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RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/03/13

Date:

Memo Report

From: W. Mark Cummings, P.E.

To: Mssrs. Jack and Dan Soley

Subject: **Code Review and Life Safety Evaluation; ICW Building Located at 106/108 High St., Portland, ME**

As requested, Fire Risk Management, Inc. (FRM) has performed a review of the information that has been provided with regards to the proposed design for renovating the 3rd floor of the building located at 106 High Street in Portland, ME. In addition to the various discussions we (FRM and Dan & Jack Soley) have had regarding this project, a site visit was performed on November 12th to review the 3rd floor area and its available means of egress. Additionally, we have reviewed both the general building plans that outline the proposed design changes, along with a set of sprinkler drawings for the entire building developed by Sprinkler Systems, Inc.

The scope of this code review and building evaluation is mostly confined to the planned renovations for the 3rd floor level of the building. However, to support this evaluation of the life safety requirements needed for this floor, other areas of the building have been reviewed and all building occupancies and their configurations/locations were included within the overall evaluation and considered when developing any recommendations.

Background

The 3rd floor of the building located at 106 High St. is being renovated to support its potential use as a dance studio, which would then result in this area being classified as an "Assembly" occupancy, per both the International Building Code (IBC) and the National Fire Protection Association's (NFPA's) Life Safety Code®, NFPA 101. With the exception of a small bathroom, this area (floor) will not be segregated by any other walls or partitions. The assembly space consists of slightly more than 730 ft^2. This space (floor) has only a single means of egress (exit), which consists of a stair that connects to a 2nd floor hallway and subsequently a stair that leads directly to an entry vestibule and an exterior door at ground level. The stair from the 3rd floor is enclosed only at its lower end; where it connects to the 2nd floor corridor. An exterior emergency fire escape stair is currently provided that connects this space to the roof of the 1st floor. This fire escape can also be accessed from the 2nd floor business occupancy (artist studio), but since the exterior doors are locked from the inside, reentry to the building is not possible. The fire escape stairs do not currently extend to the ground level.

It is understood that the presence of the exterior fire escape stair is an issue that has been discussed with the City's Historic Preservation Board; primarily as it pertains to their desire that it be removed, since it detracts from the building's historic nature. For that reason, the proposed egress plan for the 3rd floor level is to consider alternate life safety options that would obviate the need for these stairs to remain.

Based on the site review of the building, it would generally be considered as a non-separated, mixed use occupancy; having Assembly occupancies (restaurants) at the 1st floor level and business occupancies (artist studios) on the 2nd floor. The building appears to generally consist of Type IIIB construction. Although the

building is currently not provided with any fire suppression, it is understood that eff
automatic fire sprinkler system throughout the building are in process and FRM did, ir
proposed fire sprinkler system design drawings.

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The primary codes and regulations used in support of this building evaluation include the fc

1. The International Existing Building Code (IEBC); 2009 ed.
2. The Life Safety Code, NFPA 101; 2009 ed.
3. The City of Portland Code of Ordinances, Chapter 10 – Fire Prevention and Protection
4. The City of Portland Fire Department Rules and Regulations; dated 10/11/2012

Discussion

Based on the review performed of the building and the proposed design documents for the renovation activities associated with the 3rd floor alterations, this renovation would be classified as a "Level 2 Alteration" as outlined by the IEBC. The 3rd floor currently has only a single interior stair that provides an adequate means of egress from this space/floor.

Section 705.3.1 of the IEBC states; "*Every story utilized for human occupancy on which there is a work area that includes exits or corridors shared by more than one tenant within the work area shall be provided with the minimum number of exits based on the occupancy and the occupant load in accordance with the International Building Code.*" Typically, this would require that this space/floor have two exits. However, since the 3rd floor will not have more than a single tenant and this floor is also the location of the renovations (work area), this wording in the code could imply that a single exit would be allowed by the IEBC. The prescriptive requirements within NFPA 101 for Assembly occupancies provide no specific options that would allow less than two exits from this area/floor, since it does represent a separate story of the building. Due to the size of the 3rd floor, in comparison to the area of the 2nd floor below, even if this space were to be open to the area below, it would not meet the definition for a mezzanine; which the NFPA codes would allow to have only a single exit.

Based on the requirements outlined in the IEBC, vertical openings within either Assembly or Business occupancies that connect no more than three (3) stories, which in this instance would include the stairway(s) that connects the 3rd floor to the ground level exit, need only be separated from the rest of the building by barriers having at least a 30-minute fire resistance rating. To meet the requirements of NFPA 101 for stair enclosures that connect less than four (4) stories, it would need to be separated by barriers having a fire resistance rating of at least one (1) hour. Since there is no access to the stairway that leads to the 3rd floor from either the 1st floor or Basement levels, it effectively connects only two (2) stories of this building.

Based on the size and use of the space (dance studio) to be located at the 3rd floor, an occupant load of 49 persons was developed, using an occupant load factor of 15 ft^2 per person, as outlined in NFPA 101 for this type of an assembly use. Based on this value, if this space were located on the same level as the other occupancies, it would have been allowed to have a single exit, as long as all other exit travel distance requirements were met; including "common path of travel" and "total travel distance." For an assembly occupancy within a building that is fully protected by an automatic sprinkler system and that has an occupant load of less than 50, the maximum common path of travel distance would be 75 ft and the total travel distance to an exit would be 250 ft. For the 3rd floor space, the common path of travel distance would be less than 65 ft and the total travel distance to the ground floor exit would be less than 110 ft; both well within the limitations imposed by NFPA 101. The common path of travel distance for the 3rd floor is based on the fact that once occupants reach the top of the stairs at the 2nd floor level that lead to the 1st floor exit, they then have access to two separate exits; to continue down this stairway (Stairway 1) or move in the opposite direction, down the adjacent corridor to Stairway 2.

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Based on the above travel distances, coupled with the fact that the building is to be full automatic fire sprinkler system, it is considered that if the proposed design is modified floor occupants with a fully enclosed stairway that is separated from the rest of the bui having up to a 1-hour fire resistance rating, that this would provide an acceptable means c 3rd floor; even without the need for the exterior fire escape. However, to achieve an overal of life safety and ensure that all building occupants are provided with adequate fire notification, the building should also be provided with a complete fire detection/alarm/notification system that meets the requirements of NFPA 72, the National Fire Alarm and Signaling Code®. The combination of having a fire-separated exit enclosure and early notification should provide more than sufficient protection for the 3rd floor level occupants of this building.

To achieve the level of life safety outlined above, the following building modifications would need to be implemented:

- The stair enclosure at the bottom of the stairway from the 3rd floor should consist of barriers, including the doorway, that have at least a 1-hour (60 minute) fire resistance rating. Even though the estimated occupant load for the 3rd floor is less than 50, the door of this enclosure should still be designed to swing in the direction of egress.
- The corridor adjacent to stairway 1 at the 2nd floor level needs to be isolated from the rest of the building by barriers having a 1-hour fire resistance rating since this corridor is to become part of the new stair enclosure for the 3rd floor occupants. This can be accomplished by the addition of a new fire-rated barrier at that isolates the corridor from the two doors that currently provide access to the business occupancy (artist studio) and bathroom. This space can still be accessed by the doorway from the adjacent corridor. A new fire-rated door is to be installed in the opening that separates stairway 1 from the adjacent corridor to the south that leads to stairway 2. The shaded area shown in the attached sketch (Sketch 1) represents the new "enclosed" area that will be isolated from the rest of the second floor area; thereby providing 3rd floor occupants a means of egress that is completely separated from the rest of the building, from the point that they leave the 3rd floor level to the point they exit the building. The "red" lines shown on this sketch indicate where fire-rated doors and walls must be provided.
- Install an automatic, supervised fire sprinkler system throughout the entire building.
- Install a new fire detection/alarm/notification system throughout the entire building. This system shall include all initiating and notification devices; located and installed in accordance with NFPA 72. Initiation of the system shall be by both the operation of the fire sprinkler system and manual pull stations.

Summary and Recommendations

Based on the configuration of the existing building, it is not possible to fully comply with NFPA 101 requirements without installing an exterior fire escape that provides access to the ground level. However, given the impact on the historic nature of this building by maintaining the exterior stairs, alternate fire and life safety measures have been proposed that are considered as providing an adequate level of life safety for occupants located on the 3rd floor. The 3rd floor is to be occupied by a single tenant and the size and configuration of this space is such that it represents no greater risk to life safety than if it were simply another space on the floor below; whereby having a single exit would be code compliant. By providing a means of egress that is to be separated from the remainder of the building by barriers that have at least a 1-hour fire resistance rating, coupled with the addition of building-wide fire sprinkler and alarm systems, should ensure that 3rd floor occupants will be provided with an adequate level of life safety.

Based on the construction of the building, the existing walls should have an inherent fire resistance of at least one hour. However, any penetrations/openings in the existing walls that are to form part of the new stair enclosure must be properly sealed/protected.

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It is recommended that the above listed building modifications be implemented as outline these modifications and verification of proper operation of the new fire sprinkler and al considered that the 3rd floor occupancy will be provided with both adequate means of egr protection.

Although stairway 2 is considered outside the scope of the 3rd floor renovation (work are this review, it does represent a means of egress for both the 3rd and 2nd floor occupants. It is recommended that the barriers that surround this stairway and its access corridors be reviewed. At a minimum, the stairway and access corridors should be isolated from the rest of the building by barriers that are at least resistant to the passage of smoke and, preferably, that have a fire resistance of at least 30 minutes in compliance with the requirements of the IEBC.

If you have any questions regarding what has been outlined above, please don't hesitate to contact me.

W. Mark Cummings, P.E.
Principal Engineer

SKETCH 1 – FRM Code Review & Life Safety Evaluation

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