

# PROJECT MANUAL

## Conditions of the Contract Specifications

### *Union County Jail Roof Replacement Blairsville, Georgia*

*November 10, 2020  
Gardner Spencer Smith Tench & Jarbeau, PC  
20116*

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**SECTION 05500**

**METAL FABRICATIONS**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Shop fabricated steel items.

1.2 RELATED REQUIREMENTS

- A. Section 04816 - Masonry Veneer: Placement of metal fabrications in masonry.
- B. Section 09900 - Paints and Coatings: Paint finish.

1.3 REFERENCE STANDARDS

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- B. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.
- C. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- E. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003 (Reapproved 2007).
- F. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2007a.
- G. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2007.
- H. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006 and Errata.
- K. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- M. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

**PART 2 PRODUCTS**

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A 36/A 36M.

- B. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- C. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## 2.2 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## 2.3 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Lintels: As detailed; galvanized finish.

## 2.4 FINISHES - STEEL

- A. Prime paint all steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete or masonry.
- B. Prime Painting: One coat.
- C. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

## 2.5 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

### 3.2 PREPARATION

- A. Clean and stripgalvanized items where site welding is required.

### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

Union County Jail  
Roof Replacement  
GSSTJ Project No. 20116

**METAL FABRICATIONS**

05500-3  
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**END OF SECTION**

**SECTION 06100**

**ROUGH CARPENTRY**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Roofing nailers.
- E. Preservative treated wood materials.
- F. Fire retardant treated wood materials.
- G. Miscellaneous framing and sheathing.
- H. Communications and electrical room mounting boards.
- I. Concealed wood blocking, nailers, and supports.
- J. Miscellaneous wood framing accessories, nailers, furring, and grounds.

1.2 REFERENCE STANDARDS

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2001.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.
- E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- F. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- G. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.
- H. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2007.
- I. PS 1 - Structural Plywood; 2007.
- J. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

1.3 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
1. Species: Douglas Fir-Larch, unless otherwise indicated.
  2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

### 2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Stud Framing (2 by 2 through 2 by 6 ):
1. Species: Douglas Fir-Larch.
  2. Grade: No. 2.
- D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 ):
1. Species: Douglas Fir-Larch.
  2. Grade: No. 1 & Btr.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.

### 2.3 CONSTRUCTION PANELS

- A. Roof Sheathing: APA PRP-108/APA PRPR-108, Form B455, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
1. Span Rating: 24/0.
  2. Thickness: 5/16 inch, nominal.
- B. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
- C. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84.

### 2.4 ACCESSORIES

- A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A 653/A 653M.
- C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A 653/A 653M.
- D. Sill Flashing: As specified in Section 07620.
- E. Building Paper: Water-resistant Kraft paper.

### 2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood

treatments determined by use categories, expected service conditions, and specific applications.

1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards.
- B. Fire Retardant Treatment:
1. Interior Type A: AWWPA Use Category UCFA, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated .
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with masonry or concrete.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Coordinate installation of rough carpentry members specified in other sections.

#### **3.2 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

#### **3.3 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

#### **3.4 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can



be securely fastened to two or more studs or other method of support is explicitly indicated.

- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Specifically, provide the following non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Chalkboards and marker boards.
  - 8. Joints of rigid wall coverings that occur between studs.

### 3.5 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

### 3.6 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. Nail panels to framing; staples are not permitted.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

### 3.7 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### 3.8 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01732.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 07540**

**TPO ROOFING**

**PART I GENERAL**

1.01 SUMMARY

A. General

1. Work in contract does not include any asbestos abatement.

B. Base Bid

1. Install new isocyanurate insulation in 2 layers with minimum thickness to meet minimum R-value and manufacturer's 1/2 inch HD (high density) cover board. Install tapered polyisocyanurate insulation crickets between drainage points.
3. Install new insulation of sufficient thickness to in-fill areas where insulation and/or deck replacement has been done.
4. Install the specified fully adhered TPO membrane system.
5. Picture frame motorized RTUs with protection pad.
6. Install new metals per plans and specifications.

1.02 RELATED SECTIONS

C. Section 06100 – ROUGH CARPENTRY

D. Section 07620 - FLASHING AND SHEET METAL

E. Section 07900 – JOINT SEALERS

1.03 SUBMITTALS

A. General: Submit in electronic format under provisions of Section 01300. When several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among those named. When either a single named product or system is specified, substitutions will be allowed only if the specified product or system becomes unavailable through no fault of the Contractor.

B. Bid submittal

1. Statement of manufacturer's product and name of the subcontractors the bid is based upon. Product and subcontractors are not to be changed unless unavailable at no fault of the bidder.

C. Required Contractor Submittal Items:

1. Product data sheets for each material required, including:
  - a. Thermoplastic single ply membrane.
  - b. Caulks and sealant.
  - c. Bonding adhesive.
  - d. Clad metal flashing.

- e. Insulation.
  - f. Insulation adhesive.
  - g. Metal accessories.
- 2. Samples: not required.
  - 3. Shop Drawings: Roof plan showing tapered insulation sloped to drain.
  - 4. Written certification from the primary roof system manufacturer that the specification is acceptable and stating their intent to supply the specified warranty at the successful completion of Work.
  - 5. Warranty Specimens:
    - a. Sample copy of Manufacturer's specified roofing warranty stating obligations, remedies, limitations, and exclusions of warranty.
    - b. Certified letter indicating intent to supply Contractor Warranty from Section 017800 at the completion of work.
  - 6. Schedule of Values, refer to Section 01230.
- D. Manufacturer's Material Safety Data Sheets (MSDS) to be maintained by the Contractor at the worksite at all times.
- E. Submit proposed substitution a minimum of 10 days prior to bid date.
- 1. Latest edition of manufacturer's application instructions. Descriptive list of materials proposed and certificate of analysis reporting tested values of physical properties meet or exceed specified materials. Letter signed by manufacturer's corporate officer certifying that system and individual components meet all specification requirements. Make substitution request using the Construction Specifications Institute (CSI) Form 1.5C "Substitution Request (During the Bidding Stage)".
  - 2. Reference list of no less than 5 completed projects of similar scope and no less than 5 successful projects a minimum of 5 years old with the requested substitution roof system within 100 miles of the specified project jobsite.
- F. When several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among those named. When either a single named product or system is specified, substitutions will be allowed only if the specified product or system becomes unavailable through no fault of the Contractor.

#### 1.04 QUALITY ASSURANCE

- A. Roofing system shall be Underwriters Laboratory (UL) Class A listed.
- B. The Contractor shall be trained and demonstrate proficient experience in the application of the specified materials having installed no less than three projects of similar scope within the past year. The Contractor shall be approved prior to bid date to install the materials of the specified manufacturer.
- C. Pre-construction conference: Prior to the start of work, a conference to be attended by all affected parties shall be held at the jobsite with the intent of coordinating activities to minimize disruptions to the building tenants. Roofing foreman and Sheet metal foreman shall be present.
- D. Inspection: Upon completion of the installation, an inspection shall be made by the Owner's representative to ascertain that the materials have been installed according to approved specifications and details. The inspection shall be scheduled only after receipt, by the Design

Professional, of the Contractor's completed punch list. Upon approval of the project, the required warranties shall be issued.

- E. Changes: Contractors are required to bid each listed line item as specified.
- F. Applicable standards:
  - 1. Standards of the American Society for Testing and Materials (ASTM) as referenced herein.
  - 2. National Roofing Contractors Association (NRCA) "Roofing and Waterproofing Manual", fourth edition.
  - 3. State of Georgia, EPA and local building codes with regard to asbestos abatement shall be included as part of this specification.
  - 4. Occupational Safety and Health Administration (OSHA) "Interim fall protection guidelines for residential construction", dated December 8, 1995 or most current standard.
  - 5. "The International Building Code", 2006 edition, as published by the International Code Congress, Inc. and applicable local and State amendments.
  - 6. "Manual of Practice", published by the Construction Specifications Institute (CSI), copyright 1996.
  - 7. ASTM Standard D6878-11a.
- G. The application specifications of each material manufacturer's product shall be considered part of this specification and be followed if it is judged to be of higher quality in the completed roof system. In the event of a discrepancy between this specification and the manufacturer's specification, the Design Professional shall be the sole judge as to which procedure to follow. The roofing contractor shall contact the Design Professional noting any discrepancy a minimum of three days prior to the bid date.
- H. Products or materials containing asbestos are not acceptable for use on the project.

#### 1.05 WARRANTY

- A. General: Warranty shall be provided at no additional expense to the Owner.
- B. Provide a 20 year manufacturer's non-prorated warranty for single ply roofing system and roof insulation. Warranty shall cover labor and materials to correct leaks and defects encountered during the warranty period and shall take effect on the date of final completion. Warranty shall not be voided by emergency leak repairs or by ponding water conditions.
- C. The warranty term shall be 5 years correcting leaks and defects resulting from workmanship on all installed materials. Contractor shall respond with correcting action within 24 hours of Owner's call.

#### 1.06 SITE CONDITIONS

- A. Install roofing in dry weather when ambient temperature is above 40 degrees F.
- B. All roof surfaces shall be free of ponded water, ice, snow and other forms of moisture during installation.
- C. Protective tarps are required to cover materials stored out in the weather. These materials must be on pallets or blocking to raise them a minimum of 4 inches above any ponding water. Packaging labels shall indicate appropriate warnings, storage conditions, lot numbers, and usage instructions.

- D. Contractor shall field verify all dimensions. Roof Top Units (RTU) and penetration conditions shown on the roof drawings are representative of the conditions on the building. Contractor shall field verify the existing conditions.
- E. Bonding adhesive shall be stored in conditions that maintain a minimum temperature of 60 degrees F. With the Owner's permission, adhesive may be stored inside of the heated building or a temporary heated storage area.

#### 1.07 DEFINITIONS

- A. Contractor: The business entity providing all labor, materials, equipment and services to complete the Work as specified in the Contract Documents.
- B. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.
- C. Ponding water shall be considered to occur when free water remains on the roof longer than 48 hours.
- D. Leaks in the roof system shall be considered to occur when free water enters the roof assembly from defects in the waterproofing integrity of the installed roofing materials.

#### 1.08 PRECAUTIONS

- A. Adhesives, primer and caulks as indicated are extremely flammable and/or toxic. Use precautions indicated by manufacturer.
- B. Surfaces to be bonded shall be dry and clean. Suitable surfaces are usually considered to be smooth, solid masonry, wood, metal and cellular insulating concrete that is considered water resistant and accepted for application by membrane manufacturer.
- C. All fasteners shall be installed with depth-sensing screw guns to prevent overdriving.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. General: All material shall be furnished, specified or approved in writing by the membrane manufacturer.
- B. Available Manufacturers: Subject to compliance with requirements, Carlisle Syntec, Firestone and Johns Manville TPO products are approved.
- C. Requests for approved substitutions must be made in writing no later than 10 days prior to bid date. Submit complete product and test data as specified under Submittals for each proposed substitution.

- 2.02 MEMBRANE: Membrane shall be .080 inch nominal thickness, maximum 8-foot width, scrim-reinforced white thermoplastic non-curing single ply, minimum 72.5 in. wide by appropriate length with the following minimum physical properties:

Table: Physical properties of membrane

Physical Property -----	Test Method -----	Specification -----
Weight, minimum	ASTM D-751	0.43 lbs/sf
Thickness tolerance	ASTM D-751	80 mil nominal
Breaking Strength	ASTM D-751	275 lbs min.
Tear Strength	ASTM D-751	55 lbs min.
Low Temperature Bend	ASTM D-2136	Pass, -40 F (-40C) Pass 1/8 in. mandrel
Shore A Hardness	ASTM D-2240	80 +- 5
Heat Aging	ASTM D-573	7 days maintains 100% @ 200 F of original
Volatility, max. loss	ASTM D-1203A	0.5%
Hydrostatic res., min.	ASTM D-751A	300 psi
Ozone resistance *	ASTM D-1149	no effect 3 ppm @ 30% strain @ 104 F: 72 & 2500 hrs.
Emmiqua 3 million lang.	ASTM E-838	no visible surface cracking
Dimensional stability	ASTM D-1204	24 hrs 0.1% @ 129.2 F
Puncture Res., min.	FTM 101 B,	#2031 325 lbs

\* Test performed on non-reinforced material only.

### 2.03 RELATED MATERIALS

- A. Flashing: Flashing shall be same membrane as in 2.02 except for perimeter use of sheet metal Membrane Clad Metal. Unreinforced .055 in. thick membrane shall be supplied for field fabricated vent stacks, pipes and corners or as premolded accessories. Membrane shall be compatible for direct contact with bitumen materials (asphalt and coal tar pitch) or suitable separation shall be provided.
- B. Bonding Adhesive: Membrane manufacturer Bonding Adhesive shall be provided to hold field sheet and flashing in place. Not to be used in the seams.
- C. Perimeter Half Sheets: Not required with fully adhered systems.
- D. All Purpose Sealant: Provided to serve as water cut-off mastic, pitch-pan sealer and as a caulk to seal membrane to metal.
- E. Primer and Solvent: Primer and Solvent are provided for purposes of preparing membrane for hot-air welding.
- F. Seam Caulk: Seam Caulk shall be provided for the purpose of sealing any cut edge of reinforced membrane.
- G. Overnite Seal: Tie-off that are effective in preventing moisture penetration under newly installed membrane shall be made at the end of each workday and when weather threatens.
- H. Termination Bar: Used in the exposed attachment of flashing materials. Extruded aluminum bar with formed caulk edge with pre-drilled holes spaced 6 inches OC. Bar size 1/8 inch thick, 1 inch x 10 foot lengths.
- I. Walkpad: Manufactured by the primary roof membrane supplier and used for the protection of roof membrane and base flashing. The approximate size shall be 30 x 30 x 5/16 inches.

- J. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

#### 2.04 INSULATION MATERIALS

- A. Rigid isocyanurate foam insulation board with factory bonded fiberglass facers as approved by the membrane manufacturer and manufactured in compliance with ASTM C1289-95. Minimum compressive strength 20 psi, Moisture absorption <1%, dimensional stability 2% maximum linear change when conditioned at 158 F and 97% relative humidity for seven days. UL Class A listed and FM Class 1 approved. Curing time shall be 24 hours minimum, plus an additional 24 hours minimum per 1 inch of thickness at a minimum of 60F degrees before shipment from the manufacturer.
  - 1. Thickness to achieve a minimum of R-25 per requirements of the 2012 International Energy Conservation Code.
  - 2. Size per manufacturer's standards
  - 3. Tapered insulation crickets and saddles shall be ½ inch minimum thickness with slope shown on the drawings.
- B. Insulation Adhesive: Basis of design: "Insta-Stik" one part urethane adhesive as manufactured by, Dow Chemical Corp., 800/800-3626, OlyBond 500 Adhesive as supplied by Olympic Fasteners or Carlisle, Firestone or Manville membrane manufacturer's similar component product.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Examine all substrates, areas, and conditions under which roofing will be applied, for compliance with requirements. Verify that positive slope to drain exists on each roof area.
- B. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thickness of insulation required.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### 3.02 PREPARATION

- A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Block off or shut down air intake locations where odor may be drawn into building ventilation systems during application. Coordinate with the building's representative.
- C. Verify that the height of curbed units are a minimum of 4 inches above the finished roof height.

#### 3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install single roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of NRCA "Roofing and Waterproofing Manual, fourth edition."
- B. Cooperate with inspecting and testing agencies engaged or required to perform services for installing single ply roofing membrane system.

- C. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
  - 1. Provide cutoffs at end of each day's work to cover exposed insulation with a temporary water tight seal acceptable to the membrane manufacturer.
  - 2. Complete terminations and base flashing and provide temporary seals to prevent water from entering completed sections of roofing system.
  - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
  - 4. Inspect all roof drains at the completion of work to assure that water flows correctly. Replace all missing or damaged components. Notify the Design Professional of any drainage problem conditions prior to the final inspection of the Work.

### 3.05 INSULATION SYSTEM APPLICATION

- A. General:
  - 1. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
  - 2. Comply with roofing system manufacturer's written instructions for installing roofing insulation.
  - 3. Install insulation under area of roofing to conform to slopes indicated and to Roof Drawings.
- B. Install required insulation materials (base and cover board) in 2 layers with long joints of insulation in continuous straight lines with end joints staggered approximately  $\frac{1}{2}$  the board length between rows, abutting edges and ends between boards. Fill gaps exceeding  $\frac{1}{4}$  inch (6 mm) with insulation.
  - 1. Cut and fit insulation within  $\frac{1}{4}$  inch (6 mm) of nailers, projections, and penetrations.
- C. Attachment
  - 1. Mechanically fasten the two base layers of insulation to the deck per the manufacturer's recommendations. Install high density  $\frac{1}{2}$ " cover board in insulation adhesive. Apply adhesive according to the manufacturer's instructions. Apply a minimum  $\frac{3}{4}$  inch diameter bead at an application rate of one lineal foot per square foot of insulation board.
  - 2. Insulation board must be completely embedded in the adhesive and compressed to obtain acceptable attachment. It will be necessary to place secondary weight on each insulation board to maintain compression during the "set up" stage of adhesive curing.
    - a. Corners are defined as the area 8 feet from two connected walls. Adhesive beads shall be 6 inches OC.
    - b. Perimeter is defined as the area 8 feet from a side wall. Adhesive beads shall be 9 inches OC.
    - c. Field of the roof is defined as the roof area inside corners and perimeters. Adhesive beads shall be 12 inches OC.

### 3.06 ROOF MEMBRANE INSTALLATION

- A. General: Install membrane according to roofing system manufacturer's written instructions, starting at low point of roofing system. Terminate field sheets at the base of parapet walls or curbs.
  - 1. Align sheets without stretching. Membrane shall be unrolled on an area to be covered with adjoining rolls of membrane overlapped and installed in shingle fashion to shed water.
  - 2. Membrane shall be overlapped and hot-air welded. Detail work and repairs can be done with a hand welder, however, automatic welders are to be used for field seaming. Heat weld seams according to the manufacturer's recommendations and with a minimum weld width of 1  $\frac{1}{2}$  inches.



3. The entire lap must be probed each day soon after it has cooled to verify that the welder set-up is effective. The membrane must be allowed to cool. Cut edges shall be caulked by applying Seam Caulk.
  4. The top surface of the membrane shall be kept clean during installation. Any adhesive, bitumen stains or other foreign materials shall be cleaned from the membrane on a daily basis.
- B. Roof membrane is to be completely adhered to the insulation substrate without voids or wrinkles. Bonding adhesive shall be applied to the top surface of the substrate material and the underside of the roof membrane.
- C. Position membrane rolls so that no longitudinal seam results in the drain valley. Use a full roll centered in the valley line.
- D. Contractor shall use a water-filled, foam covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

### 3.07 BASE FLASHING AND STRIPPING INSTALLATION

- A. Perimeter and other details shall be flashed as shown. Membrane shall be mechanically fastened 12 inches OC into wood nailers. Each roof section shall be completely sealed; no flashing shall be left in an open condition at the end of work each day.
1. Base Flashing:
    - a. Membrane shall be mechanically fastened into deck. Fastening shall occur at parapet wall, curbs, skylights, expansion joints and any other roof penetrations that exceed 24 inches in dimension.
    - b. Install clad metal flashing fastened into wood nailers with two rows of annular ring nails spaced 4 inches OC. Space metal sections ¼ inches apart. Cover the gap with 2 inch wide aluminum tape. Install 4 inch wide membrane flashing hot air welded over the joint. Apply tape sealant to the back of the metal and tool the sealant installed at the top of the metal.
  2. Curbs: Extend a separate membrane flashing vertically up the parapet wall, across the top and a minimum of 1 inch below the nailer's bottom edge. All seams shall be hot air welded.
  3. Bonding Adhesive shall be applied to both the substrate and the membrane and allowed to dry to finger touch until it does not string or stick.
  4. All flashing shall be mechanically fastened at the top, under or through appropriate counter flashing, with approved fasteners as shown in detail drawings. Laps shall extend a minimum of 2 1/2 in. beyond fasteners onto field sheet.
  5. Gravel stop and drip edge stripping shall be hot air welded to roof membrane. Use of self adhesive stripping is not acceptable.
  6. Apply the membrane manufacturer's recommended primer to the inside face of metal pitch pans and around the outside of penetrations.
- B. Flashing height and termination:
1. Extend flashing under metal fascia to the outside nailer face fastened minimum 12 inch OC.
  2. Flashing on walls, parapets and curbed units to extend a minimum of 6 inches above the roof membrane. Install clad metal flashing where the finished flashing height is less than 8 inches.

### 3.08 ADDITIONAL ITEMS

- A. Install walkpad adhered according to the manufacturer's instructions.

1. "Picture frame" all motor driven exhaust fans and all air conditioning units.

### 3.09 FIELD QUALITY CONTROL

- A. Bonding Adhesive: Apply continuous application of bonding adhesive in all instances. Roof membrane and flashing coverage to be 70 square feet per gallon when applied to both surfaces; varies with substrate materials.
- B. Mechanical Fasteners: Used in the attachment of base sheet and wood nailers.
- C. Install the membrane manufacturer's seam caulk at all cut edges of membrane installed in the field of the roof. Seam caulk is not required on vertical cut edge seams.

### 3.10 PROTECTION

- A. Protect completed roof system from damage, the roofing contractor shall coordinate the use of temporary plywood walkways, wood planking and other precautions to protect the roof and other building surfaces from damage.
- B. Owner may engage an independent testing and inspecting agency to perform field inspections and quality assurance tests.
  1. Testing agency will prepare reports stating whether inspected and tested Work complies with or deviates from requirements.
- C. Correct deficiencies in or remove and replace roof membrane that inspections and test reports indicate does not comply with specified requirements.
  1. Membrane shall be fully bonded to the insulation and wrinkles in the sheet caused by lack of adhesion are unacceptable. Any roll that has 5 percent or more unadhered surface area will be removed and replaced.
  2. Wrinkles in field seams are unacceptable and shall be cut out and covered by a membrane patch that extends a minimum of six inches beyond the area of damaged material.
- D. Provide a minimum of two (2) fire extinguishers within 20 feet of each open flame and two (2) fire extinguishers within 20 feet of each rooftop location judged by Owner's Fire Safety Representative to be a possible fire danger.

### 3.11 ADJUSTING and CLEANING

- A. Clean-up: Immediately upon completion of all work specified, the roof and jobsite area shall be cleared of all debris resulting from the Work. Temporary protection shall be removed. Proper disposal of all materials shall be the responsibility of the Contractor.
- B. Stains to the surface of the newly installed roof membrane shall be removed using cleaner recommended by the membrane manufacturer. Heavy stains shall be "spot cleaned" with prior to use of cleaner. Cleaning shall continue until the Design Professional's acceptance is secured.
- C. Damage or staining to the building or grounds resulting from the Work shall be cleaned or corrected to the original condition. Replace landscape plantings damaged during construction with comparable size and quality.

3.12 FINAL INSPECTION

- A. Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Design Professional. Notify Design Professional and Owner 48 hours in advance of the date and time of inspection.

**END OF SECTION**

**SECTION 07620**

**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings and counterflashings.

1.2 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry: Wood nailers.

1.3 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- D. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples, 6" x 6" inch in size illustrating material of typical standing seam.
- C. Samples: Submit two samples 6" x 6" inch in size illustrating metal finish color.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

**PART 2 PRODUCTS**

2.1 SHEET MATERIALS

- A. Pre-Finished Aluminum: ASTM B 209 (ASTM B 209M); 0.032 inch thick; plain finish shop pre coated with fluoropolymer coating of color as selected.
  - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.
  - 2. TPO clad metal scuppers.

2.2 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Sealant: Type as specified in Section 07900.
- D. Plastic Cement: ASTM D 4586, Type I.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION**

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

**END OF SECTION**

**SECTION 07900**

**JOINT SEALERS**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Precompressed foam sealers.
- C. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on the drawings to be sealed or not.

1.2 REFERENCE STANDARDS

- A. ASTM C 834 - Standard Specification for Latex Sealants; 2005.
- B. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.
- C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.

1.4 DEFINITIONS

- A. Substrates:
  - 1. A-type substrates: Metals, porcelain, glazed tile, and smooth plastics.
  - 2. O-type substrates: Wood, unglazed tile, and substrates not included under other categories.
- B. Sealing: Making exterior and interior construction voids, junctions, or joints, air tight, dust tight, and water tight.
- C. Joint Failure: A sealed joint exhibiting one or more of the following:
  - 1. Air or water, or both, infiltration or leakage.
  - 2. Dust infiltration.
  - 3. Sealant material migration.
  - 4. Loss of adhesion to bonded surfaces.
  - 5. Bonding of sealer to joint filler material or bond breaker material.
  - 6. Loss of cohesion.
  - 7. Discoloration or fading.
  - 8. Staining or marring of adjacent work or materials.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with other sections referencing this section.

1.6 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit three samples, 2 inch in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.8 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- B. Do not install sealers if any of the following conditions exist:
  - 1. Air or substrate temperature exceeds the range recommended by the sealer manufacturer or is below 40 degrees F.
  - 2. Substrate is wet, damp, or covered with snow, ice, or frost.
  - 3. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the Architect and get sealer manufacturer's recommendations for alternative procedures.

#### 1.10 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Silicone Sealants:
  - 1. Dow Corning Corp.: [www.dow.com](http://www.dow.com)
  - 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com](http://www.momentive.com).
  - 4. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 5. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - 6. Substitutions: See Section 01600 - Product Requirements.
- B. Polyurethane Sealants:
  - 1. Tremco, Inc.: [www.tremcosealants.com](http://www.tremcosealants.com)
  - 2. Sonneborn, ChemRex, Inc.: [www.chemrex.com](http://www.chemrex.com)
  - 3. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 4. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 5. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - 6. Substitutions: See Section 01600 - Product Requirements.
- C. Butyl Sealants:
  - 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 3. Substitutions: See Section 01600 - Product Requirements.
- D. Acrylic Emulsion Latex Sealants:
  - 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 3. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - 4. Sonneborn, ChemRex, Inc.: [www.chemrex.com](http://www.chemrex.com)
  - 5. A.C. Horn, Inc.
  - 6. DAP, Inc.
  - 7. Substitutions: See Section 01600 - Product Requirements.

#### 2.2 SEALANTS

- A. General Purpose Exterior Sealant: Silicone; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component medium modulus.
  - 1. Color: Standard colors as selected.
  - 2. Product: #795 manufactured by Dow Corning Corp, basis of design
  - 3. Applications: Use for:
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Watertight joints and seams.
    - e. Other exterior joints for which no other sealant is indicated.

- B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
  - 1. Applications: Use for:
    - a. Concealed sealant bead in sheet metal work.
    - b. Concealed sealant bead in siding overlaps.

### 2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### 3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### 3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Perform acoustical sealant application work in accordance with ASTM C 919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.

### 3.4 CLEANING

- A. Clean adjacent soiled surfaces.

### 3.5 PROTECTION

- A. Protect sealants until cured.

**END OF SECTION**



# **PROJECT MANUAL**

## **Conditions of the Contract Specifications**

### *Union County Jail Roof Replacement Blairsville, Georgia*

*October 15, 2020  
Gardner Spencer Smith Tench & Jarbeau, PC  
20116*

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**SECTION 05500**

**METAL FABRICATIONS**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Shop fabricated steel items.

1.2 RELATED REQUIREMENTS

- A. Section 04816 - Masonry Veneer: Placement of metal fabrications in masonry.
- B. Section 09900 - Paints and Coatings: Paint finish.

1.3 REFERENCE STANDARDS

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- B. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.
- C. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- E. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003 (Reapproved 2007).
- F. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2007a.
- G. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2007.
- H. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006 and Errata.
- K. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- M. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

**PART 2 PRODUCTS**

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A 36/A 36M.

- B. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- C. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## 2.2 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## 2.3 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Lintels: As detailed; galvanized finish.

## 2.4 FINISHES - STEEL

- A. Prime paint all steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete or masonry.
- B. Prime Painting: One coat.
- C. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

## 2.5 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

### 3.2 PREPARATION

- A. Clean and stripgalvanized items where site welding is required.

### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

Union County Jail  
Roof Replacement  
GSSTJ Project No. 20116

**METAL FABRICATIONS**

05500-3  
Issued: 10/15/20

**END OF SECTION**

**SECTION 06100**

**ROUGH CARPENTRY**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Roofing nailers.
- E. Preservative treated wood materials.
- F. Fire retardant treated wood materials.
- G. Miscellaneous framing and sheathing.
- H. Communications and electrical room mounting boards.
- I. Concealed wood blocking, nailers, and supports.
- J. Miscellaneous wood framing accessories, nailers, furring, and grounds.

1.2 REFERENCE STANDARDS

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2001.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.
- E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- F. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- G. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.
- H. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2007.
- I. PS 1 - Structural Plywood; 2007.
- J. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

1.3 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
1. Species: Douglas Fir-Larch, unless otherwise indicated.
  2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

### 2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Stud Framing (2 by 2 through 2 by 6 ):
1. Species: Douglas Fir-Larch.
  2. Grade: No. 2.
- D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 ):
1. Species: Douglas Fir-Larch.
  2. Grade: No. 1 & Btr.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.

### 2.3 CONSTRUCTION PANELS

- A. Roof Sheathing: APA PRP-108/APA PRPR-108, Form B455, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
1. Span Rating: 24/0.
  2. Thickness: 5/16 inch, nominal.
- B. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
- C. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84.

### 2.4 ACCESSORIES

- A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A 653/A 653M.
- C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A 653/A 653M.
- D. Sill Flashing: As specified in Section 07620.
- E. Building Paper: Water-resistant Kraft paper.

### 2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood

treatments determined by use categories, expected service conditions, and specific applications.

1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards.
- B. Fire Retardant Treatment:
1. Interior Type A: AWWPA Use Category UCFA, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated .
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with masonry or concrete.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Coordinate installation of rough carpentry members specified in other sections.

#### **3.2 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

#### **3.3 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

#### **3.4 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can



be securely fastened to two or more studs or other method of support is explicitly indicated.

- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Specifically, provide the following non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Chalkboards and marker boards.
  - 8. Joints of rigid wall coverings that occur between studs.

### 3.5 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

### 3.6 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. Nail panels to framing; staples are not permitted.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

### 3.7 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### 3.8 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01732.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 07540**

**TPO ROOFING**

**PART I GENERAL**

1.01 SUMMARY

A. General

1. Work in contract does not include any asbestos abatement.

B. Base Bid

1. Install new isocyanurate insulation in 2 layers with minimum thickness to meet minimum R-value and manufacturer's 1/2 inch cover board. Install tapered insulation crickets between drainage points.
3. Install new insulation of sufficient thickness to in-fill areas where insulation and/or deck replacement has been done.
4. Install the specified fully adhered TPO membrane system.
5. Picture frame motorized RTUs with protection pad.
6. Install new metals per plans and specifications.

1.02 RELATED SECTIONS

C. Section 06100 – ROUGH CARPENTRY

D. Section 07620 - FLASHING AND SHEET METAL

E. Section 07900 – JOINT SEALERS

1.03 SUBMITTALS

A. General: Submit in electronic format under provisions of Section 01300. When several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among those named. When either a single named product or system is specified, substitutions will be allowed only if the specified product or system becomes unavailable through no fault of the Contractor.

B. Bid submittal

1. Statement of manufacturer's product and name of the subcontractors the bid is based upon. Product and subcontractors are not to be changed unless unavailable at no fault of the bidder.

C. Required Contractor Submittal Items:

1. Product data sheets for each material required, including:
  - a. Thermoplastic single ply membrane.
  - b. Caulks and sealant.
  - c. Bonding adhesive.
  - d. Clad metal flashing.

- e. Insulation.
  - f. Insulation adhesive.
  - g. Metal accessories.
- 2. Samples: not required.
  - 3. Shop Drawings: Roof plan showing tapered insulation sloped to drain.
  - 4. Written certification from the primary roof system manufacturer that the specification is acceptable and stating their intent to supply the specified warranty at the successful completion of Work.
  - 5. Warranty Specimens:
    - a. Sample copy of Manufacturer's specified roofing warranty stating obligations, remedies, limitations, and exclusions of warranty.
    - b. Certified letter indicating intent to supply Contractor Warranty from Section 017800 at the completion of work.
  - 6. Schedule of Values, refer to Section 01230.
- D. Manufacturer's Material Safety Data Sheets (MSDS) to be maintained by the Contractor at the worksite at all times.
- E. Submit proposed substitution a minimum of 10 days prior to bid date.
- 1. Latest edition of manufacturer's application instructions. Descriptive list of materials proposed and certificate of analysis reporting tested values of physical properties meet or exceed specified materials. Letter signed by manufacturer's corporate officer certifying that system and individual components meet all specification requirements. Make substitution request using the Construction Specifications Institute (CSI) Form 1.5C "Substitution Request (During the Bidding Stage)".
  - 2. Reference list of no less than 5 completed projects of similar scope and no less than 5 successful projects a minimum of 5 years old with the requested substitution roof system within 100 miles of the specified project jobsite.
- F. When several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among those named. When either a single named product or system is specified, substitutions will be allowed only if the specified product or system becomes unavailable through no fault of the Contractor.

#### 1.04 QUALITY ASSURANCE

- A. Roofing system shall be Underwriters Laboratory (UL) Class A listed.
- B. The Contractor shall be trained and demonstrate proficient experience in the application of the specified materials having installed no less than three projects of similar scope within the past year. The Contractor shall be approved prior to bid date to install the materials of the specified manufacturer.
- C. Pre-construction conference: Prior to the start of work, a conference to be attended by all affected parties shall be held at the jobsite with the intent of coordinating activities to minimize disruptions to the building tenants. Roofing foreman and Sheet metal foreman shall be present.
- D. Inspection: Upon completion of the installation, an inspection shall be made by the Owner's representative to ascertain that the materials have been installed according to approved specifications and details. The inspection shall be scheduled only after receipt, by the Design

Professional, of the Contractor's completed punch list. Upon approval of the project, the required warranties shall be issued.

- E. Changes: Contractors are required to bid each listed line item as specified.
- F. Applicable standards:
  - 1. Standards of the American Society for Testing and Materials (ASTM) as referenced herein.
  - 2. National Roofing Contractors Association (NRCA) "Roofing and Waterproofing Manual", fourth edition.
  - 3. State of Georgia, EPA and local building codes with regard to asbestos abatement shall be included as part of this specification.
  - 4. Occupational Safety and Health Administration (OSHA) "Interim fall protection guidelines for residential construction", dated December 8, 1995 or most current standard.
  - 5. "The International Building Code", 2006 edition, as published by the International Code Congress, Inc. and applicable local and State amendments.
  - 6. "Manual of Practice", published by the Construction Specifications Institute (CSI), copyright 1996.
  - 7. ASTM Standard D6878-11a.
- G. The application specifications of each material manufacturer's product shall be considered part of this specification and be followed if it is judged to be of higher quality in the completed roof system. In the event of a discrepancy between this specification and the manufacturer's specification, the Design Professional shall be the sole judge as to which procedure to follow. The roofing contractor shall contact the Design Professional noting any discrepancy a minimum of three days prior to the bid date.
- H. Products or materials containing asbestos are not acceptable for use on the project.

#### 1.05 WARRANTY

- A. General: Warranty shall be provided at no additional expense to the Owner.
- B. Provide a 20 year manufacturer's non-prorated warranty for single ply roofing system and roof insulation. Warranty shall cover labor and materials to correct leaks and defects encountered during the warranty period and shall take effect on the date of final completion. Warranty shall not be voided by emergency leak repairs or by ponding water conditions.
- C. The warranty term shall be 5 years correcting leaks and defects resulting from workmanship on all installed materials. Contractor shall respond with correcting action within 24 hours of Owner's call.

#### 1.06 SITE CONDITIONS

- A. Install roofing in dry weather when ambient temperature is above 40 degrees F.
- B. All roof surfaces shall be free of ponded water, ice, snow and other forms of moisture during installation.
- C. Protective tarps are required to cover materials stored out in the weather. These materials must be on pallets or blocking to raise them a minimum of 4 inches above any ponding water. Packaging labels shall indicate appropriate warnings, storage conditions, lot numbers, and usage instructions.

- D. Contractor shall field verify all dimensions. Roof Top Units (RTU) and penetration conditions shown on the roof drawings are representative of the conditions on the building. Contractor shall field verify the existing conditions.
- E. Bonding adhesive shall be stored in conditions that maintain a minimum temperature of 60 degrees F. With the Owner's permission, adhesive may be stored inside of the heated building or a temporary heated storage area.

1.07 DEFINITIONS

- A. Contractor: The business entity providing all labor, materials, equipment and services to complete the Work as specified in the Contract Documents.
- B. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.
- C. Ponding water shall be considered to occur when free water remains on the roof longer than 48 hours.
- D. Leaks in the roof system shall be considered to occur when free water enters the roof assembly from defects in the waterproofing integrity of the installed roofing materials.

1.08 PRECAUTIONS

- A. Adhesives, primer and caulks as indicated are extremely flammable and/or toxic. Use precautions indicated by manufacturer.
- B. Surfaces to be bonded shall be dry and clean. Suitable surfaces are usually considered to be smooth, solid masonry, wood, metal and cellular insulating concrete that is considered water resistant and accepted for application by membrane manufacturer.
- C. All fasteners shall be installed with depth-sensing screw guns to prevent overdriving.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. General: All material shall be furnished, specified or approved in writing by the membrane manufacturer.
- B. Available Manufacturers: Subject to compliance with requirements, Carlisle Syntec, Firestone and Johns Manville TPO products are approved.
- C. Requests for approved substitutions must be made in writing no later than 10 days prior to bid date. Submit complete product and test data as specified under Submittals for each proposed substitution.

2.02 MEMBRANE: Membrane shall be .060 inch nominal thickness, scrim-reinforced white thermoplastic non-curing single ply, minimum 72.5 in. wide by appropriate length with the following minimum physical properties:

Table: Physical properties of membrane

Physical Property	Test Method	Specification
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Weight, minimum	ASTM D-751	0.43 lbs/sf
Thickness tolerance	ASTM D-751	60 mil nominal
Breaking Strength	ASTM D-751	275 lbs min.
Tear Strength	ASTM D-751	55 lbs min.
Low Temperature Bend	ASTM D-2136	Pass, -40 F (-40C) Pass 1/8 in. mandrel
Shore A Hardness	ASTM D-2240	80 +- 5
Heat Aging	ASTM D-573	7 days maintains 100% @ 200 F of original
Volatility, max. loss	ASTM D-1203A	0.5%
Hydrostatic res., min.	ASTM D-751A	300 psi
Ozone resistance *	ASTM D-1149	no effect 3 ppm @ 30% strain @ 104 F: 72 & 2500 hrs.
Emmaqua 3 million lang.	ASTM E-838	no visible surface cracking
Dimensional stability	ASTM D-1204	24 hrs 0.1% @ 129.2 F
Puncture Res., min.	FTM 101 B,	#2031 325 lbs

\* Test performed on non-reinforced material only.

## 2.03 RELATED MATERIALS

- A. Flashing: Flashing shall be same membrane as in 2.02 except for perimeter use of sheet metal Membrane Clad Metal. Unreinforced .055 in. thick membrane shall be supplied for field fabricated vent stacks, pipes and corners or as premolded accessories. Membrane shall be compatible for direct contact with bitumen materials (asphalt and coal tar pitch) or suitable separation shall be provided.
- B. Bonding Adhesive: Membrane manufacturer Bonding Adhesive shall be provided to hold field sheet and flashing in place. Not to be used in the seams.
- C. Perimeter Half Sheets: Not required with fully adhered systems.
- D. All Purpose Sealant: Provided to serve as water cut-off mastic, pitch-pan sealer and as a caulk to seal membrane to metal.
- E. Primer and Solvent: Primer and Solvent are provided for purposes of preparing membrane for hot-air welding.
- F. Seam Caulk: Seam Caulk shall be provided for the purpose of sealing any cut edge of reinforced membrane.
- G. Overnite Seal: Tie-off that are effective in preventing moisture penetration under newly installed membrane shall be made at the end of each workday and when weather threatens.
- H. Termination Bar: Used in the exposed attachment of flashing materials. Extruded aluminum bar with formed caulk edge with pre-drilled holes spaced 6 inches OC. Bar size 1/8 inch thick, 1 inch x 10 foot lengths.
- I. Walkpad: Manufactured by the primary roof membrane supplier and used for the protection of roof membrane and base flashing. The approximate size shall be 30 x 30 x 5/16 inches.
- J. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

## 2.04 INSULATION MATERIALS

- A. Rigid isocyanurate foam insulation board with factory bonded fiberglass facers as approved by the membrane manufacturer and manufactured in compliance with ASTM C1289-95. Minimum compressive strength 20 psi, Moisture absorption <1%, dimensional stability 2% maximum linear

change when conditioned at 158 F and 97% relative humidity for seven days. UL Class A listed and FM Class 1 approved. Curing time shall be 24 hours minimum, plus an additional 24 hours minimum per 1 inch of thickness at a minimum of 60F degrees before shipment from the manufacturer.

1. Thickness to achieve a minimum of R-25 per requirements of the 2012 International Energy Conservation Code.
  2. Size per manufacturer's standards
  3. Tapered insulation crickets and saddles shall be ½ inch minimum thickness with slope shown on the drawings.
- B. Insulation Adhesive: Basis of design: "Insta-Stik" one part urethane adhesive as manufactured by, Dow Chemical Corp., 800/800-3626, OlyBond 500 Adhesive as supplied by Olympic Fasteners or Carlisle, Firestone or Manville membrane manufacturer's similar component product.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine all substrates, areas, and conditions under which roofing will be applied, for compliance with requirements. Verify that positive slope to drain exists on each roof area.
- B. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thickness of insulation required.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Block off or shut down air intake locations where odor may be drawn into building ventilation systems during application. Coordinate with the building's representative.
- C. Verify that the height of curbed units are a minimum of 4 inches above the finished roof height.

#### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install single roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of NRCA "Roofing and Waterproofing Manual, fourth edition."
- B. Cooperate with inspecting and testing agencies engaged or required to perform services for installing single ply roofing membrane system.
- C. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
  1. Provide cutoffs at end of each day's work to cover exposed insulation with a temporary water tight seal acceptable to the membrane manufacturer. Spud gravel from the BUR roof area where the tie-in will be made.

2. Complete terminations and base flashing and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.
4. Inspect all roof drains at the completion of work to assure that water flows correctly. Replace all missing or damaged components. Notify the Design Professional of any drainage problem conditions prior to the final inspection of the Work.

### 3.05 INSULATION SYSTEM APPLICATION

#### A. General:

1. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
2. Comply with roofing system manufacturer's written instructions for installing roofing insulation.
3. Install insulation under area of roofing to conform to slopes indicated and to Roof Drawings.

#### B. Install required insulation materials (base and cover board) in 3 layers with long joints of insulation in continuous straight lines with end joints staggered approximately $\frac{1}{2}$ the board length between rows, abutting edges and ends between boards. Fill gaps exceeding $\frac{1}{4}$ inch (6 mm) with insulation.

1. Cut and fit insulation within  $\frac{1}{4}$  inch (6 mm) of nailers, projections, and penetrations.

#### C. Attachment

1. Mechanically fasten the two base layers of insulation to the deck per the manufacturer's recommendations. Install high density  $\frac{1}{2}$ " cover board in insulation adhesive. Apply adhesive according to the manufacturer's instructions. Apply a minimum  $\frac{3}{4}$  inch diameter bead at an application rate of one lineal foot per square foot of insulation board.
2. Insulation board must be completely embedded in the adhesive and compressed to obtain acceptable attachment. It will be necessary to place secondary weight on each insulation board to maintain compression during the "set up" stage of adhesive curing.
  - a. Corners are defined as the area 8 feet from two connected walls. Adhesive beads shall be 6 inches OC.
  - b. Perimeter is defined as the area 8 feet from a side wall. Adhesive beads shall be 9 inches OC.
  - c. Field of the roof is defined as the roof area inside corners and perimeters. Adhesive beads shall be 12 inches OC.

### 3.06 ROOF MEMBRANE INSTALLATION

#### A. General: Install membrane according to roofing system manufacturer's written instructions, starting at low point of roofing system. Terminate field sheets at the base of parapet walls or curbs.

1. Align sheets without stretching. Membrane shall be unrolled on an area to be covered with adjoining rolls of membrane overlapped and installed in shingle fashion to shed water.
2. Membrane shall be overlapped and hot-air welded. Detail work and repairs can be done with a hand welder, however, automatic welders are to be used for field seaming. Heat weld seams according to the manufacturer's recommendations and with a minimum weld width of 1  $\frac{1}{2}$  inches.



3. The entire lap must be probed each day soon after it has cooled to verify that the welder set-up is effective. The membrane must be allowed to cool. Cut edges shall be caulked by applying Seam Caulk.
  4. The top surface of the membrane shall be kept clean during installation. Any adhesive, bitumen stains or other foreign materials shall be cleaned from the membrane on a daily basis.
- B. Roof membrane is to be completely adhered to the insulation substrate without voids or wrinkles. Bonding adhesive shall be applied to the top surface of the substrate material and the underside of the roof membrane.
- C. Position membrane rolls so that no longitudinal seam results in the drain valley. Use a full roll centered in the valley line.
- D. Contractor shall use a water-filled, foam covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

### 3.07 BASE FLASHING AND STRIPPING INSTALLATION

- A. Perimeter and other details shall be flashed as shown. Membrane shall be mechanically fastened 12 inches OC into wood nailers. Each roof section shall be completely sealed; no flashing shall be left in an open condition at the end of work each day.
1. Base Flashing:
    - a. Membrane shall be mechanically fastened into deck. Fastening shall occur at parapet wall, curbs, skylights, expansion joints and any other roof penetrations that exceed 24 inches in dimension.
    - b. Install clad metal flashing fastened into wood nailers with two rows of annular ring nails spaced 4 inches OC. Space metal sections  $\frac{1}{4}$  inches apart. Cover the gap with 2 inch wide aluminum tape. Install 4 inch wide membrane flashing hot air welded over the joint. Apply tape sealant to the back of the metal and tool the sealant installed at the top of the metal.
  2. Curbs: Extend a separate membrane flashing vertically up the parapet wall, across the top and a minimum of 1 inch below the nailer's bottom edge. All seams shall be hot air welded.
  3. Bonding Adhesive shall be applied to both the substrate and the membrane and allowed to dry to finger touch until it does not string or stick.
  4. All flashing shall be mechanically fastened at the top, under or through appropriate counter flashing, with approved fasteners as shown in detail drawings. Laps shall extend a minimum of 2 1/2 in. beyond fasteners onto field sheet.
  5. Gravel stop and drip edge stripping shall be hot air welded to roof membrane. Use of self adhesive stripping is not acceptable.
  6. Apply the membrane manufacturer's recommended primer to the inside face of metal pitch pans and around the outside of penetrations.
- B. Flashing height and termination:
1. Extend flashing under metal fascia to the outside nailer face fastened minimum 12 inch OC.
  2. Flashing on walls, parapets and curbed units to extend a minimum of 6 inches above the roof membrane. Install clad metal flashing where the finished flashing height is less than 8 inches.

### 3.08 ADDITIONAL ITEMS

- A. Install walkpad adhered according to the manufacturers instructions.

1. "Picture frame" all motor driven exhaust fans and all air conditioning units.

### 3.09 FIELD QUALITY CONTROL

- A. Bonding Adhesive: Apply continuous application of bonding adhesive in all instances. Roof membrane and flashing coverage to be 70 square feet per gallon when applied to both surfaces; varies with substrate materials.
- B. Mechanical Fasteners: Used in the attachment of base sheet and wood nailers.
- C. Install the membrane manufacturer's seam caulk at all cut edges of membrane installed in the field of the roof. Seam caulk is not required on vertical cut edge seams.

### 3.10 PROTECTION

- A. Protect completed roof system from damage, the roofing contractor shall coordinate the use of temporary plywood walkways, wood planking and other precautions to protect the roof and other building surfaces from damage.
- B. Owner may engage an independent testing and inspecting agency to perform field inspections and quality assurance tests.
  1. Testing agency will prepare reports stating whether inspected and tested Work complies with or deviates from requirements.
- C. Correct deficiencies in or remove and replace roof membrane that inspections and test reports indicate does not comply with specified requirements.
  1. Membrane shall be fully bonded to the insulation and wrinkles in the sheet caused by lack of adhesion are unacceptable. Any roll that has 5 percent or more unadhered surface area will be removed and replaced.
  2. Wrinkles in field seams are unacceptable and shall be cut out and covered by a membrane patch that extends a minimum of six inches beyond the area of damaged material.
- D. Provide a minimum of two (2) fire extinguishers within 20 feet of each open flame and two (2) fire extinguishers within 20 feet of each rooftop location judged by Owner's Fire Safety Representative to be a possible fire danger.

### 3.11 ADJUSTING and CLEANING

- A. Clean-up: Immediately upon completion of all work specified, the roof and jobsite area shall be cleared of all debris resulting from the Work. Temporary protection shall be removed. Proper disposal of all materials shall be the responsibility of the Contractor.
- B. Stains to the surface of the newly installed roof membrane shall be removed using cleaner recommended by the membrane manufacturer. Heavy stains shall be "spot cleaned" with prior to use of cleaner. Cleaning shall continue until the Design Professional's acceptance is secured.
- C. Damage or staining to the building or grounds resulting from the Work shall be cleaned or corrected to the original condition. Replace landscape plantings damaged during construction with comparable size and quality.

### 3.12 FINAL INSPECTION

- A. Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Design Professional. Notify Design Professional and Owner 48 hours in advance of the date and time of inspection.

**END OF SECTION**

**SECTION 07620**

**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings and counterflashings.

1.2 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry: Wood nailers.

1.3 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- D. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples, 6" x 6" inch in size illustrating material of typical standing seam.
- C. Samples: Submit two samples 6" x 6" inch in size illustrating metal finish color.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

**PART 2 PRODUCTS**

2.1 SHEET MATERIALS

- A. Pre-Finished Aluminum: ASTM B 209 (ASTM B 209M); 0.032 inch thick; plain finish shop pre coated with fluoropolymer coating of color as selected.
  - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.

2.2 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Sealant: Type as specified in Section 07900.
- D. Plastic Cement: ASTM D 4586, Type I.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

**PART 3 EXECUTION**

3.1 INSTALLATION

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

**END OF SECTION**

**SECTION 07900**

**JOINT SEALERS**

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Precompressed foam sealers.
- C. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on the drawings to be sealed or not.

1.2 REFERENCE STANDARDS

- A. ASTM C 834 - Standard Specification for Latex Sealants; 2005.
- B. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.
- C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.

1.4 DEFINITIONS

- A. Substrates:
  - 1. A-type substrates: Metals, porcelain, glazed tile, and smooth plastics.
  - 2. O-type substrates: Wood, unglazed tile, and substrates not included under other categories.
- B. Sealing: Making exterior and interior construction voids, junctions, or joints, air tight, dust tight, and water tight.
- C. Joint Failure: A sealed joint exhibiting one or more of the following:
  - 1. Air or water, or both, infiltration or leakage.
  - 2. Dust infiltration.
  - 3. Sealant material migration.
  - 4. Loss of adhesion to bonded surfaces.
  - 5. Bonding of sealer to joint filler material or bond breaker material.
  - 6. Loss of cohesion.
  - 7. Discoloration or fading.
  - 8. Staining or marring of adjacent work or materials.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with other sections referencing this section.

1.6 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit three samples, 2 inch in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.8 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- B. Do not install sealers if any of the following conditions exist:
  - 1. Air or substrate temperature exceeds the range recommended by the sealer manufacturer or is below 40 degrees F.
  - 2. Substrate is wet, damp, or covered with snow, ice, or frost.
  - 3. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the Architect and get sealer manufacturer's recommendations for alternative procedures.

#### 1.10 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Silicone Sealants:
  - 1. Dow Corning Corp.: [www.dow.com](http://www.dow.com)
  - 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com](http://www.momentive.com).
  - 4. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 5. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - 6. Substitutions: See Section 01600 - Product Requirements.
- B. Polyurethane Sealants:
  - 1. Tremco, Inc.: [www.tremcosealants.com](http://www.tremcosealants.com)
  - 2. Sonneborn, ChemRex, Inc.: [www.chemrex.com](http://www.chemrex.com)
  - 3. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 4. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 5. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - 6. Substitutions: See Section 01600 - Product Requirements.
- C. Butyl Sealants:
  - 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 3. Substitutions: See Section 01600 - Product Requirements.
- D. Acrylic Emulsion Latex Sealants:
  - 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 3. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - 4. Sonneborn, ChemRex, Inc.: [www.chemrex.com](http://www.chemrex.com)
  - 5. A.C. Horn, Inc.
  - 6. DAP, Inc.
  - 7. Substitutions: See Section 01600 - Product Requirements.

#### 2.2 SEALANTS

- A. General Purpose Exterior Sealant: Silicone; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component medium modulus.
  - 1. Color: Standard colors as selected.
  - 2. Product: #795 manufactured by Dow Corning Corp, basis of design
  - 3. Applications: Use for:
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Watertight joints and seams.
    - e. Other exterior joints for which no other sealant is indicated.

- B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
  - 1. Applications: Use for:
    - a. Concealed sealant bead in sheet metal work.
    - b. Concealed sealant bead in siding overlaps.

### 2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### 3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### 3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Perform acoustical sealant application work in accordance with ASTM C 919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.

### 3.4 CLEANING

- A. Clean adjacent soiled surfaces.

### 3.5 PROTECTION

- A. Protect sealants until cured.

**END OF SECTION**