

# Nether Providence Elementary Roof Replacement Technical Specifications

## General:

1) The specifications outline the steps necessary for the proper execution of the work. They are intended to meet or exceed the manufacturer's specifications and standards.

The District engineer should be immediately contacted if the contractor finds that the meaning or intent of these specifications is not clear or that the specification appears to conflict with and not exceed the manufacturer's recommendation or standard industry practice. The engineer will promptly provide direction on which standard to follow.

2) The contractor should also understand that a complete assessment of the repair scope will not be possible until the existing deck is abrasive blasted and inspection is complete.

All additional work as well as any incidental labor, equipment, and materials necessary to properly carry out repair work exceeding the bid allowance shall be provided for the ***square foot price in the contractor's proposal.***

3) The contractor must review inspection results and repair plans with the District engineer prior to proceeding. The engineer will determine schedule for observation during repairs at that time.

4) The contractor shall immediately call the engineer if conditions differ materially from those expected when exposed during the actual work.

## A. Preparation for new roof

1. Remove and dispose of all existing roofing material, insulation, edge facia, curbs, sleeves etc. to expose deck and blocking. **Roof replacement area is approximately 18,000 SF**, but must be field verified by the contractor.

1.1 A **disposal chute** shall be constructed by Contractor to prevent damage to buildings and grounds. Disposal chute shall be enclosed-type and shall be located such that demolition debris will be discharged from the roof at the designated staging area directly into disposal vehicles or containers.

1.2 Contractor shall provide for debris removal services and containers. Placement and servicing of containers shall be coordinated with the District. The **legal disposal** of all materials is the complete responsibility of the contractor.

1.3 Residue and debris from all operations shall not be allowed to accumulate on the project site. Debris shall be removed and properly disposed of daily in accordance with all Federal, state and local regulations.

1.4 Dust, dirt and debris created by project construction shall be properly contained or controlled by the Contractor. Method(s) of control shall be approved by the Engineer.

2. Remove all wood infill at old skylights and roof access hatch. Cut abandoned vent stack (noted on plans) 6" below deck and cap.

3. Remove all stone fill and debris from metal deck. ***Brush blast metal deck (SSPC-SP7) to remove all oil, grease, loose rust and loose coatings.***

4. Mark areas which have extensive corrosion or damage. Review results with the District engineer before proceeding with repairs or installation of insulation.

5. Overlay and mechanically fasten new decking to areas approved for repair. New deck should be minimum **20 gage galvanized steel** matching existing profile.

6. At all abandoned roof penetrations less than 6 inches in diameter, secure a piece of **20 gage galvanized steel** to the existing decking. Utilize appropriate fasteners to secure sheet metal to the substrate at spacing not to exceed 6 inches on center and located approximately one inch from the edge of the sheet metal. The sheet metal shall extend onto the existing deck a minimum of 6 inches in all directions.

7. **At all abandoned skylight openings (base bid on 16 skylights) and one roof hatch opening**, furnish and install new **20 gage galvanized steel** decking (profile to match existing) so that the ends and sides extend past the edges of the existing deck a **minimum of 12 inches**. Secure to the existing deck with appropriate fasteners at spacing not to exceed 6 inches on center and located approximately one inch from the edge of the new decking.

***Note: Cost associated with closing all abandoned skylights and roof hatch shall be included in the Base Bid.***

## **B. Installation of new Roof -**

### **1.01 EXTENT OF WORK**

Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a **new membrane Fully Adhered Roofing System** including vapor retarder, tapered rigid insulation, 1/2" cover board, blocking, and flashings as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.

## 1.02 PRODUCTS

### OPTION 1. TPO Membrane Roofing

1. **Fabric-Reinforced Thermoplastic Polyolefin Sheet:** ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible fabric backed TPO sheet. Basis of Design Manufacturer: Provide Carlisle SynTec; Fleeceback TPO Membrane with Flexible Fast Adhesive. Subject to compliance with requirements established by the Basis of Design Product and subject to substitution procedures. Products must be approved by district engineer prior to bidding.
2. Thickness: **Total 115 mil fleece backed**
3. Exposed Face Color: **White.**

### OPTION 2. TPA Membrane Roofing hot asphalt set over one layer glass mat hot asphalt set

1. Basis of Design: The roof system specified in this Option is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, [www.tremcoroofing.com](http://www.tremcoroofing.com). Provide specified products or comparable products. Manufacturers of comparable products: Must be approved by District Engineer prior to bid.
2. PVC Roof Membrane:  
Thermoplastic PVC/TPA sheet, internally fabric reinforced and fleece backed, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant, ASTM D4434 Type IV.  
Basis of design product: Tremco, TPA FB Single Ply Roof membrane.  
Minimum Thickness, nominal, ASTM D751: 0.060 in (1.5 mm).  
Color: White.
3. Base-Ply Sheet:  
SBS-modified asphalt coated composite polyester / fiberglass/fiberglass mat reinforced high tensile strength base sheet, ASTM D4601 Type II.  
Basis of design product: Tremco, BURmastic Composite Ply HT.  
Thickness, minimum, ASTM D5147: 0.060 inch (1.5 mm).

#### 4. Asphalt Materials

Basis of design Tremco products. Follow manufacturer's recommendations

### **OPTION 3. KEE Membrane Roofing**

1. Basis of Design: The roof system specified in this Option is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, [www.tremcoroofing.com](http://www.tremcoroofing.com).  
Provide specified products or comparable products.  
Manufacturers of comparable products: Must be approved by District Engineer prior to bid.
2. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced fleece-backed sheet, ASTM D6754 .  
Basis of design product: Tremco, TremPly KEE FB Single Ply Roof Membrane.  
Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm) Thickness over fiber, optical method: 0.016 inches (152 mm).  
Color: White.

### **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.

B. Bonding Adhesive: Manufacturer's standard.

C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, **approximately 1" by 1/8 inch thick**; With anchors.

D. 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 membrane roofing system manufacturer.

E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and Vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories

## **VAPOR RETARDER**

A. Polyethylene Film: ASTM D4397, **6 mils thick, minimum**, with 111 maximum permeance; 0.13 perm

1. Tape: Pressure sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

## **ROOF INSULATION**

A. General: Preformed roof insulation boards manufactured by TPO membrane roofing manufacturer

B. **Polyisocyanurate Board Insulation:** ASTM .C 1289, Type II, Class I, Grade 3 felt, or glass-fiber mat facer on both major surfaces.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to create a finished slope of 1/4 inch per 12 inches unless otherwise indicated. Minimum Thickness tapered insulation: to be 1/2 inch

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

E. **Cover board to be 1/2" thick High Density Polyisocyanurate** meeting ASTM C1289 Type II Class 4 Grade 1 (109 psi compressive strength with glass mat facer

F. Minimum uniform thickness insulation : *4.0 -inch*

1. Minimum R value: 37. (average over roof area)

2. Minimum plies: Two

## 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 or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer

C. 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.

## MANUFACTURED ROOF ACCESSORY MATERIALS

A. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operation and performance required

1. Surface: Smooth; flat finish.

2. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Two-Coat Fluoropolymer: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

b. **Color: As selected by District from manufacturer's** full range of available colors. The minimum selection shall be based on PPG's current coil stock fluoropolymer catalog.

c. **Concealed Surface:** Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of **0.5 mil**.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, mill finished.

C. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation

## **MANUFACTURED COPING**

A. Copings: Manufactured coping system consisting of formed-metal Coping cap in section **lengths not exceeding 12 feet**, concealed anchorage; corner units, end cap units, and concealed splice plates with same finish as coping caps.

1. Basis-of-Design Product: Subject to compliance with requirements, provide "SecureEdge 300 parapet Wall Coping", Carlisle Syntec or comparable product by one of the following:

a. Metal-Era, Inc.

2. Coping-Cap Material: Formed aluminum, 0.040 inch thick.

**Finish: Two-coat fluoropolymer.**

3. Corners: Factory mitered and mechanically clinched and sealed watertight.

4. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.

5. Snap-on-Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.

6. Splice Plates: Concealed, of same material, finish, and shape as coping cover.

## **MANUFACTURED ROOF - EDGE FLASHINGS**

A. **Roof-Edge Fascia:** Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous spring metal anchor bar with integral drip-edge cleat to engage fascia cover. Provide matching corner units.

1. Basis-of-Design Product: Subject to compliance with requirements, provide "SecurEdge 300 Fascia System"; Carlisle Syntec or comparable product by one of the following:

a. Metal-Era, Inc.



2. Fascia Cover: Fabricated from the following exposed metal:

a. Formed Aluminum: 0.040 inch thick.

3. Corners: Factory mitered and mechanically clinched and sealed watertight.

4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

5. Where spill out (or roof overflow) provisions are shown or required, modify standard roof edge flashing in accordance with indicated detail.

## ROOF DRAINS

Roof drains to be replaced as shown on Sheet 1 with Details on Sheet 4 shall be **coated cast iron** drains as manufactured by **Josam, 21500 Series** (or approved equal) of the **applicable model to fit the TPO roofing system**. Roof drains shall consist of the following:

Large polypropylene stop  
Large sump – 13.25” deck opening  
Wide roof flange bottom outlet  
Locking DOME WEJLOC  
Non-puncturing Clamp Ring with integral gravel stop

### **BARBIERI & KLINE, INC.**

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### **Josam Customer Service**

Contact Josam [Customer Service](#).  
1-800-36-JOSAM  
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## 1.03 WARRANTY

A. **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. Warranty includes membrane roofing, base flashings, roof insulation, fasteners, adhesives, roofing accessories, roof copings, roof expansion joints, roof edge flashing and other components of membrane roofing system.

### 2. **Warranty Period:**

**OPTION 1.** 20 years from date of Substantial Completion

**OPTION 2.** 30 years from date of substantial completion

**OPTION 3.** 30 years from date of substantial completion

A. **Warranty shall be total system** warranty and shall have No-dollar limit.

B. **Special Project Warranty:** Submit roofing Installer's warranty, signed by Installer, covering the 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, and walkway products, for the following warranty period:

1. **Warranty Period: Two years from date of Substantial Completion.**

C. Upon completion of the installation, the Contractor shall arrange for an Inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the District seventy-two (72) hours prior to the manufacturer's final inspection.

## 1.04 SUBMITTALS

A. Prior to starting work, the roofing contractor must submit the following:

1. Shop Drawings for roofing system. Include plans, elevations, sections, details and attachments including:
  - a. Base flashings and membrane terminations
  - b. Tapered insulation plan including slopes

**NOTE: Contractor should verify roof drain locations prior to developing tapered insulation plan.**

- c. Roof plan including orientation of membrane roofing and fastening patterns for insulation.
  - d. Shop drawings for all typical conditions shown on sheets 4 and 5
2. Sample of the manufacturer's Membrane System Warranty and installer's supplemental labor and material warranty.
3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
4. Certification of the manufacturer's warranty reserve

### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.
- B. Comply with the manufacturer's written instructions for proper material storage.
  1. Store materials between 50°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 50°F minimum temperature before using.
  2. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.

3. 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.

C. Insulation must be on pallets, off the ground and tightly covered with waterproof materials. Manufacturer's wrap does not provide sufficient waterproofing.

D. Any materials which are found to be damaged shall be removed and replaced at the Contractor's expense.

## **1.06 WORK SEQUENCE**

A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.

B. Before beginning work, the roofing contractor must secure approval from the District's representative for the following:

1. Areas permitted for personnel parking.
2. Areas permitted for storage of materials and debris.
4. Areas permitted for the location of cranes, hoists and chutes.

## **1.07 EXISTING CONDITIONS**

If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the District Engineer or District's representative by phone and solicit the manufacturer's approval prior to commencing with the work.

Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

## **1.08 WORKMANSHIP**

- A. Contractors installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
- B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the District's satisfaction.
- C. There shall be a supervisor on the job site at all times while work is in progress
- D. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the District. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the District's consideration.

## **1.09 EXECUTION**

### **GENERAL**

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

### **DAILY SEAL**

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

## VAPOR-RETARDER INSTALLATION

A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over steel deck, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively.

1. Continuously seal side and end laps with tape.

## 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. Install roofing insulation in a minimum of two layers, the first shall be mechanically fastened through vapor-retarder, the successive layers shall be adhesively attached.

D. Install tapered insulation to conform to slopes indicated.

E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is **2.0 inches or greater**, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

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

G. 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 with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
2. Fasten insulation to resist uplift pressure at comers, perimeter, and field.

H. Mechanically Fastened and Adhered Insulation: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
2. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

### **ADHERED MEMBRANE ROOFING INSTALLATION**

**General:** Install roof membrane according to manufacturer's written Instructions. Manufacturer instructions shall govern in the event these specifications vary from them.

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

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. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

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

G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to **manufacturer's written instructions** to ensure a watertight seam installation.

1. **TEST lap edges with PROBE** to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.

2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.

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

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

I. Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing membrane roofing system.

## **BASE FLASHING INSTALLATION**

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions .

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 comers with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. **Hot-air weld** side and end laps to ensure a watertight seam installation.

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



## MANUFACTURED ROOF ACCESSORY INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written Instructions Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. **Metal Protection:** Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementous or wood substrates, install a course of polyethylene sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise shown on Drawings.
2. When ambient temperature at time of installation is between 40 and 70 deg ,F. Set joint members for 50 percent movement each way . Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Seal joints with butyl sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for watertight construction. Place sealant to be Completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

## **COPING INSTALLATION**

A. **Install pressure treated (PT) lumber** curbing to accommodate new insulation. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

**Note: Cost associated with installing new PT 2x plates on the roof to achieve required insulation thickness shall be included in the Base Bid**

B. Anchor copings to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at 30-inch centers.

## **ROOF-EDGE FLASHING INSTALLATION**

A. A. Install pressure treated (PT) lumber curbing to accommodate new insulation. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

**Note: Cost associated with installing new PT 2x plates on the Roof to accommodate new tapered insulation shall be included in the Base Bid**

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

## **ROOF DRAIN REPLACEMENT**

A. Install replacement drains at locations shown on plans per **Details #2, & #3 on Sheet 5**

**1. Immediately notify District Engineer if revisions to drain piping is required**

**END OF SPECIFICATION**