

Appendix A – Bid Package #2 – MERAMEC ELEMENTARY (Section G)

PART 1 - GENERAL

1.01 SCOPE OF WORK - ROOF SECTION G

- A. Removal of existing roofing system down to steel deck. The replacement of deteriorated decking where needed. Furnish and install: 5/8" type X drywall mechanically fastened to steel deck with **WHITE** fasteners in FM 1-90 fastening pattern. Installation of NEW SA vapor barrier to primed drywall substrate as required; Install One (1) layer of 1.5" polyisocyanurate in low rise foam followed by the Installation of 1/4" per foot tapered insulation polyisocyanurate board insulation using FM 1-90 ribbon method. Install 1/2" HD polyisocyanurate insulation cover board staggered 12" minimum and adhered with 1-90 ribbon pattern low rise foam. Installation of 1/2" per foot tapered crickets between drains, end walls and up slope of all projections, or as needed to base layers insulation. All roof sections install a multi-ply APP cold-applied modified bitumen roof membrane system and multi-ply APP membrane flashing system, heat weld all laps. **Only 220 amp welders will be utilized for the heat welding process.** Install 26 gage Kynar coated counterflashing and the installation of new 26 gage Kynar coated coping, gutter box, and control heads as required. Installation of new 26 gage Kynar coated coping with 24 gage continuous cleat. Install preformed 4 lb. lead flashing with base flange at plumbing vents. Installation of raised curb details, and miscellaneous materials and accessories. **Paint all gas lines yellow.**
- B. Work includes:
1. Elevation of existing curbs, where necessary, to achieve 8" minimum flashing height.
 2. All electrical conduit, gas pipes, and condensation lines will be supported on new treated wood blocking with walk pads under wood blocking.
 3. Removal of designated abandoned curbs or equipment.
 4. Install new wood nailers at perimeter where damaged or as required to match insulation height.
 5. Installation of the following:
 - a. Installation of 4x8 5/8" type X drywall mechanically fastened to steel deck with **WHITE** fasteners in FM 1-90 fastening pattern.
 - b. Install SELF ADHERED vapor barrier over the primed and prepared dry wall substrate. In conjunction with Self Adhered Vapor Barrier, seal all penetrations and perimeter with vapor retarder / air barrier.
 - c. **Low rise foam** 1 (1) base layer of 1.5" Poly Iso to vapor barrier.
 - d. Installation of 1/4" per foot tapered insulation polyisocyanurate board insulation low rise foamed to base layer iso.
 - e. Install 1/2" HD polyisocyanurate insulation cover board staggered 12" minimum and adhered with 1-90 ribbon pattern low rise foam.
 - f. Kynar coated sheet steel: ASTM A 526-85, 26 gage, thick steel counterflashing.
 - g. .040" mill finished aluminum pitch pans with umbrellas.
 - h. Install preformed 4 lb. lead flashing with base flange at plumbing vents.
 - i. Install new crickets on up slope of all projections.
 - j. Installation of 96" x 96" drain sumps with tapered insulation. Install 1/2" per foot tapered saddles between roof drains, at end walls, and up slope of all projections.
 - k. Install liquid flashing system to all cap membrane found within the 96"x96" drain sump.
 - l. Where applicable, install liquid flashing system to projections.
 - m. Miscellaneous two (2) ply APP flashings, accessories, and allied components.

- n. Localized deck repair and/or replacement, as necessary.
- o. Walkway installed around all four sides of all equipment requiring scheduled and periodic maintenance with a motor and or egress points.
- p. Installation of APP Modified Bitumen Multi-Ply Roof System:
 - 1) APP modified bitumen base sheet:
 - 2) Fiberglass scrim/polyester mat composite impregnated and coated with high quality APP modified bitumen.
 - 3) Thickness: 160 mils.
 - 4) ASTM D 6222.
 - 5) Adhered with cold process roofing adhesive application.
 - 6) Heat welded lap seams.
- q. Installation of APP Modified bitumen membrane Cap Sheet and Flashing Membrane:
 - 1) 180 mil APP FR (COOL) Adhered with cold process roofing adhesive application.
 - 2) Heat welded lap seams.
 - 3) Granule Surfaced.
 - 4) ASTM D 6222.

1.03 QUALITY CONTROL

- A. Roofing contractor shall:
 - 1. Be experienced in all work required to complete this project.
 - a. Four (4) years minimum.
 - 2. Be acceptable by Owner, Manufacturers and Consultant.
 - 3. **Project must be started immediately after school is finished for the school year and must be finished prior to School start-up in August.**
- B. Project meetings:
 - 1. Pre-job conference:
 - a. Will be scheduled by Consultant within ten (10) days after notice of award.
 - b. Attendance:
 - .1 Owner's Representative.
 - .2 Contractor.
 - .3 Project foreman.
 - .4 Consultant Project Manager.
 - c. Agenda:
 - .1 Submittal of project completion schedule.
 - .2 Submittal of insurance certificates.
 - .3 Submittal of executed payment and performance bonds.
 - .4 Execution of Owner-Contractor Agreement.
 - .5 Review specification documents distributed during invitation to Bid.
 - .6 Review and approve submittals for project.
 - .7 Review Safety Manual.
 - .8 Submittal of list of subcontractors, material & product submittals.
 - .9 Designation of responsible personnel.
 - .10 Walkover inspection.
 - 2. Pre-construction conference:
 - a. Will be scheduled by Owner and/or Consultant on or before project start date at Owner's discretion.
 - b. Attendance:
 - .1 Owner's Representative.

- .2 Job superintendent.
 - .3 Project foreman.
 - .4 Consultant Project Manager.
 - c. Agenda:
 - .1 Submittal of applicable Building Permits.
 - .2 Review of specifications.
 - .3 Walkover inspection.
 - .4 Identify area where project will begin and areas in which admittance to building will be temporarily restricted.
- 3. Progress meetings:
 - a. Will be scheduled by Owner or Consultant as required.
 - b. Attendance:
 - .1 Project foreman.
 - .2 Owner's Representative.
 - .3 Job superintendent.
 - .4 Consultant Project Manager.
 - c. Minimum agenda:
 - .1 Review of work progress. **Contractor is expected to maintain progress schedule.**
 - .2 Field observations, problems, and decisions.
 - .3 Identification of problems that impede planned progress.
 - .4 Maintenance of progress schedule.
 - .5 Corrective measures to regain projected schedules. Provide in writing to Owner.
 - .6 Planned progress during succeeding work period.
 - .7 Coordination of projected progress.
 - .8 Maintenance of quality and work standards.
 - .9 Effect of proposed changes on progress schedule and coordination.
 - .10 Review Safety Manual, procedures and requirements.
- 4. Final inspection:
 - a. Will be scheduled by Consultant upon job completion.
 - b. Attendance:
 - .1 Clayton School District's Representative.
 - .2 Consultant Project Manager.
 - .3 Project Foreman.
 - c. Minimum agenda:
 - .1 Walkover inspection.
 - .2 Identification of problems that may impede issuance of warranty.
- C. Regulatory requirements:
 - 1. UL 790, Class C
 - 2. UL 997-81
 - 3. BOCA National Building Code/1996
 - 4. OSHA Fall Protection
 - 5. EPA for ACRM
- D. Plans and specifications:
 - 1. Contractor must notify Project Manager of any omissions, contradictions or conflicts three (3) days before bid due date. Project Manager will provide necessary corrections or additions to plans and specifications by addendum. If he does not so notify owner and Consultant of any such condition, it will be assumed he has included the necessary items in his bid to complete this specification.

- E. It is the intent that this be a completed project as far as the contract documents set forth. It is not the intent that different phases of work on this project be delegated to various trades and subcontractors by the contract documents. Contractor must make his own contracts with various subcontractors, setting forth the work these subcontractors will be held responsible for. Contractor alone will be held responsible by the owner for the completed project.
 - 1. If the contractor feels a conflict exists between what is considered good roofing practice and these specifications he shall state in writing all objections prior to submitting quotations.
 - 2. It is the contractor's responsibility during the course of the work, to bring to the attention of the Project Manager any defective membrane, insulation or deck discovered where not previously identified.

1.04 SUBMITTALS

- A. Submit at Pre-Job Conference:
 - 1. Product data:
 - a. Product data sheets.
 - b. Material safety data sheets.
 - c. Shop drawings or samples of metal coping and flashings, scuppers details, etc., showing exact profile, lengths, joints, terminations, and methods of attachment.
 - 2. Gantt (or equal) progress chart to project completion, identifying all segments of work, with appropriate timetables.
 - 3. Do not order project materials or start work before receiving approval for this project work.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery of materials:
 - 1. Deliver materials to job-site in new, dry, unopened, and well-marked containers/pallets showing product and manufacturer's name.
 - 2. Deliver materials in sufficient quantity to allow continuity of work.
 - 3. Coordinate delivery with Project Manager.
- B. Storage of materials:
 - 1. Store rolled goods on ends only. Discard rolls that have been flattened, creased, or otherwise damaged. Place materials on pallets. Do not stack pallets.
 - 2. Stack slate on pallets.
 - 3. Store materials marked "keep from freezing" in areas where temperatures will remain above 40°F.
 - 4. Neatly stack wood on dunnage.
 - 5. Remove plastic packaging shrouds. Cover top and sides of all stored materials with canvas or plastic reinforced tarpaulin (not polyethylene). Secure tarpaulin.
 - 6. Rooftop storage: Disperse material to avoid concentrated loading.
 - 7. Cover top and sides of all exterior stored materials with canvas tarpaulin (not polyethylene). Secure tarpaulin.
 - 8. No materials may be stored in open or in contact with ground or roof surface.
 - 9. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin (not polyethylene) top to bottom.
 - 10. Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

- C. Material handling:
 - 1. Handle materials to avoid bending, tearing, or other damage during transportation and installation.
 - 2. Material handling equipment shall be selected and operated so as not to damage existing construction or applied roofing. Do not operate or situate material handling equipment in locations that will hinder smooth flow of vehicular or pedestrian traffic.

1.06 SITE CONDITIONS

- A. Field measurements and material quantities:
 - 1. **Applicator shall have SOLE responsibility for accuracy of all measurements, estimates of material quantities and sizes, and site conditions that will affect work.**
- B. Existing conditions:
 - 1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Owner operations unless written approval is received from Owner.
 - 2. Access to roof shall be from exterior only. No roofing employees will be allowed within building without prior approval from Owner and/or Project Manager.
 - 3. All HVAC or electrical disconnection and re-connection, if necessary, shall be performed by a mechanical and/or electrical company licensed to perform such work and shall be the responsibility of the Contractor.
 - 4. Appropriate measures shall be taken to prevent dust, vapors, gases or odors from entering the building during roof removal, replacement or repair.
 - 5. Debris shall be removed from job site by the Contractor on a daily basis.
 - 6. **Roof project cannot begin until 7:00 am on a daily basis.**
- C. Environmental requirements:
 - 1. Do not work in rain, snow, or in presence of water.
 - 2. Do not work in temperatures below 40°F.
 - 3. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 40°F.
- D. Safety requirements:
 - 1. Fall protection measures shall be incorporated into this roof project as found in the Code of Federal Regulations 29 - Part 1926, Sub-part M - Fall Protection, effective February 6, 1995.
 - 2. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
 - 3. Comply with federal, state, local and Owner fire and safety requirements.
 - 4. Advise Owner whenever work is expected to be hazardous to Owner employees and/or operators.
 - 5. Maintain fire extinguisher within easy access whenever power tools are being used.
 - 6. Advise Owner when volatile materials are to be used near air ventilation intakes so they can be shut down or blocked.
- E. Security Requirements:
 - 1. Comply with Owner's security requirements.
 - 2. Provide Owner with current list of accredited persons scheduled to work on the project.
- F. Temporary sanitary facilities:
 - 1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove on project completion.

2. Place portable toilets in conformance with applicable laws, codes, and regulations.

1.07 CONSTRUCTION PROJECT SAFETY

A. GENERAL

1. Description:
 - a. Work Included:

To assure the work site environment is safe for the employees of all contracts, subcontract inspectors, and building occupants. This section has been written to identify and underline the importance of safe working conditions. If any conflict should arise over a specific provision or rule, the laws and rules governing that specific location shall be followed.
2. Related Work:
 - a. Additional safety items may be found in the individual technical sections.
3. Standards:
 - a. Occupational Safety and Health Act of 1970.
 - b. 29 CFR - Part 1926, Sub-part M - Fall Protection.
 - c. 40 CFR - Part 61, Sub-part M, Appendix A - Interpretive Rule Governing Roof Removal.
 - d. State, County, and City requirements, as applicable.
4. Quality Assurance:
 - a. Contractor shall have sole responsibility in seeing that the job site is safe, whether or not the Owner or Consultant is present on the project. Contractor shall appoint a "competent person" to be present on the project who will have authority to make decisions regarding safety and health issues on the Contractor's behalf.
5. Submittals:
 - a. Contractor shall submit Material Safety Data Sheets for materials to be used on the project.

B. PRODUCTS

1. Materials and Equipment:
 - a. General: Contractor shall supply all necessary material and equipment required to complete the work in a manner consistent with a safe work site, and as required by regulatory agencies.
 - b. All equipment used on the project shall be in a safe operating condition and be maintained in a safe condition for the project duration. Equipment found to be unsafe or in disrepair will be repaired and made safe or will be removed from the job site and replaced if necessary at no cost to the Owner.
 - c. Disposal of any solvents, containers, and other regulated materials shall meet all applicable laws.

C. EXECUTION

1. General: The safety requirements listed here are by design broad in nature. The Contractor will augment as necessary the information contained in this section with more specific information from OSHA and roofing industry requirements.
2. Contractor Employee Training:
 - a. Contractor will provide adequate training for employees to ensure their safety and the safety of others on the project site. Provide instruction in the proper operation of power tools, hoisting equipment and other pieces of equipment employees will be required to use in the completion of the work.
 - b. One (1) employee per job crew is required to have received Red Cross Training.
 - c. Ensure each worker is aware of job and site specific hazards and the safety precautions appropriate to each.

- d. Contractors shall present a safety and loss prevention orientation program to each new employee before that employee starts work.
- e. Contractors and subcontractors shall inform their employees of all safety and health rules pertaining to their particular job.
- f. Contractors and subcontractors shall inform their employees of location and use of safety devices such as first aid kits, phones, fire extinguishers, etc.
- g. Contractors shall implement a regular system of work inspection to detect and correct hazardous conditions, safety rule violations and unsafe working practices.
- 3. Accident Reporting:
 - a. The proper reporting and investigating of accidents is necessary for all contractors and subcontractors. An accident report and investigation shall be immediately made out by the foreman in charge, reviewed and approved by the contractor. Contractor shall provide to the Owner's Representative a copy of the Completed Accident Report, Employer's First Report of Injury or Illness or such other similar reports required by federal, state, county and municipal or local safety laws. All record keeping requirements will be in accordance with OSHA.
- 4. First Aid:
 - a. Contractors and subcontractors shall be responsible for providing first aid and medical treatment for their employees. The name, address and telephone number of contractor's and subcontractor's doctors, hospital and ambulance services shall be conspicuously posted, as required by law.
 - b. An OSHA approved first aid kit will be located at all times on the job. It shall be conspicuously located and readily accessible at all times. The unit shall be of an appropriate size for the roofing crew.
- 5. Individual Conduct and Safety:
 - a. Contractor's and subcontractor's employees shall be made aware of and comply with the following rules which will be in effect on all job sites.
 - b. Alcoholic beverages and illegal drugs will not be permitted. Employees entering job site under the influence or possession of alcohol or drugs shall be subject to removal from the job site. The carrying of firearms and all other weapons is prohibited. Fighting, gambling, stealing, soliciting and horseplay will not be tolerated. Abusive language or disrespectful behavior in public areas will not be tolerated.
- 6. Employees shall be made aware of any job site alarm, code signal, appropriate responses, and the requirements for actions that will be needed to be taken.
- 7. Protective Equipment and Clothing:
 - a. The contractor shall furnish and require the use and wearing of proper personal protective equipment by its employees.
 - b. Approved eye and face protection should be worn when warranted by the exposure. Safety glasses are required in all circumstances where there is an exposure to flying particles. Side shields offer additional protection. Plastic face shields should be worn for guarding against flying particles and spraying liquids or corrosives.
 - c. Appropriate clothing and eye protection shall be worn when chipping, grinding and during roof tear-off.
 - d. Hard hats must be worn at all times whenever there is a possibility of head injury from impact, flying or falling objects.
- 8. Housekeeping:
 - a. The contractor or subcontractor shall maintain good housekeeping standards at all times as an integral part of his work. **Daily cleanup of work, lay-up, and personnel areas is required and must be performed.**

- b. Materials shall be piled so that safe clearances are maintained and topping or movement is prevented. Loose materials on the roof must be secured so they cannot be blown or bumped off.
 - c. Accumulation of material that may create a fire hazard is not permitted. Never store excessive amounts of material in one place to overweigh the roof.
 - d. **Roof areas are to be "watertight at night" at all times during the job. Contractors or subcontractors failure to do so can be grounds for dismissal.**
 - .1 Roofing Contractor will be held liable for any and all damage to occupied areas and its contents resulting from his work or negligence.
 - .2 Roofing Contractor is required to respond within two (2) hours for any leak occurring to the interior. The leak will be repaired or measures taken to insure that interior operations are not interrupted until the leak can be repaired and clean-up is affected.
9. Signs and Barricades:
- a. When it is necessary to barricade an area for overhead work to protect Club Members and Staff, pedestrians and personnel from hazardous operations or to move equipment or cranes, barricades are to be provided by the contractor or subcontractor. Barricades must be erected before the work requiring them begins. If the barricades are in a roadway or walkway, blinking lights must be used after dark. When the work is completed, the barricades must be removed from the job site.
 - b. Contractors or subcontractors are forbidden to remove posted signs. All barricades must be scheduled and approved by Project Manager before erection.
 - c. A warning line system as described in 29 CFR 1926 Guarding of Low-Pitched Roof Perimeters for protection of employees will be erected by contractors or subcontractors on roofs with pitch less than 4:12 with roof height of more than 16 feet and width of 50 feet or more. The warning line will consist of rope, wire or similar material, flagged with highly visible material at 6 foot intervals which must be installed 42 to 45 inches above the roof and be able to take 16 pounds of pressure against the rope before falling over. Toe boards or personal fall arrest systems as described in 29 CFR 1926 shall also be installed and utilized on roof areas with pitch greater than 4:12.
 - d. Inspect all rigging equipment prior to use (chains, ropes, slings, shackles, etc.)
 - e. Ground fault detectors or an assured equipment guarding conductor program are to be used on all job sites as required by Law, Section 1926-400 (h), (1), (2), and (3).
10. Ladders:
- a. Contractors and subcontractors shall provide good ladders on the job. Ladders with split or cracked side rails and damaged rungs will be removed. They should be tagged "out of service" until they are fixed. Ladders in doorways, walkways or other congested areas must be barricaded or guarded.
 - b. Ladders should be of adequate length and must extend at least three feet above the upper landing.
 - c. Place straight ladders on solid, level footings with the foot of the ladder in a minimum distance from the wall equal to one fourth the length of the ladder from the resting point.
 - d. Straight ladders shall have non-skid feet and be securely tied off.
 - e. Face the ladder and use both hands going up or down.
 - f. Do not climb or descend ladders with tools, equipment or material in your hands.
 - g. Metal ladders must not be used near or for electrical service.
11. Fire Protection:
- a. Fire extinguishers must be located at all times on the job site. A fire extinguisher rated not less than 2A shall be provided for each 3,000 sq. ft. of the roof area under construction. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

- b. Extinguishers in poor condition, not an appropriate size, or have been discharged will be required to be replaced.
 - c. Smoking may be prohibited on job site for various reasons. Employees will be expected to obey all **"No Smoking"** signs.
 - d. All flammable liquids will be required to be stored in approved safe containers. Contents will be described and marked flammable.
 - e. Storage in excess of 10 gallons of flammable liquids on the roof will not be permitted.
 - f. When using flammable liquids to clean, dispose of the rags in OSHA approved containers and they should be removed from the roof daily to prevent possible spontaneous combustion.
 - g. Never store bulk flammable material or liquids closer than 25 feet from source of ignition.
12. Crane and Hoist:
- a. Contractor shall comply with the manufacturer's specifications and limitations. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be conspicuously visible from the operator's station.
 - b. Accessible areas within the swing radius of the rear of the rotating superstructure shall be properly barricaded to prevent the public or employees from being struck or crushed by the crane.
 - c. All crawler or truck cranes in use shall meet the requirements as prescribed in the ANSI B30-5-1968 Safety Code for Crawler and Truck Cranes.
13. Tear-off Chute Set-up Procedures, if needed:
- a. The following guidelines shall be followed when setting up a chute:
 - 1. No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected. Protection shall consist of barriers that will prevent the public or employees from entering the danger zone.
 - 2. All material chutes or section of chutes at an angle of more than 45 degrees from the horizontal shall be entirely enclosed.
 - 3. All buildings over 2 stories high or above 25 feet shall use a fully enclosed trash chute according to the referenced specifications.
 - 4. Chutes may be job-fabricated or purchased pre-made. If pre-made chutes are used, manufacturer's set-up and operating instructions shall be followed.
 - 5. When installing trash chutes, proper counter balance shall be used to off-set the weight and use of the chute. If wood boards or metal struts are used, they shall be set-up to prevent a tripping hazard to employees. A safety factor of 5 shall be used to determine counter balance.
 - 6. No job site materials shall be used as counter balance of chute.
 - 7. Guard rails shall be installed on either side of chute 6 feet from the opening. Guard rails shall be installed according to OSHA standards.
 - 8. A substantial gate shall be installed at each landing site on the roof level. A competent person shall be assigned to control the operation of the gate and the disposal of trash on the roof level.
14. Public Liability:
- a. Unauthorized persons are not allowed access to the roof at any time. Contractor shall control access to the roof.
 - b. Barricades and signs should be posted on the ground around the work area to warn the public.
 - c. Locate air intake ducts, air conditioners or air pumps. Notify Owner's Representative when dust or fumes may be drawn into the facility so the unit may be shut down or covered.
 - d. At night, lock and secure trucks, deactivate hoisting equipment and take down ladders.

- e. Park vehicles so they do not pose a hazard to other traffic moving around the job site. Trucks and equipment should not block sidewalks or other pedestrian's travel ways without providing a clear, well-marked, alternate route of travel.

1.08 SUBSTITUTIONS

- A. When a particular make or trade name is specified, it shall be indicative of standard required. Bidders proposing substitutes shall submit following at least three (3) days prior to bid due date to RMT:
 - 1. Written application with explanation of why it should be considered.
 - 2. Accredited testing laboratory certificate comparing substitute's physical/performance attributes to those specified.
 - 3. Three (3) job references available for inspection within fifty (50) miles of Owner where substitutes were used under similar conditions.
 - 4. Only substitutes approved in writing by Owner prior to scheduled bid date will be considered.
- B. Notification of approvals will be mailed at least three (3) days before bid opening.
- C. Owner reserves right to be final authority on acceptance or rejection of any substitute.

1.09 PAYMENT SECURITY

- A. The following is required:
 - 1. Payment and Performance Bond.
- B. Progress payments:
 - 1. Contractor shall establish with Owner, owner's procedure for payment and retainage prior to commencement of work on this project.
 - 2. Retainage: Ten (10%) percent.
 - 3. Partial unconditional lien waivers for every entity that could assert a claim of more than \$5,000.00 for the PREVIOUS pay application, assuming payment has been received.
 - 4. Each pay application must be accompanied by a memo indicating any known claims for time and cost that have arisen during the period.
 - 5. Partial or progress payments shall not relieve contractor of performance obligations under this contract nor shall such payments be viewed as approval or acceptance of work performed.
 - 6. Final payment shall be withheld until all provisions of the specifications are met.

1.10 UNIT PRICES

- A. Quote unit prices on:
 - 1. As stated on Bid Proposal Form.

1.11 WARRANTY/GUARANTEE

- A. Warranty:
 - 1. Upon project completion, Consultant and Owner acceptance, and before final payment can be made, Contractor shall:
 - a. Shall submit signed written guarantee for the repairs, installation of roofing and flashing to be watertight for a period of two (2) years from the date of completion of the roof replacement project. The Contractor shall make all repairs during this two (2) year period to

maintain the wall, window and roof areas watertight and in conformance with these specifications.

1. All defects shall be repaired by the Contractor at his own expense.
 2. If, within 24 hours after notification of roof leakage, the Contractor has not responded, the Owner shall have the right without invalidating this guarantee to make any temporary repairs required in order to protect the building and the building contents from damage due to the roof, walls or windows leaking.
- b. **Roofing manufacturer for modified bitumen roof system to provide NDL10 year warranty.**

PART 2 - PRODUCTS

2.01 GENERAL

- A. Comply with quality control, references, specifications, and manufacturer's data. Products containing asbestos are prohibited on this project. Use only asbestos-free products.

2.02 ACCEPTABLE MANUFACTURER

- A. Derbigum, Kansas City, MO
1. Derbicolor XPS-FR
 2. Derbigum GP
- B. Firestone Building Products
1. APP 180 FR Cool
 2. APP 160 Cool

2.03 ROOF DECK REPAIRS

- A. Metal roof deck:
1. 22 gage minimum, rib depth, rib configuration - match existing; **three (3) span minimum**; lapped and stitched joints; mechanically fastened to existing structural purlins.
 2. Sheet steel: ASTM A 611-85, Grade C structural quality with factory applied prime coat.
 3. Butt and finish strips: Twenty (20) gage sheet steel.
 4. Acceptable manufacturers:
 - a. Wheeling Corrugating Co., Division Wheeling-Pittsburgh Steel Corp., Wheeling WV.
 - b. Consolidated Systems, Inc., Columbia, SC.
 - c. Roll Form Products, Inc., Boston, MA.
 - d. Roof Deck, Inc., Hightstown, NJ.
 - e. United Steel Deck, Inc., Summit NJ.
 - f. Verco Manufacturing Co., Phoenix, AZ.
 - g. Vulcraft Division, Nucor Corp., Charlotte, NC.

2.04 INSULATION

- A. Polyisocyanurate board insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM 1289-03, Type 2, Class 1, Grade 2, with the following additional characteristics:
1. Thickness: One (1) base layer of 1.5" polyisocyanurate.
 2. Size: 48" x 48", nominal. Mechanically attached bottom layer can be 4'x8'.
 3. R-Value (LTTR):

- a. 1.5-inch Thickness: R-5.6, minimum.
 4. Compressive Strength: 20 PSI when tested in accordance with ASTM C 1289.
 5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
 6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
- B. Tapered Polyisocyanurate board for crickets:
1. Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM 1289-03, Type 2, Class 1, Grade 2.
 - a. All layers fully adhered with low rise foam. 6" ribbons in the 8' perimeter, 4" ribbons in the corners, and 12" ribbons in field.
 - b. Thickness: 1/2" minimum per ft. slope.
 - c. Density: 20 pcf.
- C. High density polyisocyanurate cover board: Closed cell polyisocyanurate foam with coated glass matt facer laminated to both faces, complying with the following additional characteristics:
1. Thickness: 0.5 inches.
 2. Size: 48 inches by 48 inches, nominal.
 3. R-Value (LTTR):
 - a. 0.5 inches, R-Value: 2.5, minimum.
 4. Compressive Strength: 120 psi.
 5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
 6. Recycled Content: 8.3 percent post-industrial, average.
- D. Cant strip:
1. ASTM C 208-72 (1982), impregnated fiberboard. Length: Forty-eight (48) inches.
 2. Thickness: 1-1/2 inches. Face: Four (4) inches.

2.05 MECHANICAL FASTENERS (WHITE)

- A. Insulation to steel deck:
1. Firestone All Purpose Fasteners, insulation plate
 2. Insul-Fixx #12, plastic or metal plate by Fabco RIF, Elyria, OH.
 3. Permaseal, **(WHITE)** coated No. 12 PH deck screw by Powers Rawl.
 4. Olympic Fastener #12-10, plastic or metal plate by Olympic Manufacturing Group, Agawam, MA.
 5. Permaseal coated No. 12 PH deck screw by Powers Rawl.
- B. Related materials:
1. Liquid Flashing:
 - a. Derbiflash by Derbigum or equivalent.
 - b. Ultraflash by Firestone Building Products
- C. Wood to wood:
1. Galvanized, common, annular ring nail.
 2. Length: Sufficient to penetrate underlay blocking 1-1/4".
- D. Wood to metal:
1. 10-24, flat head TEKS/4 by Buildex Div. of ITW, Itasca, IL
- E. One (1) inch cap nails:
1. Type: Spiral or annular ring shank, twelve (12) gage minimum, with integral one (1) inch cap.

2. Acceptable manufacturers:
 - a. Hillwood Manufacturing Co., Cleveland, OH.
 - b. Hoffer Wire Products Co., Inc., Nevada City, CA.
 - c. Independent Nail, Inc., Bridgewater, MA.
 - d. W. H. Maze Co., Peru, IL.
 - e. National Nail Corp., Grand Rapids, MI.
 - f. Simplex Nails, Inc., Americus, GA.
- F. Sheet metal to wood blocking:
 1. FS FF-N-105B(3) Type II, Style 20, roofing nails; 6061-T913 alloy wire, flat head, diamond point, round, barbed shank.
 2. Length: Sufficient to penetrate wood blocking 1-1/4 inches minimum.
- G. Termination bar to concrete/brick:
 1. Olympic Lead Masonry Anchors.
 2. Length: Sufficient to provide 1-1/4 inch embedment minimum.
- H. Termination bar to sheet metal:
 1. Fab-Lok FAC 10-8 stainless steel screw, aluminum sleeve by Fabco Fastening Systems, West Newton, PA.
- I. Draw band:
 1. Gold Seal stainless steel worm gear clamp by Murray Corporation, Cockeysville, MD.
 2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Company, Saltsburg, PA.

2.06 DUAL COMPONENT POLYURETHANE ADHESIVE

- A. General: Provide a dual component polyurethane adhesive that is intended for the attachment of polyisocyanurate insulation to various substrates. The dual component polyurethane adhesive has to have approvals from the insulation and roofing system manufacturer for attaching the polyisocyanurate insulation to approved substrates, multiple layers of polyisocyanurate insulation, and cover boards. Consult adhesive roofing system manufacturer on current acceptable substrates to apply dual component polyurethane adhesive to various substrates.
- B. Dual component polyurethane adhesive: The low-slope dual component polyurethane adhesive shall have the following minimum properties:
 1. Density ASTM D-1622: Free Rise, 3.2 lb./cf.
 2. Compressive Strength ASTM D-1621: Parallel, 38 psi @ 6% deflection.
 3. Tensile Strength ASTM D-1623: 35 psi
 4. Water Absorption ASTM D-2843: 5.1%
 5. Closed Cell Content ASTM D-6226: 90% min.
 6. R-Value ASTM C-518 3.8/inch (new)
 7. VOC Content ASTM D-2369 <5 g/l (1&2 combined)
 8. Weight/Gallon: Part A Component 10.32 lbs. Part B Component 8.54 lbs.
- C. Approved Roofing system manufacturer and Product:
 1. OMG Roofing Products, "OlyBond 500® SpotShot."

2.07 ROOFING MATERIALS

A. Adhesives:

1. Adhesive for board attachment Two-component low-rise polyurethane foam adhesive for adhering polyisocyanurate insulation to approved substrates.
 - a. Derbibond PG,
 - b. I.S.O. Twin Pack
 - c. Olybond 500, or approved equal.
 - d. Application rate: 1.5 – 2.0 gal./100 sq. ft. 4" ribbon spacing.
2. Cap ply, interply and Polybase membrane adhesive:
 - a. Firestone MB cold adhesive
 - b. Permastic cold adhesive.
3. All laps to be heat welded with hot air self-drive mechanical welder where possible.
4. All end laps to utilize 220 volt welder. **110 volt welder is not acceptable.**

B. APP modified bitumen base sheet:

1. Fiberglass scrim/polyester mat composite impregnated and coated with high quality APP modified bitumen.
2. Thickness: 160 mils.
3. ASTM D 6222.

C. APP Modified bitumen membrane Cap Sheet and Flashing Membrane:

1. APP Modified Bitumen
2. 180 mil FR Ultra White
3. Granule Surfaced
4. ASTM D 6222 Ultra White

D. Related materials:

1. Liquid Flashing:
 - a. Derbiflash by Derbigum or equivalent.
 - b. Ultraflash by Firestone Building Products
2. Asphalt mastic:
 - a. ASTM D 4601-86 - **Asbestos Free**
3. Asphalt primer:
 - a. ASTM D 41-85
4. APP mastic:
 - a. 1 Part APP roofing mastic
5. Flashing bitumen:
 - a. Manufactures Cold Application Flashing Adhesive:
 1. Performance/Firestone or approved equal
6. Flashing ply:
 1. One ply ASTM D 6222, APP modified bitumen smooth surface 160 mil
 2. One ply ASTM D 6223, APP modified bitumen granule surface 180 mil
7. Roofing granules:
 - a. ASTM D 451-85, No. 11 sieve.
8. Sealants:
 - a. Coping sealant:
 - 1) FS TT-S-00227E, (3), Type II, Class A; multi-component, non-sag epoxidized polyurethane sealant.
 - b. Draw band sealant:
 - 1) Reglet Joint Sealant

- c. Reglet sealant:
 - 1) Reglet Joint Sealant
- 9. Walkway panels:
Cold applied alternate color cap ply membrane or equivalent to cap sheet.
- 10. Lumber:
 - a. Southern Pine; No. 2 grade; free from warping and visible decay; pressure treated with chromated copper arsenate (CCA) to meet AWPB, LP-22, 0.40 retention, and marked.
- 11. Plywood:
 - a. Plywood shall have a maximum moisture content of 19% by weight on a dry weight basis. Unless kiln-dried after treatment, wolmanized plywood is not acceptable due to moisture content.
- E. Pourable Sealer:
 - 1. Description: 2-Part urethane, 2-color reliable mixing.
- F. Drywall:
 - 1. 5/8" Type X drywall to meet ASTM C1396

2.08 METAL FLASHINGS

- A. Termination bar:
 - 1. Metal-Flash Termination Bar Flashing: 1/8 x 1 inch flat aluminum bar
- B. Termination bar sealant:
 - 1. Metal cleaner: No. 200 Cleaner
 - 2. Metal primer: Primer No. 6
 - 3. Reglet joint sealant
- C. Metal coping:
 - 1. Kynar coated sheet steel: ASTM A 526-85, 26 gage, thick steel.
 - 2. Cleat: ASTM A 526-85, 24 gage thick G-90 galvanized sheet steel with 1.25 oz./sq. ft. galvanized coating.
- D. Perimeter edge metal fascia:
 - 1. Kynar coated sheet steel: ASTM A 526-85, 26 gage, thick steel.
 - 2. Cleat: ASTM A 526-85, 24 gage thick G-90 galvanized sheet steel with 1.25 oz./sq. ft. galvanized coating.
- E. Counterflashing:
 - 1. Kynar coated sheet steel: ASTM A 526-85, 26 gage, thick steel.
- F. Existing Pitch Pans:
 - 1. To be removed and wherever possible, replaced with 0.040 inch thick aluminum sheet, mill finish. Pitch pans and covered metal umbrella flashing - see drawing details.
- G. Pitch pan cement:
 - 1. ASTM C 928-80 for "setting" of pitch pan flange only
- H. Pitch pan mastic:
 - 1. Self-reinforcing, polyurethane modified, two-component mix.

- I. Work shall be in accordance with Architectural Sheet Metal Manual, Third Edition, as issued by Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA).
- J. Plumbing Vents:
 - 1. Pre-formed flashing boot: 4 lb. lead with base flange
- K. Termination bar sealant:
 - 1. Metal cleaner: No. 200 Cleaner
 - 2. Metal primer: Primer No. 6
 - 3. Reglet joint sealant

2.09 SYSTEM PERFORMANCE REQUIREMENTS

A. APP MODIFIED BITUMEN CAP SHEET & FLASHING MEMBRANE

<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
Thickness @ lap edge	180 mil	ASTM D 5147
Peak Load @ 73°F	110/lbf/in. MD,XMD	ASTM D 5147
Elongation @ Peak Load 73°F	5% MD, 5% XMD	ASTM D 5147
Tear Strength @ 73°F	190lbf, MD, XMD	ASTM D 5147
Compound Stability	270°F.	ASTM D 5147
Low temperature flexibility	32°F	ASTM D 5147

B. APP MODIFIED BITUMEN BASE PLY MEMBRANE

<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
Thickness	160 mil	ASTM D 6222-16
Weight (per 100 sq. ft.)	88 lbs.	
Tensile Strength @0°F	90 lbf/in MD, 65CD	ASTM D 6222-16
Tensile Strength @77°F	80 lbf/in MD, 60CD	
Elongation@0°F	10% MD, CD	ASTM D 6222-16
Elongation@77°F	37% MD, 45 CD	
Tear Resistance@77°F	100 lbf. MD, 80CD	ASTM D 6222-16
Compound Stability	275°F	ASTM D 6222-16

C. FIBRATED ASPHALT MASTIC

<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
Asbestos content	None	ASTM D 276-87
Viscosity @ 77°F	480,000 - 1,000,000 cP	ASTM D 2196-81
Density @ 77°F	9.3 lb/gal	ASTM D 1475-85
Solids by weight, min	80%	ASTM D 4586-86
Resistance to sag, max	1/8 in.	ASTM D 4586-86
Moisture vapor Transmission rate	0.10 - 0.40 hrs @ 0.020 in. thickness g/100 in. ² /24	ASTM E 398-83

D. ASPHALT CUTBACK PRIMER - QUICK DRYING

<u>Property</u>	<u>Typical Value</u>	<u>Test Method</u>
Asbestos content	None	ASTM D 276-87
Viscosity @ 77°F	480,000 - 1,000,000 cP	ASTM D 2196-81
Density @ 77°F	9.3 lb/gal	ASTM D 1475-85
Solids by weight, min	80%	ASTM D 4586-86
Resistance to sag, max	1/8 in.	ASTM D 4586-86
Moisture vapor Transmission rate	0.10 - 0.40 hrs @ 0.020 in. thickness	ASTM E 398-83

2.10 VAPOR RETARDER ON STEEL DECKS

- A. SA - 32 mil (0.8 mm) self-adhesive vapor barrier that can also serve as temporary roof protection. Self-Adhered is available in rolls 44.9 inches x 133.8 feet (1.14 x 40.8 m).
- B. SA Primer WB - A polymer emulsion water based primer designed to improve the adhesion of SA vapor retarder on approved substrates. Application temperature must be 41°F (5°C) and above. The coverage rate will range from 163 - 400 ft²/gal (4 - 9.8 m²/L) for non-porous surfaces to 82 - 135 ft²/gal (2 - 3.3 m²/L) for porous surfaces. The VOC content is 3 g/L.
- C. SA VB needs to be installed along vertical surface of walls and or penetrations even with base layer of insulation. Perimeter walls need to be caulked along top surface of VB to ensure adhesion to wall substrate.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify conditions as satisfactory to receive work.
- B. Do not begin roofing until all unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions.
- C. Verify that work of other trades penetrating roof deck or requiring men and equipment to traverse roof deck has been approved by Clayton School District, manufacturer, and roofing contractor.
- D. Check projections, curbs, and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system.

3.02 GENERAL WORKMANSHIP

- A. **Substrate: Free of foreign particles prior to laying roof membrane.**
- B. **Prior to placement, cut all ply sheets in 18-20 foot lengths.** Allow lengths to relax at least: Thirty (30) minutes (55°F or above); sixty (60) minutes (below 55°F). Stack lengths.
- C. Traffic and equipment: Kept off completed plies until adhesive has set.
- D. Wrapper and packaging materials: **Not to be included in roofing system.**
- E. Entrapped aggregate: Not permitted within new membrane. Its discovery is sufficient cause for rejection.
- F. Mechanical fasteners:
 - 1. Seated firmly in discs with fastener heads flush or below disc's top surface.
 - 2. Length: Sufficient to accommodate thickness and engage substrate 1/2 inch.
- G. Insulation: Form continuous insulation joints parallel to, but not directly over, deck panel joints.
- H. Base flashing height:
 - 1. Not less than eight (8) inches above finished roof surface.
- I. Flashing securement: All membrane flashing shall be mechanically secured at the top edge.
- J. Two-part sealants: Add curative to base unit. Mix thoroughly six (6) to eight (8) minutes. Mixing equipment: 1/2 inch slow speed drill; approved mixing paddle.

3.03 PREPARATION

- A. Protection:
 - 1. **Contractor shall be responsible for installing clear plastic sheeting in those areas where decking will be replaced or repaired.**
 - 2. **Contractor shall be responsible for covering equipment, floor areas, etc., where dust and debris is falling from deck.**

3. **Contractor is responsible for immediate clean-up of any dust and debris that falls onto the floor or onto equipment, desks, etc.**
4. Contractor shall be responsible for protection of property, interior and exterior, during course of work. Lawns, shrubbery, paved areas, and interior of the building shall be protected from damage. Repair damage at no extra cost to Clayton School District.
5. **Contractor shall be responsible for protection of interior (to include personnel, inventory, furniture) contents. Contractor is responsible for identifying and marking off areas on floor below work being conducted on roof.**
6. **Contractor is responsible for clean-up and posting floor guards and personnel to monitor potential falling debris.**
7. Provide at site, prior to commencing removal of debris, a dumpster or dump truck to be located adjacent to building where directed by Clayton School District.
8. Roofing, flashings, membrane repairs, and insulation shall be installed and sealed in a watertight manner on same day of installation or before arrival of inclement weather on that day.
9. At start of each work day, drains within daily work area shall be plugged. Plugs to be removed at end of each work day or before arrival of inclement weather on that day.
10. Preparation work shall be limited to those areas that can be covered with installed roofing material on same day or before arrival of inclement weather on that day.
11. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.
12. Protect building surfaces at set-up areas with tarpaulin. Secure tarpaulin. Remove dumpster from premises when full and empty at approved dumping or refuse area. Deliver empty dumpster to site for further use. Upon job completion, dumpster/chute shall be removed from premises. Spilled or scattered debris shall be cleaned up immediately. Removed material to be disposed from roof as it accumulates.
13. Seal base sheet at perimeters, projections, and other roof penetrations at end of each day.
Note: Base sheet itself, if required in an emergency basis, is not considered adequate waterproofing protection. If base sheet is utilized on an emergency basis, the roof area covered by the base sheet shall be covered the next day with the full contingent of roofing plies.
14. At end of each working day, completed segment shall be sealed with water stops along edges to prevent water entry. **All projections, penetrations and tie-ins shall be made watertight at the end of each day.**
15. Cover windows with protective covering prior to removal of roofing material.
16. Do not allow debris to fall through deck panel joints.

B. Surface preparation:

1. Remove loose dirt, dust and debris prior to roof installation.
2. Base flashings:
 - a. Raise curb height where necessary to achieve 8" minimum flashing height.
3. Remove unused equipment as directed by Clayton School District.

3.04 CARPENTRY

A. Metal curb flashings:

1. Raise curb. Clean flange.
2. Replace rotted blocking, if necessary.
3. Mechanically attach wood blocking to existing blocking, if present.
 - a. Width: Same as existing.
 - b. Blocking thickness: Equal to final insulation thickness.
 - c. Vertical height: 8" min. above roof field.

4. Fasteners shall be installed in two (2) rows staggered. Spacing in any one (1) row shall not exceed twenty-four (24) inches.
5. Offset blocking layers twelve (12) inches; weave corners.

B. Pitch pan/flashing collar locations:

1. Attach wood blocking to structural deck at all pitch pan locations; adhesive required.
 - a. Blocking thickness: Equal to final insulation thickness.
 - b. Width: Four (4) inches, nominal.
2. Offset blocking layers twelve (12) inches; weave corners.

C. Wood blocking and roof edge metal flange fastening pattern:

X	X	X---6"---X	X	X	X	X	X	X	X
X	X	X	X---6"---X	X	X	X	X	X	X

3.05 ROOF DECK REPAIRS

A. Metal Roof Deck Repairs:

1. Deck Reinforcement: Install sheet steel reinforcement profiled to existing decking configuration over all rusted openings 16" or less. If two (2) or more rusted openings exist in same panel, replace panel.
2. Deck protection: Apply rust inhibiting paint over surface rust after cleaning loose surface rust from deck panel.

B. Metal Deck Replacement:

1. Replace with 22 gage metal roof panel of the same style and profile as existing panels. Minimum length: Three (3) span panels.
2. Erect metal roof panel according to SDI Design Manual. If unable to lap, butt to adjacent deck with rib configuration cut-outs, creating an overlap to existing panel. Minimum bearing on steel supports: 1".
3. Mechanically fasten side laps 18" o.c. maximum.

3.06 THERMAL INSULATION

- A. Install One (1) layer of 1.5" polyisocyanurate insulation board in courses parallel to roof edges to the primed mechanically attached 5/8" type x drywall boards. Mechanically attach layer of the 5/8" type x drywall board insulation to the metal deck substrate with a (Minimum 16 Fasteners) FM 1-90 approved **WHITE** fasteners. Fully adhere the 1.5" base layer of insulation along with the 1/4" per 12" tapered insulation with low rise foam adhesive with 1-90 ribbon method.

1. Firmly butt each insulation board to surrounding boards.
2. Eliminate open joints and uneven surfaces.

- B. Maximum insulation gap: 1/8 inch.

- C. Fill insulation board joint gaps larger than 1/4 inch with roof insulation.

- D. Maximum elevation variation between boards at joints: 1/8 inch.

- E. Cut and fit insulation boards where roof deck intersects vertical surfaces. Cut board 1/4 inch from vertical surface.
- F. Stagger joints at least six (6) inches.
- G. Filler size: Eighteen (18) inches in length or width, minimum.
- H. All insulation boards will be weighed down with appropriate weight loads on all four (4) corners during the installation of insulation boards. Weights to remain until foam has cured.
- I. Remove all low rise foam clots from between insulation boards. This includes the surface of the board.

3.07 ATTACHMENT OF COVER BOARD

- A. Apply the dual component polyurethane adhesive at the manufacturer's written instructions for installing the specified cover board to the specified polyisocyanurate insulation.
- B. The dual component polyurethane adhesive shall be dispensed in 12 inches on center bands in the field of the roof. In the corners and perimeters of the roof area, the number of ribbons per unit width or area over the field rate by:
 - a. 70% in the perimeter - resulting in a maximum on center spacing equal to 60% of the field spacing (field ribbons at 12" on center, the perimeter spacing shall be 7" on center).
 - b. 160% in the corner - resulting in a maximum on center spacing equal to 40% of the field spacing (field ribbons at 12" on center, the corner spacing shall be 4.8" on center).
- C. After allowing low rise urethane foam to rise $\frac{3}{4}$ inch to 1 inch, lay cover board in to position and walk into place. After walking into place, the cover board shall be pressed firmly into the adhesive layer with using an approved weighted roller by frequent rolling in two or more directions.
- D. The cover board shall be completely adhered to the top layer of the specified insulation board. There shall not be any elevation change or raise of the corners or sides of the cover board as compared to the sides of the adjacent cover board sides. The cover board shall lay flat or level as compared to the edges of the adjacent cover board.
- E. Using a blower or a broom, clean the cover board thoroughly prior to applying membrane adhesive. No debris is allowed under roofing membrane.
- F. After installation of the cover board, the cover board shall lay level to the adjacent sides of the cover board. Should the cover board have more than 1/8 inch deviation or rise to the adjacent cover board, the Installer will held responsible for replacing the unacceptably installed cover board. All cost related, i.e. replacement of specified insulation, cover board, membrane, etc., to the replacement of the unacceptably installed cover board will be at no cost to the Owner. The replacement of the unacceptable cover boards shall be completed prior to the installation of the membrane.

3.08 CRICKETS

- A. Install pre-manufactured crickets of 1/2" per foot taper between any and all drains, end walls, and upslope of all units.
 - 1. Adhere crickets to substrate with low rise foam adhesive.
 - 2. Slope: 1/2" - Minimum.

3.09 ROOF SYSTEM APPLICATION – APP MODIFIED BITUMEN ROOF

- A. Base ply membranes shall be cut into 18' lengths and allowed to relax for a minimum of 30 minutes prior to installation. Fully adhere to substrate with cold process adhesive and heat weld seams.
 - 1. Side laps - 3".
 - 2. End laps - 6" minimum, staggered 36".
- B. Cold apply one (1) ply APP modified bitumen smooth surfaced membrane to base membrane, substrate and all wall, curb, and projection bases.
- C. Overlap each ply three (3) inches with first ply. Place ply sheets to ensure water will flow over or parallel to, but never against, exposed edges.
 - 1. Side laps - 3".
 - 2. End laps - 6" minimum, staggered 36".
- D. Cold apply one (1) ply mineral surfaced APP modified bitumen cap membrane over preceding membrane ply, cut into 18' lengths, shingle fashion, off-set from preceding membrane ply a minimum of 1/2 sheet and overlapping each membrane three (3) inches at selvage. Place roofing membrane in manner to ensure water flows over or parallel to, but never against, exposed edges.
- E. A 20 lb. minimum roller shall be used on all side and end laps following immediately behind the propane Cold. The edge of the seam shall be left un-tooled (not buttered), a continuous bead of molten asphalt should be visible at all laps/seams after application. Do not overheat the membrane causing damage to the membrane and/or reinforcements during application.
- F. **Ensure complete and continuous seal and contact between ply sheets including ends, edges, and laps without wrinkles, fish mouths, or blisters.**
- G. Dry laps will be marked for repair.
- H. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets not fully and continuously bonded.
- I. Lap ply membrane ends six (6) inches. Stagger end laps thirty-six (36) inches minimum.
- J. Ensure all plies form a watertight barrier on a daily basis.
- K. Extend roofing membrane to top edge of cant at wall and projection bases. Ensure all plies form a watertight barrier on a daily basis.

3.10 DAILY WATERSTOP/TIE-INS

- A. Use 160 mil APP base ply, cold applied with hot air weld laps. Ensure all waterstops/tie-ins are made watertight on a daily basis.
- B. Install "deadman" insulation filler at insulation staggers.
- C. At beginning of next day's work, remove temporary connection by cutting plies evenly along edge of existing roof system. Remove "deadman" insulation fillers.

3.11 MEMBRANE REPAIRS

- A. Buckles and splits:
 - 1. Cut away buckles.
 - 2. Reinforce and seal buckles/splits by heat welding matching APP membrane over the width of the sheet in the area requiring repair.
- B. Unadhered membrane edges or fishmouths:
 - 1. Unadhered membrane sheet within two (2) inches or less from exposed edges:
 - a. Cut away unadhered membrane and remove dust and debris; dry.
 - b. Apply heat welded matching APP membrane to affected area.

3.12 FLASHINGS

- A. At Roof Edge Flashings:
 - 1. Remove existing flashing materials to substrate. Dispose of properly.
 - 2. Install new wood blocking to match insulation height, as required.
- B. Perimeter edge metal fascia:
 - 1. Kynar coated sheet steel: ASTM A 526-85, 26 gage, thick steel.
 - 2. Cleat: ASTM A 526-85, 24 gage thick G-90 galvanized sheet steel with 1.25 oz./sq. ft. galvanized coating.
- C. At Low Parapet Wall Flashings:
 - 1. Remove existing metal coping detail and discard.
 - 2. Remove existing flashing materials to substrate.
 - 3. Install new wood blocking at flashing base - as required.
 - 4. Adhere cant strip to flashing base in a continuous application of flashing grade mastic.
 - 5. Adhere one (1) ply of flashing ply to flashing substrate in a continuous application of flashing adhesive. Remove wrinkles and voids. Overlap sections four inches.
 - 6. Extend flashing ply four (4) inches beyond toe of cant.
 - 7. **Cut APP cap flashing membrane in lengths not to exceed ten (10) feet.** Apply elastomeric mastic to flashing ply in a continuous 1/16 inch thick application. Adhere flashing membrane to mastic. Lap flashing membrane ends four (4) inches; extend membrane six (6) inches beyond toe of cant; press sheet firmly in place. Ensure complete bond and continuity without wrinkles or voids.
 - 8. Secure top edge of flashing membrane to top of substrate with termination bar secured twelve (12) inches OC.
 - 9. Install new metal coping detail, fastened 12" OC. on inside face of coping metal. Attach to new continuous cleat fastened every 6" OC.
- D. At High Parapet Wall Flashings:
 - 1. Remove existing metal coping detail and discard.
 - 2. Remove existing flashing materials to substrate.
 - 3. Install new wood blocking at flashing base - as required.
 - 4. Adhere cant strip to flashing base in a continuous application of flashing grade mastic.
 - 5. As described above in the low parapet wall flashing section at a 12 inch height above the field.
 - 6. Secure top edge of flashing membrane to top of substrate with termination bar secured twelve (12) inches OC.
 - 7. Install a spring tight counter flashing, 26 gage Kynar coated, with formed drip edge fastened every 12 inches minimum.

8. Install a single ply 60 mil EPDM fully adhered roof membrane up and over the wood blocking. Follow manufacturer's typical flashing procedures for the wall.
 9. Install new metal coping detail, fastened 12" OC. on inside face of coping metal. Attach to new continuous cleat continuous cleat fastened every 6" OC.
- E. Exhaust unit curb flashings:
1. Remove all membrane flashing. Dispose of properly.
 2. Install new wood blocking, as required, to provide 8" minimum flashing height.
 3. Install new fiber cant strip adhered to flashing base in a continuous application of flashing grade mastic.
 4. Install new roofing to top edge of cant and onto curb substrate.
 5. Adhere one (1) ply of APP smooth surfaced flashing membrane to flashing substrate in a continuous cold adhered application. Remove wrinkles and voids. Overlap sections four inches. Hot air weld laps.
 6. Cut mineral surfaced APP modified bitumen flashing sheet in lengths to fit one (1) side of projection plus six (6) inches either end; precut ends to drape cant; do not exceed ten (10) feet in total length.
 7. Cold apply one (1) ply of mineral surfaced APP modified flashing membrane. Lap flashing membrane ends four (4) inches; extend membrane six (6) inches beyond toe of cant; press sheet firmly in place. Ensure complete bond and continuity without wrinkles or voids. Hot air weld laps and footings. Roof slope determines work order; start at low side, sides, then high side.
 8. Secure top edge of flashing to substrate with 1" cap nails.
- F. At plumbing vents:
1. Remove existing stack flashing.
 2. Fabricate and install pre-formed plumbing vent flashing to cap membrane. Flange: Four (4) inches wide minimum; extend completely around periphery of vent flashing. Set flange into mastic. Neatly dress flange with wood block.
 3. Pipe stack height: 12" min. above roof field membrane.
 4. Prime both sides of flange with asphalt primer. Apply a continuous application of 1/16 inch thick application of asphalt mastic onto entire flashing flange and at least two (2) inches onto adjacent roofing.
 5. Embed target flashing ply into flashing adhesive. Extend flashing at least five (5) inches onto adjacent roofing. Remove wrinkles and voids. Hot air weld 3" of entire perimeter.
- G. Pitch pans/flashing collars:
1. Remove existing pitch pans.
 2. Where applicable: Fabricate pipe flashing liquid flashing sealed to the roof membrane.
 3. Fabricate pitch pans from .040 mill finish aluminum. Sides: Four (4) inches high, hemmed to outside at top edge. Flange: Four (4) inches wide, completely around periphery. Clearance between projection and pitch pan: Two (2) inches. Set primed flange in mastic.
 4. Apply a continuous application of flashing adhesive onto entire flashing flange and at least two (2) inches onto adjacent roofing.
 5. Embed target flashing ply into flashing adhesive. Extend flashing at least five (5) inches onto adjacent roofing. Remove wrinkles and voids. Hot air weld 3" of entire perimeter.
 6. Seal around all projections in pitch pans and completely fill with two (2) part pourable urethane sealant. Fill penetration pocket so that water is shed from the penetration.
 7. Remove residue from projection and pitch pan before installing sealant.
 8. Fabricate and install mill finish aluminum umbrella with drawband over pitch pan. Tighten drawband.

9. Wipe clean top of umbrella and projection with metal cleaner. Prime surface with metal primer.
10. Caulk stack/sheet metal interface. Provide water shed. Tool neatly.

H. Roof Drains:

1. Seal/plug drain to prevent debris entry until installation of new roof is completed, (end of day).
2. Install tapered insulation around drain to create 96" x 96" sump. Miter corners. Seal toe of tapered edge to drain rim with reinforcing membrane embedded between alternate courses of asphalt mastic. Adjust edge strip thickness so that final tapered edge strip thickness at existing roofing is even with roof drain surface.
3. Install roofing system from mid roof drain out.
4. Apply 1/16 inch uniformly thick layer of asphalt mastic to surface receiving lead flashing (APP base ply membrane).
5. Set single piece lead flashing in mastic centered over drain; extend lead twenty-six (26) inches beyond drain rim. Neatly dress lead with wood block.
6. Install APP base membrane target flashing in cold membrane adhesive over lead flashing hot air weld 3" at perimeter of target flashing.
7. Clamp flashing collar to drain in bed of mastic.
8. Install applications Liquid flashing to sump found within the 96"x96" drain sump (on granulated cap membrane only).
9. Apply liquid flashing with brush application followed by fabric material and an additional layer of liquid flashing.

I. Liquid Flashing areas:

1. Use paint brush, or trowel.
2. Prime all surfaces with a mist of Liquid Flashing Primer and allow to dry. Do not over-apply primer.
3. Apply a coating of Liquid Flashing to the area to be flashed.
4. Brush the first coating of Liquid Flashing until it is uniform.
5. Set fabric into freshly applied Liquid Flashing
6. Apply 2nd coat of Liquid Flashing to scrim. The fabric should be completely coated to form a Water-tight seal.
7. Cover freshly applied Liquid Flashing with granules.

3.13 SURFACING TREATMENT ON FLASHINGS

- A. Granules at seams.
- B. "Footballs" at all flashing corners and elevation changes.

3.14 FIELD SURFACING APPLICATION

- A. Granules at seams.

3.15 WALKWAYS

- A. Cold applied COLORED CAP MEMBRANE or equivalent to match.
- B. Provide walkways completely around units requiring scheduled maintenance.

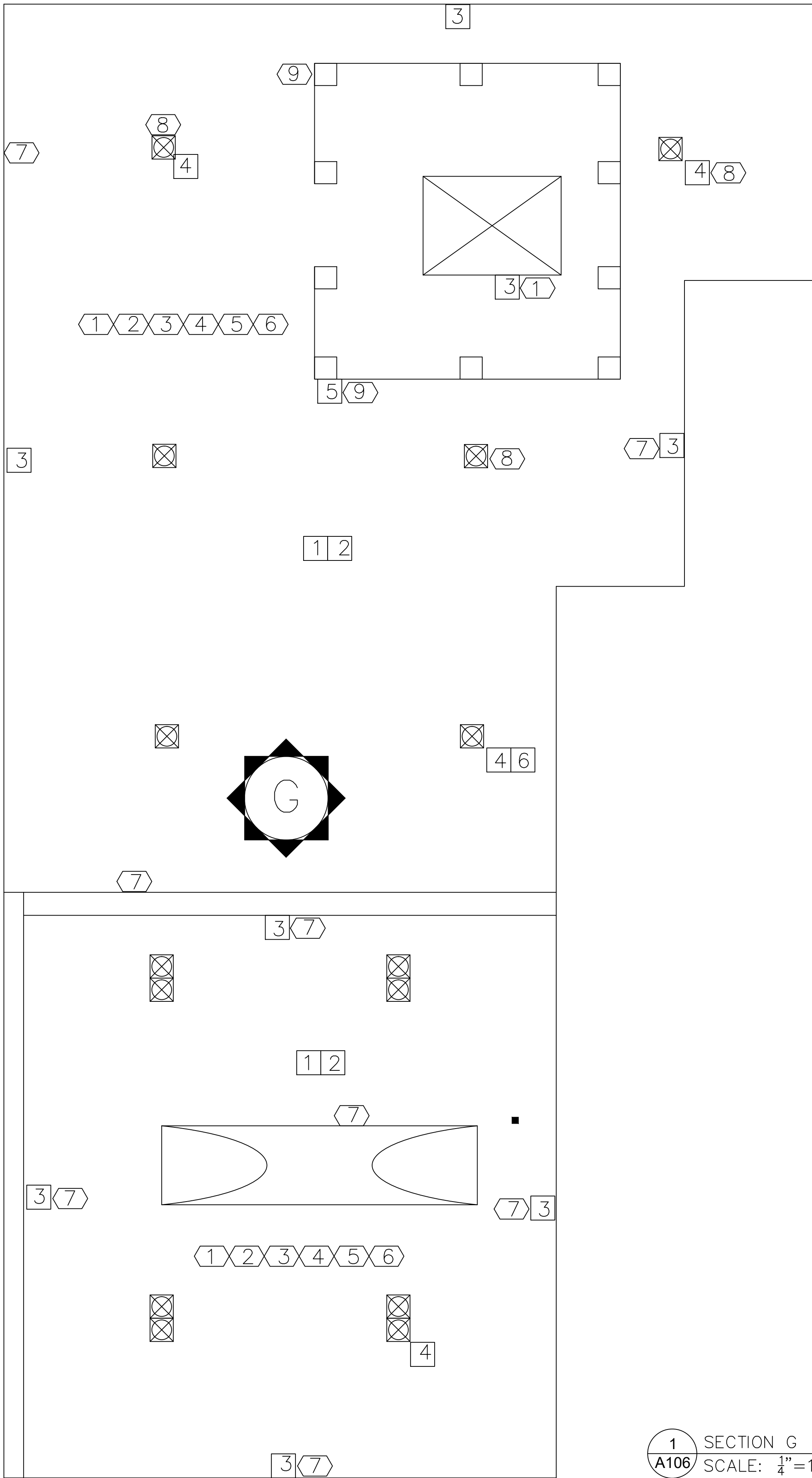
3.16 PAINTING

- A. **Paint gas lines yellow.**

3.17 ADJUSTING AND CLEANING

- A. Repair of deficiencies:
1. Installations of details noted as deficient during Final Inspection must be repaired and corrected by applicator and made ready for reinspection within five (5) working days.
- B. Clean-up:
1. Immediately upon job completion, roof membrane and flashing surfaces shall be cleaned of debris.
 2. Remove roofing and roofer related debris from work site.
 3. This is a new roof system and should look like one.

END OF THIS SECTION



1 SECTION G
A106 SCALE: 1/4"=1'

DEMOLITION NOTES - MERAMEC
ELEMENTARY

CONSTRUCTION:
STEEL DECK STRUCTURE
MULTIPLE BUR & GRAVEL ROOF ASSEMBLIES

1. REMOVE EXISTING ROOF ASSEMBLY DOWN TO THE STRUCTURAL METAL DECK
2. SWEEP DECK CLEAN OF ALL DEBRIS
3. REMOVAL ALL FLASHING AROUND ALL PROJECTIONS AND AT ALL WALLS
4. REMOVE ALL DRAIN FLASHING
5. REMOVE PITCH PANS AROUND SUPPORT POSTS AND GAS SERVICE PIPE
6. CLEAN OUT ALL DRAINS AND DRAIN LEADERS

RENOVATION NOTES - MERAMEC
ELEMENTARY

1. INSTALL PRIMED LAYER OF 5/8" TYPE 'X' DRYWALL BOARD MECHANICALLY ATTACHED TO METAL DECK
2. SA VAPOR BARRIER
3. ONE LAYER 1.5" POLYISO ADHERED W/ LOW RISE FOAM ADHESIVE
4. 1/4"-12" TAPERED POLYISO ADHERED W/ LOW RISE FOAM ADHESIVE
5. 1/2" HD POLYISO ADHERED W/ LOW RISE FOAM ADHESIVE
6. 2 PLIES APP MODIFIED BITUMEN ROOF SYSTEM ADHERED W/ COLD ASPHALT MASTIC ADHESIVE
7. INSTALL NEW MODIFIED BITUMEN MEMBRANE FLASHING AT ALL WALLS, CURBS AND LOW PARAPET WALLS
8. INSTALL NEW DRAIN FLASHING
9. INSTALL NEW SLEEVES AROUND ALL SUPPORT POSTS AND GAS SERVICE LINES

LEGEND

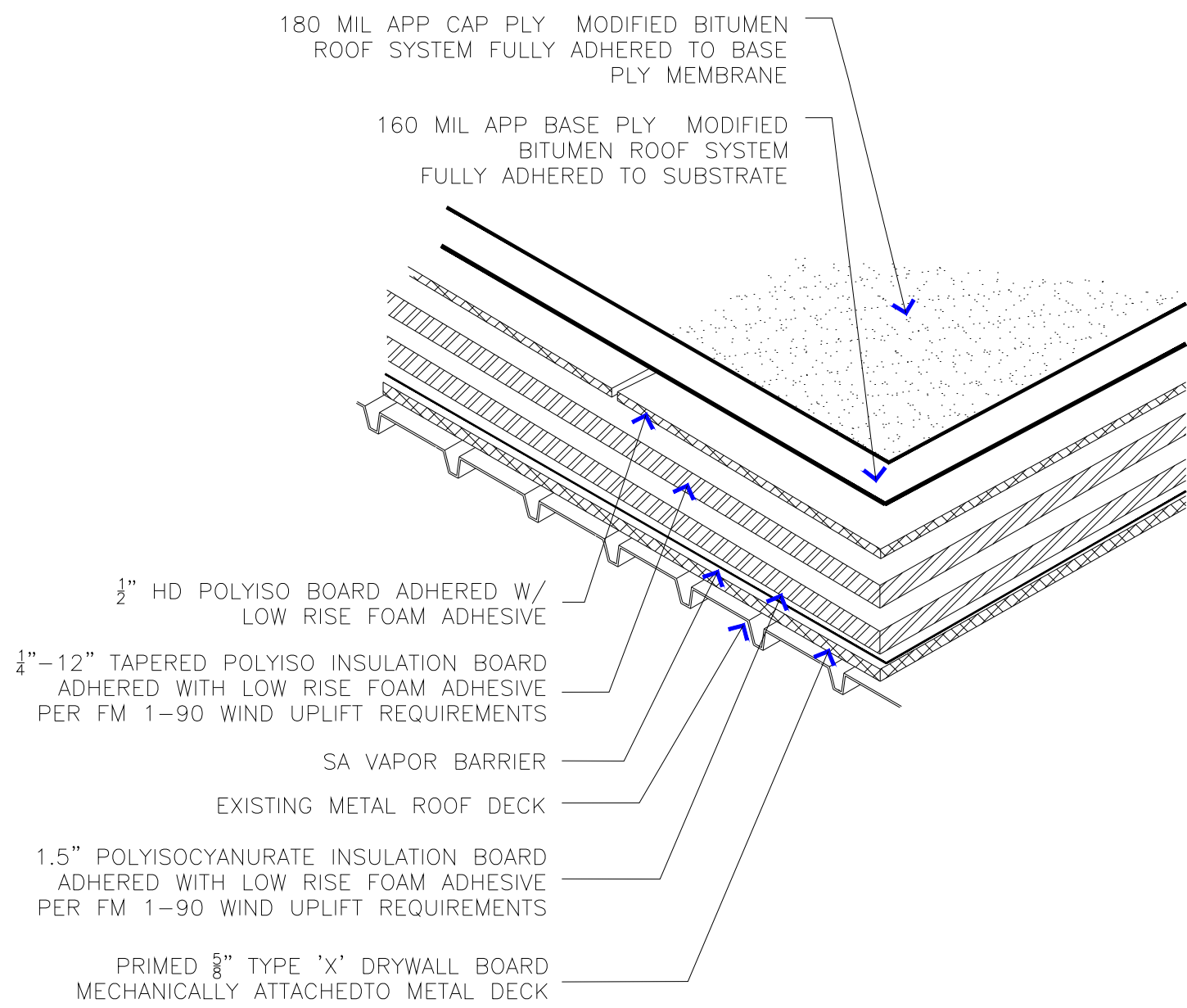
	ROOF DRAIN
	FAN
	AC UNIT ON CURB
	VENT STACK
	PIPE PENETRATION
	SKYLIGHT
	SCUPPER
	HEATER STACK
	PITCH PAN
	MECHANICAL UNIT/ HVAC
	LADDER
	MASONRY CHIMNEY
	ROOF ACCESS HATCH
	STACK ON BASE
	ABANDONED CURB/UNIT
	EVAPORATIVE COOLER
	DOMED VENTILATOR

RMT ROOFING AND
WATERPROOFING
CONSULTANTS, INC.
410 SOVEREIGN COURT #18
MANCHESTER, MO 63011
(636) 391-1266

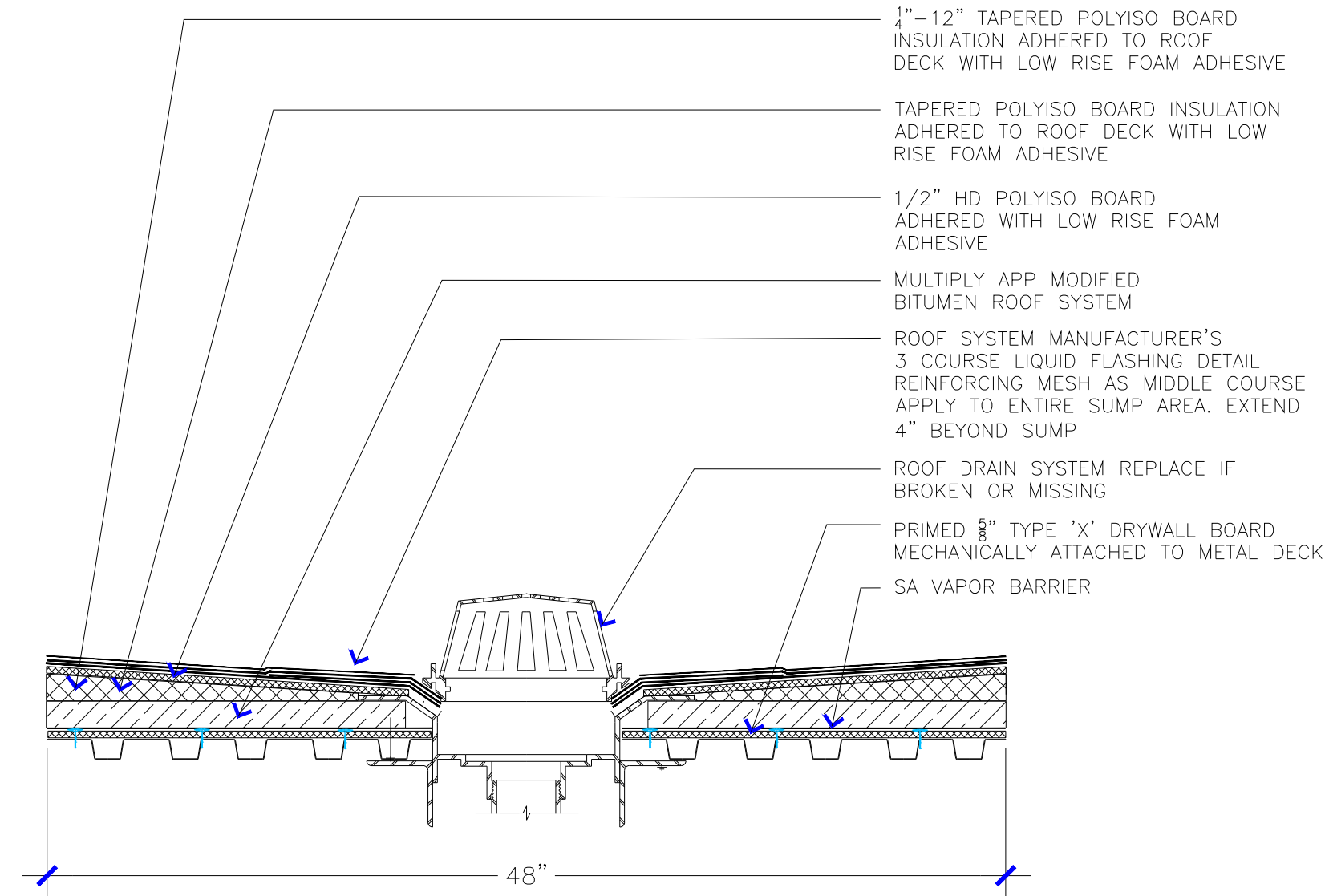
MERAMEC ELEMENTARY
ROOF REPLACEMENT
SCHOOL DISTRICT OF CLAYTON, MISSOURI
ROOF PLAN

PROJECT NUMBER
S3801-21

SHEET
A106 OF 7

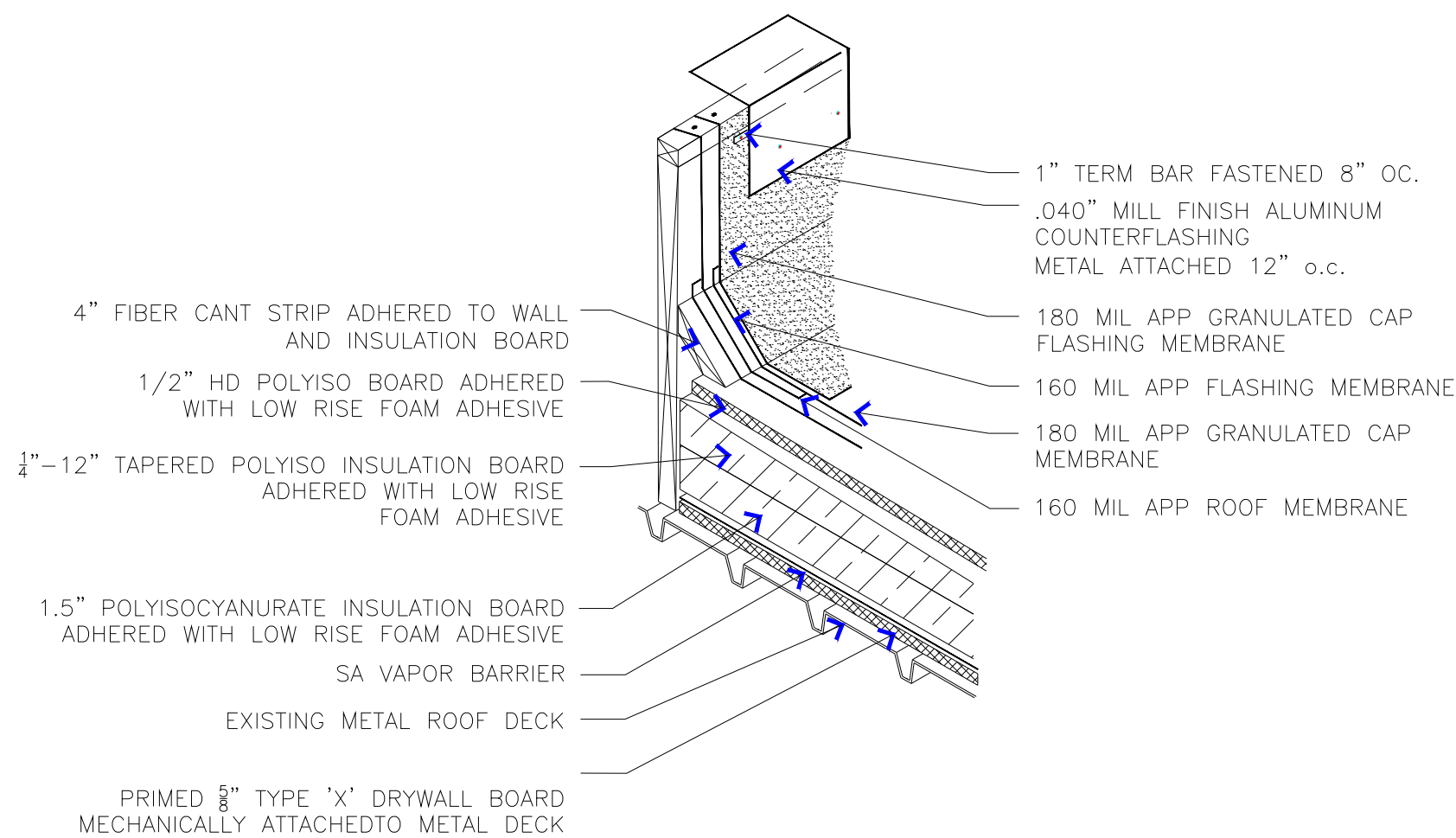


1 CROSS VIEW CONCRETE DECK
SCALE: NTS

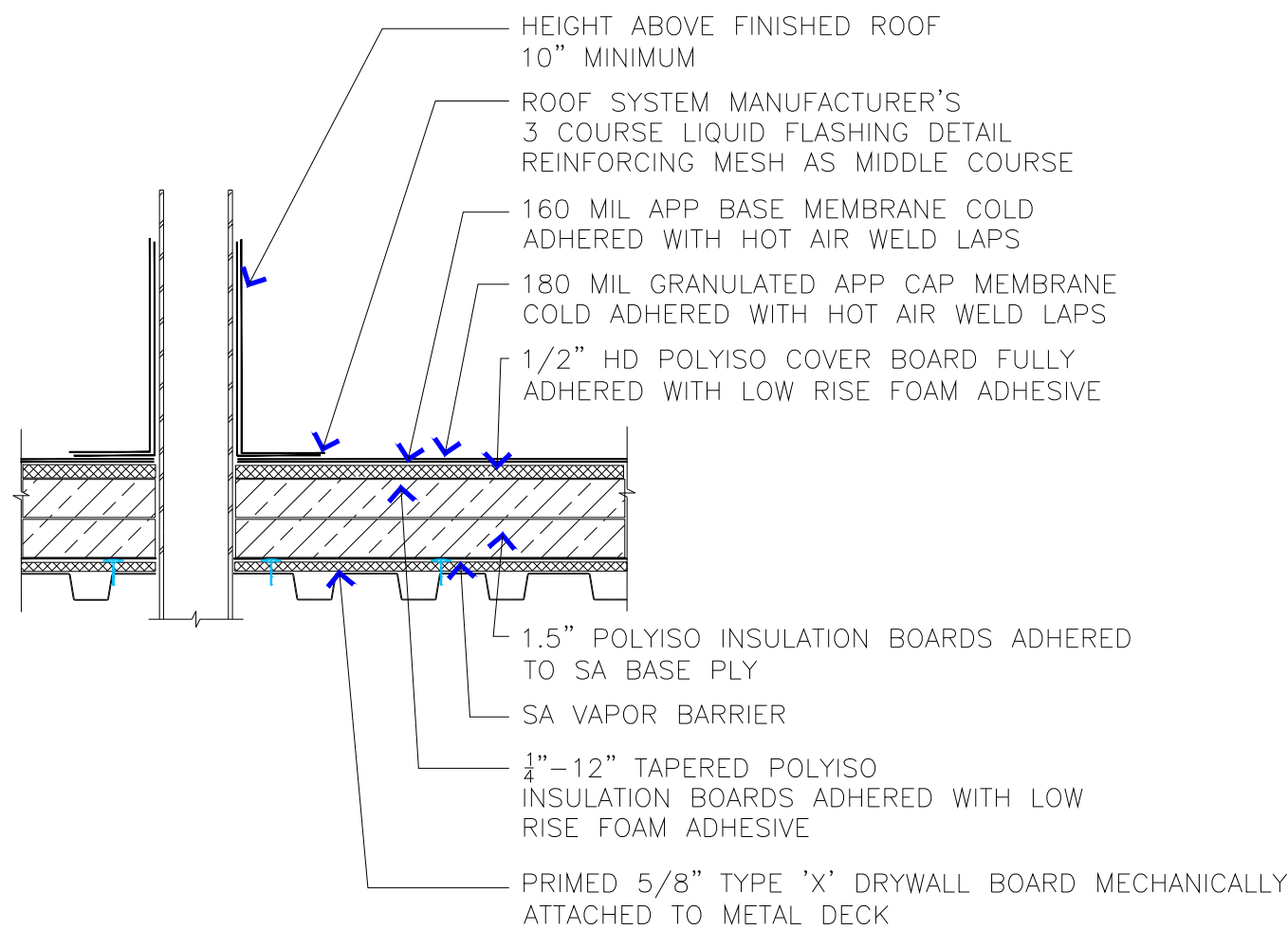


- NOTES:
1. MINIMUM 32" SQUARE, 4-LB. LEAD FLASHING, SET ON MODIFIED BITUMEN MEMBRANE IN MASTIC. PRIME BOTH SURFACES BEFORE STRIPPING.
 2. MEMBRANE PLIES, METAL FLASHING AND FLASH-IN PLIES EXTEND UNDER CLAMPING RING.
 3. ALL LAPS INSIDE SUMP MUST BE 3 COURSED WITH LIQUID FLASHING.

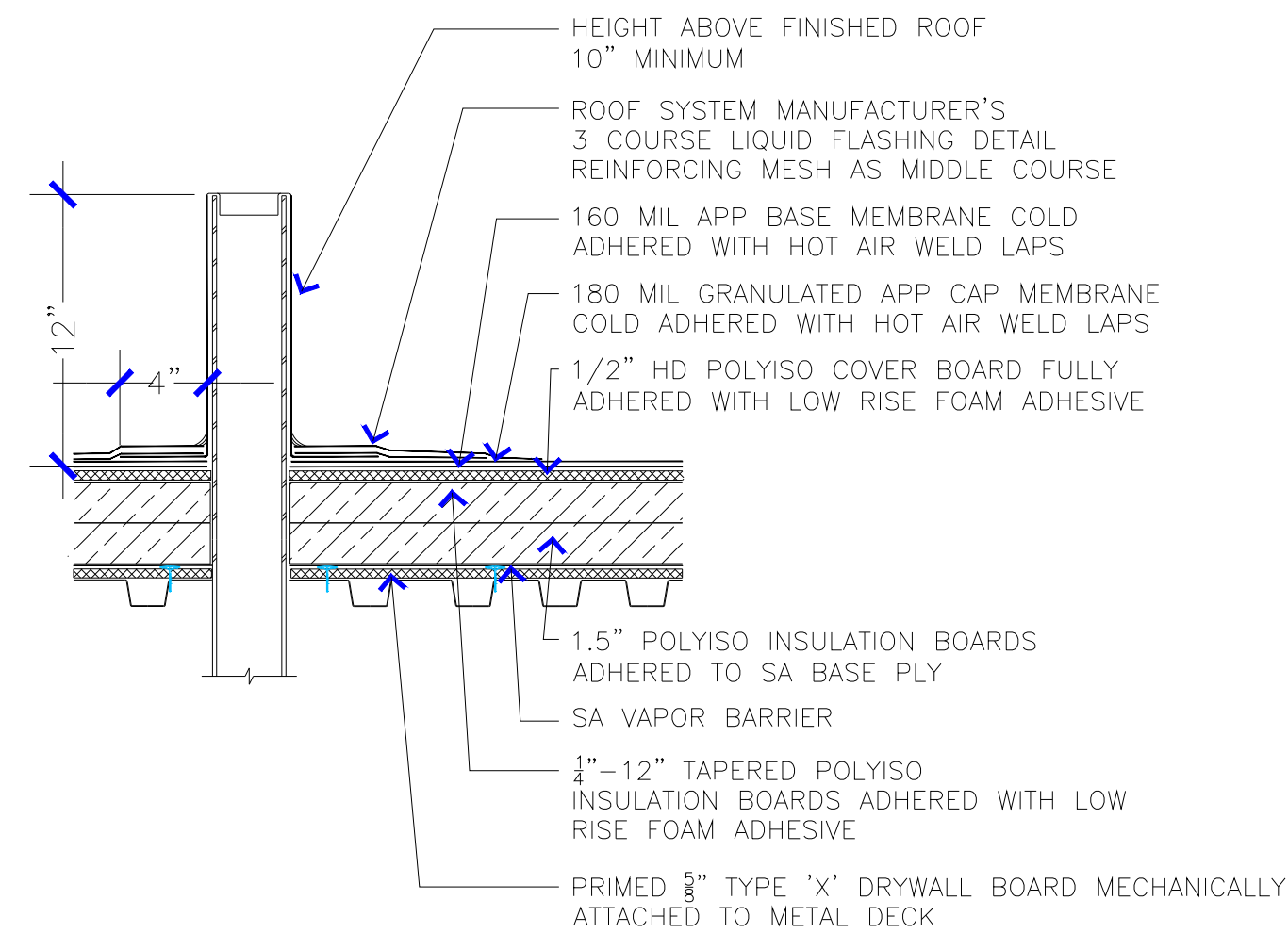
2 DRAIN FLASHING
SCALE: NTS



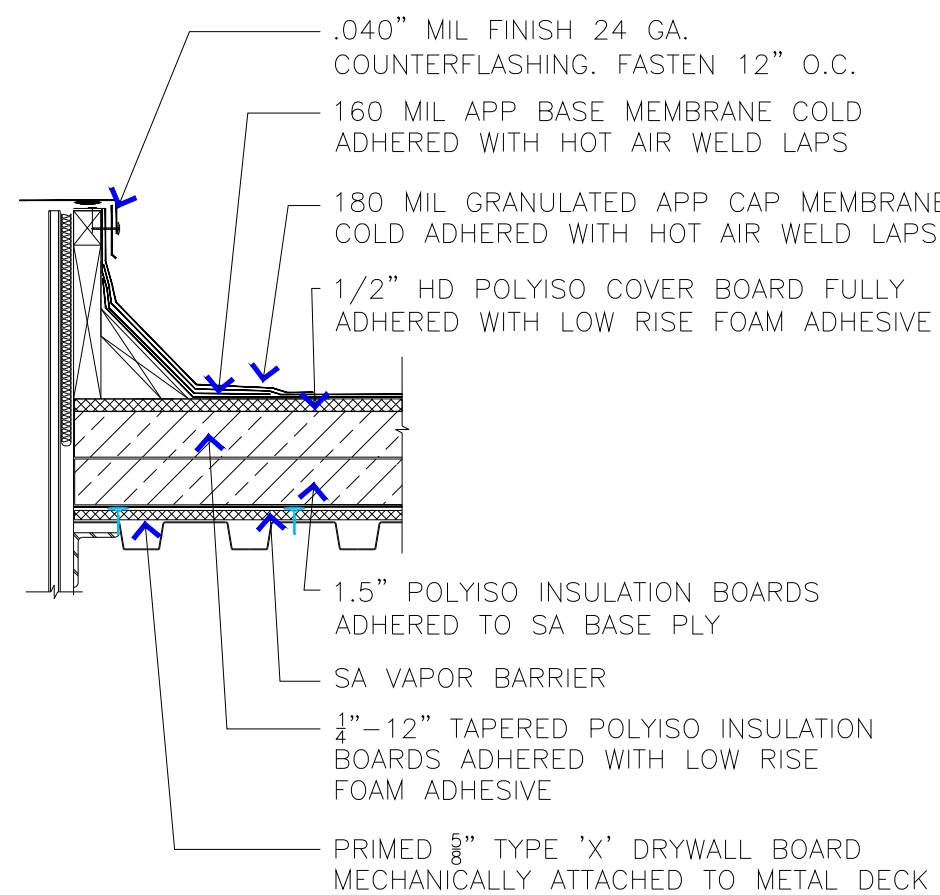
3 SKYLIGHT CURB FLASHING
SCALE: NTS



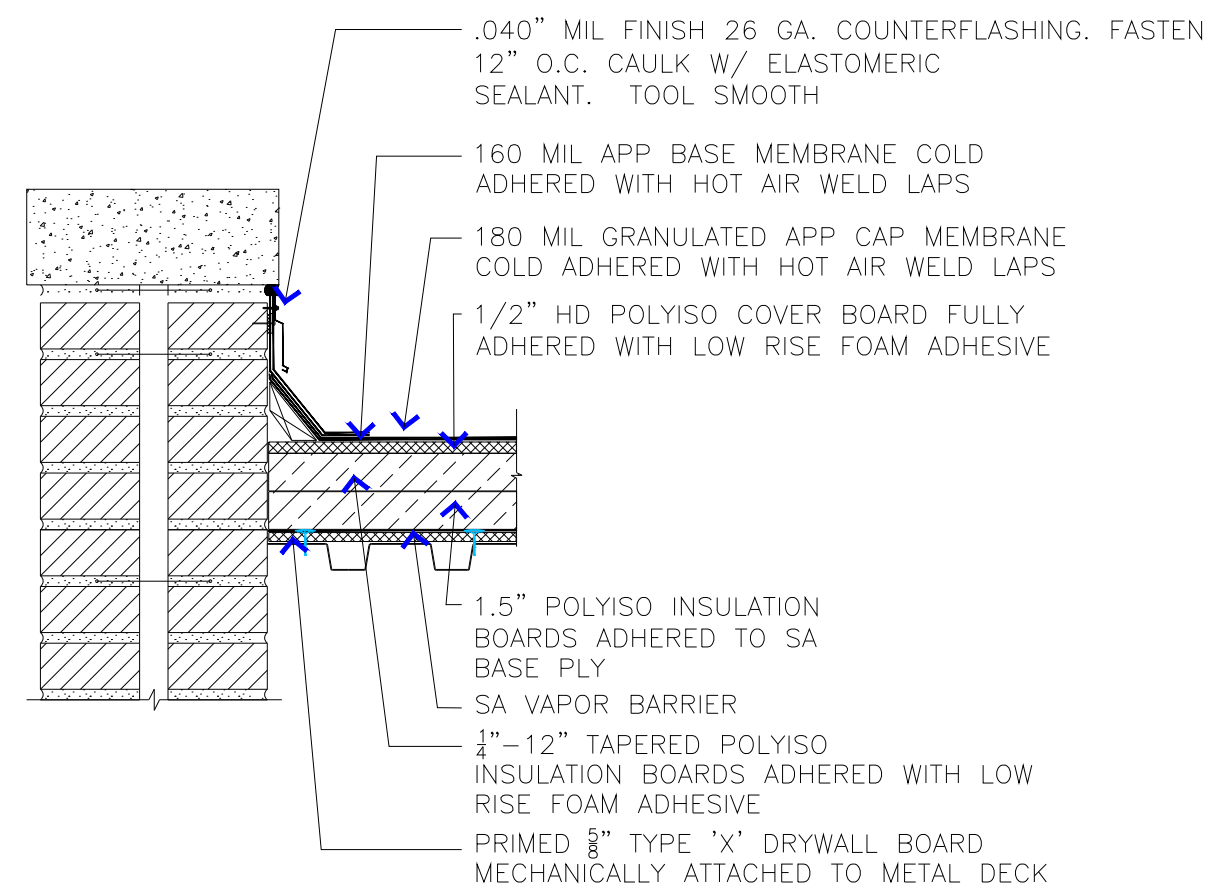
4 SUPPORT POST FLASHING
SCALE: NTS



5 SOIL STACK FLASHING
SCALE: NTS



6 HVAC CURB FLASHING
SCALE: NTS



7 LOW PARAPET WALL
SCALE: NTS