ADDENDUM NO. 1

TO: Prospective Bidders

FROM: **David Larson**, *Procurement Agent*

DATE: **4/14/23**

PROJECT: **Fire Station 18 Roof Replacement**

Bid Number: BM2023-1192

The following items are being issued herein for modification and clarification to the Bid Requirements for the project referenced above.

MODIFICATIONS TO PROJECT MANUAL

The following sections have been revised by this addendum:

1) DIVISION 01 - 22 – TECHNICAL SPECIFICATIONS:

- **Section 072216-Roof Insulation**
  - Delete in its entirety and replace with attached:

- **Section 072613- Self Adhered Vapor Retarder**
  - Delete section in its entirety as the vapor retarder has been moved to Section 07 52 16.

- **Section 075216 Modified Bitumen Roofing**
  - Delete in its entirety and replace with attached:

MODIFICATIONS TO PROJECT DRAWINGS

None

REQUEST FOR SUBSTITUTIONS

None

QUESTIONS AND ANSWERS

None

ACKNOWLEDGEMENT BY BIDDER:

Please recognize receipt of this addendum in the acknowledgment addenda section on the ***BID Form***.

END OF ADDENDUM NO. 1

SECTION 07 22 16

ROOF INSULATION - REVISION NO. 01

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Roof Areas A, B and D:

a. Provide Base Sheet mechanically attached.
b. Provide Tapered Insulation System adhered in foam adhesive.
c. Provide Cover Board adhered in foam adhesive.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections apply to this Section, including but not limited to:

1. Section 06 10 00 "Rough Carpentry"
2. Section 07 01 50 "Preparation for Reroofing"
3. Section 07 41 13 "Metal Roof Panels"
4. Section 07 52 16 "Modified Bitumen Roofing"

1.3 REFERENCES

A. Refer to the following references for specification compliance:

1. National Roofing Contractors Association (NRCA)
2. FM Global
3. Underwriters Laboratories, Inc. (UL)

1.4 PERFORMANCE REQUIREMENTS

A. Wind Design: Install insulation system to meet the required wind uplift pressures as specified in Section 07 52 16 "Modified Bitumen Roofing".

1.5 SUBMITTALS

A. Refer to Section 01 33 00 "Submittal Procedures".

B. Product Data: Manufacturer's Product Data Sheets for materials specified certifying material complies with specified requirements.

C. Manufacturer's Instructions: Latest edition of the Manufacturer's current material specifications and installation instructions.

D. Shop Drawings: Tapered insulation plan from material supplier with minimum R-value for each roof area.

1.6 QUALITY ASSURANCE

A. Install insulation in accordance with their respective manufacturer's requirements.

B. Reject insulation not bearing UL label at point of delivery.

C. Remove insulation damaged or wetted before, during, or after installation from the job site no later than the next working day from the day such damage or moisture contamination is noted.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled packaging.

B. Storage: Store materials out of direct exposure to the elements on pallets or dunnage at least 4 inches above ground level at location acceptable to Owner.

1. Utilize tarps that cover materials to prevent moisture contamination. Remove or slit factory shrouds and/or visqueen; do not use these materials as tarps.
2. Install vapor retarders under material storage areas located on the ground.
3. Remove damaged or deteriorated materials from the job site.

C. Handling: Handle material in such a manner to prevent damage and contamination with moisture or foreign matter.

1.8 PROJECT CONDITIONS

A. Do not apply insulation during precipitation. Take responsibility for starting installation in the event there is a probability of precipitation occurring during application.

B. Take necessary action to restrict dust, asphalt, and debris from entering the structure.

C. Do not remove more roofing than can be replaced with insulation, membrane and flashings in the same day to create a watertight installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Insulation Boards:

1. Tapered Insulation System:

a. Rigid polyisocyanurate roof insulation board with factory applied glass fiber reinforced cellulosic felt facers on the top and bottom complying with ASTM C1289 Type II, Class 1, Grade 2 and meeting the following requirements:

1) Curing time: 24 hours minimum, plus an additional 24 hours minimum per inch thickness, at a minimum of 60 degrees F before shipment from the manufacturer.
2) Dimensional stability: 2 percent maximum linear change when conditioned at 158 degrees F and 97 percent relative humidity for seven days.
3) Board size: 4 feet by 4 feet.
4) Slope: 1/4 inch per foot
5) Minimum thickness: 2 inches.
6) Fill Insulation: Rigid polyisocyanurate meeting the above requirements with board size of 4 feet by 4 feet and thickness of 2 inches.

2. Cover Board:

a. Cover board approved by roof system manufacturer. Board Size: 4 feet by 8 feet. Minimum thickness as listed below or as required by roof system manufacturer.

1) Georgia Pacific 1/4 inch DensDeck Prime Roof Board
2) Soprema 1/8 inch Sopraboard
3) DEXcell 1/4 inch Glass Mat Roof Board

B. Insulation Accessories:

1. Base Sheet: Fiberglass reinforced, asphalt coated base sheet meeting ASTM D 4601, Type II as approved by the roof system manufacturer.

a. Base Sheet Fasteners:

1) Galvanized coated steel tube with high-tensile double steel wire locking staple and 2.7 inch diameter coated steel, ribbed plate.
2) Approved by the base sheet manufacturer for the base sheet specified
3) Fastener length as required to and penetrate the deck a minimum of 1 inch with a minimum 1/2 inch edge distance from bottom of roof deck to tip of fastener to prevent spalling on underside of roof deck.

2. Tapered Edge Strip:

a. Perlite: Asphalt impregnated perlite tapered edge strips with 1 inch per foot slope of sizes indicated in Contract Drawings or required by field conditions meeting ASTM C 728.

1) Install at edges to make transitions as detailed in Contract Drawings.
2) Provide to form crickets in front of curbs wider than 12 inches.
3) Provide slope at top of parapet walls below coping.

3. Cant Strips:

a. Perlite: Asphalt impregnated perlite cant strips of size detailed or required by field conditions meeting ASTM C 728. Walls and vertical terminations to receive 4 inch vertical leg cant strip with 5-5/8 inch face unless height restrictions dictate smaller sizes.

C. Insulation Attachment Materials:

1. Foam Adhesive: One or two part, VOC compliant, moisture-cured polyurethane foamable adhesive designed as roof insulation adhesive and approved by insulation manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect substrate for soundness and notify Engineer in writing of deficiencies.

B. Commencement of work signifies acceptance of substrates. Correct defects in work resulting from accepted substrates at no additional expense to the Owner.

3.2 PREPARATION

A. Dry and broom roof deck clean of debris and foreign matter prior to installation of insulation system.

3.3 APPLICATION

A. General

1. Apply in accordance with the insulation and roof system manufacturer's instructions and these specifications.
2. Install insulation in full boards, carefully fitted and pushed against adjoining sheets to form tight joints. Gaps exceeding 1/4 inch are not acceptable.
3. Saw cut or knife cut insulation and cover boards in a straight line, not broken. Utilize chalk lines to cut insulation. Uneven or broken edges are not acceptable.
4. Remove insulation dust and debris that develops during insulation cutting operations.
5. Offset joints between successive and adjacent layers of insulation a minimum of six inches.
6. Stagger joints of cover boards one foot (vertically and laterally) to ensure that joints do not coincide with joints from the previous or adjacent layer.
7. For torch application, continue coverboard over combustible substrates.
8. Install crickets, saddles and tapered edge strips before the cover board.
9. Adhere cant strips and tapered edge strips at transitions, terminations and/or penetrations as detailed or required in ribbons of foam adhesive to ensure smooth transitions are provided for the roof membrane and flashings.
10. Provide necessary modifications to insulation system or nailers at roof edges as required to ensure a flush and smooth transition is provided for the roof membrane and flashing.
11. Make field modifications of insulation, tapered insulation, tapered edge strips and cants where required to accommodate roof and flashing conditions and to prevent water dams and ponding water. Ponding water at scuppers and cricket valleys is not acceptable.

12. Provide necessary modifications to prevent standing water which is defined as 1/4 inch of water in a 4-square foot or larger area 24 hours or more after precipitation.

B. Base Sheet:

1. Mechanically attach base sheet to the prepared substrate in accordance with the base sheet fastening pattern approved for the tested roof assembly. Starting at the low point of the roof, apply base sheet in a shingle fashion with minimum 6 inch end laps and 3 inch side laps. Apply asphalt primer to head and plates of fasteners.

C. Tapered Insulation System:

1. Install tapered insulation system to provide positive slope for roof drainage without ponding water.
2. Size crickets as shown in the Contract Drawings. Provide modifications to ensure positive slope and prevent standing water along the cricket valley.

    a. Minimum length to width ratio of 2:1. Fabricate partial crickets with dimensions which result in a minimum length to width ratio of 2:1 if they were extended to full size.
    b. Unless otherwise noted, fabricate crickets from tapered stock as required to provide the specified minimum slope. For example, when roof slope is indicated as 1/4 inch per foot minimum, fabricate crickets with slope of 1/2 inch per foot minimum.
    c. Construct crickets on up slope side of curbs to ensure positive drainage.
    d. Install tapered edge strips at cricket edges to provide a smooth transition between the cricket and insulation system below.

3. Insulation boards may require mechanical fasteners and stress plates at slope transition of crickets to minimize bridging.

D. Roof Drainage:

1. Install drainage sumps as detailed.
2. Carefully lay out the tapered insulation, sumps, drain bowls and scuppers to ensure the finished roof provides drainage with no ponding water.
3. Fabricate miter-cut sumps at drains/scuppers to provide smooth transitions between the insulation system and the drains/scuppers.
4. Ensure sumps provide roof drainage and prevent water dams.
5. Adjust insulation, drains and scuppers to ensure roof drainage and satisfactory substrates for membrane and flashings.
6. Secure drain sump components using specified insulation fasteners or adhesives.
7. Circular sumps and sumps that do not provide smooth transition or that create standing water at the drains are not allowed.

E. Ponding Water: The ponding of water on the roof surface after installation of the roofing system is not acceptable and is grounds for rejection of the roof. Ponding is herein defined as precipitation remaining in a four-square foot area or larger, 1/4 inch or deeper for a period of 24 hours from the termination of precipitation. Provide modifications to roof system to ensure proper drainage including but not limited to reinstallation of roof system or installation of additional tapered insulation.

F. Foam Adhesive:

1. Position and space adhesive beads as required to comply with the requirements of the roof system manufacturer's approved, tested assembly.
2. Size adhesive beads in accordance with the adhesive manufacturer's guidelines.
3. Place insulation boards onto the beads and "walk" and/or "weight" into place. Place insulation boards into the adhesive in accordance with the adhesive manufacturer's guidelines.
4. Ensure adhesion of insulation and take whatever steps necessary to achieve adhesion, including but not limited to temporary ballasting of insulation until adhesive sets.

END OF SECTION

SECTION 07 52 16

MODIFIED BITUMEN ROOFING - REVISION NO. 1

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. *Provide self-adhered or cold adhesive applied vapor retarder over mechanically attached base sheet.*
2. Provide a modified bituminous membrane system consisting of two plies of asphalt elastomeric membrane reinforced with polyester and/or fiberglass mat.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections apply to this Section, including but not limited to:

1. Section 06 10 00 "Rough Carpentry"
2. Section 07 01 50 "Preparation for Reroofing"
3. Section 07 22 16 "Roof Insulation"
4. Section 07 62 00 "Sheet Metal Flashing and Trim"

1.3 REFERENCES

A. Refer to the following references, current edition for specification compliance:

1. National Roofing Contractors Association (NRCA)
    a. NRCA Roofing and Waterproofing Manual
2. ASTM International
    a. ASTM D 41 Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
    b. ASTM E 108 Standard Test Methods for Fire Tests of Roof Coverings
    c. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction Materials.
3. ASTM D 3019 Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos Fibered and Non-Asbestos Fibered.
    a. ASTM D 3409 Standard Test Method for Adhesion of Asphalt-Roof Cement to Damp, Wet, or Underwater Surfaces.
    b. ASTM D 4479 Standard Specification for Asphalt Roof Coatings - Asbestos Free.
    c. ASTM D 4586 Specification for Asphalt Roofing Cement, Asbestos Free.

d. ASTM D 6162 Specification for SBS Modified Bitumen Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
e. ASTM D 6163 Specification for SBS Modified Bitumen Sheet Materials Using Glass Fiber Reinforcements.
f. ASTM D 6164 Specification for SBS Modified Bitumen Sheet Materials Using Polyester Reinforcements.
g. ASTM D 6222 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
h. ASTM D 6223 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Reinforcements.
i. ASTM D 6509 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Base Sheet Materials Using Glass Fiber Reinforcements.

4. Asphalt Roofing Manufacturers Association (ARMA)
5. FM Global

6. FM 4450 - Approval Standard for Class 1 Insulated Steel Deck Roofs
   a. FM 4470 - Approval Standard for Class 1 Roof Coverings

7. Underwriters Laboratories, Inc. (UL)

   a. UL 580 - Test for Uplift Resistance of Roof Assemblies
   b. UL 790 - Tests for Fire Resistance of Roof Covering Materials
   c. UL 1897 - Uplift Resistance for Roof Covering Systems

1.4 PERFORMANCE REQUIREMENTS

A. Install roofing system to meet UL 790 Class A/ASTM E 108 Class A Fire Rating.

B. Wind Design: Provide an approved, tested roof assembly to resist the design wind uplift pressures specified in the Contract Drawings.

1.5 SUBMITTALS

A. Refer to Section 01 33 00 "Submittal Procedures".

B. Product Data: Manufacturer's Product Data Sheets for materials specified certifying material complies with specified requirements.

C. Manufacturer's Instructions: Latest edition of the Manufacturer's current material specifications and installation instructions.

D. Roof System Assembly Letter: Letter from roof system manufacturer listing roof assembly components along with their method of attachment and acceptance of the specified roof system warranty terms. Assembly letter should match the submitted test report documentation and specified assembly.

E. Test Reports: Submit documentation of approved, tested roof system to meet the specified requirements for the following:

1. Wind uplift pressures
2. UL Fire Resistance Rating

1.6 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Approved by the roof membrane manufacturer and have the experience of 5 similar roof projects. Provide verification of similar experience to the Engineer upon request.

B. Manufacturer Qualifications:

1. Producing modified bitumen products in the United States for a minimum of 10 years.
2. Maintained a consistent composition for a minimum of five years without a change in the basic product design or SBS modified bitumen blend (e.g. no substantive changes in product composition, polymer specification, asphalt or filler formulation).

C. Inspect the base ply and reinforcing/stripping ply application by the Contractor and Manufacturer's technical representative. Repair and prepare to meet the Manufacturer's requirements prior to installing the surface ply.

D. Do not exceed exposure limits of the base ply for longer than the manufacturer's maximum requirement. Base ply exposed longer than the maximum requirement is subject to rejection or additional remedial requirements prior to application of the surface ply.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery. Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements on pallets at least 4 inches above ground level at location acceptable to the Owner.

1. Storage trailers are acceptable provided they are equipped with a lock and located at a site location acceptable to the Owner.
2. Utilize tarps that cover materials to prevent moisture contamination. Remove or slit factory shrouds and/or visqueen; do not use these materials as tarps.
3. Install vapor retarders under material storage areas located on the ground.
4. Store roll goods on end on a clean flat surface.
5. Remove damaged or deteriorated materials from the job site.

C. Handling. Handle material in such manner as to preclude damage and contamination with moisture or foreign matter.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply roofing during precipitation. Do not start roofing operations in the event there is a probability of precipitation during applications.
2. Do not apply the membrane or flashings at or below the dew point temperature.
3. When conditions are damp and where adjacent roof areas have moisture or dew, dry surfaces to prevent tracking water over the membrane substrates.
4. At ambient temperatures of 40°F and below, including wind chill, take precautions to ensure adhesives and other materials maintain the minimum acceptable temperature at the point of roofing application as recommended by the membrane manufacturer.

B. Protection:

1. Protect against staining and mechanical damage of adjacent surfaces and work areas during application. Staining, mechanical damage, or discoloration of the membrane is cause for rejection.
2. Refer to Section 01 14 00 "Work Restrictions" for requirements to prevent odors or smoke/fumes from entering the building.
3. Protect materials being installed and storage of materials against wind related damage.

1.9 WARRANTY

A. Manufacturer's Guarantee: Manufacturer's standard form, non-pro-rated, without monetary limitation or deductibles, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks or breaches in the primary roof membrane causing moisture to enter the substrate below (even if visible leaks are not observed inside the facility).

1. Warranty to include but not be limited to membrane, insulation, base sheet, vapor retarder, mastics, adhesives, fasteners, sealants, base flashings, etc.
2. Warranty Period: Twenty years from date of Substantial Completion
3. Warranty to remain in effect for wind speeds up to 72 mph.
4. Warranties requiring the Owner's signature are not acceptable.

B. Contractor's Warranty:

1. Five Year Warranty: Manufacturer's Representative and Contractor's Representative will attend two post construction field inspections: 1) the first two years from the date of commencement of the Contractor's Warranty plus or minus one month and 2) the second no earlier than one month prior to the expiration date of the Contractor's Warranty. Submit a written report within seven (7) days of the site visit to the Engineer listing observations, conditions and recommended repairs or remedial action.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements herein, provide roof system from a single source. Manufacturers:

1. Derbigum

2. Siplast
3. Soprema, Inc.
4. Engineer's Accepted Equivalent

2.2 MEMBRANE MATERIALS

A. Roof Membrane (Cold Adhesive):

1. A dimensionally stable roof membrane assembly consisting of 2 plies of a prefabricated, reinforced, homogeneous modified asphalt membrane secured to a prepared substrate with cold adhesive.

   a. Both reinforcement mats impregnated and coated each side with a high-quality modified bitumen blend of Styrene-Butadiene-Styrene (SBS) or Atactic Polypropylene (APP).
   b. Pass ASTM D 5849, Resistance to Cyclic Joint Displacement at 14°F. Passing results show no signs of membrane cracking or interply delamination after 500 cycles as manufactured and 200 cycles after heat conditioning according to ASTM D 5147.

2. Base Ply Membrane: Glass fiber and/or polyester reinforced ply sheet manufactured for cold adhesive application, meeting or exceeding requirements of ASTM D 6163 or D 6164, Type I or II, Grade S; or ASTM D 6509.

   a. Derbigum Derbibase Ultra
   b. Siplast Paradiene 20
   c. Soprema Elastophene Sanded

3. Surface Ply Membrane: Glass fiber and/or polyester reinforced ply sheet manufactured for cold-adhesive application, meeting or exceeding requirements of ASTM D 6163, D6164 or D 6222, Type I or II, Grade G. Granule color white.

   a. Derbigum Derbicolor P-FR
   b. Siplast Paradiene 30 FR
   c. Soprema Elastophene LS FR GR

B. Flashings: Consist of a minimum of two plies.

1. Reinforcing/Stripping Ply (Flashing Cement):

   a. Derbigum Derbibase Ultra
   b. Siplast Paradiene 20
   c. Soprema Elastophene 180 Sanded

2. Flashing/Target Ply (Flashing Cement):

   a. Derbigum Derbicolor P-FR
   b. Siplast Paradiene 40 FR or Siplast Parafor 30
   c. Soprema Sopralene 180 FR GR

C. Fluid Applied Flashing: Membrane manufacturer's polyurethane or PMMA based resin with polyester fleece flashing system.

1. Derbigum Derbiflash
2. Siplast Parapro
3. Soprema Alsan RS

2.3 RELATED MATERIALS

A. Vapor Retarder:

1. Glass fiber and/or polyester reinforced ply sheet manufactured for self-adhering or cold adhesive application, meeting or exceeding requirements of ASTM D 6163 or ASTM D 6164, Type I or II, Grade S.

a. Derbigum PRS SA Base Sheet
b. Siplast Paradiene 20 SA
c. *Soprema Soprabase S*

B. Cold Adhesive: Membrane manufacturer's standard low-VOC adhesive, specifically used for adhering membrane plies. Adhesive accepted by membrane manufacturer for inclusion in warrantable system.

1. Derbigum Permastic
2. Siplast PA 311 R
3. Soprema Colply Membrane Adhesive

C. Asphalt primer: ASTM D-41 and be approved for intended use by membrane manufacturer.

D. Flashing Cement: An asphalt cutback mastic, reinforced with non-asbestos fibers, enhanced slump resistance, used for vertical flashing applications conforming to ASTM D 4586 Type II requirements.

1. Derbigum Perflash
2. Siplast PA 828
3. Soprema Colply Flashing Cement

E. Solvent Free Adhesive: A single component, solvent-free modified asphalt adhesive designed for application of the specified roof membrane in areas below the fluid applied flashing.

F. Utility Roof Cement: An asphalt cutback general utility mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges and temporary seals conforming to ASTM D 4586 Type II requirements.

G. Sealant: An SBS polymer modified asphaltic flashing cement in a 10.4-ounce cartridge conforming to ASTM 4586 requirements approved by the roofing membrane manufacturer for use in conjunction with the roofing membrane materials.

H. Ceramic granules: Color scheme matching the granule surfacing of the cap sheet comparable to No. 11 granules.

I. Reinforcing Fabric: Woven fiberglass fabric treated with asphalt primer conforming to ASTM D 1668/D 1668M and approved by roof system manufacturer for intended use.

J. Walk Pad Material: Prefabricated (by the membrane manufacturer), puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic granule wearing surface.

2.4 FASTENERS

A. Base Flashing Fasteners (Wood): Galvanized ring shank nail with 1 inch diameter cap, minimum 1 inch length and approved by the membrane manufacturer for inclusion in warranty:

1. Simplex Nails Regular Round Head Fasteners
2. Engineers accepted equivalent

B. Base Flashing Fasteners (Concrete/Masonry): 1/4-inch diameter metal-based expansion anchor for use in concrete or masonry substrates with length to penetrate substrate a minimum of 1-1/2 inch.

C. Termination Bar: 1/8-inch by 1-inch aluminum or stainless-steel flat bar with pre-drilled oversized or slotted holes 6 inches on center.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Conduct a pre-job conference including the Owner, Engineer, Contractor, and the membrane manufacturer's representative prior to the application of the roofing.

B. Verify work penetrating the roof deck or work affecting the roofing has been properly completed.

C. Inspect insulation system substrate prior to application of membrane. Commencement of work signifies acceptance of substrate. Correct defects in work resulting from accepted substrates at no additional expense to the Owner.

3.2 PREPARATION

A. Sweep or vacuum surfaces prior to commencement of roofing.

B. Coordinate closure of air intakes prior to application of primer and cold adhesives.

C. Unroll membranes and allow to relax in accordance with membrane manufacturer's recommendations or a minimum of thirty minutes, whichever is greater.

D. Where walls, curbs, expansion joints, etc. present an unacceptable substrate for flashing and where flashings substrates are combustible, fasten a layer of non-combustible cover board to provide a suitable substrate for flashing.

3.3 APPLICATION

A. General:

1. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements.
2. Complete base ply application following base sheet/insulation system application as a continuous operation on the same work day.
3. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is required. Make necessary preparations, utilize recommended application techniques, apply the specified materials (i.e. granules, etc.), and exercise care in ensuring that the finished application is acceptable to the Owner. Excessive footprints or impressions in the surface ply are grounds for rejection thereby requiring membrane replacement.
4. Priming:

    a. Prime metal flanges, concrete and masonry surfaces with a uniform coating of asphalt primer.
    b. Provide coverage of primer to ensure surfaces are dark brown to black with minimum application rate of 1 to 1-1/4 gallons.
    c. Allow primer to dry prior to application of asphalt/adhesive.

5. Inspect membrane and flashing application each day. Repair deficiencies daily prior to beginning or resuming other work.

    a. Cut open and remove membrane deficiencies as necessary.
    b. Make repairs to extend from lap to lap.

B. Vapor Retarder:

1. Apply membrane in accordance with the manufacturer's instructions and the following requirements.
2. Apply layers of roofing free of wrinkles, creases or fishmouths.
3. Exert sufficient pressure by use of roller or broom on the roll during application to ensure prevention of air pockets.
4. Apply layers of roofing perpendicular to the slope of the deck.
5. *Bond to the prepared substrate, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps following sheet application. Stagger end laps a minimum of 3 feet.*

C. Roof Membrane:

1. Apply membrane in accordance with the manufacturer's instructions and the following requirements.
2. Apply layers of roofing free of wrinkles, creases or fishmouths.
3. Exert sufficient pressure by use of roller or broom on the roll during application to ensure prevention of air pockets.
4. Stagger the lap seams between the base ply layer and the surface ply layer.

5. Apply layers of roofing perpendicular to the slope of the deck with laps shingled to prevent back water laps or strap as required by roof membrane manufacturer due to slope.
6. Back nail as required by roof membrane manufacturer due to roof slope.
7. Bond the base ply to the prepared substrate, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps following sheet application. Stagger end laps a minimum of 3 feet.
8. Bond the surface ply to the base ply, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps of the surface ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps following sheet application. Stagger side laps of the surface ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the surface ply a minimum 3 feet from end laps in the underlying base ply.
9. Follow membrane manufacturer's recommendations if hot air welding of laps is required.

D. Cold Adhesive:

1. Apply in accordance with membrane manufacturer's published instructions.
2. Apply with 3/8-inch notched soft rubber squeegee.
3. Apply cold adhesive in a smooth, even, continuous layer without breaks or voids.
4. Utilize an application rate of 2 to 2 1/2 gal/sq over irregular or porous substrates. Utilize an application rate of 1 1/2 to 2 gal/sq for interply applications. Double the adhesive application rate at the end laps of granule surfaced sheets. Vary application rates based on conditions present.
5. Inspect and change squeegee blades daily. Replace squeegee blades more frequently as the notches are worn down less than 3/8 inch.
6. Apply cold adhesives between ambient temperatures of approximately 40°F to 100°F.
7. Minimize foot traffic in areas where adhesive has been installed.
8. In the areas surrounding details that are to receive fluid applied flashings, apply membrane plies in a coating of the specified solvent free adhesive in lieu of the solvent based adhesive a minimum 8 inches from the base of the penetration or curb.

E. Water cut-off: At end of day's work, or when precipitation is imminent, construct a water cut-off at open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Remove cut-offs prior to the resumption of roofing.

F. Flashings:

1. Install concurrently with the membrane installation.
2. Prior to installing flashings over plywood substrates, install a layer of rosin paper and base sheet. Secure to plywood with specified fasteners at 6 inches on center staggered.
3. Prior to torch application along cant strips, provide self-adhered flashing ply in accordance with the below requirements.
4. Base flashing consists of a reinforcing ply and flashing ply.

    a. Lap reinforcing ply a minimum of 3 inches at side laps, extend a minimum of 4 inches onto the base ply from the base of the cant and extend a minimum of 3 inches up the vertical termination above the toe of the cant or as noted in the detail drawings.

b. Lap flashing ply a minimum of 3 inches at side laps, extend a minimum of 6 inches from the toe of the cant onto the surface ply and extend a minimum of 3 inches up the vertical termination above the toe of the cant or as noted in the detail drawings.
c. Stagger side laps in the reinforcing ply and flashing ply.
d. Cut off the end of the roll and be apply reinforcing ply and flashing ply vertically, always working to a selvage edge.

5. Mechanically terminate base flashing a minimum of 8 inches above the finished roof surface.

   a. Wood Substrate: Mechanically terminate base flashings using specified fasteners 6 inches on center.
   b. Concrete/Masonry Substrate: Mechanically terminate base flashing 6 inches on center using specified fasteners and termination bar.
   c. Gypsum Sheathing Substrate over Metal Stud Wall: Mechanically terminate using specified fasteners and termination bar into each metal stud.

6. Seal top of base flashings and termination fasteners with 3-course of roof cement and reinforcing fabric after termination.
7. Terminate base flashing at roof edges by extending the base flashing at least two inches beyond the edge of the roof and mechanically attaching a termination bar vertically with appropriate fasteners six inches on center. Provide a continuous bead of sealant along outside edge of termination bar.
8. Seal off sheet metal incorporated into the roofing system with stripping ply.

   a. Adhere in roof cement and fit tight to the edge of the sheet metal.
   b. Extend four inches beyond sheet metal onto roof membrane.
   c. Install prior to application of surface ply.

9. Provide sealant installed to fill void between edge of sheet metal and surface ply edge (i.e. at metal edge, pipe penetrations, etc.) properly tooled to ensure adhesion and slope to shed water. Broadcast granules into properly installed sealant.

G. Fluid Applied Flashing:

1. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to set.
2. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.
3. Refer to manufacturer's installation instructions for application rates and additional installation information.
4. Broadcast granules into horizontal surface of fluid to match adjacent surface ply.

H. Walk Pad Material:

1. Apply walk pad material to a clean, dry surface.
2. Prior to application, cut walk pad material into maximum 5 foot lengths and allow to relax until flat. Use a straight edge or chalk line to ensure straight square cuts. Do not cut the walk pad material directly on the roof surface.

3. Position walk pad material so as to leave minimum 2 inch gaps between panels to allow for proper drainage.
4. Adhere walk pad panels to surface ply with roof cement applied to the back of the panels in spots approximately 5 inches square. Use a notched trowel to keep the cement 3/8-inch thick.
5. Walk-in each panel to ensure contact with the membrane surface.
6. Provide walk pads where indicated in Contract Drawings and at the following locations:

    a. Around roof hatches.
    b. At base and top of fixed wall access ladders.
    c. Around HVAC units.
    d. At door access to roof areas.

I. Ponding Water: The ponding of water on the roof surface after installation of the roofing system is not acceptable and is grounds for rejection of the roof. Ponding is herein defined as precipitation remaining in a four-square foot area or larger, 1/4 inch or deeper for a period of 24 hours from the termination of precipitation. Do not install surface ply until verification of proper drainage has been determined. Provide modifications to roof system to ensure proper drainage including but not limited to reinstallation of roof system, installation of additional tapered insulation and/or installation of additional base plies.

3.4 CLEANING

A. Remove debris and excess material from the roof area. Pick-up loose fasteners and sheet metal scraps.

B. Clean off/remove excess adhesive, sealant, stains and residue on the membrane and flashing surfaces.

END OF SECTION