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RE: Type 5A Construction for 455 Harvard St., Brookline, MA 02446

TO: Brookline Building Department
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C/O: Michael Yanovitch

The summary provided below is based on the new construction provisions of the Massachusetts State Building Code (MSBC), 8th Edition. This memo specifically addresses construction options for the proposed Type 5A Construction for, 455 Harvard St, a mixed-use development containing residential dwelling units, residential parking, and retail located at 455 Harvard St. in Brookline, MA.

Construction Type – Special Conditions

The code provisions of MSBC Section 509 permit the use of special conditions that are exempt from, or modify, the specific requirements of the MSBC related to height and area.

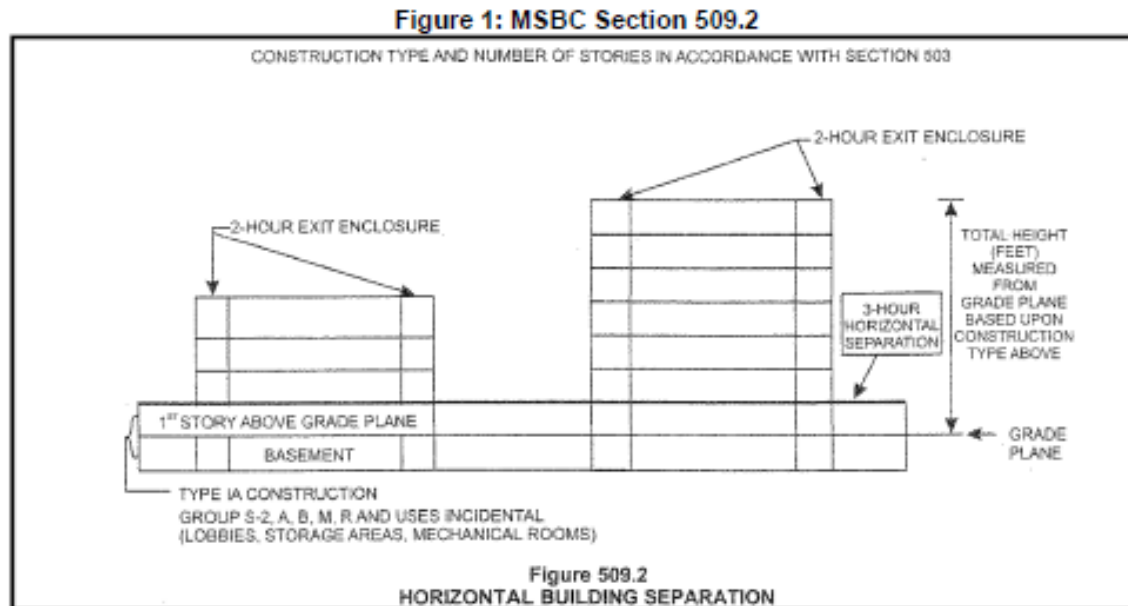
MSBC Section 509.2

Section 509.2 of the MSBC allows a 3-hour fire-rated horizontal assembly to create separate buildings. Buildings constructed using these options 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 (7) conditions that set the limits of MSBC Section 509.2:

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 not more than one story above grade plane.
3. The building below the *horizontal assembly* is of Type 1A construction.
4. *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.
5. 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 300, or Group B, M, R or S occupancies.
6. The building below the *horizontal assembly* shall 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.
7. The maximum *building height* in feet (mm) shall not exceed the limits set forth in Section 503 for the building having the smaller allowable height as measured from the *grade plane*.

The following figure is provided in the 2009 IBC Code and Commentary. Figure 509.2 illustrates the special provisions of MSBC Section 509.2.



Building Height and Area Modifications – Type 5A 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 509.2 the parking structure below the 3-hour fire-rated horizontal assembly is Type 1A construction.

Height – Type 5A 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 5A. Type 5A construction permits a base allowable building height of three (3) stories and/or 50 feet. The project is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13 and is permitted to increase the allowable building height to four (4) stories and/or 70 feet. Therefore, the total height (in stories) of the Type 5A building is limited to four (4) stories above the 3-hour fire-rated horizontal separation which is located at grade (MSBC Table 503).

The actual height of a 5A structure is limited to 70 feet. The building has a measured height of 46' 11" measured from the average grade plane to the average level of the roof.

Area – Type 5A Construction (All Residential Buildings)

Type 5A construction for Group R-2 occupancy permits a base allowable area of 12,000 square feet when equipped throughout with a NFPA 13 sprinkler system. Projects that are two or more stories above grade plane and protected throughout with an automatic sprinkler system installed in accordance with NFPA 13 are permitted an allowable area of 36,000 square feet for Type 5A construction.

The total permitted area per building in accordance with MSBC 506 is 108,000 square feet base on Group R-2 occupancy. Based on the maximum permitted height of four (4) stories each residential floor is permitted a

maximum area of 27,000 square feet. The proposed footprint area of the building is approximately 7,250 square feet as measured at the ground level. Therefore, Type 5A construction is acceptable based on the area of the building.

Type 5A Construction

Exterior Bearing Walls

As per Table 601, exterior bearing walls are required to have a 1-hour fire rating.

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 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; brick, and fiber cement siding.

Fire Resistance Ratings

The fire resistance ratings required for Type 5A 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	1
Interior Bearing Walls	1
Exterior Non-bearing Walls	0
Interior Non-bearing Walls	0
Floor construction and secondary members	1
Roof construction and secondary members	1



Construction Type – Separation Distance

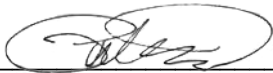
Per IBC 2009, Table 705.8, the Northeast Elevation is 5'-1" from the property line and limits the allowable open area to be no more than 25%. The actual open area is 13.5%.

IBC 2009, Table 705.8 Summary for maximum allowable opening in an exterior wall based on distance from property line.

Walls Ratings and Opening Protective – (Type 5A Construction)		
Fire Separation Distance (feet)	Wall Rating (hours)	Allowable Area of Openings (%)
0 to less than 3	1	Not Permitted
3 to less than 5	1	15%
5 to less than 10	1	25%
10 to less than 15	1	45%
15 to less than 20	1	75%
20 to less than 30	1	No Limit
30 or greater	0	No Limit

We hope this memo answers your questions related to the Type 5A Construction type. Please review and feel free to contact me if you have any further questions or comments.

Regards,



Peter W. Bartash

Associate Principal
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