March 19, 2021

City of Brookline Building Department
333 Washington Street, 3rd Floor
Brookline MA, 02445

RE: 500 Harvard Street, Brookline, MA
Preliminary Building Code Analysis and Foundation Method

To whom this may concern,

The summary provided below is based on the new construction provisions of the Massachusetts State Building Code (MSBC), 9th Edition. This memo specifically addresses construction options for the proposed Type IIIA Construction for 500 Harvard Street, a new development containing residential dwelling units and residential parking located at 500 Harvard Street in Brookline, MA.

At this time, the development team does not have a set documentation or construction schedule but does intend to submit for building permit under the 9th edition. Our team will work closely with the Brookline building department for any upcoming code changes that may take effect.

Construction Type – Special Conditions

The code provisions of MSBC Section 510 permit the use of special conditions that are exempt from, or modify, the specific requirements of the MSBC related to height and area.

MSBC Section 510.2

Section 510.2 of the MSBC allows a 3-hour fire-rated horizontal assembly to create separate buildings. Buildings constructed using this option are typically referred to as 'podium' or 'platform' buildings. The structures built above and below the 3-hour fire-rated horizontal assembly are considered distinct buildings. As distinct buildings, they are individually evaluated with respect to allowable building area, the number of stories and type of construction. Furthermore, if a fire wall is needed to address building area issues in the upper building, the fire wall construction is permitted to stop at the 3-hour fire-rated horizontal assembly and does not need to extend into the lower building to the foundation.

There are six (6) conditions that set the limits of MSBC Section 510.2:

1. The buildings are separated with a horizontal assembly having a fire-resistance rating of not less than 3-hours.

2. The building below the horizontal assembly is of Type IA construction.

3. Shaft, stairway, ramp and escalator enclosures through the horizontal assembly shall have not less than a 2-hour fire-resistance rating with opening protectives in accordance with Section 716.5. *(Some exceptions apply.)*

4. The building or buildings above the horizontal assembly shall be permitted to have multiple Group A occupancy uses, each with an occupant load of less than 300, or Group B, M, R or S occupancies.

5. The building below the horizontal assembly must be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any occupancy allowed by this code except Group H.

6. The maximum building height in feet shall not exceed the limits set forth in Section 504.3 for the building having the smaller allowable height as measured from the grade plane.

Building Height and Area Modifications – Type IIIA Construction

The following sections discuss the construction type of the residential structure above the 3-hour fire-rated horizontal assembly. In accordance with MSBC Section 510.2 the parking structure below the 3-hour fire-rated horizontal assembly is Type IA construction.

Height – Type IIIA Construction (All residential buildings)

The building height in stories is measured from the 3-hour fire-rated horizontal separation and is based upon the allowances for the construction type above the horizontal assembly, in this case Type IIIA. Type IIIA construction permits a base allowable building height of five (5) stories (per Table 504.4) and 85 feet (per Table 504.3) in a sprinklered building. The project is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13. Therefore, the total height (in stories) of the Type IIIA building is limited to five (5) stories above the 3-hour fire-rated horizontal separation, and the total height (in feet) is limited to 85 feet from the average grade plane.

The building has a measured height of approximately 69’ measured from the average grade plane to the average level of the roof.

Area – Type IIIA Construction (All Residential Buildings)

Type IIIA construction for Group R-2 occupancy permits an allowable area of 72,000 square feet per Table 506.2 for a sprinklered building. The project is protected throughout with an automatic sprinkler system installed in accordance with NFPA.

The total permitted area per building in accordance with Section 506.2.3 is 216,000 square feet base on Group R-2 occupancy (72,000 x 3). Based on the maximum permitted height of five (5) stories each residential floor is permitted a maximum area of 43,200 square feet. The largest floor of the proposed building is approximately 5,789 square feet and the entire building above the podium is 27,036 square feet. Therefore, Type IIIA construction is acceptable based on the area of the building.

Type IIIA Construction

Exterior Bearing Walls

As per MSBC 602.3, Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within *exterior wall* assemblies of a 2-hour rating or less. We plan on utilizing this approach for the design of the proposed

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building. The primary building structure will be assembled via panelized construction, and will utilize Fire-retardant-treated wood framing for all exterior wall assemblies in order to maintain compliance with this Code and a 2-hour fire rating.

As per the 2015 IBC Code Commentary, specifically Section 602.3 states "*The elements within the perimeter established by the exterior walls (i.e., floors, roofs and walls) are permitted to be of combustible materials. An example of a typical building of Type III construction is a structure having its exterior walls constructed of concrete, masonry or other approved noncombustible materials, but with a wood frame floor, interior wall and roof construction."* Further in the explanation it continues, "*Although fire-retardant-treated wood (FRTW) does not meet the specifications of the code as a noncombustible material, it is permitted as a substitute for noncombustible materials for framing within exterior wall assemblies of Type III Construction."*

Floor and Roof Assemblies

As per Table 601, the floor and roof assemblies are required to have a 1-hour fire rating. The 1-hour rated floor assembly has been designed to be supported by 1-hour rated supporting construction down to the podium level. The 1-hour rated roof assembly has been designed to be installed on top of the 2-hour exterior wall. This approach allows for the wood roof trusses and parapets to be constructed of combustible wood as it is not part of the exterior wall assembly.

Exterior Finish Materials

The proposed project also utilizes non-combustible exterior finish materials attached to the rated assembly that include, at a minimum, masonry and fiber cement siding.

Fire Resistance Ratings

The fire resistance ratings required for Type IIIA construction is summarized in the table below.

Building Element (MSBC Table 601)	**Type IIIA** **Fire Resistance Rating Required (Hours)**
Primary Structural Frame	1
Exterior Bearing Walls	2
Interior Bearing Walls	1
Exterior Non-bearing Walls	See Table 602
Interior Non-bearing Walls	0
Floor construction and secondary members	1
Roof construction and secondary members	1

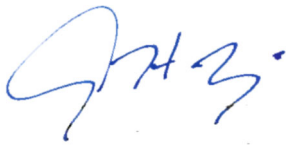
Foundation Methods

At this conceptual stage of the project and due to the existing building located on site, there is not sufficient data to make a conclusive decision on the foundation method to be used. As the design process progresses and during/following demolition of the existing building, Geotechnical Engineers will be engaged to perform additional testing of the soils and to evaluate type, size and proximity of foundations for nearby structures, specifically 514 Harvard Street. The project's foundation system will be designed per the recommendations of the licensed Geotechnical Engineer and to account for the neighboring structure.

Based on this team's experience on 455 Harvard Street nearby and assuming ground conditions at 500 Harvard Street are substantially similar, we anticipate the foundation system to be spread footing foundations in conjunction with slab-on-grade construction supported on the existing fill soil after the use of ground improvements such as aggregate piers or through the use of helical piles. All exterior and interior foundations adjacent to tempered space will have at least 4 feet of frost cover. Depending on the conditions of nearby foundations, shoring may be required.

We hope this memo addresses any concerns related to building code compliance and the proposed foundation method. Please feel free to contact me if you have any further questions or comments.

Regards,



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