits by land use. The relevant criterion for the Proposed Projects is based on residential or institutional land use. The construction noise at the property line for residential or institutional land use is limited to a maximum level of 86 dB(A), with a limit of 75 dB(A) for the construction noise level exceeded 10 percent of the time (L_{10}). In addition, the City of Boston Code, Ordinances, Title 15, Chapter 11, Section 355 (titled "Unreasonable Noise") also applies to construction activities. This ordinance establishes a noise limit of 50 dB(A) for construction noise measured at residential lot lines between 6:00 PM and 7:00 AM. This ordinance effectively prohibits nighttime construction near residential areas.

The Proponent will require the following construction noise mitigation measures to assist in ensuring the Proposed Projects comply with the criteria set by the City of Boston's Noise Ordinance:

- Scheduling of work during daytime hours. Proposed Projects' construction hours will generally be restricted to be 7:00 AM to 6:00 PM. Contractors will not be allowed to operate diesel equipment or prepare and move materials before 7:00 AM.
- Selecting the quietest practical items of equipment, e.g. whenever possible, electric instead of diesel powered equipment.
- Scheduling equipment operations to keep average levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels.

- Turning off idle equipment – and limiting idling to 5 minutes, per Commonwealth of Massachusetts regulations.
- Protecting sensitive locations by shielding or distancing noisy equipment.
- Maintaining muffler enclosure on continuously operating equipment, such as air compressors and welding generators.

6.10.8 Measure to Protect Water Quality During Construction

Local dewatering may be required to construct utilities and facilitate other deeper excavations. On-site recharge in accordance with the Massachusetts Contingency Plan at 310 CMR 50.0055 is planned as the primary approach for construction dewatering discharge. If required, discharge to municipal storm drains under a NPDES Remediation General Permit (RGP) will be implemented in the event that subsurface geology cannot accept dewatering flows. Effluent from dewatering efforts may include groundwater, precipitation, and surface water runoff. If needed, a dewatering effluent treatment system will be designed and operated by the contractor. Discharge water quality sampling and analyses will be conducted to monitor compliance with the NPDES RGP.

6.11 Rodent Control

The Massachusetts State Sanitary Code, Chapter 11, 105 CMR 510.550 and the State Building Code, Section 108.6, Policy Number 87-5 (City of Boston) states that extermination of rodents shall be required for issuance of permits for demolition, excavation, foundation and basement rehabilitation. In compliance with the City's requirements, a rodent extermination certificate will be filed with the Proponent's building permit application to the City of Boston and a rodent control program for the Proposed Projects will be developed prior to construction.

The rodent control program for the Proposed Projects will include inspection and extermination in all areas of the site under development, including the interior of the existing buildings, prior to commencement of work. During construction, regular inspections will be made in order to maintain effective rodent control levels. The Proponent will establish a post-construction pest management program for the Proposed Project.

6.12 Historic Resources

This section identifies and describes the existing buildings on the Proposed Project sites, the individual historic resources and districts in the vicinity of the Proposed

Project sites, and describes the potential impacts that the Proposed Projects may have on these resources.

6.12.1 Buildings on the Proposed Project Site

Cotting School for Handicapped Children, 241-247 St. Botolph Street
Originally constructed in 1904, the building at 241-247 St. Botolph Street is significant as the home of the first school for handicapped children in the United States. Founded in 1894, the Industrial School for Crippled and Deformed Children, as it was then named, was established entirely through donations and charitable fund raising. Dr. Edward H. Bradford and Dr. Augustus Thorndike, two orthopedic surgeons at Boston's Children's Hospital concerned that children with physical disabilities were not receiving an education in the public schools, lead the charge in founding the first private, free day school for children with physical disabilities in the country.

The school was originally housed in Saint Andrews Hall on Chambers Street in the old West End neighborhood. Later, the school rented a rowhouse at 6 Turner Street in order to provide housing for boarding students. As the school continued to grow in enrollment and expand in curriculum, a new purpose-built building was constructed on St. Botolph Street. Consisting of only the easternmost nine bays of the current building, the original structure was designed by the notable Boston architecture firm of Peabody and Stearns in the Renaissance Revival style.
The original 1904 structure featured a symmetrical façade consisting of nine bays with a recessed center entrance. Finished in brick and limestone, the three story structure rises from a raised basement level to a scrolled bracket and dentil cornice. The basement level, first floor, quoins and window trim are finished in a yellow brick, whereas the second and third floors are finished in a red brick. Window sills and lintels, the recessed entrance surround and the second floor base are executed in limestone. Located between the second and third floors are limestone plaques dated 1894 and 1904 commemorating the founding date of the school and the building's construction date.

The school developed a curriculum that included educational studies, industrial trades, exercise, nutrition, fresh air, natural light and medical treatment. In 1912, a single story glass pavilion was constructed immediately adjacent (west) of the original 1904 structure. The hip roofed, single story structure housed a class room space that provided an abundance of natural light and fresh air.
In 1926, the original 1904 building was enlarged significantly with an additional 12 bays added to the west elevation. The 1926 addition, also designed by the Peabody and Stearns firm, is remarkably similar to the original 1904 building in its architectural detailing and use of materials. Similar to the original building, the addition is finished in yellow and red brick with limestone detailing and features an identical recessed entrance with a limestone surround exactly like the original

entrance. The addition also displays two limestone plaques located between the second and third floors, commemorating the school's 1894 founding date and the date of the 1926 addition.

The 1926 addition housed a new high school, expanded industrial training areas, a modern kitchen and a new assembly hall. The additional also allowed for an expanded medical department which had grown to include several doctors, nurses and physiotherapists.

As part of the construction of the 1926 addition, the single story pavilion on the west side of the original building was modified and relocated further to the west, set on a raised foundation and attached to the new portion of the building. As part of the relocation, several of its original window openings were filled in with brick.

Over the years the school's name changed several times to reflect the evolving societal attitudes toward disabilities. Later names included shortening the original name to the Industrial School for Crippled Children, and in 1974 to the Cotting School for Handicapped Children. In 1984, the school merged with the Krebs School in Lexington. Following the merger the school relocated to the Krebs School site in Lexington and the building at 241-247 St. Botolph Street was sold to NEC. Today, the former Cotting School for Handicapped Children continues to operate as the Cotting School.

The Cotting School building is included in the Massachusetts Historical Commission's Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory) and was recommended eligible for inclusion in the National Register of Historic Places by the Boston Landmarks Commission. Recently, NEC completed a full exterior rehabilitation of the building including extensive masonry repairs and the replacement of severely deteriorated windows with new historically appropriate windows. The Boston Preservation Alliance awarded NEC a 2010 Preservation Achievement Award for their sensitive rehabilitation of the building.

33 Gainsborough Street

The eight story building at 33 Gainsborough Street was constructed by NEC in 1960. The 57,000 square foot building extends from the corner of Gainsborough Street and St. Botolph Street to the corner of Gainsborough Street and Huntington Avenue. The building continues to serve its original function as a residential dormitory and library, with the NEC print library housed in a two story wing at the northern end of the building. The building also houses a student dining facility and practice rooms in the basement level.

Designed in the Modernist style by the Boston architectural firm of Kilham, Hopkins, Greeley & Brodie, the building has a long rectangular plan and features a strong vertical expression comprised of brick, cast stone and concrete. Elevator shafts and stairwells define the north and south ends of the building and the long east and west elevations each feature large grids of fixed and awning style sash with clear and spandrel glass set in aluminum frames. The library wing is linked to the eight story, residential main block via a glazed connector. The entrance is located at the northern end of the building, along the Gainsborough Street sidewalk, at the base of the northern stairwell and elevator shaft.

The building is attributed to James Cleveland Hopkins Jr. (1914-1998), who served as a partner in the Kilham, Hopkins, Greeley & Brodie architecture firm. The firm was established by Hopkins' father, James C. Hopkins Sr. (1873-1938) and Walter Kilham (1868-1948), first as Kilham & Hopkins, and later known as Kilham, Hopkins & Greeley from 1925-1949, then as Kilham, Hopkins, Greeley & Brodie from 1950-1970 with the addition of Walter S. Brodie as a partner. The firm was responsible for many early-to-mid 20th century buildings in Massachusetts, including the Massachusetts College of Pharmacy, Kerr Hall in the Fenway and the Faneuil Branch of the Boston Public Library in Brighton. The firm is also credited for the designs of many municipal buildings including city and town halls, libraries and schools in Waltham, Tewksbury, Westborough, Hanover and Winchester, to name a few.

The younger Hopkins graduated from Harvard University in 1938, where he also received a masters degree in architecture in 1941. In addition to NEC's 33 Gainsborough Street building, Hopkins is credited for the designs of other school buildings and libraries, including buildings at Milton Academy and the Woods Hole Oceanographic Institution. Hopkins continued to practice architecture after the firm closed in 1970; he died in 1998.

The building at 33 Gainsborough Street is not included in MHC's Inventory and is not listed in the State or National Register of Historic Places.

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6.12.2 Historic Resources in the Proposed Project's Vicinity

Within the vicinity of the Proposed Project sites are several historic properties and historic districts, including properties listed in the State and National Registers, designated National Historic Landmarks, and local landmark districts and properties. Among these properties is NEC's Jordan Hall at 290 Huntington Avenue. Constructed in 1903 in the Renaissance Revival style, Jordan Hall was designed by the eminent Boston architectural firm of Wheelwright and Haven. The building is a designated National Historic Landmark and is the primary focus and centerpiece of the NEC campus.

Table 6-15 contains a complete listing of State and National Register-listed properties located within a quarter mile radius of the Proposed Project Site. The locations of these properties are identified on **Figure 6-24**.

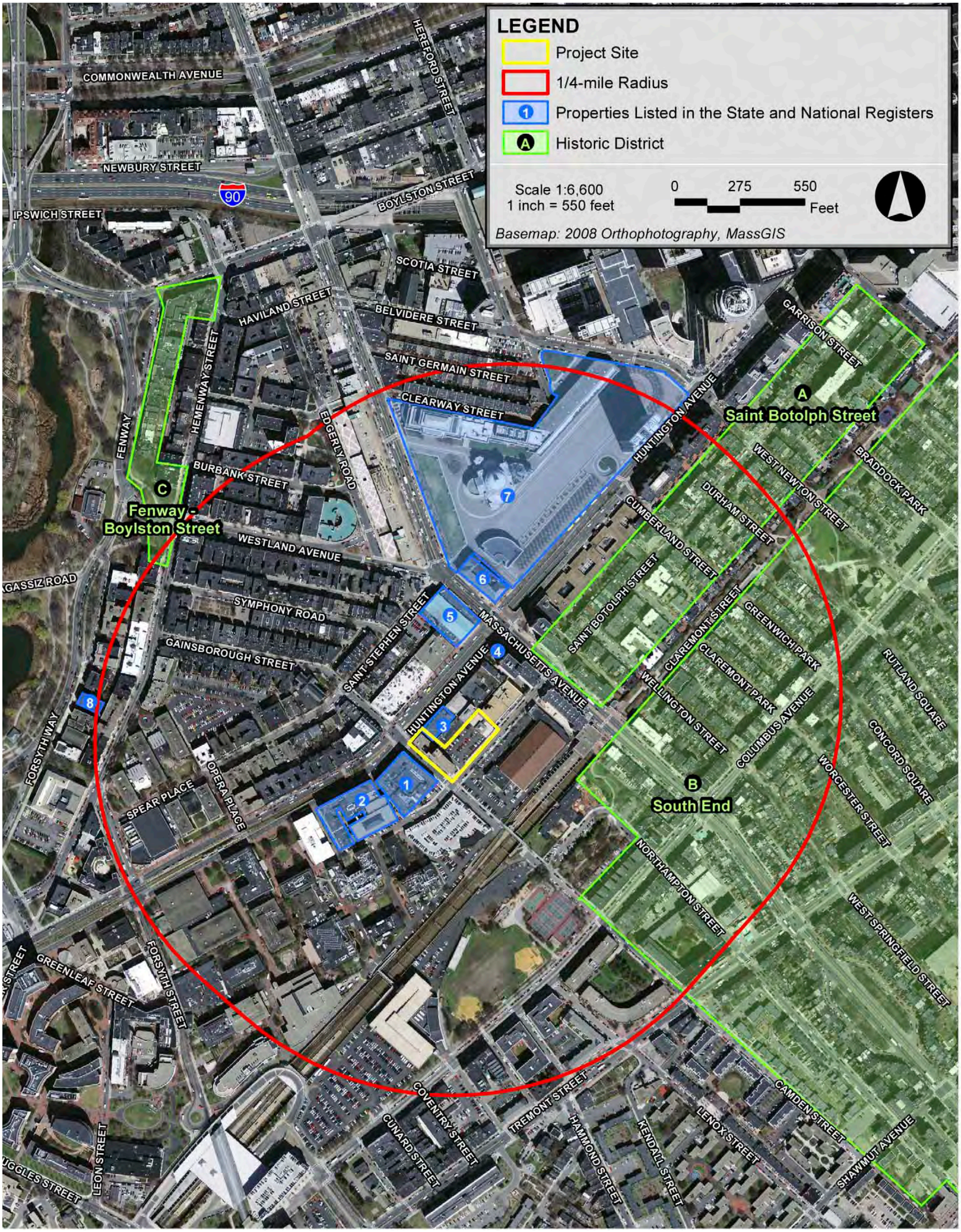

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Figure 6-24
Historic Resources

Table 6-15
State and National-Register Listed Resources within a Quarter-Mile Radius of the Project Site

Map	Name	Address	Designation
1.	New England Conservatory of Music – Jordan Hall	290 Huntington Ave.	National Register, National Historic Landmark
2.	Boston YMCA Building	312-320 Huntington Ave.	National Register
3.	The Riviera	270 Huntington Ave.	National Register
4.	Street Clock	333 Massachusetts Ave.	Local Landmark
5.	Symphony Hall	249 Huntington Ave. and 301 Massachusetts Ave.	National Register, National Historic Landmark
6.	Horticultural Hall	247 Huntington Ave. and 300 Massachusetts Ave.	National Register
7.	Christian Science Center Complex	200-210 and 250 Massachusetts Ave., 177 and 235 Huntington Ave. and 101 Belvidere St.	Local Landmark
8.	Students House	96 The Fenway	National Register
A.	St. Botolph Street District	Harcourt St., Penn Central Railroad, alley north of Massachusetts Ave. and alley east Huntington Ave.	Local Historic District
B.	South End District	Bounded by Penn Central Railroad Camden St., Harrison Ave. and East Berkeley and Tremont St.	Local Landmark District, National Register Historic District
C.	Fenway – Boylston Street	Boylston, Westland and Hemenway St.	National Register Historic District

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6.12.3 Archaeological Resources

The Proposed Project sites consist of previously developed urban parcels. Due to previous development activities and disturbances, it is not anticipated that the sites contain significant archaeological resources

6.12.4 Impacts to Historic Resources

Removal of the Former Cotting School 1912 Pavilion Structure

The Proposed Projects includes the removal of the annex structure currently attached to the side of NEC's 241-247 St. Botolph Street building. As discussed above, the pavilion was constructed in 1912 and was originally located adjacent to the 1904 Cotting School building. To accommodate the construction of the Cotting School's 1926 addition, the single story pavilion was relocated to the west, set on a raised foundation and attached to the new addition. When the pavilion was relocated several of its original window openings were filled in with brick, thereby further compromising its architectural integrity.

The pavilion structure is mentioned on the MHC Inventory form for the Cotting School for Handicapped Children (BOS.7587). The 1926 relocation, and associated modifications including its placement on a raised foundation and infilling of windows, have compromised the structure's integrity. The annex is currently used as NEC's maintenance shop and storage facility.

Demolition of 33 Gainsborough Street

While the building located at 33 Gainsborough Street is notable as a representative example of mid-century Modernist architecture, it is not believed to have particular historic or architectural significance. The building's architect, James Cleveland Hopkins Jr. (1914-1998), and his associated firm of Kilham, Hopkins, Greeley & Brodie, were responsible for the designs of many early-to-mid 20th century municipal and institutional buildings in Massachusetts. However, neither he nor his firm appears to have played a significant role in the development of the Modernist movement.

The building is not included in the MHC Inventory and has not been identified among significant examples of mid century Modern architecture in the City of Boston.

Design and Visual Impacts

As discussed in greater detail in Chapter 3, *Urban Design*, the urban design concept for the Proposed Projects is two-fold: to unify and strengthen the sense of place on NEC's campus, and to engage the public by heightening their perception of NEC. This will be accomplished by creating a new visual permeability of its buildings and in turn of the broad range of the activities they offer and by connecting the campus through the unifying effect of building treatment along the streets that run by and through it – Huntington Avenue, Gainsborough Street, and St. Botolph Street.

NEC's two historic buildings, Jordan Hall and 241 St. Botolph Street, each of which have recently undergone substantial rehabilitation and preservation work, will remain and serve important roles as bookends of the NEC campus; complimented by the new construction to be built between them.

The first three floors of the Student Life and Performance Center will form a base for the new building and will align vertically at its eastern end with the face of the adjacent 241 St. Botolph Street building. In addition, the cornice line of the base of the new building will align with the cornice of the existing 241 St. Botolph Street building. Likewise, the cornice line of the first three floors of the new Learning Center will align with that of the Jordan Hall Building across Gainsborough Street.

The prominence of Jordan Hall will be enhanced by creating a new vista of the building from St. Botolph Street that does not exist today due to the existing 33 Gainsborough Street building's occupancy of the corner of Gainsborough and St. Botolph Streets. This view will be made possible by the design of the southwest elevation of the Learning Center building, whose recessed and chamfered corner will offer pedestrians and drivers moving west on St. Botolph Street a longer-distance appreciation of the proportion and craft of NEC's National Historic Landmark building.

The streetscape along Huntington Avenue will also be enlivened with the removal of the existing closed masonry library wall of the 33 Gainsborough Street building. Replacing the existing blank wall with a glass-enclosed public coffeehouse and NEC performance venue will provide an opportunity for a new and welcoming public face for NEC and reinforce and strengthen NEC's important role as a cultural institution on the portion of Huntington Avenue known as the Avenue of the Arts.

While respectful of the existing historic buildings, the character of the new buildings will be distinctly and purposely contemporary, emblematic of the forward-looking mission of NEC as a world-class music conservatory. The transparency of the new buildings will be in contrast, yet complimentary, to the heavy masonry of Jordan Hall and 241 St. Botolph Street; highlighting the early 20th century craft of the historic buildings.

Shadow Impacts

As discussed in greater detail earlier in this chapter, the Proposed Projects will result in some new shadow. Given that the site of the proposed new Student Life and Performance Center is generally comprised of an existing surface parking lot, some new shadow will be inevitable. For example, because the west elevation of NEC's 241 St. Botolph Street building faces the parking lot some new shadow will be cast on that side elevation. Generally however, new shadow will be cast on Huntington Avenue and St. Botolph Street and their sidewalks.

Typical of a densely built urban area, some new shadow will also be cast on the rooftops of adjacent buildings to the west, north, and east of the new buildings. For example, during two of the time periods studied there will be some additional morning shadow cast on the rooftop of the Riviera Building, 270 Huntington Avenue. Similarly, during three of the time periods studied, there will be some additional afternoon shadow cast on the rooftop of NEC's own 241 St. Botolph Street building.

All new shadows will be limited to isolated areas and last a short duration and will not have any material impact on the integrity of the historic resources in the area. At no time during any of the time periods studied will there be new shadow cast on NEC's Jordan Hall building.

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6.12.5 Status of Project Review with Historical Agencies

Massachusetts Historical Commission

The Proposed Projects may require state financial assistance and/or approvals, thereby triggering review by the Massachusetts Historical Commission (MHC) in accordance with Massachusetts General Laws Chapter 9, ss 26-27C as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00). NEC will be filing a MHC Project Notification Form (PNF) to formally notify the MHC of the Proposed Projects and to initiate the MHC consultation process.

For many years the MHC has held a Preservation Restriction on the Jordan Hall building. As a result, any interior or exterior work done to the building was and remains subject to review and approval by MHC. Through the on-going review process, NEC has developed a firm understanding of the MHC review process and the agency's requirements and expectations. The Proponent is committed to working with the MHC, and other interested parties including the Boston Landmarks Commission and Boston Preservation Alliance, as part of the MHC consultative review process.

Boston Landmarks Commission

Because the 1912 Cotting School annex, currently attached to west side of 241-247 St. Botolph Street, is greater than 50 years old, its proposed removal is subject to review by the Boston Landmarks Commission (BLC) in accordance with Article 85 of the Boston Zoning Code. Likewise, the building at 33 Gainsborough Street is also greater than 50 years old and therefore is also subject to Article 85 review by the BLC. An Article 85 application for the demolition of the two buildings will be submitted to the BLC at the appropriate time. NEC is committed to working collaboratively with the BLC and the community throughout the Article 85 review process.

7

Infrastructure Systems Component

7.1 Introduction

This chapter of the IMPNF/PNF outlines the existing utilities surrounding the Proposed Project sites, the proposed connections required to provide service to the new structures, and any impacts on the existing utility systems that may result from the construction of the Proposed Projects. The following utility systems are discussed herein:

- Sewer
- Domestic water
- Fire protection
- Drainage
- Natural gas
- Electricity
- Telecommunications

The Proposed Projects consist of two phases: Phase I - the Student Life and Performance Center Project (the SLPC Project) and Phase II – the Learning Center Project (the LC Project). Phase I will also include a Phase IA renovation portion. Phase I includes the construction of a new 10-story Student Life and Performance Center building on the existing parking lot on the northwesterly side of St. Botolph Street, adjacent to the existing building at 241 St. Botolph Street. The Student Life and Performance Center Project will include student residences, a dining area and academic and performance spaces. The building will be bounded by Public Alley Number 821 to the northwest, Public Alley Number 822 to the southwest, St. Botolph Street to the southeast, and the existing building at 241 St. Botolph Street to the northeast. Phase IA consists of interim interior renovations to the existing building at 33 Gainsborough Street where the existing dormitory will be converted to temporary office and academic spaces. Phase II of the IMP involves the demolition of the building at 33 Gainsborough Street and construction of a seven-story Learning

Center building which will house primarily academic spaces. The LC project building will be bounded by Huntington Avenue to the north, Gainsborough Street to the west, St. Botolph Street to the south, and Public Alley Number 822 to the east.

7.2 Sewer Infrastructure

There are existing Boston Water and Sewer Commission (BWSC) sanitary sewer and combined sewer systems in Gainsborough Street, St. Botolph Street and Public Alley Number 821 adjacent to the project sites. The Phase I site is adjacent to the 12-inch sanitary sewer main in Public Alley 281 that flows southwesterly under the existing 33 Gainsborough Street building to connect to the 90-inch x 92-inch combined sewer, referred to as the Boston Main Interceptor, in Gainsborough Street. The Boston Main Interceptor consists of a 90-inch x 92-inch combined sewer which flows southeasterly and ultimately discharges to the Massachusetts Water Resources Authority (MWRA) Deer Island Waste Water Treatment Plant for treatment and disposal. There are two combined sewer mains located in Gainsborough Street adjacent to the Phase II site. The combined sewer main closest to the building is the 90-inch x 92-inch Boston Main Interceptor. The other combined sewer, located near the middle of Gainsborough Street, is a 15-inch combined sewer that flows northwesterly and connects to the Boston Main Interceptor before crossing into Huntington Avenue. Adjacent to the Phase II site, beneath St. Botolph Street there is an 18-inch x 21-inch sanitary sewer main which flows westerly to the Boston Main Interceptor in Gainsborough Street. Within the Phase II site, there is also a 12-inch sanitary sewer main that runs southwesterly under the existing 33 Gainsborough Street building from Public Alley 281 to Gainsborough Street, as mentioned above. The existing sewer system is illustrated in **Figure 7-1**.

The existing site of the Phase I project is currently used as a parking area with a small 2-story annex building that does not have any existing sewer connections to BWSC systems. Sanitary sewage from the project site for 33 Gainsborough site building is currently discharged to one of the adjacent sewer systems described above and is ultimately discharged into the Boston Main Interceptor.

7.2.1 Wastewater Generation

The Proposed Projects' sewage generation rates were estimated using the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program section 314 CMR 7.00, and the proposed building program. 314 CMR 7.00 lists typical generation values for the sources listed in **Table 7-1** for the Proposed Projects. Typical generation values are generally conservative values for estimating the sewage flows from new construction. 314 CMR 7.00 sewage generation values are used to evaluate new sewage flows or the increase in flows to

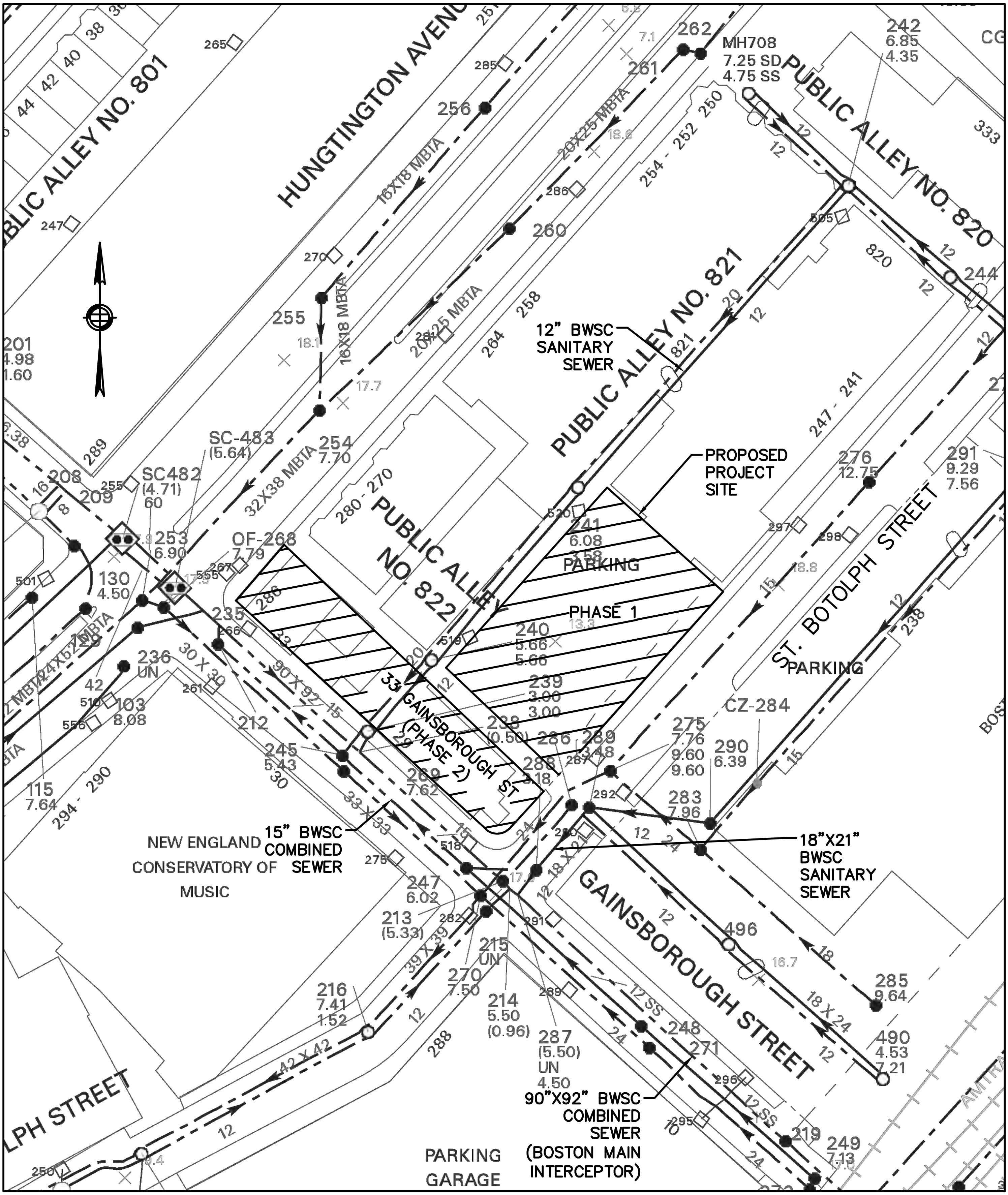

Figure 7-1 - Existing Sewer System
Not to Scale

existing connections. **Table 7-1** describes the increased sewage generation in gallons per day (gpd) for each phase of the Proposed Projects.

Table 7-1
Proposed Projects Sewage Generation

Use	Size	Rate	Total
Phase I: Existing Generation: Student Life and Performance Center Project			
No Existing Connection	-	-	0 gpd
Phase IA: Existing Generation: Interim Renovation Project			
Dormitory	163 Beds	110 gpd per bed	17,930 gpd
Library	10,000 SF	75 gpd per 1,000 SF	750 gpd
Cafeteria	105 Seats	35 gpd per seat	3,675 gpd
Phase I and Phase IA Existing: Total Existing Generation Due to Student Life and Performance Center Project and the Interim Renovation Project			22,355 gpd
Phase I: Proposed Generation: Student Life and Performance Center Project			
Dormitory	252 Beds	110 gpd per bed	27,720 gpd
Dining Commons	210 Seats	35 gpd per seat	7,350 gpd
Library	26,318 SF	75 gpd per 1,000 SF	1,974 gpd
Black Box Theater	198 Seats	3 gpd per seat	594 gpd
Rehearsal Space/Recording Room	13,509 SF	75 gpd per 1,000 SF	1,013 gpd
Phase IA: Proposed Generation: Interim Renovation Project			
Practice Rooms/Faculty Studios/Facilities Department/Academic Use	56,507 SF	75 gpd per 1,000 SF	4,238 gpd
Phase I and Phase IA Proposed: Total Proposed Sewage Generation Due to Student Life and Performance Center Project and the Interim Renovation Project			42,889 gpd
Phase I and Phase IA Summary: The difference in sewage generation between the Total Existing Phase I and Phase IA program and the Total Proposed Phase I and Phase IA programs equal the total increase in sewage generation due to the proposed Phase I and Phase IA improvements [42,899 gpd (proposed) - 22,355 gpd (existing)]			20,534 gpd
Phase II: Existing Generation: Learning Center Project - Existing Generation: Improvements from Phase IA Interim Renovation Project	56,507 SF	75 gpd per 1,000 SF	4,238 gpd
Phase II: Proposed Generation: Learning Center Project			
Practice Rooms/Faculty Studios/Facilities Department/Academic Use	58,383 SF	75 gpd per 1,000 SF	4,379 gpd
Coffeehouse	60 Seats	35 gpd per seat	2,100 gpd
Phase II Proposed: Total Proposed Sewage Generation Due to Learning Center Project			6,479 gpd
Phase II Summary: The difference in sewage generation between the Total Existing Phase II and the Total Proposed Phase II program equals the total increase in sewage generation due to the proposed Phase II improvements [6,479 gpd (proposed) – 4,238 gpd (existing)]			2,241 gpd
Total Expansion of Flows due to Proposed Projects: Phase I, Phase IA and Phase II:			22,775 gpd

■

7.2.2 Sewage Capacity and Impacts

The Proposed Projects' impact to the existing BWSC systems in the adjacent streets were analyzed. The existing sewer and combined sewer systems capacity calculations are presented in **Table 7-2**.

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)
Gainsborough St. – 90"x92" Combined Sewer	2500	1	0	0.04	90	0.013	153.57	99.26
Gainsborough St. – 15" Combined Sewer	160	6.19	6.02	0.11	15	0.013	2.11	1.36
Public Alley 821 12" Sewer	55	3.16	3.00	0.29	12	0.013	1.92	1.24

Notes: 1. Information taken from BWSC Sewer System Map no. 21I.
2. Flow Calculations based on Manning Equation
3. All pipes assumed to be vitrified clay, to be conservative

The existing adjacent roadway sewer systems in Gainsborough Street and Public Alley 822 were analyzed for impacts due to the potential building service connections as part of the Proposed Project.

Results shown in **Table 7-2** indicate the minimum hydraulic capacity of the 90″x92″ Boston Main Interceptor combined sewer main within Gainsborough Street near the Proposed Project is 153.57 million gallons per day (MGD) or 99.26 cubic feet per second (cfs). Based on an average daily flow estimate for the Proposed Project of 22,775 gpd or 0. 23 MGD and with a factor of safety of 10 (total estimate = 0.023 MGD x 10 = 0.23 MGD), capacity problems are not expected within the Boston main Interceptor system.

Results shown in **Table 7-2** indicate the minimum hydraulic capacity of the 15-inch combined sewer main within Gainsborough Street near the Proposed Project is 1.36 MGD or 2.11 cfs. Based on an average daily flow estimate for the Proposed Projects of 22,775 gpd or 0. 23 MGD and with a factor of safety of 10 (total estimate = 0.023 MGD x 10 = 0.23 MGD), capacity problems are not expected within the 15-inch combined sewer main in Gainsborough Street.

Results shown in **Table 7-2** indicate the minimum hydraulic capacity of the 12-inch sanitary sewer main within Public Alley 821 near the Proposed Project is 1.92 MGD or 1.24 cfs. Based on an average daily flow estimate for the Proposed Projects of

22,775 gpd or 0. 23 MGD and with a factor of safety of 10 (total estimate = 0.023 MGD x 10 = 0.23 MGD), capacity problems are not expected within the 12-inch sanitary sewer system in Public Alley 821.

Proposed Conditions

Sanitary sewage generated by the Proposed Projects will be discharged to the adjacent BWSC sanitary or combined sewer systems. It is anticipated that the Phase I building will discharge sanitary sewage to the 12-inch sanitary sewer main in Public Alley 281. The renovations associated with the Phase IA project will maintain the existing sewer connection for the 33 Gainsborough building and will not require modifications. As part of the demolition of the existing 33 Gainsborough Street building in Phase II, the existing sewer connections to the BWSC systems will be disconnected in compliance with BWSC requirements. The proposed Phase II building will discharge sanitary sewage to one of the adjacent dedicated sanitary or combined sewer mains in the adjacent streets and will be reviewed and approved by the BWSC engineering staff as part of the design process and the BWSC Site Plan Approval process for the Proposed Projects. NEC is anticipated to maintain the existing 12-inch BWSC sewer main that that crosses the site from Public Alley 821 and under the proposed building to connect to the Boston Main Interceptor in Gainsborough Street. NEC will work closely with the BWSC to design the new building so that there are no negative impacts to the existing BWSC 12-inch sanitary sewer main and will provide upgrades to the service as deemed necessary.

NEC will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. In addition, the Proponent will submit a General Service Application and site plan for review as the project progresses. The SLPC Project and Interim Renovation Project will generate new wastewater flow exceeding 15,000 gallons per day but less than 50,000 gpd, which will require completion of a Department of Environmental Protection Compliance Certification BRP WP 73, Sanitary and Industrial Connections Greater than 15,000 gpd but less than or equal to 50,000 gpd. The LC Project will not exceed new sewage generation of 15,000 gallons per day and will require only BWSC approval.

All improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process for the Proposed Projects. This process includes a comprehensive design review of the proposed service connections, an assessment of project demands and system capacity, and the establishment of service accounts.

7.3 Water Infrastructure

Water for the Proposed Project sites is provided by the BWSC. There are five different water systems within the city, and these provide service to portions of the city based on ground surface elevation. The five BWSC water 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 16-inch southern low water main and a 20-inch southern high water main beneath the eastbound lanes of Huntington Avenue, a 42-inch southern high water main and an 8-inch southern low water main beneath Gainsborough Street, a 42-inch southern high water main and a 10-inch southern low water main beneath St. Botolph Street and an 8-inch southern high water main beneath the private extension of Public Alley 822 near Huntington Avenue. The existing water system is illustrated in **Figure 7-2**.

The Phase I Project site is currently used as a parking area with a small 2-story annex building that does not have any existing water connections to BWSC systems. BWSC records indicate that existing water services for the 33 Gainsborough site building are connected to the BWSC water mains in Gainsborough Street and the private portion of Public Alley 822 near Huntington Avenue.

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7.3.1 Water Consumption

The Proposed Projects' water demand estimate for domestic services is based on the Proposed Projects' estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater generation calculated with 314 CMR 7.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The total estimated water demand due to the Phase I and Phase IA projects (the SLPC project, and the Interim Renovation Project) is approximately 47,178 gpd (based on a total sewage generation of 42,889 gpd) of domestic water. The LC project will require approximately 7,127 gpd of domestic water (based on the completed building sewage generation of 6,479 gpd). The water for the Proposed Projects will be supplied by the BWSC system.

All efforts to reduce water consumption will be made. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

All 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 and fire protection service connections. New meters will be installed with Meter Transmitter Units (MTU's) as part of the Boston Water and Sewer Commission's Automatic Meter Reading (AMR) system.

7.3.2 Existing Water Capacity and Impacts

BWSC record flow test data containing actual flow and pressure for a hydrant within the vicinity of the Proposed Project sites was available. Additional testing will be required once the design progresses, as hydrant flow data should be less than a year old to be used as a design tool. The results of the BWSC testing near the Proposed Project sites are indicated in **Table 7-3**.

Table 7-3
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
H72 Gainsborough Street	05/03/2003	67	57	3,724	8,589	9,532

Note: 1. Data provided by BWSC, October 11, 2011

Proposed Projects

The domestic and fire protection water service connections required by the Proposed Projects 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 includes, but is not limited to, 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.

Proposed Impacts

Water capacity problems are not anticipated within this system as a result of the Proposed Projects' construction.

7.4 Stormwater

There are BWSC storm drain systems in Gainsborough Street, St. Botolph Street and Public Alley 821. The Phase I site is adjacent to a 15-inch storm drain main in St; Botolph Street which flows northwesterly to cross Gainsborough Street and continue to the 39-inch x 39-inch storm drainage system in St. Botolph Street. Additionally, the Phase I site is adjacent to the 20-inch storm drain main in Public Alley 281 that flows southwesterly under the existing 33 Gainsborough Street building to connect to

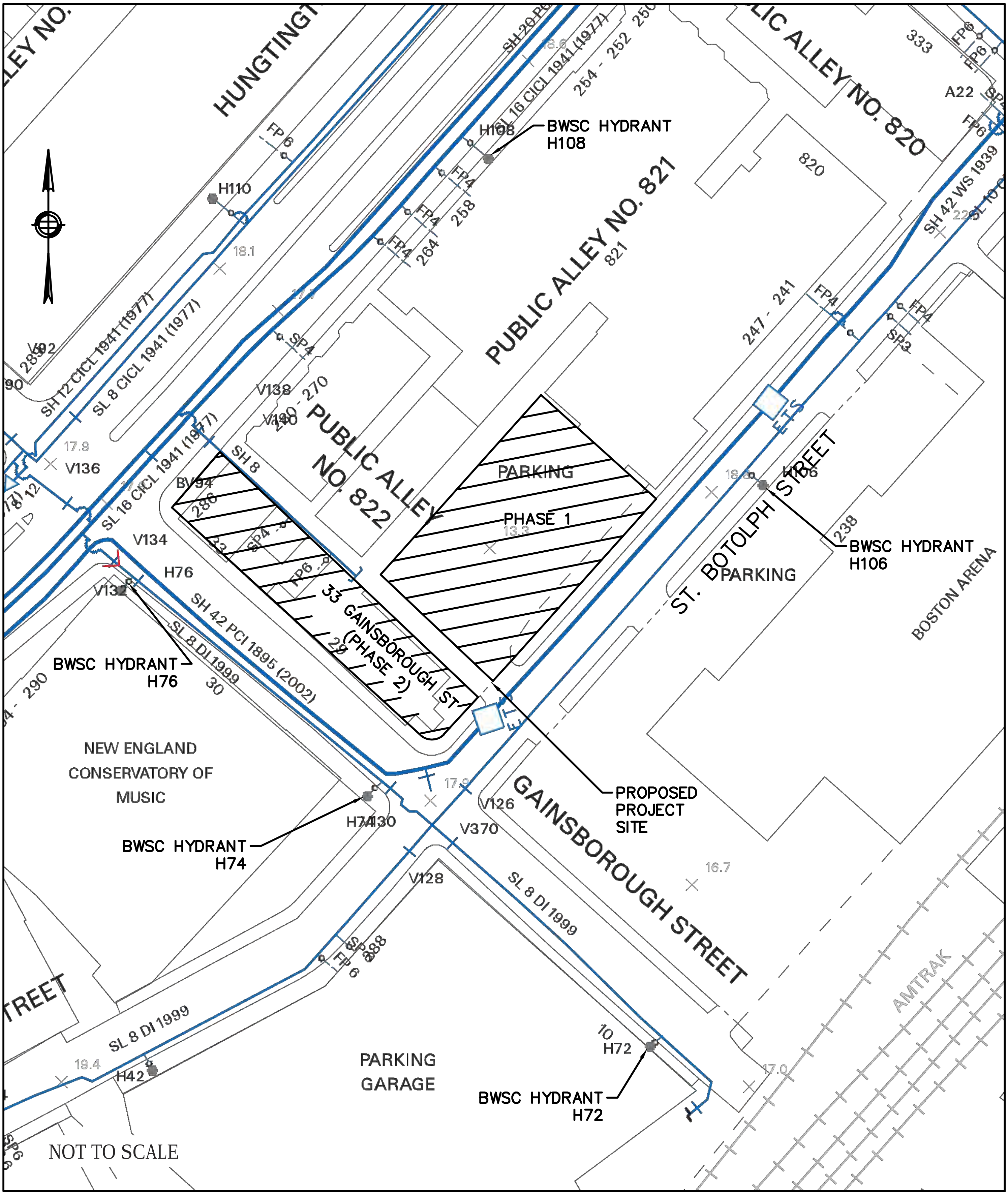

Figure 7-2 - Existing Water System
Not to Scale

the 15-inch combined sewer main in St. Botolph Street. Adjacent to the Phase II site, in Gainsborough Street, there is a 30-inch x 30-inch storm drain main flowing southeasterly, which increases to a 33-inch x 33-inch main and connects to the 39-inch x 39-inch storm drainage system in St. Botolph Street. Within the Phase II site, there is also a 20-inch storm drain main that runs southwesterly under the existing 33 Gainsborough Street building from Public Alley 281 to Gainsborough Street, as mentioned above. There is also a Massachusetts Bay Transportation Authority (MBTA) storm drain system located beneath Huntington Avenue. The MBTA system consists of a 32-inch x 38-inch storm drain main beneath the northeast-bound lanes. The existing storm drainage system is illustrated in **Figure 7-3**.

The existing site of the Phase project I is currently used as a parking area with a small 2-story annex building that does not have any existing storm drainage connections to BWSC systems. The existing parking area does not have a closed drainage system; stormwater runoff from the site flows to the adjacent properties and closed drainage systems within the adjacent streets. At the Phase II site, BWSC records do not indicate locations of existing roof drainage system connections from the 33 Gainsborough Street building to the BWSC system.

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7.4.1 Proposed Projects

Stormwater runoff generated from the roofs of the Proposed Projects' buildings, landscaped and paved areas will be collected, treated, and conveyed through a closed drainage system to a groundwater recharge system that will overflow to the BWSC storm system in the adjacent streets in large storm events. Stormwater runoff collected from the roof of the proposed SLPC project and the LC project will be routed through groundwater recharge systems with the capacity of collecting, storing and recharging one-inch of stormwater as required by Article 32 before overflowing to an adjacent BWSC storm drainage system. The Proposed Projects are expected to slightly decrease the amount of impervious area at the sites compared to the existing conditions in both Phase I and Phase II.

The combination of the decrease in impervious areas on site and the roof runoff recharge will help to promote groundwater recharge on site and reduce peak rates of runoff from the site. Any required site closed drainage systems will be designed so there will be no increase in the peak rate of stormwater discharge from the Proposed Projects in the developed condition compared to the existing condition.

All improvements and connections to BWSC infrastructure will be reviewed as part of the Commission's site plan review process. This process includes a comprehensive design review of the proposed service connections, assessment of project demands and system capacity, and compliance with the Groundwater Conservation Overlay District as described in the City of Boston Zoning Code Article 32.

7.4.2 Groundwater Conservation Overlay District

The Proposed Project sites are located within the City of Boston's Groundwater Conservation Overlay District (GCOD) and therefore the projects are required to infiltrate at least one-inch of stormwater runoff from impervious areas into the ground to meet Article 32 of the Boston Zoning Code. **Table 7-4** below, indicates the anticipated volume of runoff required for recharge for each phase of the Proposed Projects. The stormwater management systems for both of the proposed buildings will include groundwater recharge systems. It is anticipated that the stormwater recharge systems will work to passively infiltrate site runoff into the ground with a gravity recharge system or with a combination of storage tanks in the building and pumps. Conceptual design for each phases recharge systems are found in **Figure 7-4**.

As mentioned above, the Proposed Projects will decrease the amount of impervious area on the site, which will also increase groundwater recharge and aid to raise the water table. The Proponent will work closely with the City of Boston and the Boston Groundwater Trust to reduce water table impacts during and after construction of the Proposed Projects.

Table 7-4
GCOD Recharge Volume Calculations

Phase	Impervious Site Area (square feet)	1” Runoff Recharge Depth (feet)	Total Recharge Volume (cubic feet)	Total Recharge Volume (gallons)
Phase 1	19,905±	0.0833	1,659	12,407±
Phase 2	11,316±	0.0833	943	7,054±

Note: As the site design progresses, this Impervious Site Area value may be reduced to account for proposed pervious areas, which will naturally recharge runoff and are not counted in the GCOD recharge area calculations.

7.4.3 Water Quality Impact

The Proposed Projects 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, hay bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until all 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 Proposed Projects

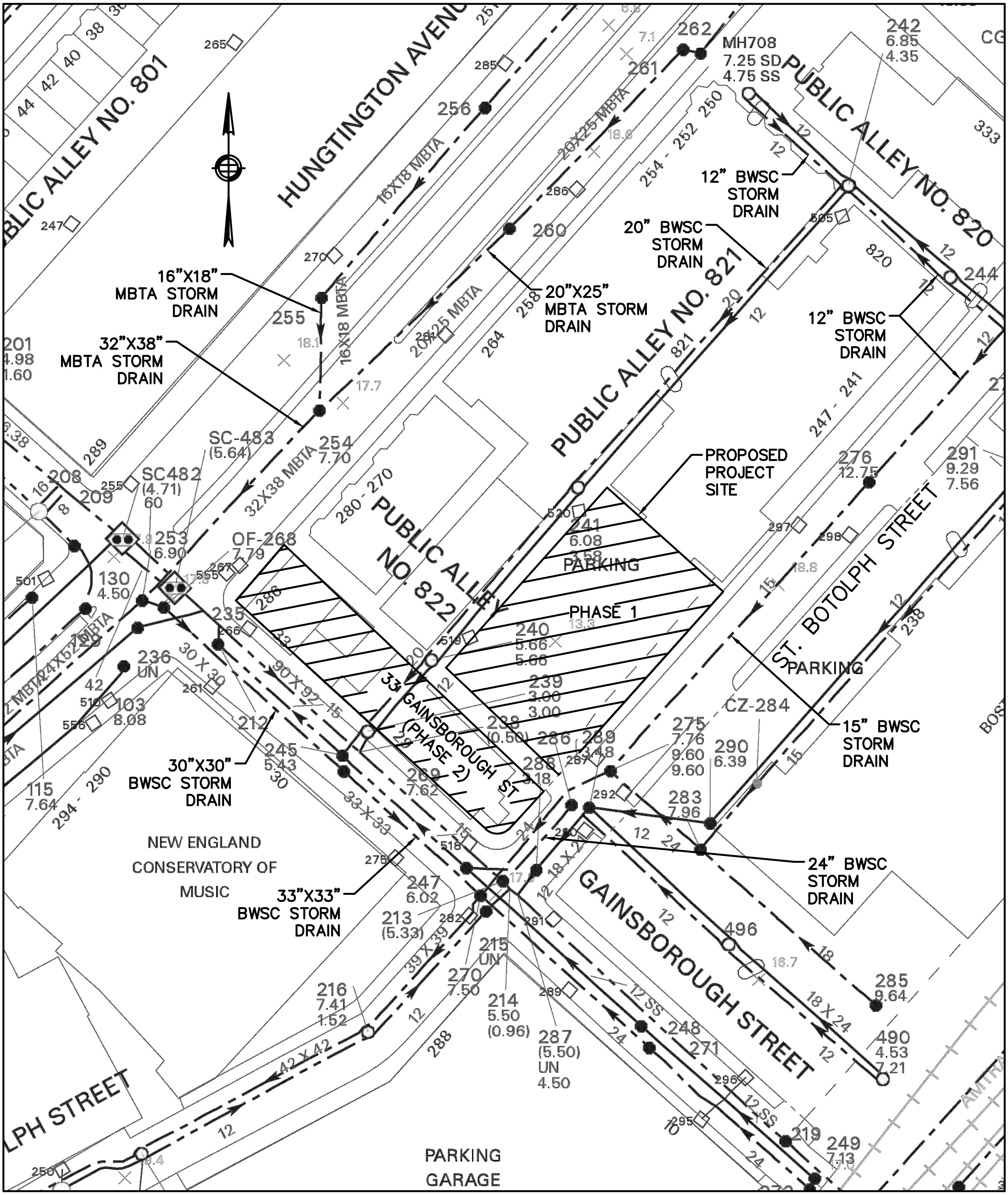

Figure 7-3 - Existing Storm Drain System

Not to Scale

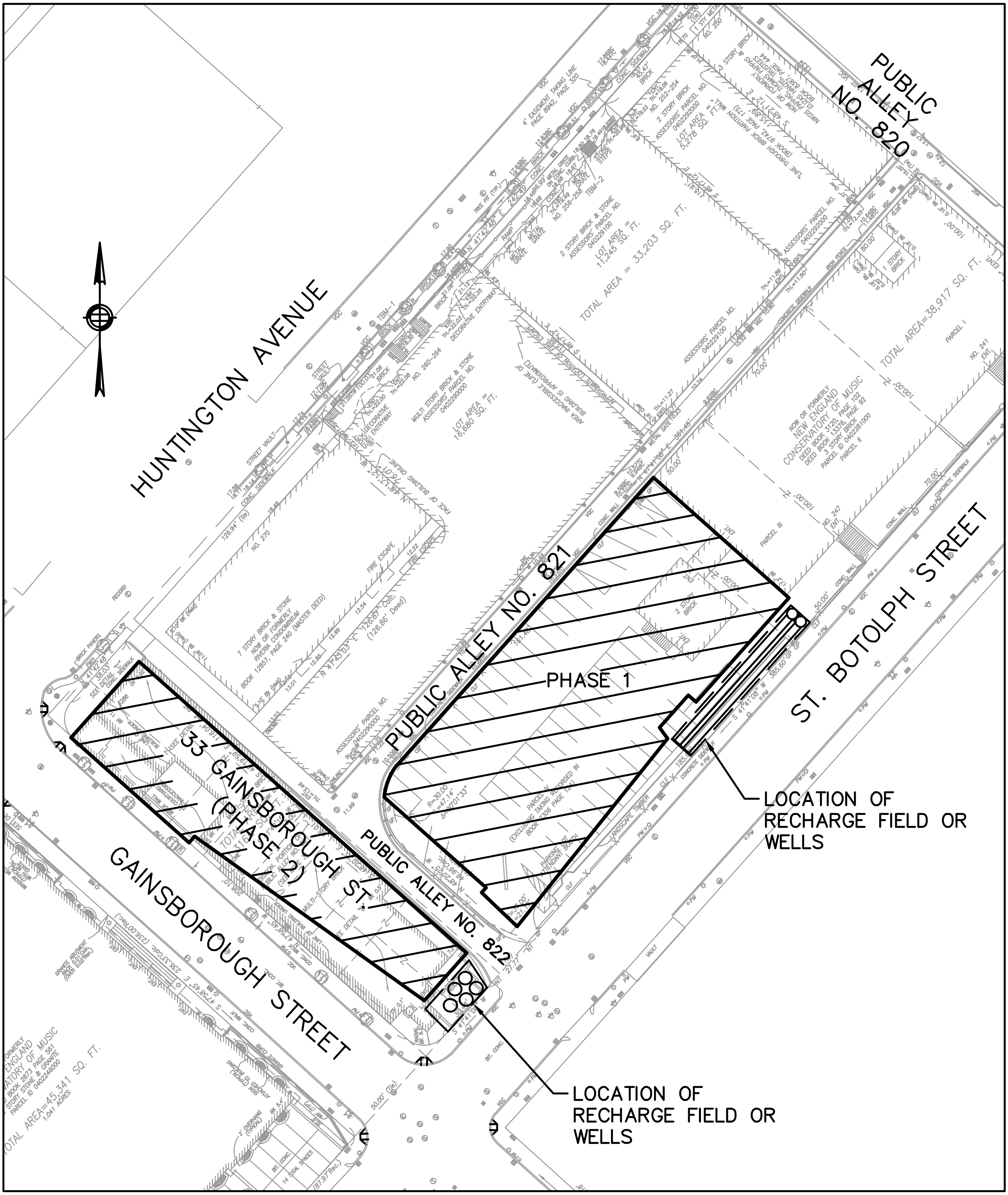

Figure 7-4 - Conceptual Recharge Locations
Not to Scale

will each be in compliance with all local and state stormwater management policies. See below for additional information.

7.4.4 DEP Stormwater Management Policy Standards

In March 1997, the Department of Environmental Protection DEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, the Massachusetts DEP 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:

<u>Standard #1:</u> 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 Proposed Projects.

<u>Standard #2:</u> Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Compliance: The proposed design will comply with this Standard. The existing discharge rate will be met or decreased as a result of the improvements associated with the Proposed Projects.

<u>Standard #3:</u> Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.

Compliance: The Proposed Projects will meet and exceed this standard. The Projects will comply with the Boston Redevelopment Authority's Groundwater Overlay Conservation District requirement to recharge one-inch of stormwater over the entire impervious area of the Proposed Project sites.

<u>Standard #4:</u> For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when: Suitable nonstructural practices for source control and pollution prevention are implemented; Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and Stormwater management BMPs are maintained as designed.

Compliance: The proposed designs will comply with this standard. Within the Proposed Projects' limit of work, there will be mostly roof, landscaping, and pedestrian areas. Any paved areas that would contribute unwanted sediments or pollutants to the existing storm drain system will be collected by deep sump, hooded catch basins and conveyed through water quality units before discharging into the BWSC system.

<u>Standard #5:</u> 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 there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

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

<u>Standard #6:</u> Stormwater discharge to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold-water fisheries and recharge areas for public water supplies.

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

<u>Standard #7:</u> 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 Proposed Projects are both redevelopments and their designs will comply with this Standard. The Proposed Projects comply with the Stormwater Management Standards as applicable to the redevelopment.

<u>Standard #8:</u> Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

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

<u>Standard 9:</u> 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 Proposed Projects will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the Proposed Projects and will assure proper maintenance and functioning of the stormwater management system.

<u>Standard 10:</u> All illicit discharges to the stormwater management system are prohibited.

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

7.5 Protection Proposed During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during construction of each component of the Proposed Projects. 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.

NEC will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Proposed Projects.

7.6 Conservation of Resources

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 restrooms will be incorporated into the design plans for the Proposed Projects.

7.7 Proposed Energy Usage and Impacts

7.7.1 Phase I – Student Life and Performance Center Project

The following types of energy resources will likely be required in connection with NEC's Phase I:

- Chilled Water
- Heating Hot Water
- Air Systems
- Humidity Control
- Exhaust
- Domestic Hot Water Heating
- Domestic Water Booster Pump
- Fire Protection – Fire Pump
- Electrical

Natural gas is expected to provide the energy to meet the Proposed Projects' heating, hot water and domestic hot water demands with an annual gas consumption estimated at 285,000 therms, with a peak demand of 92 therms/hr in January. The buildings' heating energy will be generated on-site by high efficiency gas-fired boilers and domestic water heaters. Natural gas demands and availability will be coordinated with National Grid. Currently, chilled water is expected to be generated on-site.

Natural Gas

Natural gas will be utilized by new hot water boilers to generate heating hot water and domestic water. Gas will also be utilized for cooking in the kitchen. The gas service will be extended from the existing utility gas main in the street (Huntington Avenue). Natural gas demands and availability will be coordinated with National Grid.

Natural gas is expected to provide the energy to meet the Proposed Projects' heating hot water, domestic hot water, and cooking demands with an annual gas consumption estimated at 285,000 therms, and a peak demand of 92 therms/hr in January. The building's heating energy will be generated on-site by high efficiency gas-fired boilers and domestic water heaters. The condensate from the condensing boilers will be neutralized prior to being sent to drains which feed to Huntington Avenue's sewer system.

Cooling

Water-Cooled Chillers and Cooling Tower

The estimated cooling load for the proposed building is 450 tons. Chilled water will be produced by two 225-ton water-cooled chillers located in the basement mechanical room. Chilled water distribution will utilize primary and secondary pumping. Three primary pumps will be provided. One primary pump will be a backup. The two secondary pumps will have primary/standby operation and will be fitted with variable frequency drives for variable volume operation. Space will be reserved for the addition of a third chiller and additional pumps to meet demand for potential future expansion of this central system to serve demand from the existing 241 St. Botolph Street buildings, which does not have a central chilled water plant.

Different types of water-cooled chillers will be considered. These include variable speed chillers, variable flow chillers, heat recovery chillers, and frictionless chillers. Variable speed chillers and frictionless chillers both have very high performance efficiencies. Variable flow chillers reduce the system pump energy, and heat recovery chillers can provide a pre-heat source for the large domestic hot water demand.

Heat rejection will be accomplished with either two cooling towers or a single two-cell cooling tower located on the roof. Each cell will have the capability of operating independently when the second cell is out of service. Three condenser water pumps will be provided. One pump will be a backup. Space will be reserved for the future addition of a third cooling tower cell and an additional condenser water pump to meet demand for future expansion of this central system to serve demand from the existing 241 St. Botolph Street buildings, which does not have a central chilled water plant.

The secondary chilled water distribution will utilize 2-way control valves. A differential pressure sensor will control the secondary pump speed and a differential pressure bypass will maintain pump speed above 25%.

Water-Side Economizer

A water-side economizer (WSE) will utilize cold condenser water during the heating season to generate chilled water for the winter cooling loads. This will avoid the need to provide air-side economizers (ASE) that would require very large ducts and shafts to permit cooling with 100% outside air. The WSE system will include a plate and frame heat exchanger piped in parallel with the chillers, and two-position isolation control valves on the condenser water and chilled water connections. Head pressure control will be required for the chillers to allow a smooth transition when going from WSE operation to chiller operation.

Heating

General

The heating demand for the building is estimated at 3,500 MBH. Domestic hot water heating equipment will likely be independent of the heating hot water equipment so that the condensing boilers can maintain operation at lower temperatures.

Hot Water Boilers

Heating hot water will be generated by a minimum of two high-efficiency, gas-fired, hot water boilers. The boilers will be direct-vented. The direct vents will terminate at the building sidewall in lieu of non-direct vent systems that would require a chimney terminating at the roof.

Each boiler will have a dedicated primary pump. Secondary pumps in a primary/standby arrangement will distribute hot water to terminal heating equipment. The secondary pumps will be fitted with variable frequency drives for variable volume operation.

Air Systems

Outside Air Treatment (ERV – 1 and 2)

The 7,600 CFM outside air pretreatment systems will condition outside air through utilization of a desiccant wheel for energy recovery. Energy will be transferred with the building relief air, and possibly toilet exhaust air, to the incoming outside air to provide precooling in summer and preheating in the winter. One OA unit will serve the floors below level 4 and another, mounted on the roof, will serve floors 4 through 10 of the residential tower.

The unit serving the residential tower will include heating and cooling coils in order to temper ventilation air.

The unit serving the lower floors will be located on the fourth floor. Treated outside air will be ducted directly to each air handling unit. Relief air from each air system will be ducted to the OA unit exhaust inlet. Automatic dampers on the outside air supply and relief air ducts will be fitted with integral air flow measuring stations to maintain the required ventilation rated and building pressurization.

Black Box (AC-3), Ensemble (AC-4), Orchestra (AC-5)
Each of the performance spaces will be served with a dedicated air handling unit. The units will be single zone type with variable volume control. Multiple supply fan array systems will be considered in order to reduce sound power levels generated by the units. Ducts mains serving these spaces will have large cross-sectional areas in order to maintain duct air velocities lower than 750 FPM. Nearer to the outlets and inlets, duct velocities will be reduced to 450 FPM. The supply and return ducts will require sound attenuators and all supply and return ductwork will be acoustically lined. AC-3 will provide 7,600 CFM, AC-4 will provide 4,000 CFM, and AC-5 will provide 6,000.

Dining (AC-2)
The 12,000 CFM air system serving the dining areas and other miscellaneous area on the lower level and first floors will be variable volume reheat type.

Library (AC-1)
The 25,000 CFM air system serving the library areas and other miscellaneous areas on the lower second and third floors will be variable volume reheat type. A 10,000 CFM air handling unit will serve special collections areas.

Special Collections (AC-1A)
The 15,000 CFM air system serving the library areas and other miscellaneous areas on the lower second and third floors will be constant volume reheat type. Carbon filters will be utilized to provide gas phase filtration for this space.

Air-side Economizer (ASE)
The energy code requires that an economizer be provided for the climate zone including Boston for systems exceeding 135,000 BTUH cooling capacity. Both air-side and water-side economizers are permitted. If a water-side economizer is not used, ASE's will be required for each air handling unit exceeding 135,000 BTUH. The ASE requires use of 100% outside air to provide "free" cooling when outside air temperatures are favorable. For this building the water side economizer is preferred over the ASE so that sizes of outside air and relief air ducts can be minimized.

Humidity Control

1. Humidifiers will be provided for all performance and instrument storage spaces to maintain relative humidity levels above 30%.
2. All building spaces will utilize dehumidification capabilities of air system cooling coils to maintain the relative humidity below 55%.
3. The system serving the library archive space will be provided with a humidifier and humidity controls to maintain a constant relative humidity throughout the year.

Exhaust

Toilet
Where permitted by the local codes, toilet exhaust will be processed through the energy recovery units to pretreat incoming outside air.

Kitchen
The kitchen hood exhaust system will require ductwork to be routed in a rated enclosure to the termination point. Typical installations include fire-rated duct wrap to minimize clearance requirements. The exhaust fans will be fitted with variable frequency drives to reduce exhaust fan energy use and make-up air during low demand periods.

General
Exhaust fans will likely be required for all mechanical rooms, electric rooms, janitor's closets, and trash rooms.

Domestic Hot Water Heating

General
The domestic hot water (DHW) heating can be accomplished either by tie-in to the heating hot water system, utilizing an independent gas-fired heater, or utilizing a steam-fired semi-instantaneous unit fed from the St. Botolph building steam boiler(s). The kitchen will require a higher water temperature in order to meet health codes. In order not to penalize the entire DHW system with higher energy use to maintain the higher temperature, separate DHW systems will be considered so that the DHW system serving lavatories and showers can be maintained at a lower temperature.

Gas-fired
Gas-fired instantaneous water heaters will be provided for both the kitchen DWH system and the toilet DWH system. Condensing-type heaters can achieve efficiencies above 90% and can utilize direct vents through the sidewall of the building.

Domestic Water Booster Pump

A domestic water booster pump will be required to supply domestic water to adequate pressure on all floors.

Fire Protection – Fire Pump

A fire pump will be required in order to provide adequate pressure for the building sprinkler systems.

Electrical Service

Service
Pending confirmation by the electric utility, NStar Electric, the underground high voltage primary service will originate from an existing utility manhole in St. Botolph Street and will continue to the utility transformer/network protector vault located in inside the building at Lower Level. Primary service conductors will be installed in duct bank. The utility vault is to be partially located below sidewalk and be accessible from street level via hatch or grating. Utility requires vault to house dual redundant transformers and network protectors. Approximate vault size to be 20'x40'x12'H. Refer to electrical drawings for additional utility vault construction requirements. Electrical service secondary duct bank and service conductors will be installed between the utility vault and main electric room located at Lower Level and terminate at the main distribution board (MDB).

Distribution
Main distribution board (MDB) will be 3000 A/480V utilizing molded case type distribution circuit breakers with solid state LSI trip functions for 400AF devices and larger to serve lighting and power panels, automatic transfer switches and elevators. Main circuit breaker will be 3000 ampere, stationary construction. Utility metering is included for the main switchboard and fire pump.

Sub-Distribution
Lighting and power panels will be located at each level in dedicated electrical rooms. Dry transformers are included in each electrical room to step down distribution voltage to 208/120 volts for receptacle panels and small appliance loads. Theatrical type lighting and power receptacles will be fed from separate K-13 rated transformer and distribution board(s). Audio Visual loads will be fed from separate K-13 shielded isolation transformer and isolated ground panel board(s).

Emergency and Standby Distribution
A diesel generator is planned to power emergency (life safety) and standby (non-life safety) loads. The generator and sub-base fuel storage tank may be located at the Mechanical Penthouse or the existing St. Botolph Building roof in a sound-attenuated

outdoor enclosure. Secondary fuel storage tank will be located at Lower Level with leak detection, controller and dual-pump system. The emergency power will serve life safety loads including: smoke control, lighting, security, communications and fire pump. The standby power will serve non-life safety loads including: non-simultaneous elevators, heating, pumps, and essential air handlers for freeze protection and minimal air conditioning.

Emergency and standby power transfer switches and distribution equipment will be located in dedicated electrical rooms and include feeders protected with minimum 1-hour fire rating per Massachusetts Electrical Code. Branch Circuit Transfer System will be provided for emergency lighting in Theatrical type spaces.

Lighting

Lighting for all public areas, non-public areas, building exterior, and site will be as specified by the Lighting Designer.

Architectural lighting control system will be provided for all public areas including automated schedule based controls, occupancy controls, day lighting dimming controls, site lighting relay type controls. Local occupancy controls will be used throughout the residence type spaces. Appropriate fixture cutoffs will be specified to minimize light pollution and impacts to adjacent structures.

■

7.7.2 Phase II – Learning Center Project

The following types of energy resources will likely be required in connection with NEC's Phase II:

- Chilled Water
- Heating Hot Water
- Air Systems
- Exhaust
- Perimeter Radiation
- Domestic Hot Water Heating
- Domestic Water Booster Pump
- Fire Protection – Fire Pump
- Electrical

Natural gas is expected to provide the energy to meet the new project's heating, hot water and domestic hot water demands with an annual gas consumption estimated at 93,000 therms, with a peak demand of 45 therms/hr in January. The building's heating energy will be generated on-site by high efficiency gas-fired boilers and domestic water heaters. Natural gas demands and availability will be coordinated with National Grid. Currently, chilled water is expected to be generated on-site.

Natural Gas

Natural gas will be utilized by hot water boilers in Phase 1 to generate heating hot water and domestic water. The gas service will be extended in Phase 1 from the existing utility gas main in the street (Huntington Avenue). Natural gas demands and availability will be coordinated with National Grid.

Natural gas is expected to provide the energy to meet the new project's heating hot water and domestic hot water demands with an annual gas consumption estimated at 93,000 therms, and a peak demand of 45 therms/hr in January. The building's heating energy will be generated on-site by high efficiency gas-fired boilers and domestic water heaters. The condensate from the condensing boilers will be neutralized prior to being sent to drains which feed to Huntington Avenue's sewer system.

Cooling

Water-Cooled Chillers and Cooling Tower

The estimated cooling load for the Phase II building is 225 tons. The location of the Phase II cooling tower is likely to be on the roof of the Phase II building, but the possibility of expanding the cooling tower system on the roof of the Phase I project will also be explored as an alternative.

The secondary condenser or chilled water distribution will utilize 2-way control valves.

Heating

The heating demand for the building is estimated at 1,200 MBH. Domestic hot water heating equipment will be independent of the heating hot water equipment so that the condensing boilers can maintain operation at lower temperatures.

The boiler plant for the Phase II project is anticipated to be located in the mechanical penthouse area of the building, but an alternative involving the addition of a third hot water boiler to the boiler plant installed during Phase I will also be explored. The new boiler will be a high-efficiency, gas-fired, hot water boiler. The boiler will be direct-vented with sidewall or overhead vent termination.

A new primary pump shall be provided for the new boiler and a new secondary pump will be added to supplement the existing secondary pumps. The secondary pump will be fitted with variable frequency drives for variable volume operation.

Air Systems

First and Second Floors (AC-6)
A variable air volume system with hot water reheat coils will provide heating, cooling and ventilation for the first and second floor. Spaces will be zoned with individual VAV terminal boxes. The unit will be sized at approximately 24,000 CFM.

Library (AC-7)
The air system serving the library on the third floor will be variable volume reheat type. The unit will be sized at approximately 12,000 CFM.

7th Floor and Circulation for Floor 4, 5, and 6 (AC-8)
The air system serving the 7th floor classrooms and the circulation spaces on floor 4, 5 and 6 will be variable volume reheat type. The unit will be sized at approximately 18,000 CFM.

Outside Air Treatment (ERV-3)
The 5,000 CFM outside air pretreatment system will condition outside through utilization of a desiccant wheel for energy recovery. Energy will be transferred with the building relief air, and possibly toilet exhaust air, to the incoming outside air to provide precooling in summer and preheating in the winter. The OA unit will serve floors 4 through 7.

Exhaust

Toilet
Where permitted by the local codes, toilet exhaust will be processed through the energy recovery units to pretreat incoming outside air.

General
Exhaust fans will likely be required for all mechanical rooms, electric rooms, janitor's closets, and trash rooms.

Domestic Hot Water Heating

General
The domestic hot water (DHW) heating will be accomplished by tie-in to the heating hot water system, utilizing an independent gas-fired heater. The proposed coffeehouse will require a higher water temperature in order to meet health codes.

In order not to penalize the entire DHW system with higher energy use to maintain the higher temperature, separate DHW systems will be considered so that the DHW system serving lavatories and showers can be maintained at a lower temperature.

Gas-fired

Gas-fired instantaneous water heaters will be provided for both the kitchen DWH system and the toilet DWH system. Condensing-type heaters can achieve efficiencies above 90% and can utilize direct vents through the sidewall of the building.

Domestic Water Booster Pump

A domestic water booster pump will be required to supply domestic water to adequate pressure on all floors.

Fire Protection – Fire Pump

A fire pump will be required in order to provide adequate pressure for the building sprinkler systems.

Electrical Service

Pending confirmation by the electric utility, NStar Electric, the underground high voltage primary service will originate from an existing utility manhole in St. Botolph Street and will continue to the utility transformer/network protector vault located in inside the building at Lower Level. Primary service conductors will be installed in ductbank. Utility Vault to be partially located below sidewalk and be accessible from street level via hatch or grating. Utility requires vault to house dual redundant transformers and network protectors. Approximate vault size to be 20'x40'x12'H. Refer to electrical drawings for additional utility vault construction requirements. Electrical service secondary ductbank and service conductors will be installed between utility vault and main electric room located at Lower Level and terminate at the main distribution board (MDB).

Distribution

Main distribution board (MDB) will be 1500 A/480V utilizing molded case type distribution circuit breakers with solid state LSI trip functions for 400AF devices and larger to serve lighting and power panels, automatic transfer switches and elevators. Main circuit breaker will be 1500 ampere, stationary construction. Utility metering is included for the main switchboard and fire pump.

Sub-Distribution
Lighting and power panels will be located at each level in dedicated electrical rooms. Dry transformers are included in each electrical room to step down distribution voltage to 208/120 volts for receptacle panels and small appliance loads. Audio Visual loads will be fed from separate K-13 shielded isolation transformer and isolated ground panel board(s).

Emergency and Standby Distribution
The generator installed as part of Phase I project is currently anticipated to power emergency (life safety) and standby (non-life safety) loads in Phase II building. The emergency power will serve life safety loads including: emergency lighting, security, communications and fire pump. The standby power will serve non-life safety loads including: non-simultaneous elevators. Separate 4-pole automatic transfer switches will be installed inside of Phase II building one for emergency life safety loads and one for standby non-life safety loads. Designated distribution circuit breakers and empty conduits will be installed as part of Phase I project in order to facilitate Phase II emergency power installation.

Emergency and standby power transfer switches and distribution equipment will be located in dedicated electrical rooms and include feeders protected with minimum 1-hour fire rating per Massachusetts Electrical Code.

Fire Alarm, Voice Evacuation, and Smoke Detector System
An addressable fire alarm, voice evacuation, and smoke detection system is planned including a central addressable control panel for monitoring and control of smoke detecting devices, manual alarm systems, audible and visual alarm systems, door release, and fan shutdown systems. Included: A digital alarm communication to a remote central station or campus security server via dedicated telephone line or fiber optic network. Phase I and Phase II fire alarm systems will be interconnected with 2-way communication for status notification of each system.

Lighting
Lighting for all public areas, non-public areas, building exterior, and site will be as specified by the Lighting Designer.

Architectural lighting control system will be provided for all public areas including automated schedule based controls, occupancy controls, day lighting dimming controls, site lighting relay type controls. Local occupancy controls will be used throughout the practice room spaces.

8

Sustainable Design

8.1 Introduction

New England Conservatory (NEC) is committed to the principles of sustainable development and aims to incorporate a wide array of sustainable initiatives into the Proposed Projects. The concept of environmental sustainability refers to the planned use of resources with the goal of providing for future generations while maintaining the quality of life today. Essential to the implementation of this goal at NEC is the promotion of conservation of resources, energy efficiency, waste reduction and recycling, pollution prevention, increased reliance on renewable resources, and other measures consistent with sustainable living. Working in conjunction with the development of the IMP Projects, NEC's sustainability program requires a forward-looking multi-disciplinary approach that addresses both immediate and long-term issues, incorporating sustainability as the standard of living for New England Conservatory's community.

8.2 Existing NEC Sustainability Initiatives

NEC values sustainability and environmental stewardship. The Building Operations Department takes into consideration the economic costs and benefits as well as the environmental costs and benefits associated with any sustainable strategy prior to its implementation.

NEC plans to measure its success through the framework of the LEED® rating system, using indicators such as reduced energy consumption, improved storm water management, reduction in water usage, improved indoor air quality, and use of sustainable materials where possible to evaluate performance.

8.2.1 Campus-Wide Initiatives

Recycling

NEC makes use of a co-mingled stream recycle program. The core concept of recycling is energy conservation via reuse of old materials. NEC's recycling program results in not only less pollution throughout the region, but also a more sustainable campus.

New England Conservatory Recycling Program has three objectives:

1. Preserve the environment.
2. Reduce the cost of waste disposal.
3. Keep the program simple and convenient to maintain.

NEC's co-mingled stream recycling program has grown immensely since its inception in 2009. In December 2009, NEC was recycling 7 percent of its total generated refuse. As of October 2011, NEC is recycling 55 percent of its refuse. New England Conservatory's dining facility composts all food waste from the kitchen area, greatly decreasing waste.

Other Initiatives

NEC also reduces its environmental impact by purchasing key materials for day-to-day operations that contain recycled content. Twenty-five percent of the office supplies purchased by NEC contain recycled material. Also, public copiers located throughout campus use 30 percent post-consumer recycled paper.

NEC also reduces its consumption of new materials by reusing existing furniture stock. The Master Inventory List was created and is stored on the NEC shared drive. It shows items in storage and in individual departments (such as file folders, task chairs, filing cabinets, calculators, etc.). The list shows location and who to contact for the items. The list will decrease the number of items in storage, free up storage space and encourage the reuse of items that are still in working condition to reduce the volume of materials disposed of annually.

8.2.2 Alternative Transportation

NEC encourages transit use by all members of its community by selling MBTA passes on campus through a pre-tax employee payment program**.** NEC also offers a semester pass program that allows students to purchase MBTA passes at a discount.

Students who make use of this program are able to purchase MBTA monthly passes at an 11 percent discount to the prevailing rate.

8.2.3 Campus Events

NEC's Earth Day celebration (April 20th and 21st) includes information on eco-friendly purchasing, green cleaning, sustainable eating practices, wildlife conservation, and more.

Bistro 33 adds events and prizes in the dining hall for NEC student exhibiting sustainable eating practices (bring your own mug, use of silverware instead of plastic, etc.).

8.2.4 Future Goals: Sustainability Programs and Plans

In addition to the above mentioned initiatives already in place, NEC is exploring future sustainability initiatives, including the following activities:

- Collecting data to produce energy-related carbon footprint report.
- Incorporating green building practices into renovations and new building projects.
- Decreasing energy and waste usage through efficiency projects and conservation education.
- Expanding outreach to educate and involve more employees, students, and community members in environmental initiatives.
- Engaging students living on campus by enhancing outreach and continuing to lead conservation-themed competitions in the residence hall.
- Incorporating environmental preferences into contracts and purchasing.

8.2.5 Sustainability Committee

The Sustainability Committee serves as an advisory body to the President regarding actions and practices that promote sustainability, with a strong focus on student, faculty, and staff involvement. There are currently eight committee members and one coordinator.

The Sustainability Coordinator, Jennifer M. Kelemen, LEED G.A., is a graduate from Wentworth Institute of Technology. Jennifer obtained her Bachelors of Science in Architecture and joined NEC in 2009 with a keen interest in sustainability. She obtained her LEED accreditation in January 2011 and leads NEC in becoming a more sustainable campus.

The NEC Sustainability Committee's mantra is P.E.A.R:

- **P**lan to reduce consumption
- **E**ducate others by consuming less
- **A**dopt energy saving products and service
- **R**educe, reuse, recycle

8.3 Future Sustainable Practices

Proposed Projects subject to Large Project Review under Article 80 of the City's Zoning Code must comply with Article 37 of the Zoning Code, which establishes certain standards related to sustainable development. NEC is committed to incorporating numerous sustainable design elements into the Proposed Projects. The Proposed Projects will respond to environmental concerns, reduce energy consumption, reduce water use, and increase recycling, along with incorporating other environmentally sustainable features and practices described below and in the Proposed Projects' Article 37 filing, submitted under separate cover.

LEED 2009 for New Construction Checklists have been included in this IMPNF/Expanded PNF as **Figure 8-1** and **Figure 8-2**, respectively, for each of the Proposed Projects. The LEED checklists have computed an initial summary of the green building points that each project is pursuing as defined by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) building rating system.

The Proposed Projects will receive building permits after July 2011, and therefore will be subject to the City's new "Stretch Code." Therefore, the energy and atmosphere performance analysis and criteria have integrated the Stretch Code's requirements (i.e., to achieve 20 percent greater energy efficiency than baselines described in national standard ASHRAE 90.1 – 2007).

NEC has engaged Thomas Hotaling, AIA, Principal of Ann Beha Architects and Kenneth Fisher of Gensler to optimize the sustainable design strategies for each of the Proposed Projects.

LEED 2009 for New Construction and Major Renovations

Project Checklist

New England Conservatory of Music - Phase I Student Life and Performance Center

10.19.11

Y	?	N		Sustainable Sites	Possible Points: 26
16	9	1			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
	3		Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
	1		Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1

Y	?	N		Water Efficiency	Possible Points: 10
4	6				
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4

Y	?	N		Energy and Atmosphere	Possible Points: 35
5	17	13			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
5	5	9	Credit 1	Optimize Energy Performance	1 to 19
	3	4	Credit 2	On-Site Renewable Energy	1 to 7
	2		Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

Y	?	N		Materials and Resources	Possible Points: 14
7	1	6			
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

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

Y	?	N		Indoor Environmental Quality	Possible Points: 15
8	7				
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
	1		Credit 6.1	Controllability of Systems—Lighting	1
	1		Credit 6.2	Controllability of Systems—Thermal Comfort	1
	1		Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1

Y	?	N		Innovation and Design Process	Possible Points: 6
6					
1			Credit 1.1	Innovation in Design: Specific Title	1
1			Credit 1.2	Innovation in Design: Specific Title	1
1			Credit 1.3	Innovation in Design: Specific Title	1
1			Credit 1.4	Innovation in Design: Specific Title	1
1			Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Y	?	N		Regional Priority Credits	Possible Points: 4
2	2				
1			Credit 1.1	Regional Priority: Specific Credit	1
1			Credit 1.2	Regional Priority: Specific Credit	1
	1		Credit 1.3	Regional Priority: Specific Credit	1
	1		Credit 1.4	Regional Priority: Specific Credit	1

Y	?	N		Total	Possible Points: 110
48	42	20			

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

Figure 8-1 - LEED Checklist

Phase I - Student Life & Performance Center Project

LEED 2009 for New Construction and Major Renovations

Project Checklist

New England Conservatory of Music - Phase II Learning Center

10.19.11

Y	?	N			Possible Points
16	9	1	**Sustainable Sites**		**Possible Points: 26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
	3		Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
	1		Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1
4	6		**Water Efficiency**		**Possible Points: 10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4
5	17	13	**Energy and Atmosphere**		**Possible Points: 35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
5	5	9	Credit 1	Optimize Energy Performance	1 to 19
	3	4	Credit 2	On-Site Renewable Energy	1 to 7
	2		Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2
7	1	6	**Materials and Resources**		**Possible Points: 14**
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

Y	?	N			Possible Points
			Materials and Resources, Continued		
2			Credit 4	Recycled Content	1 to 2
2			Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1
8	7		**Indoor Environmental Quality**		**Possible Points: 15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
	1		Credit 6.1	Controllability of Systems—Lighting	1
	1		Credit 6.2	Controllability of Systems—Thermal Comfort	1
	1		Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1
6			**Innovation and Design Process**		**Possible Points: 6**
1			Credit 1.1	Innovation in Design: Specific Title	1
1			Credit 1.2	Innovation in Design: Specific Title	1
1			Credit 1.3	Innovation in Design: Specific Title	1
1			Credit 1.4	Innovation in Design: Specific Title	1
1			Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1
2	2		**Regional Priority Credits**		**Possible Points: 4**
1			Credit 1.1	Regional Priority: Specific Credit	1
1			Credit 1.2	Regional Priority: Specific Credit	1
	1		Credit 1.3	Regional Priority: Specific Credit	1
	1		Credit 1.4	Regional Priority: Specific Credit	1
48	42	20	**Total**		**Possible Points: 110**

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

Figure 8-2 - LEED Checklist

Phase II - Learning Center Project

8.3.1 Phase 1 – Student Life and Performance Center

The design of the mixed-use Student Life and Performance Center for New England Conservatory will incorporate sustainable design strategies that are fully integrated with the overall design priorities of the project. A thoughtful sustainability agenda will reduce operating expenses and improve user satisfaction while controlling capital costs. As design of this project progresses, strategies will be evaluated through a life cycle cost analysis (lca), so that informed decisions can be made at appropriate milestones in the process.

The LEED Rating System as developed by the United States Green Building Council (USGBC) has become an industry understood metric for sustainable design, this project will utilize the LEED 2009 for New Construction and Major Renovations program as a tool for focusing and monitoring this agenda. A preliminary LEED 2009 NC checklist is included (see **Figure 8-1**) outlining the areas seen as potential for advancement. Based on this analysis of likely targets and potential targets, this project can easily meet a standard of LEED Certifiable with the ability to achieve higher levels certification with moderate cost premiums to the project. Again, this project will follow a thoughtful process where investment in good design leads to an effective sustainable outcome.

The following outline organizes areas of focus and is meant to assist in the establishment of criteria that will serve to inform the design process going forward.

Building Site Design

- Site Selection – as this project looks to develop a site that previously served as an at grade parking lot, the building does not create a negative environmental impact to the site.
- Development Density and Community Connectivity – as an urban building that supports educational and cultural uses, this project is extremely positive in channeling site-appropriate development into this community.
- Alternative Transportation - this project is well served by public transportation including rail, subway and bus lines. In addition, alternative modes of transportation will be encouraged through the reduction of on-site parking and through the provision of bicycle parking associated with the use of showers for the cyclists.
- Stormwater Design –the project will incorporate stormwater management and groundwater recharge systems that will both reduce the quantity of and improve the quality of stormwater discharged into the municipal storm sewer system.

- Heat Island Effect – for non roof surfaces, the design will select paving material with a high solar reflective index (sri) that exceeds 29; for roof surfaces, if vegetated roofs are not employed, light colored roofing technologies such as TPO will be specified.

Building Water Utilization / Conservation

- Water Efficient Landscape - for the vegetated areas developed at grade, the material selected will be drought resistant and will not require permanent irrigation (temporary irrigation over the first year may be required to establish the material)
- Water Use Reduction – high efficiency low flow fixtures will be employed throughout the facility. Particular focus will be on the residential fixtures and the food service fixtures employed in the plumbing design. The selection for these fixtures can be made from the catalog of major suppliers.

Building Envelope

- A high performance building envelope will be developed to support the thermal performance of the building, save energy, and allow for the downsizing of the mechanical equipment.

Building Mechanical Systems

- A high efficiency heating and cooling strategy will form the basis for the project's system design, based on hydronic thermal delivery, along with energy efficient vfd drives for fans and pumps, energy recovery systems and water side economizers.
- All mechanical equipment will be selected to incorporate zero use of chlorofluorocarbon based refrigerants.

Lighting

- Day lighting strategies through the appropriate use of external shading devices and internal glare control methods (light shelves, transmitting shades, etc.) will be evaluated.
- High efficiency lighting fixtures will be selected from standard manufacturers; lighting will be controlled through the use of occupancy sensors and the building management system (bms).

Design Material Resources

- The construction process will target 95% efficiency for the construction waste management program.
- All standard building materials will incorporate the highest levels of recycled content practicable; this will follow standard specifications and can be sourced through major suppliers; target materials will include steel, concrete, drywall, acoustical ceiling.
- Specifications will target regional suppliers and manufacturers to reduce embodied energy of building materials; this will be based on standard specifications sourced through major suppliers.

Indoor Environmental Quality

- The design will meet or exceed code requirements for quality and quantity of ventilation air.
- The contractor will follow an indoor air quality management plan during construction and a planned 'flushing' period will be scheduled for the building prior to occupancy.
- Low VOC emitting building products will be specified and sourced from through major suppliers; target materials will include paints, sealants, flooring systems (including resilient flooring and carpet) and composite wood /fiber products.

Building Commissioning / Monitoring and Verification

- A commissioning agent shall be employed through the construction process to ensure that the project's energy-related systems are installed and operate to meet the original basis of design as established by design engineer.
- The project will explore the incorporation of a building management system that facilitates measurement and verification of the design performance through the life of the building so that the initial capital investment is fully realized.

■

8.3.2 Phase 2 – Learning Center

The design of the Learning Center for New England Conservatory will incorporate sustainable design strategies similar to those integrated into the Student Life and Performance Center Project (Phase I). A preliminary LEED 2009 NC checklist for Phase II is also included (see **Figure 8-2**) outlining the areas seen as potential for advancement. Based on this analysis of likely targets and potential targets, this project can easily meet a standard of 'LEED Certifiable 'with the ability to achieve higher levels certification with modest cost premiums to the project. Again, this project will follow a thoughtful process where investment in good design leads to an effective sustainable outcome.

The following outline organizes areas of focus and is meant to assist in the establishment of criteria that will serve to inform the design process going forward.

Building Site Design

- Site Selection – as this project looks to develop a site that previously supported another building, the new building does not create a negative environmental impact to the site.
- Development Density and Community Connectivity – as an urban building that supports educational and cultural uses, this project is extremely positive in channeling site appropriate development into this community.
- Alternative Transportation - this project is well served by public transportation including rail, subway and bus lines. In addition, alternative modes of transportation will be encouraged through the reduction of on-site parking and through the provision of secure indoor bicycle parking and storage.
- Stormwater Design – the project will incorporate stormwater management and groundwater recharge systems that will both reduce the quantity of and improve the quality of stormwater discharged into the municipal storm sewer system.
- Heat Island Effect – for non roof surfaces, the design will select paving material with a high solar reflective index (sri) that exceeds 29; for roof surfaces, if vegetated roofs are not employed, light colored roofing technologies such as TPO will be specified.

Building Water Utilization / Conservation

- Water Efficient Landscape - for the vegetated areas developed at grade, the material selected will be drought resistant and will not require permanent irrigation (temporary irrigation over the first year may be required to establish the material).
- Water Use Reduction – high efficiency low flow fixtures will be employed throughout the facility's restrooms and pantries. The selection for these fixtures can be made from the catalog of major suppliers.

Building Envelope

- A high performance building envelope will be developed to support the thermal performance of the building, save energy, and allow for the downsizing of the mechanical equipment.

Building Mechanical Systems

- A high efficiency heating and cooling strategy will form the basis for the project's system design, based on hydronic thermal delivery, along with energy efficient vfd drives for fans and pumps, energy recovery systems and water side economizers.
- All mechanical equipment will be selected to incorporate zero use of chlorofluorocarbon based refrigerants

Lighting

- Day lighting strategies through the appropriate use of external shading devices and internal glare control methods (light shelves, transmitting shades, etc.) will be evaluated
- High efficiency lighting fixtures will be selected from standard manufacturers; lighting will be controlled through the use of occupancy sensors and the building management system (bms)

Design Material Resources

- The construction process will target 95% efficiency for the construction waste management program
- All standard building materials will incorporate the highest levels of recycled content; this will follow standard specifications and can be sourced through major suppliers; target materials will include steel, concrete, drywall, acoustical ceiling.
- Specifications will target regional suppliers and manufacturers to reduce embodied energy of building materials; this will be based on standard specifications sourced through major suppliers.

Indoor Environmental Quality

- The design will meet or exceed code requirements for quality and quantity of ventilation air

- The contractor will follow an indoor air quality management plan during construction and a planned 'flushing' period will be scheduled for the building prior to occupancy.
- Low VOC emitting building products will be specified and sourced from through major suppliers; target materials will include paints, sealants, flooring systems (including resilient flooring and carpet) and composite wood /fiber products

Building Commissioning / Monitoring and Verification

- A commissioning agent shall be employed through the construction process to ensure that the energy related systems are installed and operate to meet the original basis of design as established by design engineer.
- The project will explore the incorporation of a building management system that facilitates measurement and verification of the design performance through the life of the building so that the initial capital investment is fully realized.

9

Project Certification

This IMPNF/PNF has been submitted to the BRA, as required by Article 80 of the Zoning Code, on the 6th day of January 2012.

Proponent
The New England Conservatory
290 Huntington Avenue
Boston, MA 02115

Edward Lesser
Senior Vice President - Finance & Operations

Preparer
Vanasse Hangen Brustlin, Inc.

Sean M. Manning, PE, PTOE
Principal

Vanasse Hangen Brustlin, Inc.