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Inspections Division
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Memo Report

From: W. Mark Cummings, P.E.

To: Mr. Steve Bushey, Fay, Spoffard, Thorndike, Inc.

Subject: **Fire Protection Review, ICW Site Plan Updates for the Canal Landing Boatyard**

As requested, Fire Risk Management, Inc. (FRM) has reviewed the updated site information you provided with regards to the overall plan for the new Canal Landing Boatyard in Portland, ME. It is understood that due to a planned expansion of Portland's International Marine Terminal (IMT), which is located immediately to the East of the property to be used for the boatyard, the site plan for this boatyard has changed significantly from what we reviewed last year. Equally, we are also aware that this modified site plan is also to be considered an "interim" plan, since the long-term plan for the boatyard is to have its primary means of access from the West side of the property and not the East.

The focus for this review is to evaluate the necessary fire protection features for the general layout of the boatyard area to ensure that all State and Municipal codes, regulations, and ordinances are adequately addressed; to include preparing for what will be the final configuration / layout for the boatyard in the future, including the access road(s).

The primary codes and regulations used as reference for this review included;

1. The City of Portland Code of Ordinances; primarily Chapter 10, *Fire Prevention and Protection,*
2. City of Portland Technical Manual, Section 3 – Public Safety,
3. City of Portland Fire Department Rules and Regulations, and
4. The National Fire Protection Association's (NFPA's) Codes and Standards, including;
   a. NFPA 1 - The Fire Code®,
   b. NFPA 58 – The Liquid Petroleum Gas Code®, and
   c. NFPA 303 – Fire Protection Standard for Marinas and Boatyards

For this review, the primary areas of interest are to ensure that an adequate water supply will be available; including location and spacing of the new fire hydrants, and that proper access to the various structures by firefighting equipment will be provided.

No data from the Portland Water District (PWD) were provided that indicated the capabilities of the Municipal water supply system in the vicinity of the site for the boatyard. However, its ability to meet the water flow requirements for this facility as outlined by NFPA 1, Ch. 18, will need to be verified.

Two buildings and a floating pier are shown as being located on the Site. Given the planned materials of construction for the two buildings shown on the Site Plan, it is assumed that they will generally consist of Type V construction for tension fabric buildings. It is understood that this facility is to be constructed in several phases, with the initial phase only consisting of one of the tension fabric buildings. However, for the purposes of evaluating the site's fire protection requirements, both buildings are included.

If the buildings are to constructed as is currently depicted on the Site Plan, whereby the buildings are immediately adjacent to one another, for code review purposes, they would effectively be considered as a single building, since there is no separation provided. In such an instance, the more stringent code requirements for the Type V structure would apply. In this instance, that would require using the fire flow requirements for a Type V building that has approximately 48,000 ft^2 of total floor area. As outlined in Table 18.4.5.1.2 in NFPA 1, the resulting fire water flow requirements would be 6,000 gpm; for a

duration of four (4) hours. Based on discussions with FST personal, along with a proposed design document for the tension fabric building, both buildings are to be provided with an automatic fire sprinkler system(s), as required by NFPA 1 and NFPA 303 for structures of their size. When a sprinkler system is installed, the above (base) fire flow value can be reduced by 75%; which results in a total fire flow of 1500 gpm for this facility. On previous projects in the near vicinity of the proposed boatyard site, the hydrant flow test data provided by the PWD indicated that the 12" supply main serving this area of the City can support more than 6000 gpm at the minimum of 20 psig residual. Therefore, there is a high expectation that the Municipal water supply system will be more than adequate to support the needs of the private firemain system (hydrants) to be installed to support the Canal Landing Boatyard.

Based on the total fire flow demand for the structure(s), the requirements outlined by NFPA 1 - Annex E indicate that the minimum allowed spacing for fire hydrants along the site's access road can be no more than 500 ft; albeit the requirements within Annex E also include the need for only one (1) hydrant to support the fire flow demand. Based on a review of the proposed Fire Protection Plan drawing for the site, Drawing C-11.1, the access road that is to be initially used to reach the boatyard site is approximately 1300 feet in length. Based on the code requirements outlined above, this access road would need to have several fire hydrants spaced along its length. However, given the fact that this road is to be temporary in nature and the land on which it currently exists will ultimately transition to the IMT, it would not be recommended that a new fire water supply line and hydrants be installed on any property that will not be part of the boatyard in the future. Drawing C-11.1 indicates that a 6-inch firewater supply line that supplies a fire hydrant adjacent to the NGL-NE property has been extended to provide fire water to the boatyard site. This new work includes the addition of a fire hydrant that is installed just to the west of the location for the new boat ramp and will be within 100 feet of the land/pier interface as required by NFPA 303. Based on the site plan, at this location, the hydrant will be approximately 150 feet from the southeast corner of the building(s) and approximately 240 feet from the proposed location for the buildings' fire department connection (FDC).

In addition to providing a water supply within 100 feet of each pier/land intersection, the codes also require that a Class I standpipe be provided for all piers where "*the hose lay distance from the fire apparatus exceeds 150 ft.*" Based on the proposed design of the floating pier, it will be necessary to install a horizontal standpipe system that will reach to within 150 feet of the end of the pier; as measured along the length of the pier. Since this pier consists of floating sections, it would be recommended that a "fixed" standpipe connection consisting of a 2.5-inch fire department hose connection be installed at the pier-shore interface and connected to a (1.5 inch) flexible, hard rubber hose that extends along the length of the pier to a point that is within 150 feet of the end of the pier. At that point, it would be recommended that the rubber hose be provided with a 1.5 inch fire hose connection, mounted on a section of the floating pier.

NFPA 1 also requires that any portion of a building, or the exterior walls of the building, can be no more than 450 ft from an access road, when the facility is fully protected by an automatic sprinkler system. Additionally, NFPA 1 requires that at least one exterior door for each building be within 150 feet of an access roadway; for buildings protected with an automatic fire sprinkler system. Based on a review of the proposed layout for the buildings, coupled with the available access around the buildings for fire department apparatus, this facility will comply with these NFPA requirements. Section 3, *Public Safety Standards*, of the City's Technical Manual has a requirement that the access road must extend to within 50 feet of an exterior door for the building(s). Unlike NFPA, this standard does not include an allowance to extend this distance for those buildings provided with an automatic sprinkler system. Equally, the City's Fire Department Rules and Regulations also have a requirement that a hydrant must be within 100 feet of any FDC for the building(s). Given the current "temporary" nature of the access road(s) to the site and around the building(s), it would be recommended that a request be made to the City to waive these two requirements. The costs associated with compliance with these requirements would be significant and it is considered that their actual "value" in providing increased fire safety is limited. Compliance with the requirements of the National Fire Codes should provide a level of protection that is more than adequate for this site. As outlined in the review of the original Canal Landing site plan, other code requirements associated with site access that must continue to be adhered to include:

1. If the site is to be "gated", a knox box (or equivalent) will be required to support FD access and gates must be located at least 30 feet from the public right of way and shall open inward toward the site.
2. All access roads shall be a minimum of 20 ft in width and have no inside turning radius of less than 25 feet. The City's Fire Department Rules and Regulations do allow for an access road to only be up

to 16 feet in width, but it is recommended that this development fully adhere to all requirements outlined by the NFPA documents.

3. A minimum of 9 ft in vertical clearance shall be provided over all access roads.
4. All access roads must be capable of supporting the fire apparatus.
5. Any dead-end access road in excess of 150 ft, must be provided with an adequate turn-around.
6. A minimum of at least two (s) sides of all buildings must be accessible to fire apparatus.
7. Access must be provided to within 150 ft of all boats stored on site.

The current version of the Site Plan does outline where the Fire Department access roads is to be located and depicts the ability for the fire department apparatus to turn around. It was stated that the "access roads" within the boatyard itself are not really "defined roads", but the areas around the building(s) will consist of a gravel parking areas that will easily support the movement of fire department apparatus. As outlined in Section 3.5 of the City's Public Safety Standards (Technical Manual), these access lanes must remain clear at all times. To ensure that this will be the case, both the turn-around area (lane) and access lanes around the building should be provided with some means of identification/marking, along with signage that indicates they are to remain clear at all times; this to prevent them from being blocked by daily activities associated with the boatyard's operation. Future submittals should depict how the turn around and access lanes are to be identified access road(s). Additionally, it will need to be determined what the access roadway(s) surface is to be and the design will need to be capable of supporting the heavy fire apparatus.

The codes also have requirements regarding the locations for portable fire extinguishers. Specifically, these include:

1. Within 25 ft of the pier/land intersection for all piers.
2. Ensure that the maximum travel distance to a fire extinguisher does not exceed 75 ft.
3. If a fueling station(s) is to be provided, additional portable extinguishers will need to be provided in within 100 ft of this facility. [if fueling is be provided, additionally review requirements of NFPA 30A]

A review was also performed regarding the proximity of an adjacent LPG facility that includes the storage of LPG in large tanks; the NGL-NE site. The separation requirements for these storage tanks for the nearest public way that are included within NFPA 1 simply "mirror" those of NFPA 58. Based on the requirements outlined in these codes, coupled with the data provided regarding the specific storage volumes of the various (above ground) storage tanks, these LPG tanks must remain at least 75 ft from any building or the property line for this facility. Based on the amended Site Plan, it appears that adequate separation does exist between these tanks and the proposed location for the buildings; approximately 115 feet. Although it appears that the distance from these existing tanks to the property line that separates the two sites is only about 50 feet, it was stated that this facility too was to be relocating in the future. Since these tanks remain properly separated from both buildings and public ways, they are not considered as presenting a specific hazard to this development. However, it is recommended that any access lane around the building be located such that it remains outside the 75-foot separation distance from these storage tanks on the adjacent property.

In addition to the above code requirements that affect the overall site plan, numerous other fire protection requirements exist for boatyards that will need to be accommodated, but are more a function of the administration and operation of the boatyard. Examples of these include:

1. Ladders that are sufficient to reach the deck of all boats stored will need to be readily accessible.
2. All portable fuel tanks must be removed from boats prior to their being located inside a building.
3. Installed fuel tanks should be at least 95% full prior to a boat being moved inside a building.
4. The use of portable heating units in a storage/repair facility is only allowed when personnel are present.
5. Equipment must be readily available to remove boats from any building where they are stored or being repaired.

This review and a number of the recommendations provided herein are predicated on the fact that the site plan that is being initially implemented is, in fact, to be an interim arrangement until all facets associated with the expansion of Portland's IMT to the east of the proposed site and the purchase of additional property to the west of the site are fully defined. A brief review was performed of the proposed site layout that may be implemented after all property issues have been cleared. Based on this proposed plan for the boatyard, it will be necessary to significantly increase the number of hydrants located throughout the site and the actual fire flows required from this system will likely increase as well. Proper planning of any new fire water distribution system will be needed to ensure that sufficient water supply

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will be available throughout the site; which should include a verification of the planned pipe sizing for this system. It was stated that the future plan for the existing water supply line is to extend this to a point that it reconnects with the City's firemain system at a point near the location for the new access road, thereby forming a "looped" system. However, given the planned configuration and length of the access road, which is to circumnavigate the boatyard, verification of the pipe size(s) used for the distribution piping should be performed early in the design process to ensure that adequate pressure and flow will be available to support all new hydrants and other fire suppression systems that will be required for this new boatyard.

The current plans as depicted on the amended site plans, including implementation of the recommendations outlined in this assessment, for the boatyard appear to be generally adequate to support the operations associated with the initial phase of its operation. However, as the plans for its expansion proceed, a thorough review of NFPA 303 and the other applicable codes should be performed prior to finalizing any future expansion of the boatyard to ensure that all fire safety measures are properly being implemented. Should there be any questions regarding this assessment and the recommendations contained herein, please do not hesitate to contact me.

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