TO ALL BIDDERS OF RECORD:

This Addendum forms a part of the Contract Documents and modifies the Drawings and Project Manual as hereinafter indicated.

1) Technology Clarifications

A. **RFI's Questions & Responses**

1. **Question**: *The bid documents refer to Panic buttons being installed and tied into existing intrusion system. Please identify the existing intrusion system provider as they will be required to add these inputs and create the desired alarm notifications. Or is this portion of addition and programming to be provided privately thru the school department.*

   Answer: The school district will provide for the final connection in the panels and programming.

2. **Question:** *Is this a riser or plenum environment in each building?*

   Answer: Provide plenum rated cabling.

3. **Question:** *Please provide model number for the requested I Class SE encoders desired in specifications under credentials.*

   Answer: HID Global's iCLASS SE Encoder CP 1000

4. **Question:** *It appears no cards are requested, just 1000 key fobs. This makes identification of card holders difficult, is this correct?*

   Answer: Yes correct- Although the school district may want credentials in card format in the future. For the bid use the FOB only.

5. **Question:** *Will handicapped door opener require sequencing with intercom release or access card release to operate?*

   Answer: There are door release buttons as part of the project that will be an input to the access control security system to release the doors. The intercom will not be required to open the doors.

6. **Question:** *Middle school secure vestibule appears to have a new camera added near office door as does High school in hallway near office. Please provide model number desired as well as if licenses are required or extra are available for new camera additions.*

   Answer: Milestone is the software at high school Monitor Station Ver 6.3.2.12 and VI Monitor Ver 6.3.2.12 by Video Insight is what is used at the middle school. Provide licensing for each camera.

7. **Question:** *The electrical and conduits are not shown for the doors other than new vestibules.*

   Answer: Please refer to the Technology / Security drawings.

8. **Question:** *There are junction boxes and single gang boxes shown in TY but not on electricals.*

   Answer: Correct refer to the Technology / Security drawings

9. **Question:** *The power supplies for the new crash bars are typically local to the doors and required local power*

   Answer: No remote power from security panel provide 120v connection.

10. **Question:** *To confirm the VMS is currently – Milestone? What is the current version?*

    Answer: Milestone is the software at HS while Monitor Station Ver 6.3.2.12 and VI Monitor Ver 6.3.2.12 by Video Insight is what is used at GMS.

11. **Question:** *IDF/Comm Room locations, High School and Middle School?*

    Answer: to the nearest Comm room allow for 250' of cable. Pathways into the room exist.

12. **Question:** *Where are existing Intrusion Panels located – both buildings?*

    Answer: Middle School Intrusion Panel is in Shipping Receiving 162- Allow 250' of cable from panel to devices.
    High School Intrusion Panel in the in in the Science wing. Allow for 330' of cable from panels to devices

13. **Question:** *What are the model numbers for the existing cameras that you would like to match?*

    Answer: Interior cameras- Axis P3225-LV: Exterior Axis P3225-LVE

14. **Question:** *On drawing TY002, S2 AND Kantech is listed as acceptable Manufacture , CAN "RBH Axiom access control" be added to the acceptable Access control manufactures List. , Please note RBH can be intergrade to work with Milestone , Compatible with the existing cards and meet all the spec and is the preferred software and installed successful in more than 20 schools in RI. Please see enclosed*

    Answer: There is only one Integrator certified in Rhode Island for RBH products. Provide the manufacturers listed in the specification.

15. **Question:** *Re TY101A Drawing, no strikes symbols or EI door hardware is on the security drawing,*

    Answer: BTC-Provide 16/2 shielded plenum cable for the lock power

16. ***Question*** *Will all door hardware needed be providing by the door hardware company?*

    Answer: Yes, hardware is providing the electronic lock hardware the security integrator will provide cabling and connections to the hardware

17. **Question:** *Re TY301 typical 5 and 6 note 1 "door operation note:*
a. upon valid card reader validation, all doors to unlatch. when one of the doors are open, the remaining two doors are to latch closed.

Answer: The card reader-controlled door will be the only door controlled by the card reader.

18. ***Question:*** *Please provide more detail, what doors is included in ALL DOORS?*

Answer: Card reader-controlled door only

19. ***Question:*** *What doors need to be unlocked with a valid Card read, like Door 101-1 and door 157.2 or do all 9 doors need to unlatch?*

Answer: Card reader-controlled door only

20. **Question:** *according the door hardware schedule only one side of the leaf is electrified is the door company supplying the EL-strikes for all doors*

Answer: The card reader-controlled door will be the only door controlled. Other doors will remain as is for locks.

21. **Question:** *Is it acceptable to unlock only 2 doors upon valid card read (More secure)*

Answer: The card reader-controlled door is the only door controlled by the security system

22. **Question:** *RE "ADO" on security Drawing TY201C AND TY101A*

Answer: RE Drawing A910, Remark notes: 7. ELECTRONIC DOOR CLOSURE SYSTEM x24V. TIE CLOSER INTO FIRE ALARM/DETECTION SYSTEM TO AUTOMATICALLY CLOSE DOOR WHEN SYSTEM ACTIVATES. PROVIDE 120V POWER $ J-60X TO ABOVE DOOR FOR 24V TRANSFORMER FURNISHED BY DOOR CLOSURE MFR$ INSTALLED BY ELECTRICAL CONTRACTOR. PROVIDE 120V STEP DOWN TRANSFORMER$ CONTROLLER, ETC; INCLUDE RELAYS. CONTRACTOR TO COOR.DINATE HARDWARE$ ELECTRICAL WORK FOR COMPLETE OPERATIONAL SYSTEM.

23. **Question:** *Re drawing A910, remark notes: 7. electronic door closure system x24v. tie closer into fire alarm/detection system to automatically close door when system activates. provide 120v power*

Answer: No door hold open(s) in project, omit remark note 7

24. **Question:** *J-60X to above door for 24v transformer furnished by door closure mfrs installed by electrical contractor. provide 120v step down transformer controller, etc. include relays. contractor to coordinate hardware electrical work for complete*

Answer: Provide & Install 120v conduit at each push station with a 4" junction box. circuit to be determined in the field (at all ADA push buttons)

25. **Question:** *What is the model and version of the existing intercom system?*

Answer: The intercom stations and master stations will be new. Provide Airphone JP series stations with 7" master stations

26. **Question:** *Will the video intercom be integrated into the VMS existing system?*

Answer: No

2) Electrical Clarifications

A. **RFI's Questions & Responses**

1. **Question:** *Drawing TY101A Doors #2 (4/TY301) + 5 (4/TY301) and drawing TY101B Door #10 (4/TY301), Drawing TY201A Doors #11 (6/TY301) + 17 (A/TY301), and drawing TY201B Door #12 (5/TY301) + #13. At these locations the electrical contractor is required to install conduit and junction boxes for the security contractor. After, reviewing the electrical drawings nothing is noted. Please advise.*

Answer: Electrical or security contractor to install the backbox and conduit. The GC is to coordinate the work.

2. **Question:** *RCP1/A601.M note AC6 states to replace existing light fixtures with new light fixtures provided by owner. RCP4/E100M note all light fixtures existing to remain. Please advise if your intention is to remove existing and install OFCI fixtures.*

Answer: Relocate Existing Lights

19. **Question:** *Please Clarify / confirm .The El-contractor is to install complete" ADO" according the note on Electrical Drawing A910 above and the Low voltage Security Contractor is only responsible for supplying EL-contractor with Relay activated with valid Card read, and coordinate the security installation with the El contractor, It This correct?*

Answer: Correct

3) Hardware Clarifications

A. **RFI's Questions & Responses**

1. **Question:** *Drawing A910 "Door & Frame Schedule" lists only new doors that require new hardware sets. At the existing doors that are listed on the Technology drawings (TY) and noted above, do you require us to remove existing hardware and install a new hardware set. The only reason why I'm asking is that details require "crash bar with REX". Please advise.*

Answer: Use Hardware set 05 on A910

2. **Question:** *Section 087100 - High School…Should HDW Set 03 Door #157.2, 157.4 be marked Door 100.2? Middle School…Where does HDW Set 02 Door #101.2 apply?*

Answer: Middle School Door 101.2 was removed
High School: Correct HDW Set 03 is for the Door 100.2

4) Instruction to Bidders Clarifications

A. **RFI's Questions & Responses**

1. **Question:** *Page 5 of 9; Para. C.3 notes to include the cost of water, heat and utilities required for construction. Is this requirement necessary for this project?*

Answer: No.

5) Roofing Questions

Question: *We seem to be missing a Roofing specification. Items should include type/thickness of membrane, if system is Fully Adhered, warranty, fastening requirements, manufacture, etc. They show an edge detail with a fascia (2/A501H). There is also no Sheetmetal specification showing requirements, type/thickness of metal or manufacture. Please advise.*

Answer: Refer to attachments: Spec section 075320 - Single-ply Membrane EPDM

ADDENDUM ATTACHMENT LIST:

Specification section 075320 - Single-ply Membrane EPDM

(THIS COMPLETES ADDENDUM NO. 4)

SECTION 07 53 20 – EPDM SINGLE-PLY MEMBRANE [ROOFING]

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Adhered EPDM membrane roofing system
2. Vapor retarder.
3. Roof insulation.
4. Roof edge system(s).

B. Section, when acoustical deck is required, includes the installation of acoustical roof deck rib insulation strips furnished under Division 05 Section "Steel Decking."

C. Related Sections:
1. Division 05 Section "Steel Decking"
2. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
3. Division 07 Section "Preparation for Re-Roofing" for recover board beneath new membrane roofing.
4. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
5. Division 07 Section "Manufactured Roof Expansion Joints" for proprietary manufactured roof expansion-joint assemblies.
6. Division 07 Section ‘Air, Vapor, [& Water] Barrier Membrane’ for continuity of building envelope barriers.
7. Division 07 Section “Roof Accessories”
8. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
9. Division 22 Section “Plumbing” and/or “Storm Drainage Piping Specialties” for roof drains.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary of National Roofing Contractors Association [NRCA] "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7 based on Building Code wind loads and exposure.

D. State Building Code Wind Load Performance Requirements:
1. Risk Category: **2.**
2. Basic Wind Speed **130**
3. Exposure Category: **C**

E. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals' markings.
1. Fire/Windstorm Classification: Class 1A-90 minimum.
2. Hail Resistance: Moderate.

F. Roofing system to meet the roof requirements as follows: install per manufacturer's recommendations and requirements for a weather tight installation with a 20 year warranty, 2 year installer warranty, meeting at the minimum, the requirements of the Factory Mutual Insurance Criteria for FM Data Sheet 1-28 'Wind Design', Sheet 1-29 'Roof Deck Securement and Above Deck Roof Components and the State Building Code'.

G. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency or meeting the basis of design.

H. Energy Performance: Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products or meeting the basis of design.

I. Energy Performance: Provide roofing system with initial solar reflectance not less than [**0.70**] <**Insert value**> and emissivity not less than 0.75 when tested according to CRRC-1 or meeting the basis of design.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened roofing components [insulation board, etc.]
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
5. Roof fascia, parapet cap/copping, and other terminations
6. Roof accessories installation penetration flashing details,
7. Other required roof accessories installation details.

C. Samples for Verification: For the following products, in manufacturer's standard sizes:

1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
2. Roof insulation.
3. Termination bars.
4. Battens.
5. Six insulation fasteners of each type, length, and finish.
6. Six roof cover fasteners of each type, length, and finish.

1.6 INFORMATIONAL SUBMITTALS

A. Manufacture's Specifications

B. Product Data Sheets

C. Material Safety Data Sheets

D. FM/UL listing/approvals

E. UL Environmental validation of recycling claims

F. Qualification Data: For qualified Installer and manufacturer.

G. Manufacturer Certificate: Signed by roofing manufacturer certifying that membrane roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of complying with performance requirements.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

I. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.

J. Maintenance Data: For roofing system to include in a maintenance manual.

K. Field quality-control reports.

L. Warranties: Sample of special warranties, manufacturers, installers, others as indicated.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For membrane roofing system to include in maintenance manuals.

B. Final Manufacturer's letter stating Roofing Contractor has completed all installation work; fastener spacings are installed per manufacturer and/or FM requirements [the more stringent]; and Manufacturer's work remaining list or correction list.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed or FM Approvals approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. Source Limitations: Obtain components including roof insulation and fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer**.**

D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Pre-installation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.10 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
   1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, roof pavers, and other components of membrane roofing system. Includes parapet coping cap.
   2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, parapet coping cap, and walkway products, for the following warranty period:
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.

B. Basis of Design: Carlisle Sure-Seal; 60 mil black; fully adhered with manufacturer approved insulation and/or protection board.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:
      a. Carlisle SynTec Incorporated.
      b. ERSystems.
      c. Firestone Building Products.
      d. GAF Materials Corporation.
      e. GenFlex Roofing Systems.
      f. Johns Manville.
   2. Thickness: 60 mils (1.5 mm), nominal.
   3. Exposed Face Color: Color to match existing on site.

2.2 METAL EDGING AND MEMBRANE TERMINATIONS

A. Carlisle SecurEdge 300: Metal fascia system with a heavy duty 0.24 gauge coated galvanized steel anchor bar and 0.050-inch-thick minimum aluminum fascia. Metal fascia color to match existing on site with Kynar finish in special color. Provide this metal edging at entire canopy perimeter. Coordinate fascia height with wood blocking nailer height to match existing on site

2.3 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Plastic Foam Adhesives: 50 g/L.
   b. Gypsum Board and Panel Adhesives: 50 g/L.
   c. Multipurpose Construction Adhesives: 70 g/L.
   d. Fiberglass Adhesives: 80 g/L.
   e. Single-Ply Roof Membrane Adhesives: 250 g/L.
   f. Single-Ply Roof Membrane Sealants: 450 g/L.
   g. Nonmembrane Roof Sealants: 300 g/L.
   h. Sealant Primers for Nonporous Substrates: 250 g/L.
   i. Sealant Primers for Porous Substrates: 775 g/L.
   j. Other Adhesives and Sealants: 250 g/L.

B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.

C. Protection Sheet: Epichlorohydrin or neoprene non-reinforced flexible sheet, 55- to 60-mil- (1.4- to 1.5-mm-) thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

D. Bonding Adhesive: Manufacturer's standard.

E. Modified Asphaltic Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard modified asphalt, asbestos-free, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

F. Water-Based, Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard water-based, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

G. Low-Rise, Urethane, Fabric-Backed Membrane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.

H. Seaming Material: Seam and/or splicing material, with 6” wide minimum manufactured approved splice tape.

I. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

J. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

K. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

L. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05-inch-thick (25 mm wide by 1.3 mm thick), pre-punched.

M. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.

N. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

O. Liquid coating, when indicated; specifically formulated for coating EPDM membrane roofing, as follows:
1. Type: Acrylic emulsion.
2. Color: As selected by Architect from manufacturer's full range.

2.4 SUBSTRATE BOARDS [over metal deck]

A. Substrate Board: When indicated [on the drawings or required by the indicated roof UL reference] to be ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch (16 mm) thick as specifically indicated.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:
a. Georgia-Pacific Corporation; Dens Deck or approved equal.

B. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

2.5 VAPOR RETARDER

A. Self-Adhesive vapor barrier [direct to metal deck]: Unless otherwise indicated, provide reinforced composite aluminum foil, cold applied, self-adhesive SBS backing roll material equal to VapAir Seal MD as manufactured by Carlisle.

B. Polyethylene Film: When indicated, provide ASTM D 4397, 6 mils (0.15 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
2. Adhesive: Manufacturer's standard lap adhesive, FM Approvals approved for vapor-retarder application.

C. Laminated Sheet: When indicated, provide Kraft paper, two layers, laminated with asphalt and edge reinforced with woven fiberglass yarn with maximum permeance rating of 0.50 perm (29 ng/Pa x s x sq. m) and with manufacturer's standard adhesive.

D. Glass-Fiber Felts: When indicated, provide ASTM D 2178, Type IV, asphalt impregnated.

2.6 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation. [FM 4450, and/or FM 4470]. Provide multiple insulation layers for the required R-value in access of R-12, and/or thickness indicated over 2 inches.
1. When one layer of insulation is required or indicated, provide Composite Polyisocyanurate Board Insulation board with the ½ inch minimum high density polyiso cover board
2. When two (2) layers of insulation are required due to thermal barrier insulation required, unless indicated otherwise, provide Composite Polyisocyanurate Board Insulation board

with the high density polyiso cover board top for the top layer with the base layer to be Polyisocyanurate Board Insulation.

B. Polyisocyanurate Board Insulation: When indicated, provide ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

C. Composite Polyisocyanurate Board Insulation: When indicated, provide ASTM C 1289, Type II, Class 2, Grade 2 with factory-applied facing board on one major surface, as indicated below by type, and felt or glass-fiber mat facer on the other.
1. High-density polyiso cover board facer, ½" inch thick.

D. Composite Polyisocyanurate Board Insulation: When indicated, provide ASTM C 1289, Type II, Class 1, Grade 2 with factory-applied facing board on one major surface, as indicated below by type, and felt or glass-fiber mat facer on the other.
1. Type VII, glass mat faced gypsum board facer, 1/4 inch (6 mm) thick.

E. Extruded-Polystyrene Board Insulation: When indicated, provide ASTM C 578, Type IV, 1.6-lb/cu. ft. (26-kg/cu. m) minimum density, square edged.
1. Facer: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, asphalt coated, 1/2 inch (13 mm) thick.
2. Facer: DOC PS 2, Exposure 1, OSB, 7/16 inch (11 mm) thick.
3. Facer: Type VII, glass mat faced gypsum board facer, 5/8-inch, Type X (6 mm) thick
4. At UL fire rated conditions, provide coverboard and substrate board as required by the UL fire rating.

F. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch minimum per 12 inches (1:48) unless otherwise indicated or required to prevent water ponding on roof.

G. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

H. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening cover board panel to roof deck.

2.7 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and/or cover boards to substrate, and acceptable to roofing system manufacturer.

C. Modified Asphaltic Insulation Adhesive: Insulation manufacturer's recommended modified asphalt, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

E. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

F. Protection Mat: When indicated, provide Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

2.8 ASPHALT MATERIALS

A. Roofing Asphalt: [ASTM D 312, Type III or Type IV] [ASTM D 6152, SEBS modified].

B. Asphalt Primer: ASTM D 41.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
6. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

D. Where acoustical deck is indicated, install acoustical roof deck rib insulation strips, specified in Division 05 Section "Steel Decking," according to acoustical roof deck manufacturer's written instructions, immediately before installation of overlying construction and to remain dry.

3.3 SUBSTRATE BOARD

A. Install substrate board, when required, with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
   1. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
   2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.4 VAPOR-RETARDER INSTALLATION

A. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system. Seal to wall air and vapor barrier system.

B. Self-Adhesive vapor barrier Basis of Design: [direct to metal deck]: Prepare surface receiving the membrane as required by the roofing manufacturer. Provide end lap additional support layer of 6-inch minimum membrane strip or flat metal plate per manufacturer’s installation requirements. All edges to be overlapped a minimum of 2”.

C. Polyethylene Film where indicated: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively.
   1. Continuously seal side and end laps with tape or adhesive.

D. Laminate Sheet where indicated: Install laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively. Bond vapor retarder to substrate as follows:
   1. Apply adhesive at rate recommended by vapor-retarder manufacturer. Seal laps with adhesive.

3.5 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. At areas of ‘flat’ deck [pitch less than ¼” foot pitch] or where indicated to provide tapered insulation, install the tapered insulation under top layer of insulation board in the area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve the required thickness and/or R-value. Where overall insulation thickness is 2.5 inches (62 mm) or greater, install two or more layers with

joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

1. Where installing composite and non-composite insulation in two or more layers, install non-composite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

G. Mechanically Fastened Insulation: When indicated, install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

H. Mechanically Fastened Concealed Insulation and Adhered Insulation: Install first layer [and additional concealed layers] of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type. Adhere the top layer of insulation board to the mechanically fastened insulation layer.

1. Fasten first layer of insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten [all] concealed layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
3. Set top layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
4. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

I. Adhered Insulation, Top Layer over concealed insulation layers.

1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
2. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

J. Adhered Insulation [when indicated]: Install each layer of insulation and adhere to substrate as follows:

1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m) and allow primer to dry.
2. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
3. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

K. Adhered Insulation @ Concrete Roof Deck: Install each layer of insulation and adhere to substrate as follows:

1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m) and allow primer to dry.
2. Install the Self-Adhesive Air and Vapor Barrier. Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.

3. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
4. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

L. When using separated cover board, install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together and fasten to roof deck.
1. Fasten cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. Fabric-Backed Membrane Adhesive: Apply to substrate at rate required by manufacturer and install fabric-backed membrane roofing.

F. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.

G. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.

I. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.

J. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

K. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

L. Install membrane roofing and auxiliary materials to tie in to existing membrane roofing to maintain weather-tightness of transition and to not void warranty for existing membrane roofing system.

M. Adhere protection sheet over membrane roofing at locations indicated.

3.7 MEMBRANE [BASE] FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories such as Sure-Weld reinforced membrane, and adhere to substrates according to membrane roofing system manufacturer's written instructions and as indicated herein and in conformance with the construction drawings. When conflicts occur review with the Architect for resolution.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

F. The minimum allowable vertical flashing required is 12 inches from top of horizontal membrane field to the termination bar or bottom of metal counter flashing. Bonding adhesive is required at all vertical surfaces such as walls, curbs, and pipes.

3.8 COATING INSTALLATION

A. Apply coatings, when indicated, as required by roofing manufacturer, to membrane roofing and base flashings according to manufacturer's written recommendations, by spray, roller, or other suitable application method.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing agency to perform inspections.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion. Provide final reports to architect.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner: <Insert name of Owner.>
2. Address: <Insert address.>
3. Building Name/Type: <**Insert information.**>
4. Address: <Insert address.>
5. Area of Work: <Insert information.>
6. Acceptance Date: <**Insert date.**>
7. Warranty Period: <**Insert time.**>
8. Expiration Date: <**Insert date.**>

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
   a. Lightning;
   b. Peak gust wind speed exceeding **130 mph**
   c. Fire;
   d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. Vapor condensation on bottom of roofing; and
   g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.
   1. Authorized Signature: <**Insert signature**>.
   2. Name: <Insert name>.
   3. Title: <Insert title>.

END OF SECTION 07 53 20

