ADDENDUM NO.: ONE

DATE OF ADDENDUM: August 18, 2014

ROOF REPLACEMENT
CAMPBELL BUILDING
UNCAS ON THAMES
401 WEST THAMES STREET
NORWICH, CONNECTICUT
PROJECT: BI-2B-378

Original Bid Due Date / Time: August 27, 2014 1:00 PM

Previous Addendums: None

TO: **Prospective Bid Proposers:**
This Addendum forms part of the "Contract Documents" and modifies or clarifies the original "Contract Documents" for this Project dated June 23, 3014. Prospective Bid Proposers shall acknowledge receipt of the total number the Addenda issued for this Project on the space provided on Section 00 41 00 Bid Proposal Form. Failure to do may subject Bid Proposers to disqualification.

The following clarifications are applicable to drawings and specifications for the project referenced above.

Item 1

In Section 011000 SUMMARY OF WORK, Subsection 011216 WORK SEQUENCE – PHASES Paragraph B **DELETE** the word "Phase" in all subparagraphs and **REPLACE** with "Sequence"; and **DELETE** the first sentence of Paragraph B and **REPLACE** with new sentence to read:

> The entire Project shall be constructed in One Phase with work in 4 sequences as described herein and as shown by Sequencing Plan on Sheet A0.0 Existing Site Plan and Code Information.

Item 2

In Section 075323 EPDM MEMBRANE ROOFING, Article 1.2 - SUMMARY: **DELETE** Paragraph C and **REPLACE** with new Paragraph A to read:

A. Supplemental Bids: Refer to Section 0120000 "Contract Considerations" subsection 0123000 "Supplemental Bids" for supplemental bids affecting the Work of this Section.

Item 3

Section 075323 EPDM MEMBRANE ROOFING, Article 1.9 - WARRANTY: At Paragraph A **DELETE** text that reads "Alternate" and **REPLACE** with text to read "Base Bid."

Item 4

Section 075323 EPDM MEMBRANE ROOFING, Article 1.9 - WARRANTY: At Paragraph B **DELETE** text that reads "Base Bid" and **REPLACE** with text to read "Supplemental Bid No. One."

Item 5

Section 075323 EPDM MEMBRANE ROOFING, Article 2.1 – GENERAL: At Article 2.1 GENERAL **DELETE** Paragraph A and **REPLACE** with new Paragraph A to read:

A. Provide the roof system and components as specified and as required to meet requirements of the specified basis-of-design FM Global RoofNav Number.

ADDENDUM NO.: ONE **DATE OF ADDENDUM: August 18, 2014**

1. Basis of Design FM Global RoofNav No. for uplift rating of 1A-120: 308005-0-0 (field of roofs).
2. Basis of Design FM Global RoofNav No. for uplift rating of 1A-180 and higher: 161008-0-0 (perimeter and corners of roofs, and for Penthouse roofs no's 4, 6, 6A, 8, 11 and 21).
3. Comparable roof systems of alternative manufacturers shall compose complete systems with FMGlobal RoofNav No's for fire and windstorm classifications with enhancements at perimeters and corners as specified in this Section.

Item 6

Section 075323 EPDM MEMBRANE ROOFING, Article 2.2 – EPDM ROOFING MEMBRANE: **DELETE** Paragraph A and **ADD** new Paragraph A and subparagraphs to read:

A. Manufacturer: Basis of Design for EPDM roof membrane system is systems and products of Carlisle Syntec Inc. as specified herein. Subject to compliance with requirements, provide systems and products approve for inclusion of the single ply roof system of one manufacturer as specified herein or comparable systems and products of one of the following manufacturers provided that cover board thickness is 5/8 inch, proposed roof system meets all specified requirements including those for warranty and uplift, polyisocyanurate board insulation densities are comparable, and adhesives are not spray applied:

1. Firestone Building Products Company.
2. Versico Incorporated.
3. Johns Manville.

Item 7

Section 075323 EPDM MEMBRANE ROOFING, Article 2.3 – AUXILIARY MATERIALS: **DELETE** Paragraph C and **ADD** new Paragraph C to read:

C. Bonding Adhesive for EPDM Roofing Membrane: Low-VOC full spread bonding adhesive provided by manufacturer to meet FM Global uplift requirements and formulated for adhesion of non-fabric-backed EPDM membrane.

1. Product: Carlisle SynTec Inc.: 90-8-30A Bonding Adhesive.

Item 8

Section 075323 EPDM MEMBRANE ROOFING, Article 2.3 – AUXILIARY MATERIALS: At Paragraph D **ADD** text at end of sentence to read: "and to meet FM Global uplift requirements.

Item 9

Section 075323 EPDM MEMBRANE ROOFING, Article 2.6 – COVER BOARD FOR INSTALLATION OVER FIELD OF ROOF: **DELETE** Paragraph A and subparagraph 1 and **ADD** new Paragraph A and subparagraph 1 to read as follows:

A. Cover Board: ASTM C 1278, water-resistant fiber reinforced roof board with siliconized moisture- and mold-resistant gypsum core, 5/8 inch thick.

1. Product: USG: Securock gypsum-fiber roof board.

Item 10

Section 075323 EPDM MEMBRANE ROOFING, Article 3.5 – ADHERED ROOFING MEMBRANE INSTALLATION: DELETE Paragraph B that reads "Delete first paragraph below if not applicable" in its entirety without substitution.

Item 11

Section 075323 EPDM MEMBRANE ROOFING, Article 3.5 – ADHERED ROOFING MEMBRANE INSTALLATION: **DELETE** Paragraph E and **ADD** new Paragraph E and subparagraphs 1 and 2 to read as follows:

ADDENDUM NO.: ONE **DATE OF ADDENDUM: August 18, 2014**

E. Adhesive:

1. Apply urethane adhesive to substrate in continuous beads of adhesive at 3 inches o.c. in areas to receive fleeceback membrane. DO NOT SPRAY ADHESIVE. Do not apply adhesive to splice area of roofing membrane. Apply membrane with side laps shingled with slope of roof deck. Roll entire area of fleeceback membrane with 150 lb. roller to ensure full contact of surfaces to be bonded and allow to cure.
2. Apply low-VOC full spread bonding adhesive to substrate and underside of non-fleeceback EPDM membrane by roller at rate required by manufacturer to achieve full coverage. DO NOT SPRAY ADHESIVE. Allow to partially dry before installing membrane. Do not apply bonding adhesive to splice area of roofing membrane. Apply roofing membrane with side laps shingled with slope of roof deck.

Item 12

Section 075323 EPDM MEMBRANE ROOFING, Article 3.5 – ADHERED ROOFING MEMBRANE INSTALLATION: **DELETE** Paragraph G in its entirety without substitution.

Item 13

Drawing A0.0 – EXISTING SITE PLAN AND CODE INFORMATION: **CHANGE** "PHASING PLAN" to "SEQUENCING PLAN;" **CHANGE** "PROJECT PHASING" to "PROJECT SEQUENCING" and **DELETE** all instances of the word "PHASE" and **REPLACE** with "SEQUENCE."

Item 14

AVAILABLE INFORMATION: **REVISE** Paragraph 1.1 B "List of Available Information following this Cover Page" as follows:

FM Global Plan Review dated May 7, 2014, Review No. 186836
FM Global Plan Review dated May 23, 2014, Review No. 186836
FM Global Plan Review dated June 18, 2014, Review No. 188918.
FM Global Plan Review dated July 25, 2014, Review No. 191017.
OMG Roofing Products Job Report No. 7233 dated May 7, 2014 - Pull Test Report
OMG Roofing Products Job Report No. 7234 dated May 7, 2014 - Insulation Adhesive Test Report
TRC Bulk Asbestos Analysis Report, Lab Log No. 0043961

Item 14

ADD the following documents to the included Available Information documents in the specification book:

FM Global Plan Review 188918 dated June 18, 2014, consisting of 7 pages attached to this Addendum.
FM Global Plan Review 191017 dated July 25, 2014, consisting of 7 pages attached to this Addendum.

All questions must be in writing (not phone or e-mail) and must be forwarded to the consulting Architect (Moser Pilon Nelson, Hugh Pearson, fax 860-257-4675) with copies sent to the CT DCS Project Manager (Ashour Gevargisnia, fax 860-713-7270.

End of Addendum ONE

Mellanee Walton

Mellanee Walton, Associate Fiscal Administrative Officer
Department of Administrative Services
On Behalf of the Division of Construction Services

Plan Review

State of Connecticut
"Uncas-on-Thames"
401 West Thames Street
Norwich, CT
USA
Attn: Mr. Ashour Gevargisnia ashourgevargisnia@ct.gov

Index-Rec No: 879.19-01
Account No: 30882
Date of Review: June 18, 2014
Review No: 188918

Plans Submitted By: Mr. Sean Buckley, MPN Architects

Subject: Drawings and Specifications for Roof Replacement- Project No. BI-2B-378 – Response to 186836

Executive Summary:

This submittal is a response to Plan Review letter No. 186836 dated May 7, 2014.

This submittal is in accordance with FM Global Standards. Review Comment Nos. 1, 2, 3, 5, 6, and 9 are considered complete. Review Comment Nos. 4 and 8 are considered open and Review Comment No. 7 requires a formal response. The FM Global Statuses dated June 18, 2014 and the Review Comments contained in this letter are presented to help ensure that the completed project is in accordance with FM Global Standards.

Scope of Review:

This confirms the receipt and review of:

- 100% construction specifications dated May 30, 2014 provided by Moser Pilon Nelson Architects LLC
- 100% construction drawings dated May 30, 2014 provided by the State of CT

Specifications section 075323 "EPDM Membrane Roofing" indicates that the roofs will be designed and installed per FM Global requirements. Prescriptive enhancements will be provided in accordance with Data Sheet 1-29 where applicable and perimeter flashing per Data Sheet 1-49.

Two RoofNav assembly numbers have been proposed. RoofNav assembly No. 308005-0-0 has been proposed for all uplift ratings of Class 120 for all field-of-roofs. RoofNav assembly No. 161008-0-0 has been proposed for all roofs requiring a wind uplift class rating of 180 and above. **This is in accordance with FM Global Standards.**

RoofNav assembly No. 308005-0-0 is a fully adhered single-ply system for a concrete structural deck with a wind uplift class rating of 150. RoofNav assembly No. 161008-0-0 is a fully adhered single-ply system for a concrete structural deck with a wind uplift class rating of 480.

FM Global 2688 forms will be submitted by the contractor of record when they become available.

Review Comments:

1. The roof design criteria should be based on a wind speed of 110 mph, a Ground Roughness Coefficient of C, a building importance factor of 1.15, and the building can be considered enclosed per FM Global Property Loss Prevention Data Sheet 1-28, *Wind Design*. A Ground Roughness Coefficient of C is selected due to the open field/parking lot located west of the facility. The building can be considered enclosed due to the poured in place concrete roof decks.

   FM Global Status (June 18, 2014): Specification section 075323 "EPDM Membrane Roofing" indicates the wind design criteria above. No further response is needed for this recommendation.

2. The roofs should have wind uplift ratings in accordance with Data Sheet 1-28 as listed below:

Table 2: Required Wind Uplift Ratings

Roof Area Number	Roof Area Title	Field (psf)	Perimeter (psf)	Corner (psf)
1	Phelps First Floor	75	120	165
1A*	Phelps First Floor	75	120	120
2	Stairs Fourth Floor	90	135	210
3	South Third Floor	75	135	195
4	Stairs Fourth Floor	90	135	210
5	Basement	75	105	165
6	Fifth Floor	120	180	240
6A	Fifth Floor	120	180	240
8	Elevator Penthouse	120	180	255
9	East Fourth Floor	90	135	210
10*	First Floor Lobby	75	120	120
11	Fifth Floor	120	180	240
13	West Third Floor	75	135	195
14	First Floor	75	120	165
14A	First Floor	75	120	165
15	Basement	75	105	165
16	Basement Addition	75	105	165
18	First Floor	75	120	165
19	North Third Floor	75	135	195
20	Stair 2 Fourth Floor	90	135	210

21	Stair 1 Penthouse	120	180	255
22	Shed First Floor	75	120	165
23	Loading Dock (Basement)	75	105	165
24	First Floor	75	120	165
26	Credit Union First Floor	75	120	165

"*" indicates that the parapet is 3 ft. or higher

FM Global Status (June 18, 2014): The two proposed RoofNav assembly Nos. of 308005-0-0 and 161008-0-0 have wind uplift class ratings of 150 and 480 respectively. RoofNav assembly No. 308005-0-0 will be applied to all field-of-roof areas and RoofNav assembly No. 161008-0-0 will be applied to all perimeter and corner roof areas with a wind uplift class rating of 180 and higher. This is in accordance with FM Global Standards and no further response is needed for this recommendation.

3. The perimeter and corner areas should be defined as Table 3 shows below:

Table 3: Perimeter and Corner Dimensions

Roof Area Number	Roof Area Title	Perimeter (ft.)	Corner (ft.)
1	Phelps First Floor	7	7 x 7
1A	Phelps First Floor	3	3 x 3
2	Stairs Fourth Floor	3	3 x 3
3	South Third Floor	8	8 x 8
4	Stairs Fourth Floor	3	3 x 3
5	Basement	3	3 x 3
6	Fifth Floor	3	3 (See Note Below)
6A	Fifth Floor	3	3 (See Note Below)
8	Elevator Penthouse	3	3 (See Note Below)
9	East Fourth Floor	3	3 x 3
10	First Floor Lobby	3	3 x 3
11	Fifth Floor	3	3 (See Note Below)
13	West Third Floor	3	3 x 3
14	First Floor	3	3 x 3
14A	First Floor	3	3 x 3
15	Basement	4	4 x 4
16	Basement Addition	4	4 x 4
18	First Floor	3	3 x 3
19	North Third Floor	4	4 x 4
20	Stair 2 Fourth Floor	3	3 x 3
21	Stair 1 Penthouse	3	3 (See Note Below)
22	Shed First Floor	3	3 x 3
23	Loading Dock (Basement)	3	3 x 3

24	First Floor	3	3 x 3
26	Credit Union First Floor	3	3 x 3

Note The indicated areas in Table 3 above are to have "L" shape corners per Data Sheet 1-28, Table 6. The inner dimensions of the "L" shape are to be 3 ft. and the outer legs of the "L" are to be 6 ft.

FM Global Status (June 18, 2014): According to drawing A2.0, the perimeter and corner areas have been defined as Table 3 indicates above. No further response is needed for this recommendation.

4. Please fill out and submit a FM Global Form 2688, *Checklist for Roofing System* (attached), for each new roof assembly to this office for review and comment when they become available. These forms should be sent to this office by the contractor of record before the roof installation begins. Please utilize FM Approved RoofNav Assemblies for all new roofs on this project. The RoofNav Assembly numbers should be listed on a submitted Form 2688.

   FM Global Status (June 18, 2014): No FM Global 2688 forms have been provided. FM Global looks forward to the submittal of the 2688 forms to this office for review and comment when they become available. Two 2688 should be submitted (one for RooofNav assembly No. 308005-0-0 and one for RoofNav assembly No. 161008-0-0). Although only two (2) 2688 forms will be submitted, please identify all the building numbers where the specific RoofNav roof assembly is being applied to. This can be found on the first page of the 2688 form under "Overview Of Work".

5. For a fully adhered roof system that utilizes adhesives in ribbons or spots, reduce the spacing between ribbons or spots over the FM Approved field-of-roof spacing as follows:

   - In the roof perimeter, not more than 60% of the field-of-roof spacing between rows or area
   - In the roof corners, not more than 40% of the field-of-roof spacing between rows or area

   Please Note - When providing prescriptive enhancements, ensure that the adhesive ribbons are applied throughout the entire insulation board. For example, if part of an insulation board is in the corner area and part is in the perimeter area then prescriptive enhancement adhesive ribbons should be applied as if the entire insulation board was in the corner area.

   *Due to various roofing classification requirements, FM Global's best advice would be to install a fully adhered FM Approved Class 255 assembly throughout all roofing areas. This will ensure consistency of installation, required materials, and adhesive fastening rates. This option does not require reduced adhesive spacing in the perimeter in corner areas.

   FM Global Status (June 18, 2014): Reduced row spacing does not need to be performed if RoofNav assembly No. 161008-0-0 (wind uplift class rating of 480) is applied to all roof areas that require a wind uplift class rating of 180 or greater for the perimeter and corners. When applying RoofNav assembly No. 161008-0-0 to all the perimeter and corner areas, ensure to apply all adhesive fastening rates in

accordance with its RoofNav listing. These adhesive rates should be clearly identified on the 2688 forms. This recommendation will be verified once the 2688 forms are submitted and can be considered closed at this time.

6. If an adhered roof cover with mechanically attached insulation boards roof assembly is chosen, please provide the following applicable perimeter and corner roof enhancements:

   a. For roofs that have a field-of-roof wind uplift rating of 75 identified in Review Comment No. 2, prescriptive enhancements (as outlined by Data Sheet 1-29) for the perimeter and corner areas should be applied as follows:

      - Perimeter - 50% minimum of the FM Approved field-of-roofing spacing listed in RoofNav for that particular roof assembly, but at least one fastener per 2 sq. ft.

      - Corners – One fastener per 1 sq. ft.

   b. Prescriptive enhancements (as outlined by Data Sheet 1-29) for the roofs with a field-of-roof wind uplift rating of 90 and 120 are not acceptable. The following options are available for the roof areas where the field-of-roof wind uplift rating is 90 or 120:

      - A different FM Approved RoofNav Assembly for each of the field, perimeter, and corner areas should be chosen with their respected wind uplift ratings in Review Comment No. 2.

      - Select a FM Approved RoofNav Assembly that has a wind uplift rating equal to the corner area of that particular roof section (See Review Comment No. 2) and apply that corner roof assembly throughout the entire roof section. Utilizing this option will require more fasteners, but will ensure the consistency of installation, required materials, and fastening rates

        Please Note – Ensure that the fastener embedment to the structural concrete deck is a minimum of 1 in. to 1.5 in. deep.

   FM Global Status (June 18, 2014): A fully adhered roofing system has been proposed. Please notify FM Global if a change to different roofing system will be proposed. No further response is needed for this recommendation.

7. Concerns for the isolated roof areas were positive drainage slope will be less than 1/8 in./ft. were outlined in the schematic design document. If a slope of less than ¼ in.ft. is desired for positive drainage, use the analysis methods outlined in Data Sheet 1-54, *Roof Loads for New Construction*, section 2.5.4.1.13.

   FM Global Status (June 18, 2014): Please inform FM Global if the drainage system will be designed per data Sheet 1-54, section 2.5.4.1.13.

8. Although some roof perimeter flashing details were submitted, it was difficult to determine the fastening rates to the wood nailers. Please submit Perimeter Flashing and nailer assembly details and ensure compliance with Data Sheet 1-49, *Perimeter Flashing*. Please utilize FM Approved perimeter flashing

rated for the field-of-roof indentified Review Comment No. 2 and identify materials being utilized in the flashing.

FM Global Status (June 18, 2014): Although the specifications state that the perimeter flashing will be in accordance with Data Sheet 1-49, please submit perimeter flashing details to show compliance when they become available. The flashing for the areas where the required uplift rating exceeds 90 should be FM Approved and rated for the field-of-roof wind uplift rating identified in Review Comment No. 2 above.

9. If a fully adhered or adhered membrane roof assembly should be utilized than final acceptance of the roof covering installation should be conditional to successful uplift testing in accordance with Data Sheet 1-52, *Field Verification of Roof Wind Uplift Resistance*. This requirement should be included in the contract to ensure testing is witnessed by the owner's representative. If the mechanically attached perimeter and corner enhancements are provided, uplift testing will be limited to the field of roof area only.

   An acceptable alternative to negative uplift testing is to use full-time visual construction observation (VCO) during the roof system installation. A qualified Construction Observer (CO) would provide full-time on-site visual observation of the roof construction process in an accurate and objective manner. Observation and recording duties should be completed per Data Sheet 1-52, Section 3.5.

   FM Global Status (June 18, 2014): Please insert this recommendation into the specifications. No further response is needed for this recommendation.

Recommendations to Reduce Hazards during Installation:

10. Install only as much roof insulation that can be covered with roof covering in a single working day, or prior to the expected start of inclement weather. Seal loose roof cover edges at the end of each day to minimize potential moisture damage.

11. Do not allow smoking on the roofs at any time. Smoking should be permitted only in safe designated areas provided with adequate disposal containers. Posted smoking policy signs should be provided throughout the area.

12. Make a minimum of two, 10 lb., ABC fire extinguishers available during the roof construction.

Please respond to the above recommendations to our office within 14 days of receipt of this letter. If there are any questions or concerns regarding this review, you can contact the Boston Operations Lead Engineer via e-mail at bostonleadengineer@fmglobal.com or phone (781) 440-8241.

This review is for property insurance purposes only in accordance with FM Global standards and guidelines. Nothing should be inferred from this review regarding compliance with any rules, regulations or requirements of government agencies, state or local codes or any other jurisdictional authority. We are retaining the copy of your submitted plans for our files.

Sincerely,

Michael Kelley
Plan Review Consultant
FM Global – Boston Operations

Loss Prevention Resources:

FM Global Property Loss Prevention Data Sheets (http://www.fmglobaldatasheets.com)
FM Global Loss Prevention Training (https://fmglobaltraining.skillport.com)
Approval Guide (http://www.approvalguide.com)
RoofNav (http://roofnav.fmglobal.com)

Distribution:

Mr. Hugh Pearson, Moser Pilon Nelson Architects hpearson@mpn-arch.com
Mr. Alfred Tanguay, People's United Insurance ftanguay@rcknox.com
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Mr. William Santos, FM Global William.santos@fmglobal.com
Mr. Sean Buckley, MPN Architects sbuckley@mpn-arch.com
Mr. Ashour Gevargisnia, Ashour.Gevargisnia@ct.gov

Attachments:

FM Global Form 2688

Plan Review

State of Connecticut
"Uncas-on-Thames"
401 West Thames Street
Norwich, CT
USA
Attn: Mr. Ashour Gevargisnia ashourgevargisnia@ct.gov

Index-Rec No: 879.19-01
Account No: 30882
Date of Review: July 25, 2014
Review No: 191017

Plans Submitted By: Mr. Sean Buckley, MPN Architects

Subject: Drawings and Specifications for Roof Replacement- Project No. BI-2B-378 – Response to Review No. 186836

Executive Summary:

This submittal is a response to Plan Review No. 188918 dated June 18, 2014.

This submittal address Review Comment Nos: 4, 7, 8 and 9.

This submittal is in accordance with FM Global Standards. Please provide the Form 2688 for review and comment when they become available.

Scope of Review:

This confirms the receipt and review of Moser Pilon Nelson Architects formal response to Plan Review No. 188919.

Review Comments:

1. The roof design criteria should be based on a wind speed of 110 mph, a Ground Roughness Coefficient of C, a building importance factor of 1.15, and the building can be considered enclosed per FM Global Property Loss Prevention Data Sheet 1-28, *Wind Design*. A Ground Roughness Coefficient of C is selected due to the open field/parking lot located west of the facility. The building can be considered enclosed due to the poured in place concrete roof decks.

   FM Global Status (June 18, 2014): Specification section 075323 "EPDM Membrane Roofing" indicates the wind design criteria above. No further response is needed for this recommendation.

2. The roofs should have wind uplift ratings in accordance with Data Sheet 1-28 as listed below:

Table 2: Required Wind Uplift Ratings

Roof Area No.	Roof Area Title	Field (psf)	Perimeter (psf)	Corner (psf)
1	Phelps First Floor	75	120	165
1A*	Phelps First Floor	75	120	120
2	Stairs Fourth Floor	90	135	210
3	South Third Floor	75	135	195
4	Stairs Fourth Floor	90	135	210
5	Basement	75	105	165
6	Fifth Floor	120	180	240
6A	Fifth Floor	120	180	240
8	Elevator Penthouse	120	180	255
9	East Fourth Floor	90	135	210
10*	First Floor Lobby	75	120	120
11	Fifth Floor	120	180	240
13	West Third Floor	75	135	195
14	First Floor	75	120	165
14A	First Floor	75	120	165
15	Basement	75	105	165
16	Basement Addition	75	105	165
18	First Floor	75	120	165
19	North Third Floor	75	135	195
20	Stair 2 Fourth Floor	90	135	210
21	Stair 1 Penthouse	120	180	255
22	Shed First Floor	75	120	165
23	Loading Dock (Basement)	75	105	165
24	First Floor	75	120	165
26	Credit Union First Floor	75	120	165

***Notes: indicates that the parapet is 3 ft. or higher**

FM Global Status (June 18, 2014): The two proposed RoofNav Assembly Nos. of 308005-0-0 and 161008-0-0 have wind uplift class ratings of 150 and 480 respectively. RoofNav Assembly No. 308005-0-0 will be applied to all field-of-roof areas and RoofNav Assembly No. 161008-0-0 will be applied to all perimeter and corner roof areas with a wind uplift class rating of 180 and higher. This is in accordance with FM Global Standards and no further response is needed for this recommendation.

3. The perimeter and corner areas should be defined as Table 3 shows below:

Table 3: Perimeter and Corner Dimensions

Roof Area Number	Roof Area Title	Perimeter (ft.)	Corner (ft.)
1	Phelps First Floor	7	7 x 7
1A	Phelps First Floor	3	3 x 3
2	Stairs Fourth Floor	3	3 x 3

3	South Third Floor	8	8 x 8
4	Stairs Fourth Floor	3	3 x 3
5	Basement	3	3 x 3
6	Fifth Floor	3	3 (See Note Below)
6A	Fifth Floor	3	3 (See Note Below)
8	Elevator Penthouse	3	3 (See Note Below)
9	East Fourth Floor	3	3 x 3
10	First Floor Lobby	3	3 x 3
11	Fifth Floor	3	3 (See Note Below)
13	West Third Floor	3	3 x 3
14	First Floor	3	3 x 3
14A	First Floor	3	3 x 3
15	Basement	4	4 x 4
16	Basement Addition	4	4 x 4
18	First Floor	3	3 x 3
19	North Third Floor	4	4 x 4
20	Stair 2 Fourth Floor	3	3 x 3
21	Stair 1 Penthouse	3	3 (See Note Below)
22	Shed First Floor	3	3 x 3
23	Loading Dock (Basement)	3	3 x 3
24	First Floor	3	3 x 3
26	Credit Union First Floor	3	3 x 3

*Note: The indicated areas in Table 3 above are to have "L" shape corners per Data Sheet 1-28, Table 6. The inner dimensions of the "L" shape are to be 3 ft. and the outer legs of the "L" are to be 6 ft.

FM Global Status (June 18, 2014): According to drawing A2.0, the perimeter and corner areas have been defined as Table 3 indicates above. No further response is needed for this recommendation.

4. Please fill out and submit a FM Global Form 2688, *Checklist for Roofing System* (attached), for each new roof assembly to this office for review and comment when they become available. These forms should be sent to this office by the contractor of record before the roof installation begins. Please utilize FM Approved RoofNav Assemblies for all new roofs on this project. The RoofNav Assembly numbers should be listed on a submitted Form 2688.

   FM Global Status (June 18, 2014): No FM Global Form 2688s have been provided. FM Global looks forward to the submittal of the Form 268 to this office for review and comment when they become available. Two Form 2688s should be submitted (one for RooofNav Assembly No. 308005-0-0 and one for RoofNav Assembly No. 161008-0-0). Although only two Form 2688s will be submitted, please identify all the building numbers where the specific roof RoofNav Assembly is being applied to. This can be found on the first page of the Form 2688 under "Overview Of Work."

   Moser Pilson Nelson Architects (July 7, 2014): The submission of FM Global Form 2688 is required by the contractor of record. See our excerpt from our specification manual Section 07 53 23 Paragraph.

FM Global Response (July 23, 2014): Acknowledged. We look forward to reviewing the Form 2688.

5. For a fully adhered roof system that utilizes adhesives in ribbons or spots, reduce the spacing between ribbons or spots over the FM Approved field-of-roof spacing as follows:

   - In the roof perimeter, not more than 60% of the field-of-roof spacing between rows or area
   - In the roof corners, not more than 40% of the field-of-roof spacing between rows or area

   Please Note - When providing prescriptive enhancements, ensure that the adhesive ribbons are applied throughout the entire insulation board. For example, if part of an insulation board is in the corner area and part is in the perimeter area then prescriptive enhancement adhesive ribbons should be applied as if the entire insulation board was in the corner area.

   *Due to various roofing classification requirements, FM Global's best advice would be to install a fully adhered FM Approved Class 255 assembly throughout all roofing areas. This will ensure consistency of installation, required materials, and adhesive fastening rates. This option does not require reduced adhesive spacing in the perimeter in corner areas.

   FM Global Status (June 18, 2014): Reduced row spacing does not need to be performed if RoofNav Assembly No. 161008-0-0 (wind uplift class rating of 480) is applied to all roof areas that require a wind uplift class rating of 180 or greater for the perimeter and corners. When applying RoofNav Assembly No. 161008-0-0 to all the perimeter and corner areas, ensure to apply all adhesive fastening rates in accordance with its RoofNav listing. These adhesive rates should be clearly identified on the Form 2688. This recommendation will be verified once the Form 2688s are submitted and can be considered closed at this time.

6. If an adhered roof cover with mechanically attached insulation boards roof assembly is chosen, please provide the following applicable perimeter and corner roof enhancements:

   a. For roofs that have a field-of-roof wind uplift rating of 75 identified in Review Comment No. 2, prescriptive enhancements (as outlined by Data Sheet 1-29) for the perimeter and corner areas should be applied as follows:

      - Perimeter - 50% minimum of the FM Approved field-of-roofing spacing listed in RoofNav for that particular roof assembly, but at least one fastener per 2 sq. ft.

      - Corners – One fastener per 1 sq. ft.

   b. Prescriptive enhancements (as outlined by Data Sheet 1-29) for the roofs with a field-of-roof wind uplift rating of 90 and 120 are not acceptable. The following options are available for the roof areas where the field-of-roof wind uplift rating is 90 or 120:

      - A different FM Approved RoofNav Assembly for each of the field, perimeter, and corner areas should be chosen with their respected wind uplift ratings in Review Comment No. 2.

      - Select a FM Approved RoofNav Assembly that has a wind uplift rating equal to the corner area of that particular roof section (See Review Comment No. 2) and apply that corner roof

assembly throughout the entire roof section. Utilizing this option will require more fasteners, but will ensure the consistency of installation, required materials, and fastening rates

Please Note – Ensure that the fastener embedment to the structural concrete deck is a minimum of 1 in. to 1.5 in. deep.

FM Global Status (June 18, 2014): A fully adhered roofing system has been proposed. Please notify FM Global if a change to different roofing system will be proposed. No further response is needed for this recommendation.

7. Concerns for the isolated roof areas were positive drainage slope will be less than 1/8 in./ft. were outlined in the schematic design document. If a slope of less than ¼ in. ft. is desired for positive drainage, use the analysis methods outlined in Data Sheet 1-54, *Roof Loads for New Construction*, section 2.5.4.1.13.

   FM Global Status (June 18, 2014): Please inform FM Global if the drainage system will be designed per data Sheet 1-54, section 2.5.4.1.13.

   Moser Pilson Nelson Architects (July 7, 2014): Design of the drainage system in accordance with Data Sheet 1-54, section 2.5.4.1.13. This section is concerned with Roof Slope. In reviewing this section, the concern is for deflection and the resultant instability due to ponding, which appears applicable to contemporary steel construction. The original building was constructed in 1940. Two other additions were constructed, the latest in 1966, and all areas are of a concrete structure as verified in visual observations and the limited documentation. Where documents are available, the original construction consists of a 4 in. concrete structure with a minimum 2 in. cementations topping added for drainage, providing 3 in. of slope. The last construction in 1966 consists of 10 in. structural slab (radiation building) with a light weight concrete topping from 3 to 5 in. for drainage. No deflection has been observed, and per our design, we are reducing the loading with removal of ballasted and aggregate surfaced built up roof assemblies. Additionally, we are providing areas of tapered insulation (1/8in./ft.) over the sloped material and areas of tapered crickets to enhance slope to drains. See the following details which illustrate the original constructions including the topping layer providing slope.

   FM Global Status (July 23, 2014): Acknowledged. This is acceptable and this recommendation is considered complete at this time.

8. Although some roof perimeter flashing details were submitted, it was difficult to determine the fastening rates to the wood nailers. Please submit Perimeter Flashing and nailer assembly details and ensure compliance with Data Sheet 1-49, *Perimeter Flashing*. Please utilize FM Approved perimeter flashing rated for the field-of-roof indentified Review Comment No. 2 and identify materials being utilized in the flashing.

   FM Global Status (June 18, 2014): Although the specifications state that the perimeter flashing will be in accordance with Data Sheet 1-49, please submit perimeter flashing details to show compliance when they become available. The flashing for the areas where the required uplift rating exceeds 90 should be FM Approved and rated for the field-of-roof wind uplift rating identified in Review Comment No. 2 above.

Moser Pilson Nelson Architects (July 7, 2014): Per our specs we require the contractor, consistent with FM Global Item No. 4 above, to provide the following; Submittal to show that roof edge securement meets performance requirements; a) roof edge securement shall be engineered to meet specified performance requirements as part of the Base Bid; b) submit drawings and calculations prepared by a Structural Engineer registered in the state in which Work of this Contract is to be executed showing compliance; c) submittal drawings shall indicate how systems are installed to meet requirements.

FM Global Status (July 23, 2014): Acknowledged. Please provide documentation when it becomes available.

9. If a fully adhered or adhered membrane roof assembly should be utilized than final acceptance of the roof covering installation should be conditional to successful uplift testing in accordance with Data Sheet 1-52, *Field Verification of Roof Wind Uplift Resistance*. This requirement should be included in the contract to ensure testing is witnessed by the owner's representative. If the mechanically attached perimeter and corner enhancements are provided, uplift testing will be limited to the field of roof area only.

   An acceptable alternative to negative uplift testing is to use full-time visual construction observation (VCO) during the roof system installation. A qualified Construction Observer (CO) would provide full-time on-site visual observation of the roof construction process in an accurate and objective manner. Observation and recording duties should be completed per Data Sheet 1-52, Section 3.5.

   FM Global Status (June 18, 2014): Please insert this recommendation into the specifications. No further response is needed for this recommendation.

   Moser Pilson Nelson Architects (July 7, 2014): We will insert the noted recommendation into our project specifications as follows. Final acceptance of fully adhered membrane roof assembly is conditioned on successful negative uplift testing in accordance with Data Sheet 1-52, *Field Verification of Roof Wind Uplift Resistance*, testing to be witnessed by the Owner's representative.

   FM Global Status (July 23, 2014): Acknowledged.

Please respond to the above recommendations to our office within 14 days of receipt of this letter. If there are any questions or concerns regarding this review, you can contact the Boston Operations Lead Engineer via e-mail at bostonleadengineer@fmglobal.com or phone (781) 440-8241.

This review is for property insurance purposes only in accordance with FM Global standards and guidelines. Nothing should be inferred from this review regarding compliance with any rules, regulations or requirements of government agencies, state or local codes or any other jurisdictional authority. We are retaining the copy of your submitted plans for our files.

Sincerely,

Joshua Richardson
Plan Review Consultant
FM Global – Boston Operations

Loss Prevention Resources:

FM Global Property Loss Prevention Data Sheets (http://www.fmglobaldatasheets.com)
FM Global Loss Prevention Training (https://fmglobaltraining.skillport.com)
Approval Guide (http://www.approvalguide.com)
RoofNav (http://roofnav.fmglobal.com)

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Attachments:

FM Global Form 2688