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Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 09/08/15

Date: 1 September, 2015

Memo Report

From: W. Mark Cummings, P.E.

To: Ms. Elizabeth Adams; Mount Joy, LLC

Subject: Fire & Life Safety Evaluation of 98 Washington Ave. in Portland, ME

As requested, Fire Risk Management, Inc. (FRM) has performed an evaluation of the building located at 98 Washington Avenue in Portland, ME. The primary focus for this evaluation is to assess the proposed design changes associated with a planned renovation of the building to to ensure that an adequate level of life safety is being provided to the occupants.

Background

Plans to renovate the building located at 98 Washington Ave. in Portland are currently in process. The building includes four stories above grade, with a basement level below grade. Based on descriptions and photos of the building that have been provided, it appears to generally consist of a Type IIIB (*or possibly Type IV based on some exposed floor/ceiling assemblies reviewed*) construction, as defined by the International Building Code (IBC); which forms the basis for the Maine Uniform Building and Energy Code (MUBEC). The 1st (ground) floor of the building is planned for use by Business and/or Mercantile type occupancies. The upper floors (2nd through 4th) are to be used for apartments; Residential, Group R-2 occupancies as defined by the IBC. The building is provided with a basement level, which houses the building's mechanical and electrical systems, along with being used to support some miscellaneous storage. It is also understood that as part of the renovation, some laundry facilities (washer & dryer) may be installed in the basement for common use by the building's tenants.

Include discussion on separation between the basement and first floor. How is the basement being classified?

It is understood that the renovation plans include the installation of a new fire sprinkler system that is to be installed throughout the building. Equally, the renovation plans include the potential "re-use" of the building's existing fire alarm/notification system.

Discussion

Since the building code (MUBEC/IBC) has requirements that would continue to mandate that the floor/ceiling assembly between the Residential occupancy and the Business & Mercantile occupancies must continue to be maintained at a minimum of a 1-hour fire resistance rating (FRR), there would be no benefit in using a classification of a non-separated mixed use building; albeit due to its size and construction, it could meet the requirements for such designation. Table 508.4 of the IBC only requires a 1-hour fire separation of the Residential occupancy from the other two occupancy types to comply with the requirements for a "separated mixed use" building. As such, the building and fire code requirements associated for each occupancy type will be applied to their respective areas of the building.

In addition to the use of the currently-adopted edition of the IBC, other general code requirements used as the primary basis for this evaluation are those contained in the National Fire Protection Association's *Life Safety Code*®, NFPA 101; inclusive of requirements outlined in Chapter 30, *New Apartment Buildings*, Chapter 36, *New Mercantile Occupancies*, and Chapter 38, *New Business Occupancies*.

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Even if the building were to be classified as a non-separated mixed use occupancy, based on existing size (area and height), construction type (whether Type IIIB or Type IV), and the f that a fire sprinkler system is to be installed, it will easily comply with the height and area limitations outlined in the IBC for any of the occupancies planned for inclusion in this building's use. In addition to the separation requirements between the Residential and other occupancies, the individual apartments must be separated from one another by barriers having at least a ½-hour FRR.

Based on the proposed use and configuration for the newly renovated building as depicted in the drawings provided, the following occupant loading has been estimated:

Floor	Occ. Load Factor (ft^2/person)	Occupant Load
Basement	500	2
1st	100 (B) / 30 (M)	20
2nd	200	5
3rd	200	4
4th	200	2
Total Building Occupant Load:		**33**

Provide revised occupant load per Table 1004.1.1 Maximum Floor Area Allowances per Occupant. Revise occupant load in basement. A code analysis is needed per both NFPA and IBC.

The building is to be provided with two (2) primary exits at the 1st floor level; one on the east side of the building, leading from the proposed Mercantile space, and a second on the south side of the building, which serves as the exit for the enclosed stairway and also serves as the exit from the Business occupancy on the west end of the building. If these exit doors consists of at least a "standard" 36-inch door that provides approximately 34 inches of clear width, they would each have the capacity to accommodate up to at least 170 persons; using the standard exit capacity factor of 0.2 in./person from NFPA 101. Therefore, the building has more than sufficient exit capacity to accommodate the expected maximum occupant load.

The codes typically require that each story and all areas within a building be provided access to at least two means of egress. Although the 1st floor area indicates that the mercantile and business portions of the floor are connected via an open hallway, due to the expected occupant loading of each, and the fact that each has direct access to an exterior exit door, a single exit would be allowed for each of these areas and if desired, they could be separated from one another.

Chapter 30 of NFPA 101 includes a requirement for each apartment to have access to two separate means of egress, unless specific requirements are met; as outlined in Section 30.2.4.4. Based on the proposed design for the building, it appears that the renovations will generally comply with all requirements of this section, which would allow for the use of only a single means of egress from the apartments. The primary feature that will support this compliance is to ensure that the exit stair enclosure is provided with barriers that have at least a 1-hour FRR; including any doors that open to the enclosure also having at least a 1-hour (60-minute) FRR. Although this stairway will connect to the stair that provides access to/from the basement, as long as the doorway leading to the basement is provided with a 1-hour FRR, this should continue to meet the code requirements to keep the stair enclosure separated from the rest of the building by barriers having the 1-hour FRR. All doors opening to the stair enclosure must be self-closing and latching.

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The code includes maximum travel distances; both from within a dwelling unit to the doorw leading to an exit and from the dwelling unit's access door to an exit. The maximum allowa travel distance within any apartment is 125 ft. when the apartments are provided with fire sprinkler systems, with a maximum travel distance of 200 ft to an exit once leaving the apartment. Based on the drawings provided, no travel distance within any of the apartments to reach a doorway leading to the exit will exceed the maximum allowed by the code. Since the apartment doors, which will each have a 1-hour (60-minute) FRR, lead directly to the exit stair enclosure, no further travel distance restrictions apply; albeit the maximum travel distance from any apartment once within the stair enclosure will only be approximately 65 ft. Although the current building configuration is such that all apartments will have access to the existing emergency fire escape ladder, this would not be a requirement to support code compliance.

As stated above, it is understood that a fire sprinkler system is to be installed throughout the building as is required by NFPA 101. At a minimum, the sprinkler system should be installed in accordance with the requirements of NFPA 13, the *Standard for the Installation of Sprinkler System.* However, it should be noted that, in general, the design requirements within NFPA 13 for the residential units on the upper floors are effectively the same as those outlined in NFPA 13R, the *Standard for the Installation of Sprinkler Systems in Low Rise Residential Occupancies*. The sprinkler system's overall "hydraulic demand", the minimum demand that the water supply system must meet, will be determined by the "worst-case" system demands; whether it's the flow and pressure requirements on the lower levels or those in support of the residential units on the upper floor.

The IBC requirements also include the need to install a Standpipe system when the highest floor above fire department access exceeds 30 ft. Although it is understood that the Portland Fire Prevention Bureau has already indicated they would not mandate a need for a standpipe system, based on a review of this building, it appears that a Standpipe system may not be required anyway. The Fire Department would access the building from either Washington Avenue or Madison St. and these access points to the building appear to be less than the 30 ft below the 4th floor level; albeit this should be verified.

To comply with the NFPA 101 requirements it will also be necessary to have an installed fire alarm/notification system throughout the building. It is understood that the desire is to utilize the existing fire alarm/notification system going forward, but it will be necessary to verify that the existing system can support the alarm/notification requirements of the current codes. In general, since the sprinkler system is required to be supervised and if its operation is used to initiate the building's fire alarm system, it would not be required to have installed manual pull stations anywhere in the building; with the one exception being the Mercantile space. NFPA 101, Chapter 36, still includes a requirement that at least one manual pull station be provided, even when a sprinkler system is installed. In this instance, the pull station that is located by the main entrance/exit door for this space would need to remain.

It will also be necessary to ensure that notification devices, horns or horn/strobes, are properly located throughout the building in accordance with NFPA 72, the *National Fire Alarm and Signaling Code®*. This should include the installation of horn/strobe devices in the Basement and 1st floor areas, and at least one horn or horn/strobe device within each of the apartments to support compliance with the audibility requirements outlined in NFPA 72 and/or the need for compliance with "accessibility" requirements for the hearing impaired in some or all of the apartments. This system is in addition to the requirements to install single station smoke detection within each of the dwelling units as is required by NFPA 72 and the City's ordinances

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and rules and regulations. However, it would not be required that these smoke detectors connected to the building's fire alarm/notification system, and even if they were, they wou only result in a "supervisory" signal and not initiate an "alarm" throughout the building. Equally, since the building appears to use fuel-fired equipment for heating and hot water, it will be necessary to install carbon monoxide (CO) detectors in the basement and other areas in compliance with NFPA 72 and NFPA 720, the *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, along with the City's ordinances and regulations.

All areas of the building that are used to support the means of egress will be required to be provided with adequate lighting in accordance with NFPA 101. This would include areas within the basement and 1st floor levels and the exit enclosure stairway. It will also be necessary to ensure that proper exit signage is provided as required by NFPA 101; again primarily within the basement and 1st floor levels since there are currently no public spaces or exit access corridors installed on the upper floors.

Summary and Recommendations

The primary focus for this evaluation is to assess the code compliance of the proposed design for the renovations, with specific emphasis on the life safety systems, for the building located at 98 Washington Ave. in Portland, ME. It is believed that if the requirements outlined above are generally implemented, this building will not only provide an adequate level of life safety, but will be compliant with the applicable codes, standards, and regulations.

To generally support the applicable code requirements outlined in NFPA 101 and the IBC, the following recommendations are provided:

1. Install a new fire sprinkler system throughout the building; complying with design requirements for each occupancy type. This system must be supervised and should initiate an alarm signal on the fire alarm/notification system.
2. Ensure the required fire separation is provided throughout the building, which includes:
    a. 1-hour fire resistance rating (FRR) for all barriers that isolate the exit stair enclosure from the rest of the building, including all doors that open into the enclosure having a 60-minute FRR. All doors leading to the exit stair enclosure must be self-closing and latching.
    b. 1-hour FRR for the floor/ceiling assembly separating the 1st and 2nd floor levels; separating the residential occupancies from those on the 1st floor level. Verify whether or not existing floor/ceiling assembly can provide a 1-hour FRR (or equivalent) or make the necessary modifications to obtain the requisite FRR. Ensure all penetrations in the floor/ceiling assemblies are properly sealed with materials/assemblies having the proper FRR value.
    c. ½-hour FRR for all walls and floor/ceiling assemblies separating individual dwelling units. Use of standard wall and floor/ceiling construction materials should be adequate; albeit all penetrations in these barriers must be properly protected/sealed.
3. Install a new fire alarm/notification system or modify the existing system if it's feasible, verifying that the existing system has the capabilities to accommodate the post-renovation alarm and notification requirements/devices outlined in NFPA 72. Although the code will only require that a manual pull station be provided at the exit door from the mercantile area, it is recommended that the existing pull station adjacent to the south side exit door at the bottom of the stair enclosure also be maintained.

There is no information if this has been verified. Please confirm if this has been verified and provide separation detail with necessary modifications.

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4. Install emergency lighting and exit signs to be compliant with NFPA 101 requirements.
5. Install single station smoke detectors in all dwelling units and CO detectors throughout th building, as required by NFPA 72 and NFPA 720.

In general, this building is not very large and egress paths from all areas, including the dwelling units, are relatively short. Upon notification, all tenants/occupants should be able to easily exit the building within a few minutes. However, this is dependent upon having a properly installed fire alarm/notification system, ensuring adequate audibility levels are provided within the sleeping areas of the apartments.

Based on a review of the proposed design changes that are scheduled to occur as a result of the planned renovations to the building, it is believed that if the above recommendations are implemented, this building will not only provide an acceptable level of life safety, but will be compliant with the applicable codes, standards, and regulations. If there are any questions regarding this evaluation, including any of the recommendations contained herein, please don't hesitate to contact me.

W. Mark Cummings, P.E.
Principal Engineer