

Addendum 01

Date: November 12, 2010

To: Wright Ryan Construction (Construction Manager)
From: Ben Walter, CWS Architects
Regarding: **Oak Street Apartments** – Portland, Maine
Subject: **Addendum 01**

Modify the previously issued documents dated October 25, 2010 and any previously issued addenda, if applicable, as follows:

Book 1 -Bidding and Contract Documents Manual:

1.

Book 2 -Specifications Manual:

2. Add item 3. Alternate 3 to 1.11.C Schedule of Alternates in specification Section 01 20 000 Price and Payment Procedures as indicated below:
 3. Alternate No. 3: Provide new bituminous asphalt paving in place of existing paving in the alley passageway as indicated on site drawing Sheet 2 and corresponding details.
 - a. Base Bid Item: Patch existing pavement in alleyway as required to complete the scope of work.
 - b. Alternate Item: Remove and replace bituminous asphalt paving in entire alley passageway.
3. Add specification Section 07 81 00 APPLIED FIREPROOFING (attached) to the SPECIFICATIONS INDEX in Division 07 THERMAL AND MOISTURE PROTECTION and to the body of the specification.
4. Replace specification Section 07 19 50 Air and Vapor Barrier in its entirety with the attached specification Section 07 19 50 Air and Vapor Barrier. The update changes the product to a fluid-applied, vapor permeable air barrier membrane system.
5. In 08 54 13 All Fiberglass Windows Section 3.2, C: Delete the sentence "Do not use expanding foam sealant." Replace with "Seal rough-opening to window frame gaps with low-expanding foam sealant."
6. Add item B. to 2.2 Components of specification Section 08 71 00 Door Hardware as follows:
 - B. Access Control System
 1. Refer to Door Hardware Schedule for Access Control Components.
 2. Provide main Processor/Controller: Schlage "Bright Blue" SBB with Power Supply SBB-3-APS (Connected to Static IP address), or equal.
 3. Door with Auto Openers shall have "Altronics" Power Supply Model RB12-24, or equal to shunt exterior Actuator.
 4. Provide programming and owner training of card access system and components by hardware supplier/distributor.

7. Add "Weatherstripping" to the Hardware description of Door 01 in the "IBC Type "B" Unit – SRO unit" as listed on 08 10 00 DOOR AND FRAME SCHEDULE.
8. Add the following items to 08 70 00 DOOR HARDWARE SCHEDULE:

Key FOBs/User Buttons	Schlage	IBF-110	
Wall Mounted Credential Reader	Schlage	1050	Schlage SBB-RI interface

9. On 08 10 00 DOOR AND FRAME SCHEDULE, add "Wall Mounted Credential Reader" to the hardware description of Doors 101A and 102A.
10. On 08 10 00 DOOR AND FRAME SCHEDULE, add "Wall Mounted Credential Reader, credential lock, electric hinges, electric strike tied to intercom and credential lock" to the hardware description of 113A and 113B.
11. Clarification specification 26 00 00 ELECTRICAL Part 2 2.6B does not apply to service conductors from transformer vault to main service equipment. Provide COPPER ONLY service conductors from transformer vault to main service equipment per CMP.
12. Add item D. to 2.1 INSULATION MATERIALS in specification Section 07 21 00 MISCELLANEOUS BUILDING INSULATION as follows

D. Fiberglass Board Insulation: mechanically fastened 4" rigid faced Fiberglass Board Insulation, Owens Corning Fiberglas 700 Series Insulations, or equal.

13. Replace the Building Use Summary in the International Building Code – Code Calculation dated August 10, 2010 with the schedule below:

	Level 1	Level 1	Levels 1+2	Levels 2-4
Building Use Summary	Parking S-2	Residential R-2	R-2 Accessory - Assembly	Residential R-2
Number of Floors (Proposed)	1	1	1	3
Level 1	4,373	2,426	734	
Level 2			733	6,610
Level 3				7,343
Level 4				7,343
Total floor area per use (SF)	4,373	2,426	1,467	21,297
Total Building Area	29,563			

Drawings:

Title Page

N/A

Civil and Site:

14. Provide new buried Telephone service entrance - Telephone Conduit: Telephone conduit shall be extended from the end of a vacant 1 ½ inch conduit in Oak Street as shown on SKC-1 of CSK-1. Provide a new 1 ½ inch steel conduit extended from terminus of vacant conduit to new mechanical room as

shown on SKC-1 of CSK-1. Saw cut pavement limits for utility installation have been revised to include new telephone conduit. Restoration of pavement shall conform to the City of Portland Design Standards. Refer to Electrical items, below.

Structural:

N/A

Architectural:

15. On Floor Assembly Type C2 on Drawing A0.2, change the word "Firesafing" to read "Fireproofing" (see 07 81 00 APPLIED FIREPROOFING) and change the words "Fire Retardant Coating" to read "Ignition Barrier" (see 07 21 19 item 2.2.B).
16. Clarification: Provide Applied Fireproofing per Section 07 81 00 on all steel beams supporting the 2nd floor elevated concrete slab.
17. DELETE all references to Foamed-in-Place Insulation per section 07 21 19 indicated to be applied to the underside of the Metal Decking (05 31 00) on drawings A5.1 through A5.7, A6.1 through A6.3 and A7.1 through 7.12 and PROVIDE mechanically fastened 4" rigid faced Fiberglass Board Insulation, Owens Corning Fiberglas 700 Series Insulations, or equal at ALL locations previously indicated to provide Foamed-in-Place Insulation applied to the under side of the metal deck (at all metal deck locations except where exposed to the elements (111 TENENT PARKING)).
18. Provide a Threshold and Sweep as per attached SKA-1 at all unit entry doors denoted as door number 01 Apartment Entrance at both the IBC Type "A" and Type "B" units. This detail correlates with Threshold 2 listed on 08 70 00 DOOR HARDWARE SCHEDULE.
19. A0.1 - Change " 5/8" PLYWOOD LAMINATED FRP " in Wall Assemblies 5C and 5E on drawings A0.1 to read " 5/8" GWB LAMINATED FRP " as listed in item 2.1.B.a in specification Section 09 77 00 Fiberglass Reinforced Plastic Panels.
20. At all through wall kitchen exhaust hood ductwork, provide Foamed in place insulation around the duct in the wall cavity prior to insulating the wall cavity with the specified insulation.

Mechanical:

21. Drawing M1.4 - Add solar collector piping from 4th floor ceiling cavity up to collectors on roof as shown on SKM-1.

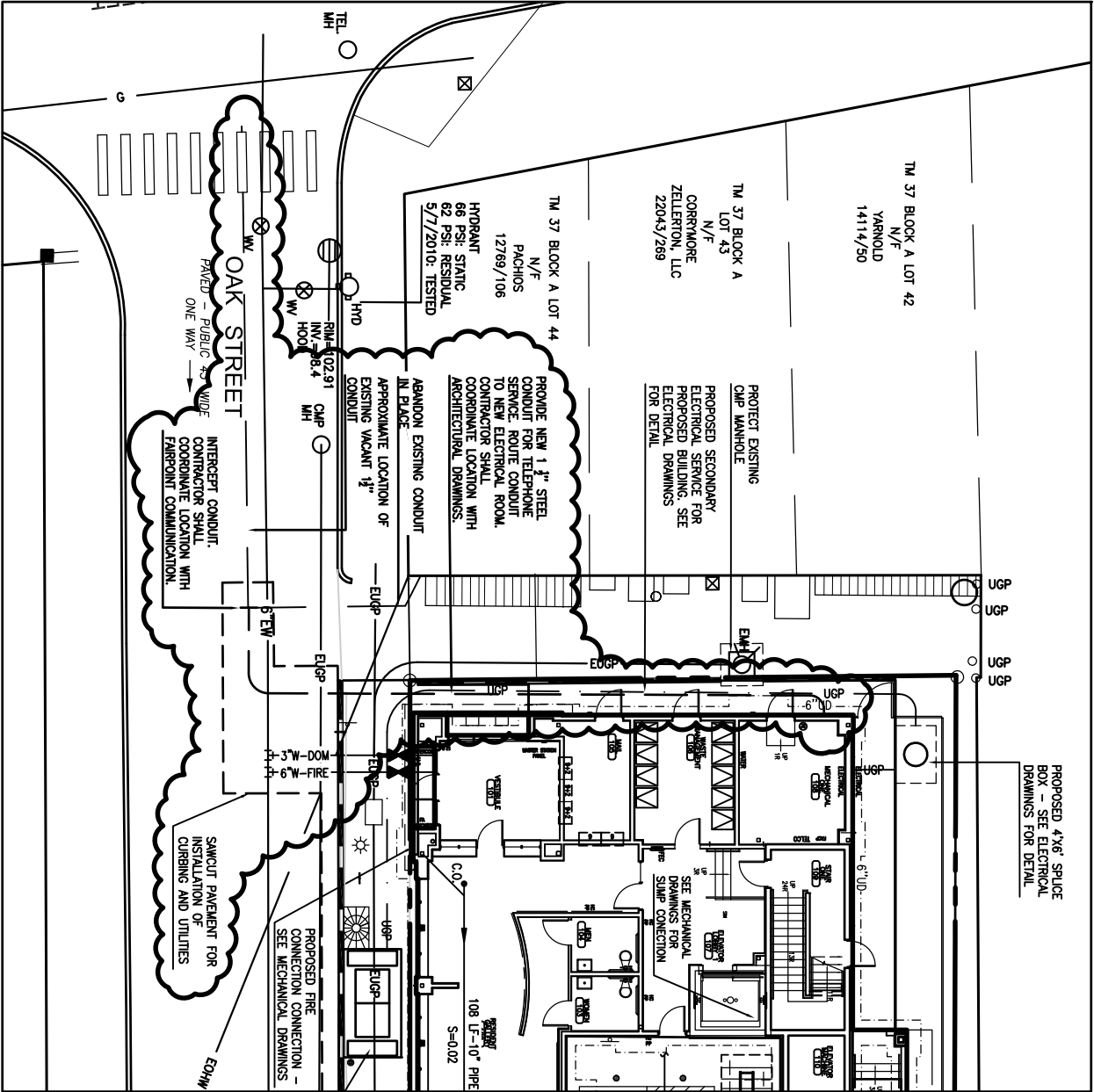
Electrical:

22. Provide buried telephone service entrance per attached SKC-1, see civil items, above.
23. Drawing E1.1 – Change note on service conductors to read 5-4" W/4#600 in each.
24. Drawing E1.5 – ERV-1 alternate #2 - delete second disconnect. ALT #2 ERV-1 feeder breaker shall be 175A, 3P and 200A feeder. Electrical load is a single point power feed of 169.3MCA, 175MOP at 208/3/60.
25. Drawing E3.1 – One line diagram change note on main service conductors to 4-4' W/4#600 MCM in each for main disconnect. House panel feeder remains unchanged.
26. Drawing E3.2:
27. Panel HP – Cir 1 – ALT #2 ERV-1 feeder breaker shall be 175A, 3P and 200A feeder. Electrical load is a single point power feed of 169.3MCA, 175MOP at 208/3/60.
28. Panel HP - Cir 66 – delete Alt #2 breaker make spaces in panel.
29. Change Main service equipment from 2000A to 1600A – AIC 69,500

30. Clarification: QUESTION: There isn't a mole limiter cabinet shown anywhere. I thought CMP would require one to be installed on the underground system in this area. ANSWER: This project is not on the "downtown network". No mole limiters are required on this project.

End of Addendum 01

Attachments: (See attached specifications, sketches and drawings listed above, if applicable)



Mitchell & Associates
LANDSCAPE ARCHITECTS

70 Center Street
Portland, Maine 04101
Tel: (207) 774-4427
Fax: (207) 874-2460

Title: TELEPHONE SERVICE CONNECTION

Date: 11/11/10

Project: OAK STREET EFFICIENCIES

Magnetic North:



**SKC-1
OF
CSK-1**

RESILIENT FLOOR, REFER TO
FINISH LEGEND AND SCHEDULE

DOOR FRAME BEYOND

TYPICAL UNIT ENTRY DOOR

ATTACHED PEMCO,
THRESHOLD STOP STRIP WITH
SILICONE SEAL, 290ASSTOP

ALIGN FACE OF STOP WITH
FACE OF DOOR FRAME STOP

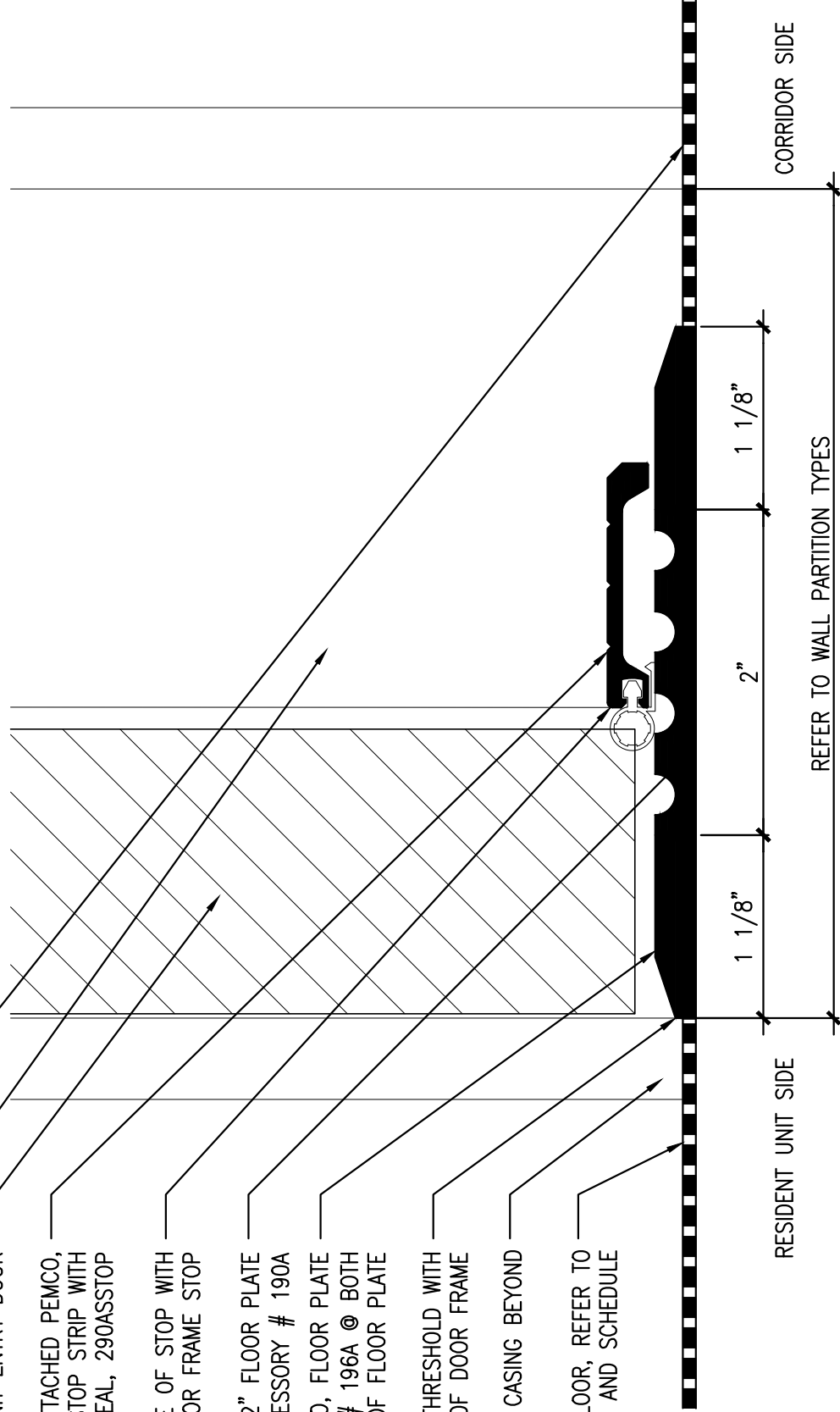
PEMCO, 2" FLOOR PLATE
ACCESSORY # 190A

PEMCO, FLOOR PLATE
ACCESSORY # 196A @ BOTH
SIDES OF FLOOR PLATE

ALIGN FACE THRESHOLD WITH
FACE OF DOOR FRAME

DOOR CASING BEYOND

RESILIENT FLOOR, REFER TO
FINISH LEGEND AND SCHEDULE



RESIDENT UNIT SIDE

REFER TO WALL PARTITION TYPES

CORRIDOR SIDE

154 Cumberland Avenue
Portland, ME, OHIO
Phone: (207) 774-4441
Fax: (207) 774-4016

Project:

OAK STREET LOFTS
72 OAK STREET
PORTLAND, ME

PROJECT #: 07446

Drawing Title:

THRESHOLD AT UNIT ENTRANCE DOOR

Scale: 1" = 1'-0"

Date: November 11, 2010

Drawing Number:

SKA-1



Curtis Walter Stewart
Architects

SECTION 07 19 50
AIR AND VAPOR BARRIER

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Materials and installation methods for fluid-applied, vapor permeable air barrier membrane system located in the non-accessible part of the wall.
 2. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.
- B. Related Sections include the following:
1. Section 03300 – Cast-In-Place Concrete
 2. Section 04810 – Unit Masonry Assemblies
 3. Section 06161 - Gypsum Sheathing
 4. Section 07115 – Bituminous Dampproofing
 5. Section 07131 – Self-Adhering Sheet Waterproofing
 6. Section 07530 – Elastomeric Membrane Roofing
 7. Section 07620 – Sheet Metal Flashing and Trim
 8. Section 07920 – Joint Sealants

1.2 DEFINITIONS

- A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:
1. It must be continuous, with all joints made airtight.

2. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.
3. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
4. It shall be durable or maintainable.
5. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
 - a. Foundation and walls
 - b. Walls and windows or doors
 - c. Different wall systems
 - d. Wall and roof
 - e. Wall and roof over unconditioned space
 - f. Walls, floor and roof across construction, control and expansion joints
 - g. Walls, floors and roof to utility, pipe and duct penetrations
6. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

1.4 REFERENCES

- A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.
- B. American Society for Testing and Materials (ASTM)
 1. ASTM C1193 Guide for Use of Joint Sealants
 2. ASTM D412 Standard Test Methods for Rubber Properties in Tension
 3. ASTM D570 Test Method for Water Absorption of Plastics
 4. ASTM D903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 5. ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
 6. ASTM D1876 Test Method for Peel Resistance of Adhesives
 7. ASTM D1938 Test Method for Tear Propagation Resistance of Plastic Film and Sheeting
 8. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 9. ASTM D4258 Practice for Surface Cleaning Concrete for Coating
 10. ASTM D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
 11. ASTM E96 Test Methods for Water Vapor Transmission of Materials
 12. ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
 13. ASTM E1186 Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems
 14. ASTM E2178 Standard Test Method for Air Permeance of Building Materials

15. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

1.5 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.
- B. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.
- C. Provision of general LEED requirements and forms: Section 01 81 13, Sustainable Design and LEED Requirements.”

1.6 SUBMITTALS

- A. LEED Submittals - Product data as per Section 01 81 13, Sustainable Design and LEED Requirements.
- B. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- C. Product Data: Submit data on product characteristics, performance criteria and limitations.
- D. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.7 SUSTAINABLE DESIGN REQUIREMENTS AND SUBMITTALS

- A. Conform to Section 01 81 13 - Sustainable Design Requirements and provide LEED Submittals, Manufacturer's Certificates and Product Cost Data, where applicable, for targeted LEED Credits targeted.
 1. Refer to Sustainable Design Requirements, Attachment 1: LEED for Homes – Mid-Rise Pilot Simplified Project Checklist for a description of each Credit.
- B. Targeted LEED Credits
 1. The Scope of Work outlined in this specification is targeted for one or more Credits in order to achieve the specified Certification level of LEED for Homes – Mid-Rise Pilot program.
 2. Refer to Drawing L-1 LEED for Homes – Mid-Rise Scope Matrix for specific Credits that are applicable to Work included in this specification Section.
 3. Refer to Section 01 81 13 - Sustainable Design Requirements for required Contractor requirements of each listed LEED Credit.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's recommendations for storage and handling of each product.

1.9 WARRANTY

- A. Standard Product Warranty:

1. Submit manufacturer's warranty that air & vapor barrier and accessories are free of defects at time of delivery, and are manufactured to meet manufacturer's published physical properties and material specifications.
2. Installer to warrant that air & vapor barrier and accessories have been installed in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 FLUID-APPLIED, VAPOR PERMEABLE MEMBRANE AIR BARRIER

- A. FLUID-APPLIED AIR BARRIER MEMBRANE: Fluid-applied, vapor permeable, acrylic membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces. The membrane provides superior protection against the damaging effects of air and liquid water ingress on the building structures. Perm-A-Barrier VP, as manufactured by Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA, or equal. Product shall have the following minimum physical properties:
1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.0004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.002 L/s. x sq. m. @ 75 Pa)
 2. Assembly Performance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.0008 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.004 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
 3. Membrane Vapor Permeance: ASTM E96, Method B: 11.2 perms
 4. Peel Adhesion: ASTM D903: min. 5 pli or substrate failure to glass faced wall board, min. 20 pli to concrete/CMU
 5. UV Exposure Limit: Not more than 180 calendar days
- B. TRANSITION MEMBRANE: Perm-A-Barrier Detail Membrane manufactured by Grace Construction Product; a 0.9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (4 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/Pa s. sq. m.) max.
 2. Air Permeance at 75 Pa (0.3 in. water) pressure difference: 0.0006 L/s. sq. m (0.00012 cfm/ sq. ft.) max.
 3. Puncture Resistance: ASTM E154: 178 N (40 lbs.) min.
 4. Lap Adhesion at -4°C (25°F): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
 5. Low Temperature Flexibility: ASTM D1970: Unaffected to -43°C (-45°F)
 6. Tensile Strength: ASTM D412, Die C Modified: min. 2.7 MPa (400 psi)
 7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%
- C. FLEXIBLE MEMBRANE WALL FLASHING: Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products; a 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/ Pa s. sq. m.) max.
 2. Water Absorption: ASTM D570: max. 0.1% by weight

3. Puncture Resistance: ASTM E154: 356 N (80 lbs.) min.
4. Tear Resistance
 - a. Initiation ASTM D1004: min. 58 N (13.0 lbs.) M.D.
 - b. Propagation ASTM D1938: min. 40 N (9.0 lbs.) M.D.
5. Lap Adhesion at -4°C (25°F): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
6. Low Temperature Flexibility: ASTM D1970: Unaffected to -43°C (-45°F)
7. Tensile Strength: ASTM D412, Die C Modified: min. 5.5 MPa (800 psi)
8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%

D. FLEXIBLE MEMBRANE ALUMINUM FLASHING: Perm-A-Barrier Aluminum flashing manufactured by Grace Construction Products; a 0.9 mm (35 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (5 mil) of aluminum film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:

1. Water Absorption: ASTM D570: max 0.1% by weight
2. Puncture Resistance: ASTM E154: 355N (80 lbs) min.
3. Lap Adhesion at -4°C (25°F): ASTM D1876 Modified: 880 N/m (5.0 lbs./in.) of width
4. Low Temperature Flexibility: ASTM D1970 Modified: Unaffected to -26°C (-15°F)
5. Tensile Strength: ASTM D412, Die C Modified: min. 4.1 MPa (600 Psi)
6. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C Modified: min. 200%

2.02 PRIMERS

A. Wall Primer for Self-adhered transition membrane and Self-adhered flexible membrane wall flashing: Perm-A- Barrier WB Primer manufactured by Grace Construction Products; a water-based primer which imparts an aggressive, high tack finish on the treated substrate.

1. Flash Point: No flash to boiling point
2. VOC Content: Not to exceed 10 g/L
3. Application Temperature: -4°C (25°F) and above
4. Freezing point (as packaged): -7°C (21°F)

2.03 PENETRATIONS & TERMINATION SEALANT

A. Liquid Membrane for Details and Terminations: Bituthene Liquid Membrane manufactured by Grace Construction Products; a two-part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L max. VOC content.

B. Substrate Patching Membrane: Bituthene Liquid Membrane manufactured by Grace Construction Products; a two- part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L max. VOC content.

C. Joint Sealant: Refer to sealant manufacturer's recommendations.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates and conditions are ready to accept the Work of this section. Notify [engineer] [architect] [consultant] in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.
Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

3.02 SURFACE PREPARATION

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier assembly.
- B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 – 75 mm (2-3 in.) wide, manufacturer's recommended mesh-style wallboard tape. Gaps greater than 6 mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the mesh-style wallboard tape and fluid applied air barrier system.
- C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
- D. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.
- E. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- F. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- G. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- H. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.
- I. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- J. At changes in substrate plane, apply sealant or Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.
- K. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.
 - 1. Prime substrate as required.
- B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply mesh-style wallboard tape to joint prior to installing fluid air barrier membrane.

3.04 AIR BARRIER MEMBRANE INSTALLATION

- A. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- C. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
 - 1. Vapor-Permeable Membrane Air Barrier: 90-mil (2.4-mm) wet film thickness, 42~45-mil (1.2-mm) dry film thickness.
- D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.05 TRANSITION MEMBRANE INSTALLATION

- A. Install strips, transition membrane, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
- B. Apply primer to substrates to receive transition membrane at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Re-prime areas exposed for more than 24 hours.
 - 1. Prime glass-fiber-surfaced gypsum sheathing not covered with air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition membrane to substrate with termination sealant.
- E. Apply joint sealants forming part of air barrier assembly within sealant manufacturer's recommended application temperature ranges. Consult sealant manufacturer when sealant cannot be applied within these temperature ranges.

- F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.
 - 1. Transition Membrane: Roll firmly to enhance adhesion.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- H. Repair punctures, voids, and deficient lapped seams in strips and transition membrane. Slit and flatten fish-mouths and blisters. Patch with transition membrane extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.06 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes
 - 2. Continuous structural support of air barrier system has been provided
 - 3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings
 - 4. Site conditions for application temperature and dryness of substrates have been maintained
 - 5. Maximum exposure time of materials to UV deterioration has not been exceeded
 - 6. Surfaces have been primed, if applicable
 - 7. Laps in strips and transition membrane have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish-mouths
 - 8. Termination sealant has been applied on cut edges
 - 9. Strips and transition membrane have been firmly adhered to substrate
 - 10. Compatible materials have been used
 - 11. Transitions at changes in direction and structural support at gaps have been provided.
 - 12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal
 - 13. All penetrations have been sealed
- C. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:
 - 1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186.
- D. Remove and replace deficient air barrier components and retest as specified above.

3.07 CLEANING AND PROTECTION

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace main air barrier material exposed for more than 180 days.
- C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- D. Remove masking materials after installation.

END OF SECTION

SECTION 07 81 00
APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Spray-on cementitious fireproofing for interior structural steel.
 2. Spray-on cementitious fireproofing for exterior exposed structural steel.
 3. Spray-on cementitious fireproofing for exposed metal deck.

1.2 RELATED SECTIONS

1. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.
2. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.
3. Provision of general LEED requirements and forms: Section 01 81 13, Sustainable Design and LEED Requirements.”
4. Specification Section 05 12 00 Structural Steel
5. Specification Section 07 21 19 Foamed-in-Place Insulation

1.3 SYSTEM DESCRIPTION

- A. Applied (Sprayed-On) Fireproofing Systems: Provide UL fire rated assemblies to hourly ratings as follows:
1. Interior Columns: N/A.
 2. Exterior Columns: N/A.
 3. Interior Beams: 1 hour.
 4. Exterior Beams: 1 hour.
 5. Interior Floors: N/A.
 6. Interior Roof Deck: N/A.
- B. Air Erosion: Maximum 0.005 gram/sq. ft (0.05 gram/sq. m) allowable weight loss of fireproofing when tested in accordance with ASTM E859.
- C. Corrosion: No contribution to corrosion of steel test panels when tested in accordance with ASTM E937.
- D. Dry Density: The field density shall be measured in accordance with ASTM Standard E605. Minimum average density shall be that required by the manufacturer, or as listed in the UL Fire Resistance Directory for each rating indicated, or as required by the authority having jurisdiction, or a minimum average 640 kg/m³ (40pcf) whichever is greater.
- E. Mold Resistance: Material to show resistance to fungi growth when tested in accordance with ASTM C665 requirements for fungi resistance of insulation or ASTM G21.
- F. Deflection: Material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.

- G. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or delaminate from the surface to which it is applied.
- H. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have a minimum average bond strength of 478 kN/m² (10,000 psf) and a minimum individual bond strength of 383 kN/m² (8,000 psf).
- I. Compressive Strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of when tested in accordance with ASTM E761.
- J. Fire Resistance Classification: The spray applied fireproofing material shall have been tested and reported by Underwriters Laboratories Inc. in accordance with the procedures of ANSI/ASTM E119 and shall be listed in the Underwriters Laboratories Fire Resistance Directory.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. LEED Submittals - Product data as per Section 01 81 13, Sustainable Design and LEED Requirements.
- C. Product Data: Submit data indicating product characteristics, performance criteria, and limitations of use.
- D. Manufacturer's Installation Instructions: Submit information including special procedures, and conditions requiring special attention.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements
- F. Manufacturer's Field Reports: Indicate compliance with manufacturer's installation instructions and Contract Documents.

1.5 SUSTAINABLE DESIGN REQUIREMENTS AND SUBMITTALS

- A. Conform to Section 01 81 13 - Sustainable Design Requirements and provide LEED Submittals, Manufacturer's Certificates and Product Cost Data, where applicable, for targeted LEED Credits targeted.
 - 1. Refer to Sustainable Design Requirements, Attachment 1: LEED for Homes – Mid-Rise Pilot Simplified Project Checklist for a description of each Credit.
- B. Targeted LEED Credits
 - 1. The Scope of Work outlined in this specification is targeted for one or more Credits in order to achieve the specified Certification level of LEED for Homes – Mid-Rise Pilot program.
 - 2. Refer to Drawing L-1 LEED for Homes – Mid-Rise Scope Matrix for specific Credits that are applicable to Work included in this specification Section.
 - 3. Refer to Section 01 81 13 - Sustainable Design Requirements for required Contractor requirements of each listed LEED Credit.

1.6 QUALITY ASSURANCE

- A. Fireproofing Assembly: Rating as indicated on Drawings.

1. Tested Rating: Determined in accordance with ASTM E119.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Maintain one copy of each document on site.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Maintain minimum ambient and substrate temperature of 40 degrees F (4 degrees C) during and for minimum 24 hours after application of fireproofing, unless otherwise recommended by manufacturer.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

1.8 WARRANTY

- A. Furnish five year manufacturer warranty for applied fireproofing.

PART 2 - PRODUCTS

2.1 SPRAY-ON CEMENTITIOUS FIREPROOFING

- A. Manufacturers:
 1. Grace Construction Products Monokote Z-146.
 2. Isolatek International
 3. Pyroc
 4. Substitutions: Permitted subject to compliance with requirements.
- B. Product Description:
 1. High Density Cementitious Type: Factory mixed, portland cement blended for uniform texture with mineral aggregates and additives, without chlorides, approved for exterior use and conforming to the following requirements:
 - a. Compressive Strength: ASTM E761, minimum 500 psi.
 - b. Dry Density: ASTM E605, minimum density of 40 pcf.
 - c. Bond Strength: ASTM E736, 10,000 psf when set and dry.
 - d. Bond Impact: ASTM E760, no cracking, flaking or delamination.
 - e. Durometer Hardness: ASTM D2240, not less than 40.
 - f. VOC: Less than 1PPM/W.
 - g. Leachable Ammonia: Less than 50 PPB.

2.2 ACCESSORIES

- A. Primer, Bonding Agent: Of type recommended by fireproofing manufacturer.
- B. Overcoat, Sealer: As recommended by manufacturer of fireproofing material for exposed condition and to receive overcoat application of spray foam insulation where indicated.

- C. Metal Lath: Expanded metal lath; 3.4 lb/sq ft (16 kg/sq m), galvanized finish; conform with ASTM C847.
- D. Water: Clean, potable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify surfaces are ready to receive fireproofing.
- B. Verify clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify ducts, piping, equipment, or other items interfering with application of fireproofing have not been installed.
- D. Verify voids and cracks in substrate have been filled. Verify projections have been removed where fireproofing will be exposed to view as finish material.
- E. Verify roof traffic has ceased and roof mounted equipment is in place.

3.2 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials affecting bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing.
- D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.
- E. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- F. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION - SPRAY-ON CEMENTITIOUS FIREPROOFING

- A. Install metal lath over structural members as indicated on Drawings or as required by fire rated assembly Design Numbers.
- B. Apply primer coating, fireproofing and overcoat sealer as recommended by manufacturer.
- C. Apply fireproofing in sufficient thickness to achieve required fire ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture. Apply in layers as recommended by manufacturer, but no more than $\frac{3}{4}$ " thickness in one pass.

- D. In exposed locations, trowel surface smooth and form square edges, using tools and procedures recommended by fireproofing manufacturer.
- E. Apply overcoat, sealer at rate and in applications recommended by fireproofing manufacturer.
- F. Remove excess material, overspray, droppings, and debris.
- G. Remove fireproofing from materials and surfaces not required to be fireproofed.
- H. At exposed fireproofing, clean surfaces soiled or stained, using manufacturer's recommended procedures.
- I. Patch damaged work as recommended by manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements. Field inspecting, testing, adjusting, and balancing.
- B. Independent Testing Agency To:
 - 1. Inspect fireproofing substrates prior to application of fireproofing for surface temperature and surface preparation in accordance with manufacturer's instructions.
 - 2. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
 - 3. Test frequency and type in accordance with applicable code and authorities having jurisdiction.
 - 4. Inspect for the following:
 - a. Installed Thicknesses and Density: ASTM E605.
 - b. Bond Strengths: ASTM E736.
 - 5. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

...END OF SECTION 07 81 00