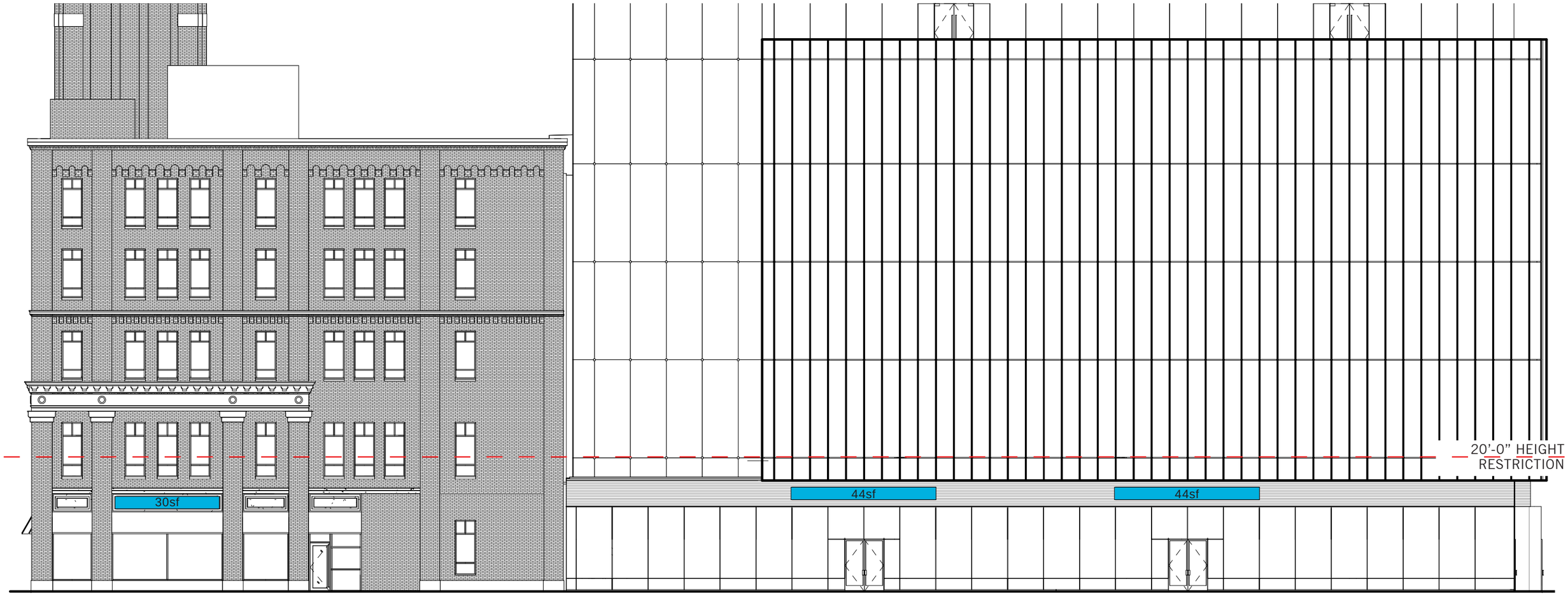
SIGNAGE

EAST ELEVATION

SIGNAGE

WEST ELEVATION



SoMa Building 3

Sustainability Narrative and Article 22: Green Building Report

Table of Contents

I. Introduction

MIT's Kendall Square Initiative is designed to be a leader in urban sustainability, revitalization and renewal. MIT has made sustainability an integral part of the Kendall Square design process. MIT is committed to developing a district that is sustainably designed, energy efficient, environmentally conscious and healthy for the occupants and visitors that enhance the community.

The Building 3 project team has embraced an integrated process and includes technical experts who are actively engaged with the design process of both the site and the overall SoMa district. This comprehensive view allows the development to incorporate sustainability best practices in design and operation, stormwater capture and reuse, transportation and landscape strategies.

Sustainability Design Review Overview

This memo provides an overview of the sustainability efforts and decisions related to the Building 3 project.

In working with the City of Cambridge to shape the PUD-5 Zoning Requirements, MIT established a minimum commitment to Leadership in Energy and Environmental Design (LEED) Gold. The project will therefore achieve a LEED Gold Rating under the v4 system. The team's efforts have been in developing buildings that are sustainably designed, energy efficient, environmentally conscious, and healthy for the occupants, visitors, and community and committed to earn the buildings at least 60 credit points under the more stringent LEED v4 system, for LEED Gold ratings. MIT's Kendall Square Initiative will be one of the largest LEED v4 collections of projects on the east coast that incorporates the latest energy standards and new sustainability initiatives such as material content disclosure to encourage healthy buildings and indoor environments.

In addition to achieving the LEED project goals, the Building 3 design team has addressed the City of Cambridge's Sustainability requirements and guidelines throughout the design process.

II. Consistency with Zoning Requirements

The Building 3 project incorporates best practices for Energy and Emissions, Urban Site and Landscaping, Healthy Living & Working, Transportation, Promotion of Sustainability Awareness, Cool Roofs, and Monitoring. The team has responded to these sustainability issues with the following integrated design measures to enhance the project's environmental performance.

Energy + Emissions
Reducing energy consumption and resulting emissions is an important driver for environmental design in order to limit the Building operations' impact on climate change.

The team performed a comprehensive analysis of potential district energy measures for the entire Kendall Square development. In addition, further analysis was conducted for the potential for Building 3 to connect to the Veolia steam network. Veolia and MIT collectively agreed that the Building 3 laboratory building was an appropriate site to evaluate for Veolia steam due to its proximate location to a possible future steam line. The detailed analysis compared a number of factors including life cycle cost, reliability, and emissions. Ultimately, the analysis demonstrated that Building 3's efficiently designed local mechanical plant has equal, if not improved, greenhouse gas emissions compared to the Veolia-connected option or an ASHRAE 90.1-2010 code compliant building.

Building 3 design is currently exceeding the Stretch Code and energy code requirements. In thorough examination of predicted building performance, the design team has modeled the building based on three different ASHRAE baseline buildings. The design team is currently working with Eversource to confirm benefits of efficiency measures already incorporated in the design and to evaluate opportunities for additional energy savings. The measures reviewed to date include heat recovery, chilled beams, and high efficiency LED lighting and controls.

In order to conserve energy and reduce greenhouse gas emissions, the building 3 project has prioritized efficient mechanical systems for conditioning systems and ventilation air strategies which is the main contributor to energy consumption for the proposed laboratory programs. As indicated in the preliminary energy model study, significant savings come from the variable speed ventilation, high efficiency boilers and efficient LED lighting and controls used in common spaces under the developer's control. In order to maximize energy savings while providing for future tenant flexibility, the team will look to incorporate 100% outdoor air sensible heat recovery strategies and continue to investigate Konvecta heat recovery or similar new technologies that would allow for even greater efficiency with increased enthalpy recovery. In order to allow flexibility for the mechanical system to adapt to future tenant scenarios, the systems have been designed to modulate for part load conditions, maintaining efficient performance while building loads fluctuate.

Beyond the base building performance as a core and shell project, the future occupancy of the building will have a significant impact on energy performance. Tenants will be encouraged to reduce plug loads with efficient laboratory equipment and refrigeration, including low-flow fume hoods. MIT can help suggest strategies for careful laboratory planning and program layout to reduce the need for over conditioning laboratory support spaces such as offices and conference spaces that may not require the same ventilation air as laboratory areas. In addition, the team is evaluating chilled beams for heating and cooling of office spaces and potentially in laboratory spaces.

Finally, the building envelope has been designed with high performance glazing and insulated shadowbox areas along with thermally broken and insulated mullions with external shading to reduce heat gains and losses through the façade while improving occupant comfort and passive survivability during extreme weather events and outages.

Urban Site + Landscaping – Water Management
The Kendall Square project improves upon existing paved surface area with a landscape that provides habitat and pedestrian tree canopy cover, active outdoor recreation areas, and stormwater management and reuse strategies. As part of the overall development, the design of Building 3 will achieve sustainability in water management and site landscaping strategies while managing domestic potable water consumption. The current design incorporates potable water use reductions, stormwater management in SoMa open space areas, native vegetation, and includes reuse of stormwater for non-potable demands as outlined in the Zoning Requirements.

Building 3 is an important component of the SoMa district rainwater management approach. Overall, the Kendall site will achieve a 68-70% annual average reduction in site runoff through stormwater reuse and site infiltration. All stormwater falling on the SoMa site area will either be infiltrated through permeable paved areas into the fill between the garage and surface hardscape, directed to planted areas that include low level native plantings or numerous trees within the open space, or directed to catchment grilles that will direct runoff into a district stormwater tank.

All water from roof areas (including Buildings 3, 4, and 5) will be diverted along with site runoff from the open space areas into a district stormwater tank located in the below grade garage. This district collection of water will be filtered and stored to be diverted from the already strained regional sewers and instead reused as cooling tower makeup water on the roof of Building 3 for year-round building heat rejection.

Cooling tower makeup water is the primary demand for water in the SoMa district, over building domestic water and irrigation water. In addition, comparing seasonal rainfall to demand profiles for irrigation reuse versus cooling tower reuse shows that the demand for cooling tower makeup water is a better fit to maximize the amount of recycled stormwater. Moreover, cooling towers do not require drinkable (potable) water, and stormwater requires less treatment than greywater (sink/shower water) or blackwater (toilet/kitchen water) before being reused in building applications. Therefore, stormwater reuse for the cooling towers on top of Building 3 is the optimal rainwater management and potable water reduction reuse strategy for the SoMa district.

Healthy Living + Working
Providing healthy living and working environments is a further defining factor of high performance buildings. The Building 3 project incorporates envelope design that maximizes access to daylight and views while managing occupant thermal comfort and energy use. The design provides access to daylight while enhancing visual and thermal comfort through the use of a high performance, glazed curtainwall design. The team has balanced increasing the insulated shadow box at the sill area and above the vision area of the glazing while maintaining clear glazing in the vision area. The team has set a goal of a center of glass U-value of 0.33 and goal to get to U-0.35 overall.

The glazing at the top of the window contributes to deeper daylight penetration to provide more natural light to interior spaces to maximize the perimeter daylight zone while reducing the need for electric lighting. Direct views through the glazing provides connection to the outdoors for occupants, including quality views to the site open space, neighboring streetscapes, and the Charles River and Boston beyond.

In contrast, external shading has been designed to have limited impact on views while shading the glazing from solar gain and occupants from excessive direct solar glare. This shading will improve thermal comfort for occupants along the perimeter of the floorplan who would otherwise be in direct sunlight.

Transportation
Being located within a dense urban area, the Kendall development aims to reduce traffic impact on the community while accommodating alternative transportation strategies to reduce effective emissions associated with this new destination. Building 3 and the district below grade garage support multimodal transportation and reductions in emissions associated with transit. The SoMa district's advantageous position in Kendall Square positions itself at a nexus of MBTA Redline, bus, local shuttle and transit connectivity.

MIT will improve bicycle infrastructure to support and extend the successful bicycle connectivity of the Cambridge and Boston metro areas, which will decrease reliance on personal vehicles in transit. Bicycle parking provided in the garage is in an area dedicated to each building while street level bicycle racks will provide accessibility for visitors. Moreover, there will be two new Hubway stations located in the SoMa district to encourage use of the regional bikeshare system.

Moreover, by moving all existing parking below grade from the surface lots covering the majority of the district, the development is able to provide an expansive open space with vegetation, room for programming and community engagement, and quality exterior environments. Building 3 sits with an extension of this open space which will benefit the

connection to community, access to amenities and retail, and pedestrian connectivity for building occupants.

Meanwhile, low-emitting and fuel-efficient vehicles will be provided with preferred locations in the below grade garage. Charging stations for electric vehicles have been provided in the garage, and the team has designed for flexibility to increase the number of charging stations in the future as demand for electric vehicles rises.

Promotion of Sustainability Awareness
The Building 3 project will support sustainability awareness by demonstrating the direct connection between the new building and the clock tower building at 238 Main Street to enable the active reuse of the existing building. The Building 3 project will provide a written set of Tenant Design and Construction Guidelines to the future building tenants to encourage or require (as dictated by LEED V4 standards) sustainable and energy efficient measures be incorporated into fit out design. Tenants will also have the opportunity to monitor their energy use through the installation of energy and water use meters in their individual MEP designs.

Cool Roofs
The design team has taken several steps to include building-specific strategies to help reduce the project's impact on the local heat island effect. The project aims to achieve this through the use of a light-colored roofing membrane with a minimum solar reflective index (SRI) of 78, hardscape materials with an initial solar reflectance (SR) of 0.33 or greater, an underground parking structure that reduces the need for dark, uncovered on-site parking, and additional site landscaping and shading measures.

Potable Water Use Reduction
The project will reduce potable water use through installation of low-flow plumbing fixtures. As per the minimum requirements of the LEED v4 Indoor Water Use Reduction prerequisite, the project must implement water use reduction strategies that use a minimum of 20% less potable water than the baseline calculated after meeting Energy Policy Act of 1992 fixture performance requirements. All newly installed toilets, urinals, and showerheads will be WasterSense labelled. Preliminary calculations (as shown in the Article 22 report) indicate the project is currently showing at least a 30% reduction in potable water use. Tower tenants and retail spaces will meet tenant guidelines that will set limits on installed fixtures to align with base building potable water conservation goals.
Additional water conservation measures and higher-efficiency fixtures are being considered in order to achieve a greater reduction in potable water use for the project. Potable water use will also be reduced by using reclaimed rainwater in the building as cooling tower make up water.

Daylight and Visual and Thermal Comfort
Access to thermal comfort will be provided by a building automated system that will employ local thermostats to maintain a comfortable temperature and relative humidity in the building. Tenants will be provided with ample opportunity to design their fit-out to maximize daylight and quality views due to the high amount of glazing in the project design.

Monitoring
Monitoring building energy data and sharing with the City allows for not only accountability in energy performance but consistency internally in building operations and ongoing identification of operational deficiencies. The project will comply with the City of Cambridge's Building Energy Use Disclosure Ordinance. MIT will commit to sharing building energy data annually under this ordinance.

MIT and the design team understand the importance of metering building energy data to evaluate whether the building is being operated as efficiently as designed. Building meters will be installed to measure water and energy consumption in line with the LEED v4 requirements. Additional metering of building performance data is likely for tenant spaces and building systems. Having sufficient meters in place will allow building operation to be continuously evaluated over time, evolving to improve performance, increase efficiency, and reduce emissions.

Building meters can also be paired with lobby score board features to display energy performance real-time for occupants, going beyond the City's Building Energy Use Disclosure Ordinance, while building awareness for energy conservation.

III. Consistency with Sustainability Guidelines

This section outlines the design team's considerations, strategies, and benchmarks with respect to MIT's Kendall Square Initiative Sustainability Guidelines.

The Building 3 design process included integrated design efforts to incorporate proposed strategies from the Net-Zero Action Plan and likely climate conditions as described in the Cambridge Climate Vulnerability Assessment, while considering how such environmental design measures may evolve over time with the changing climate.

A detailed breakdown of the decision making process is outlined below for the primary sustainability guidelines, including how the design investigated and incorporated strategies or where the investigation demonstrated a more efficient or feasible opportunity.

Energy Performance
Building 3 has established a 10% target for reduction in energy cost from the more stringent ASHRAE 90.1-2010/LEED v4 Baseline. The design team will continue to evaluate additional energy efficiency measures as described in the above section *Design Response to Zoning Requirements: Energy + Emissions*. Moreover, the team is collaborating with Eversource to determine the numerous possibilities where the design can best maximize energy and emissions reductions.

Energy Supply
To date, the design has considered alternative sources of energy, such as solar, district steam, and geothermal heating and cooling.

Given the significant energy demand of a laboratory building and limitations on an urban site for locating equipment, photovoltaics or solar thermal panels currently cannot provide sufficient energy savings. The design team investigated opportunities to include PVs in the future on open roof areas, but the majority of the roof area is occupied by mechanical equipment and cooling towers as necessary to support a laboratory building. Low roof areas would be primarily overshadowed by the taller tower massing which would limit their potential for generating energy. The team agrees that future solar installations for amenity areas or site areas could provide educational opportunities while supplying energy for site features. In addition, as efficiency of solar panels and energy storage improves, there is a potential for low-voltage powered LED lighting to be installed operating on DC power.

The team performed a comprehensive analysis of potential district steam connections, as outlined in the above section *Design Response to Zoning Requirements: Energy + Emissions*.

Lastly, the team investigated opportunities for geothermal, or ground source heat pumps, during the early design phases of the project. Ground source heat pumps allow buildings to reject heat to the ground when in cooling and remove heat from the ground for heating during cooler months. Wells are drilled vertically into the ground and require a significant spacing to avoid any interaction between wells underground to maintain efficiency. Currently, the site area required to meet a significant portion of the building's heating and cooling load is greater than the current extents of the SoMa district.

Additionally, the team discussed rejecting heat to the Charles River in a similar way given proximity to the waterfront, but this is not permitted under environmental regulations.

Energy Storage
Energy storage is not feasible for the building due to space considerations. As energy storage technologies improve, the team will continue to consider opportunities to incorporate energy storage, possibly paired with advancements in solar renewable technologies.

Commissioning
MIT has adopted the Enhanced Commissioning standards as outlined in LEED V4. Through ongoing operation, MIT will consider opportunities for recommissioning of building systems to maintain performance and ensure maximum energy savings and emissions reductions. The Building 3 team has begun coordination with a commissioning agent to meet the requirements and understands the lasting value of strong commissioning practices, particularly with the operation of laboratory buildings. To further ensure the building is constructed in alignment with the design and energy efficiency goals, MIT has engaged a Building Envelope Commissioning Agent, (BECxA). The BECxA will review project documents, provide suggestions to the design team and conduct on-site testing to confirm the constructed building envelope meets the Owner's project requirements.

Transitioning to Net Zero
The laboratory program presents a challenge for achieving net-zero energy on a dense urban site. The proposed design reflects new construction being built to the best of currently available technology and efficiency given market and program restraints. The design team continues to evaluate opportunities to reduce energy consumption and greenhouse gas emissions.

In concert with the district energy studies, the team has brainstormed pathways for potential emissions reductions, including speculation about future technologies, future greening of the grid, and what it would take to fully electrify the buildings. In terms of future technologies, the team anticipates that chilled beams may be the new standard in tenant laboratory fit-out spaces, but the market currently does not show support for wide adoption of this system with lingering hesitation stemming from indoor air quality concerns in research spaces.

Additional energy savings are likely to be seen in advancement of building controls and active personalization of your environment in spaces. New technologies have the opportunity to be tested and incorporated as tenant turnover happens to bring spaces up to the most current integrated systems.

The biggest reduction-potential in energy consumption and greenhouse gas emissions for laboratory buildings will likely be in laboratory equipment performance and/or in a shift in the way research and laboratory science is structured. As research grows more computation intensive, less biology and chemistry laboratory demands will reduce the energy use intensity of laboratory spaces. In this case, the team predicts a significant reduction in building emissions is possible. Fit out program and technology is determined by the tenant that occupies the space and the design team will provide exemplary access to internet infrastructure to allow for future shift to laboratory computing dependence.

The team discussed where it sees energy supply and decarbonization in the future, particularly with improvements from the grid electricity sources. The makeup of the Massachusetts energy grid is anticipated to shift more towards renewable energy sources in the coming decades. Thus, the electricity component consumed by the project under the current design could see an improvement in emissions factor, thus reduction the overall emissions from operation of the building.

The project mechanical space and equipment has the ability to be transitioned to all-electric systems in the future as the building design does not rely on infrastructure outside the building.

Resilience

Building 3's design will locate critical equipment above the flood elevation, above at least Elevation 26 feet. The ability to infiltrate a site stormwater storage system will assist in reducing strain on sewer systems and reduce flooding potential. The design team is currently evaluating surface flows through the open space to maximize the runoff capture potential for peak rain events seen recently with short, high volume rain events.

In addition, the high performance envelope is well insulated to reduce heat loss and gain and maintain comfortable temperatures during severe weather events and potential power outages. Additionally, backup systems are being designed for critical health, safety, and preservation of critical research. The team has considered particular plug receptacles and infrastructure for tenants to connect their equipment in the case of full building power outages.

Finally, building equipment capacities are being designed to account for future temperature changes. Such equipment design includes modular chiller design that will be able to accommodate rising temperatures and increasing average building cooling loads.

Evolving Standards

As the design has progressed, the design team has continued to evaluate the building performance against new guidelines and standards. Mainly, the team has continued to model the building against the LEED v4 ASHRAE 90.1 baseline as well as the most current applicable energy code AND more current versions of ASHRAE 90.1 that are anticipated to be adopted as code prior to construction.

The team also has benchmarked the design in respect to greenhouse gas emissions in addition to energy consumption and cost (as is referenced by LEED) to be in line with any potential future City benchmarks in reference to energy and emissions.

MIT and the design team members continue to be engaged with City initiatives and are prepared to respond to new environmental design expectations for the design and operation of the building. MIT and the design teams look forward to continued collaboration with the City and Cambridge Community to develop a sustainable destination in Kendall Square.

IV. Building 3 LEED CS v4 Scorecard Summary

The Project anticipates exceeding the Gold Certification threshold of 60 credit points by attempting 65 'yes' credit points, additionally the project has earmarked 17 'likely' and 9 'maybe' credit points that require further research; these credits will remain under consideration as the design continues to evolve. Please refer to the attached LEED Core and Shell (CS) v4 Project Scorecard in Appendix A.

The breakdown of attempted credit points by LEED category are as listed below:

Integrative Process	1 point	*0 'likely' points*
Location and Transportation	14 points	*6 'likely' points*
Sustainable sites	8 points	*2 'likely' points*
Water Efficiency	6 points	*3 'likely' point*
Energy and Atmosphere	13 points	*4 'likely' points*
Materials & Resources	6 points	*1 'likely' points*
Indoor Environmental Quality	5 points	*0 'likely' points*
Innovation in Design	5 points	*1 'likely' points*
Regional Priority	2 points	*0 'likely' points*
Total Points	**60 points**	***17 'Likely' points***

V. Building 3 LEED Credit Narrative

The project meets the LEED CS v4 Minimum Program Requirements and each of the required Prerequisites.

This project is part of a LEED Master Site project. Several Location and Transportation and Sustainable Sites credits will be attempted through the LEED Master Site documentation process and be applied to each of the individual building projects associated with the Master Site.

The project is anticipating reaching the Gold Certification level by targeting 60+ 'yes' credit points. There are several additional credits which are still being researched as to whether or not the project may attempt them; it may be determined that some of these credits under consideration are not attainable. Please refer to the attached LEED CS v4 Project Scorecard included in Appendix A.

Integrative Process

Credit 1 Integrative Process 1 point
The project will meet the intent of this credit through identification of cross discipline opportunities to design a sustainable building project. The project will use early energy modeling to assess areas where energy loads may be significantly reduced including lighting and plug load demand. Additionally, the project will perform a water budget analysis to aid in establishing water use reduction targets.

Location and Transportation

Credit 2 Sensitive Land Protection 2 points
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site narrative provided by Atelier 10

Credit 3 High Priority Site *3 maybe points*
Pursuit of this credit is to be determined. If the development area contains contaminated soils or groundwater it will be appropriately remediated. This credit may be pursued as part of the Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 4 Surrounding Density and Diverse Uses 6 points
The project will meet Option 1 for Surrounding Density by being located in an area with an average density greater than 35,000 sf/acre. Additionally, the project will meet Option 2 for Diverse Uses by being located within ½ mile walking distance of at least 10 publically available diverse uses.

Credit 5 Access to Quality Transit 3 points
The project is located within ½ mile walking distance of the Kendall/MIT MBTA station. This transit station provides occupants with access to greater than 144 weekday and 108 weekend trips via the MBTA Redline, and MBTA bus lines 64, 68, 85 and CT2.

Credit 6 Bicycle Facilities 1 point
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 7 Reduced Parking Footprint 1 point
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 8 Green Vehicles 1 point
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Sustainable Sites

Prerequisite 1: Construction Activity Pollution Prevention Required
The Construction Manager will be required to submit and implement a compliant SWPPP/Erosion and Sedimentation Control (ESC) Plan for construction activities related to the construction of the Building 3 project. The ESC Plan will conform to the erosion and sedimentation requirements of the applicable regulations and specific municipal requirements for the City of Cambridge. Additionally, the ESC Plan will address management/containment of dust and/or particulate matter generated by on site demolition and construction activities. Civil design drawings will include measures for the implementation of the ESC plan.

Credit 1: Site Assessment 1 point
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 3 Open Space *1 maybe point*
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 4 Rainwater Management 3 points
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 5 Heat Island Reduction 2 points
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 7 Tenant Design and Construction Guidelines 1 point
The project will provide Tenant Design and Construction Guidelines for distribution and review will potential building tenants. The guidelines will outline the sustainable design and energy efficiency measures implemented in the core and shell building and provide detailed guidance for the Tenants to design and build in alignment with the project sustainability goals.

Water Efficiency

Prerequisite 1 Outdoor Water Use Reduction, 30% Required
This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3narrative provided by Atelier 10 for details.

Prerequisite 2 Indoor Water Use Reduction, 20% Reduction Required
Through the specification of low flow and high efficiency plumbing fixtures, the project will implement water use reduction strategies that use, at a minimum, 20% less potable water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. Summary target water use calculations provided below.

Flush Fixture Type	Baseline GPF	Design GPF	Uses/ Day	Baseline Annual Use	Design Annual Use	% Savings
Water Closet	1.6	1.28	1524	2438.4	1950.72	
Urinal	1	.125	762	762	95.25	
Sub-TOTAL annual water savings				**3200.4**	**2045.97**	**36.07%**
Flow Fixture Type	**Baseline GPM/GPC**	**Design GPM/GPC**	**Uses/ Day**	**Baseline Annual Use**	**Design Annual Use**	**% Savings**
Public Lavatory	.5gpm	.35gpm	2286	571.5	400.05	
Shower for FTEs	2.5gpm	1.5gpm	76.2	952.5	571.5	
FTE Kitchen Sink	2.2gpm	2.2gpm	762	419.1	419.1	
Sub-TOTAL annual water savings				**1943.1**	**1390.65**	**28.44%**
TOTAL annual water savings				**1337310**	**893521.2**	**33.19%**

Prerequisite 3 Building Level Water Metering Required

The project will comply with the requirements of this prerequisite by installing permanent water meters to measure total potable water use for the building and site.

Credit 1 Outdoor Water Use Reduction 50% 1 point

This credit will be pursued as part of the Development LEED Master Site application. Please refer to the Master Site 3 narrative provided by Atelier 10 for details.

Credit 2 Indoor Water Use Reduction 30-50% 3 points

Through the specification of low flow and high efficiency plumbing fixtures, the project will implement water use reduction strategies that target 35% less potable water use annually when compared to EPA baseline fixtures for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. Refer to the summary water use calculations provided with WEp1.

Credit 3 Cooling Tower Water Use 1 point

The project will test the water used by the cooling tower and calculate the cycles of concentration. A minimum of five of the following control parameters will be assessed: Ca, Total alakalinity, SiO_2, Ci, and Conductivity.

Credit 4 Water Metering 1 point

The project will comply with the requirements of this credit by installing end use water meters for two of the following water sub-systems: irrigation, indoor plumbing fixtures/fittings, domestic hot water, reclaimed water, other process water or a boiler with an aggregate projected annual water use of 100,000 gallons or more.

Energy and Atmosphere

Prerequisite 1 Fundamental Commissioning and verification Required

A third party Commissioning Agent, (CxA) will be engaged by the owner for purposes of providing fundamental commissioning services for the building energy related systems including HVAC, lighting, domestic hot water systems and building envelope. The CxA will be required to perform the scope of work required to comply with the prerequisite in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC & R systems

Prerequisite 2 Minimum Energy Performance Required

The project will use a whole building energy model to assess the annual predicted energy use. The model will demonstrate at a minimum, a 5% improvement in energy use by cost when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2010. This requirement will be met by the selection of efficient building systems equipment and a high performance building envelope.

The HVAC systems will include

- AHUs that provide 100% Outside Air and include heat recovery coils.
- Energy Recovery Units
- High Efficiency Chiller plant
- High Efficiency condensing boilers

Additional Energy Conservation Measures include

- Lighting Power Density targets below code maximums
- High performance window glazing
- Insulation levels above code minimums
- Water conserving flow and flush plumbing fixtures

Prerequisite 3 Building Level Energy Metering Required

To meet the requirements of this prerequisite, the project will install whole building energy meters for gas and electricity use by the core and shell project.

Prerequisite 4 Fundamental Refrigerant Management Required

The specifications for refrigerants used in the building HVAC & R systems do not permit the use of CFC based refrigerants. The proposed design of the HVAC systems will most likely achieve the prerequisite however, if applicable, compliant selections of any walk in freezers/coolers (installed by possible restaurant tenants), will be required. The specified chiller units use HCFC-123.

Credit 1 Enhanced Commissioning 6 points

A Commissioning Agent, (CxA), has been engaged and the commissioning scope of work will include the enhanced commissioning requirements for the building systems. The CxA's role will include reviewing the owner's project requirements, and the basis of design, creating, distributing and implementing a commissioning plan, performing a design review of the project documents, witnessing on-site installations and testing and performing commissioning of installed HVAC, lighting, lighting controls and domestic hot water systems.
Additionally the project owner has engaged a Building Envelope commissioning agent to pursue building envelope commissioning for an additional two credit points. To meet the requirements for building envelope commissioning the anticipated scope of work will include the activities required to meet the credit requirements.

Credit 2 Optimize Energy Performance est. 6 points

This project is planning to achieve 6 points of the Optimize Energy Performance credits by investing in high efficiency MEP systems including an energy recovery system. We are using an

eQuest DOE-2 energy simulation model for calculating the building performance. The building geometry, materials, and HVAC systems included in the design model are based on the design documents for this project. The energy cost savings is estimated to be 13% as compared to a baseline model built per ASHRAE 90.1-2010 requirements.

Credit 3 Advanced Energy Metering 1 point

This project is planning to install meters for future tenant spaces so that tenants will be capable of independently measuring consumption of electricity, chilled and or condenser water for cooling, and hot water for heating. Electricity will be measured for both consumption and demand and all data will be recorded at a minimum of one hour or less with a remotely accessible building automation system.

Credit 6 Enhanced Refrigerant Management 1 point

The project will specify building systems components with compliant refrigerants that are used in quantities below the maximum levels allowed by the credit requirements.

Credit 7 Green Power and Carbon Off Sets *1-2 maybe points*

The owner is exploring the purchase of 'carbon off-sets' through a 5-year contract to offset a minimum of 50% of the building's energy use from renewable sources.

Materials and Resources

Prerequisite 1 Storage and Collection of Recyclables Required

Storage of collected recyclables will be accommodated on the ground floor of the project in an area adjacent to the loading dock, Tenants will bring their recyclables to ta central storage room. The recyclables will be collected by a contracted waste management company on a regular basis.

Prerequisite 2 Construction and Demolition Waste Management Planning

The project will meet the requirements of this prerequisite by including a Construction Waste Management section in Division 1 of the project manual. The specification will include direction for the Construction manager to submit and implement a compliant waste management plan for the duration of construction.

Credit 1 Building Life Cycle Impact Reduction 3 points

The project will meet the credit requirements by implementing a Whole building life-cycle assessment of the structure and enclosure to demonstrate a 10% reduction. The assessment will include at least three of the following six impact categories: global warming potential, depletion of the stratospheric ozone layer, acidification, eutrophication, formation of tropospheric ozone and depletion of nonrenewable energy resources.

Credit 2 Building Product Disclosure and Optimization: Environmental Product Declaration 1 point

The project will attempt this credit via Option 1. The technical specifications will include direction for the Construction Manager and their sub-contractors to provide/submit materials and products Environmental Product Declarations that conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. The project will work to provide documentation for 20 different permanently installed products sourced from at least five different manufacturers.

Credit 3 Building Product Disclosure and Optimization: Sourcing of Raw Materials *1 maybe point*

The project will attempt this credit via Option 2. The technical specification will include information for applicable products and materials to meet one of the following extraction criteria: Extended producer responsibility, Bio-Based materials, FSC wood, Materials reuse, Recycled Content, or regionally extracted and manufactured (within 100 miles of the project site).

Credit 4 Building Product Disclosure and Optimization: Material Ingredients *1 point*

The project will attempt this credit via Option 2. The project manual will include the information and direction for the Construction Manager and their sub-contractors to provide/submit materials and products documentation identifying the chemical make-up. The documentation may be the manufacturer's inventory, Health Product Declarations or Cradle to Cradle certification

Credit 5 Construction and Demolition Waste Management 1 point

The project will meet the requirements of this prerequisite by including a Construction Waste Management section in Division 1 of the project manual. The specification will include direction for the Construction manager to divert a minimum of 75% of the demolition and construction waste generated on site from area landfills.

Indoor Environmental Quality

Prerequisite 1 Minimum IAQ Performance Required

The building mechanical systems are designed to meet or exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7 and/or applicable building codes. Outdoor air flow must be monitored in accordance with the requirements pertaining to the particular system. The project will be equipped with a ventilation systems that provided 100% outside air and include an energy recovery unit.

Prerequisite 2 Environmental Tobacco Smoke (ETS) Control Required

The entire building and the associated site will be non-smoking. This policy will be enforced through posted signage.

Credit 1 Enhanced Indoor Air Quality Strategies 2 points

The project will attempt this credit through compliance with Option 1 for mechanical ventilation. The project will incorporate permanent entryway systems, properly enclosed and ventilated chemical use/storage areas and compliant filtration media.

Additionally, the project may choose to implement one of the following indoor air quality measures: exterior contamination prevention, increased ventilation, carbon dioxide monitoring or additional source control and monitoring.

Credit 2 Low Emitting Materials 1 point

The project will attempt this credit through meeting the compliance criteria for a minimum of two of the possible six compliance categories:

Interior paints and coatings
Interior adhesives and sealants
Flooring
Composite wood
Ceilings, walls, thermal and acoustic insulation
Furniture

Credit 3 Construction Indoor Air Quality Management Plan 1 point

The project manual will include direction for the Construction Manager to develop and implement an Indoor Air Quality Management plan in compliance with applicable control measures as stated in the SMACNA IAQ Guidelines for Occupied Buildings under construction 2nd Edition, 2007 ANSI/SMACNA 008-2008 Chapter 3. Additional measures will be required to be implemented to ensure absorptive materials will be protected from moisture damage.

Credit 5 Quality Views 1 point

The project will use a test fit tenant layout plan to demonstrate compliance with the credit requirements to provide quality views for 75% of the regularly occupied building floor area. The quality views out of the building may include landscaped areas, sky, pedestrian walkways, and or streetscapes,

Innovation & Design Processes 5 points

Green Education
The owner may explore providing two publically accessible educational outreach programs

Green Housekeeping/Operations
The owner may explore the use green cleaning products and equipment in the common areas and provide a package for residents explaining the 'green living' components of the project.

Integrated Pest Control
The owner may explore implementing a compliant sustainable low impact pest control program for the project

Organic Landscape Management
The owner may explore implementing compliant, sustainable low-impact landscape management protocols for the project site.

Credit 2 LEED Accredited Professional 1 point

A LEED AP will provide administrative services to oversee the LEED credit documentation process.

Regional Priority Credits 2 points

Regional Priority Credits, (RPC) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a project team achieves one of the designated RPCs and additional credit is awarded to the project. RPCs applicable to the Cambridge area include: Regional Priority applicable to 02139 include: Renewable Energy Production; Optimize Energy Performance 8pt threshold; High Priority Site; Building Life-Cycle impact reduction; Rainwater Management; Cooling Tower Water Use. This project anticipates achievement of three RPCs: Building Life-Cycle impact reduction; Rainwater Management; Cooling Tower Water Use.

LEED v4 for Core and Shell Development
Project Scorecard

Project Name: MITIMCo: Kendall Site 3
Project Address: 238 Main St, Cambridge, MA 02142
Date Updated: 9/20/2016

Legend

Master Site credits *itlalcized* in GREEN.
Credit not applicable or not pursued

PROJECT TOTALS

Yes	Likely	Maybe	No
64	9	13	24

		Yes	Likely	Maybe	No			
						GENERAL PROJECT DOCUMENTATION		Responsible
D	Y					PI form 1	Minimum Program Requirements	Req'd	Team
		Yes	Likely	Maybe	No			
		1	0	0	0	INTEGRATIVE PROCESS		1	Responsible
D	1					Credit 1	Integrative Process	1	Team
		Yes	Likely	Maybe	No			
		17	0	3	0	LOCATION & TRANSPORTATION		15	Responsible
D					N	Credit 1	LEED for Neighborhood Development Location	15	Team
D	2					*Credit 2*	*Sensitive Land Protection*	2	A10
D				3		*Credit 3*	*High Priority Site*	2-3	A10
D	6					*Credit 4*	*Surrounding Density and Diverse Uses*	1-6	A10
D	6					*Credit 5*	*Access to Quality Transit*	1-6	A10
D	1					*Credit 6*	*Bicycle Facilities*	1	A10 / PW
D	1					*Credit 7*	*Reduced Parking Footprint*	1	A10
D	1					*Credit 8*	*Green Vehicles*	1	A10
Phase		Yes	Likely	Maybe	No			
		7	2	1	1	SUSTAINABLE SITES		11	Responsible
C	Y					*Prereq 1*	*Construction Activity Pollution Prevention*	Req'd	A10
D	1					*Credit 1*	*Site Assessment*	1	A10
D				1	1	*Credit 2*	*Site Development - Protect or Restore Habitat*	1-2	Civil/LA
D		1				*Credit 3*	*Open Space*	1	A10
D	3					*Credit 4*	*Rainwater Management*	2-3	A10
D	2					*Credit 5*	*Heat Island Reduction*	1-2	A10 / PW / LA
D		1				*Credit 6*	*Light Pollution Reduction*	1	A10
D	1					Credit 7	Tenant Design and Construction Guidelines	1	Owner/TGE
		Yes	Likely	Maybe	No			
		8	1	0	2	WATER EFFICIENCY		12	Responsible
D	Y					*Prereq 1*	*Outdoor Water Use Reduction*	Req'd	A10 / Civil
D	Y					Prereq 2	Indoor Water Use Reduction	Req'd	AHA/TGE
D	Y					Prereq 3	Building-level Water Metering	Req'd	AHA/Owner
D	2					*Credit 1*	*Outdoor Water Use Reduction*	1-2	A10 / Civil
D	3	1			2	Credit 2	Indoor Water Use Reduction	1-6	Owner/AHA
D	2					Credit 3	Cooling Tower Water Use	1-2	AHA
D	1					Credit 4	Water Metering	1	AHA
		Yes	Likely	Maybe	No			
		12	3	3	15	ENERGY & ATMOSPHERE		33	Responsible
C	Y					Prereq 1	Fundamental Commissioning and Verification	Req'd	CxA
D	Y					Prereq 2	Minimum Energy Performance	Req'd	AHA
D	Y					Prereq 3	Building-level Energy Metering	Req'd	AHA/Owner
D	Y					Prereq 4	Fundamental Refrigerant Management	Req'd	AHA
C	6					Credit 1	Enhanced Commissioning	2-6	CxA
D	5	1	2	10		Credit 2	Optimize Energy Performance	1-18	AHA
D	1					Credit 3	Advanced Energy Metering	1	AHA
C					2	Credit 4	Demand Response	1-2	Owner
D					3	Credit 5	Renewable Energy Production	1-3	Owner
D				1		Credit 6	Enhanced Refrigerant Management	1	MEP
C		2				Credit 7	Green Power and Carbon Offsets	1-2	Owner
Phase		Yes	Likely	Maybe	No			
		6	2	3	3	MATERIALS & RESOURCES		14	Responsible
D	Y					Prereq 1	Storage & Collection of Recyclables	Req'd	Owner
C	Y					Prereq 2	Construction and Demolition Waste Management Plan	Req'd	A10
C	3				3	Credit 1	Building Life-Cycle Impact Reduction	2-6	Team
C	1			1		Credit 2	Building Product Disclosure & Optimization-EPD's	1-2	CM
C		1	1			Credit 3	Building Product Disclosure & Optimization-Raw Materials	1-2	CM
C		1	1			Credit 4	Building Product Disclosure & Optimization-Material Ingrediants	1-2	CM
C	2					Credit 5	Construction and Demolition Waste Management	1-2	CM
		Yes	Likely	Maybe	No			
		5	0	2	3	INDOOR ENVIROMENTAL QUALITY		14	Responsible
D	Y					Prereq 1	Minimum IAQ Performance	Req'd	AHA
D	Y					Prereq 2	Environmental Tobacco Smoke (ETS) Control	Req'd	A10
D	2					Credit 1	Enhanced IAQ Strategies	1-2	AHA/Owner/PW
C	1		2			Credit 2	Low-Emitting Materials	1-3	CM
C	1					Credit 3	Construction IAQ Management Plan	1	CM
D					3	Credit 7	Daylight	1-3	PW/TGE/Owner
D	1					Credit 8	Quality Views	1	PW/TGE
		Yes	Likely	Maybe	No			
		6	0	0	0	INNOVATION IN DESIGN		6	Responsible
D	1					*Credit 1*	*Innovation in Design: Green Education*	1	A10
D	1					*Credit 2*	*Innovation in Design: Green Cleaning*	1	A10
D	1					*Credit 3*	*Innovation in Design: Organic Landscape Maintenance*	1	A10
C	1					*Credit 4*	*Innovation in Design: Intergrated Pest Management*	1	A10
C	1					Credit 5	Innovation in Design: To be determined	1	Team
C	1					Credit 6	LEED Accredited Professional	1	TGE
		Yes	Likely	Maybe	No			
		2	1	1	0	REGIONAL PRIORITY		4	Responsible
						Zip code - 02142: LTc3, SSc4, WEc3, MRc1 (3 pts), EAc2 (17%), EAc5 (3%)			
D	1					*Credit 1*	*Regional Priority Credit: MRc1*	1	-
D		1				Credit 2	Regional Priority Credit: WEc2	1	-
D	1					*Credit 3*	*Regional Priority Credit: SSc4*	1	-
D			1			Credit 4	Regional Priority Credit: EAc2 17% (8 points)	1	-
Yes	Likely	Maybe	No						
64	9	13	24	PROJECT TOTALS (Certification Estimates)				110	

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

ACENTECH

33 Moulton Street
Cambridge MA 02138
617 499 8000
acentech.com

October 10, 2016

Sandra Smith, AIA LEED AP
Perkins + Will
225 Franklin Street
Boston, MA 02110

Subject Environmental Sound Review and Recommendations
MITIMCo South of Main (SoMA) Site 3 Project
Cambridge, MA
Acentech Project No. 625881

Dear Sandra:

This letter presents the outdoor equipment sound evaluation for the MITIMCo Site 3 project in Cambridge, MA. This project site needs to comply with the City of Cambridge noise regulation as well as the Massachusetts state regulation. A more detailed evaluation of the entire South of Main (SOMA) sound impact to the neighborhood was conducted in 2015 and included in the Article 19 submission (dated July 13, 2015). This report confirms some earlier assumptions and provides updated evaluations for Site 3.

APPLICABLE NOISE REGULATION

Massachusetts

The Massachusetts Department of Environmental Noise Policy (MassDEP) defines noise pollution by the condition resulting when:

- The equipment increases broadband sound level by more than 10 dB(A) above ambient, or
- The equipment with tonal sound - when any octave band center frequency sound pressure level exceeds the two adjacent bands by 3 dBA or more

For this project, we confirmed the existing background sound levels are high enough in the project area that the meeting the City of Cambridge Noise Regulation would be the more stringent. We will need to comply with the MassDEP regulation for the emergency generators.

City of Cambridge

The City of Cambridge Noise Regulation has fixed sound emissions level limits for daytime and nighttime hours. There are different limits based on the zoning district. Based on the City of Cambridge Zoning Map, the equipment of our project should meet the Residential Zoning District at the closest residential building and hotel. The rest of the building should meet the Business Zoning District.

An updated evaluation will include the predicted sound levels to the future Site 4 building, which is a mixed-use building including residential uses.

Daytime is defined by the City as the period between the hours of 7AM and 6PM except Sunday and holidays.

PREDICTED SOUND EMISSION LEVELS

Your engineer has provided us with all outdoor equipment and emergency generator sound data. We have predicted the sound emission levels of the future equipment to the property lines. We have assumed that for nighttime conditions, all rooftop mechanical equipment will operate at full capacity in the worst-case scenario. For worst-case daytime condition, the same rooftop equipment will be operating, as well as the emergency generator (per testing).

The list below shows equipment used in our acoustic analysis.

- Four cooling towers on the roof level with Quiet Fan option similar to Marley NC8409 series, with solid acoustical barriers around
- 12 general exhaust fans on the roof level similar to M.K. Plastics Axijet-VC 3650, with discharge sound attenuators
- Various inline exhaust and supply fans located within the building for ventilation similar to Greenheck QEI, outfitted with sound attenuators to the exterior
- Garage supply and exhaust fans located below grade of the building with air inlet and exhaust openings to the exterior one the second level, outfitted with silencers to the exterior
- Mechanical penthouse enclosing the chillers, boilers, pumps, and air handling units, with louvers and roof openings outfitted with sound attenuators as needed to mitigate sound to the exterior
- Two 1500 kW diesel emergency generators with an acoustic enclosure and exhaust muffler provided to each generator that achieves an average of 65 dB(A) overall sound levels at 50 ft. The generators will only be tested during the daytime hours.

The figure below shows the project location and the closest adjacent residential / hotel receivers:

Tone Evaluation

Based on the equipment sound data and the predicted sound levels to the closest receivers, we do not anticipate the equipment to emit tonal sound as defined by the state of Massachusetts.

Predicted Equipment Sound Levels

Based on the equipment sound data and the noise control measures described above, we predicted the rooftop equipment sound emission levels to the closest residential receivers (Table 1). These are the sound levels without the existing background sound level.

Receiver Location	Overall daytime nighttime sound emission levels excluding the emergency generator (dBA)	Sound Limits (dBA)
1	47 dBA	60 dBA (day) 50 dBA (night)
2	43 dBA	
3	32 dBA	

Table 1. Predicted sound pressure levels to the receivers with all noise control measured provided as described in this report.

The predicted A-weighted levels with the noise control described above will be within the allowable daytime and nighttime sound limits.

Table 2 shows the predicted sound levels with the one emergency generator turned on. It is assumed that only one generator will be tested at a time.

Receiver Location	Overall daytime nighttime sound emission levels excluding the emergency generator (dBA)	Sound Limits (dBA)
1	52 dBA	60 dBA (day)
2	51 dBA	
3	44 dBA	

Table 2. Predicted sound pressure levels to the receivers with all noise control measured provided as described in this report.

CONCLUSION

Based on our evaluation of the rooftop equipment and emergency generators proposed for SOMA MITIMCo Site 3 project, the equipment sound emission to the community are within the acceptable sound limits and will not produce any tonal sound.

* * * * *

I trust this letter provides the information that you need at this time. If you have questions, please call me on my direct line at 617.499.8080.

Sincerely,

Rose Mary Su
Senior Consultant

J:\625xxx\6258xx\625881 - Perkin+Will - MITIMCo Parcel N\Reports\04-rms-PW-MIT Site 3 Environmental Noise Evaluation.docx

PUD-5 SoMa Wind Update
November 1, 2016

INTRODUCTION

During the PUD Special Permit process, RWDI, an international engineering firm that specializes in testing and analysis of wind conditions, evaluated approximately 170 locations in and around PUD-5 on behalf of MIT. The wind study showed that there are many locations outside of the PUD that have existing wind conditions that the MIT Kendall project neither improves nor worsens. The study further demonstrated that the project improves wind conditions at several wind locations both within and outside of the PUD that are deemed "uncomfortable" in the existing (no build) condition. At the time of the granting of the Special Permit, all locations within the SoMa PUD, with the exception of eight, were "comfortable for sitting, standing or walking" with the remaining eight identified as areas for continued focus.

While projected conditions in these areas of focus are not dangerous and are consistent with urban wind conditions existing in Kendall Square and throughout the region, MIT, the design and engineering teams and RWDI have continued to evaluate strategies to further improve conditions at these locations. This memo serves as an update regarding the work the teams have been undertaking to improve conditions at these areas of focus.

OVERVIEW

The SoMa areas of focus are shown on the attached graphic and can be viewed in two main groups – those in the Gateway/MBTA stations area influenced by design around Building 5 and those along Hayward Street between Buildings 3 and 4 and influenced by design around Building 4. (The area around sensor 56 will be addressed in future Building 2 design.)

Between September 2015 and October 2016, RWDI conducted multiple pedestrian wind tunnel tests, as well as area specific sensitivity studies, to determine strategies for improving conditions in these areas. Members of the MIT and the design teams associated with the proposed Kendall Square buildings participated in the wind tunnel testing at RWDI's labs in Guelph Ontario. The results of the most recent test, October 2016, are presented and discussed below.

Gateway/MBTA Station
Given wind direction along Main Street, MIT evaluated a range of additional design elements and strategic landscape around Building 5 to improve the areas of focus around the MBTA station and the Gateway (sensors 136, 133, 126 and 124/128). As tested in the October 2016 test, these strategies can result in all areas around the T station achieving a level comfortable for sitting, standing or walking. As some of these design elements are integral to Building 5 design, MIT will present these elements in more detail as part of the Building 5 design review process.

Hayward Street
MIT has also focused on the area on Hayward Street between Buildings 4 and 3 (sensors 92 and 94). The October 2016 test resulted in significantly improved conditions at sensor 94. However, it did not improve conditions at sensor 92. Focusing on this area, the team then tested the impact of inserting a 60' x 35' wall between the Building 4 tower cantilever and the ground. Although that did bring the wind comfort to Comfortable for Walking (19 mph) it was deemed undesirable from an urban design standpoint, as it prevents both views and pedestrians from passing through the area in question. Additionally, the relatively minimal decrease in wind speed (3 mph difference from the Special Permit test), did not seem worth the trade off, particularly due to the fact that it is within the standard deviation of the wind testing.

Although the initial attempt at strategic planting studied in the October 2016 test resulted in higher wind speeds than in the April 2016 test, the design and engineering teams believe that strategic planting in this area can result in conditions similar to the April 2016 test. This is particularly true because all of the adjacent sensors are not only comfortable for walking but also for sitting or standing. Although this area may still be in the uncomfortable range it will be at the low end of wind speed, closer to "comfortable for walking". These conditions are similar to existing conditions at several locations along Main Street and Third Street and in Point Park.

WIND STUDY RESULTS

Below are descriptions and results for the SoMa areas of focus for the major tests conducted.

1. **Existing Conditions Test:**
   - Assumptions
     - **i.** Existing Conditions (no new construction)

2. **April 2016 PUD Special Permit Test:**
   - Assumptions
     - **i.** New Construction
     - **ii.** New planting: mix of evergreen and deciduous trees, as well as low planting
   - Results:
     - **i.** All points within the SoMa PUD were comfortable for sitting, standing or walking with the exception of eight "areas of focus" which were uncomfortable
     - **ii.** Point 92 result: 22 mph = Uncomfortable (area of focus)

3. **October 2016 Updated Landscape Plan and Strategic Planting:**
   - Assumptions
     - i. New Construction
     - ii. Landscape Plan reflective of current design (October 2016)
     - iii. Revised planting: mix of deciduous and evergreen trees altered to test wind impact
   - Results
     - i. General result: reduced wind speeds by 1-10 mph in areas of focus; did not result in any new areas of focus
     - ii. Point 92 result: 25 mph = Uncomfortable
     - iii. Also, a low (10'x10') wall at SE corner of Site 4 corner: wall had no measurable no impact

Sensor	Building Area	Existing Conditions	April 2016 Special Permit	October 2016 Revised Landscape and Strategic Planting
56	2	16 mph	21 mph	16 mph
83	5	16 mph	21 mph	17 mph
92	4	11 mph	22 mph	25 mph
94	4	11 mph	20 mph	10 mph
124/128	5	17mph/15 mph	21mph/19 mph	19 mph/21 mph
126	5	10 mph	20 mph	17 mph
133	5	12 mph	20 mph	20 mph
136	5	12 mph	21 mph	19 mph

The comfort levels have been defined as follows. The range of standard deviation is +/- 3 mph.

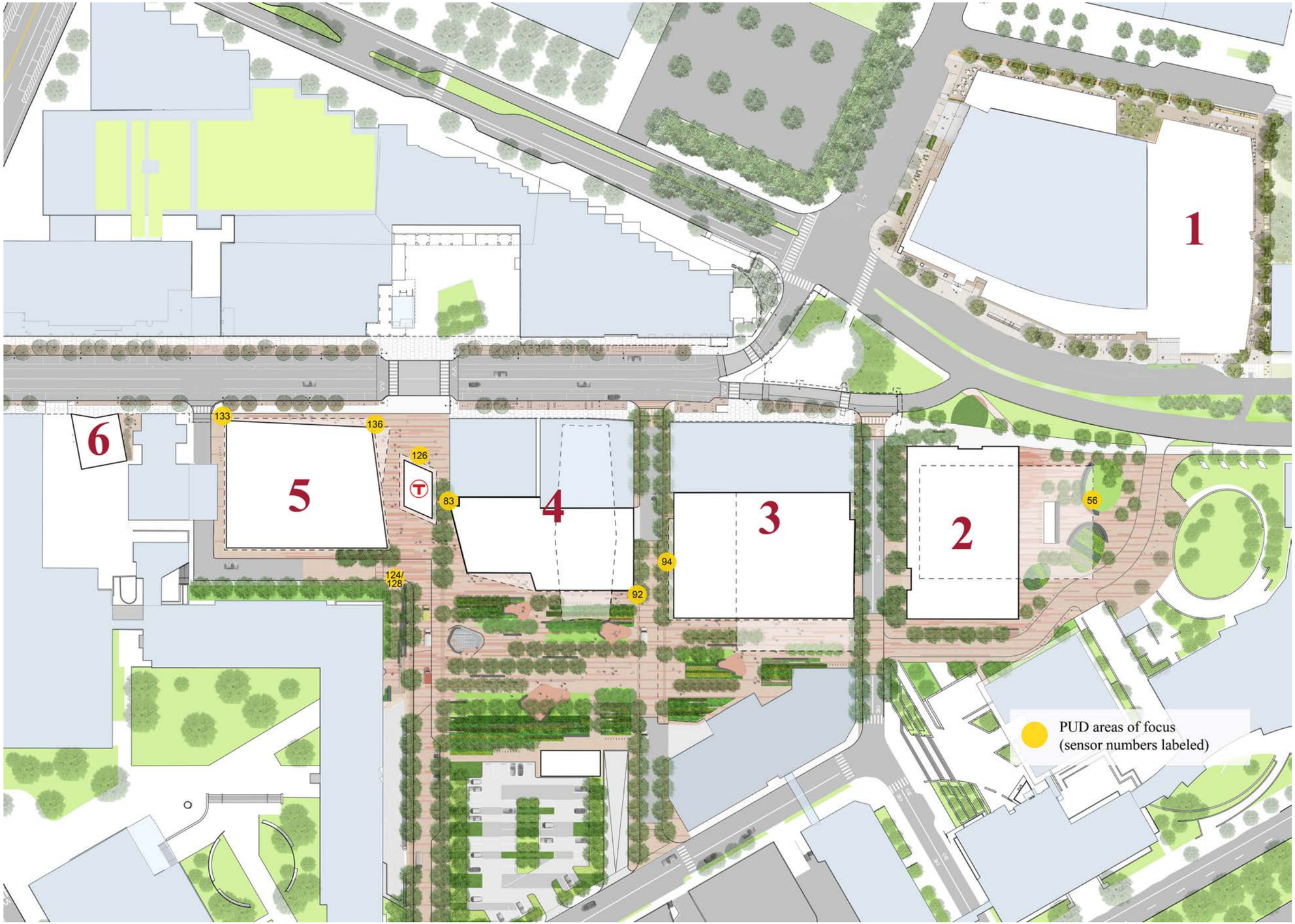
Comfortable for Sitting: Annual average wind speeds of 12 mph or less at least for 80% of the time

Comfortable for Standing: Annual average wind speeds of 13-15 mph or less at least for 80% of the time

Comfortable for Walking: Annual average wind speeds of 16-19 mph or less at least for 80% of the time

Uncomfortable: Annual average wind speeds of 20-27 mph at least for 80% of the time.

Dangerous: Annual average wind speeds of 28 mph or greater at least for 80% of the time.


1
2
3
4
5
6
133
136
126
83
124/
128
94
92
56
PUD areas of focus
(sensor numbers labeled)