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Memo Report

From: W. Mark Cummings, P.E.

To: Michael Johanning, AIA; WBRC Architects and Engineers

Subject: Independent Fire Protection Review for Cumberland County Civic Center Renovations

A review has been completed of the fire protection construction documents (CD) set, dated 21 January, 2013, which has been developed to support renovation efforts at the Cumberland County Civic Center in Portland, ME. The documents reviewed included both the fire protection demolition and design drawings, along with the design specifications for the various fire protection and life safety related systems.

Fire Protection Related Drawings

The Civic Center is an existing facility. As such, a number of the fire and life safety protection systems and features already exist and may only be modified or not updated at all in connection with this renovation. However, give the level of detail that is provided with these documents, especially the drawing set, it is very difficult to ascertain whether the final design will, in fact, be code compliant. For example; the sprinkler system drawings utilize a "performance specification" approach that does not depict the final sprinkler system design. Also, although it does appear that some fire extinguishers are depicted on the Architectural drawings, it does not appear that these drawings consistently depict all extinguisher locations necessary to be fully code compliant.

The fire alarm system components are being included with the electrical drawings. This makes a review of this system very difficult. The fire alarm system design should follow standard drawing standards and be depicted separately, using the standard drawing naming/numbering scheme (FA series). A review of the electrical drawings that depict the fire alarm system components indicates there are numerous problems, both from the lack of devices as well as devices being depicted in areas where they are unnecessary. For example, numerous smoke and heat detectors are shown in areas where they are not needed, such as in corridors and closets. Additionally, symbols are used on the drawings that are not depicted in the legend. The fire alarm system design drawings must be reviewed in detail to not only ensure that they provide a code-compliant system, but one that does not require numerous components where they are not needed or required.

Some of the fire barrier requirements shown on the Life Safety Plans are not properly depicted and/or are not consistent with code requirements. For example, no fire rated barrier is depicted for the Fire Pump Room. These plans should be reviewed to verify that all fire rated barriers are properly depicted on the plans, to include highlighting requirements associated with floor/ceiling assemblies. It would also be recommended that all locations for the fire extinguishers be depicted on the life safety plans, such that they can be readily identified and verified as meeting code requirements.

Fire Protection Related Systems Design Specifications

In connection with a review of the related fire protection and life safety system specifications; the following sections were reviewed:

078100 – Applied Fireproofing
078413 – Penetration Firestopping
078446 – Fire Resistive Joint Systems
104413 – Fire Extinguisher Cabinets
104416 – Fire Extinguishers
210500 – Common Work For Fire Suppression
211200 – Fire Suppression Systems

211313 – Wet-Pipe Sprinkler Systems
230593 – Testing, Adjusting, and Balancing
230993 – Sequence of Operation
283111 – Digital, Addressable Fire-Alarm System

In addition to the above specifications, the Building Code and Smoke Control Reports were also reviewed and referenced, since these are both associated with the design specifications.

Building Code Report

It had previously been highlighted that there were some questions regarding the occupancy loading calculations used for the enclosed office areas associated with the mezzanine area in the Northwest corner of the Civic Center, which should be reviewed for accuracy. The Fire Resistance Rating table on page 6 of this report does not correctly depict the fire rating for the barriers that separate the Fire Pump Room from the remainder of the building (also the NFPA 20 section citation is incorrect). Since this is a fully sprinklered facility, one a one-hour rating is needed. This section also does not indicate whether NFPA or IBC requirements will have precedence when conflicting requirements exist; such as with the Emergency Generator Room. This should be stated. The Fire Resistance Rating for the building elements on page 7 also should indicate that only a one hour rating is required for the interior load-bearing structures that only support the roof.

Within paragraph 5.5 of the code report, the requirements listed for the standpipe systems should be reviewed. The IBC section referenced, 905.3.19, is incorrect (should be 905.4) and should also indicate the use of NFPA 14; albeit that is referenced in NFPA 1. Also the references to IBC section 905.3.2 should be removed, since these are for non-sprinklered buildings. In item 5.5.2, the specific drawings that depict the fire extinguisher locations should be referenced.

Item 5.6.2 should be clarified. This simply states that "one manual pull station is required." This is not a correct statement.

Item 5.8.2 should be updated to add the word "less" to the first bullet; "··· four stories or **less** are listed ···." Also, "and Standpipe" should be added to the title for item 5.9.2.

Section 078100

In item 3.4.A.1, the IBC section referenced is incorrect. This should be "1704.12."

Section 078413

In item 1.5.C, paragraph 3.5 of this section should be referenced as pertaining to how the penetration seal assembly is to be inspected and tested. In item 1.7.C, the term "owner" is used. The owner should be defined within this specification section, to include if an "owner's representative" may also have some jurisdiction. In paragraph 3.5, the source requirements for the tests and inspections should be cited; such as the IBC or other requirements. This paragraph should include the percentage of penetration seal assemblies that are to be tested; as appropriate.

Section 078446

As outlined previously, the "owner" should be defined within the specification and paragraph 3.5 should specifically outline the source for the required tests and inspections, along with the percentage of assemblies that must be tested.

Section 104413

Under paragraph 1.2, item B – "Related Sections", the specific section number should be referenced (i.e.; 104416). This section should also list the drawing(s) where the specific locations for the cabinets are depicted.

Section 104416

Item 1.2.B.2 references a specification section that is not included with the design package. However, given the fact that the kitchen hood system(s) does exist, this section should be provided with this package. Currently, all design specifications for the fire protection aspects of the kitchen hood(s) is contained in (spread over) numerous mechanical specification sections. Also, since the kitchen hood system is a "fixed" system, including it as a related section in this specification section is likely not appropriate.

In paragraph 1.6, it is required that coordination occur with the extinguisher cabinet section. Currently, no document exists that outlines the type or size of extinguishers that are to be located throughout the building. Equally, item 3.2.A should specifically reference the drawings where the locations of the extinguishers can be found.

Section 210500

Item 1.1.D, Related Sections, should provide the specific section number for each section listed, not simply the Division number. The section listed as item 1.1.D.2 should be removed, since this project is not required to have seismically-qualified designs. This fact should be outlined within the Building Code Report. The specification section for the Standpipe system (211200) should be included within item 1.1.D.

Item 3.3.A seems to indicate that the suppression system piping is to be painted, referencing Division 09 sections (should specifically reference 099123). The referenced section does not specifically discuss fire protection systems/components, nor does it indicate the color to be used. If it is to be required that the piping and components are all to be painted, this should be specifically stated, with the proper color scheme indicated.

Section 211200

Item 1.2.B, Related Sections, should include both the sprinkler system section (211313) and the fire alarm system section (283111).

Items 1.5.C and D should be removed, since this section deals only with the standpipe system design, not sprinkler systems.

Remove reference to NFPA 14 in item 3.1.A. This code does not provide any information regarding hydrant flow tests.

Item 3.11.A needs to be clarified. NFPA 14 does not have any requirements for labeling or "pipe markers" on equipment. There is a requirement that listed pipe must be used and that it is clearly marked with the size and schedule info, but this is done when manufactured and not something that can be "installed." If this is a reference to painting the piping and components, this should be specifically stated. If this is referring to the label plates for valves and other components that are to be affixed to each, this too should be clarified.

In item 3.12.A; it should be verified that all State required certifications will be adhered to with regards to the maintaining fire suppression systems.

In paragraph 3.13, consideration should be given to simply referencing compliance with NFPA 14 for all materials used. The current requirements address only piping that is 4-inch and smaller. All pipe sizes that could be installed should be included.

Section 211313

Item 1.2.B, specific specification section numbers should be provided. Item 1.2.B.3 should be removed; no fire pump section has been included.

Item 1.4.B should be expanded and clarified. A fire pump does exist for this facility; yet no mention is made of this and how it may, or may not, support the sprinkler systems. This is likely to be a point of confusion for any contractor that may be charged with design/installing these systems. The drawings indicate that the fire pump does supply the sprinkler systems. The specific flow characteristics for the fire pump (pump rating) should be provided, such that it can be used to support the necessary hydraulic calculations.

Item 1.5.C.1 should include fire pump data.

Item 1.6.D should include the review and permitting requirements for the City of Portland (PFD).

Item 1.8.A should be expanded to provide clarification on the overall renovation requirements, including that some systems are to remain, some will be modified, and others added. Cite the sprinkler system drawings as a reference.

Item 2.7.A should specify both the type (Storz) and size of fire department connection that is to be provided. Will assume that it is to be the same as that listed in the Standpipe section.

The wording in item 3.3.A should be updated to reflect that the piping is to be installed as indicated on the approved shop drawings.

In item 3.3.L, remove any reference to installing pressure gauges at the top of the standpipe risers, since this info should be included in the standpipe specification.

Item 3.11.A needs to be clarified. NFPA 13 does not have any requirements for labeling or "pipe markers" on equipment. There is a requirement that listed pipe must be used and that it is clearly marked with the size and schedule info, but this is done when manufactured and not something that can be "installed." If this is a reference to painting the piping and components, this should be specifically stated. If this is referring to the label plates for valves and other components that are to be affixed to each, this too should be clarified.

Verify that it is really the intent to allow the use of "pendent" sprinklers in areas subject to freezing, as indicated by item 3.16.A.4.

Section 230993

It should be verified that it will be acceptable to the City (PFD) to allow the smoke control system (smoke exhaust fan) to be automatically shut down as outlined in item 1.16.G. Typically, only manual actions are used to deactivate and reset a life safety system such as this.

Section 283111

Paragraph 1.2 should be expanded to add an item 1.2.B – Related Sections, similar to other specification sections. This should include the following sections; 087100, 211200, 211313, 230593, 230993, and possibly along with some of the electrical division sections. Additionally, both the City (PFD) rules and regulations and the Smoke Control Report should be referenced as well, to ensure that this system accommodates all required features and functions.

Insert the word "smoke" in front of "detector" in item 2.3.G.1.a.

Insert an "e" in 2.3.K.1 in the sentence "announcement by "us**e**" of … "

Renumber item 2.3.K.3 to ".2".

Remove the option to use a "wrench" in item 2.4.A.2. The City regulations will only allow for the use of a key to reset manual pull stations.

Item 2.10.A.4.a.1) allows for up to 180 seconds for manual actions to occur to either reset the fire alarm system after receiving an alarm signal from a smoke detector. This appears to be an inordinately long time frame to delay system operation. The Smoke Control Report only allows for a delay of 90 seconds in the smoke modeling associated with the system design parameters. Recommend that any delay in the automatic operation of this system be no greater than 60 to 90 seconds; which is more than sufficient time for operators to verify the accuracy of the alarm signal.

Paragraphs 2.15 and 2.16 make no references to the requirements for the wireless master box system as required by the City's regulations. All requirements within this specification section must be reviewed to ensure that it complies with all the City's requirements.

Replace the word "Door" with "Finish" where referencing specification section 087100 in item 3.4.A.

Paragraph 3.7 should be expanded to include specific testing requirements for the smoke control systems, including citing the required sources of testing parameters; such as the IBC sections.

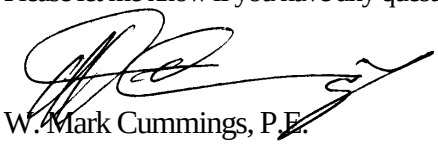
Summary

In general, the majority of the documents appear to need only some minor additions or changes as outlined above. It is strongly recommended that the fire alarm system drawings be established as a "separate set", using standard drawing numbering and symbology for fire alarm systems. Currently, the layout that is depicted within the electrical drawings would not be fully code-compliant and there are many devices shown that are not needed/required. This will result in unnecessary costs for the owner, both as capital and life cycle expenditures. Equally, the life safety plans should be updated to reflect all required fire separation boundaries. It is also recommended that consideration be given to including the fire extinguisher/cabinets locations on these plans.

A new specification section for the kitchen hood fire protection systems should be added to the submittal package, such that these requirements are explicitly detailed within a single specification. This section would need to be related to the fire alarm specification section.

The Building Code Report needs some minor corrections as noted above. Equally, it is recommended that this document be expanded to clearly delineate the overall water supply issues; specifically as pertaining to the fire pump and how this system is being used to support the sprinkler systems, but apparently not the standpipe systems. The overall philosophy for providing adequate fire water for all systems should be highlighted and be coordinated with the Portland Fire Department's Pre-Fire Plan for this building.

Please let me know if you have any questions regarding the above.



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