Massachusetts Institute of Technology
Office of Campus Planning
Building NW23–100
77 Massachusetts Avenue
Cambridge, Massachusetts
02139–4307

campusplanning.mit.edu

December 17, 2020

Cambridge Planning Board
Community Development Department
Attn: Swaathi Joseph and Liza Paden
344 Broadway
Cambridge, MA 02139

RE: MIT West Campus Graduate Student Dormitory Special Permit

Dear Chairperson Preston Connolly and Members of the Board,

The Massachusetts Institute of Technology (MIT) is pleased to submit the enclosed special permit application in connection with its proposal to construct a new academic facility, the MIT West Campus Graduate Student Dormitory (the "Project"), at 269-301 Vassar Street on the west end of MIT's campus.

The Project will provide up to approximately 690 new Graduate Student Housing (GSH) beds on MIT's campus. As such, the enclosed special permit application for the Project satisfies the following requirement set forth in Section C of MIT's Volpe commitment letter, dated October 23, 2017, which was entered into in connection with the PUD-7 rezoning effort: "MIT agrees that it shall…no later than December 31, 2020, apply for a discretionary permit (or a building permit if no discretionary permits are required) to create at least 500 New GSH Beds."

We have reviewed the Project described in the enclosed application with City staff (CDD, DPW, CHC, and TP&T) and believe that all comments and questions have been addressed at this time. We look forward to meeting with the Board and sincerely thank you for your time and consideration of this Project.

Regards,

Jon Alvarez, AIA Director
MIT Office of Campus Planning

MIT West Campus Graduate Student Dormitory

Planning Board Special Permit Submission

Volume 1

December 17th, 2020

TABLE OF CONTENTS

1. APPLICATION FORMS

CITY OF CAMBRIDGE, MASSACHUSETTS

PLANNING BOARD

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

SPECIAL PERMIT APPLICATION • COVER SHEET

In accordance with the requirements of the City of Cambridge Zoning Ordinance, the undersigned hereby petitions the Planning Board for one or more Special Permits for the premises indicated below.

Location of Premises:	269-301 Vassar St.
Zoning District:	Special District 6 and Special District 11
Applicant Name:	Massachusetts Institute of Technology
Applicant Address:	77 Massachusetts Ave., NW23-100, Cambridge MA 02139
Contact Information:	617-293-6380 kbrown@mit.edu
	Telephone # Email Address Fax #

List all requested special permit(s) (with reference to zoning section numbers) below. *Note that the Applicant is responsible for seeking all necessary special permits for the project. A special permit cannot be granted if it is not specifically requested in the Application.*

Section 17.63.2(b) - Special Permit to increase building height to approximately105' within the SD-6 District
Section 17.203.2 - Special Permit to increase building height to approximately 100' within the SD-11 District
Section 6.35.1 - Special Permit to reduce the minimum parking requirements
Section 19.20 - Project Review Special Permit

List all submitted materials (include document titles and volume numbers where applicable) below.

Volume I: Application forms, project narratives, and project certifications

Volume II: Plans and Illustrations

Signature of Applicant: Kelley Brown (Kelley Brown)

For the Planning Board, this application has been received by the Community Development Department (CDD) on the date specified below:

Date Signature of CDD Staff

DIMENSIONAL FORM

Project Address: 269-301 Vassar St. **Application Date:** 12/17/2020

	Existing	Allowed or Required (max/min)	Proposed	Permitted
Lot Area (sq ft)	765,106[1]	5,000	765,106[1]	
Lot Width (ft)	>50	50	>50	
Total Gross Floor Area (sq ft)	1,118,831[1]	2,102,877[1]	1,430,922[1]	
Residential Base	N/A	N/A	N/A	
Non-Residential Base	N/A	N/A	N/A	
Inclusionary Housing Bonus	N/A	N/A	N/A	
Total Floor Area Ratio	1.51[1]	1.75 - 3.0[1]	1.87[1]	
Residential Base	N/A	N/A	N/A	
Non-Residential Base	N/A	N/A	N/A	
Inclusionary Housing Bonus	N/A	N/A	N/A	
Total Dwelling Units	N/A	N/A	N/A	
Base Units	N/A	N/A	N/A	
Inclusionary Bonus Units	N/A	N/A	N/A	
Base Lot Area / Unit (sq ft)	N/A	N/A	N/A	
Total Lot Area / Unit (sq ft)	N/A	N/A	N/A	
Building Height(s) (ft)	28'; 0'	85'/100'; 100'/180'	100'; 105'[5]	
Front Yard Setback (ft)	38'; N/A	73'2"; NA	37-'9"[6]; 35'-7"	
Side Yard Setback (ft)	N/A[3]; N/A[3]	N/A[3]; N/A[3]	N/A[3]; N/A[3]	
Side Yard Setback (ft)	18'-7"; NA[3]	41'5"; NA[3]	1'0"[6]; NA[3]	
Rear Yard Setback (ft)	16'-11"; N/A	50'9"; NA	13'-8"[6]; 18'-6"	
Open Space (% of Lot Area)	N/A	N/A	N/A[7]	
Private Open Space	N/A	N/A	N/A[7]	
Permeable Open Space	N/A	N/A	N/A[7]	
Other Open Space (Specify)	N/A	N/A	N/A[7]	
Off-Street Parking Spaces	136	58	0[4]	
Long-Term Bicycle Parking	0	345	345	
Short-Term Bicycle Parking	0	35	35	
Loading Bays	0	4	per Section 6.74	

Use space below and/or attached pages for additional notes:

Refer to Footnotes on the following page

Footnotes to Dimensional Form

(1) Lot area, total GFA, and FAR for the lot as shown in the dimensional form are calculated across "Block 7", a contiguous multi-building lot owned by MIT. The figure and chart provided below shows the bounds of Block 7 and the associated aggregate calculations.

Zoning District	Zoning Block Area	FAR (Dorm)	Total Block Capacity (GFA)	Existing GFA on Block	Built Space to be Demolished	Remaining Block Development Capacity	New GFA
SD-6	608,466	3	1,825,398	968,481	n/a	n/a	
SD-8	143,206	1.75	250,611	135,441	n/a	n/a	
SD-11	13,434	2	26,868	14,909	14,909	n/a	
TOTAL	**765,106**	**n/a**	**2,102,877**	**1,118,831**	**14,909**	**998,955**	**327,000**

(2) Where there are two numbers separated by a semicolon the first number pertains to the portion of the site within SD-11, and the second number pertains to the portion of the site within SD-6 (ie. SD-11; SD-6). Where there are two numbers separated by a slash the first is the height allowed by right and the second is the increase allowed by Special Permit.

(3) Per 5.13, distance between buildings on multi-building parcel calculations:
- East Building (105 ft) + West Building (100 ft) =205 ft/6 = 34.2 ft (Proposed = 127'6")
- East Building (105 ft) + Simmons Hall (100 ft) = 205 ft/6 = 34.2 ft (Proposed= 50'1")

(4) Subject to Special Permit to reduce minimum parking requirements per Section 6.35.1. This reflects a net loss of 136 surface spaces from the West Lot which is discussed in greater detail in the Transportation Access and Circulation Study included in the Appendix to this application

(5) Subject to receipt of Special Permit from the Planning Board to increase height per Section 17.63.2(b) and Section 17.203.2

(6) Subject to receipt of a variance from the Board of Zoning Appeal for relief on yard setback requirements

(7) Although not required, the Project is providing 30,100 SF of open space of which 15,390 SF is categorized as publicly beneficial open space. This is detailed on Exhibit 2.4 in Volume II of this application.

FEE SCHEDULE

Project Address: 269-301 Vassar St. **Application Date:** 12/17/2020

The Applicant must provide the full fee (by check or money order) with the Special Permit Application. Depending on the nature of the proposed project and the types of Special Permit being sought, the required fee is the larger of the following amounts:

- If the proposed project includes the creation of new or substantially rehabilitated floor area, or a change of use subject to Section 19.20, the fee is ten cents ($0.10) per square foot of total proposed Gross Floor Area.
- If a Flood Plain Special Permit is being sought as part of the Application, the fee is one thousand dollars ($1,000.00), unless the amount determined above is greater.
- In any case, the minimum fee is one hundred fifty dollars ($150.00).

Fee Calculation

New or Substantially Rehabilitated Gross Floor Area (SF): 327,000	× $0.10 =	$32,700.00
Flood Plain Special Permit	Enter $1,000.00 if applicable:	$0
Other Special Permit	Enter $150.00 if no other fee is applicable:	
TOTAL SPECIAL PERMIT FEE	**Enter Larger of the Above Amounts:**	$32,700.00

OWNERSHIP CERTIFICATE

Project Address: 269-301 Vassar St. **Application Date:** 12/17/2020

This form is to be completed by the property owner, signed, and submitted with the Special Permit Application:

I hereby authorize the following Applicant: Kelley Brown

at the following address: Office of Campus Planning, MIT, 77 Massachusetts Ave., NW23-100, Cambridge MA 02139

to apply for a special permit for: Massachusetts Institute of Technology

on premises located at: 269-301 Vassar St.

for which the record title stands in the name of: Massachusetts Institute of Technology

whose address is: 77 Massachusetts Ave., Cambridge MA 02139

by a deed duly recorded in the: Refer to title references on following page

Registry of Deeds of County: Book: Page:

OR Registry District of the Land Court, Certificate No.: Book: Page:

Jim Alvarez, DIRECTOR OF CAMPUS PLANNING, MIT

Signature of Land Owner (If authorized Trustee, Officer or Agent, so identify)

To be completed by Notary Public:

Commonwealth of Massachusetts, County of Middlesex

The above named Jim Alvarez personally appeared before me,

on the month, day and year Dec. 14, 2020 and made oath that the above statement is true.

Notary: Kim Medeiros

My Commission expires: 06/26/2026

Kim Medeiros
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
06/26/2026

Kim Medeiros
My Commission Expires
06/26/2026
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS

Title References for 269-301 Vassar St.

- a deed dated January 19, 2001 and recorded with Middlesex South Registry of Deeds in Book 32259, Page 276 and filed with the Middlesex Registry District of the Land Court as Document No. 1160877 (Certificate of Title 220502)

- a deed dated April 29, 1970 and recorded with Middlesex South Registry of Deeds in Book 11826, Page 680 and filed with the Middlesex Registry District of the Land Court as Document No. 475238 (Certificate of Title 132242)

- a deed dated July 30, 1980 and recorded with Middlesex South Registry of Deeds in Book 14022, Page 253 and filed with the Middlesex Registry District of the Land Court as Document No. 599934 (Certificate of Title 161239)

- a deed dated July 30, 1980 and recorded with Middlesex South Registry of Deeds in Book 14022, Page 220 and filed with the Middlesex Registry District of the Land Court as Document No. 599935 (Certificate of Title 161239)

- a deed dated July 30, 1980 and recorded with Middlesex South Registry of Deeds in Book 14022, Page 231 and filed with the Middlesex Registry District of the Land Court as Document No. 599936 (Certificate of Title 161239)

- a deed dated July 30, 1980 and recorded with Middlesex South Registry of Deeds in Book 14022, Page 242 and filed with the Middlesex Registry District of the Land Court as Document No. 599937 (Certificate of Title 161239)

- a deed dated October 22, 1980 and filed with the Middlesex Registry District of the Land Court as Document No. 603303 (Certificate of Title 162009).

2. PROJECT OVERVIEW

2. PROJECT OVERVIEW

MIT is proposing to construct a new graduate student dormitory on the western side of the MIT campus. As part of the Volpe Rezoning Letter of Commitment dated October 23, 2017 by MIT (the **"Volpe Commitment Letter"**), MIT agreed that it shall create 950 new beds for graduate students (collectively, the **"New GSH Beds"**), pursuant to the schedule outlined in the Volpe Commitment Letter. In November 2020, the new graduate student housing tower at Kendall Square Site 4 was delivered, adding 250 new beds to campus. Additionally, MIT converted 150 beds to graduate student use within its existing housing stock, the majority being in the housing at 70 Amherst Street. The remainder of new beds to be created pursuant to the Volpe Commitment Letter will be fulfilled by this Project (as defined below). The schedule in the Volpe Commitment Letter states that MIT shall "no later than December 31, 2020, apply for a discretionary permit (or a building permit if no discretionary permits are required) to create at least 500 New GSH Beds." This development fulfills and builds upon that promise by seeking to build up to approximately 690 new on-campus beds for graduate students to relieve pressure on the larger Cambridge housing market. Tables 1 and 2 below summarize the Volpe Commitment Letter and the current MIT fulfillment plan.

Commitment Summary

Source	Beds
Kendall Square Site 4	250
New	500
Converted or New	200
Total	950

Table 1

MIT Fulfillment Plan

Source	Beds
Kendall Square Site 4	250
New West Graduate Residences	650-700
Converted	150
Total	1,050-1,100

Table 2

In accordance with the above described commitment and schedule for compliance, this is an application by MIT for Special Permits to enable the construction of two dormitory buildings at 269-301 Vassar Street (the **"Site"**), containing approximately 690 beds, including a large central plaza (the **"Central Plaza"**), two entry courts, and green space improvements along the Grand Junction Rail Line and future Grand Junction Multi-Use Path (the **"Project"**). The Site is situated on MIT's campus and includes parcels subject to Special District 6 and Special District 11 zoning, as well as the Fort Washington Historic District. The Project proposes approximately 327,000 square feet of Gross Floor Area **("GFA")** across the two buildings described herein. The **"West Building",** as it will be referred to throughout this application, is approximately 168,000 square feet of GFA, containing approximately 355 beds. The **"East Building",** as it will be referred to throughout this application, is approximately 159,000 square feet of GFA, containing approximately 335 beds. MIT intends to engage a third-party student housing developer, American Campus Communities **("ACC"),** to deliver the Project, a model that has proven successful with other higher educational institutions and may allow MIT the financial flexibility and resources necessary to expand bed capacity and expedite capital renewal improvements and deferred maintenance in the graduate housing system and overall residential property portfolio.

Currently occupied by an MIT surface parking lot and the MIT Police Station, the Site will be cleared as part of the Project and work is underway to relocate the Police Station across Vassar Street to MIT Building W91. MIT's proposed improvements are intended to reinforce the importance of the Vassar Street corridor by expanding graduate housing in West Campus and enhancing connections with the surrounding neighborhood by way of the improved public realm and new Central Plaza at the Site.

Informed by the strong linear forms of Vassar Street, the future Grand Junction Multi-Use Path, and the Fort Washington Park and Historic District, the Project consists of two buildings framing a large Central Plaza. The Central Plaza honors the Fort Washington Historic District boundary and respects an easement associated with the Talbot Street outfall, which passes though the Site. The Central Plaza is flanked by five and six story wings that are below the 60' height restriction imposed by the Fort Washington Historic District. Once beyond the Fort Washington Historic District regulating lines, the East and West Buildings step up to ten stories.

The heart of the Project, and the nexus between campus and the surrounding neighborhood, is the publicly accessible Central Plaza. Functionally, the plaza connects the existing rail crossing to Fort Washington Park and the existing Vassar Street crosswalk, establishing a strong pedestrian and cyclist route from the river and playing fields, through to the historic park. The landscape design of the plaza acknowledges the orientation and alignment of Fort Washington Park across the Grand Junction Rail Line, replaces a large surface parking lot, and establishes a vastly improved view corridor from the Park toward the river. The Central Plaza interprets this grain and language through a series of new outdoor "rooms", with desirable southern exposure, that encourage and support multi season activity. Whether used for informal neighborhood gatherings, lawn games, study space, or organized events, the Central Plaza is envisioned as an active and publicly beneficial open space that is inviting to building occupants and Cambridgeport residents alike.

Both buildings include highly transparent ground floor facades on Vassar Street, with punched windows on the upper residential floors. Facades are rendered in brick and metal, with a framed construction logic and material expression that recalls the industrial history of the neighborhood.

Actively used entries, lobbies, lounges, and resident amenity spaces engage a majority of the sidewalk along Vassar Street, while dormitory units occupy a portion of the West Building ground floor facing Vassar Street, and all upper floors. Ground floor lounges are expected to be hubs of activity, acting as the living rooms of the buildings and supporting small group study and informal gatherings throughout the day and night. Extending from the Central Plaza, linear landscape zones reach along the North sides of both buildings, providing access to ground level residences in the East Building. Semi-private patio spaces and exterior dormitory unit entries enliven the Site, creating an active residential zone facing the Grand Junction Multi-Use Path and Fort Washington Park.

The proposed Site and buildings are fully accessible and encourage multi-modal transportation in addition to public transit. Pedestrian ways are designed to facilitate connections to campus and out to the surrounding neighborhood. Dedicated bicycle parking for residents is provided in secure rooms

within the buildings, with additional exterior racks located near the building entries and in the Central Plaza. MIT shuttle routes run along Vassar Street, providing easy access to MIT campus and regional transit. The future Grand Junction Multi-Use Path will serve as a major off-street pedestrian and bicycle route, easily accessible via the existing rail crossing that connects to the north side of the Central Plaza. MIT will make efforts to coordinate with the project team in charge of designing and implementing the future Grand Junction Multi-Use Path to ensure consistency with the Project. New vehicular parking is not provided on Site as there is existing capacity within the MIT campus parking supply to handle new demand from the Project as well as the demand previously satisfied by spaces from the West Lot, approximately 39 of which are to be relocated (as detailed in the Traffic Access and Circulation Study filed herewith).

The Project will register under LEED v4 BD+C Multifamily Midrise and is currently tracking Gold level certification. The Project team is evaluating building envelope performance, including roof, foundation, walls and window assemblies, and window-to-wall ratio to reduce operational carbon. While net zero fossil fuel operation is the ultimate objective, the Project team is also aware of the importance of reducing the embodied carbon in construction materials and remains dedicated to that analysis.

Building height and massing affect local sun and wind conditions in the immediate surroundings. Appendix A.1 contains a shadow study representing shading on the summer solstice, winter solstice, and spring/fall equinox at 9am, noon, and 4pm. Shadows from the Project reach the south side of Fort Washington park from November through March. The Central Plaza, due south of Fort Washington Park, interrupts the building mass and ensures that even on the winter solstice, every area in the park receives at least 2 hours of direct sun. On the winter solstice, the southern third of the park receives 2-4 hours of direct sun and the northern two thirds receives 5-7 hours. Winds during winter months predominantly occur from the northwest and west, blowing from Cambridgeport towards MIT. A lower percentage of winter winds occur from the southwest, parallel to Vassar Street and the long axis of the buildings. Depending on the wind direction, wind shadows are expected at the building entry courts and portions of the Central Plaza with increased velocities at building corners. Along the length of the site, minimal impact is expected on the overall pedestrian experience.

The Project strives to mitigate several risks highlighted in the Cambridge Climate Change Vulnerability Assessment, particularly related to flooding and heat island effect. The elevations of both buildings' ground floors are located above the projected 2070 100-year flood level and neither building includes interior space below grade. While utility service entries are located on the ground level, major mechanical equipment and emergency generators are located at the roof levels. The design includes green roofs on the five and six story wings and the Project team is evaluating the possibility of incorporating photovoltaics. Beyond the buildings, the landscape design helps to address urban heat island and vulnerabilities in the existing trees on-site. The tree planting plan provides a healthy variety of species to replace existing Ash trees, a species in decline and currently located in isolated islands within the existing parking lot. The new planting design provides an increase in green area on the Site, serving to improve both stormwater management and heat island effect.

3. ZONING AND CONSISTENCY

3. ZONING AND CONSISTENCY

i. Special Permits Requested

The Applicant respectfully requests the Planning Board grant the following Special Permits in favor of the Project:

- **Special Permit to increase building height of a portion of the East Building within the SD-6 District to approximately 105',** pursuant to Section 17.63.2(b) of the Ordinance;
- **Special Permit to increase building height of a portion of the West Building within the SD-11 District to approximately 100',** pursuant to Section 17.203.2 of the Ordinance;
- **Special Permit to reduce the minimum parking requirements**, pursuant to Section 6.35.1 of the Ordinance;
- **Project Review Special Permit**, pursuant to Section 19.20 of the Ordinance.

The basis for the above-listed special permit requests is provided in Section 3.iii of this application.

ii. Compliance with Zoning

The Project includes demolition of the existing MIT Police Station and construction of two dormitory buildings at the Site, referred to as the West and East Buildings, each to contain up to approximately 355 and 335 beds respectively for a total of up to approximately 690 beds. The Project is anticipated to comprise the construction of approximately 327,000 GFA of dormitory use and accessory uses (i.e., approximately 168,000 GFA in the West Building and approximately 159,000 GFA in the East Building). The West Building is proposed to range in height from approximately 60' to 100' and the East Building is proposed to range in height from approximately 60' to 105'. Exhibit 2.1 in Volume II of this application shows the general dimensional parameters for each of the West and East Buildings.

The Site is part of "Block 7", a contiguous multi-building lot (see below) owned by MIT that has been previously designated by MIT and recognized by the City of Cambridge as a single Lot for zoning purposes (the "**Zoning Lot**"). The Site is a "split lot" under the City of Cambridge Zoning Ordinance (the "**Ordinance**"), with a majority of the Site located in Special District 6 (the "**SD-6 District**") and the remainder of the Site located in Special District 11 (the "**SD-11 District**"). The entirety of the Site is located within the MIT Institutional Overlay District. Dimensional parameters set forth in this application are calculated according to the applicable definitions in the Ordinance.

The Project's compliance with applicable zoning requirements at the Site is as follows:

- **Use**. Dormitory use is permitted as of right in the SD-6 and SD-11 Districts and is defined in Article 2.000 of the Ordinance as "[a]ny dwelling (other than a sorority or fraternity house) owned or controlled by an educational institution and occupied primarily as a place of temporary residence for persons whose permanent residence is elsewhere and who are employed or enrolled at the educational institution." For this Project, MIT is currently considering a ground lease with a third party who will develop the Project, own the dormitory building (but not the underlying land), and manage the dormitory's day-to-day operations. During the term of the ground lease, MIT will retain ownership of the land and will have sufficient oversight over the Project to ensure fulfillment of the Project's educational purpose. Upon the expiration of the ground lease, the ownership of the dormitory building will revert to MIT. In addition, to maximize occupancy while still satisfying the requirements of the dormitory use, MIT intends to lease the dormitory beds to residents in the following order of priority: (i) first, to MIT students enrolled in a graduate level educational program; (ii) then, to other MIT students, such as undergraduate students; (iii) and then, to MIT employees with finite employment arrangements, such as post-doctoral candidates. Finally, the dormitory units are intended to serve as temporary housing, with the units leased fully furnished (such that occupants need only bring clothing and personal items) and with the occupancy terms typically expiring simultaneously with the expiration of the residents' respective enrollments at MIT. The proposed Project use thus meets the definition of dormitory under the Ordinance because: (a) MIT will retain a sufficient level of control over the dormitory pursuant to the ground lease and will own the dormitory upon the expiration of the ground lease; (b) occupancy of the units will be limited to students and employees of MIT; and (c) occupancy of the units will be temporary in nature and duration. Accordingly, the proposed use is allowed as of right. The Project buildings will also contain accessory uses that are consistent with and support the proposed

dormitory use, such as management offices, study areas, social lounges, mail and package rooms, indoor bicycle parking areas and a fitness center.

- **Maximum Floor Area Ratio (FAR)**. The Site is part of the multi-building Zoning Lot owned by MIT referred to as "Block 7", measuring 765,106 square feet in total as shown in Figure 1 below. Portions of the Zoning Lot are in the SD-6, SD-8, and SD-11 Districts, which districts have a maximum FAR for dormitory use of 3, 1.75, and 2, respectively. As detailed in Table 3, the total build capacity allowed on the Zoning Lot is 2,102,877 square feet of GFA. The existing buildings total approximately 1,118,831 square feet of GFA, allowing for approximately 998,955 square feet of additional development capacity, after the MIT Police Station is demolished. The Project proposes up to approximately 327,000 square feet of GFA, creating a total of 1,430,922 square feet of GFA on the entire multi-building Zoning Lot, which is within the available capacity. Accordingly, the Project complies with the maximum FAR requirement.

Figure 1 – Block 7 Map

Zoning District	Zoning Block Area	FAR (Dorm)	Total Block Capacity (GFA)	Existing GFA on Block	Built Space to be Demolished	Remaining Block Development Capacity	New GFA
SD-6	608,466	3	1,825,398	968,481	n/a	n/a	
SD-8	143,206	1.75	250,611	135,441	n/a	n/a	
SD-11	13,434	2	26,868	14,909	14,909	n/a	
TOTAL	**765,106**	**n/a**	**2,102,877**	**1,118,831**	**14,909**	**998,955**	**327,000**

Table 3 – Block 7 Development Capacity

- **Maximum Height**. A large portion of the Site within the SD-6 District has a maximum building height of 60', with the remainder allowing for building height to be increased up to 180' by special permit. The SD-11 District has a maximum building height of 85', which can be increased to 100' by special permit. As shown on Exhibit 2.1 in Volume II of this Application and described in Section 3.iii below, the Project: (a) complies with the 60' height limitation where it applies within the SD-6 District; (b) requires a special permit to increase the height of the Project outside of such 60' restricted area within the SD-6 District to approximately 105'; and (c) requires a special permit to increase the height of the Project within the SD-11 District to approximately 100'.

- **Minimum Yard Setbacks**. There are no minimum yard setback requirements in the SD-6 Districts. As described in Section 3.iii below, the Project requires variances from the front, side and rear yard setback requirements in the SD-11 District as they apply to the portion of the West Building located within such district. Subsequent to receiving input from the Planning Board on the proposed Project design through the special permit process, the Applicant will submit a complete variance application to the Board of Zoning Appeal.

- **Minimum Motor Vehicle Parking**. The SD-6 and SD-11 Districts require one (1) space per each 12 beds, resulting in a requirement of up to approximately 58 spaces for the Project. Pursuant to Section 6.22.1(a)(3) of the Ordinance, MIT has historically provided motor vehicle parking required under zoning to serve its campus buildings through a pooled campus-wide inventory of parking spaces. However, as a result of recent and upcoming development by MIT, the MIT inventory will not have sufficient spaces to meet the zoning requirement for the Project. As described in Section 3.iii below, the Applicant is requesting that the minimum parking supply requirement be eliminated, thereby allowing no minimum parking requirement for the Project. As demonstrated by the empirical data provided in the Parking Analysis in the Transportation Access and Circulation Study attached in the Appendix to this application, any parking demand that is generated from the Project is expected to be accommodated within the existing and future campus-wide parking supply. As shown in the Transportation Access and Circulation Study, the existing parking supply has a capacity of over 1,150 spaces during peak demand and the projected new demand for the Project will range between approximately 34 to 58 spaces, depending on methodology. The future parking supply, accounting for construction of new spaces and new demand (including demand from the Project) shows availability of over 1,300 spaces during peak demand. As such, the future MIT campus parking supply can absorb the projected parking demand from the Project. The projected new demand generated by the Project will be met in nearby parking facilities, such as the Westgate or the 65 Waverly parking lots. The existing users of the West Lot and some others currently using parking facilities in this area will be shifted to under-utilized parking facilities further east on the campus.

- **Minimum Bicycle Parking**. The SD-6 and SD-11 Districts require 0.05 short-term bicycle spaces per bed and 0.5 long-term bicycle spaces per bed, resulting in a requirement of up to approximately 35 short-term spaces and 345 long-term spaces (assuming maximum buildout at 690 beds). As shown on Exhibit 4.2 in Volume II of this application, the Project proposes a

minimum of 35 short term spaces and 345 long term spaces. Accordingly, the Project complies with the minimum bike parking requirements.

- **Loading Requirements**. A total of four (4) loading bays are required to serve the Project pursuant to Section 6.83 of the Ordinance. As shown on Exhibit 4.4 in Volume II of this application, the Project proposes two (2) on-site loading bays. Under Section 6.74 of the Ordinance, the required amount of loading facilities to serve an institutional use (such as the Project) may be calculated in the aggregate for uses on a lot and any lot contiguous thereto. The multi-building Zoning Lot on which the Project is proposed currently contains 43 loading facilities. Based on the requirements of Section 6.83 of the Ordinance, only 17 loading facilities are needed to serve the existing buildings on the Zoning Lot. Accordingly, the Project will comply with the required number of loading bays through the combination of two (2) new on-site loading bays and reliance on the lot-wide pool of loading facilities for provision of the two (2) additional bays required to serve the Project. The Project includes relocating an existing curb cut for the driveway that will provide access to the loading/service facilities at the West Building and proposes maintaining the existing curb cut that will provide access to the loading/service facilities at the East Building.

- **Additional dimensional requirements**. As identified on the dimensional form provided in Section 1, the Project complies with the following dimensional requirements: minimum lot size (5,000 sf); minimum lot width (50'); multiple buildings on a lot (not less than the sum of the heights of the buildings divided by six, or ten feet, whichever is greater); and minimum ratio of private open space to lot area (none or N/A).

iii. Compliance with Special Permit Criteria

The following sections detail the Project's compliance with criteria specific to Special Permits being sought (if any) and the general Special Permit criteria outlined in Section 10.43 of the Ordinance.

3.iii.a Compliance with Criteria Specific to Special Permits being sought (if any)

- **Special Permit to increase building height of a portion of the East Building within the SD-6 District to approximately 105',** pursuant to Section 17.63.2(b) of the Ordinance. The following sub-bullets demonstrate how the Project complies with the **criteria** to be considered by the Planning Board in granting such a special permit, as set forth in Sections 17.63.2(b) and (c):

    - **The height of the other buildings or portions of buildings constructed in the district is reduced to significantly below the one hundred (100) foot height permitted as of right.**

        - *The portion of the other building proposed on the Site (the West Building) that is located within the SD-6 District is proposed to be constructed to a height of 60.*
        - *To the Applicant's knowledge, there are no buildings in the SD-6 District that exceed 100', such that the 165,000 sf cap on GFA in portions of buildings exceeding 100' in the SD-6 District can accommodate the Project[2].*
        - *As shown on Exhibits 2.10 in Volume II of this application, a large portion of the East Building is approximately 60' in height and the portion of the East Building to be built to this increased height of approximately 105' is outside of the area of the SD-6 District that may only be built to a maximum height of 60'.[3]*

    - **In the vicinity of Fort Washington buildings are constructed below the one hundred (100) foot height permitted or green space is created so as to increase the views from Fort Washington across the MIT campus to the river and to the Boston skyline beyond.**

        - *The portion of the East Building abutting the Fort Washington view corridor steps down to 60'.*
        - *In order to respect the Fort Washington Historic District and the abutting Fort Washington Park, the Site will contain two new buildings separated by an approximately 11,500 square foot Central Plaza (shown on Exhibit 2.4 and 2.5 in Volume II of this application), preserving the view corridor from Fort Washington*

[2] The top floor of the East Building is 10,444 GFA and sits at 90'4". The roof level extends above 100' but contains no GFA as calculated per the Ordinance.

[3] Pursuant to Section 17.63.2(a) of the Ordinance, the maximum height allowed at the Site is 60', which can be increased to a maximum of 180' by special permit in accordance with the provisions of Section 17.63.2(b).

Park and Historic District into the West Campus and beyond to the Charles River.

- **The view corridors along residential Cambridgeport streets, such as Erie and Pacific Streets, are uninterrupted by buildings, wherever possible.**

  - *The Project provides a 50' offset from the existing MIT residence hall located to the east (Simmons Hall). The resulting open space aligns with Erie Street and preserves the view corridor south from Cambridgeport, across MIT's campus, to Boston and the Four Seasons tower.*

- **Green space is created in the district at grade where it can be visible to the general public.**

  - *The Site will contain two new buildings separated by an approximately 11,500 square foot Central Plaza, preserving the view corridor from Fort Washington Park and Historic District into the West Campus and beyond. The view corridor itself is to be occupied by a new green space, shown as the Central Plaza on Exhibit 2.4 and 2.5 in Volume II of this application. It will be provided at grade, clearly visible from Vassar Street, and enhanced with lighting, furnishing and seating areas to encourage use and engagement by the general public.*

- **The buildings are distributed in the district so as to create a visual penetration as viewed from the residential Cambridgeport neighborhood to the MIT campus and to the river beyond.**

  - *As described above and throughout this application, the Site has been designed with two new buildings separated by an approximately 11,500 square foot Central Plaza (shown on Exhibit 2.4 and 2.5 in Volume II of this application), which will create a visual penetration that preserves the view corridor from Fort Washington Park and Historic District into the West Campus and the Charles River beyond.*

- **Special Permit to increase building height of a portion of the West Building within the SD-11 District to approximately 100',** pursuant to Section 17.203.2 of the Ordinance.

  - No specific criteria applicable.

- **Special Permit to reduce the minimum parking requirements**, pursuant to Section 6.35.1 of the Ordinance. The Applicant requests that the minimum parking supply requirement be eliminated, such that there would be no minimum parking required for the Project. The following sub-bullets demonstrate how the Project complies with the **criteria** to be considered by the Planning Board in granting such a special permit, as set forth in Section 6.35.1:

- **The lesser amount of parking will not cause excessive congestion, endanger public safety, substantially reduce parking availability for other uses or otherwise adversely impact the neighborhood** because the projected parking demand from the Project can be accommodated by MIT's campus-wide parking supply. As detailed in the attached Transportation Access and Circulation Study, which includes a Parking Analysis pursuant to Section 6.35.3:

    - *Under current conditions, existing parking supply shows availability of more than 1,150 parking spaces during peak hour, and the projected demand for the Project will range between approximately 38 to 58 spaces, depending on methodology.*
    - *Under proposed future conditions, which account for other MIT campus projects and parking spaces that are anticipated to be constructed within the next five (5) years, a future supply of approximately 3,944 spaces is expected (ie. an increase of 150 spaces over the existing inventory). Accounting for this future inventory and any future demand generated (including from the Project), the future parking supply shows availability of approximately 1,300 spaces during peak hour.*
    - *As shown in the Transportation Access and Circulation Study, the peak utilization of parking garages/lots on the MIT campus is expected to reach 67 percent under the future conditions, which demonstrates the ability to readily accommodate the anticipated demand from the Project within MIT's campus-wide parking inventory.*
    - *The empirical data included in the attached Transportation Access and Circulation Study and Parking Analysis demonstrates that the baseline zoning requirement for parking spaces for dormitory use for the Project (1 space per 12 beds) well exceeds the actual demand by graduate residents. MIT will continue to encourage use of alternative modes of transportation, and the Applicant is proposing to accommodate all parking demand generated by the Project demand rate methodology within the existing spaces owned and operated by MIT as documented in the October 2019 MIT Parking Inventory.*

- **The Board shall also consider whether or not less off street parking is reasonable in light of the following:**

    - **The availability of surplus off street parking in the vicinity of the use being served and/or the proximity of an MBTA transit station.**

        - *Vehicular parking for the Project will be accommodated within the MIT off-street parking inventory; MIT currently owns and operates 3,532 off-*

street parking spaces and by the year 2024 will own and operate 3,944 parking spaces. As detailed in the attached Parking Analysis, MIT utilizes approximately two-thirds of the total parking supply at peak parking demand periods (mid-week, 11 am -3 pm). During such peak parking demand periods, approximately 1,300 unused spaces are available to permit holders. (See Parking Analysis section within the attached Transportation Access and Circulation Study.)

- *The Project is immediately served by the MIT Tech Shuttle, which provides free access for faculty, students, and staff to the Kendall Square MBTA station making this a very convenient method of transportation for occupants of the Project.*

- **The availability of public or commercial parking facilities in the vicinity of the use being served provided the requirements of Section 6.23 are satisfied.**

    - *This is not applicable to the Project, as vehicular parking for the Project will be accommodated within the MIT off-street parking inventory, which has adequate capacity to accommodate anticipated demand from the Project.*

- **Shared use of off street parking spaces serving other uses having peak user demands at different times, provided that no more than seventy-five (75) percent of the lesser minimum parking requirements for each use shall be satisfied with such shared spaces and that the requirements of Subsection 6.23 are satisfied.**

    - *This is not applicable to the Project, as vehicular parking for the Project will be accommodated within the MIT off-street parking inventory, which has adequate capacity to accommodate anticipated demand from the Project.*

- **Age or other occupancy restrictions which are likely to result in a lower level of auto usage; and**

    - *Occupancy of the Project will be restricted to MIT students; as detailed in the attached Transportation Access and Circulation Study, student automobile usage is minimal. More specifically, mode split for the Project is anticipated to be primarily walk, bike, and MIT Tech Shuttle (85% walk/bike, 10% shuttle, 5% auto).*

- **Impact of the parking requirement on the physical environment of the affected lot or the adjacent lots including reduction in green space, destruction of significant existing trees and other vegetation, destruction of existing dwelling units, significant negative impact on the historic resources on**

the lot, impairment of the urban design objectives of the city as set forth in *Section 19.30* of the Zoning Ordinance, or loss of pedestrian amenities along public ways.

- *Providing on-site parking spaces would require elimination of hundreds of beds at the Project due to necessary reconfiguration of the proposed buildings to accommodate parking spaces, which is contrary to the desire to provide additional student housing.*
- *Reconfiguration of the Site to accommodate on-site parking spaces would also negatively impact the improved pedestrian experience and require removal of the new Central Plaza, which provides attractive green space for the community and preserves and enhances the Fort Washington Historic District view corridor.*

- **The provision of required parking for developments containing affordable housing units, and especially for developments employing the increased FAR and Dwelling unit density provisions of Section 11.200, will increase the cost of the development, will require variance relief from other zoning requirements applicable to the development because of limitations of space on the lot, or will significantly diminish the environmental quality for all residents of the development.**

    - *This is not applicable to the Project.*

- **Project Review Special Permit,** pursuant to Section 19.20 of the Ordinance allowing for the new construction of approximately 327,000 GFA of dormitory use and accessory uses (i.e., approximately 168,000 sf in the West Building and approximately 159,000 sf in the East Building).

    - Section 19.25 provides that in order to grant a Project Review Special Permit under Section 19.20, the Planning Board must make certain findings to ensure that new construction or changes of use in existing buildings are consistent with the city's urban design objectives and do not impose substantial adverse impacts on city traffic.

        - The Traffic Impact Findings set forth in Section 19.25.1 of the Ordinance are not applicable to the Project because it does not require a Traffic Study under

Section 19.24(3).[4] Howard Stein Hudson Associates has nonetheless prepared the Transportation Access and Circulation Study attached in the Appendix to the this application, which indicates that the Project will have no substantial adverse impact on city traffic, pedestrian, and bicycle flow in the study area.

- As detailed in Section 3.iv below, the Project will conform with the urban design objectives of the City as set forth in Section 19.30.

3.iii.b Compliance with General Special Permit Criteria (Section 10.43)

Zoning criteria from the Ordinance are presented in **bold**, with the Applicant's responses presented in *italics*.

Pursuant to Section 10.43 of the Ordinance, special permits will normally be granted where the specific provisions of the Ordinance are met, except where the Planning Board finds that the particular location or use for which relief is sought would be to the detriment of the general public because any of the following items (a) through (f) applies to the proposed project.

Granting the special permits requested herein would not be to the detriment of the public because none of the following is true with respect to the Project:

(a) It appears that requirements of this Ordinance cannot or will not be met, or

i. *As detailed in Sections 1 through 6 and the attached exhibits, studies and reports, the Project complies with all applicable requirements of the Ordinance related to granting the requested special permits from underlying dimensional requirements in the SD-6 and SD-11 Districts, parking requirements and the Article 19 Project Review Special Permit.*

(b) Traffic generated or patterns of access or egress would cause congestion, hazard, or substantial change in established neighborhood character, or

[4] Under Section b.6 of Table 1 in Section 19.20 of the Ordinance, a Traffic Study is not required for college or university facilities unless construction of the same includes creation of 150 new parking spaces or relocation of 250 existing parking spaces or any combination thereof. The Project comprises construction of a college or university facility, i.e., a dormitory to house MIT graduate students and the above-described Table 1 parking thresholds are not exceeded. The Project is not creating any new parking. Of the 136 spaces being displaced by the Project, 39 are being relocated as detailed in the attached Transportation Access and Circulation Study. Therefore, a Traffic Study is not required for the Project.

i. *As set forth in the Transportation Access and Circulation study submitted with this application, the proposed construction of two graduate dormitory buildings in this area will not have substantial adverse effects on City traffic within the study area.*

(c) The continued operation of or the development of adjacent uses as permitted in the Zoning Ordinance would be adversely affected by the nature of the proposed use, or

i. *Development of the Project will not adversely affect the continued operation or development of adjacent uses, as the Site is located within MIT's West Campus, and therefore, it is surrounded by many MIT institutional uses. The Project will support, rather than adversely affect, the continued operation of adjacent uses by providing housing opportunities for graduate students.*

(d) Nuisance or hazard would be created to the detriment of the health, safety and/or welfare of the occupant of the proposed use or the citizens of the City, or

i. *The Project will provide enhanced pedestrian connectivity with a new Central Plaza , which has been designed to provide a direct connection from Fort Washington Park (and the surrounding pedestrian network) through the Site to Amherst Alley and the remaining pedestrian and vehicular network through the West Campus. The Project also proposes improved public realm amenities (including within the entry courts at each building and the sidewalks abutting the Site) and will be constructed in accordance with all applicable safety and building codes. The proposed dormitory use will complement adjacent institutional uses and support the continued vitality of MIT's West Campus. Additionally, the Applicant will implement a detailed construction management plan that will include measures to mitigate any construction effects on the surrounding area. Accordingly, the Project would not create nuisance or hazard to the detriment of the health, safety and/or welfare of occupants of the Project or citizens of the City.*

(e) For other reasons, the proposed use would impair the integrity of the district or adjoining district, or otherwise derogate from the intent and purpose of this Ordinance, and

i. *The Project would not impair the integrity of the adjoining districts, but rather will complement the existing uses by providing necessary housing for the surrounding MIT campus. New dormitory housing, open space and urban design benefits of the Project identified in this narrative advance the following purposes of the Ordinance: to lessen congestion in the streets; to conserve health; to secure safety from fire, flood, panic and other danger; to provide adequate light and air; to prevent overcrowding of land; to avoid undue concentration of population; to encourage housing for persons of all income levels; to facilitate the adequate provision of transportation, water supply, drainage,*

sewerage, schools, parks, open space and other public requirements; to conserve the value of land and buildings, including the conservation of natural resources and the prevention of blight and pollution of the environment; to encourage the most rational use of land throughout the city, including the encouragement of appropriate economic development, the protection of residential neighborhoods from incompatible activities and including the consideration of plans and policies, if any, adopted by the Cambridge Planning Board, and to preserve and increase the amenities of the City.

(f) The new use or building construction is inconsistent with the Urban Design Objectives set forth in Section 19.30.

i. *As detailed in Section 3.iv below, the Project is consistent with the Urban Design Objectives set forth in Section 19.30*.

As demonstrated by Sections 3.iii and 3.iv and the associated Exhibits and Appendices referenced therein, the Project satisfies all criteria for granting the Special Permits sought.

In addition to the above-described relief, the Project requires variances from the Board of Zoning Appeal pursuant to Section 10.30 of the Ordinance to reduce the required front, side and rear yard setbacks for the portion of the West Building located within the SD-11 District. Subsequent to receiving input from the Planning Board on the proposed Project design through the special permit process, the Applicant will submit a complete variance application to the Board of Zoning Appeal.

iv. Urban Design Narrative – Conformance with City Wide Urban Design Objectives (Section 19.30)

Section 19.31: New projects should be responsive to the existing or anticipated pattern of development. Indicators include:

(1) Heights and setbacks provide suitable transitions to abutting or nearby residential zoning districts that are generally developed to low scale residential uses.

i. *The Site is bounded by Vassar Street and the Grand Junction Rail Line and does not abut residential zoning districts or uses generally developed to low scale residential uses. Simmons Hall, located to the East, is a similar use and scale as the Project, along with Westgate and Tang residence halls located to the South of the Site. The new buildings are shaped to respect the open space and height restrictions associated with the Fort Washington Historic District and the respective SD-6 and SD-11 Districts. The building setbacks as designed are consistent with the currently established street wall along Vassar Street.*

ii. *The Project requires variances from the front, side and rear yard setback requirements in the SD-11 District as they apply to the portion of the West Building located within such district. Subsequent to receiving input from the Planning Board on the proposed Project design through the special permit process, the Applicant will submit a complete variance application to the Board of Zoning Appeal. The requested relief would allow the Applicant to create a visual continuity across the portions of the Site within the SD-6 and SD-11 Districts.*

(2) New buildings are designed and oriented on the lot so as to be consistent with the established streetscape on those streets on which the project lot abuts. Streetscape is meant to refer to the pattern of building setbacks and heights in relationship to public streets.

i. *The new building heights and setbacks along Vassar Street are consistent with, and improve upon, the existing streetscape. Constructed as two stepped masses separated by a Central Plaza, the form of each building responds to the context. In order to protect the view corridor associated with Fort Washington Park, sixty (60) foot tall wings flank either side of the Central Plaza and step up to one hundred and one hundred five (100 / 105) foot towers West and East of the Fort Washington Historic District regulating lines. Along Vassar Street, the resident entry to each building is planned around public entry courtyards that engage and extend the public realm of the sidewalk. A covered loggia runs the length of the East Building at grade to provide cover in inclement weather and to enhance and expand the sidewalk zone. The West Building is set back to situate a landscape apron running along the sidewalk. At the heart of the Site, the main Central Plaza provides a vibrant and active public open space that connects between the MIT*

campus and Fort Washington Park by utilizing the existing Grand Junction Rail Line pedestrian crossing.

(3) In mixed use projects, uses are to be located carefully to respect context.

i. *This is a dormitory project, rather than a mixed use project. Actively used amenity spaces such as entry lobbies, lounges, and a fitness studio are located on the ground level facing Vassar Street and the public Central Plaza.*

(4) Where relevant, historical context are respected, e.g. special considerations should be given to buildings on the site or neighboring buildings that are preferably preserved.

i. *The Project respects the requirements related to the Fort Washington Historic District, the boundaries of which extend across the middle of the Site. The district requirements include maintaining open space south of Fort Washington Park in what was the line of cannon fire from the park towards the river during the Revolutionary War. The Project responds to this requirement through the creation of the new Central Plaza, preserving the open view through from the park to the river and placing a companion public space to serve both as a place of respite but also a critical connector between Cambridgeport and the river. The design of the Central Plaza landscape adopts the orientation of Fort Washington Park by transposing the Cambridgeport grid onto the Site. The central landscape serves to merge the park, city, and campus languages, connecting the area south of the Grand Junction Rail Line to the park, and reflecting local history in the organization of the plaza.*
ii. *In addition to the form of the landscape, the masonry material palette and composition of the proposed building hearkens the industrial heritage of 19th century Cambridge, and more specifically Vassar Street. The Project and the configuration of the Site acknowledge the historical rail siding warehouses that once stood on sites in this area, and still do at the Metropolitan Warehouse just blocks away.*
iii. *The MIT Police Station building (W89 at 301 Vassar Street) is to be demolished for the project. While W89 is more than 50 years old, it was ranked as of "Low Significance" in MIT's Historic Inventory and Assessment (2016) and is not expected be deemed "Preferably Preserved" by the Cambridge Historical Commission.*

Section 19.32: Development should be pedestrian and bicycle-friendly, with a positive relationship to its surroundings.

(1) Ground floors, particularly where they face public streets, public parks, and publicly accessible pathways consist of spaces that are actively inhabited by people.

i. *The most actively used spaces, including building entry lobbies, ground floor lounges, and fitness studio are located with frontage along the public way. In addition to the physical break provided by the Central Plaza, which space will include pedestrian amenities (e.g., furnishing, lighting and seating), the glazed ground floor facades and open program spaces are aligned to create moments of through-building transparency, creating an additional visual connection from the city into and through the buildings.*

(2) Covered parking on the lower floors of a building and on-grade open parking, particularly where located in front of a building, is discouraged where a building faces a public street or public park, and publicly accessible pathways.

i. *The Project will replace the existing surface parking fronting on Vassar Street with the two new dormitory buildings; there is no on-site parking proposed. Accordingly, there will be no covered parking visible to the public or on-grade open parking at the Site.*

(3) Ground floors should be generally 25-50% transparent. The greatest amounts of glass would be expected for retail uses with lesser amounts for office, institutional or residential use.

i. *The ground floor facades along Vassar Street are designed to be greater than 50% transparent, particularly along the building entries, lobbies, lounges, and fitness areas. Dormitory units occupy the ground level along the North side of the buildings and portion of the South side of the West Building, with window placement and transparency appropriate for the use.*

(4) Entries to buildings are located so as to ensure safe pedestrian movement across streets, encourage walking as a preferred mode of travel within the city and to encourage the use of public transit for employment and other trips.

i. *Careful thought has been given to pedestrian movement through the Site and the Project has been designed to encourage and support pedestrian movement. The main pedestrian movement occurs along Vassar Street, connecting East to the main campus. Building entries and entry courts are located along Vassar Street, with the West entry and Central Plaza both paired with existing Vassar Street crossings. The Central Plaza encourages pedestrian movement to the North, across the existing Grand Junction Rail Line pedestrian crossing, and to Fort Washington Park. Pedestrian routes through the park and surrounding neighborhood lead to the Central Square MBTA station, while the Kendall Square station is also accessible via walk or shuttle along Vassar Street.*

(5) Pedestrians and bicyclists are able to access the site safely and conveniently; bicyclist should have secure storage facilities conveniently located on-site and out of the weather.

i. *Significant indoor bicycle storage is provided on the ground floors of both East and West Buildings, directly and securely accessible through doors adjacent to the Vassar Street sidewalk. Supplemental bicycle storage is located on the second floor of the West Building adjacent to the building elevators. Service areas are located on the extreme ends of each building, limiting potential conflicts between bicycles and pedestrians with service vehicles. The Project will maintain the existing cycle track for the majority of the Site's length. Additionally, the Project will enhance and improve the safety of the existing bike lane at the western end of the Site as indicated in Exhibit 4.3 in Volume II of this application,*

ii. *Multi-modal traffic will occur through the Central Plaza, as pedestrians and bicyclists share the access route connecting to Fort Washington Park and the future Grand Junction Multi-Use Path. The Central Plaza design includes approximately 15' wide spacing between trees in the paved portion of the plaza to allow adequate clearance for bikes, runners, and pedestrians, and provides additional edge zones, protected with trees and benches, intended for pedestrian use.*

(6) Alternate means of serving this policy objective 19.32 through special building design, siting, or site design can be anticipated where the building form or use is distinctive such as freestanding parking structures, large institutional buildings such as churches and auditoriums, freestanding service buildings, power plants, athletic facilities, manufacturing plants, etc.

i. *This is not applicable to the Project.*

Section 19.33: The building and site design should mitigate adverse environmental impacts of development upon its neighbors. Indicators Include:

(1) Mechanical equipment that is carefully designed well organized or visually screened from its surroundings and is acoustically buffered from neighbors.

i. *All exterior mechanical equipment is located on the roof and set back from the parapet to minimize the impact on the public realm. Each building includes mechanical enclosures and screening for energy recovery ventilators, condensing equipment, and emergency generators. Screening on each roof top has been carefully considered to reduce visual clutter and unify the appearance of the façade.*

ii. *Please refer to the noise mitigation narrative for additional information on the Site noise profile and strategies for attenuation.*

(2) Trash that is handled to avoid impacts (noise, odor, and visual quality) on neighbors, e.g. use of trash compactors or containment of all trash storage within a building is encouraged.

i. *Trash and recycling access for the Project will be provided for residents throughout the building via internal trash and recycling chutes directed to a central location within each building. Each building will have a trash compactor and recycling containers. Ground floor trash and recycling rooms will be located inside the building, with convenient access to the loading areas.*

(3) Loading docks that are located and designed to minimize impacts (visual and operational) on neighbors.

i. *Loading areas are located on the extreme East and West ends of the building, with convenient access from Vassar Street. Access to the East loading area utilizes an existing curb cut that serves the MIT Simmons Hall loading bay, while access at the West loading area requires a new 28' curb cut. The buildings' loading and service areas are behind the ground floor program facing Vassar Street to diminish visibility.*

(4) Stormwater Best Management Practices and other measures to minimize runoff and improve water quality are implemented.

i. *The Site will be designed to meet the provision of the MASSDEP Stormwater Management Policy for a redevelopment project. Stormwater management strategies for the proposed building and Site improvements will provide mitigation for stormwater runoff as required by the City of Cambridge standards and standard engineering practices of the State of Massachusetts. Refer to the Sewer Service Infrastructure Narrative in Section 4.ii.b for more detail on stormwater management.*

(5) Landscaped areas and required Green Area Open Space, in addition to serving as visual amenities, are employed to reduce the rate and volume of stormwater runoff compared to pre-development conditions.

i. *Surface parking is the predominant feature of the existing Site condition. The proposed design increases the pervious area with panels of open lawn and planted zones, both in the Central Plaza and the various landscapes that surround the building. Loading zones and fire access have been planned to limit the amount of impervious surface in the proposed condition, allowing larger areas for landscape. Pervious and planted zones are used to increase infiltration of Site stormwater.*

(6) The structure is designed and sited to minimize shadow impacts on neighboring lots, especially shadows that would have a significant impact on the use and enjoyments of adjacent open spaces.

i. *The Project is designed to minimize the impact of overshadowing on open space. Given*

the adjacency of the Grand Junction Rail Line to the North, shadowing on neighboring lots from the Project is limited. Additionally, as described throughout this application, the buildings have been designed to respect the Fort Washington Historic District view corridor, such that the shorter 60-foot portions of the buildings flank the new Central Plaza open space on the Site to minimize any shadowing. As shown in Exhibit A.1 included in Volume II of this application, the building shadows have minimal impact on Fort Washington Park during the winter months, and no impact from March through September.

(7) Changes in grade across the lot are designed in ways that minimize the need for structural retaining walls close to the property line.

i. To the extent feasible, grade change across the Site is limited and retaining walls are not anticipated along the property line.

(8) Building scale and wall treatment, including provisions of windows, are sensitive to existing residential uses on adjacent lots.

i. The Project building scale is largely similar to adjacent MIT residential buildings, and the massing is shaped to respond to height restrictions associated with the Fort Washington Historic District. Exterior facades include extensive glazing at active ground level lobby, lounge, and amenity spaces that front on the public way. Appropriate window treatments are proposed where dormitory units occupy the portions of the ground floor and all upper floors. Ground floor dormitory units along the North side of the East Building are accessed from the exterior and additional resident outdoor spaces flank the North elevations of both buildings, creating an active residential landscape zone facing the Grand Junction Multi-Use Path.

(9) Outdoor lighting is designed to provide minimum lighting necessary to ensure adequate safety, night vision, and comfort, while minimizing light pollution.

i. Outdoor building and landscape lighting will be designed to provide sufficient light levels for safety and an active public realm, but respect the dark-sky requirements of LEED.

(10) The creation of a Tree Protection Plan that identifies important trees on site, encourages their protection, or provides for adequate replacement of trees lost to development on the site.

i. A Tree Study complete with a Tree Mitigation Plan was submitted to the City of Cambridge Arborist, certified on 12/8/2020, and is included in this submission. The total

DBH of significant trees at the existing Site is 374", all of which are located in parking lot islands and will be removed to facilitate construction. The current landscape design includes 358" DBH of new tree plantings and the remaining 16" DBH removed will be mitigated through payment into the Tree Replacement Fund. Please refer to Exhibit A.2 in Volume II of this application for additional information on tree mitigation.

Section 19.34; Projects should not overburden the City infrastructure services, including neighborhood roads, city water supply system, or sewer system

(1) The building and site design are designed to make use of water-conserving plumbing and minimize the amount of stormwater run-off through the use of best management practices for stormwater management.

i. *The Project will include water-conserving low flow plumbing fixtures and aerators that will reduce the water demand of each bathroom. The building systems will be designed to meet the Stretch Code and LEED standards.*

(2) The capacity and condition of drinking water and wastewater infrastructure systems are shown to be adequate, or steps necessary to bring them up to an acceptable level are identified.

i. *Existing water infrastructure available to the Site includes a 12" water main within Vassar Street. The Project proposes a new 6" water service connection and an 8" fire protection service, both tapped off the Vassar Street main at the East side of the Site. The Project also proposes two new sewer connections to the main in Vassar Street, one each from the East and West Buildings. Please refer to the water service and sewer service infrastructure narratives in Section 4 of this application for additional information and detail.*

(3) Buildings are designed to use natural resources and energy resources efficiently in construction, maintenance, and long-term operation of the building, including supporting mechanical systems that reduce the need for mechanical equipment generally and its location on the roof of a building specifically. The buildings are sited on the lot to allow construction on the adjacent lots to do the same. Compliance with Leadership in Energy and Environmental Design (LEED) certification standards and other evolving environment efficiency standards is encouraged.

i. *The Project will be designed to meet or exceed LEED Gold. For additional information on system strategies and performance, please refer to the Article 22 Green Building Report (which was certified by the City on 12/7/2020) included in the Appendix.*

Section 19.35: New construction should reinforce and enhance the complex urban aspects of Cambridge as it has developed historically. Indicators include:

(1) New educational institutional construction that is focused within the existing campuses.

i. The Project is located on the MIT campus. In addition to improving the western end of the MIT campus, the Project reinforces connections with the Cambridgeport neighborhood, enhances the environs of Fort Washington Park, and fulfills agreements with the City related to graduate student housing on campus.

(2) Where institutional construction occurs in commercial areas, retail, consumer service enterprises, and other uses that are accessible to the general public are provided at the ground (or lower) floors of buildings. Where such uses are not suitable for programmatic reasons, institutional uses that encourage active pedestrian traffic to and from the site.

i. As noted above, the Site is located on MIT's West Campus and has been designed to encourage pedestrian traffic to and from the Site, including through construction of a Central Plaza between the proposed East and West Buildings. The Central Plaza has been designed to provide a direct connection from Fort Washington Park (and the surrounding pedestrian network) through the Site to Amherst Alley and the remaining pedestrian and vehicular network through the West Campus. Additionally, the Central Plaza will include appropriate lighting, seating and furnishings to promote pedestrian engagement with this area, while also preserving the view corridor through the Site to Fort Washington Park. There will also be welcoming entry courts at each of the buildings.

(3) In large, multiple-building non-institutional developments, a mix of uses, including publicly accessible retail activity, is provided where such uses are permitted and where the mix of uses extends the period of time the area remains active throughout the day.

i. *This is not applicable to this institutional Project. SD-6 prohibits retail uses.*

(4) Historic structures and environments are preserved.

i. The Central Plaza and adjacent building volumes work to frame the vista to and from Fort Washington Park, reinforcing the significance of the role of the park in the history of the region.

(5) Preservation or provision of facilities for start-up companies and appropriately scaled manufacturing activities that provide a wide diversity of employment paths for Cambridge residents as a component of the development; however, activities heavily dependent on trucking for supply and distribution are not encouraged.

i. This is not applicable to the Project.

Section 19.36: Expansion of the inventory of housing in the city is encouraged.

i. *This Project addresses MIT's obligation to the Volpe Commitment Letter by providing additional on-campus housing for graduate students, thereby relieving pressure on the Cambridge housing stock. By expanding on-campus housing offerings, and exceeding the minimum requirement of the Volpe Commitment Letter, MIT seeks to demonstrate a commitment to the long-term health and diversity of Cambridge neighborhoods and long standing relationships between MIT, the community, and the City.*

Section 19.37 Enhancement and expansion of open space amenities in the city should be incorporated into new development in the city. Indicators include.

(1) On large-parcel commercial developments, publicly beneficial open space is provided.

i. *This is not applicable to the Project, however the Central Plaza and Entry Courts at both East and West Buildings are publicly beneficial open space.*

(2) Open space facilities are designed to enhance or expand existing facilities or to expand networks of pedestrian and bicycle movement within the vicinity of the development.

i. *As shown on Exhibits 2.4 and 2.5 included in Volume II, and described throughout this application, the Central Plaza proposed between the West and East Buildings has been designed to provide a direct connection from Fort Washington Park (and the surrounding pedestrian network) through the Site to the pedestrian and vehicular network through the West Campus and to the Charles River. The Central Plaza will be appointed with inviting lighting, furnishing, and seating elements to create an engaging open space environment that complements the nearby Fort Washington Park, sidewalks and pedestrian/bicycle pathways.*

(3) A wider range of open space activities than presently found in the abutting area is provided.

i. *This Project transforms an existing surface parking lot into a vibrant residential area that seeks to establish meaningful open space connections to the surrounding neighborhood. From the South, the new Central Plaza creates a meaningful linkage between the campus and Cambridgeport neighborhood. From the North, the plaza respects the historic view corridor from Fort Washington Park to the river and maintains a clear visual connection between the park and the MIT playing fields to the South. The Central Plaza establishes a new type of shared public space along Vassar Street that is welcoming to students and neighbors alike.*

4. INFRASTRUCTURE NARRATIVES

4. INFRASTRUCTURE NARRATIVE

i. Water Infrastructure Design

Report detailing the anticipated impact of the project on the city's water delivery infrastructure and supply. The requirements are set forth in Section 19.24 Paragraph {6}.

Water Service Infrastructure Narrative. The application shall include a report by the applicant detailing the anticipated impact of the project on the city's water delivery infrastructure and supply. It shall indicate the likely improvements to infrastructure necessary to accommodate the identified impacts. Where such determinations cannot be made at the time of application, the report shall indicate what investigations must be undertaken by the applicant to make such determination, their anticipated costs, and the schedule for their completion. The applicant shall provide certification that this report has been submitted to the Water Department.

Domestic water for the proposed Project will be provided by a paired redundant connection to the municipal water system in Vassar Street, adjacent to second paired redundant connection for Fire water service. The domestic and fire services for the Project will run to a pump room located in the East Building. The domestic and fire services for the West Building will be fed by the pump room in the East Building with connections between the buildings running through the Central Plaza area. Anticipated demand on the water service is outlined in Table 4 below.

Anticipated Water Service Demand

Zone	Peak Flow	Average Flow
West Building	317 GPM	190 GPM
East Building	275 GPM	165 GPM

Table 4

The following strategies and technologies will be employed in the plumbing design, which aid in water conservation and limiting water demands from the proposed building:

- *Low-flow plumbing fixtures in restrooms*
- *Reduced or eliminated irrigation by use of native, tolerant plant species*

Based on conversation with MIT and the Cambridge Water Department, there are currently no water capacity issues in the vicinity of the Site. Hydrant flow tests will be performed to determine the capacity of the water main in Vassar Street. Should it be determined that there is inadequate pressure and volume available a booster pump will be provided as part of the Project to handle the deficiency. It is not anticipated that any improvements to the City owned infrastructure will be required for the Project.

ii. Sewer Service Infrastructure Design

Report detailing the anticipated impact of the project on the city's sanitary, stormwater, and combined sewer infrastructure. The requirements are set forth in Section 19.24{5}.

Sewer Service Infrastructure Narrative. The application shall include a report by the applicant detailing the anticipated impact of the project on the city's sanitary, stormwater, and combined sewer infrastructure. It shall indicate the adequacy of the preliminary site plan in meeting city, state, and federal requirements or established standards for implementation of best management practices for stormwater management and the likely improvements to infrastructure necessary to accommodate the impacts of the proposed project. Where such determinations cannot be made at the time of application, the report shall indicate what investigations must be undertaken by the applicant to make such determination, their anticipated costs, and the schedule for their completion. The applicant shall provide certification that this report has been submitted to the Department of Public Works.

4.ii.a Sanitary Sewer Narrative

- *Sewer flows from the two new residential buildings will be directed to the City of Cambridge infrastructure in Vassar Street. Anticipated wastewater flows are outlined in Table 5 below. This calculation is based upon Title V flow assumptions of 110 gallons per day per bedroom. The existing Site generates approximately 1,100 gallons per day of wastewater flow from the MIT Police Station and therefore the Project does trigger the Infiltration/Inflow (I/I) mitigation threshold of adding more than 15,000 gallons per day of new sewer flow. As such the Project will require a 4:1 mitigation of new sewer flow. MIT, as part of their redevelopment of Kendall Square (SOMA project), agreed to construct the new Talbot Street Outfall to meet their I/I mitigation requirement for SOMA. The construction of the Talbot Street Outfall provided far more mitigation than was required for that project and therefore the City of Cambridge agreed to set up a 'bank" for the excess mitigation that MIT could use on future projects. It has been confirmed with the Cambridge Department of Public Works (DPW) that this Project will be allowed to use the established bank for the required I/I mitigation.*
- *Based on discussions with the DPW the City has requested that the Project undertake flow metering in the Vassar Street sewer main to help establish baseline flows in the existing sewer main and confirm its capacity. The Project is coordinating this flow monitoring with the DPW and it will take approximately 6-8 weeks to conclude once it is set up.*
- *Additionally, the Project plans to implement low-flow plumbing fixtures as part of the plumbing design, which will aid in water conservation thereby limiting sanitary sewer flows from the proposed buildings.*

Anticipated Wastewater Generation

Zone	Peak Flow	Reference
West Building	45,760 GPD	310 CMR Title 5
East Building	36,190 GPD	310 CMR Title 5

Table 5

4.ii.b Stormwater Infrastructure Narrative

- *The Project will be designed to meet the provisions of MassDEP's Stormwater Management Policy for a redevelopment project and standard engineering practices in the State of Massachusetts. Stormwater management strategies for the proposed building and Site improvements will provide mitigation of stormwater runoff as required by the City of Cambridge standards (25-2 rate deduction and phosphorous removal) to the maximum extent practicable. Mitigation measures will include the use of Cambridge-approved Best Management Practices (BMPs), underground detention/infiltration systems, deep sump catch basins, green roofs and potential rainwater reuse for cooling tower makeup, that will help to control peak rates of runoff and quality of runoff. Also, where possible, Site stormwater will be directed into landscaping or porous surfaces to promote increased infiltration.*
- *The Project will be required to submit a Stormwater Permit to the Cambridge DPW for approval of all the above measures.*
- *Storm sewer flows (roof drain connections and Site drainage) from the Site will be connected to the municipal storm system located in Vassar Street. Storm sewer flow rates from the proposed Project will be reduced under final conditions as required by the City of Cambridge Stormwater Regulations. Based on discussions with the City of Cambridge DPW, the capacity and condition of the sewer and storm sewer mains in Vassar Street are known to be adequate and in good condition.*

It is not anticipated that upgrades to the existing municipal infrastructure will be required. The locations of the proposed sewer and storm drain service connections to the municipal systems will continue to be discussed and reviewed with the City of Cambridge DPW as the Project moves further into design.

5. COMMUNITY OUTREACH

5. COMMUNITY OUTREACH

September 24th, 2020

Cambridgeport Neighborhood Association (CNA)

MIT requested time during the CNA's September 2020 monthly meeting to share information about the Project with its Cambridgeport neighbors. The Project team provided a detailed presentation of the proposed Project via Zoom depicting the overall Site context, the building design, public spaces, and street and sidewalk interface with the surrounding campus and neighborhood to the North. MIT staff responded to questions about the potential of future retail, the scale of the building, demographic of the proposed occupants, and the importance of designing the North side of the buildings and Site as to not feel like the "back" of the building.

October 14th, 2020

MIT-Hosted Community Meeting

MIT sent a notice directly to abutters as well as to Cambridge CDD for posting on their website. Additionally, the notice was sent to MIT community members and posted to other Cambridge community members and neighbors through Nextdoor.com. The Project team provided a detailed presentation of the proposed Project via Zoom depicting the overall Site context, the building design, public spaces, and street and sidewalk interface with the surrounding campus and neighborhood to the North. MIT staff responded to questions about parking, preserving the integrity of Fort Washington Park, the building massing, design of public spaces, and the potential of future retail.

December 7th, 2020

Letter from the Cambridgeport Neighborhood Association

Shortly after the submittal of our draft Article 19 application for the MIT West Campus Graduate Student Dormitory Project, MIT received a letter from the CNA regarding the Project. The letter requests the addition of 25,000 SF of ground floor public and commercial space, the creation of an alternative rail crossing while the Project Site is temporarily closed during construction, the planting of a linear buffer of trees along the north side of the RR corridor, and the future implementation of open space on either side of Fort Washington Park.

Accordingly, we are acknowledging this input here in the final version of our Article 19 submission. We will examine each of these requests and share our learnings and responses during the public Planning Board review process. We look forward to bringing the Project forward and to hearing further feedback from City staff, Planning Board members, Cambridgeport residents, and the broader community.

6. APPENDIX

6.i GREEN BUILDING REPORT

Steven Winter Associates, Inc.
Improving the Built Environment Since 1972

November 24, 2020

Swaathi Joseph, Zoning Associate Planner
Cambridge Community Development Department
344 Broadway, Cambridge, MA. 02139

Re: MIT West Campus Graduate Student Dormitory, Article 22 Green Building Report

Dear Ms. Joseph,

For compliance with Article 22.000, Green Building Requirements, The MIT West Campus Graduate Student Dormitory will pursue LEED Gold Certification under the LEED v4 BD+C Multifamily Midrise Program. The USGBC rolled-out LEED v4 in 2016 as a more comprehensive, rigorous standard. Projects scoring under LEED v4 are typically a full tier lower than those that were certified under the previous version, LEED for Homes 2008.

To obtain certification and operate sustainably, the project is implementing the following building systems and strategies: Only ENERGY STAR® certified appliances and all electric cooking; LED lighting with occupancy and sensor controls; the potential for heat pump water heating to supply all domestic hot water, low U-value and SHGC windows, and a high performing envelope that includes tight air-sealing with no thermal bridging, which reduces loads and allows the HVAC systems to be sized correctly. Equipment that is right-sized lasts longer, provides proper dehumidification, and maintains thermal comfort. The current HVAC design is through water source heat pumps; however, the team is evaluating a fossil fuel free system through variable refrigerant flow systems. In compliance with the 2019 Massachusetts Energy and Stretch codes, the building is proposed to perform 15% better than ASHRAE 90.1-2013 based on annual site energy usage. Additionally, the proposed building is projected to perform 30.8% better than ASHRAE 90.1 -2010 for LEED v4 compliance based on annual energy cost.

All of these strategies are detailed in the Green Building Report which includes the Sustainability Narrative, LEEDv4 Multifamily Workbook, Energy Modeling Summary, Resiliency Report, Net-Zero Narrative, and Affidavit of Compliance.

Please let me know if you have any questions or if I can be of further assistance.

Sincerely,

Karla Butterfield, LEED AP, Homes
Sustainability Director
kbutterfield@swinter.com

CC: Tim Peters, KieranTimberlake
Robert Leber, Cosentini Associates

1

Rating System Narrative

1.1 Introduction

In compliance with Article 22, the following chapter outlines the LEED certification goals for the Project and describes the strategies employed to meet the targeted LEED requirements and credits based on this stage of design development. The current LEED Scorecard is presented as Figure 4.1.
Attachment 3 includes an affidavit by the project LEED Accredited Professional.

While the proposed buildings comprise a graduate student dormitory building, the Project will register under the LEED v4 BD+C Multifamily Midrise program. It is tracking Gold level certification (74.5 preliminary + 12 possible points). The following is a summary of points per category:

Integrative Process (IP)	2 points	
Location and Transportation (LT)	15 points	
Sustainable Sites (SS)	5.5 points	1.5 possible points
Water Efficiency (WE)	6 points	2 possible points
Energy and Atmosphere (EA)	23 points	2 possible points
Materials and Resources (MR)	4.5 points	1.5 possible points
Indoor Environmental Quality (IEQ)	11.5 points	3 possible points
Innovation (IN)	4 points	1 possible point
Regional Priority (RP)	3 points	1 possible point
Total Points	**74.5**	**12**

1.2 Conformance with Article 22.23

■

1.2.1 Integrative Process

The Project is targeting 2 points total in the Integrative Process (IP) category and 1 point for exemplary performance.

IP Credit Integrative Process
Option 1. Integrative Project Team (1 point)
This credit will be earned with the experienced project team's capabilities and involvement throughout the design and construction process as well as at regularly held project team meetings. In addition to the Owner, the project team includes the Architect, Mechanical Engineer, Civil Engineer, Landscape Architect, Energy Modeler, Sustainability Consultant, Structural Engineer, Acoustical Consultant and Lighting Designer will work together from design through construction with the goal of achieving a durable, energy efficient, sustainable and healthy project.

Option 2. Design Charrette (1 point)
Building upon the Integrative Project Team Credit above, initial charrettes were held on August 25 and September 4th, 2020 including American Campus Communities (ACC), the architectural firm of Kieran Timberlake, Cosentini Engineering, as well as the landscape architects, civil & structural engineers, and sustainability consultants.

Option 3. Trades Training (1 point)
In addition to the Design Charrette during the design phase, eight hours of training on the green aspects of the project will be conducted in the beginning of construction for the trades. The training will focus on how the trades can contribute to achieving each LEED for Homes prerequisite and attempted credit.

■

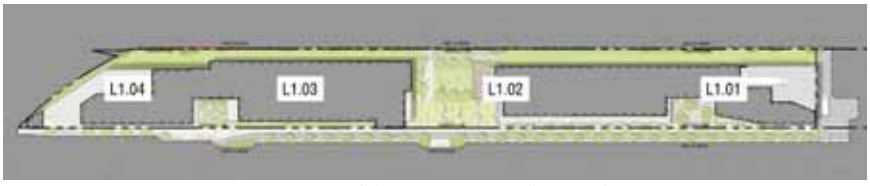
1.2.2 Location and Transportation

The Project is currently targeting 15 points in the Location and Transportation (LT) category and 1 point for exemplary performance.

LT Prerequisite Floodplain Avoidance (Required)
The MIT West Campus Graduate Student Dormitory is located on a previously developed urban site in Cambridge, MA outside of the flood hazard area and therefore complies with this credit. FEMA Flood Map Panel 25017C0576E lists this address in minimal flood area.

LT Credit Site Selection
Option 1. Sensitive Land Protection Path 1. Previously Developed (4 points)

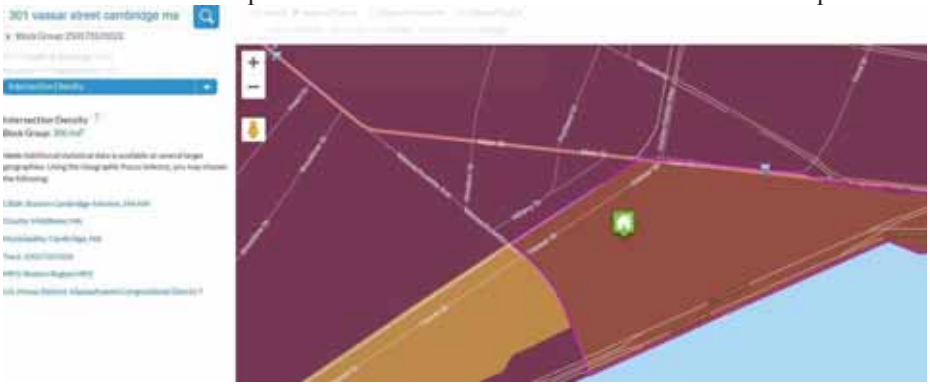
The Project Site is located on a parcel currently occupied by the MIT Police Building and West Lot which will be disassembled. As a 100% previously developed urban site in Cambridge, MA the project complies with this credit.



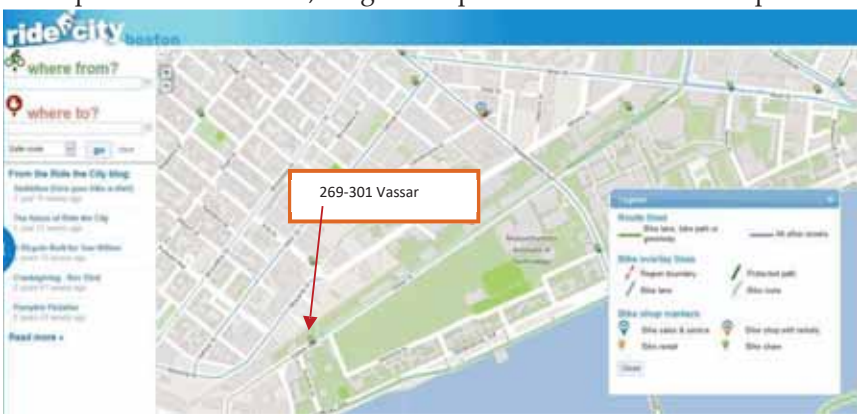
Option 2. Infill Development (2 points)
The project is sited in an urban location and is considered an infill site with development on all sides of its boundaries, complying with the requirements for this credit.

Option 3. Open Space (1 point)
The project is located within .3 miles from Fort Washington (.70 acres) and .3 miles of Tudor Street Dog Park (.5 acres) and therefore complies with this credit.

Option 4. Street Network (1 point)
The project is located within 1 square mile of 300 intersections and therefore complies with this credit.



Option 5. Bicycle Network and Storage (1 point)
The project will have bicycle storage within 200 yards of a bicycle network connecting Vassar Street, Massachusetts Avenue and the Dr. Paul Dudley White Bike Path. This network connects to more than forty LEED qualifying community resources including a school, employment center, and bus and the red line transit stops. For this credit, long term bicycle storage is required for 30% of the occupants and short-term bicycle storage is required for 2.5% of occupants (690 beds with up to 876 residents), a minimum of 263 long-term building and 22 short term spaces are required to meet this credit.
However, the project will provide 340 interior, long-term spaces and 35 short-term spaces.



LT Credit Compact Development (3 points plus 1 point regional priority)
The project includes 350 units (153 studios, 46 one-bedroom, 62 two-bedrooms, 89 four-bedroom) on 1.77 buildable acres. It exceeds the LEED midrise credit for 80 dwelling units per acre (providing 177.6 DU/acre) and therefore is considered very high density.

LT Credit Community Resources (2 points)
Located within ½ mile walking distance to at least 16 community resources (28 qualifying) earns the project an extra point in exemplary performance.

MIT Graduate Housing, 269-301 Vassar St., Cambridge, MA, 02139
LEED v4 LT Credit - Community Resources

Category	Tally*	Name of resource	Distance from project (mi)
FOOD RETAIL			
Supermarket (up to 2)	1	LaVerde's Market at Stratton Student Center	0.4
Other food store with produce (up to 2)	1	Starbucks Café, 575 Memorial Dr.	0.2
COMMUNITY SERVING RETAIL			
Clothing store or department store selling clothes	1	MIT Coop at Stratton Student Center	0.4
Convenience store	1	First United Market, 271 Brookline St.	0.4
Farmers market			
Hardware store			
Pharmacy			
Other retail			
SERVICES			
Bank	1	Bank of America at Stattion Student Center	0.4
Gym, health club, exercise studio	1	MIT Zesiger Sports & Fitness Center	0.5
	1	Atlantis Sports Club, 575 Memorial Dr.	0.1
Hair care			
Laundry, dry cleaner	1	Metropolitan Laundromat, 266 Brookline St.	0.4
Restaurant, café, diner excluding anything that ONLY has drive-through	1	Cambridge Pizzeria, 4517 Brookline St.	0.4
	1	Flour Bakery, 40 Erie St.	0.4
CIVIC AND COMMUNITY FACILITIES			
Adult or senior care (licensed)			
Child care (licensed)	1	The David W. Koch Childcare Center, 219 Vassar St.	0.1
Community or recreation center	1	Jack Barry Field at MIT	0.1
	1	Briggs Field at MIT	0.1
Cultural arts facility (museum, performing arts)	1	MIT Museum	0.4
	1	Hart Nautical Gallery, 55 Massachusetts Ave.	0.5
Educational facility (school, university, adult education center, vocational school, community college)	1	MIT Campus	0.3
	1	James F Farr Academy, 71 Pearl St.	0.5
Family entertainment venue (theater, sports)			
Government office that serves public on-site			
Place of worship	1	MIT Chapel, 48 Mass. Ave.	0.5
	1	Justice House of Prayer, 459 Putnam Ave.	0.5
Medical office or office that treats patients	1	Dr Elizabeth Ferrery, 771 Albany St.	0.4
	1	Jennifer Strong, 29 Henry St.	0.3
Police or fire station	1	MIT Police	0.1
Post office	1	MIT Post Office	0.3
Public library			
Public park	1	Tudor Street Dog Park	0.5
	1	Fort Washington Park	0.2
Social services center	1	Virginia A. Falcon, MSW, 292 Pearl Street	0.5
	28	TOTAL Community Resources	

LT Credit Access to Transit (2 points)
Located on an urban site in Cambridge, MA, the project site is near many options of public transportation. It is within ¼ mile of several bus routes with a combined 412 weekday trips and 277 weekend day trips, qualifying for 2 points under this credit.

■

1.2.1 Sustainable Sites

The Project is currently targeting 5.5 points plus 1.5 possible points in the Sustainable Sites (SS) category.

SS Prerequisite Construction Activity Pollution Prevention (Required)
The Construction Manager (CM) is providing and shall implement an Erosion and Sedimentation Control (ESC) Plan for construction activities related to the demolition of existing site elements and construction of the new building. The ESC Plan shall conform to the erosion and sedimentation control requirements of the 2012 EPA Construction General Permit (ESC) and specific municipal requirements for the City of Cambridge.

SS Prerequisite No Invasive Plants (Required)
The project team is specifying plantings for the project that are identified by the local extension services as either native or non-invasive. While the LHMR program requires avoidance of invasive plantings and awards projects installing drought tolerant species, the project team has set a more rigorous goal.

SS Credit Heat Island Reduction
Option 2. Nonabsorptive materials (1 points)
The project has been designed for reduced heat island effects on the site by installing Energy Star qualified high solar reflective roofing. Hardscapes will be evaluated for shading where possible such that approximately 75% of the project is targeted to be either shaded or non-absorptive material to achieve this credit.

SS Credit Rainwater Management (1 point and 1 possible points)
Case 2. NPDES Projects
The project is anticipating a design that will manage a 95th percentile rainfall event for the site, or 1.60 inches and assessing viability to manage 98th percentile rainfall event. Roof and hardscape storm water run-off will be managed through multiple subsurface infiltration systems designed to collect the 95th percentile storm event. As part of the overall stormwater management plan, the of roof space is being evaluated for a 6" deep Green Roof System. For a minimal portion of the site, bioretention rain gardens will provide infiltration to the maximum extent practical. These strategies shall be detailed in the Stormwater Pollution Protection Plan provided by Nitsch Engineering.

SS Credit Nontoxic Pest Control (2.5 points and .5 possible points)
The project will integrate design strategies to mitigate pest control such as excluding wood siding and structure and sealing external cracks and joints with caulking and installing pest-proof screens. Discharge points for gutters, equipment condensate lines and other moisture sources will terminate at least 24" form the foundation system. The building operator and developer, ACC, implements a thorough Integrated Pest Management Plan (IPM) on all projects which includes an educational and awareness component for residents and building managers.
Other credit options within Nontoxic Pest Control, like the steel mesh termite control, physical termite barrier, and cellulosic structural material treating, are not being pursued because the building will be constructed of steel and concrete.

■

1.2.2 Water Efficiency

The Project is currently targeting 6 points plus 2 possible points total in the Water Efficiency (WE) category.

WE Prerequisite Water Metering Case 2. Multifamily
(Required)
The project will install a water meter for the entire building, meeting the requirement of this prerequisite.

Performance Path
WE-T Total Water Use (6 points & 2 possible points)
The project team will complete the WaterSense Water Budget Tool to demonstrate the reduction of indoor and outdoor water use by 30% - 40% as compared to standard practices. Low flow fixtures shall include shower heads with less than 1.5 gallons per minute(gpm), lavatory faucets at or below 1.0 gpm and toilets with 1.28 gpf. The project will include minimal turf (no more than 20% of the total landscaped area) and

vegetation shall include drought-tolerant and natively adapted plantings. Irrigation will be installed with high efficiency features such as: rain sensors, zone controls, high-efficiency nozzles, pressure regulating devices, and drip irrigation in beds.

Maximizing the water use reduction credits is possible for this project but currently half of the points are assumed and 2 more marked as possible points while the landscape design is being finalized.

■

1.2.3 Energy and Atmosphere

The Project is currently targeting 23 points plus 2 possible points under the LEED v4 Multifamily Midrise, Energy and Atmosphere (EA) category. The Rating System offers two pathways for compliance with the prerequisite and credits: through demonstrated performance (ASHRAE 90.1 modeling) or compliance through prescriptive measures. This project will comply with EA prerequisites and credits by demonstrating performance with a whole building, ASHRAE 90.1 energy model.

EA Prerequisite Minimum Energy Performance (Required)
The project is exceeding requirements of ASHRAE 90.1-2010 Sections 5.4, 6.4, 7.4, 8.4, 9.4 & 10.4.

EA Commissioning
Option 1. Commissioning with Energy Star Protocols (Required)
This project will comply with the Energy Star Multifamily New Construction Program testing and verification protocols.

EA Prerequisite Energy Metering Case 2. Multifamily
(Required)
The project will install a whole-building gas meter and electric meter complying with this requirement.

EA Prerequisite Education of Homeowner, Tenant, or Building Manager (Required)
The key to a successful project is during operations, and the building manager is the center of operations. ACC is very active with the ownership, maintenance and longevity of their properties. The project team will assemble an operations and training manual for the building manager and will coordinate an orientation with appropriate system vendors. In collaboration with the project design team, ACC will also develop a tenant operations and training manual to be provided to residents during orientation.

EA Credit Annual Energy Use (20 points)
A primary project goal is to design and build an exemplary structure with extremely low energy consumption and low life cycle costs. The building is designed to meet multiple energy codes and standards, including those set by the City of Cambridge and ASHRAE Standard 90.1. Energy efficiency strategies will include:

1.2.3.1 High performance envelope
1.2.3.2 Reduced Lighting Power Density in common areas, corridors, and dorms
1.2.3.3 Advanced Lighting Controls
1.2.3.4 Energy Recovery Ventilation
1.2.3.5 Reduced fan power, high performance heating & cooling & distribution
1.2.3.6 Low-flow plumbing fixtures
1.2.3.7 Energy Star certified appliances where applicable
1.2.3.8 Attention to compartmentalization air sealing

All mechanical, electrical, and plumbing (MEP) equipment shall be of the highest quality to minimize maintenance while providing long useful life and high operating efficiencies. Dorm units will meet ASHRAE 6.2 local and whole-unit exhaust levels with central Energy Recovery Ventilators. The HVAC systems will be "right-sized" to match the heating and cooling loads, with no oversizing, and distribution systems are compact without compromising occupant comfort. The HVAC system will be required to meet occupant thermal comfort as outlined by ASHRAE 55 Thermal Environmental Conditions for Human Occupancy. To ensure efficient operations and comfort, comprehensive commissioning of the HVAC systems, domestic water heaters, lighting control and electrical systems will be conducted. Passive strategies, such as solar shading, daylighting, and optimized massing and orientation will reduce the impact of cooling and heating loads. Thermal insulation levels will ultimately be selected based on energy model outputs and whole-building performance metrics. Thermal bridging will be minimized resulting in optimized overall building enclosure energy efficiency. The effects of building structure, cladding systems, and attachment methods will be carefully examined to ensure thermal bridging is minimized.

Multiple water heater equipment systems are being evaluated to meet the building resident's hot water needs. Regardless of the hot water source, the appliances will be centrally located, and residences designed to minimize pipe lengths.

LEED v4 MFMR calculates energy cost savings as compared to ASHRAE 90.1 -2010; the project is holding a conservative 20% savings based upon ASHRAE 2010 in the current Lv4 workbook. However, the minimum building energy standard that serves as the baseline for this project will be ASHRAE 90.1 Energy Standard for Buildings, Except Low-Rise Residential Buildings, 2013 Edition. Project team goals and decisions are based upon this more rigorous energy modeling assessment. The project will also follow the International Energy Code 2018 with amendments based on Massachusetts Stretch Energy Code. The City of Cambridge has adopted the MA Energy Stretch Code (Appendix AA to 780 CMR: State Board of Building Regulations and Standards). The MA Energy Stretch Code requires new buildings over 100,000 SF to demonstrate an energy reduction of a minimum 15% in comparison to ASHRAE 90.1 2013. The project intends to exceed this minimum target by constructing a high performing, air- tight envelope with high efficacy lighting, appliances and equipment. The projected energy reduction for the MIT West Campus Graduate Student Dormitory is 30.8%. LEED v4 MFMR also credits projects with high occupancy per square foot.

EA-HW Efficient Hot Water Distribution System (2 points) Option 1. HW Efficient Hot Water Distribution
Path 1. Maximum Allowable Pipe Length (2 possible points)
Hot water pipe insulation is specified 1" to 1 ½" for all pipe-lines. The team is evaluating the feasibility of insulating all domestic hot water lines with a minimum R-4 pipe insulation including at elbows and tees.

Other credits within Energy and Atmosphere, Efficient Hot Water Distribution System, is not being pursued because the DHW system design will calculated by limiting pipe lengths rather than volume.

Option 3. Pipe Insulation (2 points)
Hot water pipe insulation is specified 1" to 1 ½" for all pipe-lines. The team is evaluating the feasibility of insulating all domestic hot water lines with a minimum R-4 pipe insulation including at elbows and tees. This specification shall be detailed in Plumbing Systems.

EA Credit Advanced Utility Tracking Option 1. Electric and Water (1 point)
A permanent submeter will be installed to monitor the irrigation systems which will be identified in the Building Controls Specifications.

The third-party Utility Reporting credit is not being pursued for electric use given the frequent turnover in this dorm

style residence. It is anticipated that the domestic hot water system will be a compact design, however, equipment is still being evaluated which limits the team's ability to achieve all credits at this time.

■

1.2.4 Materials and Resources

The Project is targeting 4.5 points plus 1.5 possible points in the Materials and Resources (MR) category.

MR Prerequisite Certified Tropical Wood (Required)
The project specifications will outline a preference for non-tropical, reused or reclaimed, or Forest Stewardship Council (FSC) or USGBC-approved equivalent products and will require submittals for all wood products to indicate the country of origin of the wood. If a tropical wood is specified, appropriate documentation and chain of custody will be provided to the LEED Green Rater.

MR Prerequisite Durability Management (Required)
The project team will demonstrate all minimum durability planning strategies mandated by regulatory agencies and LEED will be designed and implemented effectively. Building durability goals will be met through enhanced building enclosure, component systems, and material selection. Resource efficiency will be met by specifying and installing materials of recycled content and local sourcing when available. Greenhouse Gas (GHG) impact and Life Cycle Cost Analysis (LCCA) are the basis for specifying systems. During the design decision-making process, the team is converting energy modeling predictions into GHG equivalencies, allowing for an educated evaluation of specific Energy Efficiency Measures (EEMs) and materials.

MR Credit Durability Management Verification (1 point)
The owner has retained a LEED Green Rater to assist the contractor in ensuring the delivery of a durable building and verify that the ENERGY STAR for Homes version 3 water management system builder checklist items are executed.

MR Credit Environmentally Preferable Products (1.5 point & 1 point possible)
The project specifications will require more than 50% of foundation aggregate will be extracted, harvested and manufactured within a 100-mile radius of the project site.
High recycled content, minimum 25% postconsumer and/or 50% postindustrial waste recycled content, will also be pursued for materials, including insulation, counters and flooring. The project team is utilizing resources such as The Cradle to Cradle Products Program and The Health Product Declaration Collaborative to assess materials and finishes.

Option 2. Environmentally Preferable Products (1 point)
The project is targeting 90% of insulation be EPP with the exception of HVAC and pipe insulation.

Other credits within Materials and Resources (Environmentally Preferable Products) are not being pursued because local material availability and construction cost estimations have determined which product materials are attainable.

MR Credit Construction Waste Management (1 point & 0.5 possible)
The project will contract a waste management company responsible for diverting construction material from landfill and documenting the amount of material recycled. Points are conservatively

estimated and will be based on percentages calculated from provided documentation.
While the project team is targeting at least 75% diversion rate, Lv4 only allows half the points to be claimed when calculating by a percentage of construction debris removed from the site vs. a performance calculation based on a baseline. A baseline calculation is not feasible for this building demographic.

■

1.2.5 Indoor Environmental Quality

The Project is currently targeting 11.5 points plus 3 possible points in the Indoor Environmental Quality (IEQ) category.

EQ Prerequisite Ventilation (Required) Local Exhaust
Each unit must be provided with adequate exhaust for local points of contaminants, such as bathrooms and kitchens, as required by ASRHAE 62.2- 2010. All local exhaust systems will be ducted directly to the outside via the Energy Recovery Ventilators.

Whole Unit Mechanical Ventilation (Required)
Each unit will be provided with sufficient outdoor air as required by ASHRAE 62.2-2010. The project will provide enough outdoor air as required to each unit with a balanced, energy recovery ventilation system.

Non- Unit Spaces
The project is designed to meet the minimum requirements of ASHRAE Standard 62.1 – 2010 Sections 4 through 7 for all non-unit spaces. Filters will have a MERV 6 or higher rating for these systems and will be part of a scheduled maintenance agenda.

EQ Prerequisite Combustion Venting (Required)
Non-combustion for domestic hot water equipment is being assessed. However, exhaust will be provided for any installed combustion equipment. In addition, carbon monoxide sensors will be provided to each unit and sleeping areas. No fireplaces will be installed in this project, complying with the requirements of this credit.

EQ Prerequisite Garage Pollutant Protection (Required)
The project meets this mandate as no on-site garage is included in the design.

EQ Prerequisite Radon-Resistant Construction (Required)
Cambridge, MA is in a high-risk area for Radon according to the US EPA. The project team will incorporate radon mitigation measures into design and construction which include these five components: 1) a gas-permeable layer; 2) heavy-gauge plastic sheeting; 3) sealing and caulking of all penetrations through the concrete slab; 4) vent pipe that exhausts gases to the outside through side wall or roof; and 5) exhaust fan at the roof top which is located away from all intake air. Specifications and drawings shall be provided.

EQ Prerequisite Air Filtering - Good Filters (Required)
Both a VRF and Water Source Heat Pump system is being assessed. Regardless of the source, dorm units and common spaces will have MERV 8 filters (30% eff) located at the return side of the equipment.
Energy recovery units will all have two sets of air filters on the outside air intake: MERV 8 pre-filters (30% eff) and MERV 13 post-filters (85%eff).

EQ Prerequisite Environmental Tobacco Smoke (Required)
As part of MIT's non-smoking campus policy, smoking will be prohibited in all areas of the building.

EQ Prerequisite Compartmentalization (Required)
Each residential unit will be compartmentalized to minimize leakage between units. Uncontrolled pathways for indoor air pollutants between units will be reduced by sealing penetrations in walls, ceilings, and floors and by sealing vertical chases adjacent to the units. Air Sealing details shall be added to plans and specifications.
Acceptable sealing of residential units will be demonstrated by blower door testing. The procedure described by RESNET will be used to demonstrate compliance with an allowable maximum leakage of 0.23 cfm50 per square foot (0.07 cmm50 per square meter) of enclosure (i.e., all surfaces enclosing the units, including exterior and party walls, floors, and ceiling). The owner has retained a RESNET accredited provider and rater to perform these air infiltration tests.

EQ Credit Enhanced Ventilation (2 points and 1 possible)
A balanced whole-unit ventilation system meeting ASHRAE 62.2 shall be tested, adjusted and balanced with 100-110% of ASHRAE design flows. The team is considering exhaust fan boost controls with timer settings to achieve the Enhanced Local Exhaust credit.

EQ Credit Contaminant Control for multifamily projects Option 1. (.5 point)
Permanent walk-off mats shall be installed at all main entrances.
The other credit options within Contaminant Control (Shoe Removal) are not being pursued because shoe removal & storage aren't appropriate for each dorm apartment.

Option 3. Preoccupancy Flush (.5 point)
Prior to occupancy the building will undergo a 48-hour flush out with windows open (in accordance with weather and safety) and fans running continuously.
Filters will be replaced after this process which is intended to expedite off gassing of building materials and finishes for enhanced indoor air quality. This procedure is detailed in Appendix Part C. (0.5 point)

Indoor air quality testing isn't being pursued due to a tight occupancy schedule.
EQ Credit Balancing of Heating & Cooling Distribution (2 points)
Supply air flow shall be tested and balanced to within 80% - 120% of the Manual D calculations. And bedrooms will demonstrate natural pressure differential with the installation of transfer grills.

The other credit options within Balancing of Heating & Cooling Distribution Systems (Multiple Zones) are not being pursued because the graduate student residences are single zoned, as calculated in Manual J & D.

EQ Credit Enhanced Compartmentalization (3 possible points)
In order to prevent high building leakage, a selected number of units shall have a blower door leakage test performed where the results demonstrate less than 0.15 CFM50/sf of leakage.
Enhanced compartmentalization would require each dorm apartment meet roughly half the code threshold for air infiltration. While the project is targeting a whole building air infiltration threshold roughly three times tighter than code, it's acknowledged that compartmentalization air sealing to meet 0.23 cfm50/ SFE is a difficult target and therefore listed as possible points.

EQ Credit Combustion Venting (2 points)
No fireplaces will be installed in this project, complying with the requirements of this credit.

EQ Credit Enhanced Garage Pollutant Protection Option 2. No Garage or Detached Garage (1 point)
The project achieves this credit as no on-site garage is planned for the residents.

EQ Credit Low-Emitting Products (2.5 points)
Interior finish materials such as paintings and coatings, adhesives and sealants, and flooring will be verified for low VOC content that will meet requirements of CA Section 01350.

EQ Credit No Environmental Tobacco Smoke (1 point)
Smoking will be prohibited in all areas of the building. The prohibition is communicated to residents through the building agreement and training session.

■

1.2.6 Innovation

The Project is currently targeting 4 points plus 1 possible point total in the Innovation (IN) category.

IN Prerequisite Preliminary Rating (Required)
Multifamily construction can be a rushed process without thought of impact of the development to the community, the residents, or the larger environment. LEED for Homes requires project teams to take the essential first step to sustainability planning with a Preliminary Rating during the design phase. The first rating was conducted at a sustainability kick off meeting on August 13, 2020 with subsequent updates to present date.

IN Credit LEED Pilot Credit (1 point)
The project team is assessing several LEED Pilot Credits including, Social Equity within the Community, Design for Accessibility, Assessment and Planning for Resilience or Design for Enhanced Resilience, and Learning Controls for Thermal Comfort.

IN Credit Exemplary Performance (2 points plus 1 possible point)
Due to the project location and aggressive energy saving strategies, exemplary performance credits will be realized for access to transit, community resources and increased energy savings.

IN Credit LEED Accredited professional (1 point)
Karla Butterfield of Steven Winter Associates, Inc. has been a principal participant of the project team during all phases of design and will continue to provide support throughout construction and commissioning. Ms. Butterfield's LEED Accredited Professional (AP) Homes certificate to has been filed to earn the project 1 point.

■

1.2.7 Regional Priority

The Project is currently targeting 3 points plus 1 possible point total in the Regional Priority (RP) category.
RP Credit (3 points, 1 possible points)
Due to the project location, regional priority credit will be achieved with compact development and access to community resources as well as energy use reduction.

LEED BD+C: Homes and Multifamily v4 Workbook

Step 1.
Ensure this project is registered in LEED Online.

Step 2.
Enable macros

Note: This workbook is for use with Excel for Mac 2011 and Excel 2007 or later.

Step 3.

Unit of measure	IP units

Step 4.

Project rating system	LEED BD+C: Multifamily Midrise v4 - LEED v4
Project type	Individual
Market Classification	Educational
Total homes in submittal	
Construction type	New construction
Subdivision/Development Name	Vassar Street Grad Dorm
Project team leader name	Tim Peters
Project team leader organization name	Kieran Timberlake
Builder (if different than team leader org)	John Moriarty Associates
Project team leader Email address	Tim Peters <tpeters@kierantimberlake.com>
Provider Organization name	Steven Winter Associates, Inc.
Green rater	Karla Butterfield
Green rater	
Energy Rater	Ari Sokolov
Provider QAD	Maureen M. Mahle
Mid-construction visit date(s)	*ex: 1/1/2015, 2/27/2015*
Date final visit completed	*ex: 3/31/2016*

Step 5.
The following information must be consistent with project details in LEED Online:

Individual Project Information

Project ID #	
Project name	MIT West Campus Graduate Student Dormitory
Project address	269-301 Vassar Street
City	Cambridge
State	MA
Country	USA
Zip Code	02139
Building type	Multifamily midrise
Number of stories	10
Number of bedrooms	679
Conditioned floor area (sq ft)	326091
Gross floor area (sq ft)	326091

Additional Resources

- Resources & Tools section of the Homes Guide to Certification (http://www.usgbc.org/cert-guide/homes#tools)
- Credit Library (http://www.usgbc.org/credits)

LEED BD+C: Multifamily Midrise v4 - LEED v4

MIT West Campus Graduate Student Dormitory Scorecard

Location: **269-301 Vassar Street, Cambridge, MA 02139, USA**

Note: The information on this tab is READ-ONLY. To edit this information, see the Credit Category tabs.

Integrative Process		**Preliminary**	Y	2 of 2	M	*0*	**Verified**	0
IPc	**Integrative Process**			2 of 2		*0*		
Location and Transportation		**Preliminary**	Y	15 of 15	M	*0*	**Verified**	0
LTp	Floodplain Avoidance			Required				Not Verified
Performance Path								
LTc	LEED for Neighborhood Development			0 of 15		*0*		
Prescriptive Path								
LTc	Site Selection			8 of 8		*0*		
LTc	Compact Development			3 of 3		*0*		
LTc	Community Resources			2 of 2		*0*		
LTc	Access to Transit			2 of 2		*0*		
Sustainable Sites		**Preliminary**	Y	5.5 of 7	M	*1.5*	**Verified**	0
SSp	Construction Activity Pollution Prevention			Required				Not Verified
SSp	No Invasive Plants			Required				Not Verified
SSc	Heat Island Reduction			2 of 2		*0*		
SSc	Rainwater Management			1 of 3		*1*		
SSc	Nontoxic Pest Control			2.5 of 2		*0.5*		
Water Efficiency		**Preliminary**	Y	6 of 12	M	*2*	**Verified**	6
WEp	Water Metering			Required				Not Verified
Performance Path								
WEc	Total Water Use			0 of 12		*0*		
Prescriptive Path								
WEc	Indoor Water Use			4 of 6		*1*		4
WEc	Outdoor Water Use			2 of 4		*1*		2
Energy and Atmosphere		**Preliminary**	Y	23 of 37	M	*2*	**Verified**	20
EAp	Minimum Energy Performance			Required				Not Verified
EAp	Energy Metering			Required				Not Verified
EAp	Education of the Homeowner, Tenant or Building Manager			Required				Not Verified
EAc	Annual Energy Use			20 of 30		*0*		20
EAc	Efficient Hot Water Distribution System			2 of 5		*2*		
EAc	Advanced Utility Tracking			1 of 2		*0*		

Materials and Resources		Preliminary	Y	4.5 of 9	M	1.5	Verified	0
MRp	Certified Tropical Wood			Required				Not Verified
MRp	Durability Management			Required				Not Verified
MRc	Durability Management Verification			1 of 1		0		
MRc	Environmentally Preferable Products			2.5 of 5		1		
MRc	Construction Waste Management			1 of 3		0.5		

Indoor Environmental Quality		Preliminary	Y	11.5 of 18	M	3	Verified	4
EQp	Ventilation			Required				Verified
EQp	Combustion Venting			Required				Verified
EQp	Garage Pollutant Protection			Required				Not Verified
EQp	Radon-Resistant Construction			Required				Verified
EQp	Air Filtering			Required				Verified
EQp	Environmental Tobacco Smoke			Required				Not Verified
EQp	Compartmentalization			Required				Verified
EQc	Enhanced Ventilation			2 of 3		0		2
EQc	Contaminant Control			1 of 2		0		1
EQc	Balancing of Heating and Cooling Distribution Systems			2 of 3		0		1
EQc	Enhanced Compartmentalization			0 of 3		3		
EQc	Combustion Venting			2 of 2		0		
EQc	Enhanced Garage Pollutant Protection			1 of 1		0		
EQc	Low-Emitting Products			2.5 of 3		0		
EQc	No Environmental Tobacco Smoke			1 of 1		0		

Innovation		Preliminary	Y	4 of 6	M	1	Verified	0
INp	Preliminary Rating			Required				Not Verified
INc	Innovation			3 of 5		1		
INc	LEED Accredited Professional			1 of 1		0		

Regional Priority		Preliminary	Y	3 of 4	M	1	Verified	0
RPc	Regional Priority			3 of 4		1		

Point Floors	
The project earned at least 8 points total in Location and Transportation and Energy and Atmosphere	Yes
The project earned at least 3 points in Water Efficiency	Yes
The project earned at least 3 points in Indoor Environmental Quality	Yes

Total		Preliminary	Y	74.5 of 110	M	12	Verified	30

Certification Thresholds Certified: 40-49, Silver: 50-59, Gold: 60-79, Platinum: 80-110

Integrative Process

Preliminary Y **2** Maybe **0** **Verified** **0**

IP Credit Integrative Process

Up to 2 points — **Preliminary** Y 2 M 0 **Verified** 0

Exemplary Performance: Achieve all three options

Option 1. Integrative Project Team (1 point) Y 1 M V

True — Team members, in addition to the builder and verification team, include capabilities in at least three of the following skill sets:
architecture or residential building design;
mechanical or energy engineering;
building science or performance testing;
green building or sustainable design; and
civil engineering, landscape architecture, habitat restoration, or land-use planning.

True — All team members referenced above were involved in at least three of the following phases of the design and construction process:
conceptual or schematic design;
LEED planning;
preliminary design;
energy and envelope systems analysis or design;
design development;
final design, working drawings or specifications;
and construction.

True — Meetings were conducted with the project team at least monthly to review project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify next steps.

AND/OR

Option 2. Design Charrette (1 point) Y 1 M V

True — A full-day workshop (or two half-day workshops) was conducted with the project team, as defined in Option 1, no later than the design development phase.

08/31/20 — Date(s)

Duration

AND/OR

Option 3. Trades Training (1 point)

Y	M	V
1		

True	At least eight hours of training on the green aspects of the project and how the trades can contribute to achieving each LEED for Homes prerequisite and attempted credit was conducted before construction but after trades have been hired for the project.
	Date(s)
	Duration
	Trainer

Location and Transportation

Notes

Preliminary Y **15** Maybe **0** **Verified** **0**

LT Prerequisite Floodplain Avoidance

LT Prerequisite Floodplain Avoidanc

Required **Required** **Verified**

Select one of the following:

True	The project is not built on land within a flood hazard area.	MAP FILED
True	The project is built on land within a flood hazard area and in accordance with flood provisions.	
True	The project is built on land within a flood hazard area and is a previously developed building and hardscape.	

Performance Path

Performance Path

LT Credit LEED for Neighborhood Development

LT Credit LEED for Neighborhood De

15 points **Preliminary** Y 0 M 0 **Verified** 0

	Name of LEED for Neighborhood Development project	
	LEED ND project ID number	
	Rating system and version	
	LEED ND certification date	

Prescriptive Path

Prescriptive Path

LT Credit Site Selection

LT Credit Site Selection

Up to 8 points **Preliminary** Y 8 M 0 **Verified** 0

Exemplary Performance: Earn all 9 points

Option 1. Sensitive Land Protection (3-4 points) Y 4 M 0 V 0 **Option 1. Sensitive Land Protection (3**

Path 1. Previously Developed (4 points) Y 4 M V Path 1. Previously Developed (4 points)

1.75	Total buildable land area (acre or sq ft)	MAP FILED
1.75	Previously developed buildable land area (acre or sq ft)	
100.00%	Percentage of lot previously developed (%)	

OR

Path 2. Avoidance of Sensitive Land (3 points)	Y		M		V		Path 2. Avoidance of Sensitive Land (3 p

All new buildings, hardscapes, roads, or parking areas of the project are located on land that meets the following criteria:

(Select one)	Does not consist of prime farmland, unique farmland, or farmland of statewide of local importance.	
(Select one)	Was not public parkland prior to acquisition.	
(Select one)	Is not in a flood hazard area shown on a legally adopted flood hazard map or otherwise legally designated by the local jurisdiction or state.	
(Select one)	Is not on land specifically identified as habitat for species listed in the U.S. Endangered Species Act; the state's endangered species act; NatureServe GH, G1, or G2 lists; or those listed under local equivalent standards (for projects outside the U.S.) that are not covered by NatureServe data.	
(Select one)	Is not on land within 50 ft (15 m) of wetlands or within the setback distance from wetlands prescribed by local, state or national regulations, whichever is more stringent.	
(Select one)	Is not on land within 100 ft (30 m) of water bodies, including seas, lakes, rivers, streams and tributaries.	

AND/OR

Option 2. Infill Development (2 points)	Y	2	M		V		**Option 2. Infill Development (2 points)**

100.00%	Percent of land within a 1/2 mile (800 meters) from the project boundary that is previously developed	MAP FILED

Alternatively, for projects within city limits of towns with populations less than 20,000

Alternatively, for projects within city limits

	Percent of land adjacent to the project boundary that is previously developed	

AND/OR

Option 3. Open Space (1 point)	Y	1	M		V		**Option 3. Open Space (1 point)**

Select one of the following:

Yes	Built within 1/2 mile (800 meters) of open space that is at least 3/4 acres (0.3 hectares)	Tudor Street Dog Park .5 acres .3 miles
	Create publically available open space on the project site	

AND/OR

Option 4. Street Network (1 point)	Y	1	M		V		**Option 4. Street Network (1 point)**

300.00	Qualifying intersection density (intersections per square mile)	FILED

AND/OR

Option 5. Bicycle Network and Storage (1 point)	Y	1	M		V		**Option 5. Bicycle Network and Storage**

Bicycle Network

Bicycle Network

Select one of the following. The project has a functional entry and/or bicycle storage within 200 yd (180 m) of a bicycle network that connects to:

Yes	At least 10 uses	
Yes	A school or employment center	
Yes	A bus rapid transit stops, rail stations, and/or ferry terminals	

Bicycle Storage for Multifamily Buildings

	Number of building occupants
	Number of residential units
	Number of short-term spaces provided
4	Number of short-term spaces required
	Number of long-term spaces provided
0	Number of long-term spaces required

Bicycle Storage for Multifamily Buildings

NEED STORAGE COUNT

Bicycle Storage for Single Family Homes

	The project is a single family home with garage.

Bicycle Storage for Single Family Homes

LT Credit Compact Development

Up to 3 points **Preliminary** Y 3 M **Verified** 0

Exemplary Performance for Single and Multifamily Lowrise Only: 35 DU/acre (86.5 DU/hectare)

	Total project boundary area (acre)
1.77	Buildable land area (acre)
350	Number of dwelling units
197.74	DU/acre of buildable land

LT Credit Compact Development

LT Credit Community Resources

Up to 2 points **Preliminary** Y 2 M **Verified** 0

Exemplary Performance: 16 uses for 1/2 point, 20 uses for 1 point.

26	Number of community resources within a 1/2 mile (800 meters) walking distance

LT Credit Community Resources

LT Credit Access to Transit

Up to 2 points **Preliminary** Y 2 M **Verified** 0

Exemplary Performance: For multiple transit types, 720 weekday trips and 432 weekend trips; For commuter rail or ferry, 120 weekday trips.

For projects with multiple transit types

786	Number of weekday trips
416	Number weekend day trips

For projects with multiple transit types

For projects with commuter rail or ferry service only

	Number of weekday trips

For projects with commuter rail or ferry se

LT Credit Access to Transit

Sustainable Sites

Notes

Preliminary Y **5.5** Maybe **1.5** **Verified** **0**

SS Prerequisite Construction Activity Pollution Prevention

SS Prerequisite Construction Activit

Required **Required** **Verified**

Confirm all of the following measures were implemented on the project, as applicable:

True	Stockpiled and protected disturbed topsoil from erosion.	Provide SWPPP Reports
True	Controlled the path and velocity of runoff with silt fencing or comparable measures.	
True	Protected on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures.	
True	Provided swales to divert surface water from hillsides.	
True	Used tiers, erosion blankets, compost blankets, filter socks, berms, or comparable measures to stabilize soils in any area with a slope of 15% (6.6:1) or more that was disturbed during construction.	
True	Prevented air pollution from dust and particulate matter.	

For construction sites larger than 1 acre

For construction sites larger than 1 acre

Select one of the following:

True	The project team created an implemented an Erosion and Sedimentation Control (ESC) plan that conforms to the requirements of the 2012 U.S. Environmental Protection Agency Construction General Permit (CGP).	
True	The project team created an implemented an Erosion and Sedimentation Control (ESC) plan that conforms to local standards and codes, which are as or more stringent than the 2012 EPA Construction General Permit (CGP).	

SS Prerequisite No Invasive Plants

SS Prerequisite No Invasive Plants

Required **Required** **Verified**

True	No invasive plant species have been introduced into the landscape.	

SS Credit Heat Island Reduction

Up to 2 points

Preliminary Y: 2 M: | **Verified**:

SS Credit Heat Island Reduction

Option 1. Shading and Option 2. Nonabsorptive Materials (1-2 points)

Option 1. Shading and Option 2. Nona

Hardscapes

0	Total hardscape area (driveways, walkways, patios, etc.) (sq ft)
	Area of shaded hardscapes (sq ft)
	Area of unshaded paving materials with an initial SR value of at least 0.33 (sq ft)
	Area of unshaded vegetation in open pavers (sq ft)
	Remaining hardscape area (not earning credit) (sq ft)

Roof

0	Total roof area (sq ft)
	Area of ENERGY STAR qualified roof (sq ft)
	Area of vegetated roof (sq ft)
	Remaining roof area (not earning credit) (sq ft)

0.0%	Percentage of area with shading or nonabsorptive material (%)

SS Credit Rainwater Management

Up to 3 points

Preliminary Y: 1 M: 1 | **Verified**: 0

SS Credit Rainwater Management

Exemplary Performance: For Case 1, manage 100% of all stormwater on-site.

Case 1. Low Impact Development (1-3 points)

Y: M: V:

Case 1. Low Impact Development (1-3

Site Characteristics

0	Total lot area (sq ft)

Roof

0	Total roof area (sq ft)
	Vegetated roof area (sq ft)
	Roof area directed to a qualifying infiltration feature (sq ft)
	Remaining roof area (not earning credit) (sq ft)

Non-roof Site Area

	Total landscape softscape area (sq ft)
0	Total hardscape area (driveways, walkways, patios, etc.) (sq ft)
	Permeable paving (sq ft)
	Qualifying open pavers (sq ft)
	Hardscapes directed to qualifying infiltration features (sq ft)
	Remaining hardscape area (not earning credit) (sq ft)

Qualifying area, as a percentage of total lot area

0.0%	Qualifying area, as percentage of total lot area (%)

Reduction of total impermeable area

0	Total impermeable area of the project (sq ft)
#N/A	Reference home size (sq ft)
0.0%	Impermeable area as a percentage of reference home size

OR

Case 2. NPDES Projects (2-3 points) Y 1 M 1 V

Case 2. NPDES Projects (2-3 points)

95th	Percentile rainfall event

PROVIDE CALCS

SS Credit Nontoxic Pest Control								SS Credit Nontoxic Pest Control
Up to 2 points		**Preliminary**	Y	2.5	M	0.5	**Verified**	0

Exemplary Performance: Projects that achieve 2 points can earn another ½ point for each additional strategy, up to a total of 1 point.

Select all of the following that have been included in the project.

	Install a steel mesh barrier termite control system. (1 point)	
	Install a physical termite barrier system (e.g., basaltic rock) approved by code. (1 point)	
Yes	For below-grade walls, use solid concrete foundation walls, masonry walls with a course of solid block bond beam, or concrete-filled block. (0.5 point)	
	Install post-tension slabs. (0.5 point)	
	Treat all cellulosic structural material (e.g., wood framing) with a registered pesticide containing borates, following the manufacturer's directions for preconstruction treatment. (0.5 point)	
Yes	Use noncellulosic material for all structural elements. (0.5 point)	
	Install ports or openings for all plumbing elements that penetrate the slab, to allow access for inspection and treatment of pest infestations. (0.5 point)	
	Install a registered termite bait system and provide for ongoing maintenance as required by the manufacturer. (0.5 point)	
	Design a minimum 6-inch (150 millimeters) inspection space between the surface of the planned landscape grade and nonmasonry siding. (0.5 point)	
Yes	Seal all external cracks, joints, penetrations, edges, and entry points with appropriate caulking. Install rodent- and corrosion-proof screens (e.g., copper or stainless steel mesh) on all openings greater than ¼ inch (6 millimeters), except where code prohibits their installation. (0.5 point)	
Yes	Design discharge points for rain gutters, air-conditioning condensation lines, steam vent lines, or any other moisture source such that discharge is at least 24 inches (600 millimeters) from the foundation. (0.5 point)	NEED STORMWATER PLAN
Yes	Design landscape features to provide a minimum 18-inch (450 millimeters) space between the exterior wall and any plantings. (0.5 point)	
For multifamily projects		*For multifamily projects*
Yes	Develop an integrated pest management policy. The policy must include guidance for residents on pesticide use, housekeeping and prompt reporting of pest problems and incorporate policy in the Homeowner Education Manual. (Required)	NEED IPM

Water Efficiency

Notes

Preliminary Y **6** Maybe **1** **Verified** **0**

WE Prerequisite Water Metering

Required **Required** **Verified** N

Case 1. Single Family V

Select one of the following:

(Select one) A whole-house water meter is installed.

(Select one) The house uses only well water and is not connected to a municipal water system.

OR

Case 2. Multifamily V

( ) A water meter or submeter is installed for each unit.

True A water meter or submeter is installed for the whole building.

Performance Path

WE Credit Total Water Use

Up to 12 points **Preliminary** Y M **Verified** 0

Exemplary Performance: 70% reduction of indoor and outdoor water consumption

0.00% Total reduction of indoor and outdoor water consumption as calculated in the Water Reduction Calculator (%)

For single family projects

(Select one) The water pressure does not exceed 60 psi (415 kPa). There are no detectable water leaks. Any installed water softeners are demand initiated.

WE Prerequisite Water Metering

Case 1. Single Family

Case 2. Multifamily

Performance Path

WE Credit Total Water Use

For single family projects

Prescriptive Path

WE Credit Indoor Water Use

Up to 6 points | **Preliminary** Y 4 M 0 | **Verified** 0

Case 1. Single Family Y M V

(Select one) The water pressure does not exceed 60 psi (415 kPa). There are no detectable water leaks.

Meet any of the following:

Lavatory Faucet (1-2 points)

All installed lavatory faucets and/or faucet aerators are WaterSense labeled.

Average rated flow volume across all lavatory faucets (gpm)

Showerheads (1-2 points)

All installed showerhead fixtures and fittings are WaterSense labeled.

Average rated flow volume per shower compartment (gpm)

Toilets (1 point)

All installed toilet fixtures and fittings are WaterSense labeled.

Average rated flush volume across all toilets (gpf)

Clothes Washers (1 point)

All clothes washers are ENERGY STAR qualified or performance equivalent

OR

Case 2. Multifamily and Midrise Y 4 M V

Note: No additional credit is awarded if the fixtures and fittings in non-unit spaces are more efficient than those of in-unit spaces.

Meet any of the following for in-unit spaces and non-unit spaces:

Lavatory Faucet (1-2 points)

True All installed lavatory faucets and/or faucet aerators are WaterSense labeled.

Average rated flow volume across all lavatory faucets (gpm)

Showerheads (1-2 points)

True All installed showerhead fixtures and fittings are WaterSense labeled.

Average rated flow volume per shower compartment (gpm)

Toilets (1 point)

True All installed toilet fixtures and fittings are WaterSense labeled.

Average rated flush volume across all toilets (gpf)

Clothes Washers (1 point)

True All clothes washers are ENERGY STAR qualified or performance equivalent

Prescriptive Path

WE Credit Indoor Water Use

Case 1. Single Family

Lavatory Faucet (1-2 points)

Showerheads (1-2 points)

Toilets (1 point)

Clothes Washers (1 point)

Case 2. Multifamily and Midrise

Lavatory Faucet (1-2 points)

NEED SPECS

Showerheads (1-2 points)

Toilets (1 point)

Clothes Washers (1 point)

WE Credit Outdoor Water Use								WE Credit Outdoor Water Use
Up to 4 points	**Preliminary**	Y	2	M	1	**Verified**	0	

30.00	Turf grass area as a percentage of total landscape softscape area (%)	NEED LANDSCAPE PLAN / CALCS
100.00	Native or adapted plant area as a percentage of total landscape softscape area (%)	

Energy and Atmosphere

Notes	Verified (initials)	Date Verified	Verification Details

Preliminary Y **23** Maybe **2** **Verified** **20**

EA Prerequisite Minimum Energy Performance

Required **Required** **Verified** N

Responsible Party COSENTINI

Whole-Building Energy Simulation

	Target Finder (Optional). Enter energy performance rating target (kBtu/sq ft per year)				
True	The project meets the mandatory requirements of ASHRAE 90.1-2010, Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4	NEED LOAD CALCS			
20	Total energy cost savings (%)	ASHRAE 90.1 -2010			

Commissioning

Option 1. Commissioning using ENERGY STAR Protocols. V

True	The project meets the ENERGY STAR Qualified Multifamily High Rise Buildings Testing and Verification Protocols.				

OR

Option 2. Commissioning using Prescriptive Path V

1. Reduced Heating and Cooling Distribution System Losses for In-Unit HVAC

	Duct leakage rate does not exceed 4.0 cfm25 per 100 sq ft (1.2 cmm at 25 Pa per 100 sq m) of conditioned floor area.	Who is Cx Agent? NEED PLAN			
	Duct leakage rate in units smaller than 1,200 sq ft (110 sq m) does not exceed 6.0 cfm25 per 100 sq ft (1.7 cmm at 25 Pa per 100 sq m) of conditioned floor area.				
	Total duct leakage rate in-units systems does not exceed 8.0 cfm25 per 100 sq ft (2.4 cmm at 25 Pa per 100 sq m) of conditioned floor area.				
	The air-handler unit and ductwork are visbly within the unit's envelope.				

2. Fundamental Commissioning of Central HVAC Systems

	The project meets the performance testing and ongoing maintenance requirements of LEED v4 New Construction EA Prerequisite Fundamental Commissioning and Verification for central commercial heating, cooling, water heating and ventilation systems.				

3. Construction Document Specifications

	The following details were included in the bid documents: Elements to be sealed, air barrier sheet and compartmentalization sheet.				

4. LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist

	The LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist has been completed.				
	The project is a certified Passive House project.				

EA Prerequisite Energy Metering

Required **Required** **Verified** N

Responsible Party

Case 1. Single Family V

	A whole-house electric meter is installed.				
	A whole-house gas meter is installed.				

OR

Case 2. Multifamily V

True	Electric submeters are installed in each residential unit.				

Whole building	A whole-building gas meter or submeter for each residential unit is installed.				

EA Prerequisite Education of Homeowner, Tenant, or Building Manager

Required	Required	Verified	
True	An operations and maintenance manual, binder, or CD has been/will be provided to all individuals or organizations responsible for the maintenance of the home.		
True	A minimum one-hour walkthrough of the home with the occupants has been conducted.		

EA Prerequisite Education of Homeowner, Tenant, or Building Manager

Responsible Party			
PROVIDE MANUALS			

0	Total Points

EA Credit Annual Energy Use

Up to 30 points | **Preliminary** Y 20 M 0 V 20.0

Exemplary Performance: 65% or better reduction from ASHRAE 90.1-2010.

20.0%	Percent reduction from ASHRAE 90.1-2010
15	Points earned
5.0	Average home size point adjustment (from the Multifamily HSA tab)
20.0	Final points earned

EA Credit Annual Energy Use

Responsible Party

Cosentini 90.1, SWA holding HSA 14.5 points		

EA Credit Efficient Hot Water Distribution System

Up to 5 points | **Preliminary** Y 2 M 2 **Verified** 0

Option 1. Efficient Hot Water Distribution (2 points) Y 0 M 2 V 0

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

For projects using circulating systems

	Circulating pump does not operate continuously, is on a timer, or is on a water temperature sensor.
	Circulating pump is demand activated by a momentary contact switch, motion sensor, flow switch, door switch or voice command.
	After the pump starts, the controls allow the pump to operate until the water temperature in the return pipe rises not more than 10ºF (6 ºC) above the initial temperature of the water in the pipe. Controls limit the water temperature to a maximum of 105ºF (40 ºC). Controls limit pump operation to not more than 5 minutes per activation in the event that both means of shutting off the pump have failed.
	Circulating hot water systems have with an automatic or readily accessible manual switch to turn off the hot water circulating pump when not in use.

EA Credit Efficient Hot Water Distribution System

Responsible Party

Option 1. Efficient Hot Water Distribution (2 points)

For projects using circulating systems

For projects using heat-traced piping systems

Piping is insulated.

Path 1. Maximum Allowable Pipe Length (2 points) Y M 2 V

Pipe or tube length installed (ft)

Nominal pipe size (in)

Maximum pipe or tube length allowed for water heaters, boilers with no circulation loop or heat traced pipe or in multifamily buildings a central circulation loop or heat traced pipe (ft)

Maximum pipe or tube length allowed for circulation loop or heat traced pipe serving a single unit or house (ft)

OR

Path 2. Maximum Allowable Pipe Volume (2 points) Y M V

Volume of hot or tempered water from source to termination (oz)

OR

Option 2. Performance Test (3 points) Y 0 M 0 V 0

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

For projects using circulating systems

Circulating pump does not operate continuously, is on a timer, or is on a water temperature sensor.

Circulating pump is demand activated by a momentary contact switch, motion sensor, flow switch, door switch or voice command.

After the pump starts, the controls allow the pump to operate until the water temperature in the return pipe rises not more than 10ºF (6 ºC) above the initial temperature of the water in the pipe. Controls limit the water temperature to a maximum of 105ºF (40 ºC). Controls limit pump operation to not more than 5 minutes per activation in the event that both means of shutting off the pump have failed.

Circulating hot water systems have with an automatic or readily accessible manual switch to turn off the hot water circulating pump when not in use.

For projects using heat-traced piping systems

Piping is insulated.

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

Case 1. Hot water source is a water heater or boiler with no circulation loop or heat traced pipe; or in multifamily buildings a central circulation loop or heat traced pipe. Y M V

Meets WaterSense Labeled New Homes requirements

Tested volume of water stored in piping (gal)

OR

Case 2. Hot water source is a circulation loop or heat traced pipe serving a single unit or house Y M V

Tested volume of water stored in piping (gal)

For projects using heat-traced piping systems

Piping is insulated.

AND/OR

Option 3. Pipe Insulation (2 points) Y 2 M V

R-4 Insulation R-value

For projects using heat-traced piping systems

Path 1. Maximum Allowable Pipe Length (2 points)

anticipated

Path 2. Maximum Allowable Pipe Volume (2 points)

Option 2. Performance Test (3 points)

For projects using circulating systems

For projects using heat-traced piping systems

Case 1. Hot water source is a water heater or boiler with no circulation loop or heat traced pipe; or in multifamily buildings a c

Case 2. Hot water source is a circulation loop or heat traced pipe serving a single unit or house

For projects using heat-traced piping systems

Option 3. Pipe Insulation (2 points)

EA Credit Advanced Utility Tracking

Up to 2 points — **Preliminary** Y 1 M 0 — **Verified** V 0

Exemplary Performance: Meter separate energy usage information for at least four end uses.

Case 1. Single Family Y 0 M 0 V 0

Option 1. Electric and Water (1 point) Y M V

Select one of the following:

- [ ] A permanent energy-monitoring system that records at intervals of one hour or less has been installed.
- [True] The house has an automatic in-ground irrigation system and landscaped irrigated area larger than 1,000 sq ft (93 sq m) and has installed a submeter to monitor all irrigation system components.

AND/OR

Option 2. Third-Party Utility Reporting (1 point) Y M V

- [ ] The homeowner has shared all applicable utility data with USGBC via a USGBC-approved third-party.

Case 2. Multifamily Y 1 M 0 V 0

Option 1. Electric and Water (1 point) Y 1 M V

Select one of the following:

- [ ] A permanent energy-monitoring system that records at intervals of one hour or less has been installed in each unit.
- [True] The project has an automatic in-ground irrigation system and landscaped irrigated area larger than 1,000 sq ft (93 sq m) and has installed a submeter to monitor all irrigation system components.

AND/OR

Option 2. Third-Party Utility Reporting (1 point) Y 0 M 0 V 0

Path 1. Whole-Building Master Meter Y M V

- [ ] The building owner has shared all applicable utility data with USGBC via a USGBC-approved third-party.

OR

Path 2. Individual Unit Meters Y M V

- [ ] At least 50% of unit owners or occupants have shared all applicable utility data with USGBC via a USGBC-approved third-party.

EA Credit Advanced Utility Tracking

Responsible Party

Case 1. Single Family

Option 1. Electric and Water (1 point)

Option 2. Third-Party Utility Reporting (1 point)

Case 2. Multifamily

Option 1. Electric and Water (1 point)

NEED SUBMITTAL

Option 2. Third-Party Utility Reporting (1 point)

Path 1. Whole-Building Master Meter

Path 2. Individual Unit Meters

	ENERGY STAR–qualified ceiling fans are installed. (0.5 point)						
	ENERGY STAR–qualified dishwasher(s) are installed. (0.5 point)						

EA Credit Renewable Energy

Up to 4 points

Preliminary Y 0 M 0 **Verified** 0

Exemplary Performance: Produce at least 2,500 kWh annually.

	Annual electricity produced by the renewable electricity generation system (kWh)						
	RECs are retained by owner.						
	Total points from all other EA credits						

EA Credit Renewable Energy

Responsible Party

Materials and Resources

Preliminary Y **4.5** Maybe **1.5** **Verified** **0**

MR Prerequisite Certified Tropical Wood

Required **Required** **Verified**

True — All wood in the building is nontropical, reused or reclaimed, or certified by the Forest Stewardship Council, or USGBC-approved equivalent.

MR Prerequisite Durability Management

Required **Required** **Verified**

True — ENERGY STAR for Homes, version 3, water management system checklist is collected from builder.

Confirm all of the following have been implemented on the project:

True — Nonpaper-faced backer board, or a product or coating over wallboard that meets standard ASTM D 3273 standard, was installed on the area above bathtub, spa or shower, and in areas behind fiberglass enclosures where wallboard is installed.

True — Water-resistant flooring was installed in the kitchen, bathroom(s), laundry room, spa area(s). No carpet was installed in these areas.

True — Water-resistant flooring was installed in entryways within 3 feet of exterior door(s).

True — A drain and drain pan, drain pan and automatic water shut-off or flow restrictors, or floor drain with floor sloped to drain was installed for all tank water heaters in or over living space.

True — A braided washer hose, drain and drain pan, drain pan and automatic water shut-off or flow restrictors, or floor drain with floor sloped to drain was installed for clothes washer in or over living space.

True — Conventional clothes dryers exhaust directly to outdoors.

MR Credit Durability Management Verification

1 point | **Preliminary** Y: 1 | M: 0 | **Verified**: 0

True	Each measure in the ENERGY STAR for Homes, version 3, water management system builder checklist was verified by the verification team.

MR Credit Environmentally Preferable Products

Up to 5 points | **Preliminary** Y: 2.5 | M: 1 | **Verified**: 0

Exemplary Performance: For Option 2, achieve a minimum of 4 points to earn another 2 points for purchasing products that meet the requirements.

Option 1. Local Production | **Preliminary** Y: 0.5 | M: | **Verified**:

Select which the following were extracted, processed, and manufactured within 100 miles (160 km) of the project site:

	Percentage of locally produced framing (%) (0.5 point)
50.00	Percentage of locally produced aggregate for concrete and foundation (%) (0.5 point)
	Percentage of locally produced drywall and interior sheathing (%) (0.5 point)

AND/OR

Option 2. Environmentally Preferable Products | **Preliminary** Y: 2 | M: 1 | **Verified**:

Select the criteria met by at least 90% of the component:

No Floor Covering (2 points)	
Floor Covering (1 point)	At least 25% postconsumer or 50% preconsumer recycled content
Insulation (1 point)	At least 25% postconsumer or 50% preconsumer recycled content
Sheathing (1 point)	
Framing (1 point)	
Drywall (1 point)	For non-synthetic, 10% post-consumer recycled content
Concrete (1 point)	
Roofing (1 point)	
Siding (1 point)	

Select criteria met for at least 3 of the following additional components by at least 90% of the component (1 point):

Doors	
Cabinets	
Counters	
Interior Trim	
Decking/Patio	
Windows	

MR Credit Construction Waste Management

Up to 3 points **Preliminary** Y 1 M 0.5 **Verified** 0

Exemplary Performance: For renovation projects, track and divert at least 50% of demolition waste.

	LEED Reference Home Baseline Waste (lbs)
	Total Construction Waste (including recycled waste) (lbs)
	Recycled Waste (lbs)
0.00	Project Construction Waste (lbs)
	Percent reduction below baseline (%)

Indoor Environmental Quality

Notes	Verified (initials)	Date Verified	Verification Details

Preliminary Y **11.5** Maybe **3** **Verified** **0**

EQ Prerequisite Ventilation

Required **Required** **Verified** N

Responsible Party COSENTINI

Case 1. Single Family

V

The project has earned the EPA Indoor airPLUS label

OR

Local Exhaust

Confirm all of the following have been implemented on the project:

Local exhaust systems meeting the requirements of ASHRAE Standard 62.2–2010, Sections 5 and 7 or local equivalent, whichever is more stringent, were installed in all bathrooms (including half-baths) and the kitchen.

Local exhaust systems exhaust air directly to the outdoors.

All bathroom exhaust fans are ENERGY STAR-labeled or an HRV or ERV is used.

For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), makeup air is provided at a rate approximately equal to the exhaust air rate.

Makeup air systems have a means of closure and can be automatically controlled to start and operate simultaneously with the exhaust system.

Whole House Mechanical Ventilation

The building meets ASHRAE Standard 62.2-2010 Sections 4 and 7 or local equivalent, whichever is more stringent.

OR

Case 2. Multifamily

V

Local Exhaust

Confirm all of the following have been implemented on the project:

True — Local exhaust systems meeting the requirements of ASHRAE Standard 62.2–2010, Sections 5 and 7 or local equivalent, whichever is more stringent, were installed in all bathrooms (including half-baths) and the kitchen.

True — Local exhaust systems exhaust air directly to the outdoors.

True — All bathroom exhaust fans are ENERGY STAR-labeled or an HRV or ERV is used.

True — For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), makeup air is provided at a rate approximately equal to the exhaust air rate. Makeup air systems have a means of closure and can be automatically controlled to start and operate simultaneously with the exhaust system.

Whole Unit Mechanical Ventilation

True — The project meets ASHRAE Standard 62.2-2010 Sections 4 and 7 or local equivalent, whichever is more stringent.

Non-Unit Spaces

True — The project meets the minimum requirements of ASHRAE Standard 62.1-2010 Sections 4 -7 or local equivalent, whichever is more stringent.

True — The project is located in a nonattainment area for PM2.5. The project has installed MERV 11 or higher filters.

True — The project is located in a nonattainment area for ozone.

EQ Prerequisite Ventilation

Case 1. Single Family

Local Exhaust

Whole House Mechanical Ventilation

Case 2. Multifamily

Local Exhaust

Whole Unit Mechanical Ventilation

PROVIDE CALCS & ERV SPECS

EQ Prerequisite Combustion Venting

Required	Required	Verified	N

	The project has earned the EPA Indoor airPLUS label
	OR
True	No unvented combustion appliances were installed (ovens and ranges excluded).
True	A carbon monoxide (CO) monitor is installed on each floor, hard-wired with a battery backup.

For projects with fireplaces or woodstoves installed

	Provide doors that close or a solid glass enclosure.
	Closed-combustion, power-vented or passes BPI or RESNET combustion safety protocols

For projects where space and water heating equipment involving combustion are installed

Select one of the following:

True	Equipment is installed with closed combustion (i.e. sealed supply air and exhaust ducting)
True	Equipment is installed with power-vented exhaust
True	Equipment is located in a detached utility building or open-air facility

EQ Prerequisite Garage Pollutant Protection

Required	Required	Verified	N

	The project has earned the EPA Indoor airPLUS label
	OR
	All air-handling equipment and ductwork is placed outside the fire-rated envelope of the garage.
	Shared surfaces between the garage and conditioned spaces are tightly sealed.

Conditioned Spaces Above Garage

	All penetrations and all connecting floor and ceiling joist bays are sealed.

Conditioned Spaces Next to Garage

	All doors are weather-stripped.
	Carbon monoxide detectors are installed in rooms that share a door with the garage
	All penetrations and all cracks at the base of the walls are sealed.

EQ Prerequisite Combustion Venting

Responsible Party	

For projects with fireplaces or woodstoves installed

For projects where space and water heating equipment involving combustion are installed

EQ Prerequisite Garage Pollutant Protection

Responsible Party	

Conditioned Spaces Above Garage

Conditioned Spaces Next to Garage

EQ Prerequisite Radon-Resistant Construction

Required | **Required** | **Verified** | N

Exemplary Performance: For projects in radon zones 2 and 3, install a qualifying passive radon ventilation system.

EPA Indoor airPLUS label | V

	The project has earned the EPA Indoor airPLUS label

OR

Case 1. New Construction | V

1	EPA radon zone

For projects in EPA radon zone 1

True	There is a capillary break per the Indoor airPLUS specifications.
True	An electrical outlet has been provided near vent piping in the attic to facilitate future fan installation.
True	A gas-tight vertical vent pipe extending up through the conditioned spaces and terminating above the roof opening has been installed.
	OR
	The house is elevated by at least 2 feet (600 millimeters) with open air space between building and ground or there is a garage under the building.

OR

Case 2. Renovation of Existing Building | V

	EPA radon zone

For renovation projects in EPA radon zone 1 with no slab work being performed

	Radon test results (pCi/L)
	If results are greater than 4 pCi/L, an active ventilation system has been installed.

EQ Prerequisite Radon-Resistant Construction

Responsible Party

EPA Indoor airPLUS label

Case 1. New Construction

For projects in EPA radon zone 1

Case 2. Renovation of Existing Building

EQ Prerequisite Air Filtering

Required | **Required** | **Verified**

	The project has earned the EPA Indoor airPLUS label
	OR
8.00	MERV rating of filters on recirculating space conditioning systems
6.00	MERV rating of filters on mechanically supplied outdoor air systems with 10 ft (3 m) or more of ductwork

EQ Prerequisite Air Filtering

Responsible Party

EQ Prerequisite Environmental Tobacco Smoke

Required | **Required** | **Verified**

For multifamily projects

True	Smoking is prohibited in all common areas of the building.
True	Smoking is prohibited outside the project building(s) except in designated smoking areas located at least 25 ft (7.5 m) from all entries, outdoor air intakes, and operable windows.
True	Signage communicating the smoking policy has been installed.

EQ Prerequisite Environmental Tobacco Smoke

Responsible Party

For multifamily projects

EQ Prerequisite Compartmentalization

Required | **Required** | **Verified**

For multifamily and attached single-family projects

True	Each residential unit has sealed penetrations through walls, ceilings, and floors and vertical chases adjacent to units.
True	All doors in the residential units leading to common hallways have weather-stripping.
True	All exterior doors and operable windows have weather-stripping.
	Blower door test results (cfm50)
	Envelope enclosure area (sq ft)
0.00	Leakage per area of enclosure (cfm50/sq ft)

EQ Prerequisite Compartmentalization

Responsible Party

For multifamily and attached single-family projects

EQ Credit Enhanced Ventilation

Up to 3 points | **Preliminary** Y 2 M 0 | **Verified** 0

Option 1. Enhanced Local Exhaust (1 point) Y M V

Bathroom exhaust fan control type in every bathroom with a shower, bathtub, or spa

AND/OR

Option 2. Enhanced Whole-House Ventilation (2 points) Y 2 M 0 V

True	A balanced whole-house ventilation system was designed and installed that meets ASHRAE 62.2-2010 sections 4 and 7 in each home or unit.
True	The system does not exceed ASHRAE 62.2-2010 requirements by more than 10%.

EQ Credit Enhanced Ventilation

Responsible Party

Option 1. Enhanced Local Exhaust (1 point)

Option 2. Enhanced Whole-House Ventilation (2 points)

EQ Credit Contaminant Control

Up to 2 points **Preliminary** Y 1 M 0 **Verified** 0

Exemplary Performance: Achieve a minimum of 2 1/2 points to earn another 1/2 point.

Option 1. Walk-off Mats (0.5 point) Y 0.5 M V

For all primary entryways, a permanent walk-off mat that is at least 4 feet (1.2 meters) long and allows access for cleaning has been installed.

For multifamily projects

True — For exterior entryways in common areas, permanent systems that are at least 10 feet (3 meters) long have been installed.

AND/OR

Option 2. Shoe Removal and Storage (0.5 point) Y 0 M V

A shoe removal and storage space is near the primary entryway.

No conventional carpet is installed in shoe removal and storage area.

AND/OR

Option 3. Preoccupancy Flush (0.5 point) Y 0.5 M V

The project has earned the EPA Indoor airPLUS label

OR

True — At installation, all permanent ducts and vents were sealed to minimize contamination from construction.

After construction ends and before occupancy

True — Any dust and debris was removed from ducts.

True — The home was flushed out for 48 hours, with all windows open, a fan run continuously or all HVAC fans and exhaust fans.

AND/OR

Option 4. Air Testing (1 point) Y 0 M V

The building was tested for indoor air contaminants and maximum concentrations were not exceeded.

EQ Credit Contaminant Control

Responsible Party

Option 1. Walk-off Mats (0.5 point)

Option 2. Shoe Removal and Storage (0.5 point)

Option 3. Preoccupancy Flush (0.5 point)

After construction ends and before occupancy

NEED OUTLINE/DATES

Option 4. Air Testing (1 point)

EQ Credit Balancing of Heating and Cooling Distribution Systems

Up to 3 points — **Preliminary** Y 2 M 0 — **Verified** 0

Case 1. Forced-Air Systems Y 2 M 0 V 0

Option 1. Multiple Zones (1 point) Y M V

- A system with at least two space-conditioning zones with independent thermostatic controls has been installed.

OR

- The project is a single family home less than 800 sq ft (74 sq m) or a multifamily building whose average unit size is less than 1,200 sq ft (110 sq m).

AND/OR

Option 2. Supply Air-Flow Testing (1 point) Y 1 M V

- True — The supply air-flow rates are within +/- 20% (or +/- 25 cfm or 11 lps) of calculated values from ACCA Manual J.

AND/OR

Option 3. Pressure Balancing (1 point) Y 1 M V

- True — The pressure differential between bedroom and rest of the house is less than 3 Pa.

OR

Case 2. Radiative Systems Y 0 M 0 V 0

Option 1. Multiple Zones (1 point) Y M V

- A system with at least two zones with independent thermostatic controls has been installed
- Each zone has a separate loop and pump controlled automatically by a thermostat control.

OR

- The project is a single family home less than 800 sq ft (74 sq m) or a multifamily building whose average unit size is less than 1,200 sq ft (110 sq m).

AND/OR

Option 2. Room-by-Room Controls (2 points) Y M V

- Room-by-room thermostatic controls are installed.

EQ Credit Balancing of Heating and Cooling Distribution Systems

Responsible Party

Case 1. Forced-Air Systems

Option 1. Multiple Zones (1 point)

Option 2. Supply Air-Flow Testing (1 point)

Provide TABS

Option 3. Pressure Balancing (1 point)

Transfer grills in BR

Case 2. Radiative Systems

Option 1. Multiple Zones (1 point)

Option 2. Room-by-Room Controls (2 points)

EQ Credit Enhanced Compartmentalization

Up to 3 points — **Preliminary** Y M 3 — **Verified** 0

- 0.00 — Leakage per area of enclosure (cfm50/sq ft)

EQ Credit Enhanced Compartmentalization

Responsible Party

anticipated

EQ Credit Combustion Venting

Up to 2 points — **Preliminary** Y 2 M 0 — **Verified** 0

Option 1. No Fireplace or Woodstove (2 points) Y 2 M V

- True — No fireplaces or woodstoves have been installed.

OR

Option 2. Enhanced Combustion Venting Measures (1 point) Y M V

EQ Credit Combustion Venting

Responsible Party

Option 1. No Fireplace or Woodstove (2 points)

Option 2. Enhanced Combustion Venting Measures (1 point)

	The project has earned the EPA Indoor airPLUS label			
	OR			
	EPA qualified wood- or pellet-burning fireplaces with either power or direct venting have been installed.			
	A natural gas, propane, or alcohol stove approved by a safety testing facility and has power or direct venting has been installed.			
	A natural gas, propane, or alcohol stove has a permanently fixed glass front or gasketed door and an electronic pilot.			

EQ Credit Enhanced Garage Pollutant Protection

1 point | **Preliminary** Y 1 M 0 | **Verified** 0

Option 1. Exhaust Fan on Controls in Garage (1 point) Y M V

	All of the requirements in ASHRAE 62.1-2010 for garage ventilation have been met.
	The garage has sufficient exhaust to create negative pressure with respect to adjacent spaces with the doors to the garage closed.
	Self-closing doors have been installed. Deck-to-deck partitions or a hard lid ceiling have been installed.
	The exhaust fan either runs continuously or is on a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm.

OR

Option 2. Detached Garage or No Garage or Carport (1 point) Y 1 M V

True	No garage has been constructed.
	A detached garage has been constructed

EQ Credit Low-Emitting Products

Up to 3 points | **Preliminary** Y 2.5 M 0 | **Verified** 0

Select all that apply. At least 90% of a component must meet the requirement:

True	Site-applied interior paints and coatings have been tested and meet the requirements of CA Section 01350. (0.5 point)
	Flooring has been tested and meets the requirements of CA Section 01350. (0.5 point)
True	Insulation has been tested and meets the requirements of CA Section 01350. (0.5 point)
True	Site-applied adhesives and sealants have been tested and meet the requirements of CA Section 01350. (0.5 point)
True	Composite wood products have been tested and meet the California Air Resources Board requirements for ultra-low-emitting formaldehyde (ULEF) resins or no-added formaldehyde based resins. (1 point)

EQ Credit No Environmental Tobacco Smoke

1 point | **Preliminary** Y 1 M 0 | **Verified** 0

True	Smoking is prohibited throughout the building, including within living units.
True	The prohibition is communicated to tenants through building rental or lease agreements or in condo or co-op association covenants. Restrictions and provisions for enforcement are also included.

EQ Credit Enhanced Garage Pollutant Protection

Responsible Party

Option 1. Exhaust Fan on Controls in Garage (1 point)

Option 2. Detached Garage or No Garage or Carport (1 point)

Detached garage or on-top?

EQ Credit Low-Emitting Products

Responsible Party

NEED SUBMITTALS
NEED SUBMITTALS
NEED SUBMITTALS

EQ Credit No Environmental Tobacco Smoke

Responsible Party

Innovation

Preliminary Y **4** Maybe **1** **Verified** **0**

IN Prerequisite Preliminary Rating

Required **Required** **Verified** N

True — Preliminary rating and meeting are complete.

IN Credit Innovation

To achieve all five innovation points, a project team must achieve at least one pilot credit, at least one innovation credit and no more than two exemplary performance credits.

Up to 5 points **Preliminary** Y 3 M 1 **Verified** 0

Option 1. Innovation (1 point) Y M V

Describe the intent of the proposed innovation credit.

AND/OR

Option 2. Pilot (1 point) Y 1 M V

Identifying w/ team — Pilot credit name

AND/OR

Option 3. Additional Strategies (0.5-3 points) Y 2 M 1 V

Exemplary Performance: 1-2 points

Exemplary Performance	Strategy
ALL IP Credits	Credit name
Exemplary Performance	Strategy
LT - Community Resources (26)	Credit name
	Strategy
	Credit name
	Strategy
	Credit name
	Strategy
	Credit name
	Strategy
	Credit name

IN Credit LEED Accredited Professional

1 point **Preliminary** Y 1 M 0 **Verified** 0

SWA — Name of credential holder

Regional Priority

Preliminary Y **3** Maybe **1** **Verified** **0**

RP Credit Regional Priority

Up to 4 points

Preliminary Y 3 M 1 **Verified** 0

Regional priority credits may be found on www.usgbc.org/rpc.

Regional Priority Credit Name	Required Threshold
LT	
EA	
SS	

Net Zero Narrative

In accordance with Paragraph (c), Section 22.25.1 of the Zoning Ordinance:
The project team is evaluating building envelope performance, including roof, foundation, walls and window assemblies, and window-to-wall ratio to reduce operational carbon.
During schematic design and design development phases, the project team has implemented Passive House Planning Package (PHPP) and ASHRAE simple box modeling to influence design decisions based upon first cost and operational cost. Site Energy Use Intensity (EUI), Source EUI and total greenhouse gas emissions reduction goals are integral to the envelope and equipment decision making process.
Utilizing an existing building site for the new grad dorm means limitations for orientation and massing. However, the project team is dedicated to a study of high-performance envelope and mechanical systems and the potential for on-site and off-site renewable energy systems to reduce the building's operational carbon.
While net zero fossil fuel construction is the ultimate objective, the project team is also aware of the importance of reducing the embodied carbon in construction materials and remains dedicated to that analysis.

Project Name: MIT West Campus Graduate Student Dormitory
Project Address: 269 -301 Vassar Street
Submitted By: Melissa Stopa, MIT
Date of Submission: October 30, 2020

Development Characteristics

Lot Area (sq. ft.):	77,101
Existing Land Use(s) and Gross Floor Area (sq. ft.) by Use:	Police Station (14,000 gsf) and surface parking lot
Proposed Land Use(s) and Gross Floor Area (sq. ft.), by Use:	Dormitory (326,091 gfa)
Proposed Building Height(s) (ft. and stories):	105' / 10 Stories
Proposed Dwelling Units:	350
Proposed Parking Spaces:	0
Proposed Bicycle Parking Spaces (Long-Term and Short-Term):	344 long-term & 35 short-term

Green Building Rating System

LEED – Leadership in Energy & Environmental Design (U.S. Green Building Council)			
Rating System & Version:	LEED v4 BD+C Multifamily Midrise	Seeking Certification?	YES
Rating Level:	Gold	# of points	74.5 preliminary & 12 possible

Proposed Project Design

Building Envelope

Envelope Component	Thermal Value	Description
Roofs:	R-38 hr·ft2·°F/Btu	6 ½" (on average) tapered polyisocyanurate
Above-Grade Walls:	R-18 hr·ft2·°F/Btu	5" of exterior mineral wool insulation and thermally broken brick ties. Thermally broken shelf angles or standoff shelf angles. At the thin brick locations, 5" of exterior mineral wool insulation and precast concrete panels
Cantilevered Floors / Soffit:	R-30 hr·ft2·°F/Btu	10" of mineral wool insulation
Ground Slab:	R10	2" XPS continuous exterior perimeter insulation extending 48" below grade.
Punched Window U-value:	≤ 0.39 Btu/hr·ft2·°F	Double Pane
Punched Window SHGC ("g-factor"):	0.40	Argon filled. While the project budget cannot support triple-glazed windows at this time, the team will conduct further analysis of available window products to improve the u-value.
Curtain Wall Vision U-value:	≤ 0.42 Btu/hr·ft2·°F	Double Pane
Curtain Wall Spandrel U-value:	0.17 Btu/hr·ft2·°F	
Curtain wall vision SHGC ("g-factor"):	0.40	Argon filled
Exterior Opaque Doors:	R-2.5 hr·ft2·°F/Btu	
Window to Wall Ratio:	26%	

Envelope Performance

	Proposed		Baseline	
	Area (sf)	*U-Value*	*Area (sf)*	*U-Value*
Window	36,530	0.38	36,530	0.42
Wall	103,970	0.055	103,970	0.055
Roof	48,500	0.026	48,500	0.032

Envelope Commissioning Process

LEED v4 Multifamily Midrise mandates quality installation and third-party verification of thermal insulation by qualified energy raters. Thermal bridging will be minimized resulting in optimized overall building enclosure energy efficiency. Glazing will consist of high performance thermally broken windows, frames and curtainwall. The building will undergo building enclosure commissioning in addition to the energy rater insulation inspections. Building Envelope Commissioning (BECx) will be performed per the LEED BD+C v4 reference guide. BECx consists of the validation that the design and performance of materials, components, assemblies and systems achieve the objectives and requirements of the owner. The process comprises modeling, observing, testing, documenting, and verifying materials, components, assemblies, and systems to validate that both their use and installation meet the owner's requirements. It uses performance-oriented practices and procedures to verify that the project is achieving the owner's project requirements. As required by LEED, the BECx process will be performed in general accordance with NIBS Guideline 3-2012.

The commissioning scope of work includes the following:

Criteria for Commissioning	Design	Construction	Pre-Occupancy
Develop air-barrier set:	✓		
Develop Trades Training & Mock-Up unit testing:	✓		
Develop a list of Quality Assurance (QA) responsible parties:	✓		
Incorporate Inspection Schedule and QA Responsibilities into Construction Schedule:		✓	
Inspections of Site, Foundation, Structure, Air Sealing, Insulation, and Mechanicals during construction for LEED requirements:		✓	
Conduct Intermediate (Mock-Up area) Performance Testing:		✓	
Conduct final air infiltration, ventilation, duct & pressure differential testing:			✓
Verify finishes, appliances, mechanicals, lighting:			✓
Submit final Energy Model & Ventilation Calculations and LEED certification Documentation:			✓

Building Mechanical Systems

The current design for heating and cooling is through a Water Source Heat Pump (WSHP) System. However, the team is evaluating a fossil fuel free heating and cooling through Variable Refrigerant Flow (VRF) systems using a Passive House specific methodology. The required space conditioning thresholds and energy demands for each scenario analyzed are displayed in the following tables. As shown below:

Criteria for Design WSHP	Current Design	Fossil Fuel Free Target
Space Heating Demand (kBTU/ft^2·yr):	11.61	≤ 4.75
Space Cooling Demand (kBTU/ft^2·yr):	3.86	≤ 5.39
Source Primary Energy (kBTU/ft^2·yr):	56.4	≤ 46.8
Criteria for Design VRF	**Current Design**	**Fossil Fuel Free Target**
Space Heating Demand (kBTU/ft^2·yr):	11.61	≤ 4.75
Space Cooling Demand (kBTU/ft^2·yr):	3.56	≤ 5.39
Source Primary Energy (kBTU/ft^2·yr):	52.3	≤ 46.8

**All noted primary energy and space heating & cooling demands and thresholds are calculated in reference to the project's "treated floor area", not the project's gross square footage.*

Systems Description

Space Heating:	High efficiency WSHP –with NG condensing boilers, or VRF systems
Space Cooling:	High efficiency WSHP with open cell cooling towers and heat exchangers or VRF systems
Heat Rejection:	In WSHP concept – open circuit cooling towers, in VRF option – air cooled condensers
Pumps & Auxiliary:	Condenser water pumps and heat exchangers in WSHP scheme
Ventilation:	Central Energy Recovery Ventilation with MERV 13 minimum filtration
Domestic Hot Water:	w/ VRF Heating & Cooling, Heat Pump Water Heaters (being evaluated) or central NG high EF boilers
Interior Lighting:	LED with automated controls
Exterior Lighting:	LED with automated controls
Appliances:	Central laundry, high-efficiency washers/dryers, dorm apartments w/ ES appliances & electric cooking

Airtight Building Envelope

To ensure a high performing envelope, the whole building should target maximum infiltration rate of 1.5 ACH50 which is significantly tighter than the code threshold and requires diligent taping and sealing of all joints, penetrations, and transitions.

Thermal Bridge Free Design and Construction

Thermal bridge-free construction shall be addressed in the design phase and detailed in the project drawings; the design and construction drawing set shall be reviewed for thermal bridges and improved with iterative thermal modeling.

Appliances

All appliances shall be ENERGY STAR® certified and all project specifications for exact appliance model numbers must be provided to SWA. Any deviation from the appliance specifications must be approved by the architect. All cooking ranges and ovens in the apartments shall be electric.

Lighting & Controls

Common area lighting shall be LED, wherever possible. All lighting fixtures should target 80 lumens per watt or greater. The common area lighting should not exceed 99,860 kWh/year with the use of controls.
The following installed lighting power densities (LPD) in W/ft2 should be pursued as a maximum, prior to the integration of area lighting controls. All non-apartment common spaces shall have either bi-level lighting, occupancy or vacancy sensors.

Room Type:	W/ft^2	Hours/Day
Corridors	0.5	24
Stairs	0.40	24
Back of House	0.50	4
All other Common Spaces	0.70	10

DHW System

Central domestic hot water (DHW) can be provided with natural gas condensing boiler(s). The condensing boiler should have an energy efficiency of 95% or greater. Central DHW re-circulation lines should be insulated to code minimum levels of insulation, and pipe lengths should be kept to a minimum via optimized layouts of plumbing fixtures and recirculation loops.

Building Mechanical Systems Commissioning

Based on LEED BD+C v4 requirements, Fundamental Commissioning and Enhanced Commissioning (including Building Envelope Commissioning) will be performed for the project. Commissioning is a process that can span from the inception of a new construction project and continues through the post-occupancy phase. Commissioning is the process of verifying through demonstration, visual inspections, testing, and documentation that the Building Envelope and all the building's Mechanical, Electrical, Plumbing and Fire Alarm systems are performing interactively according to the design intent, are operating efficiently and meet the owner's expectations. The commissioning process typically includes design and specification reviews; pre-functional testing (with Factory Acceptance Testing depending on component); mock-up and prototype testing; and final assembly operational testing. To satisfy the associated LEED credits, Whole Building Energy Modeling and plan and specification reviews will be completed during the Design Development Phase. Review of Construction Documents for compliance with LEED criteria will occur at 50% and 90% CDs.

LEED v4 Fundamental Cx	LEED v4 Enhanced Cx
Develop Owner's Project Requirements	Conduct Commissioning Design Review
Incorporate Cx Requirements into Construction Documents	Review Contractor Submittals
Develop a Commissioning Plan	Conduct Building Envelope Commissioning
Conduct Functional Performance Testing	Develop a Systems Manual
Develop a Summary Commissioning Report	Verify that Training Requirements have been met
Compile the Operations and Maintenance Plan	Visit site 8-10 months into the Warranty Period

Anticipated Energy Loads and Greenhouse Gas Emissions

Using EQuest software, the baseline for this project is the ASHRAE 90.1 Energy Standard for Buildings, Except Low-Rise Residential Buildings, 2013 Edition. The building will also comply with the International Energy Code 2018 with amendments based on Massachusetts Stretch Energy Code. The City of Cambridge has adopted the MA Energy Stretch Code (Appendix AA to 780 CMR: State Board of Building Regulations and Standards) requiring new buildings over 100,000 SF to demonstrate a site or source energy reduction of a minimum 10% in comparison to ASHRAE 90.1 2013. Preliminary modeling of the MIT West Campus Graduate Dorm is predicting 30.8% site energy reduction in comparison to ASHRAE 90.1 2013.

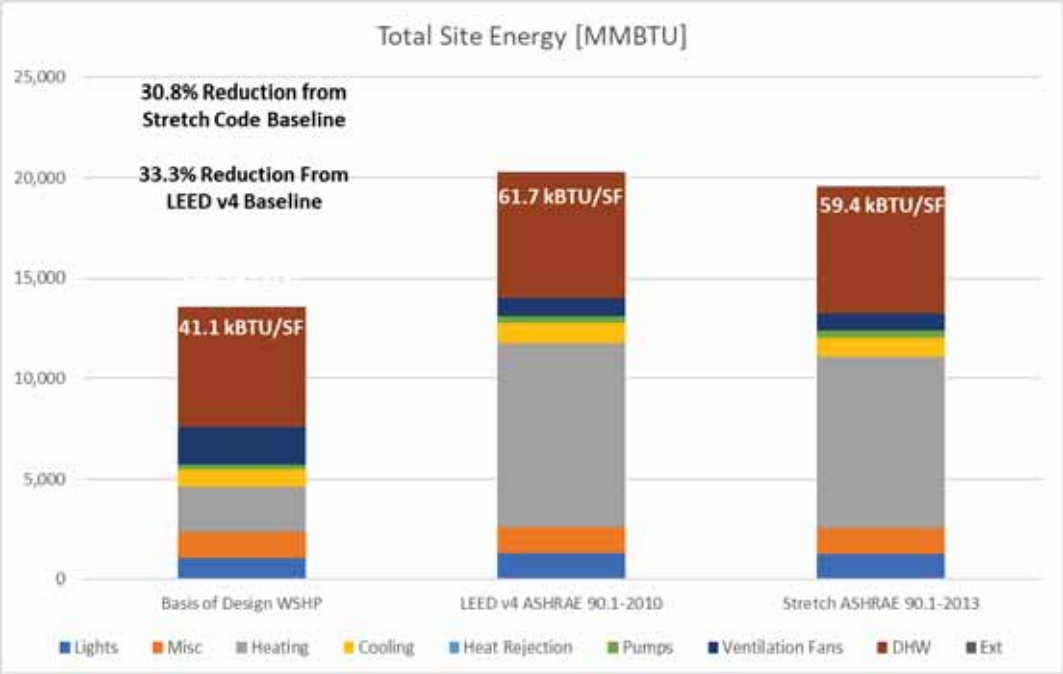
Annual Projected Energy Consumption and GHG Emissions

	Baseline Building per ASHRAE 90.1-2013		Proposed Building		Net Zero Scenario Transition	
	kWh or Therms	*% of Total*	*kWh or Therms*	*% of Total*	*kWh or Therms*	*% of Total*
Space Heating	84,587 therms	41%	94,595 kWh, 19,022 therms	16.5%	372,000 kWh	14%
Space Cooling	277,097 kWh	5%	255,016 kWh	6.5%	255,016 kWh	10%
Heat Rejection	2,042 kWh	<1%	1,799 kWh	<1%	1,799 kWh	<1%
Pumps & Aux.	103,713 kWh	2%	78,686 kWh	2%	78,686 kWh	3%
Ventilation	256,086 kWh	4.5%	538,979 kWh	14%	538,979 kWh	20%
Domestic Hot Water	62,717 therms	32%	59,271 therms	41%	659,000 kWh	25%
Exterior Lighting	4,500 kWh	<1%	4,500 kWh	<1%	4,500 kWh	<1%
Interior Lighting	371,506 kWh	6.5%	371,506 kWh	8%	371,506 kWh	14%
Misc. Equipment	383,510 kWh	7%	383,510 kWh	10%	383,510 kWh	14%
	$US, kBTU, kBTU/SF		*$US, kBTU, kBTU/SF*	*$ Reduction from Baseline*	*$US, kBTU, kBTU/SF*	*$ Reduction from Baseline*
Total Energy Cost	$407,617		$387,838	7.4%	$466,374	+14.4%
Total Energy Use	19,526 MMBTU		13,511 MMBTU	30.8%	9,093 MMBTU	53.4%
Site EUI	59.4 kbtu/SF		41.1 kbtu/SF	30.8%	27.7 kbtu/SF	53.4%
Source EUI	92.7 kbtu/SF		78.7 kbtu/SF	15.1%	91.4 kbtu/SF	1.4%
	kWh or Therms	*% Total Energy*	*kWh or Therms*	*% Total Energy*	*kWh or Therms*	*% Total Energy*
On-site Renewable Energy Generation	-		-		208,703 kWh per Case 2	7.8%
Off-site Renewable Energy Generation	-		-		-	
	Metric Tons, CO2, [SF]		*Tons, CO2, [SF]*	*% Reduction from Baseline*	*Tons, CO2, [SF]*	*% Reduction from Baseline*
GHG Emissions	1,215 metric tons		1,015 metric tons	16.5%	763 metric tons	37.2%
GHS Emissions/SF	0.0037 metric tons/SF		0.0031 metric tons/SF	16.5%	0.0023 metric tons/SF	37.2%

Energy Use Intensity

Site Energy Use Intensity (EUI), Source EUI and total greenhouse gas emissions reduction goals are integral to the envelope and equipment decision making process. Using the ASHRAE 90.1 modeling for this preliminary analysis, the building has a projected site EUI of 41 kBtu/sf.yr as designed with water sourced heat pumps. This as-designed reference meets Mass Stretch Code and LEED v4 Gold levels of efficiency. To move the building toward zero operational carbon, triple pane windows were modeled and resulted in a projected site EUI of 34 kBtu/sf.yr. The project team has made best-guess assumptions for the following loads however these will ultimately be dependent upon occupant behavior and final structural design considerations:

- Domestic hot water consumption
- Dwelling unit miscellaneous plug loads



Integrative Design Process

The project team includes sustainability consultants who have been integral to the process from the schematic design phase. The initial LEED-focused design charrette took place on August 13, 2020 and the project team has head several break-out meetings to analyze specific strategies on a weekly basis, at minimum. Milestone meetings requiring additional, outside consultants have included: analysis of common versus in-unit laundry; green-roof vs. solar roof spaces; thermal comfort and durability implications from fossil fuel free heating and cooling; implementing new, untested strategies for fossil fuel free domestic hot water.

As part of the integrative design process, the project team has assessed tools to better ensure the health and well-being of the building's residents. In addition to pursuing Energy Star Multifamily New Construction (ESMFNC) Certification, which addresses building-science best practices affecting indoor air quality, the project team is assessing Indoor airPLUS Certification. The EPA's Indoor airPLUS (IAP) program is currently available to low-rise residential buildings. However, version 2 will allow residential buildings of all heights to receive an IAP label when it rolls in 2021. IAP builds upon the ESMFNC program with requirements in the following categories:

- Moisture Control
- Radon Mitigation
- Pest Barriers

- Heating, Cooling and Ventilation Systems
- Low-Emission Materials
- Occupant Education

The International WELL Building Institute's™ WELL Building Standard is focused on improving occupant comfort and driving better choices. Several WELL practices align with the MIT West Campus Graduate Dorm design goals, such as:

- Smoke Free Environment
- Ventilation Effectiveness
- Construction Pollution Management
- Enhanced Air Quality
- Pollution Infiltration Management
- Fundamental Water Quality
- Drinking Water Promotion
- Moisture Management
- Light Exposure
- Glare Control
- Occupant Control of Lighting Environments
- Site Planning and Selection
- Physical Activity Opportunities
- Enhanced Thermal Performance
- Sound Masking

While WELL Core and Multifamily Residential Certification is available for this building demographic, the air quality testing requirements are extremely challenging for dormitory residences. Nourishment and Movement categories are also a challenge given buildable lot restrictions and in-unit kitchens.

The Fitwel Multifamily Residential Scorecard also uses a verification approach to address health as an integrated system. Fitwel principles which align with the MIT West Campus Graduate Dorm design goals include:

- Walkability
- Bicycle Access
- Proximity to Transit
- Tobacco Smoke-Free
- Active Pedestrian Areas
- Indoor Air Quality
- Integrated Pest Management
- Acoustic Comfort
- Operable Windows
- Views from Common Spaces
- Thermal Control
- Stakeholder Collaboration Process
- Water Bottle Refilling
- Water Quality
- Emergency Preparedness Plan

The project team will continue to evaluate the practicality of implementing Fitwel Certification given project restraints including lack of common food and snack areas, lot restrictions and building layout.

Renewable Energy

A Solar PV Feasibility Study was completed to determine the racking system selections and estimated productions of a potential rooftop solar array. The current design consists of multiple roof levels and large mechanical systems. As such, solar array options are limited due to available roof space and shading. Two arrays were created in AutoCAD using preliminary files, assessing potential solar PV system sizes while accounting for shading and access pathways required for fire department and equipment maintenance. The basis of design of the PV arrays is SunPower's 360W module. The two arrays most viable at the project site are a trellis canopy and combination ballasted and tilt-up kit system.

Raised PV systems like a trellis or canopy, offer the potential to offset greater levels of electrical consumption. However, trellis options require penetrations into the roof – which could result in significant incurred costs to the project for structural and drainage evaluations. Installing a trellis canopy system would incur significant installation costs and is not deemed feasible at this point.

Case 1: Solar PV system on a trellis canopy. This more significant mounting system would allow the modules to be installed higher, spanning above the main rooftop energy recovery units, generators, plumbing penetrations, and circumvent loss of production due to shading from the bulkheads and upper roofs. This system would be significantly heavier and costlier than a low-profile rack but allows for a much larger system size and deep offsets of annual electrical consumption. One of the main obstacles to installing a system like this is often the zoning height limit, since the entire array should be mounted with a minimum clearance of 9' underneath to allow for fire access pathways. It is SWA's understanding that encroachment above the maximum allowable height is allowed for a solar PV system in this jurisdiction. Cooling towers and ERU's also require clearance directly above to allow exhaust to vent upwards. This array is a viable for the MIT Grad Housing project as it is raised to allow for access to equipment beneath.

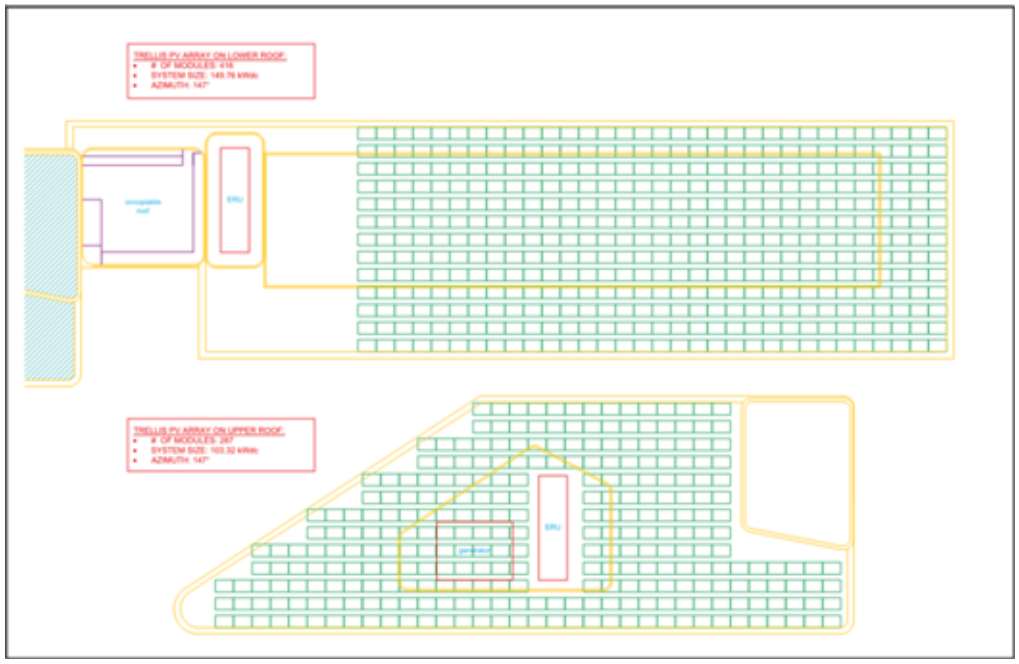
Trellis systems are estimated as follows:
Building A: 253.08 kW w/ annual production of 322,589 kWh
Building B: 192.24 kW w/ annual production of 245,039 kWh

Case 2: Combination Ballasted PV array and tilt-up kit at 10 degrees. This combination system maximizes production with ballasted arrays on the lower roofs paired with a low-profile tilt-up racking product, such as the Iron Ridge Tilt Mount or the ProSolar SolarWedge, on the upper roof and bulkhead.

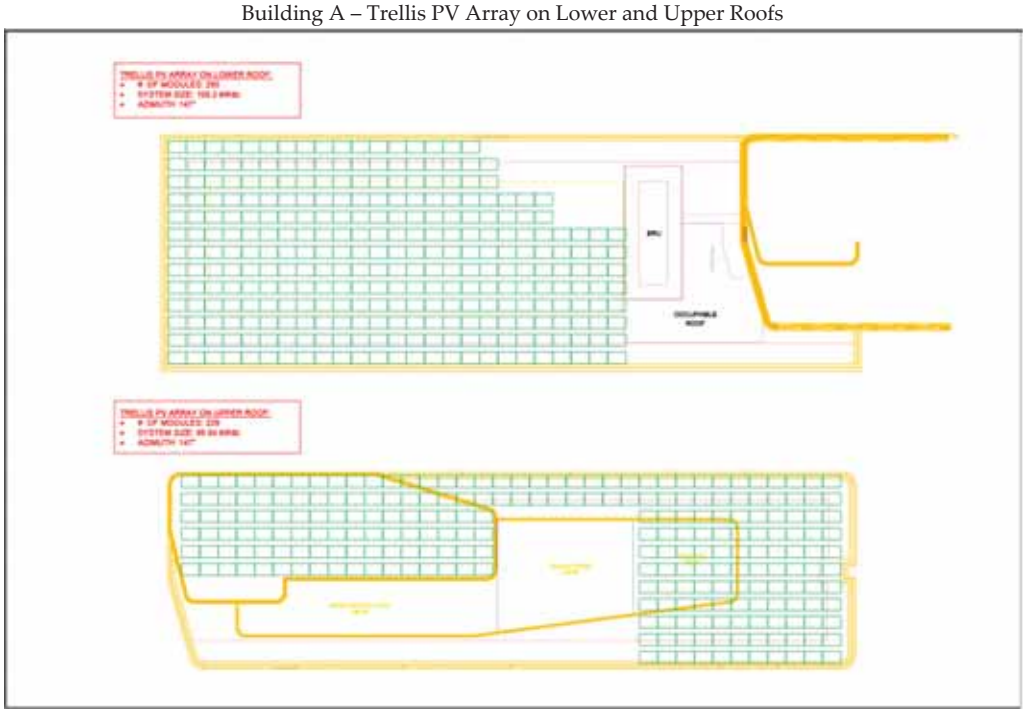
Ballasted systems are fairly light (approximately 3-6 psf), can be installed without penetrations into the roof, and are inexpensive in comparison to larger racks. However, their low profile makes them more susceptible to shading. Just like the ballasted option, tilt-up systems are simple to install and inexpensive in comparison to larger racks. Tilt-up systems are typically lighter than regular ballasted systems and are more well suited to higher elevations. However, the primary method for resisting wind uplift is direct connections to the roof structure as opposed to ballast.

Ballasted and Tilt-Up Kit systems are estimated as follows:
Building A: 107.28 kW w/ annual production of 129,570 kWh
Building B: 65.52 kW w/ annual production of 79,133 kWh

Trellis PV Array – Building A and Building B

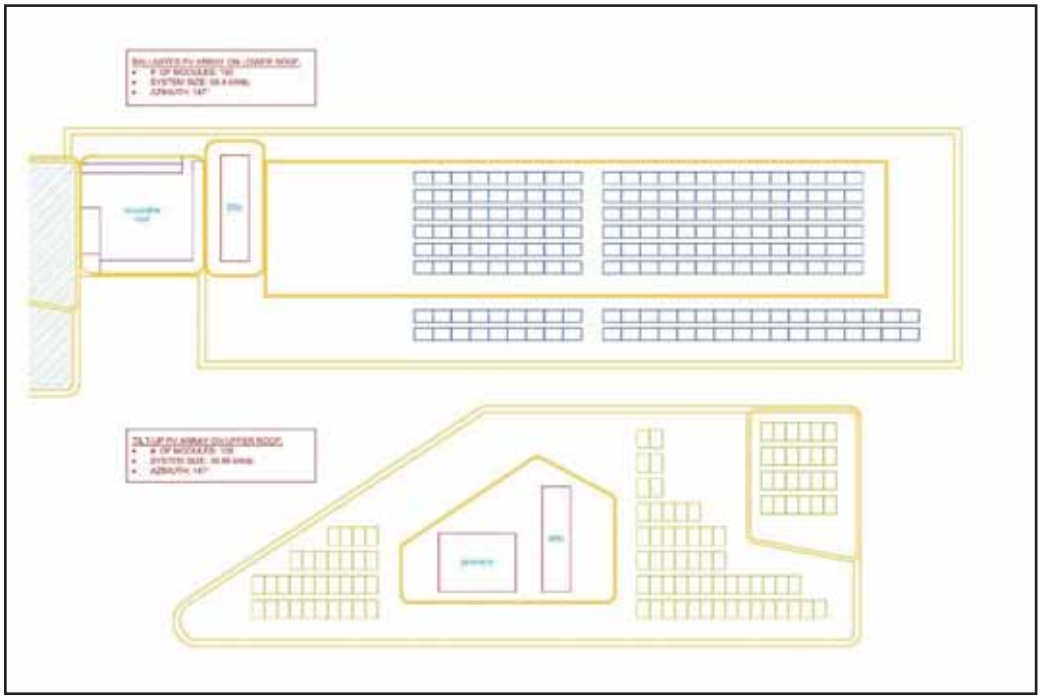


Building A – Trellis PV Array on Lower and Upper Roofs

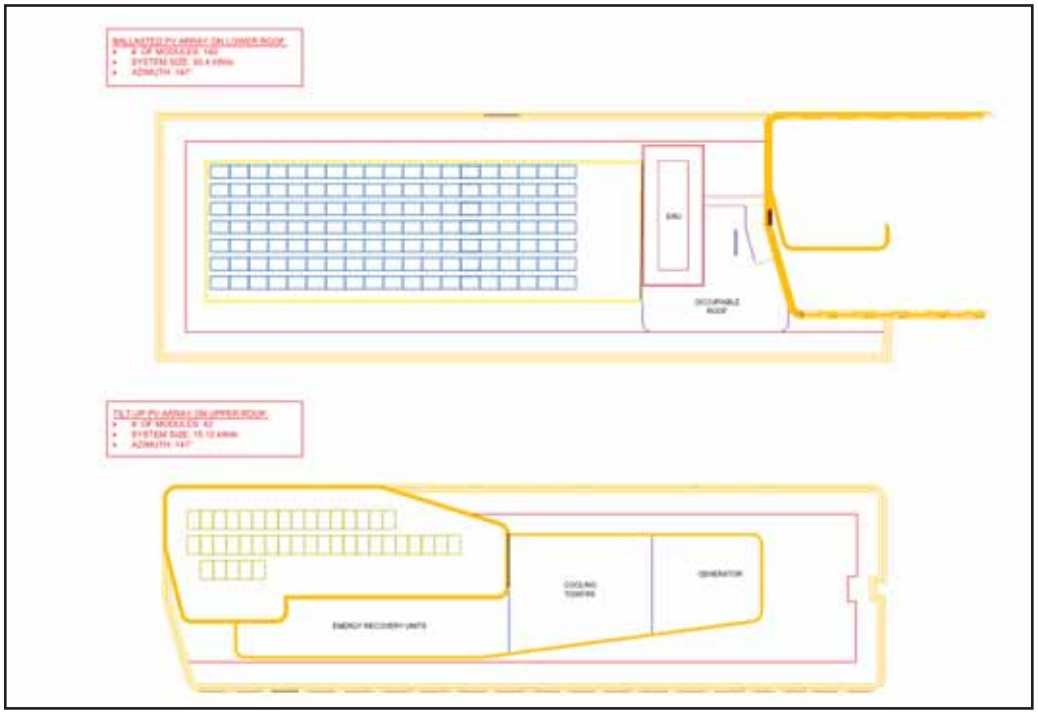


Building B – Trellis PV Array on Lower and Upper Roofs

Ballasted & Tilt-up PV Array – Building A and Building B



Building A – Ballasted and Tilt Up Kit Array on Lower and Upper Roofs



Building B – Ballasted and Tilt Up Kit Array on Lower and Upper Roofs

Net Zero Scenario Transition

While some building components and mechanical technologies may not currently be feasible, the following opportunities have been identified to advance the project toward future net zero green-house gas emissions:

	Net Zero Condition	Transition Process:
Building Envelope:	Triple Pane Windows	Replace window assemblies for all Insulated Glass Units (IGU's) with triple pane glazing in high-R frames (i.e. fiberglass). This transition will require a phased approach at vacancy and full replacement of the window units.
HVAC Systems:	WSHP to Electrified Hydronic Heat Pump System	Convert the WSHP system to an electrified hydronic system taking advantage of a hydronic loop for a WSHP lasting 50 -80 years. Provide structural support and space for storage tanks in or near the boiler room and roof space for heat pumps located to minimize piping. Allow chases from the boiler to the outdoor heat pump locations for easy installation of a riser pair with insulation. Provide adequate electric capacity for heat pumps and leave spare breakers in the boiler room for additional pumps and controls for the heat pump system.
Domestic Hot Water:	Heat Pump Water Heaters	Replace central NG fired DHW with a central Heat Pump Water Heater System. Provide structural support and roof space for rooftop HPWH units. Allow plumbing chases from the roof top to the mechanical room and provide adequate room and electric capacity for additional pumps.
Renewable Energy Systems:	Site PV	Install the ballasted system from the above solar study. During the design and as practical, the mechanical roof mounted equipment will be mounted on the building to accommodate future renewables and electrical conduits will be installed between the roof and central electrical switchgear rooms. Space will be identified during the design to show future location of inverters, storage, and related equipment.
Other Strategies:	Embodied Carbon	Kieran Timberlake conducts whole-building LCA on all projects using Tally®, a software developed by the firm to enable real-time embodied carbon and environmental impact data to inform design decisions. Through targeted LCA studies and review of product EPDs, this approach has reduced embodied carbon and other environmental impacts buildings and reduced or eliminated products containing chemicals from Living-Future's red-list. A whole-building LCA is underway for the MIT West Campus Graduate Student Dormitory and to date, embodied carbon analysis is being conducted on specific building assemblies to inform design.

Local Utility and Agency Support

The Mass Save® program has the goal of helping residents and businesses across Massachusetts save money and energy, leading the state to a clean and energy-efficient future. The program is composed of local electric and natural gas utilities and energy efficiency service providers who are taking strides in energy efficiency. These sponsors include Berkshire Gas, Blackstone Gas Company, Cape Light Compact, Columbia Gas, Eversource, Liberty Utilities, National Grid, and Unitil. Residential and mixed-use new construction projects or greater than-50% gut rehab projects—all four stories or more—are eligible to participate if located within a Sponsor's service territory. Incentives and rebates are available for both residential in-unit and common area energy efficiency measures. Incentives are awarded based on annual site energy saved. Incentives are determined by the amount of electric savings, natural gas fuel savings, and overall performance compared to the program-provided energy

model. This model compares efficiencies of windows, insulation, mechanical equipment, lighting, and appliances.
The project team recently reached out to Mass Save, during the schematic development phase, to receive information regarding technical support and potential incentives. The project team is waiting to be assigned a dedicated Mass Save Account Manager for guidance throughout the process. Account Managers provide ongoing technical support throughout construction including optional design charrettes in order to increase efficiency beyond the Baseline. The project team is prepared to provide detailed project information outlining all qualifying energy efficiency equipment and measures being installed as well as plans, specifications, and approved submittals to help facilitate this process.

As a member of the Carbon Leadership Forum (CLF) Boston, Karla Butterfield, the project's LEED Green Rater, has engaged other members of the CLF Boston in a dialogue about embodied carbon for this project. Born from the Embodied Carbon in Buildings Workshop (MIT, May 31, 2019) the CLF Boston is a valuable resource for assessing building materials including, but not limited to, concrete, steel, insulation, carpeting and furnishings.

The project team intends to leverage both private and public organizations to help ensure the thermal envelope, mechanical equipment, appliances and fixtures are assessed for water, energy and material efficiency.

Green Building Project Checklist

Green Building
Project Location: Cambridge, MA

Applicant

Name: MIT West Campus Graduate Student Dormitory
Address: 269-301 Vassar St., Cambridge MA 02139
Contact Information
Email Address: kbutterfield@swinter.com
Telephone #: 203-857-0200 x3030

Project Information (select all that apply):

- ☑ New Construction – GFA: 326,091 sf
- ☐ Addition – GFA of Addition: _____
- ☐ Rehabilitation of Existing Building – GFA of Rehabilitated Area: _____
  - ☐ Existing Use(s) of Rehabilitated Area: _____
  - ☐ Proposed Use(s) of Rehabilitated Area: _____
- ☐ Requires Planning Board Special Permit approval
- ☐ Subject to Section 19.50 Building and Site Plan Requirements
- ☐ Site was previously subject to Green Building Requirements

Green Building Rating Program/System:

- ☑ Leadership in Energy and Environmental Design (LEED) – Version: 4
  - ☐ Building Design + Construction (BD+C) – Subcategory: _____
  - ☐ Residential BD+C – Subcategory: _____
  - ☐ Interior Design + Construction (ID+C) – Subcategory: _____
  - ☑ Other: Homes - Multifamily Midrise
- ☐ Passive House – Version: _____
  - ☐ PHIUS+
  - ☐ Passivhaus Institut (PHI)
  - ☐ Other: _____
- ☐ Enterprise Green Communities – Version: _____

Project Phase

☐ **SPECIAL PERMIT**

Before applying for a building permit, submit this documentation to CDD for review and approval.

Required Submissions

All rating programs:

- ☑ Rating system checklist
- ☑ Rating system narrative
- ☑ Net zero narrative (see example template for guidance)
- ☑ Affidavit signed by Green Building Professional with attached credentials – use City form provided (Special Permit)

Project Phase

☐ **BUILDING PERMIT**

Before applying for a building permit, submit this documentation to CDD for review and approval.

Required Submissions

All rating programs:

- ☐ Rating system checklist – updated from any prior version
- ☐ Rating system narrative – updated from any prior version with additional supporting information from construction documents
- ☐ Net zero narrative – updated from any prior version (see example template for guidance)
- ☐ Energy Simulation Tool results demonstrating compliance with selected rating system. *[Note: For Passive House rating program, must use WUFI Passive, Passive House Planning Package (PHPP), or comparable software tool authorized by Passive House.]*
- ☐ Credentials of Green Commissioning Authority (or copy of contract between developer and Commissioning Authority if an independent consultant or subcontractor), including documentation of Green Commissioning process experience on at least two building projects with a scope of work similar to the proposed project extending from early design phase through at least ten (10) months of occupancy
- ☐ Affidavit signed by Green Building Professional with attached credentials – use City form provided (Building Permit)

Passive House rating program only:

- ☐ Letter of intent from Passive House rater/verifier hired for on-site verification, with credentials of rater/verifier
- ☐ Credentials of Certified Passive House Consultant who has provided design, planning, or consulting services (if different from the Green Building Professional for the project)
- ☐ Construction drawings and specifications

Project Phase

☐ **CERTIFICATE OF OCCUPANCY**

Before applying for a certificate of occupancy, submit this documentation to CDD for review and approval.

Required Submissions

All rating programs:

- ☐ Rating system checklist – updated from any prior version
- ☐ Rating system narrative – updated from any prior version with additional supporting information from as-built conditions
- ☐ Net zero narrative – updated from any prior version (see example template for guidance)
- ☐ Energy Simulation Tool results demonstrating compliance with selected rating system, updated to as-built conditions. *[Note: For Passive House rating program, must use WUFI Passive, Passive House Planning Package (PHPP), or comparable software tool authorized by Passive House.]*
- ☐ Affidavit with schedule of commissioning requirements signed by Green Commissioning Authority, with attached credentials – use City form provided (Certificate of Occupancy)
- ☐ Affidavit signed by Green Building Professional with attached credentials – use City form provided (Certificate of Occupancy)

Passive House rating program only:

- ☐ Pressure Test Verification
- ☐ Ventilation Commissioning
- ☐ Quality Assurance Workbook
- ☐ Final testing and verification report from rater/verifier

Affidavit Form for Green Building Professional
Special Permit

Green Building
Project Location: 269-301 Vassar Street, Cambridge, MA

Green Building Professional

Name: Paula M. Zimin

☒ Architect

☐ Engineer

Mass. License Number: LEED AP BD+C #41637 / NY Registered Architect License #041233

Company: Steven Winter Associates, Inc.

Address: 61 Washington Street, Norwalk, CT 06854

Contact Information

Email Address: pzimin@swinter.com

Telephone Number: 212-564-5800 x1170

I, Paula M. Zimin, as the Green Building Professional for this Green Building Project, have reviewed all relevant documents for this project and confirm to the best of my knowledge that those documents indicate that the project is being designed to achieve the requirements of Section 22.24 under Article 22.20 of the Cambridge Zoning Ordinance.

Paula M Zimin — November 20, 2020

(Signature) *(Date)*

Attach either:

☒ Credential from the applicable Green Building Rating Program indicating advanced knowledge and experience in environmentally sustainable development in general as well as the applicable Green Building Rating System for this Green Building Project.

☐ If the Green Building Rating Program does not offer such a credential, evidence of experience as a project architect or engineer, or as a consultant providing third-party review, on at least three (3) projects that have been certified using the applicable Green Building Rating Program.

LEED AP BD+C

GREEN BUSINESS CERTIFICATION INC. CERTIFIES THAT

Paula Zimin

HAS ATTAINED THE DESIGNATION OF

LEED AP® Building Design + Construction

by demonstrating the knowledge and understanding of green building practices and principles needed to support the use of the LEED green building program.

41637-AP-BD+C

CREDENTIAL ID

09 NOV 2009

ISSUED

07 NOV 2021

VALID THROUGH

MAHESH RAMANUJAN
PRESIDENT & CEO, U.S. GREEN BUILDING COUNCIL
PRESIDENT & CEO, GREEN BUSINESS CERTIFICATION INC.

6.ii GREEN BUILDING REPORT CERTIFICATION

Green Building Requirements

269-301 Vassar Street Green Building Report – Comments on Special Permit Stage

Status: The Community Development Department (CDD) received the final update of the Green Building Report (GBR) for the special permit stage of 269-301 Vassar Street**,** "Project"**,** per Section 22.25.1 of the Zoning Ordinance, on 11/25/2020. The Project, also referred to as the MIT West Campus Graduate Student Dorm. It includes the construction of two buildings for the MIT graduate students and consists of approximately 327,000 SF of gross floor area (GFA) for 690 on-campus beds. CDD staff have reviewed the GBR and offer the following Determination, Summary of Compliance and Advisory Comments.

CDD Determination: The documentation provided by the Applicant is adequate and demonstrates compliance with the Green Building Requirements of Section 22.24 for the Special Permit stage. A revised submission with additional documentation will be required at the Building Permit and Certificate of Occupancy stages.

LEED Project Summary: This project is subject to the City's Green Building Requirements (Section 22.20, Zoning Ordinance). The Project is currently meeting the minimum requirement with 74.5 credit points, targeting LEED Gold, under LEED v4 Residential: Multifamily Midrise. Additional 12 points have been designated as possible points. The Green Building Report for this project is anticipated to be complete and meets the Zoning requirements of Article 22-Sustainable Design and Development.

Rating System: LEED v4 Residential – Multifamily Homes Midrise

Summary of Compliance and Comments:

Green Building Professional Affidavit Certification

- Paula Zimin of Steven Winter Associates, Inc. has been identified as the Green Building Professional for the project. The affidavit states that this professional has reviewed all relevant documents for this project and confirm to the best of his/her knowledge that those documents indicate that the project is being designed to achieve the requirements of Section 22.24 under Article 22.20 of the Cambridge Zoning Ordinance.
- A copy of the professional's credential from the LEED Green Building Rating Program has been provided.

LEED Rating System Checklist, Rating System Narrative and Net Zero Narrative

The Project is pursuing 74.5 credit points and 12 points have been designated as possible points. The following is LEED credit points summary:

- Integrative Process – 2 points
- Location and Transportation – 15 points
- Sustainable Sites – 5.5 points (*Possible points – 1.5*)
- Water Efficiency – 6 points (*Possible points – 2*)
- Energy and Atmosphere – 23 points (*Possible points – 2*)
- Materials and Resources – 4.5 points (*Possible points – 1.5*)
- Indoor Environmental Quality – 11.5 points (*Possible points – 3*)
- Innovation – 4 points (*Possible points – 1*)
- Regional Priority – 3 points (*Possible points – 1*)

According to LEED, Location and Transportation credit, Compact Development, the MIT West Campus Graduate Student Dorm is considered very high-density development. The project would consist of 690 dormitory/housing units on the site. Other highlights from the LEED Rating Narrative include:

- The project is pursuing Integrative Process credit points and a point for exemplary performance.
- The project includes commissioning process for various building systems and assemblies as well as building's thermal envelope to meet the requirements of the prerequisite for Minimum Energy Performance.
- The project is targeting energy reduction of about 30.8 % better than ASHRAE 90.1-2010 (This is in compliance with the MA Energy and Stretch Code and projected to be 15% better based on the ASHRAE 90.1-2013). The project's relatively smaller sized units would further advance the energy efficiency with reduced per capita energy consumption.
- The project is pursuing Innovation credit using Option 3, which includes exemplary performance and pilot strategies.
- Anticipated energy loads, baseline energy simulation tool assumptions, and proposed energy targets as currently modelled in this design phase:
    - Proposed site energy use intensity (EUI) will be 30.8% below baseline (ASHRAE 90.1-2013) with a targeted EUI of approximately 41 kBtu/sf-yr. Proposed source energy use intensity (EUI) will be 15.1% below baseline with a targeted EUI of approximately 78 kBtu/sf-yr.
    - Proposed GHG emissions will be 16.5% reduction from baseline with targeted GHG emission of 1015 metric tons CO2/yr.
- The Net Zero Scenario anticipates site energy use EUI of approximately 27.7 kBtu/sf-yr which is 53.4% below baseline.
- Description of building energy performance integrated into the project's planning, design, and engineering, massing, envelope systems, building mechanical systems, on-site and off-site renewable energy systems, and district-wide energy systems:
    - Airtight building envelope with thermal bridge free design and construction.
    - Low Window to Wall Ratio at 26%.
    - LED lighting with automated controls.
    - Central domestic hot water with natural condensing boiler.
- Description of technical framework for transitioning project to net zero emission in the future, including future net zero emission options for building envelope, HVAC systems, domestic hot water, interior lighting, and on-site and off-site renewable energy sources:
    - Replacement of window units with triple pane windows.
    - Convert water source heat pumps to electrified hydronic system.
    - Replace natural gas domestic hot water system with central heat pump water heater system.
    - Install photovoltaic panels on the solar ready roof.
- Description of programs offered by local utility companies that are being considered to improve building performance:

- MassSave utility incentives.

Advisory Comments by CDD Staff:

Staff urge the design team to keep pursuing additional points especially from impactful categories such as energy and atmosphere, indoor environmental quality and materials and resources. Some of the recommended practices also relevant to this project include the conservation of natural resources and reduction of embodied carbon. Almost 10-15% of construction materials get wasted during construction[1].

Staff recommend the Applicant to do better in the Material Resources, MR Credit, Construction Waste Management relative to the baseline of LEED 4.0 (MFMR). The intent should be to cut construction waste to the maximum extent possible. It is not clear in the MR Credit, Construction Waste Management as to what the % of construction waste diversion sought by the project team. It is assumed that if only one point identified, then the team is seeking only 20% below the LEED baseline.

Staff would also recommend other design strategies that would foster education about sustainable transportation modes including pedestrian, bicycle, and public transit use in the city. With the close proximity of the Grand Junction Rail project (GJ), currently under design, being at the 'backyard' of this project, CDD staff encourage the project team to coordinate with the City staff involved with GJ project to explore design elements such as wayfinding and signage that promote public transit education. Staff also recommend exploring with City staff on ways to integrate the perimeter fencing and crossing points as part of the landscape design and backdrop scenery for the MIT Dorm.

While the documentation provided by the MIT design team demonstrates compliance with the Green Building Requirements, CDD staff look forward to receiving updates on the project's Net Zero Narrative and modeled energy savings as the design moves forward. Staff is available to assist the Applicant through continuing design review. The project will be subject to review prior to receiving its Building Permit and Certificate of Occupancy.

[1] Source: Ellen MacArthur Foundation.

6.iii NOISE MITIGATION NARRATIVE

ACENTECH

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

Initially released November 2, 2020
Revised November 10, 2020

Tim Peters
Kieran Timberlake
841 North American Street
Philadelphia, PA 19123

Subject: Environmental Noise Mitigation Narrative
Massachusetts Institute of Technology Graduate Housing; Cambridge, MA
Acentech Project No. 633642

Dear Tim,

This Massachusetts Institute of Technology (MIT) Graduate Housing project includes the construction of two 10-story buildings. As part of our scope of work, we are contracted to conduct an environmental sound analysis and provide design input to the project with respect to outdoor sound.

This letter serves to address the elements of the Cambridge Massachusetts Zoning Ordinance Article 19, *Project Review*. This letter report is based on the guidance presented in §19.24.7, *Noise Mitigation Narrative*, of that zoning ordinance, and addresses applicable elements of this project design.

This report is based upon the Schematic Design Pricing Set drawings issued by Kieran Timberlake and dated on August 7, 2020.

ENVIRONMENTAL SOUND REGULATIONS

Applicable Regulations and Policy

The City of Cambridge specifies regulations for environmental sound in the City of Cambridge Municipal Code, Chapter 8.16, *Noise Control*. This ordinance specifies sound level limits by Zone and time of day.

The site of this project is at the existing MIT West Lot and MIT Police station, located at 269-301 Vassar Street, Cambridge, MA 02139. The project is located in "Special District" zones SD-6 and SD-11, and is bounded by a Residence C-3 zone to the east and by other "Special District" zones on other sides. Sound limits for relevant zones pertaining to this project are shown in Table 1 below.

Table 1. Maximum Allowable Sound Pressure Levels
From Cambridge Municipal Code Table 8.16.060E
Table of Zoning District Noise Standards

Zoning	Time Period	Single Number Equivalent (dB(A))	Octave Band Center Frequency Measurement (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Residential Area	Daytime [a]	60	76	75	69	62	56	50	45	40	38
	Other Times	50	68	67	61	52	46	40	33	28	26
Commercial Area	Anytime	65	79	78	73	68	62	56	51	47	44

[a] As defined in the Noise Control Ordinance of the City of Cambridge, §8.16.030, "'Daytime' means the period between the hours of seven a.m. and six p.m. daily except Sunday and holidays according to the time system locally in effect."

(this section is continued on the following page)

The Commonwealth of Massachusetts evaluates noise as a public health concern that falls within the scope of the Massachusetts Department of Environmental Protection (MassDEP). MassDEP has defined their "Noise Policy" for interpretation of Massachusetts Regulation 310 CMR 7.10 in Division of Air Quality Control (DAQC) Policy 90-001, approved on February 1, 1990. In summary, the Noise Policy states that sound from any source must not increase the overall A-weighted L_{90} sound level by more than 10 decibels, and cannot generate a "'pure tone' condition" as defined in the Policy.

MassDEP may enforce the Noise Policy for this project if it responds to complaints from the public about noise generated from this source after construction. Therefore, it is recommend that this project be designed to comply with both the Noise Ordinance of the City of Cambridge and with the MassDEP Noise Policy jointly and simultaneously.

Measurements of Existing Conditions

Existing Sound Measurements

Acentech conducted a survey of existing sound levels at four representative locations around the project site. Measurements were conducted from October 14, 2020 to October 21, 2020, throughout which sounds were continuously monitored. Measurement locations are shown in Figure 1 attached to this report.

Acoustic measurements for this project were conducted with Rion NL-52 sound level meters which conform to ANSI S.14-1961 for Type 1 precision sound level meters. All equipment was field-calibrated before and after the measurement period using a Pulsar Model 105 acoustic calibrator. Measurements were conducted at heights of five to eight feet above grade elevation.

Sound level statistics were measured for each one-hour interval throughout the measurement period. The two sound level metrics (also called sound level percentiles) considered for this study are the L_{90} and L_{eq} levels.

The L_{90} sound level (level exceeded 90% of the time, defined mathematically as the 10^{th} percentile) quantifies the steady-state "background" sounds of an environment. This metric is specified in the MassDEP Noise Policy, and is typically used to evaluate continuous sound sources.

The L_{eq} sound level (called the Equivalent Sound Level) is calculated as a logarithmic average of sound level in a given duration. This metric is common for evaluation of annoyance due to environmental sound. For additional information, we have also presented the L_1 sound level (level exceeded 1% of the time, defined mathematically as the 99^{th} percentile), and quantifies the loudest short-term events in an environment, while excluding transient and potentially erroneous sounds close to the microphone that are not representative of the site.

Sounds on the project site were qualitatively determined to be due to intermittent local traffic on Vassar Street, distant traffic on Memorial Drive, occasional train pass-bys and grade crossing bells from the commuter rail alignment to the west of the project site, and other typical parking lot and community sounds.

Summary of Measurement Results

Time series of measured hourly sound levels and ranges of L_{90} sound levels by hour are shown in Figure 2 through Figure 9 attached to this report. Representative ranges of octave band L_{eq} sound levels compared to the Residence Zone limits in the Noise Ordinance of the City of Cambridge are shown in Figure 10 and Figure 11. A summary of the range of measured hourly L_{90} and L_{eq} sound levels are shown in Table 2 on the following page of this report.

In summary we recommend that the project is designed with respect to the minimum measured sound levels on the project site. This methodology results in the most stringent design goal with respect to applicable regulations, and a project which is conservatively expected to comply with those regulations at all times.
(this section is continued on the following page)

Table 2. Ranges of Measured Sound Levels

Measurement Location	Measured Hourly L_{90} (dBA)			Measured Hourly L_{eq} (dBA)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum
A	47	51	56	48	55	70
B	48	51	68	50	55	69
C	48	52	65	50	59	68
D	51	54	58	53	60	73

Evaluation of Cambridge Noise Ordinance and Existing Conditions

The measured existing overall and octave band L_{eq} sound pressure levels have been evaluated with respect to the limits presented in the Cambridge Noise Ordinance for Residence Zone receptors shown in Table 1 of this report. It was observed that for many periods, measured existing L_{eq} sound levels exceed those criteria prior to construction of the project.

At Measurement Location C (closest to nearest residential receptor property lines), the existing sound level on the project site exceeded the Cambridge Noise Ordinance overall sound level limits for 162 out of 169 measured hourly samples (96% of samples), and exceeded at least one of the octave band limits in 100% of measured hourly samples. A representative graphical summary of this phenomenon is presented in Figure 11.

It is not feasible that construction of the project will reduce existing on-site sound levels such that they will meet the limits specified in the Cambridge Noise Ordinance. It is therefore recommended that the project is designed such that the project sound **contribution** does not exceed the limits specified in Table 1.

Interpretation and Quantitative Project Goals

In general, the MassDEP Noise Policy defines a more conservative sound level limit during the daytime hours (based on our measurements), and the Cambridge Municipal Code defines a more conservative limit during the nighttime hours and on Sundays. It is assumed that for this project, building HVAC systems will operate using a typical schedule on Sundays, and therefore it is recommended that the “Other Times” limit in the Cambridge Noise Ordinance should be applied as a design goal.

Therefore, the project should be designed such that the **project sound level contribution does not exceed 50 dBA** at residential property line locations. This criterion represents the most stringent regulation which applies to this project, and will also guarantee that the project complies with the overall limit in the MassDEP Noise Policy for this project.

As discussed in the previous section of this report, the existing conditions on the site currently exceed the project sound level contribution criteria. As this project develops and further noise mitigation narratives are issued, comparisons of predicted project sound to existing measured sound on the project site will be detailed.

NOISE MITIGATION APPROACH

Acentech is contracted to develop an acoustic model of the project for the detailed prediction of outdoor sound emissions from various sources. The project is still schematic in nature and as such equipment selections are not available as inputs to this model. Therefore, this report presents general noise mitigation measures for design of the project.

This section of the report documents recommended specific approaches and designs to be incorporated to this project to comply with applicable regulations with respect to outdoor sound. Design and mitigation with respect to specific project sound sources are documented as follows.

Energy Recovery Units (ERU)

The project currently includes ERUs (air handling units) on the south side of Building A 7th floor and Building B 6th floor. Additional ERUs are to be located on the rooftops of both buildings. Rooftop mechanical equipment is to be located inside a mechanical penthouse constructed of perforated metal on a galvanized steel frame which will shield the direct line-of-sight from sound sources.

Wherever feasible, ERUs should be oriented such that outdoor air intakes and exhausts do not directly face residential receptors, or incorporate hoods to redirect air and sound paths. In cases where sound emitted from air ventilation paths are predicted to exceed allowable levels, HVAC silencers may be specified and incorporated on these inlets and exhausts to attenuate sound to the required degree.

As equipment selections are made for these locations, they will be analyzed in detail with respect to sound transmitted through all ventilation paths and through the body of the unit.

Cooling Towers

The project currently includes cooling towers on the rooftops of both Building A and B. These cooling towers are to be located inside an open-top mechanical penthouse constructed of perforated metal on a galvanized steel frame which will shield the direct line-of-sight from sound sources.

Due to the height of typical cooling tower equipment, sound barriers or screen walls are typically not effective noise control devices. These sources will be analyzed in detail with respect to their orientation and heights, to predict sound emission to the community. If sounds emitted by cooling towers are predicted to exceed allowable levels, HVAC silencers may be specified and incorporated on the fan discharges to attenuate sound to the required degree.

Generators

The project currently includes generators on the rooftops of both Building A and B. The generators are located such that there is other equipment located between generators and the nearest residentially-zoned receptor.

Both generators should be installed with an outdoor enclosure. The degree to which this enclosure should generate sound is to be determined based on the distance from the generator location to the nearest receptor, the orientation of the generator, and the degree to which ventilation attenuators can be incorporated.

Wherever feasible, the generators should be located such that the air discharge radiator does not face directly towards residential receptors. In cases where sound emitted from air ventilation paths are predicted to exceed allowable levels, HVAC silencers may be specified and incorporated on these inlets and discharges to attenuate sound to the required degree. In addition, a silencer/muffler should be incorporated on the combustion exhaust stack of the generator.

(this section is continued on the following page)

It is recommended that the generator undergo periodic testing during the daytime afternoon hours between 1:00pm and 3:00pm whenever possible, and should not occur on Sunday. These hours were determined to be the loudest hours due to other sources (such as traffic) during our study, and may therefore limit the prevalence of complaints and limit the risk of noncompliance with applicable environmental sound regulations.

Sound Barrier Walls

In the case that additional sound attenuation is required from rooftop or exterior equipment, but enclosures or attenuators cannot be feasibly designed to provide the necessary degree of attenuation, sound barrier walls may be recommended to shield sound from residential receptors. Such walls are not currently recommended or required as part of this project.

In general, sound barrier walls should be constructed such of materials such that they weigh approximately 3lbs/ft^2. They should be constructed to minimize gaps below the barriers and between panels. Gaps between panels should be reduced by using an interlocking panel system or by sealing with a non-hardening sealant. Barriers should be designed with an acoustically-absorptive face facing the sound-emitting equipment, which should have a minimum Noise Reduction Coefficient (NRC) 0.75.

* * * * * * *

Please contact us (617-499-8000 or via email at ipieleanu@acentech.com and jbriskie@acentech.com) to discuss any questions or comments you may have about this letter or our study.

Sincerely,

ACENTECH INCORPORATED

Jack Briskie, P.E.
Consultant

CC: Ioana Pieleanu; Acentech
Andrew Cronin; Kieran Timberlake

Enclosed: Figures 1 to 11

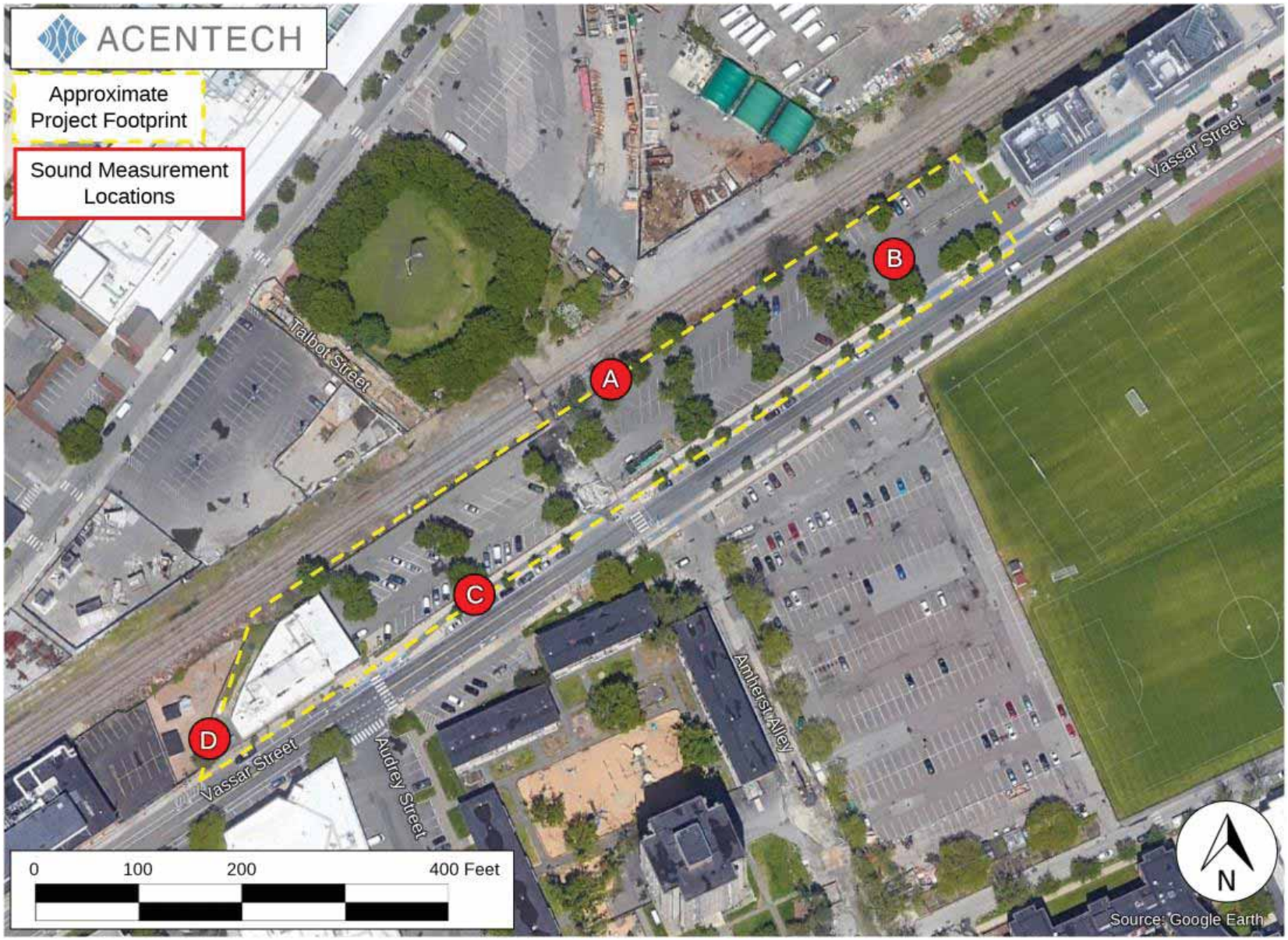


Figure 1. Sound Measurement Locations

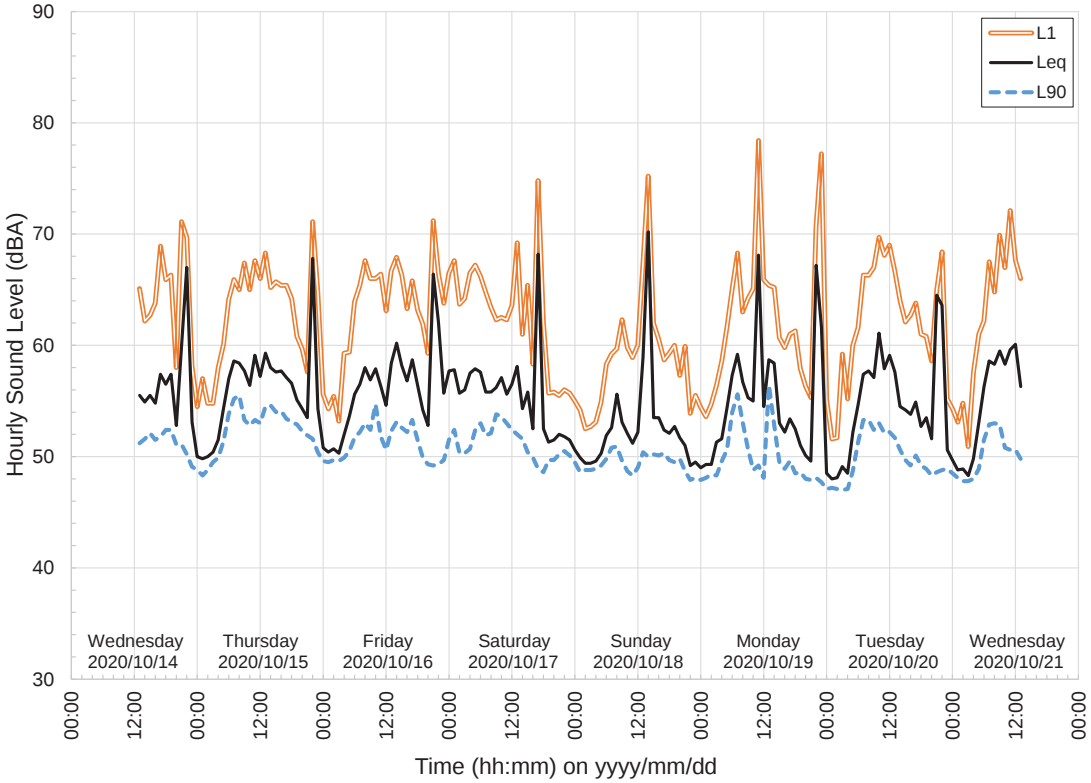


Figure 2. Location A Measured Hourly Sound Levels

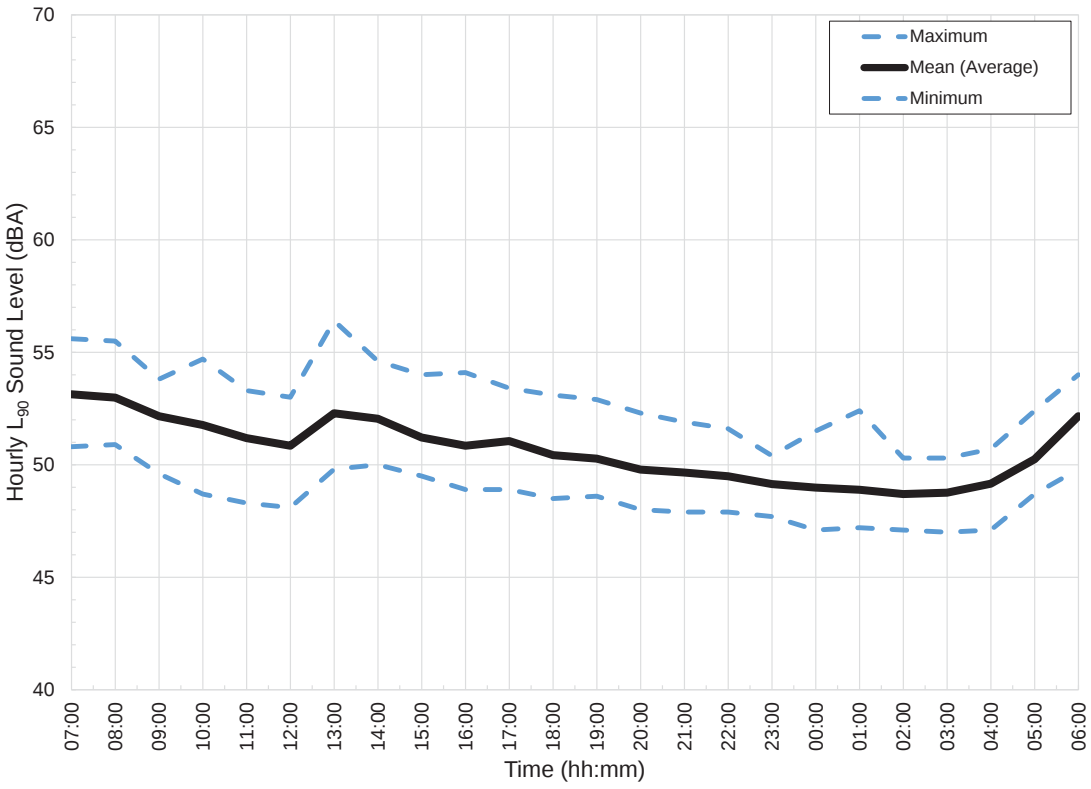


Figure 3. Location A Hourly L_{90} Sound Level Ranges

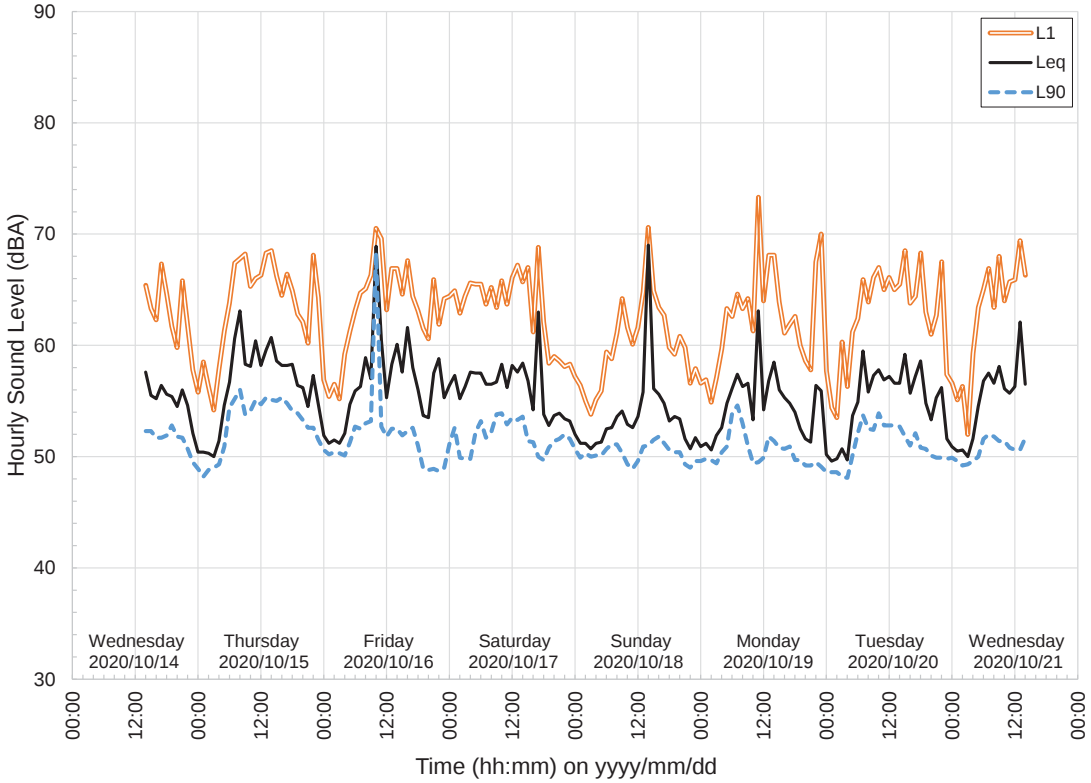


Figure 4. Location B Measured Hourly Sound Levels

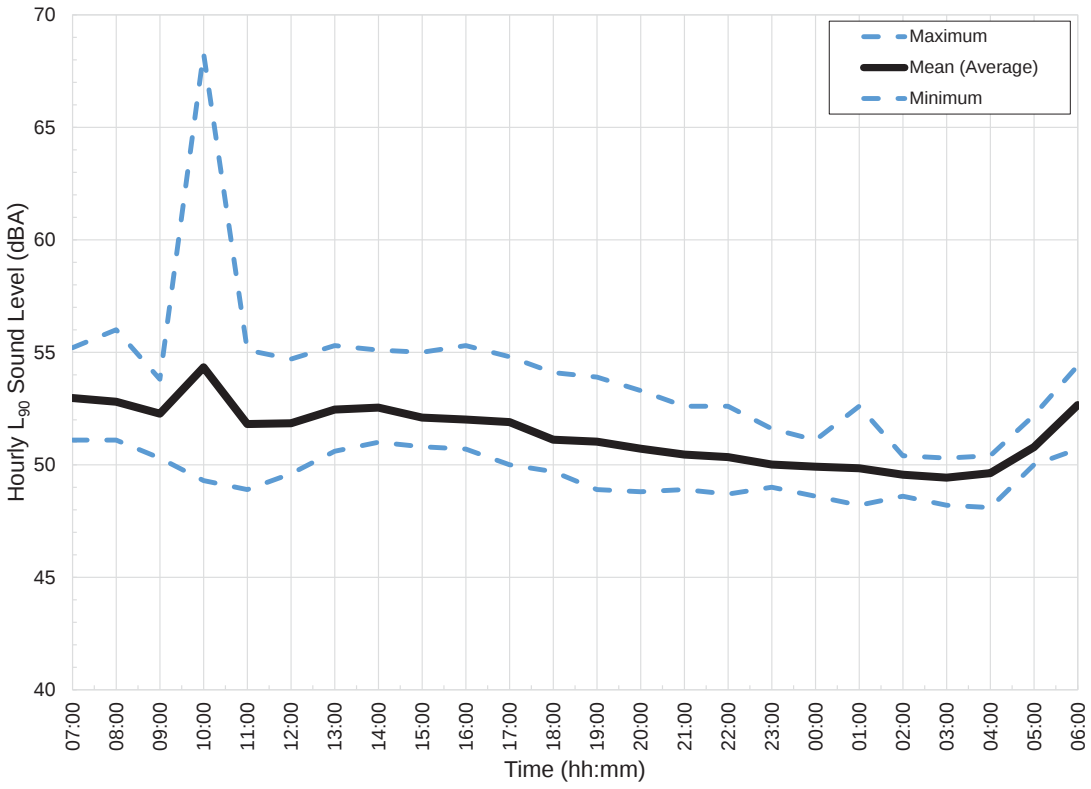


Figure 5. Location B Hourly L_{90} Sound Level Ranges

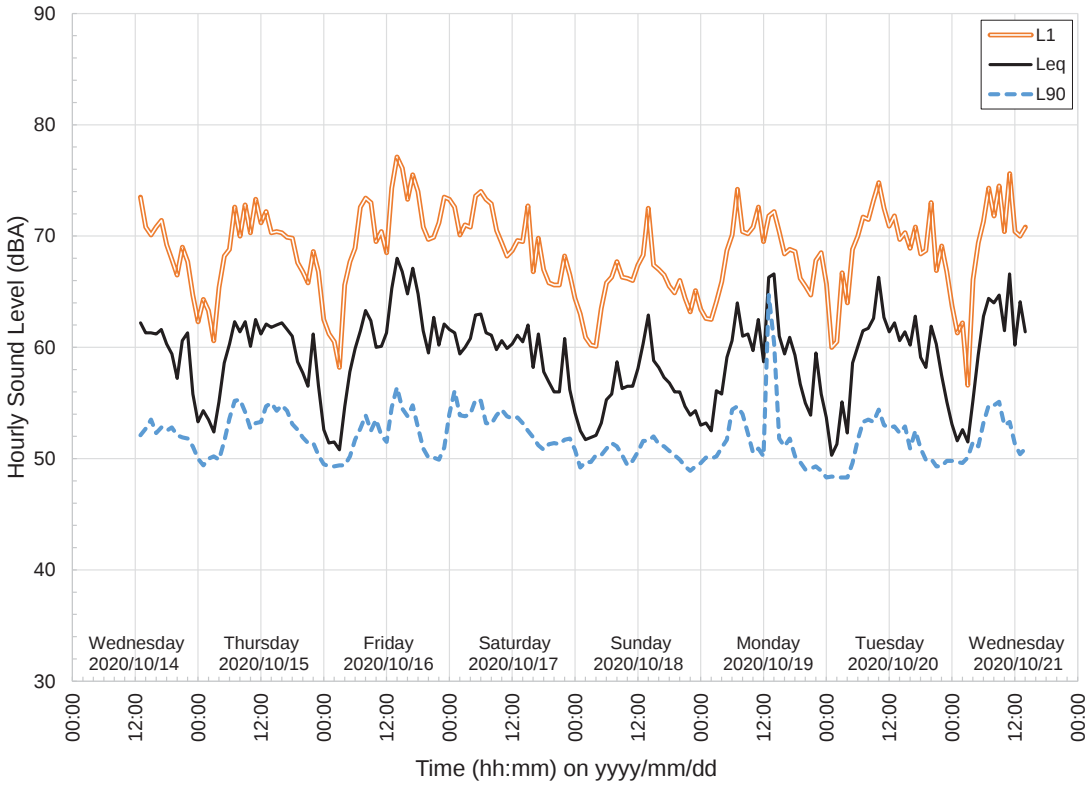


Figure 6. Location C Measured Hourly Sound Levels

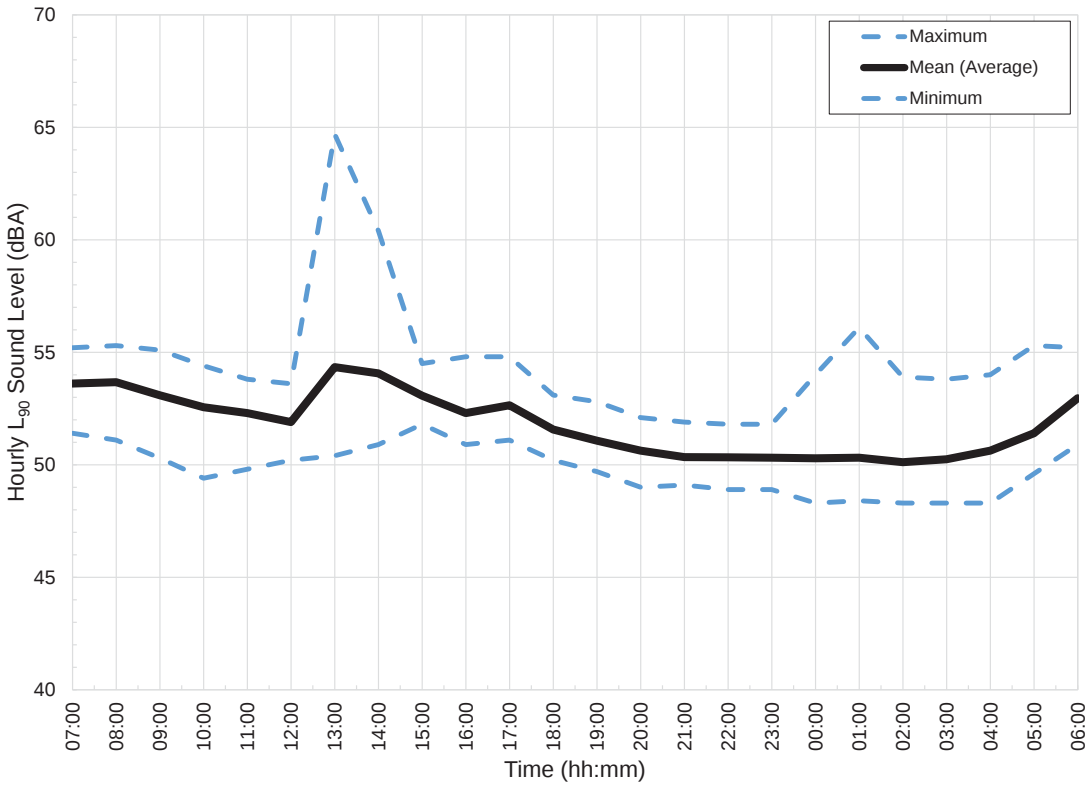


Figure 7. Location C Hourly L_{90} Sound Level Ranges

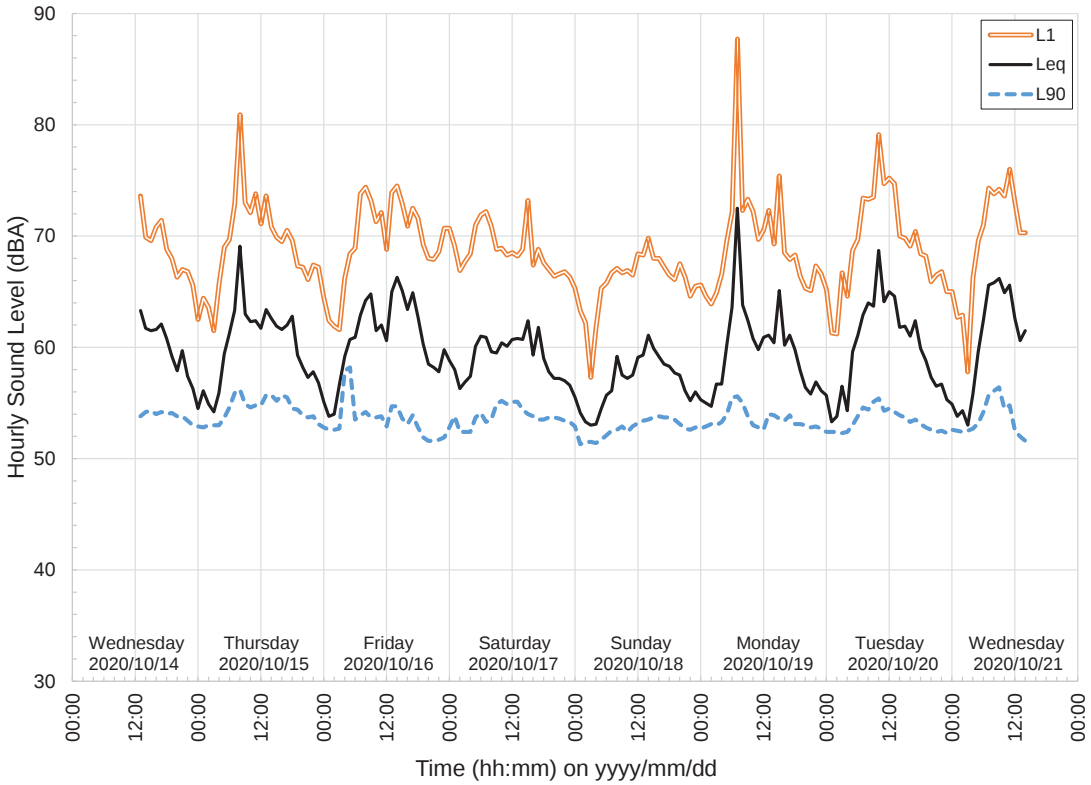


Figure 8. Location D Measured Hourly Sound Levels

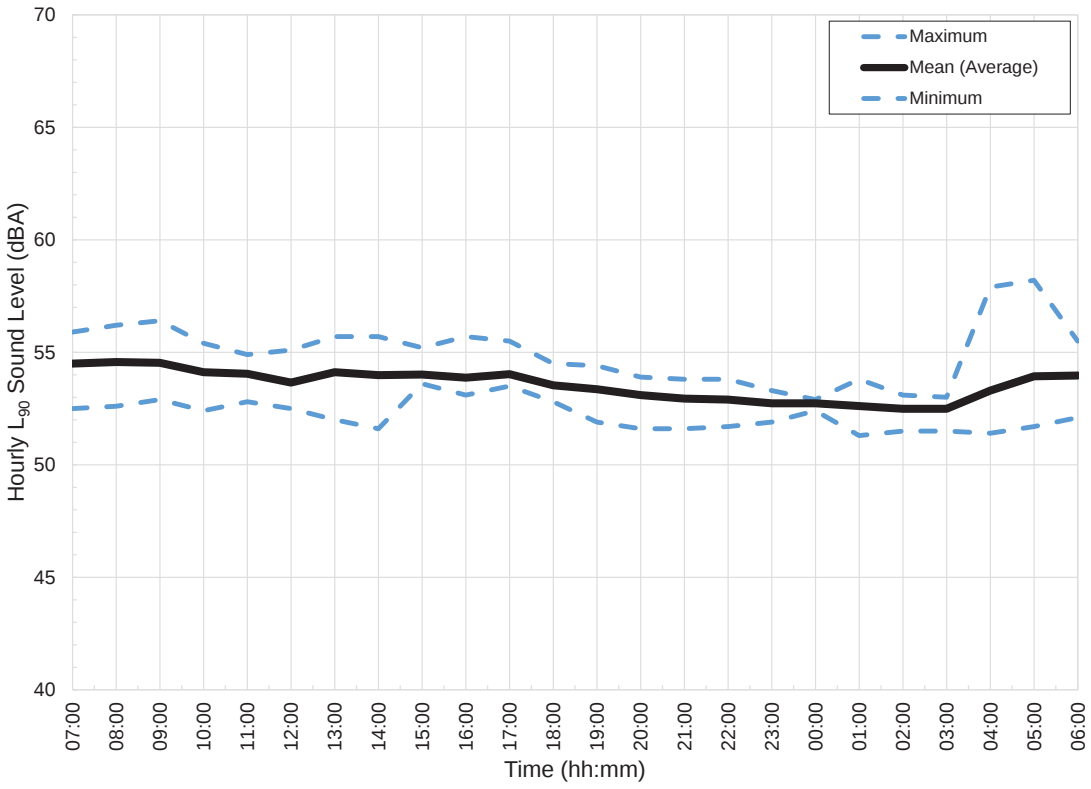


Figure 9. Location D Hourly L_{90} Sound Level Ranges

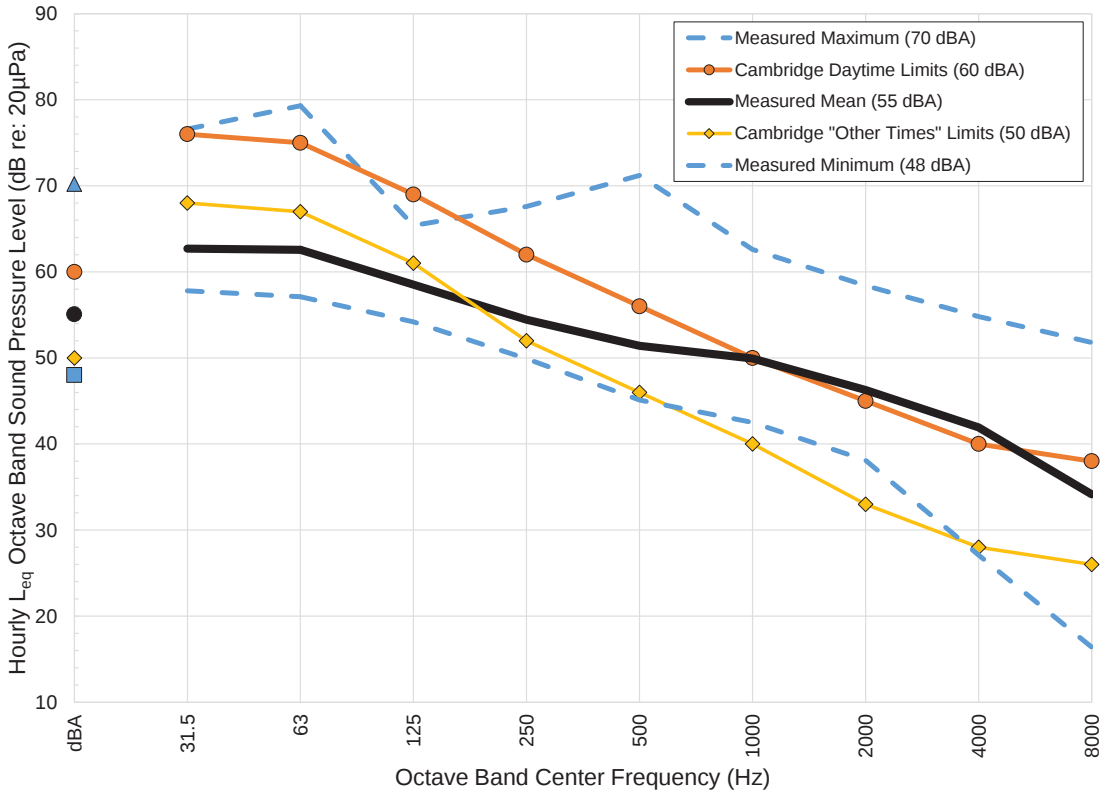


Figure 10. Representative Spectral Comparison – Measurement Location A

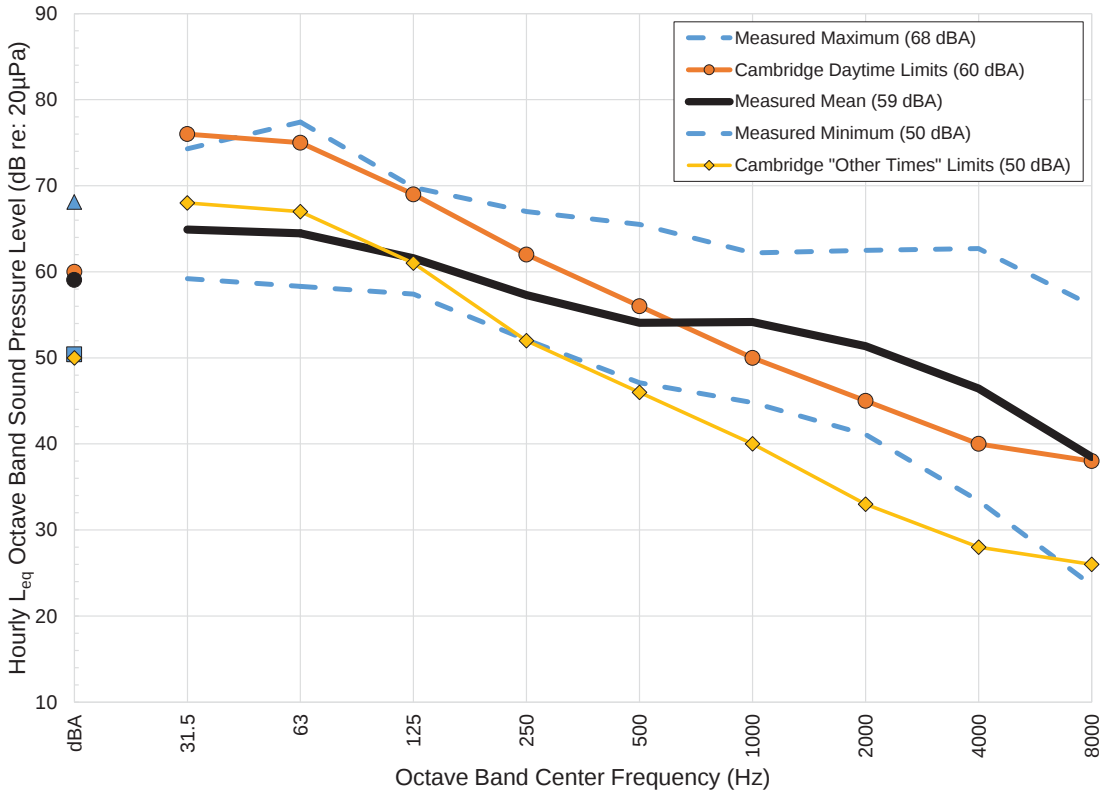


Figure 11. Representative Spectral Comparison – Measurement Location C

6.iv TRANSPORTATION ACCESS AND CIRCULATION STUDY

CITY OF CAMBRIDGE

Transportation Access and Circulation Study

MIT West Campus Dormitory Project

Prepared for
Massachusetts Institute of Technology

Prepared by
Howard Stein Hudson

December 2020

HOWARD STEIN HUDSON

Engineers + Planners

Table of Contents

List of Figures

List of Tables

Appendices

Introduction

Howard Stein Hudson (HSH) has prepared this Transportation Access and Circulation Study to determine the potential impacts related to the proposed Massachusetts Institute of Technology (MIT) West Campus Graduate Student Dormitory development which will construct up to 690 beds of graduate housing. The Project will eliminate the existing MIT Police Station and surface parking lot (West Lot). The Project will not provide any parking on site.

The Project site is located within MIT's campus and is within walking distance of a variety of transportation alternatives including public transit, Bluebikes shared bicycle facilities, as well as Zipcar car-sharing services.

For MIT students, bicycling and walking are the primary modes of access to and throughout the Cambridge campus. Additionally, MIT has excellent access to a wide variety of public transportation options including two Massachusetts Bay Transportation Authority (MBTA) bus routes through the campus, the MIT Tech Shuttle, and the Charles River Transportation Management Association (TMA) EZ Ride shuttle route.

MIT has made a strong commitment to transportation demand management (TDM) and continues to make improvements to TDM practices to reduce single-occupant automobile trips to and from its campus, and to promote non-automobile alternatives.

While the Project requires a Project Review Special Permit (Section 19.20), it is below the threshold that requires a Traffic Impact Study (TIS). A TIS is required for projects that create 150 new parking spaces and/or relocate 250 or more existing parking spaces. In recognizing the important role transportation plays in new building development within the City of Cambridge, MIT has developed this Transportation Access and Circulation Study. The Transportation Access and Circulation Study will document existing conditions, develop future condition summaries, and explore transportation demand management tools. The Project site is shown on the Locus Map (**Figure 1**).

Figure 1. ***Locus Map***

Methodology

This Transportation Access and Circulation Study follows the guidelines set forth by the City of Cambridge Traffic, Parking and Transportation Department (TP+T), as described below:

- Description of vehicular, bicycle, pedestrian access and egress to and from the site;
- Description of available public transportation service;
- Project description and expected traffic, transit, and pedestrian trip generation utilizing City of Cambridge mode use guidelines for this neighborhood;
- Description of parking supply and demand;
- Description of bicycle parking arrangements; and
- Description of loading/servicing and trash removal arrangements.

Existing (2020) Condition

This section documents the condition of the roadways located in study area including geometric layout, lane use, other pertinent information.

Roadway Description

Vassar Street is an urban minor arterial roadway under local jurisdiction with one lane in each direction. Vassar Street runs generally in a northeast–southwest direction between Main Street to the northeast and Memorial Drive to the southwest. Vassar Street becomes Galileo Galilei Way north of Main Street. On-street parking is generally provided on the northwest side of the street between Memorial Drive and Main Street. Traffic signals are located at Massachusetts Avenue and Main Street. Vassar Street has sidewalks on both sides of the street. Between Memorial Drive and Massachusetts Avenue, crosswalks are located at Amesbury Street, Audrey Street, and Amherst Alley; mid-block crosswalks are located at Simmons Hall and to the north and south of the Vassar Street Residence Hall that is currently under construction.

Construction of a raised cycle track on each side of Vassar Street from Audrey Street to Main Street was completed in 2009. The cycle tracks are at grade level and are each 5-feet wide with 5-foot landscaped buffers separating the bikeway from parked cars. The cycle track serves as a primary east-west route across the MIT campus for cyclists and as a connector to the Kendall Square area and the riverfront.

Public Transportation

MIT has excellent transit access, and the Project is conveniently located adjacent to the MBTA CT2 bus route and is within a ten-minute walk (one-half mile) from four more MBTA bus routes. The MBTA Red Line on Massachusetts Avenue is to the north, the MBTA Green Line B-Branch on Commonwealth Avenue is to the south, and EZRide shuttles to the Lechmere Station (Green Line) and North Station (Green Line, Orange Line, and Commuter Rail) are within a five-minute walk (one-quarter mile).

Public transportation is also an important mode of access for students and visitors and provides important connections to the surrounding commercial and cultural attractions, particularly for students living on the campus.

MBTA SERVICE

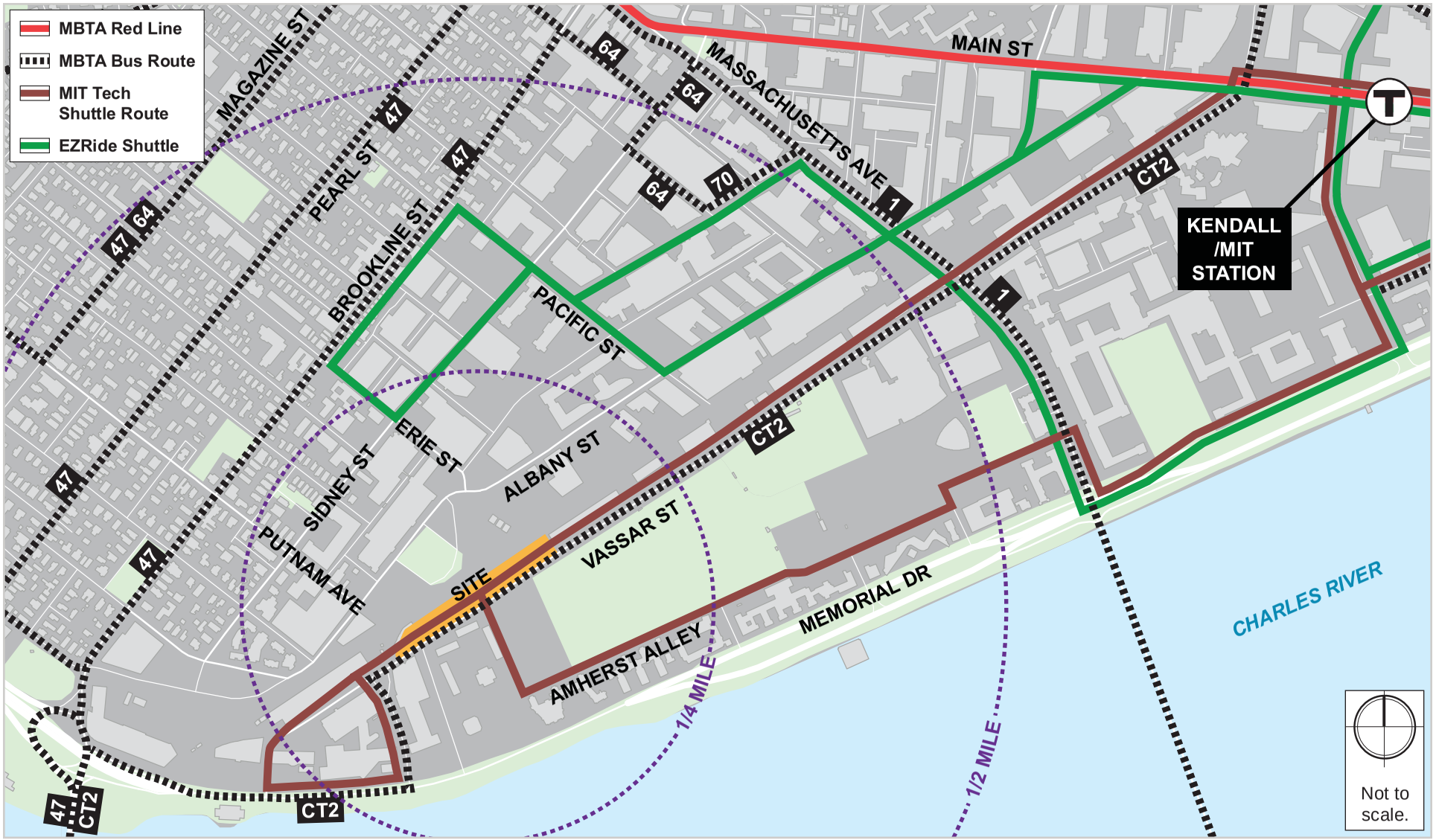
The public transportation system serving the area around MIT is shown in **Figure 2** and listed in **Table 1**.

Table 1. Public Transportation

MBTA Service	Description	Weekday Service Duration	Peak-hour Headway (minutes)
Subway			
Red Line	Alewife – Braintree/Ashmont	5:08 a.m. – 12:30 a.m.	9
Green Line	B-Branch – Boston College – Park Street	5:01 a.m. – 12:52 a.m.	5-6
	E-Branch – Heath Street - Lechmere	5:00 a.m. – 12:47 a.m.	6-7
Bus Routes			
CT2	Sullivan Station – Ruggles Station	5:55 a.m. – 7:59 p.m.	25-32
1	Harvard Square – Dudley Station	4:37 a.m. – 1:41 a.m.	8
47	Central Square -- Broadway Station	5:15 a.m. – 1:31 a.m.	10-15
64	Oak Sq., Brighton -Central Sq., Cambridge or Kendall/MIT Station	5:21 a.m. – 1:30 a.m.	19-34
70	Market Place, Waltham-University Park, Cambridge	4:28 a.m. – 1:21 a.m.	11-16
EZRide Shuttle	Cambridge – North Station	6:20 a.m. – 8 p.m.	12-15

Source: Fall 2020 MBTA schedule

Figure 2. ***Public Transportation***



EZ RIDE

The Charles River Transportation Management Association (TMA) operates commuter programs to improve mobility and promote sustainable travel in Cambridge, MA. The Charles River TMA operates the EZRide shuttle which connects Boston's North Station and the Cambridgeport area, including MIT, Kendall Square, North Point, Lechmere, and Community College. EZRide is open to the public and free of charge to MIT community members.

MIT SHUTTLE SERVICE

MIT operates a variety of shuttle services to safely transport members of the MIT community to, from, and around the MIT campus.

TECH SHUTTLE

The MIT Tech Shuttle provides access throughout the MIT campus. The Tech Shuttle route mainly operates along Vassar Street, Main Street, and Memorial Drive. Tech Shuttle service runs Monday through Friday, from 6:15 a.m. to 7:45 p.m. The Tech Shuttle is free and available to all members of the MIT community.

STUDENT LIFE SHUTTLES

The Division of Student Life sponsors shuttles to transport students to and from Trader Joe's, Whole Foods, Costco, and Target. The shuttles make stops at many MIT residences on the Cambridge campus and pass through Kendall Square and Central Square. The goal of the grocery shuttles is to provide students with easier access to more nutritious food options.

Trader Joe's and Whole Foods Market

The Trader Joe's and Whole Foods Market shuttle offers service on Wednesdays and Sundays between the hours of 11:30 a.m. and 4:30 p.m.

CostCo and Target

The CostCo and Target shuttle offers service on Sundays between the hours of 11:00 a.m. and 3:05 p.m.

SAFERIDE

The MIT Parking and Transportation Office safety shuttle service, known as SafeRide, provides a safe means of transportation at night within and around the MIT campus and to some Boston neighborhoods where MIT students live. SafeRide is a free service and is available to all members of the MIT community who have an MIT account.

SafeRide shuttles operate 6:00 p.m. to 2:30 a.m. Sunday through Wednesday and 6 p.m. to 3:30 a.m. Thursday through Saturday. During the COVID-19 health emergency, the SafeRide shuttle service schedule has been curtailed to operate from 6:00 p.m. to 2:30 a.m. Sunday through Saturday.

The SafeRide fixed-route Campus shuttle service resumed on August 31. SafeRide provides OnDemand service from 6:00 p.m. to 11:30 p.m. each night ("last call" for an on-demand ride is 11:30 p.m. with an end of service at midnight).

MIT Shuttle ridership data provided by MIT is summarized in **Table 2**. Detailed data is in **Appendix A**.

Table 2. MIT Shuttle Ridership

Month	CostCo		Trader Joe's	Tech Shuttle
	2019	2020	2020	2020
January	81	*	*	*
February	158	*	*	*
March	100	6	44	441
April	129	14	60	92
May	65	24	103	166
June	138	45	41	209
July	123	45	49	275
August	110	53	69	589
September	218			
October	195			
November	285			
December	160			

** Data not available*

Existing Parking

An inventory of the existing on-street parking and car-sharing services in the vicinity of the Project was collected. A description of each follows.

ON-STREET PARKING AND CURB USAGE

On-street parking surrounding the Project site consists of a variety of different parking regulations including metered parking, no-parking, residential permit parking, and 30-minute police parking. The on-street parking regulations within the study area are shown in **Figure 3**.

OFF-STREET PARKING

MIT currently owns and operates six parking garages and 35 surface parking lots on campus, including the proposed Project site, with a combined capacity of approximately 3,532 parking spaces. Parking is available for a combination of faculty, staff, students, and visitors. The MIT off-street parking supply is summarized in **Table 3** and illustrated in **Figure 4**. The MIT Parking Facility Inventory is included in **Appendix B**.

Table 3. MIT Off-street Parking Supply

Area	MIT ID #	Facility Name	Restrictions	Supply (spaces)
Surface Lots				
West	1	Kresge	West permit, handicap, reserved, zip car	94
	2	Dormitories	West permit, reserved	25
	3	Student Center	Loading/service	4
	4	Amherst & Danforth	West permit, handicap, reserved, loading	43
	5	Amherst Alley	West permit, loading/service, reserved, temporary construction	26
	35	Cruiser	Loading, handicap	3
	40	Koch Childcare Center	reserved, loading, handicap, motorcycle	19
Northwest	22	Plasma Fusion	Northwest permit, Motorcycle, handicap, reserved, electronic vehicle	29
	23	Nuclear Reactor	Northwest permit, temporary construction	23
	24	65 Waverly Street	Northwest permit, handicap	55
	25	NW86	Northwest permit, motorcycle, reserved, zip car, handicap	77
	26	NW35	Handicap, reserved	8
	27	158 Mass Ave.	Northwest permit, handicap	51
	28	Cross Street	Northwest permit, temporary construction	11
	29	NW22/NW23	Northwest permit, handicap	84
	30	NW 32	Handicap, temporary construction	23

Area	MIT ID #	Facility Name	Restrictions	Supply (spaces)
Riverside	31	WW15	Riverside permit, electric vehicle	35
	32	W91	Riverside permit, motorcycle, handicap, loading	59
	33	W98	Riverside permit, visitor, handicap, loading	66
	34	West	Riverside permit, reserved, handicap	136
	39	W92	Riverside permit, reserved, handicap	18
Westgate	36	Westgate	Riverside permit, motorcycle, Zipcar, temporary construction	331
	37	Westgate Low Rise	Riverside permit, temporary construction, reserved	56
Visitor	6	Visitor	Visitor	54
Main	7	Main	Handicap, reserved	20
*East/ Kendall	10, 11, 13-16		Hayward permit, handicap, reserved, loading, temporary construction	160
*Sloan	12	Sloan Lot	Zipcar, reserved, loading, handicap, visitor	49
*North	18, 19, 21	N10, N52, 44/46	North permit, temporary construction, loading, electric vehicle, reserved, Zipcar, handicap	94
	Subtotal Lots			**1,653**
Garages				
Northwest	25A	NW86 Garage	Northwest permit, temporary construction, handicap	130
Riverside	38	W92 Garage	Riverside permit, handicap, electric vehicle, reserved, motorcycle, temporary construction	54
*Sloan	8	Hermann Garage	Visitor, handicap, reserved	22
*Sloan	9	East Garage	Sloan permit, handicap, temporary construction, electric vehicle, reserved	424
North	17	Albany Garage	North permit, handicap, temporary construction, reserved, electric vehicle	420
Northeast	20AB	Stata Garage, Lot, Attendant-assist	Northeast permit, handicap, loading/service, electric vehicle, temporary construction, alternative fuel vehicle	829
	Subtotal Garages			**1,879**
	Total			**3,532**

Reserved parking spaces include: campus police, facilities, medical reserve, senior administration, head of house, ROTC, 30-min tech.child care, MIT museum, information services, faculty
** not shown in Figure 4*
Source: MIT Parking Facility Inventory (October 2019)

Figure 3. ***On-street Parking***

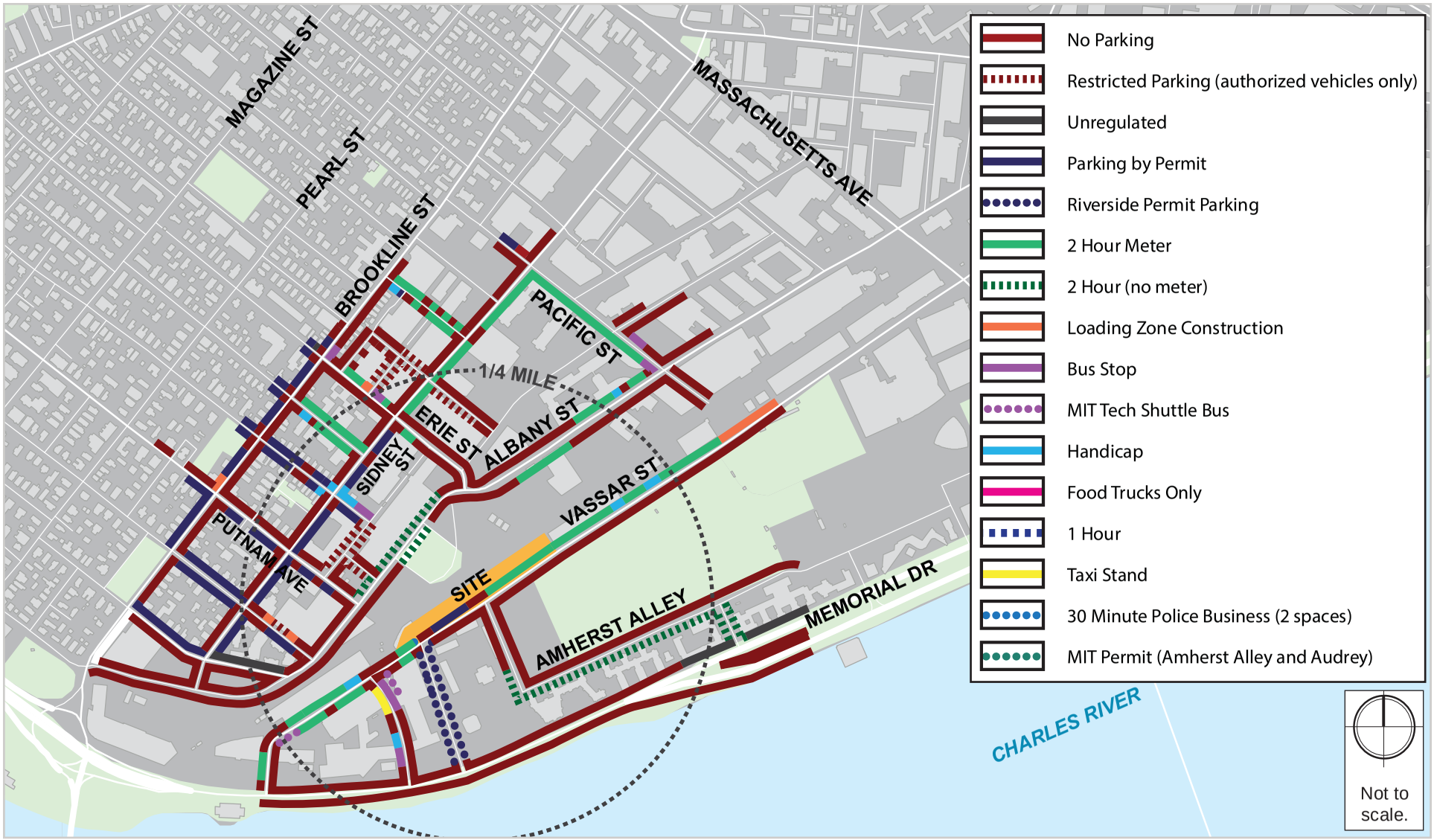
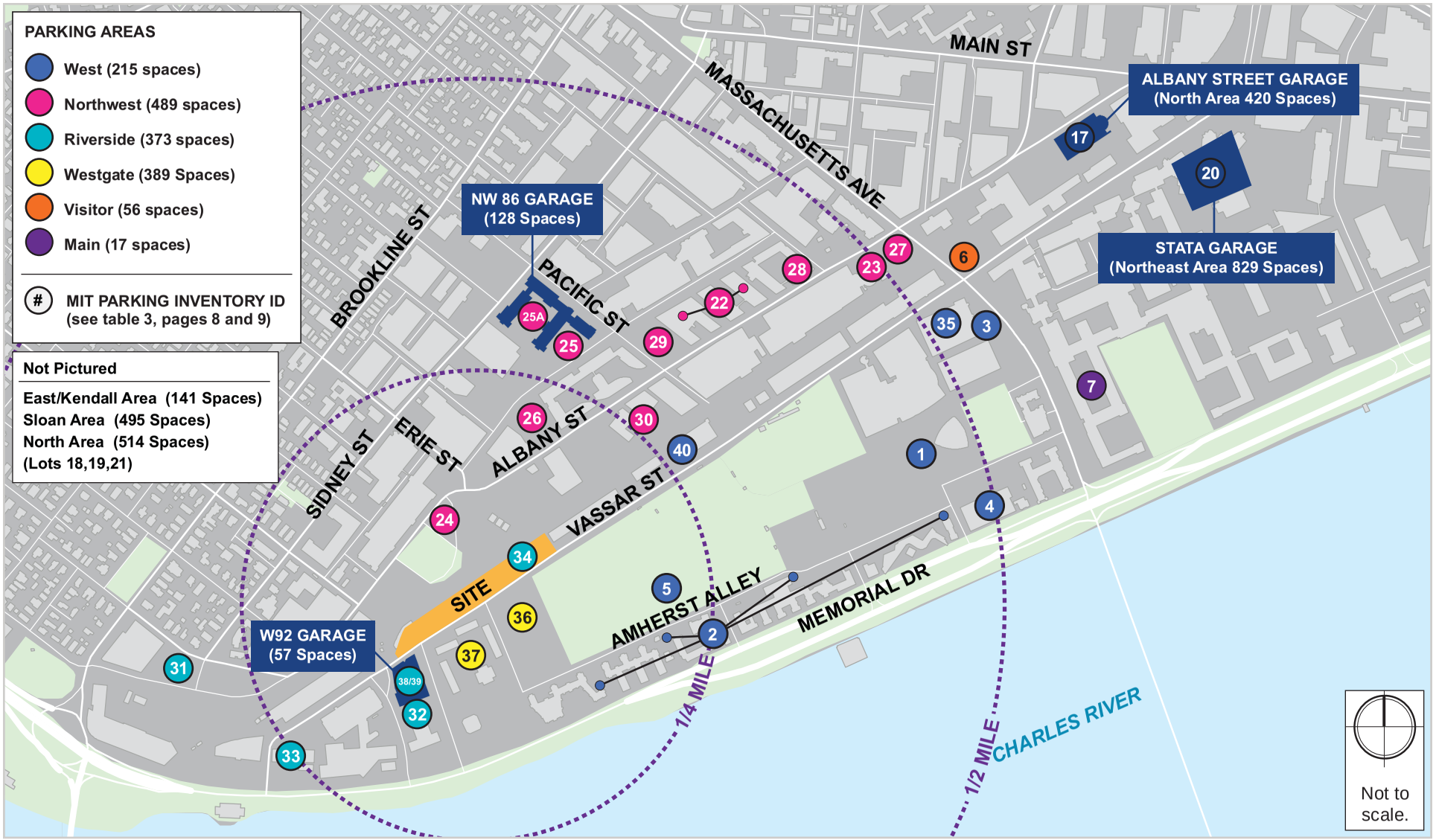


Figure 4. ***Off-street Parking***



Car-Sharing Services

Car-sharing services enable easy access to short-term vehicular transportation. Vehicles are rented on an hourly or daily 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. Pick-up/drop-off locations are typically in existing parking lots or other parking areas throughout neighborhoods as a convenience to users of the services. Nearby car-sharing services provide an important transportation option and reduce the need for private vehicle ownership.

Zipcar is the primary car-share company in the metro-Boston car-sharing market. Zipcars are located across the street from the Project in the Westgate Lot. An additional two Zipcar locations are within a five-minute walk (one-quarter mile) of the Project site. Five Zipcar locations are within a ten-minute walk (one-half mile) from the Project. The nearby car-sharing locations are shown in **Figure 5**.

Existing Pedestrian and Bicycle Environment

Sidewalks are provided on both sides of all the roadways within the study area. Crosswalks and ramps are provided at all the study area intersections.

The raised cycle track on each side of Vassar Street are at grade level and are each 5-feet wide with 5-foot landscaped buffers separating the bikeway from parked cars. The cycle track serves as a primary east-west route across the MIT campus for cyclists and as a connector to the Kendall Square area and the riverfront. The cycle track is continuous along Vassar Street from Audrey Street to Main Street.

The Project site is also located in proximity to numerous bicycle-sharing stations provided by Bluebikes. Bluebikes (formerly Hubway) is the metro-Boston area's largest bicycle sharing service which was launched in 2011 and currently consists of more than 3,000 shared bicycles at more than 300 stations throughout Boston, Brookline, Cambridge, Somerville, and Everett. As shown in **Figure 6**, there is one Bluebikes station located adjacent to the site across Vassar Street at the Westgate Apartments and an additional six stations located within one-half-mile of the site.

Bluebikes use at the Vassar Street station nearest the site is summarized in **Table 4**. Bluebikes trips from and to Vassar Street are typically less than 10 minutes with origins or destinations within the MIT campus or Cambridge. The most popular trips occur between Vassar Street and the Stata Center or Vassar Street and Massachusetts Avenue/Main Street. Only two percent of Vassar Street

station trips begin and end at Vassar Street station. Bicycle users are typically subscribers (90 percent) and male (70 to 75 percent). Detailed Bluebikes data is in **Appendix C**.

Table 4. Vassar Street Bluebikes Use

		April 2019		June 2019		October 2019	
Vassar Street (Origin or Destination)		**Origin at Vassar**	**Destination at Vassar Street**	**Origin at Vassar**	**Destination at Vassar Street**	**Origin at Vassar**	**Destination at Vassar Street**
Total Trips		2082	2030	2474	2369	3978	3806
Trip Start Time	M-F, 7-10	519	308	548	359	1002	581
	M-F, 3-6	447	503	527	551	514	572
	M-F, off-peak	654	735	722	816	1408	1631
	Weekend	462	484	677	643	1054	1022
Day of the Week	Monday	276	291	380	362	518	509
	Tuesday	390	375	330	317	697	679
	Wednesday	303	299	385	371	589	541
	Thursday	333	313	331	312	590	589
	Friday	318	268	371	364	530	466
	Saturday	205	231	389	346	564	534
	Sunday	257	253	288	297	490	488
Age	Youngest	18	18	16	16	18	17
	Oldest	74	65	78	79	67	67
	<20	34	31	22	19	313	321
	20-29	1166	1066	1254	1193	2248	2149
	30-39	609	627	698	676	947	893
	40-49	158	119	291	247	206	169
	50+	115	187	209	234	264	274
Gender	M	1566	1502	1795	1682	2936	2753
	F	436	391	588	565	911	916
	Not recorded	80	137	91	122	131	137

		April 2019		June 2019		October 2019	
Vassar Street (Origin or Destination)		**Origin at Vassar**	**Destination at Vassar Street**	**Origin at Vassar**	**Destination at Vassar Street**	**Origin at Vassar**	**Destination at Vassar Street**
Member	Subscriber	1949	1857	2197	2098	3657	3493
	Customer	133	173	277	271	321	313
Trip Duration (minutes)	<5	421	367	343	315	570	599
	5 to 10	1092	1113	1123	1211	2247	2194
	11 to 15	258	244	349	304	522	448
	16-20	144	148	294	227	306	293
	21-30	110	91	217	177	190	170
	31-60	45	52	120	114	111	66
	61-90	4	7	19	4	23	25
	91-120	5	3	5	10	7	9
	121-180	1	1	2	2	2	0
	181+	2	4	2	5	0	2
Top O-D Rank (number of trips)	MIT Stata Center at Vassar St/ Main St	1 (408)	2 (262)	1 (321)	1 (314)	3 (361)	2 (466)
	MIT at Mass Ave/ Amherst St	2 (283)	1 (401)	2 (280)	2 (301)	2 (428)	1 (564)
	Ames St at Main St	3 (191)	6 (92)	3 (166)	4 (135)	1 (699)	3 (370)
	Kendall T	4 (169)	3 (197)	5 (120)	5 (133)	4 (299)	4 (285)
	Central Square at Mass Ave/ Essex St	5 (112)	4 (127)	4 (138)	3 (139)	5 (192)	5 (274)

Figure 5. ***Car-share Locations***

Figure 6. ***Bicycle Facilities***

Future Conditions

The Future Condition includes descriptions of the detailed Project and expected traffic, transit, and pedestrian trip generation; parking supply and demand; bicycle parking arrangements; and proposed loading/servicing and trash removal arrangements.

PROJECT DESCRIPTION

The Project consists of demolishing the existing MIT Police Station and surface parking lot and constructing up to 690 beds in two graduate student dormitory buildings. Residential units will be a mix of studios, 1-bedroom, 2-bedroom, and 4-bedroom units. The MIT graduate student population will not increase because of this Project. It is anticipated that many graduate students who might otherwise live in off-campus housing will instead reside in these new facilities.

The Project will not provide any vehicular parking on site. Approximately 345 long-term and 35 short-term bicycle spaces will be provided on site.

The site plan is illustrated in **Figure 7 and Figure 8**.

Providing additional on-campus housing for graduate students will make more off-campus housing available to other Cambridge community members.

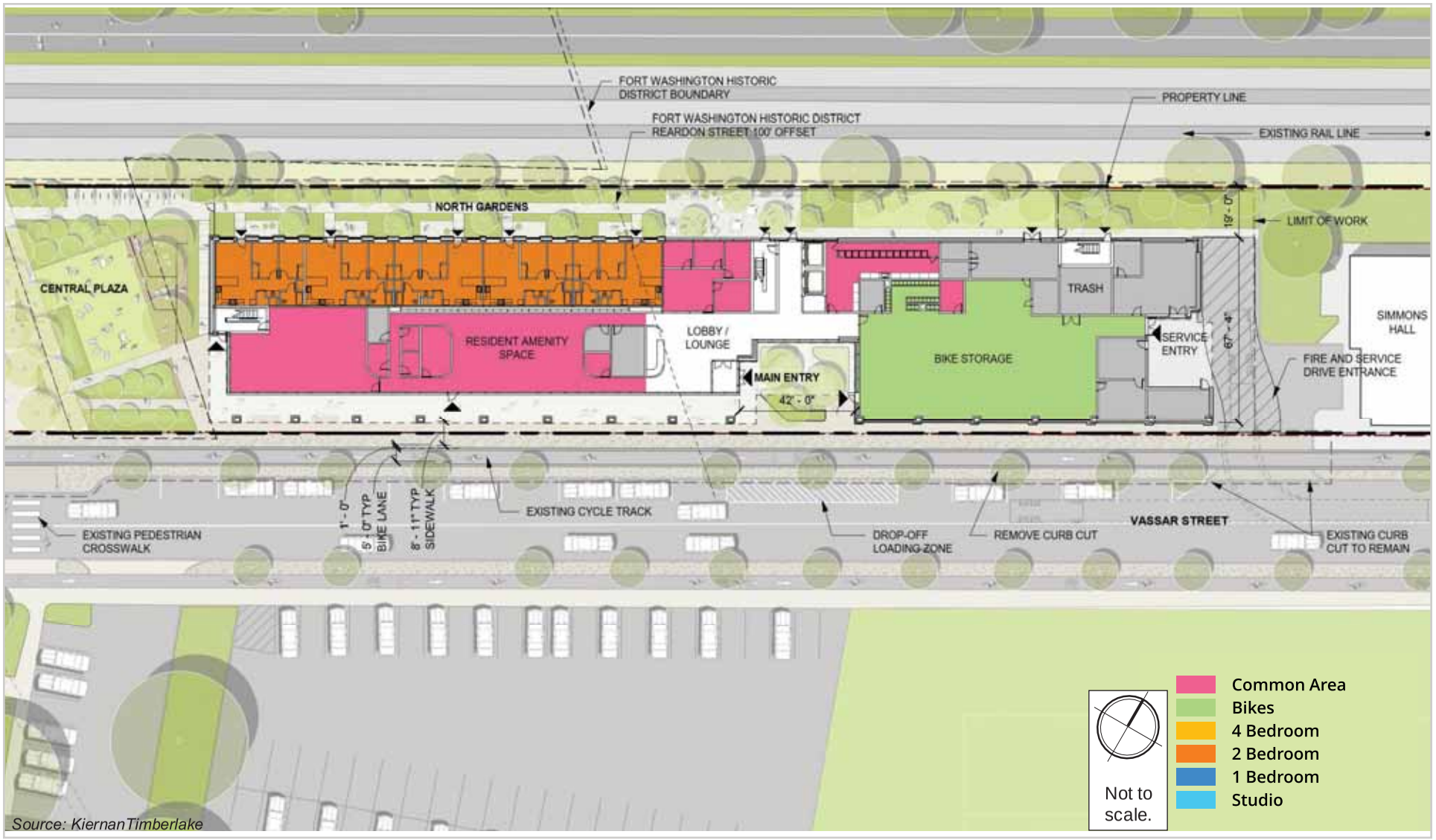
According to the *Graduate Student Housing Working Group Report to the Chancellor* (August 2018), in 2017 more than 80% of all off-campus graduate students lived in Cambridge, Somerville, and Boston (see **Table 5**).

Table 5. Off-campus Graduate Student Residence Locations (2017)

Home Location	Percentage
Cambridge	57%
Somerville	12%
Boston	11%
Brookline	2%
Allston-Brighton	1%
Other	16%

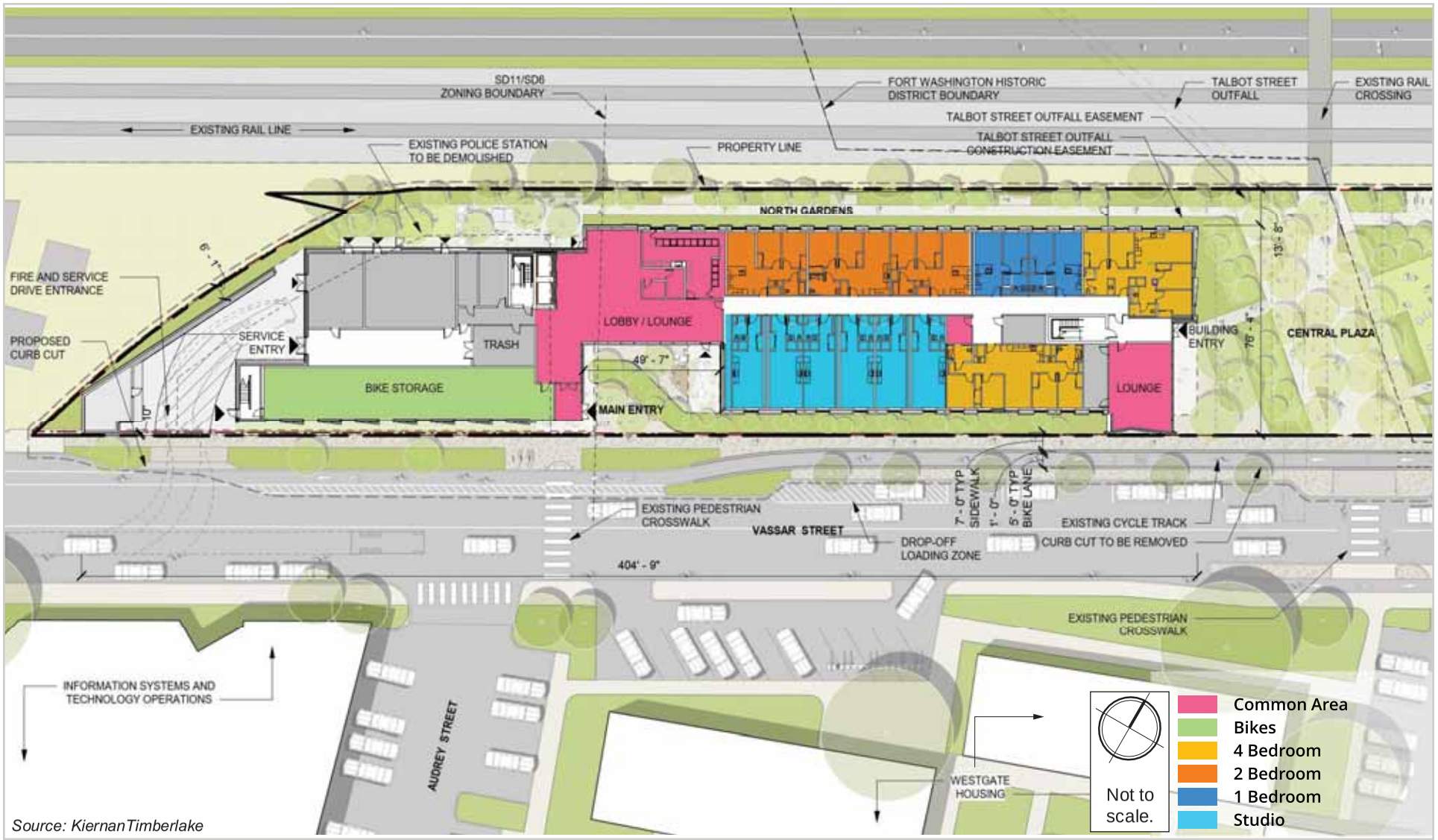
Source: Graduate Student Housing Working Group Report

Figure 7. ***Site Plan (East Building)***



Source: KiernanTimberlake

Figure 8. ***Site Plan (West Building)***



Source: KiernanTimberlake

TRIP GENERATION METHODOLOGY

Trip generation is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, and walk/bicycle trips associated with a proposed development and a specific land use program. A project's location and proximity to different travel modes determines how people will travel to and from a site.

Trip generation estimates for the graduate residences utilized data published by the Institute of Transportation Engineers (ITE) in the Trip Generation Manual. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel modes such as walking, bicycling, and public transit.

To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use code (LUC) was used:

- Land Use Code 221 – Mid-rise Multi-family Housing. Mid-rise multi-family housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 floors.

TRAVEL MODE SHARE

Mode split estimates for the Project are based on a variety of sources specific to MIT, including the 2018 Commuting Survey. Every two years, MIT administers a Transportation Survey to understand how the MIT community commutes to campus. The State of Massachusetts and the City of Cambridge require that MIT collect data related to how students and staff get to MIT every day. In addition, this survey gives MIT the opportunity to find out if transportation-related services (subsidized T-passes, bicycle racks, parking access, etc.) are meeting community needs.

Table 6 presents campus mode split data obtained from the MIT 2014, 2016, and 2018 Transportation Surveys for on-campus and off-campus students. Survey results are included in **Appendix D**.

Table 6. Mode Split (On-campus MIT Students)

	2014	2016	2018	Project
Drove Alone	1%	0%	0%	5%
Carpool	0%	0%	4%[2]	
Transit	15%[1]	13%[1]	7%	10%
Bicycle	15%	15%	13%	15%

	2014	2016	2018	Project
Walk	65%	68%	74%	70%
Other	3%	2%	1%	0%

[1] 2014 and 2015 transit data includes tech shuttle ridership
[2] 2018 carpool data includes tech shuttle ridership (vanpool)
** source data does not add to 100%*

The site location is directly across Vassar Street from the Westgate and Tang graduate student housing, though slightly farther from the center of campus than some of the other on-campus housing. The site is located directly on the route of the Tech Shuttle. Slightly more residents at the site may utilize bicycle and transit than students living more centrally on campus.

For the Project, the MIT on-campus mode split was adjusted to reflect the proximity to the Tech Shuttle and a suggestion from the Cambridge Community Development Department (CDD) that the Project will have a slightly higher bicycle use than the average MIT on-campus bicycle mode split.

PROJECT TRIP GENERATION

Travel mode share percentages for the 690 student beds were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates for the Project. **Table 7** presents a summary of the existing unadjusted person trips, vehicle trips, transit trips, and bike/walk trips for the Project based on the adjusted mode split distribution of on-campus student residents applied to ITE LUC 221 including daily, a.m. peak hour, and p.m. peak hour trips. The detailed trip generation information is provided in **Appendix E**.

Table 7. Project Trip Generation (690 beds)

Time of Day	In/Out	Total Person Trips	Vehicle Trips*	Transit Person Trips	Bike Person Trips	Walk Person Trips
Daily	**Total**	**2,336**	**98**	**234**	**350**	**1,636**
a.m. Peak	In	40	2	4	6	28
	Out	114	5	11	17	80
	Total	**154**	**7**	**15**	**23**	**108**
p.m. Peak	In	116	5	11	17	82
	Out	73	3	7	11	51
	Total	**189**	**8**	**18**	**28**	**133**

** ITE LUC 221 with 1.18 VOR* (average rate per unit)*

PARKING ANALYSIS

The parking analysis for the Project is based on the requirements outlined in Section 6.35.3 in Article 6 of the Zoning Ordinance. On-site vehicular parking will not be provided. Project parking for residents with on-campus parking permits will be accommodated within the future parking supply (3,944 spaces).

VEHICLE PARKING DEMAND AND CAPACITY

The total number of spaces owned and operated by MIT in the October 2019 *Parking Inventory Report* was 3,532 spaces. MIT has added 509 spaces at the Kendall Garage (409 spaces this fall, and the remaining 100 spaces will be added in fall 2021). MIT will construct 155 spaces in an underground garage as part of the new Music Building project. Spaces will be eliminated at the West Lot (136 spaces) to build the Graduate Dormitory, Kresge Lot (94 spaces) to build the Music Building, and Lots 44/46 (22 spaces) to build the Schwarzman College of Computing. By 2025, MIT will own and operate 3,944 parking spaces on campus (see **Table 8**).

Table 8. Future Parking Capacity

	Spaces
Total Existing Spaces (Fall 2019)	**3,532**
Spaces to be eliminated (by 2025)	
West Lot	-136
44/46 Lot	-22
Kresge	-94
Spaces to be created (by 2025)	
Kendall Garage	+509
Music Building	+155
Total Future Spaces (2025)	**3,944**

To establish the parking demand at MIT, parking counts provided by MIT were used to determine the number of spaces occupied on campus throughout the day. According to MIT's Parking and Transportation Office, peak utilization for parking on the campus occurs between 8 a.m. and 3 p.m. As shown in **Table 9**, throughout the course of the day parking demand for the 3,532 spaces on campus ranges from 2,340 spaces at noon time (66 percent of total capacity) to 1,321 spaces at 5 p.m. (36 percent of capacity).

As part of the Access and Circulation Plan for the Schwarzman College of Computing (VHB, November 2020), the parking demand in the future was forecast to increase by 300 spaces. **Table 9**

shows that the peak parking demand for campus parking will continue to be 66 to 67 percent of total capacity in the future. Existing and future parking data are provided in **Appendix B**.

Table 9. Parking Demand and Capacity

	Average Occupancy		
	9 a.m.	Noon	5 p.m.
Existing (2019)			
Demand	2,002	2,340	1,321
Capacity	3,532	3,532	3,532
Utilization	57%	66%	37%
Future (2024)			
Demand	2,302	2,640	1,621
Capacity	3,944	3,944	3,944
Utilization	58%	67%	41%

Source: Schwarzman College of Computing Transportation Access and Circulation Plan (VHB, November 2020),

If it is deemed there is insufficient occupancy for permit holders in an area, MIT manages demand and supply on a geographic basis and re-allocates permits to facilities/areas with greater parking vacancies.

West Lot Parking Relocation and Elimination

The Project proposes to eliminate 136 spaces in the West Lot. As outlined in the 2019-2020 *MIT Parking Inventory Report* and *Zoning Parking Requirements and Allocation Plan*, 22 spaces from the West Lot will be replaced in the new Music Building garage.[1] The remaining 97 parking spaces displaced from the West Lot will be dropped from the MIT Parking Inventory if no new parking is constructed; MIT has no plans for constructing new parking. Some Riverside permits may be re-assigned to permit areas further east, and closer to the center of campus, such as the Kendall Garage or the attendant-assist spaces at the Stata Garage.

The economy parking rate permits currently assigned to the West Lot and Westgate Area will be discontinued. The economy parking program is being eliminated over the next few years, removing

[1] The 155-sapce Music Building garage will provide spaces for the relocation of 22 spaces from the 44/46 lots (Schwarzman College of Computing site), 39 spaces from the West Lot (West Campus Graduate Dormitory site), and 94 spaces for the Kresge Lot (Music Building site).

the incentive for those living and working in other parts of the campus to park on the western end of campus.

PROJECT PARKING DEMAND

Graduate parking demand for the Project was estimated based on existing ratios of graduate students and student parking permits. The graduate parking demand for the campus is 0.03 spaces per commuting student and 0.09 spaces per on-campus resident student. Parking demand created by the Project would be approximately 62 on-campus graduate resident permits with approximately 28 commuter permits eliminated, for a net new demand of 34 spaces. The number of permits issued is not necessarily the number of spaces demanded on campus. Student parking permit data from the 2018-2019 and 2019-2020 school years is summarized in **Table 10**.

On-campus student permits are predominantly assigned to the Northwest (30 percent), Riverside/Westgate (40 percent), and Eastgate (20 percent) areas. Fewer than 20 on-campus resident permits were issued to the Amherst, Hayward, E62, Kresge, Northwest, and Northeast areas.

Table 10. Parking Permit Data

	2018-2019	2019-2020	Permit Demand
Graduate Students	6,742	6,780	
Off-campus	4,394	4,334	
On-campus	2,348	2,446	
Parking Permits	369	451	
Commuter	150	218	0.04
On-campus residents	219	233	0.09

Assignment of Parking Permits and Future Project Parking Permits

MIT aggregates its 40 individual parking facilities into 8 geographic areas. Commuters, residents, and other permit types are allocated to balance supply and demand across campus. Permits are issued by area according to a rule of thumb that limits a permit holder's walk to his or her destination to no more than 10 minutes.

The number and type of permits allocated to any individual area is based on frequency and time of day use. The goal is to be certain that even at maximum daily demand, there will be parking spaces available somewhere in the area; therefore, if one facility is full, another nearby facility in the area will still have capacity. Managing each facility individually, especially smaller facilities, would require assigning many fewer permit holders to the facility to prevent overcrowding on any given

day, ultimately requiring more total facilities and parking spaces to accommodate peak demand, even as other facilities have vacant spaces. Allowing parking anywhere on campus could theoretically limit the total number of parking spaces needed to meet campus demand, but this would frustrate individual parkers confronting the wide variability of space availability in any single facility, requiring diversion to other facilities without assurance that parking would be available in a second or even a third choice. The variability in time-of-day use would mean those who come to campus later in the day would potentially (and unpredictably) must park quite remotely from their destination.

The opening of large new facilities at the Kendall Garage and Music Building, the loss of the West Lot spaces, the elimination of economy parking in the West Lot and Westgate Lot, accommodating new demand from the dormitory and the uncertainty of post-COVID travel and parking patterns will require a careful rebalancing of permit assignment as each of these events unfolds over the next several years. Specific permit assignments take place on an annual basis, so there will be substantial changes in assignments made prior to the occupancy of the new dormitory. As demonstrated in the parking analysis, there is substantial capacity for such a reassignment to adequately accommodate the new residential parking demand within the future MIT Parking Inventory of 3,944 spaces.

Zoning Ordinance Parking Minimum

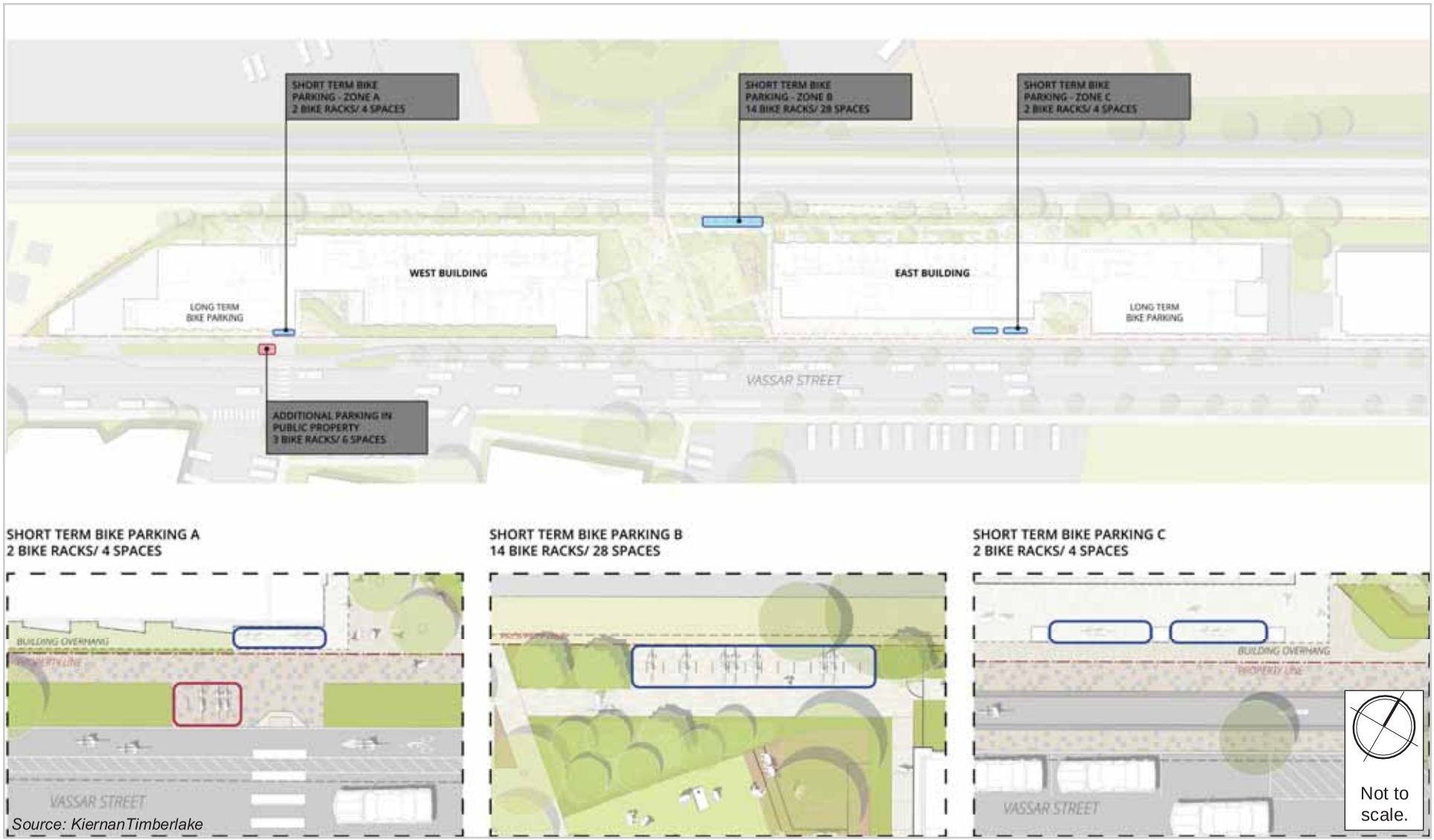
The zoning requirement for this Project is 58 off-street parking spaces (1 space per 12 beds). MIT is seeking relief from the minimum parking demand requirement for this Project based on the minimal automobile usage of the future residents (85% walk or bicycle, 10% Tech Shuttle, and 5% auto); proximity to MIT, MBTA, and EZRide shuttle routes; and the availability of off-street parking within the future MIT parking inventory (3,944 spaces). The future on-campus MIT Parking Inventory can accommodate the parking demand for this Project.

BICYCLE PARKING

The City of Cambridge has established guidelines requiring projects to provide secure bicycle parking for all employees and/or residents, as well as short-term bicycle racks for guests and visitors. The Project will provide a total of approximately 345 secure/covered bicycle parking spaces and 35 short-term bicycle spaces. Bicycle space counts are based on the City of Cambridge guidelines of a minimum of 0.50 secure/covered bicycle parking spaces per dormitory bed, as well as at a rate of 0.05 short-term bicycle parking spaces per dormitory bed.

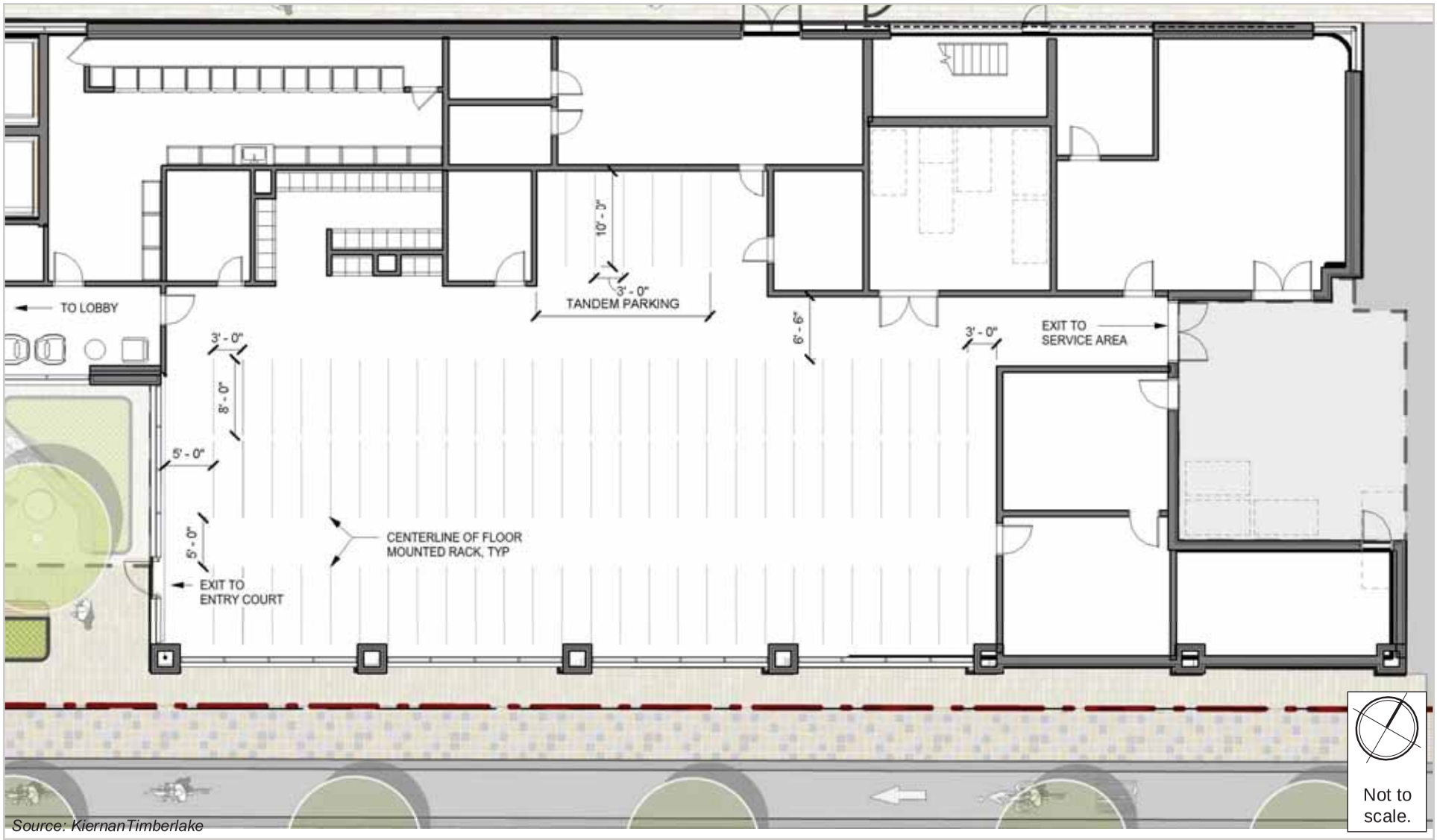
Project bicycle racks will meet city standards and zoning requirements. Bicycle layout parking plans, shown in **Figure 9** through **Figure 11**, illustrate the layouts have sufficient space and are consistent with zoning requirements for bicycle parking.

Figure 9. ***Short-term Bicycle Parking***



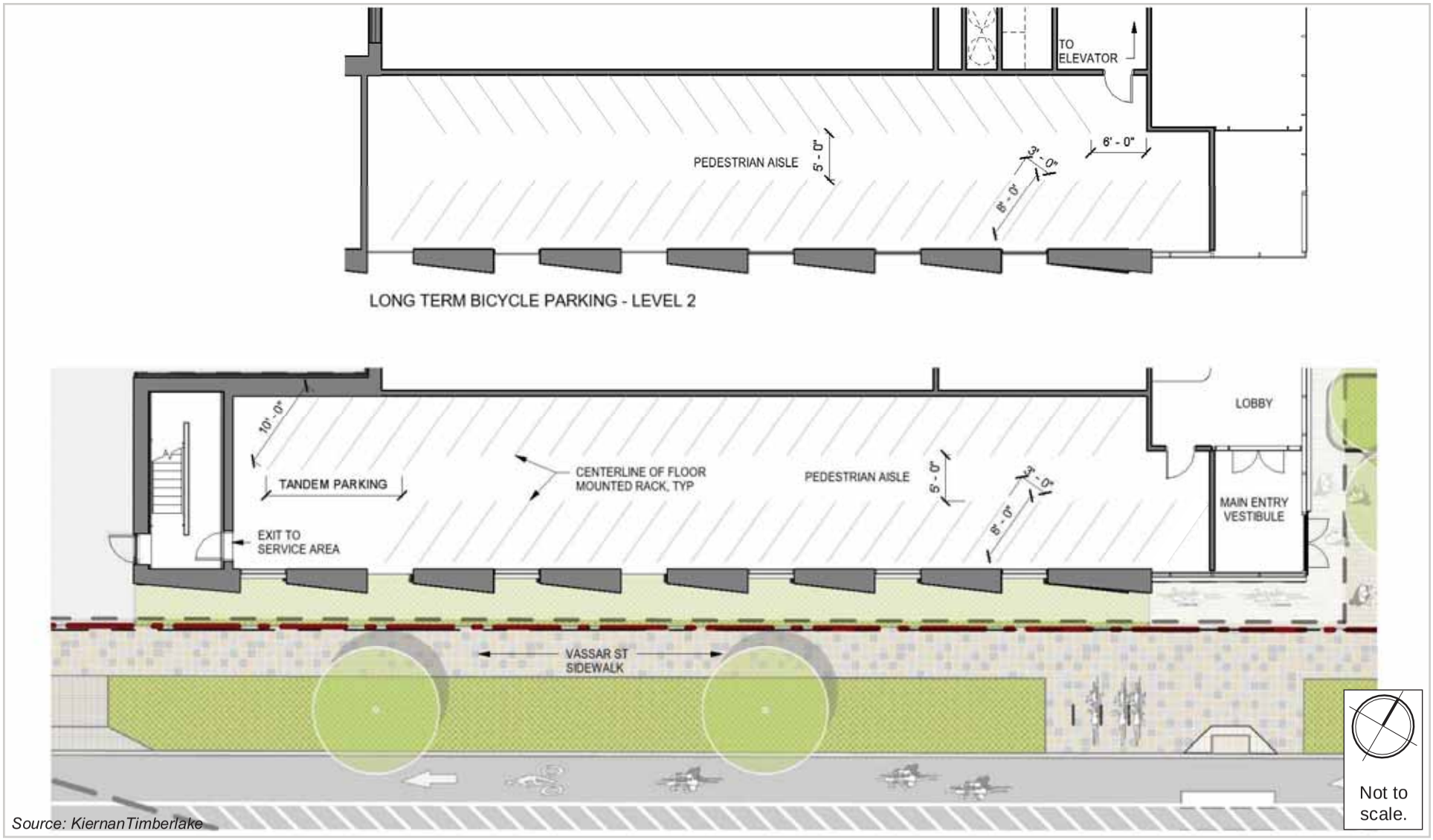
Source: KiernanTimberlake

Figure 10. ***Long-term Bicycle Parking (East Building)***



Source: KiernanTimberlake

Figure 11. ***Long-term Bicycle Parking (West Building)***



Source: KiernanTimberlake

BLUEBIKES AVAILABILITY

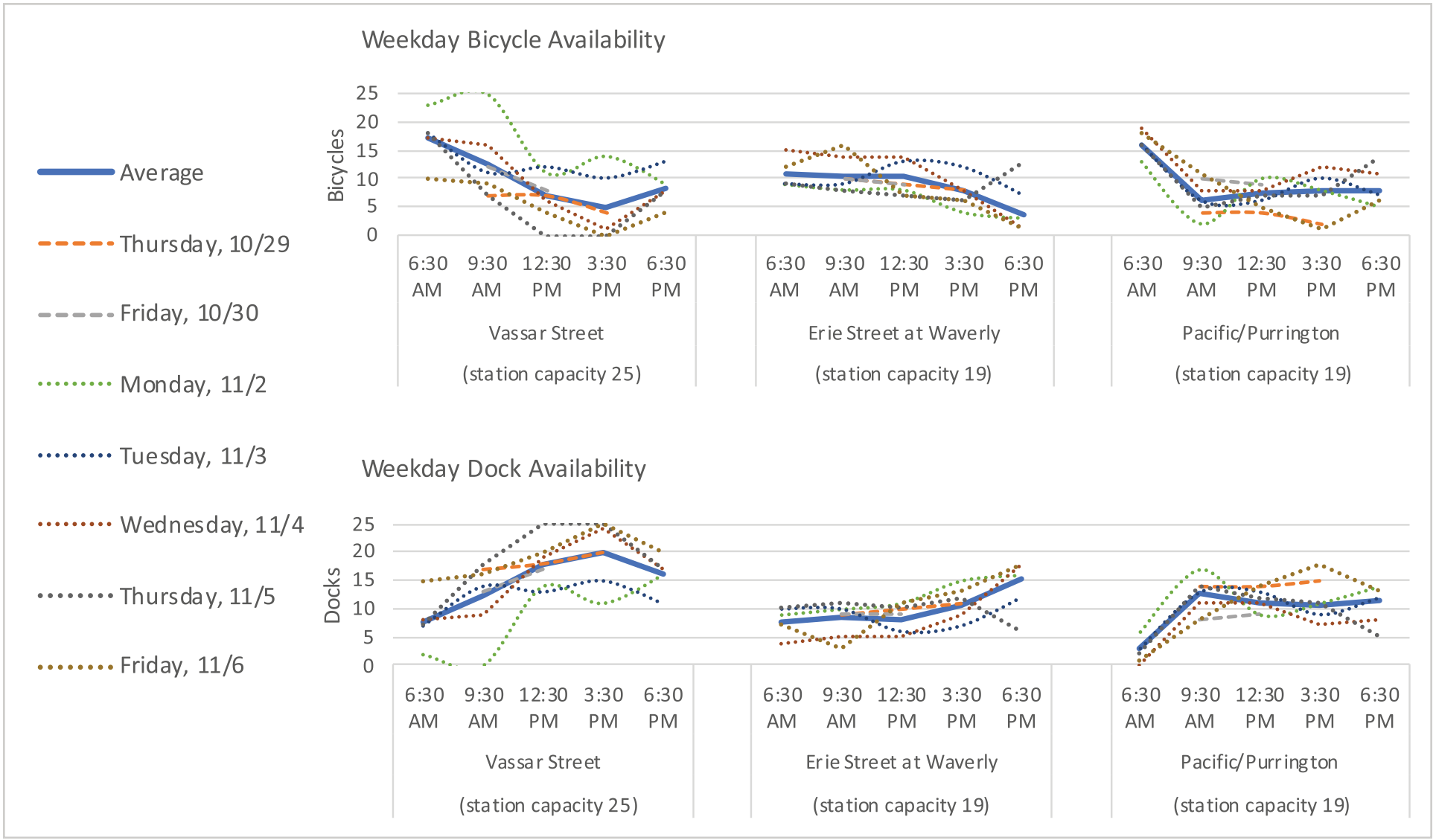
To establish the availability of Bluebikes for Project residents, data at the Vassar Street and nearest Bluebikes stations was collected for available bicycles as well as available docks from Thursday, October 29, 2020 to Sunday, November 8, 2020. As shown in **Figure 12** and **Table 11**, throughout the course of the day docks and bicycles are available in the area. The Vassar Street Bluebikes station is typically stocked nearly to capacity early each morning, supporting residential travel patterns within this area of campus. Vassar Street Bluebikes availability runs lowest in mid-afternoon. Bluebikes staff continually redistribute bicycles throughout the system to accommodate demand. Bluebikes availability data are provided in **Appendix F**.

Table 11. Typical Weekday Bluebikes Availability

Bluebikes Station (capacity)	6:30 a.m.	9:30 a.m.	12:30 p.m.	3:30 p.m.	6:30 p.m.	Average
Bluebikes Available						
MIT Vassar Street (25)	19	14	9	7	10	**12**
Erie Street at Waverly (19)	11	10	11	8	4	**9**
MIT Pacific Street at Purrington (19)	16	6	7	8	8	**9**
Bluebikes Docks Available						
MIT Vassar Street (25)	6	11	16	18	15	**13**
Erie Street at Waverly (19)	8	9	8	11	15	**10**
MIT Pacific Street at Purrington (19)	3	13	11	11	11	**10**

In addition to providing 345 secure, covered bicycle parking spaces in the building for residents, the Project will expand the existing Vassar Street Bluebikes station across the street from the site at the Westgate Apartments.

Figure 12. ***Bluebikes Availability (Bicycles and Docks)***



STUDENT DESTINATIONS

MIT bridges Cambridge's Central Square Cultural District and the innovation district of Kendall Square. The campus is within walking distance to cultural venues and a wide variety of restaurants, cafes, and shops. Area dining, retail, and grocery services are summarized in **Table 12.**

Table 12. Area Dining and Grocery Services

Services	Facility	Miles	Walk-time	Bike-time
Dining	*Flour Bakery (40 Erie Street)	0.2	5 min	1 min
	Sebastian's Café (600 Memorial Drive)	0.3	7 min	2 min
	Thirsty Ear Pub (235 Albany Street)	0.4	7 min	3 min
	Pacific Street Café (70 Pacific Street)	0.5	10 min	3 min
	Anna's Taqueria (84 Massachusetts Avenue)	0.6	12 min	3 min
	Maseeh Hall (305 Memorial Drive)	0.7	13 min	4 min
	Café 4 (77 Massachusetts Avenue)	0.7	14 min	4 min
	Bosworth's Café (77 Massachusetts Avenue)	0.7	14 min	4 min
	Oath Craft Pizza (181 Massachusetts Avenue)	0.7	14 min	4 min
	Steam Café (77 Massachusetts Avenue)	0.7	14 min	2 min
	Chicago Pizza (239 Massachusetts Avenue)	0.8	15 min	4 min
	Forbes Family Café (32 Vassar Street)	0.8	17 min	4 min
	R&D Pub (32 Vassar Street)	0.8	17 min	5 min
	Starbucks (32 Vassar Street)	0.8	17 min	5 min
	Koch Café (500 Main Street)	0.9	18 min	6 min
	Sebastian's Café (415 Main Street)	1	20 min	5 min
	Rebecca's Café (142 Memorial Drive)	1.1	22 min	6 min
Grocery	*Trader Joe's (748 Memorial Drive)	0.8	17 min	6 min
	*Whole Foods (340 River Street)	0.8	17 min	6 min
	H Mart (581 Massachusetts Avenue)	0.9	18 min	6 min
	Tech Mart (142 Memorial Drive)	1.1	22 min	6 min
	Star Market (14 McGrath Highway)	1.8	37 mi	12 min
General	Target (564 Massachusetts Avenue)	0.9	18 min	7 min
	Marshalls (22 McGrath Highway)	1.8 miles	36 min	11 min
	Cambridgeside Galleria (100 Cambridgeside Place)	1.8 miles	36 min	11 min
	Target (180 Somerville Avenue)	2.0 miles	40 min	14 min

** Does not accept MIT TechCASH*

FUTURE CONNECTIONS

It is the goal of the Project to be compatible with existing and proposed transportation infrastructure. The Project recognizes the need to be consistent with the existing Vassar Street cycle track, Fort Washington Historic District, Grand Junction Multi-Use Path, and other campus connections.

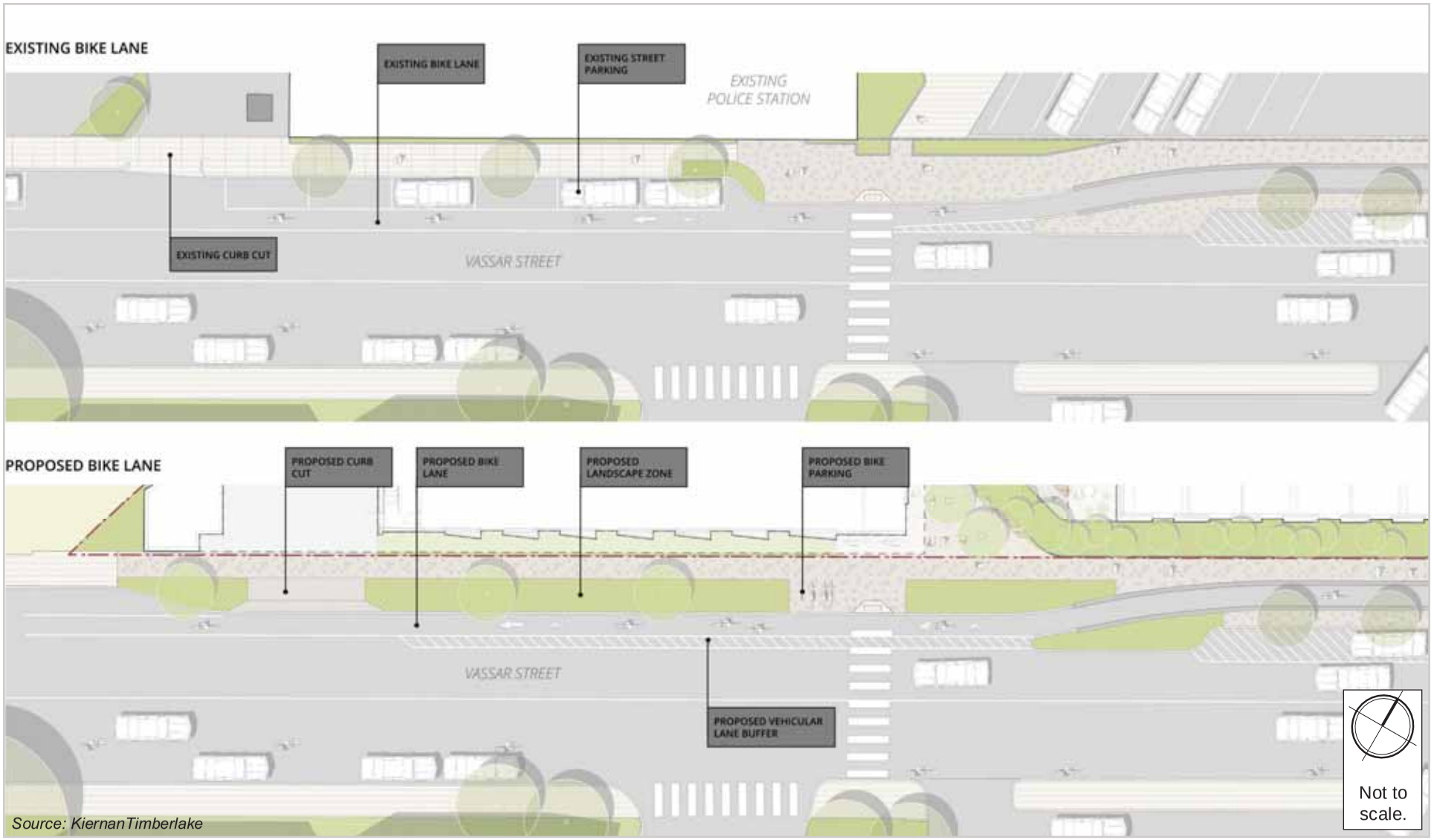
CYCLE TRACK

The Project proposes to improve the site-adjacent off-street Vassar Street cycle track. The Vassar Street cycle track provides a northeast-southwest connection between the Paul Dudley White Bike Path to Massachusetts Avenue and Main Street. Separated bicycle lanes along Massachusetts Avenue connect the Kendall and Central Square neighborhoods of Cambridge to Boston via the bike lanes across the Massachusetts Avenue Bridge.

At the final 200-feet on the west end of the Project Site, the sidewalk-level bike facilities transition to an on-street bike lane. The Project is designing feasible and constructable means to improve safety and enhance the cyclist experience within the buffered bike lane on Vassar Street to the end of the Project limits (see **Figure 13**).

Improvements will support safe interactions with the Proposed new loading curb cut to the end of the West Building. The buffered bike lane concept as currently proposed would require supplanting four on-street, metered parking spaces.

Figure 13. ***Vassar Street Cycle Track Improvements***



Source: KiernanTimberlake

FUTURE CENTRAL PLAZA

At the heart of the Site, the main central plaza provides a vibrant and active public open space that connects the MIT campus and Fort Washington Park by utilizing the existing Grand Junction Rail Line multi-modal crossing (see **Figure 14** and **Figure 15**). The new central plaza provides attractive green space for the dormitory community and preserves and enhances the Fort Washington Historic District view corridor. The central plaza honors the Fort Washington Historic District boundary and an easement associated with the Talbot Street outfall, which passes though the Site.

The plaza provides a necessary multi-modal connection from Fort Washington Park across the Grand Junction Rail Line to the existing Vassar Street crosswalk, reinforcing a strong pedestrian and cyclist route from the river and playing fields, through to the historic park. The landscape design of the plaza acknowledges the orientation and alignment of Fort Washington Park across the Grand Junction Rail Line, replaces a large surface parking lot, and establishes a vastly improved view corridor from the Park toward the river.

The proposed multi-modal connections through the Plaza align with the north-south desire lines of the Grand Junction Rail crossing and the existing mid-block Vassar Street pedestrian crossing. The Plaza will have additional pathways to both new buildings and pathways to the rear of each building. The Central Plaza will seamlessly connect the public realm of Vassar Street to the future Grand Junction Multi-Use Path.

The central plaza establishes new shared public space along Vassar Street that is welcoming to students and neighbors alike. The central plaza will include appropriate lighting, seating, and furnishings to promote pedestrian engagement with this area, while also preserving the view corridor through the Site to Fort Washington Park.

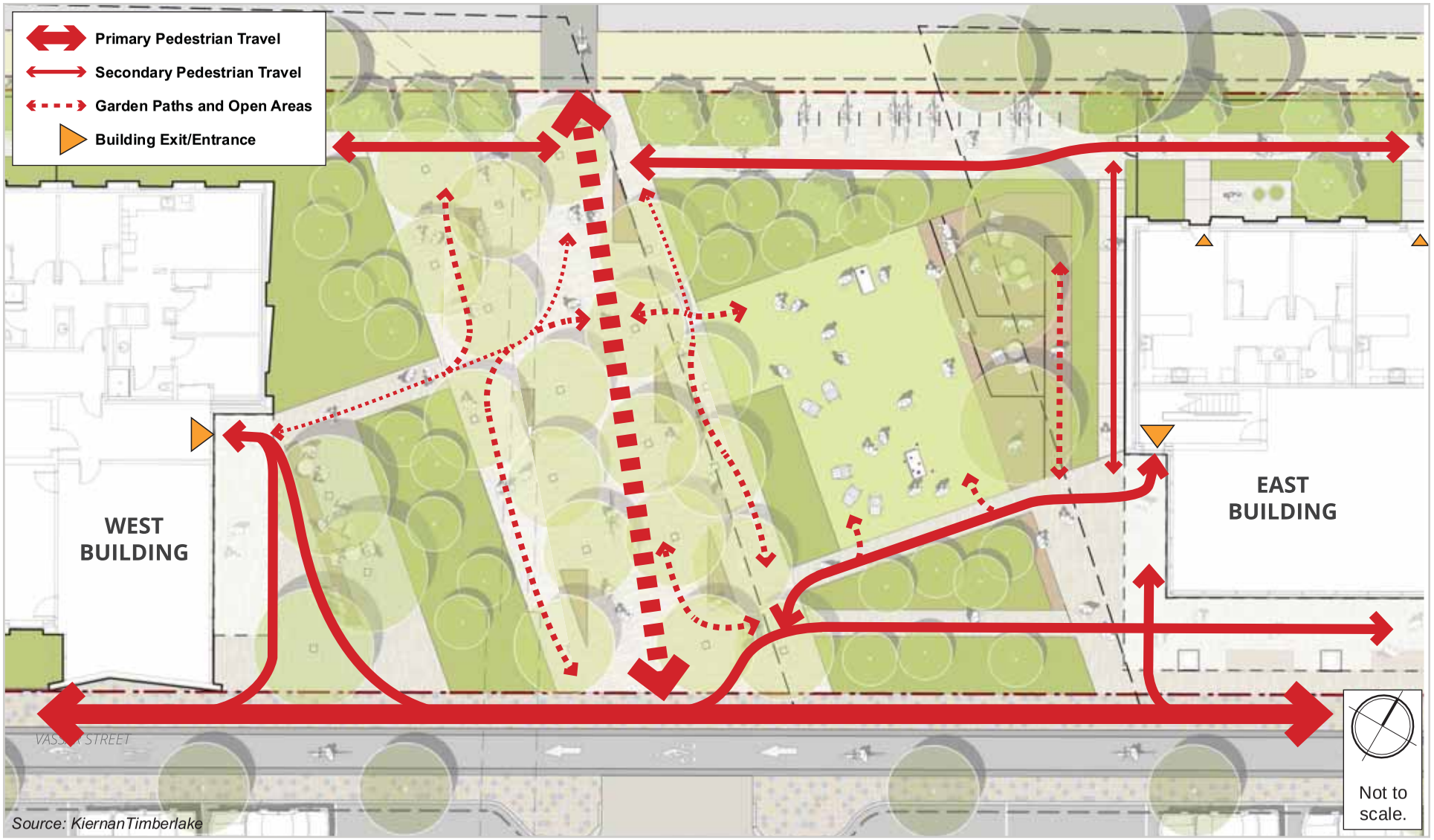
FORT WASHINGTON HISTORIC DISTRICT

Fort Washington, also known as Fort Washington Park, is a historic site at 95 Waverly Street. The park is part of a small district that protects the remains of a Revolutionary War earthwork fortification erected by soldiers of the Continental Army under the direction of George Washington. The existing Fort Washington rail crossing connects the central plaza of the proposed Project to the existing mid-block crossing adjacent Amherst Alley and the Charles River pathway system beyond.

Figure 14. ***Central Plaza Conceptual Plan***

Source: KiernanTimberlake

Figure 15. ***Central Plaza Circulation***



Source: KiernanTimberlake

GRAND JUNCTION MULTI-USE PATH

The Grand Junction Multi-Use Path is proposed adjacent to the railroad tracks in the Grand Junction corridor from the Boston University Bridge to Somerville. The Grand Junction Multi-Use Path will provide a continuous off-street path for residents, schoolchildren, workers, and visitors to stroll, jog, or bike. The first phase of the Grand Junction Multi-Use Path adjacent to the railroad right-of-way was completed in 2016 between Main Street and Broadway. The path will be designed to preserve room for at least two tracks for a future rail transit line within the Grand Junction right-of-way.

The Project will provide direct access from the building to the rail crossing that provides access to the Grand Junction Multi-Use Path. A safety fence separates the campus from the rail right-of way. A 12-foot-wide crossing on the north side of the Project provides access to the Fort Washington Park and will provide a connection to the future Grand Junction Multi-Use Path (**Photo 1** and **Photo 2**). No improvements are proposed on the rail right-of-way as part of this Project. The Project will continue to provide a wide view corridor of the potential path to serve as an intermediate gateway.

Photo 1. Grand Junction Rail Crossing to Fort Washington Park (to northwest)

Photo 2. Grand Junction Rail Crossing from Fort Washington Park (to southeast)

DR. PAUL DUDLEY WHITE BIKE PATH

The Dr. Paul Dudley White Bike Path provides access along the Charles River from Boston to Watertown. The Dr. Paul Dudley White Bike Path is only 16 miles of a larger, paved Charles River Bike Path, also referred to as the Charles River Greenway. These trails are also part of a larger, developing network called the East Coast Greenway, which stretches from Maine to Florida.

The bike path is within one-quarter mile of the Project. Signals provide access from the campus across Memorial Drive at Amesbury Street, Endicott Street, and Massachusetts Avenue.

LOADING/SERVICE

Loading and service will occur on-site in designated service areas behind each building. Trash pick-up will occur at each building one to two times per week. Recycling is expected to be collected once a week at each building. All mail and packages will be delivered to the loading area at the East building. A central area on the ground floor of the East building will be designated for residents of both buildings to collect mail/packages.

Fire access to the site will be achieved along the length of Vassar Street from the street. In addition, to accommodate the hose length requirements for fire access to the Project, the loading/service curb cuts will provide access to the ends of the buildings.

Loading/service areas and their access are illustrated in **Figure 16**.

CURBSIDE PICK-UP/DROP OFF

The Project proposes to maintain existing on-street, metered parking spaces along much of the Project adjacent curb. To accommodate future curb use demand for the two buildings, two separate pick-up and drop-off zones are proposed. Curbside pick-up and drop-off areas will be provided adjacent to each building as shown in **Figure 17**. Each pick-up/drop-off area will be approximately 60-feet long and will accommodate three vehicles. On-street parking will be eliminated to accommodate the pick-up/drop-off areas. When considering total Project proposed curb use changes, including consolidated curb-cuts and added short-term, pick-up/drop-off areas, an equivalent of six on-street spaces would be reallocated to bicycle and active curb uses along the site frontage.

Figure 16. ***Loading and Service Access***

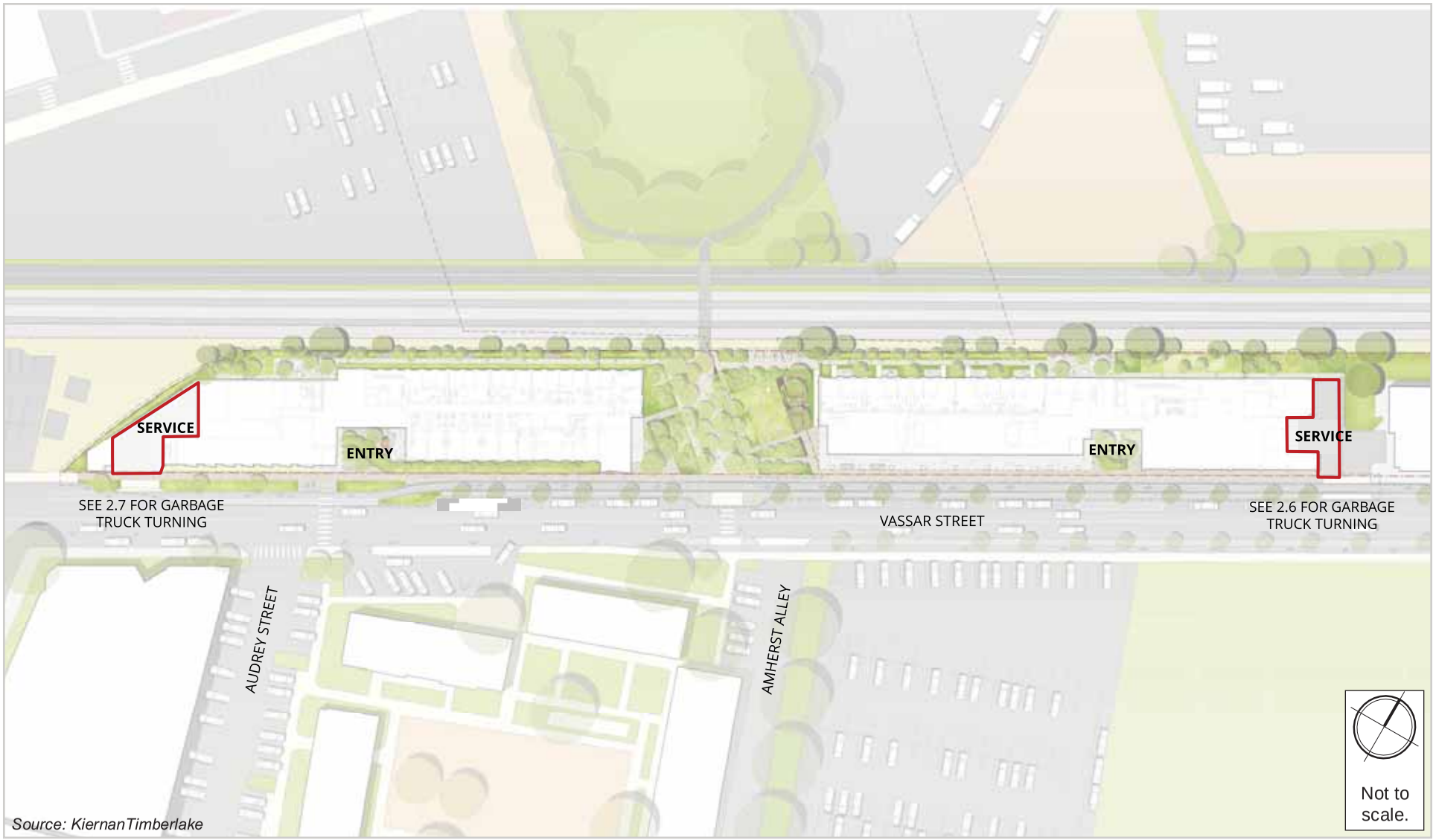
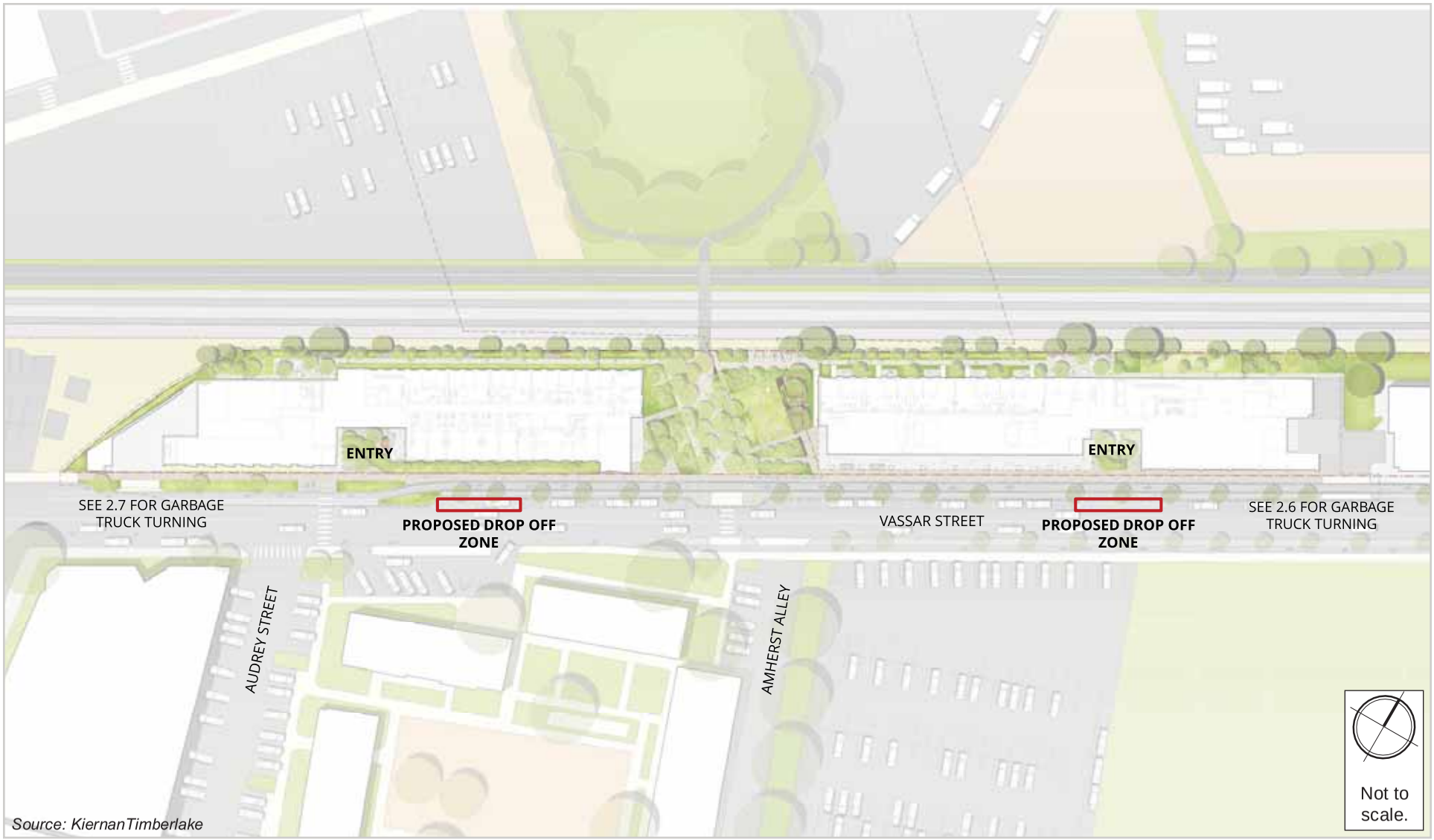


Figure 17. ***Curbside Pick-up/Drop-off***



Source: KiernanTimberlake

MOVE-IN/MOVE-OUT

The Division of Student Life rigorously coordinates and supervises the move-in/move-out activities for both undergraduate and graduate on-campus housing. Residents are assigned move-in/move-out times and days. MIT shuttles provide airport access and campus access during move-in/move-out weekends. Students may drop off belongings at designated curbside areas and then must proceed to the nearest parking lot. All parking lots are open and free of charge during move-in/move-out weekends.

The Project, when completed, will conform to the move-in/move-out policies established by MIT. Move-In activities associated with the Project are expected to have only a small impact on area roadways, as they will account for only 10 percent of the total number of students housed by MIT. Project move-in/move-out should have little impact on the adjacent neighborhoods.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

MIT is committed to reducing single-occupancy vehicles traveling to MIT and has a strong transportation demand management (TDM) program to encourage sustainable modes including carpool/vanpool, public transportation, walking, and biking. The MIT Parking and Transportation Office through their AccessMIT program offers the following TDM measures to students, staff, and faculty:

- Campus Transportation Coordinator;
- Bicycle Reimbursement Program and discounted Bluebikes membership;
- Free Shuttles (EZ Ride, SafeRide, Emergency Ride Home, Airport Shuttle, Grocery Shuttles, Tech Shuttle);
- Transit Subsidy Program that includes:
  - Free, unrestricted use of the MBTA subway and local bus systems for benefits-eligible Cambridge campus MIT faculty and staff with the Access MIT pass;
  - A 50% subsidy for MBTA subway and local bus systems on a monthly or semester basis for MIT students with the Access MIT pass;
  - A 50-60% commuter rail subsidy for students, faculty, and staff;
  - A 50% subsidy for faculty and staff parking at MBTA stations, up to $100 per month; and
  - Reimbursement for up to 50% of private transit commuting costs, up to $255 per month.
- MIT ID and T-Pass all-in-one;
- Daily Parking fee structure for commuters; and
- Vibrant and Walkable Campus.

Conclusion and Recommendations

The West Campus Graduate Student Dormitory Project will construct up to 690 beds of graduate housing. The Project will not provide any parking on site. Parking for the Project will be accommodated within the future capacity of the MIT parking inventory (3,944 spaces). Detailed parking analysis indicate future utilization of campus parking will be maintained at two-thirds of total capacity.

Approximately 345 long-term and 35 short-term bicycle spaces will be provided on site. The Project will expand the existing Vassar Street Bluebikes Station at the Westgate Apartments. In addition, the Project is designing feasible and constructable means to improve safety and enhance the cyclist experience within the buffered bike lane on Vassar Street to the end of the Project limits. The Central Plaza will preserve and enhance corridors and community access to the Fort Washington Historic District, Grand Junction Multi-Use Path, and Paul Dudley White Bike Path.

The Project will not increase MIT's graduate student population, but rather is intended to provide additional on-campus housing for graduate students to make more off-campus housing available to other Cambridge community members. The Project will have minimal impacts on the adjacent roadways because:

- Relocating graduate students from off-campus housing to the MIT campus will have a negligible impact on traffic on Vassar Street and area roadways.
- Students will be walking or bicycling as their primary travel mode.
- MIT continues to demonstrate a strong commitment to TDM to minimize vehicular traffic to and within the campus.

HOWARD STEIN HUDSON

Engineers + Planners

Appendix A

MIT Shuttle Ridership

Weekly Costco Shuttle Ridership - 2019

January 2019
01/06/2019 – 16
01/13/2019 – 38
01/20/2019 – 27

Feb-19
02/03/2019 – 49
02/10/2019 – 31
02/17/2019 – 78

Mar-19
03/03/2019 – 40
03/10/2019 – 28
03/17/2019 – 32

Apr-19
04/07/2019 – 48
04/14/2019 – 32
04/28/2019 – 49

May-19
05/12/2019 – 30
05/19/2019 – 35

Jun-19
06/16/2019 – 82
06/23/2019 – 56

Jul-19
07/14/2019 – 42
07/28/2019 – 81

Aug-19
08/11/2019 – 48
08/25/2019 – 62

Sep-19
09/08/2019 – 67
09/15/2019 – 47
09/22/2019 – 104

Oct-19
10/06/2019 – 60
10/13/2019 – 58
10/20/2019 – 77

Nov-19
11/03/2019 – 94
11/10/2019 – 118
11/17/2019 – 73

Dec-19
12/01/2019 – 52
12/08/2019 – 47
12/15/2019 - 61

MIT Shuttle Summary	Passenger Counts																									
	we 3-20-20	we 3-27-20	we 4-3-20	we 4-10-20	we 4-17-20	we 4-24-20	we 5-1-20	we 5-8-20	we 5-15-20	we 5-22-20	we 5-29-20	we 6-5-20	we 6-12-20	we 6-19-20	we 6-26-20	we 7-3-20	we 7-10-20	we 7-17-20	we 7-24-20	we 7-31-20	we 8-7-20	we 8-14-20	we 8-21-20	we 8-28-20	we 9-4-20	we 9-11-20	Total Rides
Tech Shuttle																										
Tech Shuttle	380	35	26	0	47	15	30	35	42	43	21	25	51	52	59	47	26	52	102	95	103	139	182	165			**1772**
Tech Shuttle Backup #1																											**0**
Tech Shuttle Backup #2																											**0**
Tech Shuttle																											**0**
Boston All																										
Boston All	0	7	2	0	0	2	2																				**13**
Boston Daytime																										
Boston Daytime	58																										**58**
Saferide																										
Boston East	53																										**53**
Campus Shuttle	17																										**17**
Brookline Cambridge	5																										**5**
Somerville	1																										**1**
Boston East Backup																											**0**
Brookline Cambridge Backup																											**0**
Costco / Target Shuttle																										
Costco / Target Shuttle	6	0	0	0	2	8	4	4	4	8	8	0	0	22	10	13	0	16	13	16	14	14	8	17			**187**
Trader Joe's / Wholefoods																										
Trader Joe's / Wholefoods	17	13	14	0	12	19	29	25	25	10	19	24	0	16	12	13	12	9	12	16	16	23	8	22			**366**
Dana Faber																										
Dana Faber																											**0**
Harvard Medical																										
Harvard Medical																											**0**
On-Demand																										
On-Demand	32			0	3	4	0	4	2	8	8	15	0	8	10	31	22	10	32	17	21	23	46	39			**335**
On-Demand	19	5	10																								**34**
On-Demand	27	7	2																								**36**

HOWARD STEIN HUDSON

Engineers + Planners

Appendix B

October 2019 Parking Inventory

MIT Parking Facility Inventory **As of: 10/2019**

#	Facility Name	Facility Address	Location	Spaces In Use	Spaces Temp Out of Service	Total Spaces
1	Kresge Lot	Danforth Street	Central	94		94
2	Dormitories	Various Addresses	Central	25		25
3	Student Center	76 Mass Avenue	Central	4		4
4	Amherst & Danforth	Amherst & Danforth	Central	43		43
5	Amherst Alley	Amherst Alley	Central	21	5	26
6	Visitor Lot	139 Mass Ave	Central	54		54
7	Main Lot	60 Vassar Street	Central	20		20
8	Hermann Garage	170 Main Street	East Side	22		22
9	East Garage	170 Main Street	East Side	418	6	424
10	Ford Lot	370 Main Street	East Side	22		22
11	Amherst Lot (E51)	21 Amherst Street	East Side	60		60
12	Sloan Lot	170 Main Street	East Side	49		49
13	President's House	111 Memorial Drive	East Side	8		8
14	East Campus	3 Ames Street	East Side	5		5
15	68 Koch	31 Ames Street	East Side	4		4
16	Hayward Lot	21 Hayward Street	East Side	39	22	61
17	Albany Garage	20 Albany Street	North	418	2	420
18	N10 Lot	66 Albany Street	North	0	55	55
19	N52 Lot	22 Windsor Street	North	7		7
20	Stata Garage	32 Vassar Street	North East	676	3	679
20A	Attendant Assist at Stata	32 Vassar Street	North East	136		136
20B	Stata Lot	32 Vassar Street	North East	14		14
21	44/46 Lots	25,51,59 Vassar Streets	North East	22	10	32
22	Plasma Fusion Lot	167 Albany Street	North West	29		29
23	Nuclear Reactor Lot	116 Albany Street	North West	22	1	23
24	65 Waverly Street Lot	65 Waverly Street	North West	55		55
25	NW86 Lot	70 Pacific Street	North West	77		77
25A	NW86 Garage	70 Pacific Street	North West	128	2	130
26	NW35 Lot	235 Albany Street	North West	8		8
27	158 Mass Avenue	158 Mass Avenue	North West	51		51
28	Cross Street	Cross Street	North West	7	4	11
29	NW22/NW23 Lot	185 Albany Street	North West	84		84
30	NW32 Lot	230 Albany Street	North West	2	21	23
31	WW15 Lot	350 Brookline Street	Riverside	35		35
32	W91 Lot	565 Memorial Drive	Riverside	59		59
33	W98	600 Memorial Drive	Riverside	66		66
34	West Lot	243 Vassar Street	Riverside	136		136
35	Cruiser Lot -W31	96 Vassar Street	Riverside	3		3
36	Westgate lot	319 Vassar Street	Riverside	286	45	331
37	Westgate Low Rise	290 Vassar Street	Riverside	42	14	56
38	W92 Garage	Audrey Street	Riverside	53	1	54
39	W92 Lots	Amesbury Street	Riverside	18		18
40	Koch Lot/TCC	219 Vassar Street	Riverside	19		19
Owned Spaces Subtotal				*3,341*	*191*	*3,532*
Leased	Tech Sq	NE47, NE49, Biophysics		70	0	70
Leased	141 Portland	EdX		39	0	39
Leased	1 Main	Office Corporate Relations		33	0	33
Leased	3 Cambridge Center	OSP		38	0	38
Leased	1 Rogers Street	MIT Press		14	0	14
Leased	Talbot Street			0	10	10
Leased	55 Franklin Street	DSL		1	0	1
Leased	105 Broadway	Libraries/General Counsel		48	0	48
Leased	NW98 - 12 Emily Street	UBIT (Sea Grant)		9	0	9
Leased Spaces Subtotal				*252*	*10*	*262*
Total Campus Spaces				**3,593**	**201**	**3,794**

Massachusetts Institute of Technology

77 Massachusetts Avenue
Cambridge, Massachusetts
02139–4307

October 26, 2020

Mr. Joseph E. Barr, Director
Traffic, Parking and Transportation
City of Cambridge
344 Broadway
Cambridge, Massachusetts 02139

Re: MIT Parking Inventory Report: 2019 – 2020
MIT Institutional Zoning Parking Requirements and Allocation Plan: 2019 – 2020

Dear Mr. Barr:

Enclosed is a copy of the MIT Parking Inventory for 2019 – 2020, along with a copy of the MIT Institutional Zoning Parking Requirements and Allocation Plan. Apologies for its late submission. The onset of pandemic delayed wrapping up the work on the reports.

MIT PARKING INVENTORY REPORT

The Inventory includes a summary page and a full report showing the location and status of all parking spaces included as part of the MIT campus parking facility as of October 2019. The number of spaces in use when we conduct the inventory is identified and totaled in the summary sheet. Each map reflects the number of spaces in use at the time of inventory and identifies spaces that have been temporarily removed from use.

The total number of spaces in the 2018 – 2019 MIT Parking Inventory was 3,790 spaces. Between the October 2018 and October 2019 inventories, there were minor adjustments to the MIT parking inventory which brought the total number of spaces (in use on campus, temporarily under construction and leased) to 3,794 parking spaces.

Adjustments to Parking Inventory: 2018 – 2019 vs. 2019 – 2020

Changes in the total number of Institute parking spaces for 2019 – 2020 are detailed below and summarized in ***Attachment A***:

- Nineteen (19) spaces were added to what remains of the Hayward Lot in the middle of the Kendall development, serving MIT Medical patients.
- There was a net reduction of five (5) spaces across the campus due to minor adjustments, such as re-striping lots.
- The amount of leased parking decreased by 10 spaces due to changes in MIT office and lab leases.

Expected changes in 2020 and Future Parking

MIT's vision to redevelop Kendall Square called for replacement of the surface parking lots adjacent to the Kendall MBTA station in east campus with underground parking. This vision will be realized with the opening of the new Kendall Garage this month. Only 61 surface spaces remain located in the Hayward Lot for use by MIT Medical.

In addition to enabling the Kendall Square vision, the new garage is part of the Institute's plan to maintain its parking inventory in compliance with City PTDM and zoning regulations and to continue to meet parking demand on campus. There are additional development projects on campus that have removed parking, including the CUP Expansion that took over most of the N10 Lot in 2017 and the demolition of the West Garage in March 2018 to enable construction of the new Vassar Street Undergraduate Dormitory. There has been a net loss of 555 of inventory parking spaces (owned and leased) from October 2016 until October 2019. The 509 academic parking spaces in the Kendall Square Garage being made available in two tranches of 400 in October 2020 and another 109 next summer will compensate for some spaces removed for these two projects, in addition to replacing spaces removed in Kendall Square. The 136 spaces provided by attendant assist parking at the Stata garage partly made up for these losses on both a regulatory and an operational basis. MIT will be seeking to extend this operation through the Board of Zoning Appeal in the coming months.

There are several additional projects in development that will temporarily or permanently displace parking. A new Music building garage of 155 spaces will replace the existing 94 spaces it will displace at the Kresge Parking lot. This garage will also accommodate the 22 spaces that need to be relocated from Lot 44/46, to make way for the new building for the College of Computing and 39 spaces from the displacement of 136 spaces in the West Lot, the site of the proposed West Campus Graduate Dormitory. **By the fall of 2023, MIT will have approximately 143 fewer spaces in its inventory than it had seven years earlier in the fall of 2016.** [Please see ***Attachment A*** for a summary detailing space changes in the Parking Inventory to date and a forecast of future changes.]

INSTITUTIONAL ZONING PARKING REQUIREMENTS + ALLOCATION PLAN (PZAP)

The object of the PZAP is to review MIT's compliance with the parking requirements established by the Cambridge Zoning Ordinance. As discussed in our March 21, 2019 meeting, all MIT-owned spaces, including those temporarily out of service, may be allocated to comply with the ordinance.

The report outlines in detail the method for establishing the parking requirement for each building and presents the results of using these methods in Table 1: Building Data and Zoning Parking Requirements. Table 2: Parking Allocation Data takes the required number of parking spaces for each building and allocates them to individual parking lots, limited by two things:

- The number of spaces available in the parking facility.
- The distance of the parking facility to the specified building being no more than 3,000 feet. (See City of Cambridge Zoning Ordinance Section 6.22.1(a)(3), which allows this distance for institutional uses (Section 6.36.3b) on five (5) acre areas containing one or more lots, contiguous except for streets, owned by a single institution.) All of the property in MIT's academic portfolio (including residence halls) is in this institutional use category.

All owned spaces on campus are currently allocated for zoning purposes. The Allocation Plan is done solely for the purpose of demonstrating compliance with zoning and does not necessarily reflect the location of parking provided for the residents or laboratory and office users who occupy the cited buildings.

As noted in the accompanying report, 3,758 parking spaces are required by the Cambridge Zoning Ordinance. MIT owns and leases 3,794 spaces. However, only permanently held parking spaces are able to fulfill zoning requirements, leaving a deficit.

When the fall 2020 Inventory is completed, the first tranche of 400 spaces in the Kendall garage will be available. We project 3,919 zoning-qualified parking spaces to fulfill a campus-wide requirement of 3,853

spaces, including the spaces required by zoning for the Site 4 graduate dormitory and the Vassar Street Undergraduate Residence, bringing MIT into compliance with zoning parking requirements. MIT will remain in zoning compliance even when it removes an additional 94 spaces at the Kresge lot next year. Going forward though, the loss of the 136 spaces at West Lot and the approximately 273 zoning-required parking spaces for upcoming projects (the College of Computing (98), the West Campus Graduate dormitory (57) and the Met Warehouse (118)), MIT would again find itself out of compliance.

At our meeting of March, 2019, we discussed a variety of means for MIT to comply with the zoning ordinance's parking requirements on a long term basis, following the opening of the Kendall garage. One would be to construct net new parking. This would entail a major new MIT investment in parking. MIT considered such a new parking facility investment in the past, but decided instead to invest in reducing parking demand through the Access MIT program, including 100% Link pass subsidy, increased commuter rail subsidy, remote parking 50% subsidy and the introduction of daily parking fees to incent MIT commuters to consider their best travel option on a daily basis. This has been successful program for MIT and for Cambridge.

Another alternative would be to amend the zoning ordinance to eliminate all or most parking minimum requirements as antithetical to City policy and emulate best contemporary planning practice or at least reduce parking minimums to more appropriately reflect actual parking demand by institutions and other uses, similar to those that have accompanied PUD re-zonings proposed by property owners. This would be best accomplished through a broad re-conception of parking requirements in the zoning ordinance, sponsored by the Planning Board with the support of the City administration.

The last choice is to begin seeking special permits to reduce parking requirements for large projects. Barring City action to amend the zoning ordinance, MIT will begin seeking special permits on new projects as are required to keep campus-wide zoning-qualified parking supply in line with the existing parking required by zoning. Three projects in development are now slated to seek elimination of their individual parking requirements: The Stephen A. Schwarzman College of Computing, the West Campus Graduate Dormitory, and the Metropolitan Warehouse.

A current accounting and future projections in line with this strategy for MIT's parking as it relates to the Cambridge Zoning Ordinance is included in ***Attachment B***.

We will be filing this fall for these parking special permits for the College of Computing and the West Campus Graduate Dormitory. Both of these projects will provide data and analysis that will meet the criteria established for parking reductions in Section 6.35.1. Please contact me if you have any questions about MIT's compliance with City parking regulations.

Sincerely,

Kelley Brown

Kelley Brown
Senior Campus Planner
MIT Office of Campus Planning

Enc: (1) MIT Parking Inventory Report: 2019 – 2020
(1) MIT Institutional Zoning Parking Requirements and Allocation Plan: 2019 – 2020

CC: Ranjit Singanayagam, Commissioner of Inspectional Services/Building Commissioner
Sean O'Grady, Zoning Specialist, Cambridge Inspectional Services
Adam Shulman, Cambridge Traffic, Parking and Transportation Department
Stephanie Groll, PTDM Planning Officer, Cambridge Community Development Department
Tom Giannino, MIT Parking and Transportation Office
Melissa Stopa, MIT Office of Campus Planning

Attachment A

MIT Campus Parking Inventory Summary

Prepared October 19, 2020

Total Number of Institute Parking Spaces

including Institute owned spaces in use, temporarily under construction, and leased

	Space Change	Location	Cause	Plan to Replace
2016 - 2017 Inventory	**4,349**			
	136	Stata Attendant Assist	Add capacity central to campus	n/a
	23	NW32	Transferred property from investment	n/a
	-45	Hayward Annex	Kendall Square construction	Kendall Square Garage
	-60	Kendall Lot	Kendall Square construction	Kendall Square Garage
	-25	Hayward Lot	Kendall Square construction	Kendall Square Garage
	-97	N10	CUP construction	Kendall Square Garage
	-38	West Annex	Grounds relocation	Kendall Square Garage
	-50	Leased	Changes to office space leases	n/a
	-19	Various	Various	n/a
2017 - 2018 Inventory	**4,174**			
	-372	West Garage	Vassar Dorm construction	Partial replacement in Kendall
	17	Westgate Lot	Reconfiguration for Talbot Outfall	
	-23	Leased	Changes to office space leases	
	-6	Various	Various	
2018 - 2019 Inventory	**3,790**			
	-5	Various	Various	
	-10	Leased	Changes to office space leases	
	19	Hayward lot	Medical Lot reconfiguration	
2019 - 2020 Inventory	***3,794***			
	409	Kendall Garage	Kendall development (partial occup.)	
	-22	44/46 Lots	College of Computing construction	Underground Garage at Music
2020 - 2021 Inventory*	***4,181***			
	-94	Kresge Lot	Music Building construction	Underground Garage at Music
	100	Kendall Garage	Kendall balance of occupancy	
2021 - 2022 Inventory*	***4,187***			
	-136	West Lot	New Graduate residence hall	Partial (39) replacement at Music Garage
2022 - 2023 Inventory*	***4,051***			
		No change anticipated		
2022 - 2023 Inventory*	***4,051***			
	155	UG Garage at Music	Music Building completion	
2023 - 2024 Inventory*	***4,206***			

*projected

Attachment B **Prepared October 19, 2020**

MIT Campus Parking Inventory Projections

Parking Zoning Allocation Plan

	Campus Inventory (Owned)	Change	Minimum Zoning Requirement	Change	difference
Fall 2017	**3,879**		**3,649**		**230**
	-372	West Garage	104	MIT.Nano	
	11	Various		Review	
			4	Adjustment	
Fall 2018	**3,518**		**3,757**		**-239**
	-5	Various	**1**	W36	
	19	MIT Medical Lot Expansion			
Fall 2019	***3,532***		***3,758***		***-226***
	409	Kendall Garage (partial)		Vassar St	
			38	Dorm	
	-22	44/46 Lots for SAS CoC	57	Site 4	
Fall 2020*	***3,919***		***3,853***		***66***
	-94	Kresge Lot for Music			
	100	Kendall Garage (Balance)			
Fall 2021*	***3,925***		***3,853***		***72***
	-136	West Lot for Graduate Residence			
Fall 2022*	***3,789***		***3,853***		***-64***
	155	UG Garage at Music	0	SAS CoC	
				Building 54	
			7	expansion	
			20	Music Building	
Fall 2023*	***3,944***		***3,880***		***64***
		No change anticipated	0	West Campus Graduate Dormitory	
Fall 2024*	***3,944***		***3,880***		***64***
		No change anticipated	0	Met Warehouse	
Fall 2025*	***3,944***		***3,880***		***64***

Table 10 MIT Campus Existing Vehicle Parking Utilization (October 2019)

Garage/Lot	Supply/	Tuesday 10/22/2018				Wednesday 10/23/2019				Thursday 10/24/2019				Average			
	Capacity	9:00 AM	Noon	5:00 PM	Peak	9:00 AM	Noon	5:00 PM	Peak	9:00 AM	Noon	5:00 PM	Peak	9:00 AM	Noon	5:00 PM	Peak
Amherst Alley + Dormitories + Danforth	**94**	20	52	67	67	34	21	34	34	35	18	35	35	30	30	45	45
Sloan Lot	**49**	15	15	26	26	21	12	21	21	12	12	12	12	16	13	20	20
E51 Lot / Amherst lot	**60**	27	27	60	60	60	41	60	60	60	38	38	38	49	35	53	53
Kresge Lot	**94**	79	94	94	94	72	94	94	94	70	86	94	94	74	91	94	94
Main Lot	**20**	20	5	9	20	7	4	7	7	7	5	7	7	11	5	8	11
N52 Lot	**7**	1	1	1	1	7	7	7	7	7	7	7	7	5	5	5	5
Albany Garage	**420**	246	297	55	297	243	293	67	293	241	299	69	299	243	296	64	296
68 Koch	**4**	3	3	4	4	4	4	4	4	4	2	4	4	4	3	4	4
Stata Garage + Lot + Valet	**829**	345	469	180	469	314	461	159	461	332	468	181	468	330	466	173	466
158 Mass Ave	**51**	45	46	15	46	42	42	11	43	43	41	13	43	43	43	13	44
Plasma Fusion Center	**29**	16	29	29	29	7	24	24	24	16	16	29	29	13	23	27	27
NW23 Lot/22	**84**	66	66	11	69	67	64	4	67	67	66	10	67	67	65	8	68
NW35 Lot	**8**	4	8	8	8	4	7	7	7	4	7	7	7	4	7	7	7
65 Waverly	**55**	9	17	17	17	6	16	16	16	10	20	20	20	8	18	18	18
NW86 Lot	**77**	62	69	7	71	62	75	19	75	74	79	13	77	66	74	13	74
Cross Street	**11**	11	11	11	11	8	8	11	11	10	2	10	10	10	7	11	11
Nuclear Reactor Lot	**23**	5	8	2	9	6	8	2	8	6	8	3	8	6	8	2	8
Koch Lot TCC	**19**	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
West Lot	**136**	79	80	12	80	89	93	20	93	79	77	12	83	82	83	15	85
Westgate Lowrise + lot economy	**387**	109	139	37	139	92	123	35	123	96	116	34	116	99	126	35	126
W15	**35**	19	35	35	35	21	35	35	35	25	35	35	35	22	35	35	35
W98	**66**	66	66	66	66	42	66	66	66	35	58	58	58	48	63	63	63
W91 lot + 92 lot	**77**	77	77	77	77	49	77	77	77	62	77	77	77	63	77	77	77
W92 Garage	**54**	17	22	4	25	13	23	4	23	17	20	1	20	16	22	3	23
East Garage	**424**	261	315	91	315	249	304	95	304	256	302	85	302	255	307	90	307
President's House	**8**	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Hermann Garage	**22**	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
East Campus	**5**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Medical Lot / Hayward lot	**61**	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Ford Lot	**22**	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Student Center	**4**	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Visitor Lot	**54**	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
NW86 Garage	**130**	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Cruiser Lot - W31	**3**	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
nw32 lot	**23**	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
44/46 lots	**32**	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
N10	**55**	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
Total	**3,532**												**Total**	**2,002**	**2,340**	**1,321**	**2,405**
													% Utilization of Total Supply	**57%**	**66%**	**37%**	**68%**

Note: MIT Parking Data October 2019; facilities with no data were assumed to be fully occupied for conservative approach

Table 15 summarizes parking demand projections for the additional three developments that are based on zoning minimum parking ratios, as a conservative approach. Once each project goes through their individual permitting/review, they will develop parking estimates that are more reflective of expected demand levels.

Table 15 Future Parking Demand Projections (5+ years) based on min. Zoning Ratios

Project	Land Use	Approximate Program	Parking Ratio*	Estimated Parking Demand
West Campus Graduate Dormitory	Dormitory	690 beds	1 space / 12 beds	58
Music Building	Academic	34,000 SF	1 space / 1,800 SF	19
Met Warehouse Project	Academic	214,000 SF	1 space / 1,800 SF	119
			Sub-Total	196
			+ SCC Project	98
			Total	**294**

*parking rate assumed to be zoning minimum

As outlined in Table 15, the total estimated parking demand from the four identified projects that are expected to be developed by MIT over the next five years, calculate to approximately 300 parking spaces (rounded from 294 spaces).

In addition to parking demand that will be added to the MIT campus, parking supply is also projected to increase. Table 16 summarizes the additional parking spaces that are planned to become available over the next several years, estimated at +412 spaces.

Table 16 Future Parking Supply Projections (5+ years)

	Change in Supply	Total Supply
Existing 2019 Supply		**3,532 spaces**
Kendall Square Garage	+509 spaces	
Lot 44/46	-22 spaces	
Kresge Lot	-94 spaces	
West Lot	-136 spaces	
Music Garage	155 spaces	
Total	+412 spaces	
Future Supply		**3,944 spaces**

Source: MIT Institutional Zoning Parking requirements and Allocation Plan 2019-2020, as submitted to the City on October 26, 2020 and copy included in the appendix to this report

Addition of 412 parking spaces to the MIT campus parking supply will bring the total from 3,532 spaces (October 2019 inventory) to 3,944 spaces in the future.

Similarly, the additional parking demand of approximately 300 spaces gets layered into the existing parking utilization data, to develop a snapshot of parking conditions in the future.

Table 17 summarizes the resulting future parking demand, supply and utilization at 9am, 12pm/noon and 5pm. The table also highlights the daily peak occupancy/utilization.

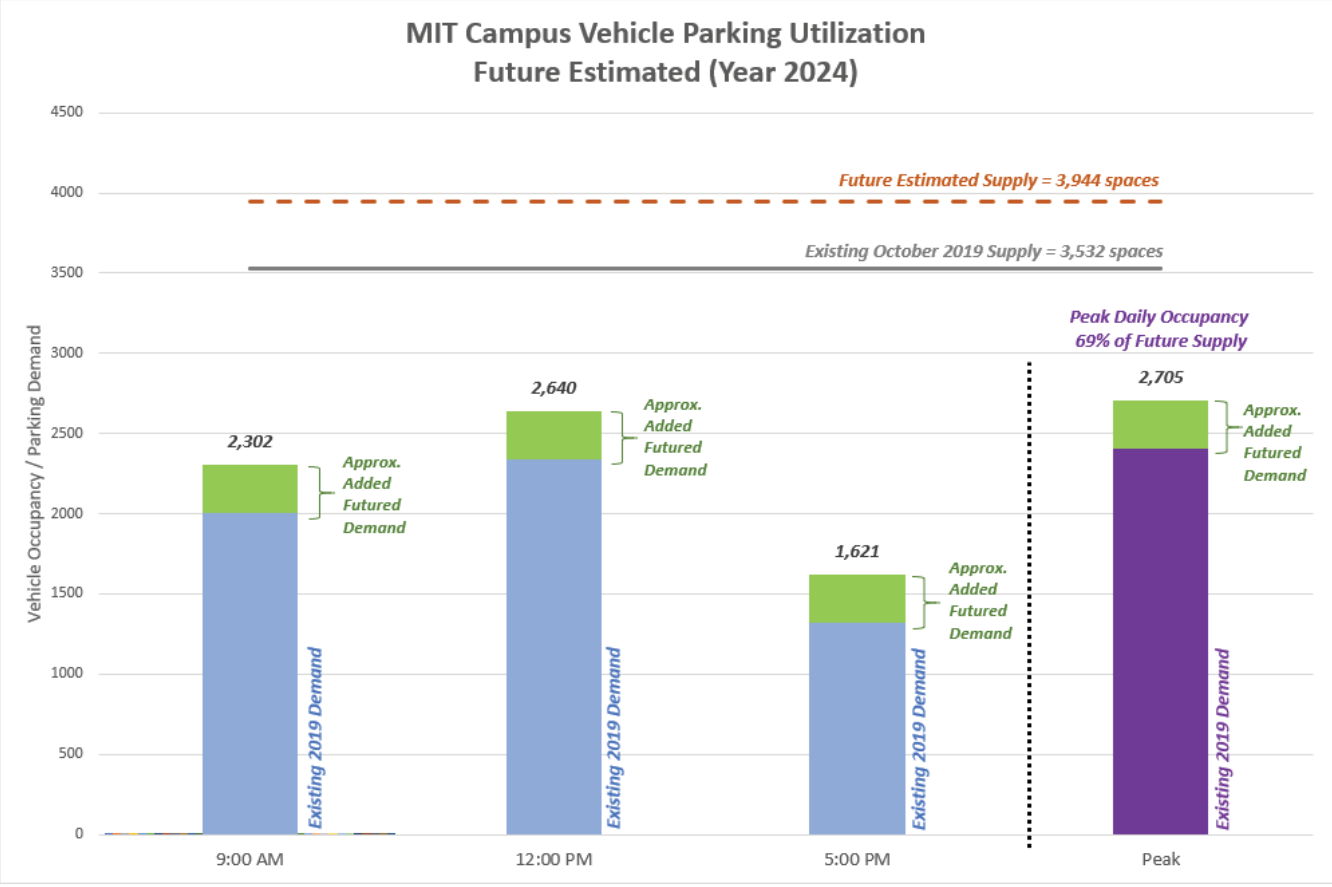
Table 17 MIT Campus Future Estimated Vehicle Parking Utilization

	9am	12pm	5pm	Peak
Total Existing Demand*	2,002	2,340	1,321	2,405
Added Demand	300	300	300	300
Total Future Demand	**2,302**	**2,640**	**1,621**	**2,705**
Existing Supply	3,532	3,532	3,532	3,532
Added Supply	+412	+412	+412	+412
Total Future Supply	**3,944**	**3,944**	**3,944**	**3,944**
% Utilization	**58%**	**67%**	**41%**	**69%**

*Average parking utilization from October 2019, MIT

The data form Table 17 was translated into Chart 2 for a visual representation of capacity and utilization. As illustrated in Chart 2 the peak utilization of garages/lots is expected to reach just below 70 percent in the future.

Chart 2 MIT Campus Future Estimated Vehicle Parking Utilization



Appendix C

2019 Bluebikes Trip Data

Available upon request and at https://s3amazonaws.com/hubway-data/index.html

HOWARD STEIN HUDSON

Engineers + Planners

Appendix D

MIT Graduate Student Mode Split (2014-2018)

MIT 2014 Commuting Survey by Respondent Type

Thinking about the last year, what would you say is your PRIMARY commuting method?

		Type			
		Staff	Students (off-campus)	Students (on-campus)	Overall
Thinking about the last year, what would you say is your PRIMARY commuting method?	Drive alone the entire way	28%	3%	1%	16%
	Drive alone, then take public transportation	6%	1%	0%	4%
	Walk, then take public transportation	30%	25%	8%	23%
	Share ride/dropped off, then take public transportation	3%	1%	0%	2%
	Bicycle and take public transportation	3%	6%	2%	4%
	Ride in a private car with another person	5%	1%	0%	3%
	Ride in a private car with 2-4 commuters	1%	0%	0%	1%
	Ride in a vanpool (5 or more commuters) or private shuttle (e.g. TechShuttle, SafeRide)	0%	4%	5%	2%
	Dropped off at work	0%	0%	0%	0%
	Take a taxi or ride service (e.g., Uber, Lyft)	0%	1%	0%	0%
	Bicycle	9%	29%	15%	15%
	Walk	9%	27%	65%	26%
	Work at home	0%	0%	0%	0%
	Other	5%	3%	3%	4%
	N	6335	2658	2784	11777

Are you considering changing the way you commute over the next year?

		Type			
		Staff	Students (off-campus)	Students (on-campus)	Overall
Are you considering changing the way you commute over the next year?	Yes	15%	17%	16%	15%
	No	85%	83%	84%	85%
	N	6322	2654	2788	11764

2016 Transportation Survey

Overall results by respondent type

Response Rates

		Respondent Type			
		Staff	Students (off-campus)	Students (on-campus)	Overall
Answered survey at least partially	Yes	54%	47%	44%	50%
	No	46%	53%	56%	50%
	N	10471	5191	5870	21532

ABOUT YOU

Is MIT your primary employer/school?

		Respondent Type			
		Staff	Students (off-campus)	Students (on-campus)	Overall
Is MIT your primary employer/school?	Yes	96%	97%	100%	97%
	No, I am a student at another institution	0%	1%	0%	0%
	No, MIT is my secondary employer	2%	0%	0%	1%
	No, I am a visitor	1%	0%	0%	1%
	Other	1%	1%	0%	1%
	N	5639	2457	2567	10663

How many hours do you normally work/study on campus each week?

		Respondent Type			
		Staff	Students (off-campus)	Students (on-campus)	Overall
How many hours do you normally work/study on campus each week?	Less than 17 hours	4%	9%	4%	5%
	17-30 hours	7%	17%	17%	12%
	31-40 hours	37%	23%	21%	30%
	More than 40 hours a week	53%	52%	58%	54%
	N	5630	2458	2558	10646

Please tell us what commuting method(s) you are considering. Check all that apply.

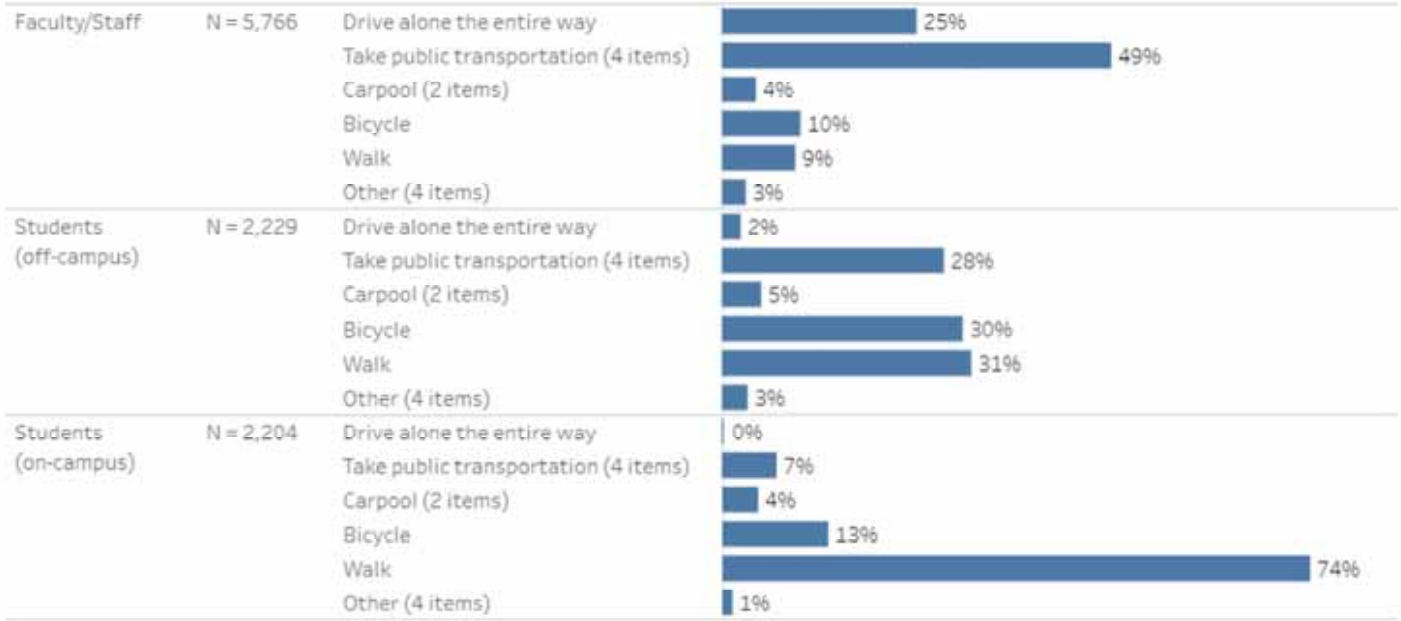
	Respondent Type							
	Staff		Students (off-campus)		Students (on-campus)		Overall	
	Responses	Percent of Respondents	Responses	Percent of Respondents	Responses	Percent of Respondents	Responses	Percent of Respondents
Drive alone the entire way	126	22.8%	13	5.3%	8	2.3%	147	12.8%
Drive alone, then take public transportation	122	22.1%	5	2.0%	0	0.0%	127	11.1%
Walk, then take public transportation	145	26.3%	65	26.4%	71	20.3%	281	24.5%
Share ride/dropped off, then take public transportation	31	5.6%	6	2.4%	3	0.9%	40	3.5%
Bicycle and take public transportation	62	11.2%	32	13.0%	31	8.9%	125	10.9%
Ride in a private car with another person	35	6.3%	5	2.0%	3	0.9%	43	3.7%
Ride in a private car with 2-4 commuters	22	4.0%	5	2.0%	1	0.3%	28	2.4%
Ride in a vanpool (5 or more commuters) or private shuttle (e.g. TechShuttle, SafeRide)	31	5.6%	35	14.2%	50	14.3%	116	10.1%
Dropped off at work	17	3.1%	5	2.0%	3	0.9%	25	2.2%
Take a taxi or ride service (e.g., Uber, Lyft)	12	2.2%	14	5.7%	15	4.3%	41	3.6%
Bicycle	119	21.6%	131	53.3%	248	71.1%	498	43.4%
Walk	41	7.4%	32	13.0%	53	15.2%	126	11.0%
Work at home	66	12.0%	8	3.3%	6	1.7%	80	7.0%
Other	43	7.8%	10	4.1%	17	4.9%	70	6.1%
Total	872	158.0%	366	148.8%	509	145.8%	1747	152.3%

Only asked of respondents who answered 'Yes' to question above.
Note: 'Percent of Respondents' column adds to more than 100% because respondents could check more than one item.

COMMUTING 2018

Intro | Hours per Week | Arrive Time | Depart Time | Commute Time | Flexibility | Primary Commute Method | Carpooling | Financial Impact

What is your primary commuting method to MIT?



Breakout
Affiliation (Summary)

Commuting Mode
Summary

Location
- [x] (All)
- [x] Off-campus
- [x] On-campus

HOWARD STEIN HUDSON

Engineers + Planners

Appendix E

Trip Generation Information

MIT West Campus Graduate Dormitory

Trip Generation Worksheet

HOWARD STEIN HUDSON

September 2020

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Transit Share[2]	Transit Person-Trips	Walk/Bike/ Other Share[2]	Walk/ Bike/ Other Trips	Auto Share[2]	Auto Person-Trips	Assumed Local Auto Occupancy Rate[1]	Total Adjusted Private Auto Trips
Daily Peak Hour															
Multifamily Housing (Mid Rise)[3]	364	Total		5.440	1,980	1.18	**2,336**	10%	**234**	85%	**1,986**	5%	**116**	1.18	**98**
	units	In	50%	2.720	990	1.18	**1,168**	10%	**117**	85%	**993**	5%	**58**	1.18	**49**
		Out	50%	2.720	990	1.18	**1,168**	10%	**117**	85%	**993**	5%	**58**	1.18	**49**
AM Peak Hour															
Multifamily Housing (Mid Rise)[3]	364	Total		0.360	131	1.18	**154**	10%	**15**	85%	**131**	5%	**8**	1.18	**7**
	units	In	26%	0.094	34	1.18	**40**	10%	**4**	85%	**34**	5%	**2**	1.18	**2**
		Out	74%	0.266	97	1.18	**114**	10%	**11**	85%	**97**	5%	**6**	1.18	**5**
PM Peak Hour															
Multifamily Housing (Mid Rise)[3]	364	Total		0.440	160	1.18	**189**	10%	**18**	85%	**161**	5%	**10**	1.18	**8**
	units	In	61%	0.268	98	1.18	**116**	10%	**11**	85%	**99**	5%	**6**	1.18	**5**
		Out	39%	0.172	62	1.18	**73**	10%	**7**	85%	**62**	5%	**4**	1.18	**3**

1. 2017 National vehicle occupancy rates - 1.18: home to work; 1.82: family/personal business; 1.82: shopping; 2.1: social/recreational
2. Mode share for graduate students based on 2018 DEP survey results for on-campus resident commuting data
3. ITE Trip Generation Manual, 10th Edition, LUC 221 (Multi-family Housing, mid-rise with 2.46 residents/unit), average rate per unit

Note:
Trip Generation for 680 beds in 364 units was presented at September TP&T meeting (1.87 beds/unit).
The project submitted for Special Permit in November 2020 proposes up to 690 beds in 351 units (1.97 beds/unit).
The unit count was not decreased for the Special Permit filing.

HOWARD STEIN HUDSON

Engineers + Planners

Appendix F

2020 Bluebikes Availability (Bicycles and Docks)

Bluebike Bicycle Dock Availability
Fall 2020

	6:30 AM	6:30 AM	9:30 AM		12:30 PM		3:30 PM		6:30 PM	
	bikes	docks	bikes	docks	bikes	docks	bikes	docks	bikes	docks
Vassar Street										
29-Oct Thursday			7	17	7	18	4	20		
30-Oct Friday			12	13	8	17				
31-Oct Saturday					7	17	9	15	7	17
1-Nov Sunday			2	23	2	23	5	20	15	10
2-Nov Monday	23	2	25	0	11	14	14	11	9	16
3-Nov Tuesday	18	7	11	14	12	13	10	15	13	11
4-Nov Wednesda	17	8	16	9	6	19	1	24	8	17
5-Nov Thursday	18	7	7	18	0	25	0	25	8	17
6-Nov Friday	10	15	9	16	4	20	0	25	4	20
7-Nov Saturday	14	10	10	14	10	14	1	23	4	20
8-Nov Sunday	23	2	23	2	18	7	10	15	25	0
9-Nov Monday	25	0								
Erie										
29-Oct Thursday			10	9	9	10	8	11		
30-Oct Friday			10	9	9	9				
31-Oct Saturday					9	8	9	9	10	8
1-Nov Sunday			10	9	8	11	9	9	8	10
2-Nov Monday	9	9	8	10	8	11	4	15	3	16
3-Nov Tuesday	9	10	9	10	13	6	12	7	7	12
4-Nov Wednesda	15	4	14	5	14	5	8	9	1	18
5-Nov Thursday	9	10	8	11	7	10	6	12	13	6
6-Nov Friday	12	7	16	3	7	11	6	13	1	18
7-Nov Saturday	4	15	5	14	2	17	0	18	0	19
8-Nov Sunday	7	12	4	14	3	15	6	13	3	16
9-Nov Monday	8	11								
Pacific/Purrington										
	bikes	docks	bikes	docks	bikes	docks	bikes	docks	bikes	docks
29-Oct Thursday			4	14	4	14	2	15		
30-Oct Friday			10	8	9	9				
31-Oct Saturday					0	19	5	14	1	18
1-Nov Sunday			8	11	2	17	7	12	10	9
2-Nov Monday	13	6	2	17	10	9	8	11	5	14
3-Nov Tuesday	16	3	6	13	6	13	10	9	7	12
4-Nov Wednesda	19	0	8	11	8	11	12	7	11	8
5-Nov Thursday	16	2	5	14	7	12	7	11	14	5
6-Nov Friday	18	1	11	8	5	14	1	18	6	13
7-Nov Saturday	10	9	10	9	1	17	3	16	5	14
8-Nov Sunday	12	17	10	9	2	16	4	15	5	14
9-Nov Monday	14	4								
BU Central										
	bikes	docks	bikes	docks	bikes	docks	bikes	docks	bikes	docks
29-Oct Thursday			10	1	5	6	4	6		
30-Oct Friday					6	5				
31-Oct Saturday					1	10	3	8	6	5
1-Nov Sunday			1	10	8	3	8	3	3	8
2-Nov Monday	1	10	4	7	5	6	9	2	1	9
3-Nov Tuesday	3	8	4	7	0	11	5	6	7	4
4-Nov Wednesda	4	7	3	8	6	5	9	2	1	10
5-Nov Thursdsay	1	10	1	10	10	1	10	0	6	3
6-Nov Friday	6	5	11	0	6	5	0	10	8	2
7-Nov Saturday	3	7	5	5	6	4	5	5	5	5
8-Nov Sunday	0	10	5	5	10	0	9	1	3	7
9-Nov Monday	2	8								

HOWARD STEIN HUDSON

11 Beacon Street, Suite 1010
Boston, Massachusetts 02108
617.482.7080

www.hshassoc.com

6.v TREE STUDY CERTIFICATION

From:	Putnam, Andrew
To:	Paden, Liza
Cc:	Drew Stangel; Andrew Cridlin; Bentley, Abigail; jkelly@bartlett.com; Timothy Armstrong; Melissa S Stopa; Laura L Tenny; Lefcourt, David
Subject:	Certification of Tree Study for MIT West Campus Graduate Student Dormitory Special Permit Project
Date:	Tuesday, December 8, 2020 2:40:57 PM

Hi Liza,

I have reviewed the Tree Study for the MIT West Campus Graduate Student Dormitory Project and it is complete and meets all the requirements needed for certification by the City Arborist as defined in 8.66.030. I have requested some additional documentation regarding the final location of some replacement trees but nothing that changes the calculations of the Mitigation Plan. The only additional recommendation I have is that the developer adhere to the Tree Protection Plan as described in the Tree Study.

Thank you,

Andrew Putnam
Superintendent of Urban Forestry & Landscapes
(617)-349-4888