

ADDENDUM 1

DATE: October 22, 2014
PROJECT: CYF Roof Replacement
RFP NO: RFP 744-R1505 CYF Roof Replacement
OWNER: The University of Texas Health Science Center at Houston
TO: Prospective Proposers

This Addendum forms part of and modifies Proposal Documents dated, October 22, 2014, with amendments and additions noted below.

1. **Section 5.3 – Project Description and Scope of Work – (Changes / Additions)**

See attached Walter P. Moore Addendum 001 included below.

END OF ADDENDUM 1

WALTER P MOORE

Addendum

Project: UT Health Cyclotron Facility Roofing Repairs
6431 Fannin
Houston, Texas 77030

Addendum No: 001

Issue Date: 06/14/13

Owner: Mr. William Stewart
UT Health
7000 Fannin, Suite M100
Houston, Texas 77030

Addendum Issued by: Walter P Moore
1301 McKinney, Suite 1100
Houston, Texas 77010

Note: This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents as noted below. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may subject Bidder to disqualification.

Additions to Original Contract Documents:

SPECIFICATIONS:

1. Section 000110 – Table of Contents: **Replace with new section attached.** Added Section 077100 – Roof Specialties
2. Section 011000 – Task Items: **Replace with new section attached.** Added Task Item 1.2, Fall Protection System, and Task Item 5.2, Access Ladder.
3. Section 076200 – Sheet Metal Flashing and Trim: **Replace with new section attached.** Added parapet coping flashing requirements.
4. Section 077100 – Roof Specialties: **Add new section, attached.**

DRAWINGS:

1. Sheet S-0.0 – Cover, Site Map, Sheet Index, Task Items: **Replace with new sheet attached.** Updated Task Item table and Sheet Index.
2. Sheet S-0.2 – General Notes (Continued): **Replace with new sheet attached.** Updated General Notes and Symbol Legend for Roof Plans.
3. Sheet S-2.2 – Roof Plan-Replacement: **Replace with new sheet attached.** Altered detail at heated vent stack. Added parapet coping to the top of the precast parapets. Added joint sealant repair at window frame. Added permanent fall protection guard rail and access ladder.
4. Sheet S-3.4 – Flashing at Heated Vent Stack, Parapet Coping: **Add sheet to the construction documents.**
5. Sheet S-3.5 – Guard Rail Details: **Add sheet to the construction documents.**
6. Sheet S-3.6 – Access Ladder Details: **Add sheet to the construction documents.**

Issued by: Walter P Moore and Associates



Project Manager: Kimani Augustine, P.E.

SECTION 000110

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END OF SECTION 000110

SECTION 011000

TASK ITEMS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section is for the convenience of the Contractor only and shall not be construed as a complete accounting of all work to be performed.
- B. The extent of the Task Items is indicated on the drawings and by the requirements of each section of the specifications.
- C. **Field Verification:** The Contractor shall examine the site and shall be responsible for verifying all existing construction, conditions, and dimensions. No extra payment will be considered for work additional to that shown or noted, if such work would have been apparent in an inspection of the premises.
- D. **Coordination:** Coordinate the work throughout the duration of the project as to minimize disruption of facility operations.
 - a. As indicated in certain task items below which require Engineer review of existing conditions, provide Engineer minimum 7 working days notice to prevent delays to construction.
- E. **Unit Price Work:** Several task items below include instructions for performing work per unit price. Contractor shall include in the Base Bid a cost for performing the number of units assumed in the Task Item. Contractor shall also provide an Add/Deduct cost for performing a single unit of the work. The Base Bid amount will be adjusted using this Add/Deduct cost according to actual work units completed.

PART 2 – PRODUCTS (See EXECUTION section)

PART 3 – EXECUTION

3.1 TASK ITEM (T.I.) – DESCRIPTION – **BASE BID**
UTHSCH CYF ROOFING REPAIRS

T.I. 1.1 PROJECT MOBILIZATION AND GENERAL CONDITIONS

A. Scope of Work

1. Work consists of coordinating, scheduling, obtaining and assembling at construction site all equipment, materials, permits, supplies, manpower and other essentials and incidentals necessary to perform Work.
2. Coordinate all aspects of work with Owner and all trades.
3. Provide protective measures in and around the building as directed by the Owner prior to beginning work. The Contractor shall take measures as necessary to keep access to the building free and clear of all hazards.
4. **Contractor is advised that the roof does not have OSHA compliant parapet walls or fall protection systems. Fall protection must be installed prior to performing any work on the roof and must remain in place for the duration of the repairs.**
5. Perform disruptive or noisy work during times indicated by Owner. Coordinate with Owner if weekend or evening hours are required.
6. Salvage existing material which has been indicated for reinstallation according to work items below. Store salvaged materials in clean, dry locations and protect from moisture, extreme temperatures, and direct sunlight.
7. Properly dispose of all debris and waste construction materials in accordance with all applicable laws and regulations.

B. Materials

1. Not Applicable.

C. Repair Drawings and Specifications

1. Not Applicable

T.I. 1.2 FALL PROTECTION SYSTEM

A. Scope of Work

1. **Provide a railing system that meets the performance requirements outlined in the specifications and drawings.**
2. **Install new railing system per OSHA requirements. See roof plans for locations.**
3. **Load test and certify new railing system to meet OSHA requirements.**

B. Materials

1. **See Specification Section “Roof Specialties” for material requirements.**

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for locations of work.
2. Refer to Sheet S-3.5 for installation details.
3. Refer to specification sections "Roof Specialties" and to General Notes and drawings for work requirements, performance requirements, materials, and procedures.

T.I. 2.1 DEMOLITION AND SUBSTRATE PREPARATION

A. Scope of Work

1. Work consists of coordinating, scheduling, obtaining and assembling at the construction site all equipment, materials, permits, supplies, manpower and other essentials and incidentals necessary to perform Work.
2. Coordinate all aspects of demolition work with Owner's Representative and all other trades.
3. Provide protective measures in and around the building as directed by the Owner's Representative prior to beginning roofing work. The building will be in use throughout the project with public traffic in and out continuously. The contractor shall take measures as necessary to keep access to the building free and clear of all hazards.
4. Interior Protection: Contractor is to include in their bid all costs and equipment required to protect interior of building from water infiltration and debris that could enter the building during this work. This includes plastic drape dust protection and protection of all interior finishes and furniture. The contractor shall clean all areas affected by any interior operations. Where curbs are being removed and existing openings filled in, provide protection in the area below the work area and coordinate the work with the facilities management so that personnel in affected areas can be notified.
5. Existing roofing system:
 - a. Hot-applied asphalt built-up roofing membrane
 - b. 1-1/2" polyisocyanurate insulation
 - c. Hot-applied asphalt built-up vapor barrier
 - d. Concrete structural roof, sloped to drains
6. Remove all existing roofing and insulation down to the concrete structural roof. Tear off all base flashings. Remove all existing wood and fiber cants at base of curbs and walls.
7. Remove obsolete roof penetrations and curbs identified on the roof plan or as otherwise directed by Owner or Engineer. Where curbs and supports are removed, patch or fill in the metal deck as required. Contractor shall coordinate equipment removal with the Owner. Contractor shall perform all necessary service disconnects and relocations as may be required.
8. Contractor shall inspect the condition of the concrete structural roof. Where spalling or other distress or deterioration of the concrete is observed, contact the Engineer immediately for review. **Do not proceed**

with roofing work until provided further direction in writing by Engineer.

9. Remove and dispose of existing sheet metal.
10. Remove all debris from roof area and properly dispose of all materials off site.
11. At the end of each day, ensure that all drains are in proper working order and that drain lines are clear to the first elbow and downspouts are completely clear. Implement any required corrective measures before leaving the job site that day.

B. Materials

1. Not Applicable.

C. Drawings and Specifications

1. Refer to Sheet S-2.1 for location of work.
2. Refer to specification section "Selective Demolition" for work requirements, materials, and procedures.

T.I 3.2 DECK REPAIR/REPLACEMENT – PATCH CONCRETE DECK

A. Scope of Work

1. Work consists of repair and/or replacement of damaged, spalled, or otherwise deteriorated concrete roof deck.
2. Contractor shall locate and mark all work areas as specified in Section "Surface Preparation for Patching." Marking will be done with methods approved by Engineer and Owner. Contractor shall identify all critical repair work areas before starting the work.
3. Procedure for delaminated, spalled, and unsound concrete removal shall be as specified in Section "Surface Preparation for Patching."
4. All steel exposed within cavities shall be cleaned to bare metal by abrasive methods or other approved methods as specified in Section "Surface Preparation for Patching."
5. Exposed wire mesh with concrete cover less than 1-inch shall be removed. Consult with Engineer prior to any removal of reinforcement.
6. Exposed steel shall be epoxy coated with an approved epoxy product as specified in Section "Surface Preparation for Patching."
7. Contractor shall prepare cavities for repair placement as specified in Section "Surface Preparation for Patching."
8. Patch installation procedures shall be in accordance with referenced specifications for selected material.
9. For bidding purposes, the contract price will include the following allowances for this task item repair, to be adjusted by unit costs listed in Owner's bid form:
 - a. 100 SF

B. Materials

1. Epoxy coating material
2. Polymer modified cementitious patching mortar.

C. Drawings and Specifications

1. Refer to Detail 1/S-3.3 of Drawings for repair details.
2. Refer to specification sections "Surface Preparation for Patching" and "Concrete Repair Materials" for work requirements, materials, and procedures.

T.I. 5.1 CROSSOVER BRIDGES

A. Scope of Work

1. Work consists of the installation of new pre-engineered crossover bridge at elevated piping and mechanical equipment on the roof. Bridge shall be engineered to support the live load requirements provided on Sheet S-0.1 of the Drawings in accordance with all relevant codes and regulations.
2. New bridge shall be 6 feet wide minimum and provide a minimum of 4 inches clearance above the elevated piping and mechanical equipment at the location show on the Plan Sheets. Field verify all dimensions prior to fabrication/purchase of bridge.
3. Submit shop drawings or product data to Engineer for review prior to fabrication/purchase of bridges.
4. Bridge shall be pre-fabricated and all tubular members shall be capped and fully sealed prior to installation. Field welding shall not be allowed.
5. Install new bridges and anchors in compliance with all OSHA and ADA requirements. See plans for locations of work.
6. New bridge supports shall not penetrate into the roofing system. Install sacrificial cap sheet where new bridge supports will bear on new roofing membrane.

B. Materials

1. Metal bridge assembly shall be hot-dipped galvanized steel. Refer to General Notes on Sheet S-0.1 of Drawings.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.

T.I. 5.2 ACCESS LADDER

A. Scope of Work

1. **Work consists of the installation of new pre-engineered access ladder at the transition between the upper and lower portions of the roof. The ladder shall be engineered to support the live load**

requirements provided on Sheet S-0.1 of the Drawings in accordance with all relevant codes and regulations.

2. New ladder shall comply with all OSHA and ANSI A14.3 requirements including but not limited to ladder widths, extension heights, rung spacing.
3. Submit shop drawings or product data to Engineer for review prior to fabrication/purchase of ladders.
4. Ladder shall be pre-fabricated and all tubular members shall be capped and fully sealed prior to installation. Field welding shall not be allowed.
5. Install sacrificial cap sheet where new ladder supports will bear on new roofing membrane (if applicable).

B. Materials

1. See Specification Section "Roof Specialties" for material requirements.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.
2. Refer to Sheet S-3.6 for installation details
3. Refer to specification sections "Roof Specialties" and to General Notes and drawings for work requirements, performance requirements, materials, and procedures.

T.I. 6.1 ROUGH CARPENTRY

A. Scope of Work

1. Work consists of installation of lumber nailers, sleepers, curbs, and edging as required for installation of new roofing system. For bidding purposes, assume 10% of all existing lumber will require replacement.
2. Install replacement nailers where deteriorated components were removed or new nailers as indicated by project details. Add nailers along roof edges to accommodate new insulation board.
3. Install new curbs and platforms as necessary to provide a minimum of 8 inch freeboard as required by the membrane manufacturer.

B. Materials

1. Lumber and plywood.
2. Fasteners, sealants, and other accessories.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.
2. Refer to Sheets S-3.0 through S-3.2 for installation details.
3. Refer to specification section "Rough Carpentry" for work requirements, materials, and procedures.

T.I. 6.2 AIR BARRIER

A. Scope of Work

1. Work consists of installing an air barrier layer over the structural metal roof slab.
2. Install a continuous 1/4-inch thick cover board direct to the concrete roof. Cover board shall be adhered to the concrete.
3. Install a 120-mil modified bitumen base sheet on top of the cover board substrate in accordance with the membrane manufacturer's instructions. Nominal sheets will not be acceptable. Fully adhere in cold adhesive or, if acceptable to Owner, air barrier may be torch applied. Electric heat weld all seams.
6. Cover board and base sheet attachment to substrate shall be designed to resist the following wind uplift pressures based on ASCE 7:
 - a. Interior (Zone 1): - 20 psf
 - b. Edge (Zone 2): - 24 psf
 - c. Corner (Zone 3): - 24 psf
 - d. Perimeter and Corner width is 6-feet
4. Seal base sheet at all penetrations, edges, and terminations to form a continuous air barrier layer.

B. Materials

1. 1/4-inch thick cover board.
2. Air barrier membrane.
3. Fasteners, adhesives, and other accessories.

C. Drawings and Specifications

1. Refer to Sheets S-2.0 and S-2.2 for location of work.
2. Refer to Sheets S-3.0 through S-3.2 for installation details.
3. Refer to specification section "APP Modified Bituminous Membrane Roofing" for work requirements, materials, and procedures.

T.I. 7.1 ROOFING INSULATION – FLAT POLYISO WITH COVER BOARD

A. Scope of Work

1. Work consists of providing flat polyisocyanurate insulation for insulating purposes and to introduce slope for positive drainage.
2. Install two continuous layers of polyisocyanurate insulation. Stagger joints between layers of insulation.
 - a. Fully adhere all layers of insulation.

3. Install 1/4-inch thick cover board on top of new insulation. Fully adhere in cold adhesive to substrate.
4. Install tapered insulation crickets at:
 - a. The high side of the rooftop curbs.
 - b. Other areas as indicated on the project plans.
6. Insulation attachment to substrate shall be designed to resist the following wind uplift pressures based on ASCE 7:
 - a. Interior (Zone 1): - 20 psf
 - b. Edge (Zone 2): - 24 psf
 - c. Corner (Zone 3): - 24 psf
 - d. Perimeter and Corner width is 6-feet
7. Provide tapered sumps to the drains.

B. Materials

1. Flat polyisocyanurate insulation board.
2. Tapered polyisocyanurate insulation board for crickets.
3. 1/2-inch thick cover board.
4. Fasteners, adhesives, and other accessories.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.
2. Refer to Sheets S-3.0 through S-3.2 for installation details.
3. Refer to specification section "APP Modified Bituminous Membrane Roofing" for work requirements, materials, and procedures.

T.I. 7.2 LOW SLOPE ROOFING MEMBRANE – 2-PLY APP MODIFIED BITUMEN

A. Scope of Work

1. Work consists of installation of a 2-ply APP modified bitumen roofing membrane, all membrane flashings, and other accessories.
2. Install a 120-mil modified bitumen base sheet on top of the cover board substrate in accordance with the membrane manufacturer's instructions. Nominal sheets will not be acceptable. Fully adhere in cold adhesive. Electric heat weld all seams.
3. Install a 140-mil modified bitumen highly reflective cap sheet in accordance with the membrane manufacturer's instructions. Nominal sheets will not be acceptable. Fully adhere in cold adhesive to substrate. Electric heat-weld all seams.

Cap sheet shall meet the following cool roofing requirements:

Minimum initial total solar reflectance: 0.70

Minimum initial thermal emittance: 0.75

4. Install base flashing per manufacturer's specifications.
5. Install sacrificial sheet membrane under all pipe, duct, and conduit supports.
6. Where indicated, install liquid resin flashing around penetrations. Apply a primer, a two part resin, woven fleece membrane and a second coat of the two part resin.
7. Install walkway pad and/or sacrificial caps sheets at areas indicated.
8. Membrane attachment to substrate shall be designed to resist the following wind uplift pressures based on ASCE 7-05:
 - a. Interior (Zone 1): - 20 psf
 - b. Edge (Zone 2): - 24 psf
 - c. Corner (Zone 3): - 24 psf
 - d. Perimeter and Corner width is 6-feet

B. Materials

1. Modified bitumen base and cap sheets.
2. Base flashings, adhesive, sealants, fasteners, and other accessories.

C. Drawings and Specifications

1. Refer to Sheets S-2.0 and S-2.2 for location of work.
2. Refer to Sheets S-3.0 through S-3.2 for installation details.
3. Refer to specification section "APP Modified Bituminous Membrane Roofing" for roofing system performance requirements, work requirements, materials, and procedures.

T.I. 7.3 FLASHING AND SHEET METAL TRIM

A. Scope of Work

1. Work consists of installation of all sheet metal flashing and trim as indicated on project drawings and specifications.
2. Install new edge metal and flashing.
3. Install new counter-flashings.
4. Install new metal pitch pans, filler and collars. Bonnets shall be installed on all pitch pans.
5. Install new continuous sheet metal caps for all new curbs. Provide a minimum vertical lip of 4" on the cap.
6. Install new formed metal flashings at flues, pipes, etc.
7. Install new soil pipe lead flashings.
8. Install reinforced resin flashing where indicated.

9. Provide gooseneck hoods at all HVAC line penetrations to eliminate gang pitch pans. All hoods shall extend above the finished roof system a minimum of 8”.
10. Provide all necessary sealants, sealant tapes, and fasteners to ensure a watertight installation.

B. Materials

1. Base flashings, adhesive, sealants, fasteners, and other accessories.
2. Prefinished sheet metal flashing and trim. Color shall be per Owner’s selection from Manufacturer’s standard colors.
3. Stainless steel sheet metal flashing and trim.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.
2. Refer to Sheets S-3.0 through S-3.2 for installation details.
3. Refer to specification section “APP Modified Bituminous Membrane Roofing” and “Flashing and Sheet Metal Trim” for work requirements, materials, and procedures.

T.I. 7.4 ROOFING SYSTEM WARRANTY

A. Scope of Work

1. Work consists of providing a manufacturer and contractor warranties for new roofing system.
2. Provide a 20 Year “Roof System/Labor Guaranty” material and labor warranty for the new roofing system, including the membrane, insulation, overlay board, and other accessories.
3. Warranty shall be the shared responsibility of the Roofing Contractor and the Roofing Membrane Manufacturer for the first **five (5)** years. The contractor shall provide a standard NRCA warranty form.
4. The Contractor shall make all necessary notices for warranty purposes to the primary roofing manufacturer, to secure timely inspections and issuance of the warranty.

B. Materials

1. Not applicable.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.
2. Refer to specification section “APP Modified Bituminous Membrane Roofing” and “Product Warranties” for work requirements, materials, and procedures.

T.I. 7.5 JOINT SEALANT REPLACEMENT

A. Scope of Work

1. Work consists of removal and replacement of sealant joints.
2. Remove existing sealant from joints.
3. All joints shall be thoroughly cleaned by either abrasive methods or grinding to remove all laitance, unsound substrate, and curing compounds which may interfere with adhesion. Joint shall be air blasted to remove remaining debris.
4. Prime joint surfaces as needed.
5. Install backer rod or bond breaker in strict accordance with manufacturer's instructions.
6. Install sealant with concave profile and overall dimensions to conform with manufacturer's recommendations for best practice for sealant installation.
7. Do not allow sealant to ooze or sag.
8. Where double sealant joints are indicated, allow the inner sealant joint to fully cure before installation of the outer sealant joint.

B. Materials

1. Joint sealants shall be as specified in Specification Section "Joint Sealants."

C. Repair Drawings and Specifications

1. Refer to Sheet S2.2 for location of work.
2. Refer to 2/S-3.3 for repair details.
3. Refer to Specification Section "Joint Sealants" for work requirements, materials, and procedures.

T.I. 22.1 PLUMBING WORK

A. Scope of Work

1. Work consists of cleaning existing drain lines, repairing damaged drains, and other drain related work items.
2. Clean and rod out all drains.
3. **Check drain bowl to deck connection to ensure watertight connection prior to roofing tear-off.** Check drain bowl to interior downspout connection to ensure watertight connection prior to roofing tear-off. Contact Engineer prior to roofing tear-off if existing interior drain connections may lead to interior water leakage.
4. Reuse existing drain bowls and deck plates. Reuse existing clamping rings, fasteners, and strainers. Report missing or damaged drain bowls and clamping rings to the Engineer. Clean and coat steel if required.
5. Install new metal strainers at all drains where strainer is missing or damaged.
6. Install piping extensions as required to raise curbs, vents, stacks, and soil pipes to a minimum of 8-inches above the finished roof surface.

7. Install new pipe supports on top of new roofing membrane with sacrificial pad.

B. Materials

1. Roof drain strainer; Contractor to submit product.
2. Anti-corrosion coating for drain bowl.
3. Piping extensions and accessories, as needed; Contractor to submit products.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.

T.I. 23.1 MECHANICAL WORK

A. Scope of Work

1. Work consists of raising equipment curbs, conduits, gas lines, ducts, and pipes to accommodate and protect new roofing system.
2. Remove abandoned curbs and rooftop equipment as indicated in project drawings.
3. Raise all curbs and platforms to a minimum of 8 inches or as indicated in project details above the finished roof surface and flash over the tops of the curbs to install proper counter-flashing.
4. Raise all gas lines as necessary to provide 8 inches clearance above finished roofing for new insulation thicknesses.
5. Install new gas line supports on top of new roofing membrane with sacrificial pad.

B. Materials

1. Pipe supports, fasteners, and other accessories, as needed.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.

T.I. 26.1 ELECTRICAL WORK

A. Scope of Work

1. Work consists of removing and reinstalling conduits, wiring, cameras, lights, and other electrical work (except the existing lightning protection system) during installation of new roofing system.
2. All electrical work shall be performed by a licensed and experienced electrician and shall be performed according to current code.
3. Raise existing electrical conduit to a minimum of 8 inches above the finished roof surface. Provide extensions of services to allow for

goosenecks to be installed.

4. Install new conduit supports on top of new roofing membrane with sacrificial pads of modified bitumen cap sheet.

B. Materials

1. Conduit supports, fasteners, and other accessories, as needed.

C. Drawings and Specifications

1. Refer to Sheet S-2.2 for location of work.

END OF SECTION 011000

SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Formed low-slope roof flashing and trim.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Division 07 Section "APP Modified Bituminous Membrane Roofing" for installation of new roofing membrane.
 - 3. Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.
 - 4. **Division 07 Section "Roof Specialties" for permanent fall protection and access ladders.**

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 - 1. Wind Zone 3: For velocity pressures of 46 to 104 lbf/sq. ft. (2.20 to 4.98 kPa): 208-lbf/sq. ft. (9.96-kPa) perimeter uplift force, 312-lbf/sq. ft. (14.94-kPa) corner uplift force, and 104-lbf/sq. ft. (4.98-kPa) outward force.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, cleats, clips, closures, and other attachments.
 - 2. Trim: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
 - 3. Accessories: Full-size Sample.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Approval of mockups is for other material and construction qualities specifically approved by Engineer in writing.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Engineer in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Meet with Owner, Engineer, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. **Stainless-Steel:** Type 304 Austenitic stainless steel in minimum 24-gauge, or as recommended by SMACNA for sheet metal flashing installations.
- B. **Prepainted, Metallic-Coated Steel Sheet:** Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 1. **Exposed Finishes:** Apply the following coil coating:
 - a. **High-Performance Organic Finish:** Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1) **Fluoropolymer 2-Coat System:** Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA [2604] [2605], except as modified below:

- a) **Humidity Resistance: 1000 hours.**
- b) **Salt-Spray Resistance: 1000 hours.**

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 2. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- C. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

2.3 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

2.4 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
 1. Fabricate parapet scuppers from the following material:
 - a. Stainless Steel: 0.0187 inch (0.5 mm) thick.

2.5 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. **Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, seal, and solder or weld watertight.**
 1. **Joint Style: Butt, with 12-inch- (300-mm-) wide concealed backup plate [.**
 2. **Fabricate copings from the following material:**
 - a. **Prepainted, Metallic-Coated Steel: 0.0396 inch (1.0 mm) thick.**
- B. Base Flashing: Fabricate from the following material:
 1. Stainless Steel.
- C. Counterflashing: Fabricate from the following material:
 1. Stainless Steel.
- D. Roof-Drain Flashing: Fabricate from the following material:
 1. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.
 2. Copper Sheet: ASTM B 370, Temper H00 or H01, cold-rolled copper sheet.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 - 1. Coat side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of

intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.

- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
 - a. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 24-inch (600-mm) centers.
- C. Copings: **Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.**
 - 1. **Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 24-inch (600-mm) centers.**
 - 2. **Anchor interior leg of coping with screw fasteners and washers at 18-inch (450-mm) centers.**
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.
 - 1. Secure in a waterproof manner by means of anchor and washer at 36-inch (900-mm) centers.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077100
ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following roof specialties and accessories:
 - 1. Roof Guard Rail
 - 2. Roof Access Ladder
- B. Related Sections include the following:
 - 1. Section 075213 – APP Modified Bituminous Roofing Membrane

1.3 REFERENCES

- A. 29 CFR 1910.23 - Occupational Health and Safety Standards for General Industry.
- B. 29 CFR 1910.28 - Walking/Working Surfaces, Subpart D.
- C. 29 CFR 1926.500 - Safety and Health Regulations for Construction, Subpart M-Fall Protection.
- D. AISC S342L-1993
- E. AISI SG-971-1996
- F. ANSI Z359.1 - Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components.
- G. ANSI ASC A14.3-2008 - Safety Requirements for Fixed Ladders
- H. ASME A120.1-2001
- I. ASTM A 36 - Standard Specification for Carbon Structural Steel.
- J. ATM A 182 - Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
- K. ASTM A 193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
- L. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- M. ASTM F 593C - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- N. AWS D1.1/D1 - American Welding Society, Structural Welding Code.
- O. AWS-D1.2/D1.2M:2003
- P. OSHA (29 CFR 1920.66 App C to 1910 Subpart F (Personal Fall Arrest Systems). 1910 Subpart D (Walking and Working Surfaces) c. 1910.66 Appendix C (Personal Fall Arrest) d. 1910.66 Subpart F (Powered Platforms) e. OSHA Procedures and precautions for employees using descent control equipment.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Provide Fall Protection System in compliance with OSHA, ANSI, and all applicable state and federal regulatory requirements.
- B. Design of fall arrest safety systems, and equipment shall meet or exceed the following:
 - 1. Ensure design of primary support equipment is capable of sustaining without failure at least four times the maximum static working load applied or transmitted to the components.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Plans and details of entire fall protection layout, showing member sizes and part identification, fasteners, anchors, fittings and evidence of compliance with structural performance requirements.
 - 1. Include system layout, design analysis, and calculations prepared and sealed by a Registered Professional Engineer licensed in the State of Texas.
 - 2. Provide manufacturer's certifications that the ultimate strength of the fall protection system is equal to or greater than those specified.
 - 3. Include data regarding all necessary Restrictive and Non-Restrictive General Safety and Usage Notes.
- C. Operation and Maintenance Data:
 - 1. Include parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying part numbers.
 - 2. Include technical information for servicing equipment.
 - 3. Include detailed operating procedures indicating proper use of equipment for safe operation of the system.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for annual inspection, re-certifications, periodic checking and adjustment of cable tension and periodic cleaning and maintenance of all railing and infill components.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Work of this Section to be executed by manufacturer specializing in the design, fabrication and installation. Must carry specific product liability insurance in the amount of \$10,000,000.00 to protect against product failure. Companies, such as miscellaneous metal fabricators, who do not typically engage in the design and manufacturing of suspended maintenance equipment, are not permitted to bid.
- B. Professional Engineer: A professional engineer who is legally qualified to practice in the jurisdiction where the project is located and who is experienced in providing engineering services of the kind required.
- C. Welding to be executed by certified welders in accordance with AWS requirements.

- D. Installer Qualifications: Specializing in the Work of this section and trained and certified by the fall protection system manufacturer.
- E. Single-Source Requirement: The DESIGN, FABRICATION, INSTALLATION, CERTIFICATION AND WARRANTY of the fall protection system must be SINGLE-SOURCED.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.8 SEQUENCING

- A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 MAINTENANCE SERVICE

- A. Furnish service and maintenance for fall protection system and components for a period of one year from Date of Substantial Completion with an option for extending maintenance service on an annual basis thereafter.

1.11 WARRANTY

- A. Roof Guard Rail: Provide with manufacturer's 1 year limited warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Rooftop Anchors Inc
 - 2. Thompson Fabricating, LLC.
- B. Substitutions: May be considered provided manufacturer's qualifications and job references are furnished to Owner.

2.2 MATERIAL

- A. Exposed Structural Components Finish: Hot Dip Galvanized Steel
 1. Steel: ASTM A 53, Grade B.
 2. Steel: ASTM A 36.
 3. Stainless Steel: 304 ASTM A 182.
- B. Non-Structural Components:
 1. Sheet and Plate: ASTM A 36
 2. Extruded Bars, Rods, Shapes, and Tubes
- C. Nuts, Bolts, and Washers:
 1. Stainless Steel: 304 ASTM A 193 Grade B8 or ASTM F 593C
- D. Anchor Bolts for securing base plates:
 1. Metal: Stainless Steel, 304 Stainless Steel; ASTM A 193 Grade 8, B8 2. Size: 5/8 inch (16 mm) diameter minimum.

2.3 ROOF GUARD RAIL

- A. General: Fabricate pipe handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish and member sizes including wall thickness of post, post spacing and anchorage, but not less than that required to support the structural loads.
- B. Handrails shall be made of pipes joined together with component fittings. Samples of all components, bases, toe plate, and pipe shall be submitted for approval at the request of the Engineer. Components that are pop-riveted or glued at the joints will not be acceptable. All components must be mechanically fastened with stainless steel hardware.
- C. Posts shall not interrupt the continuation of the top rail at any point along the railing, including corners and end terminations. The top surface of the top railing shall be smooth and shall not be interrupted by any projected fittings.
- D. To provide safety to workers near the edge of a rooftop, safety guardrails are to be installed along open-sided walking surfaces, roofs, terraces, balconies, stairways, ramps, and landings located more than 48" above floor level. Minimum height of 42". Design to OSHA guidelines.
- E. Concrete anchors shall be stainless steel type 303 or 304 and shall be designed by the handrail manufacturer.
- F. Railings Structural Requirements:
 1. Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum concentrated load of 200 pounds (90719 g) applied in any direction on the top rail.
 2. Mid-rail shall withstand a minimum concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 3. Minimum 4" high toe board, where applicable.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrication by preventing buckling, opening of joints, overstressing of components, failure of connections and other detrimental effects. Expansion couplers to be inserted a minimum of every 20'
- H. Isolate dissimilar metals
- I. Flashing/Water Tight Finish: Coordinate with roofing contractor for proper flashing of each penetration. Additionally, ensure moisture cannot bypass flashing via weep/vent holes required for galvanizing
- J. Openings in the Guard Rail: Openings shall be guarded by self-closing gates. Safety chains shall not be used.

2.4 ROOF ACCESS LADDER

- A. General: Fabricate access ladder to comply with requirements indicated for design, dimensions, details, finish and member sizes, but not less than that required to support the structural loads.
- B. Rungs shall be fabricated to provide a non-slop power grip surface.
- C. Design to ANSI-A14.3 and OSHA guidelines.
- D. Ladder Structural Requirements:
 - 1. Ladder rungs shall be designed to withstand a concentrated load of 250 pounds plus 30% impact. Maximum rung deflection shall not exceed $L/360$. The design load shall be applied at the center of the rung over a 4-inch area.
 - 2. Ladder side rails shall be designed to withstand a minimum live load of two 250 pound concentrated loads plus 30% impact concentrated between any two consecutive attachments.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrication by preventing buckling, opening of joints, overstressing of components, failure of connections and other detrimental effects.
- F. Provide a swinging, self-closing gate at the opening through the guard rail for the ladder per OSHA 1910.23(a)(2).
- G. Isolate dissimilar metals
- H. Flashing/Water Tight Finish: Coordinate with roofing contractor for proper flashing of each penetration. Additionally, ensure moisture cannot bypass flashing via weep/vent holes required for galvanizing

2.5 FABRICATION

- A. Fabricate work true to dimension, square, plumb, level, and free from distortion or defects detrimental to appearance and performance.
- B. Grind off surplus welding material to ensure exposed surfaces are smooth so as not to abrade workers ropes.
- C. Coordinate anchorage system with supporting structure.
- D. Welding shall be in accordance with the AWS Structural Welding Code D1.1/D1. AWS-D1.2/D1.2M:2003

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Examine project prior to installation and report in writing any defects or other site conditions that would cause problematic installation of products or possible deficiency.
- C. Confirm site dimensions.
- D. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with Roof Fall Protection manufacturer's instructions and approved shop drawings.
- B. Roof Fall Protection manufacturer shall supervise, inspect, and test installation of fall protection system.
- C. Assure that all anchors are level, tightly fitted and flush with adjoining surfaces as required.
- D. Isolate dissimilar materials as required to prevent electrolytic corrosion.
- E. Coordinate with roofing specified in the drawings for the installation of flashings to assure a watertight installation.
- F. Chemical Adhesive Anchoring System:
 - 1. Install using accredited installers using manufacture's installation instructions.
 - 2. Load test each installed anchor assembly to 50 percent of its rated capacity. Test results shall be certified by a certified installer with experience in suspended access equipment.
- G. Adjust and leave properly functioning equipment.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Testing and certification shall be provided under supervision of the fall protection manufacturer or original installer.
- B. Annual inspection plus 5 and 10 year recertification provided by the manufacturer or their authorized representatives.
- C. Repair or replace parts whenever required. Use parts produced by manufacturer of original equipment.
- D. Provide emergency call back service at all hours for this maintenance period.
- E. Perform maintenance work using competent and qualified personnel under supervision of the fall protection manufacturer or original installer.

3.5 PROTECTION

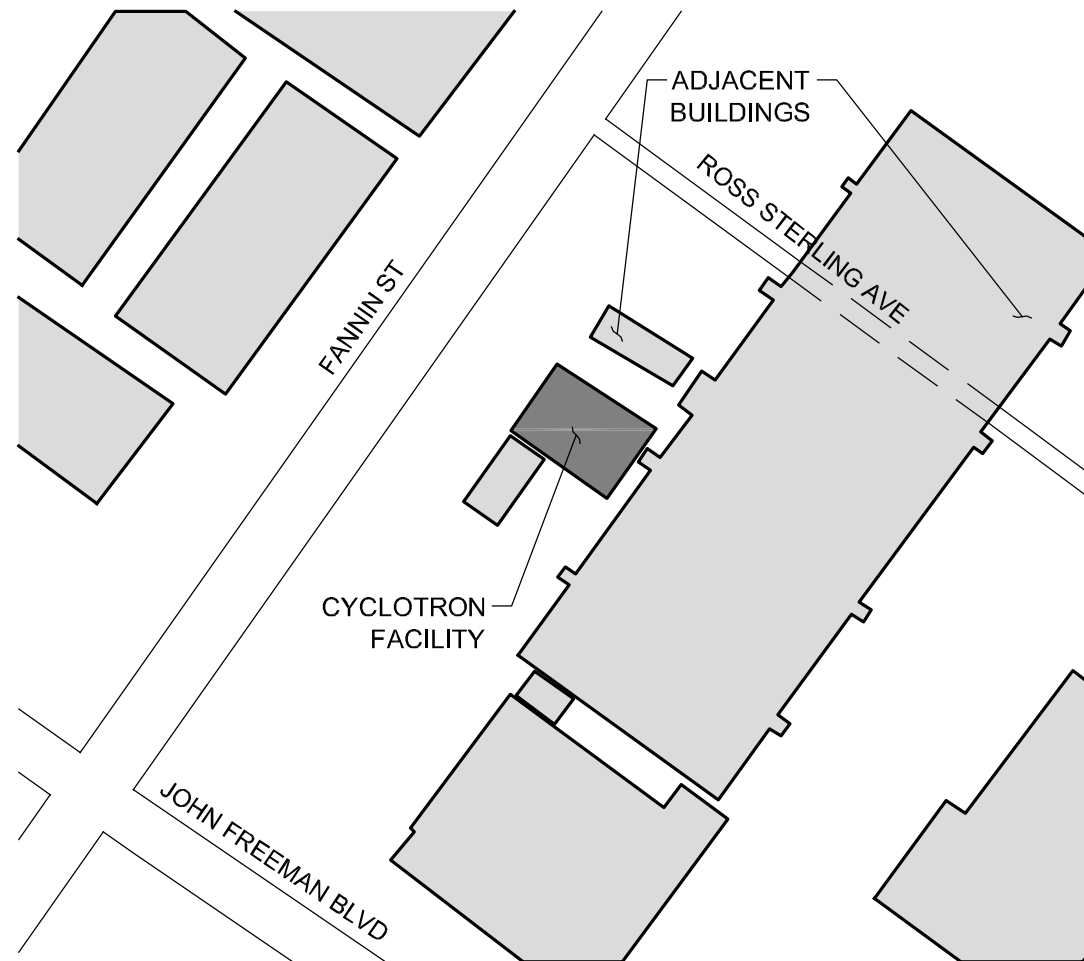
- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 077100

UTHSCH CYCLOTRON FACILITY

ROOFING REPAIRS

HOUSTON, TEXAS



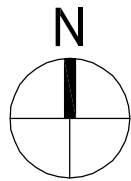
TASK ITEMS		
T.I. 1.1	PROJECT MOBILIZATION AND GENERAL CONDITIONS	
T.I. 1.2	FALL PROTECTION SYSTEMS	
T.I. 2.1	DEMOLITION AND SUBSTRATE PREPARATION	
T.I. 3.2	DECK REPAIR/REPLACEMENT - PATCH CONCRETE DECK	
T.I. 5.1	GROSSOVER BRIDGES	
T.I. 5.2	ACCESS LADDER	
T.I. 6.1	ROUGH CARPENTRY	
T.I. 6.2	AIR BARRIER	
T.I. 7.1	ROOFING INSULATION - FLAT POLYISO WITH COVER BOARD	
T.I. 7.2	LOW SLOPE ROOFING MEMBRANE - 2-PLY APP MODIFIED BITUMEN	
T.I. 7.3	FLASHING AND SHEET METAL TRIM	
T.I. 7.4	ROOFING SYSTEM WARRANTY	
T.I. 7.5	JOINT SEALANT REPLACEMENT	
T.I. 22.1	PLUMBING WORK	
T.I. 23.1	MECHANICAL WORK	
T.I. 26.1	ELECTRICAL WORK	

11x17 SHEETS	
S-0.0	COVER, SITE MAP, SHEET INDEX, TASK ITEMS
S-0.1	GENERAL NOTES
S-0.2	GENERAL NOTES, ROOF LEGEND
S-1.0	SCHEMATIC SITE PLAN
S-2.0	ROOF PLANS - WIND PRESSURE ZONES
S-2.1	ROOF PLAN - DEMOLITION
S-2.2	ROOF PLAN - REPLACEMENT
S-3.0	FLASHING AT VERTICAL WALL, ROOF DRAINS
S-3.1	FLASHING AT RIGID PENETRATIONS, ROOF TOP UNIT CURBS
S-3.2	FLASHING AT SCUPPERS, SLEEPERS
S-3.3	DECK REPAIR/REPLACEMENT - PATCH CONCRETE DECK, JOINT SEALANT REPLACEMENT
S-3.4	FLASHING AT HEATED VENT STACK, PARAPET COPING
S-3.5	GUARD RAIL DETAILS
S-3.6	ACCESS LADDER DETAILS

Walter P. Moore and Associates, Inc.
TBPE Firm Registration No. 1856



1 PARTIAL VIEW OF ROOFTOP
NTS



2 SITE MAP
NTS

WALTER P MOORE
WALTER P. MOORE AND ASSOCIATES, INC.
1301 MCKINNEY, SUITE 1100
HOUSTON, TEXAS 77010
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Project Name: **CYCLOTRON FACILITY ROOFING REPAIRS HOUSTON, TX**
Client: **UTHSCH**

No.	Date	Description
	01/07/2013	90% Owner's R/rev Set
	05/22/2013	Issued for Construction
1	06/14/2013	Addendum #1

Prof No.: D03.12131.00 Eng: KA Drafter: JG / KG

Sheet: **S-0.0**

GENERAL NOTES (CONT'D)

IV. SUBMITTALS

A. SUBMITTAL LIST AND SCHEDULE

The General Contractor shall prepare a detailed list and schedule of all submittal items to be sent to the Engineer prior to the start of construction. This list shall be updated and revised and kept current as the job progresses. The submittal list shall be organized as shown below:

1. Shop Drawings
2. Manufacturers Literature for Products, Assemblies, and Hardware
3. Products, Assemblies and Hardware
4. Product Certifications, Mill Certificates, and Affidavits
5. Product and Contractor Warranties.

B. SHOP DRAWINGS

1. The General Contractor shall submit for Engineer review shop drawings for the following items:
 - (1) Sheet Metal Flashing
 - (2) Roofing Membrane
 - (3) Crossover Bridges
 - (4) Roof Guard Rail
 - (5) Access Ladder
2. All shop drawings must be reviewed and stamped by the General Contractor prior to submittal.
3. Contractor shall submit one electronic set of prints for all shop drawings specified to be returned by the Engineer.
4. The omission from the shop drawings of any materials required by the Contract Documents to be furnished shall not relieve the Contractor of the responsibility of furnishing and installing such materials, regardless of whether the shop drawings have been reviewed and approved.

C. MANUFACTURERS LITERATURE

Submit one electronic set of manufacturers literature for all materials and products used in construction on the project.

D. REPRODUCTION

The use of electronic files or reproductions of these contract documents by any contractor, subcontractor, erector, fabricator or material supplier in lieu of preparation of shop drawings signifies their acceptance of all information shown hereon as correct, and obligates themselves to any job expense, real or implied, arising due to any errors that may occur hereon.

E. DEFERRED SUBMITTALS

The following items are considered deferred submittals by the registered design professional in responsible charge:

- (1) Fall Protection Assemblies (S&S)
- (2) Roof Access Ladder (S&S)

Notes:
(S&S) Items marked thus shall have the shop drawings and delegated design submittals (including calculations) sealed per the project specifications by an engineer registered in the State of Texas.

V. DRAWING INTERPRETATION

A. STRUCTURAL ABBREVIATIONS

The following abbreviations are used on the structural drawings:

Ø	ROUND, DIAMETER	MAX	MAXIMUM
APPROX	APPROXIMATE	MIN	MINIMUM
CONT	CONTINUOUS	MISC	MISCELLANEOUS
DIA	DIAMETER	OC	ON CENTER
DIM	DIMENSION	QTY	QUANTITY
EMBED	EMBEDMENT	REF	REFERENCE, REFER
FT	FOOT/FEET	SIM	SIMILAR
FV	FIELD VERIFY	STD	STANDARD
HORIZ	HORIZONTAL	TERM	TERMINATION
IN	INCH	TYP	TYPICAL
LBS	POUNDS	VERT	VERTICAL

B. TYPICAL DETAILS

Details on the drawings shall apply to all situations occurring on the project that are the same or similar to those specifically detailed. The applicability of the detail to its location on the plans can be determined by the title of the detail. Such details shall apply whether or not they are keyed in at each location. Decisions regarding applicability of Typical Details shall be determined by the Engineer.

SYMBOL LEGEND FOR ROOF PLANS

SYMBOL	DESCRIPTION
	CONCRETE/PRECAST PARAPET
	SCUPPER
	PIPE PENETRATION
	ROOF DRAIN
	CURB FOR ROOF TOP UNIT
	MECHANICAL/ELECTRICAL CONDUIT
	FALL PROTECTION HANDRAIL
	ACCESS LADDER
	SWINGING SELF-CLOSING GATE
	WALKPADS
	AREA NOT IN SCOPE
	TASK ITEM OR WORK DESCRIPTION

GENERAL ROOFING NOTES

1. Scope of work includes the removal and replacement of the existing roof system, sheet metal components, and all associated accessories as described in the drawings and specifications. Demolition to include all abandoned and defunct conduit, roof-top equipment, ductwork, curbs, pipes, and etc.
2. Remove and dispose of existing roofing material, coping, ballast, walkpads, duct and pipe piers, roof insulation, and all associated flashing and hardware in accordance with all federal and local regulatory requirements.
3. All penetrations through the roof and anchored to the structure below shall be flashed per roofing membrane manufacturer recommendations.
4. Provide temporary protection at all areas where existing roofing has been removed. Contractor is responsible for maintaining a weather-tight condition of the building at all areas exposed during roofing replacement.
5. The interior of the building shall be protected from construction at all times. At completion of work, interior of the building, all roof areas, and all areas around the building shall be fully cleaned of all work and debris as a result of the roofing work.

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CYCLOTRON FACILITY
ROOFING REPAIRS
HOUSTON, TX

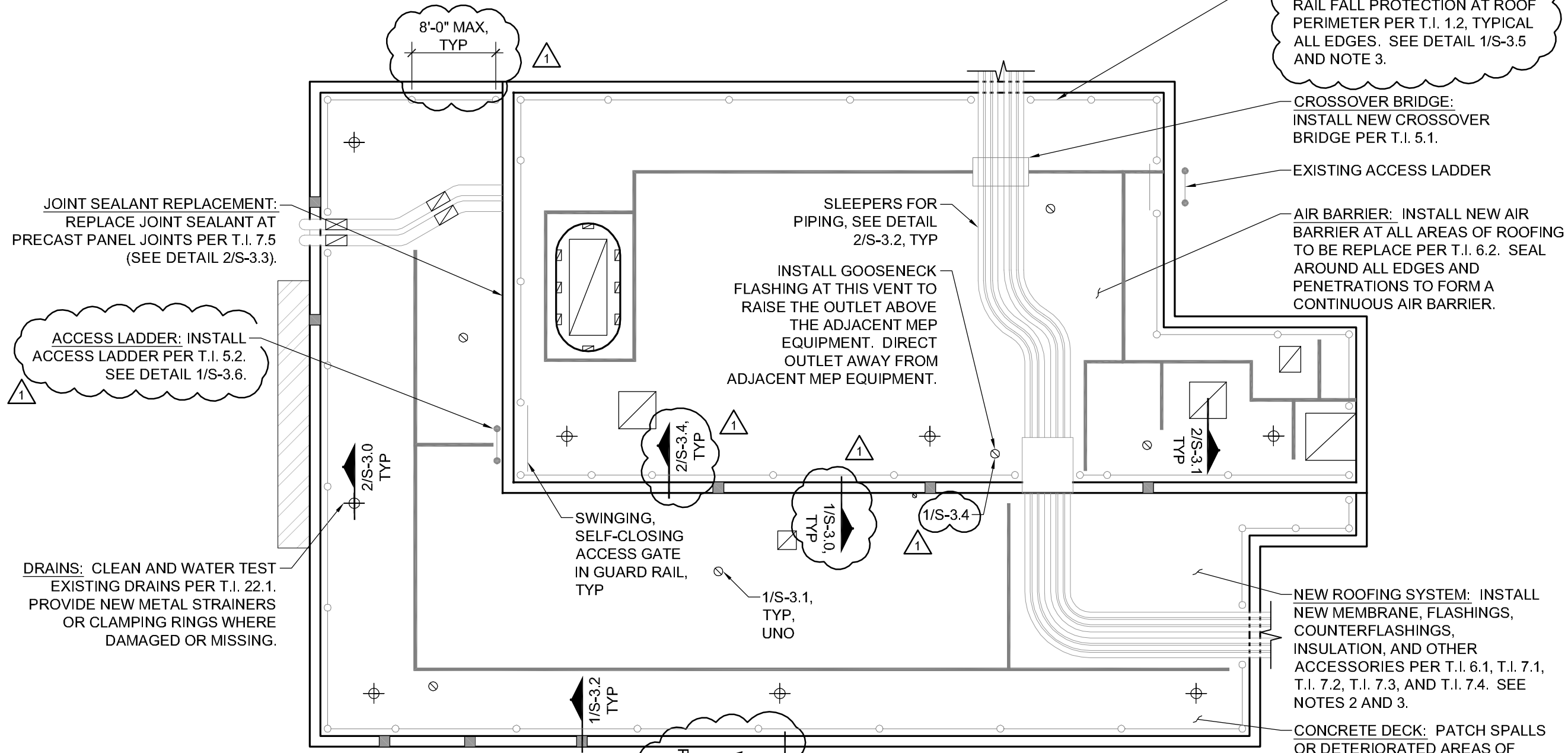
UTHSCH

Project Name:

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FALL PROTECTION SYSTEM:
 INSTALL NEW PERMANENT HAND RAIL FALL PROTECTION AT ROOF PERIMETER PER T.I. 1.2, TYPICAL ALL EDGES. SEE DETAIL 1/S-3.5 AND NOTE 3.

CROSSOVER BRIDGE:
 INSTALL NEW CROSSOVER BRIDGE PER T.I. 5.1.

EXISTING ACCESS LADDER

AIR BARRIER: INSTALL NEW AIR BARRIER AT ALL AREAS OF ROOFING TO BE REPLACE PER T.I. 6.2. SEAL AROUND ALL EDGES AND PENETRATIONS TO FORM A CONTINUOUS AIR BARRIER.

SLEEPERS FOR PIPING, SEE DETAIL 2/S-3.2, TYP
 INSTALL GOOSENECK FLASHING AT THIS VENT TO RAISE THE OUTLET ABOVE THE ADJACENT MEP EQUIPMENT. DIRECT OUTLET AWAY FROM ADJACENT MEP EQUIPMENT.

JOINT SEALANT REPLACEMENT:
 REPLACE JOINT SEALANT AT PRECAST PANEL JOINTS PER T.I. 7.5 (SEE DETAIL 2/S-3.3).

ACCESS LADDER: INSTALL ACCESS LADDER PER T.I. 5.2. SEE DETAIL 1/S-3.6.

DRAINS: CLEAN AND WATER TEST EXISTING DRAINS PER T.I. 22.1. PROVIDE NEW METAL STRAINERS OR CLAMPING RINGS WHERE DAMAGED OR MISSING.

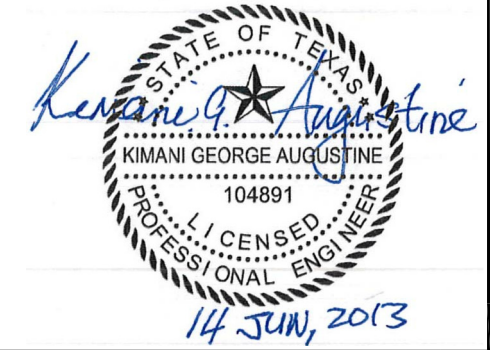
NEW ROOFING SYSTEM: INSTALL NEW MEMBRANE, FLASHINGS, COUNTERFLASHINGS, INSULATION, AND OTHER ACCESSORIES PER T.I. 6.1, T.I. 7.1, T.I. 7.2, T.I. 7.3, AND T.I. 7.4. SEE NOTES 2 AND 3.

CONCRETE DECK: PATCH SPALLS OR DETERIORATED AREAS OF EXISTING CONCRETE DECK PER T.I. 3.2. SEE DETAIL 1/S-3.3.

NOTES:

1. INFORMATION SHOWN ON PLANS AND DETAILS IS FOR CONTRACTOR'S GENERAL REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS AND REPORT DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS TO ENGINEER PRIOR TO STARTING WORK.
2. EXISTING STRUCTURE IS SLOPED TO DRAINS. NEW INSULATION SHALL BE FLAT BOARD STOCK, EXCEPT WHERE ADDITIONAL TAPERING OR THICKNESS IS REQUIRED TO PROVIDE SUFFICIENT SLOPE TO THE DRAINS TO ELIMINATE PONDING WATER.
3. CONTRACTOR IS ADVISED THAT THE ROOF DOES NOT HAVE OSHA-COMPLIANT PARAPET WALLS. FALL PROTECTION MUST BE INSTALLED PRIOR TO PERFORMING ANY WORK ON THE ROOF. LAYOUT OF GUARDRAIL IS CONCEPTUAL IN NATURE AND FINAL DESIGN, INCLUDING LAYOUT AND STRUCTURAL ATTACHMENTS SHALL BE PROVIDED BY THE FALL PROTECTION MANUFACTURER.

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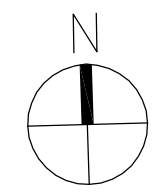
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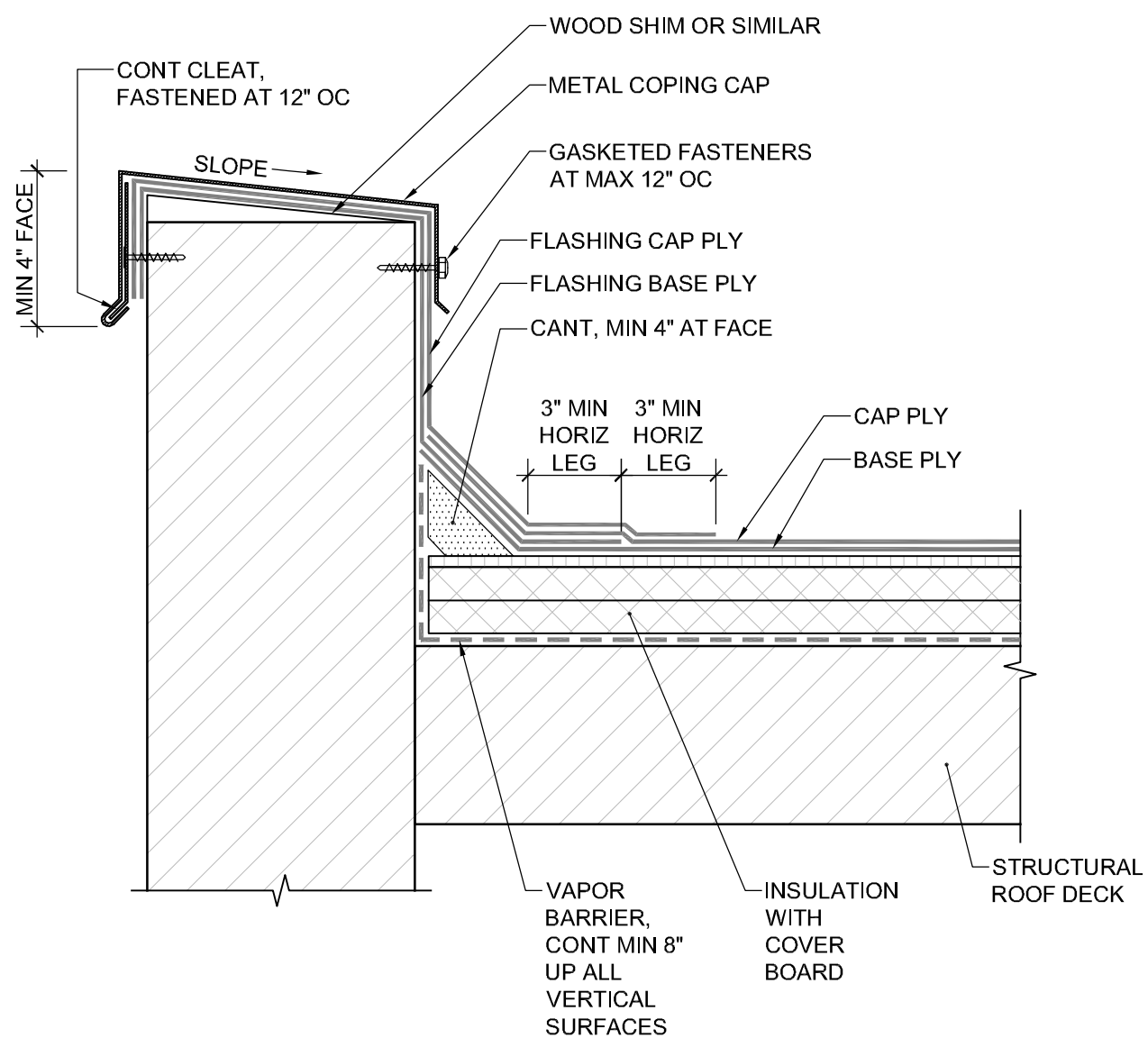
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ROOF PLAN - REPLACEMENT



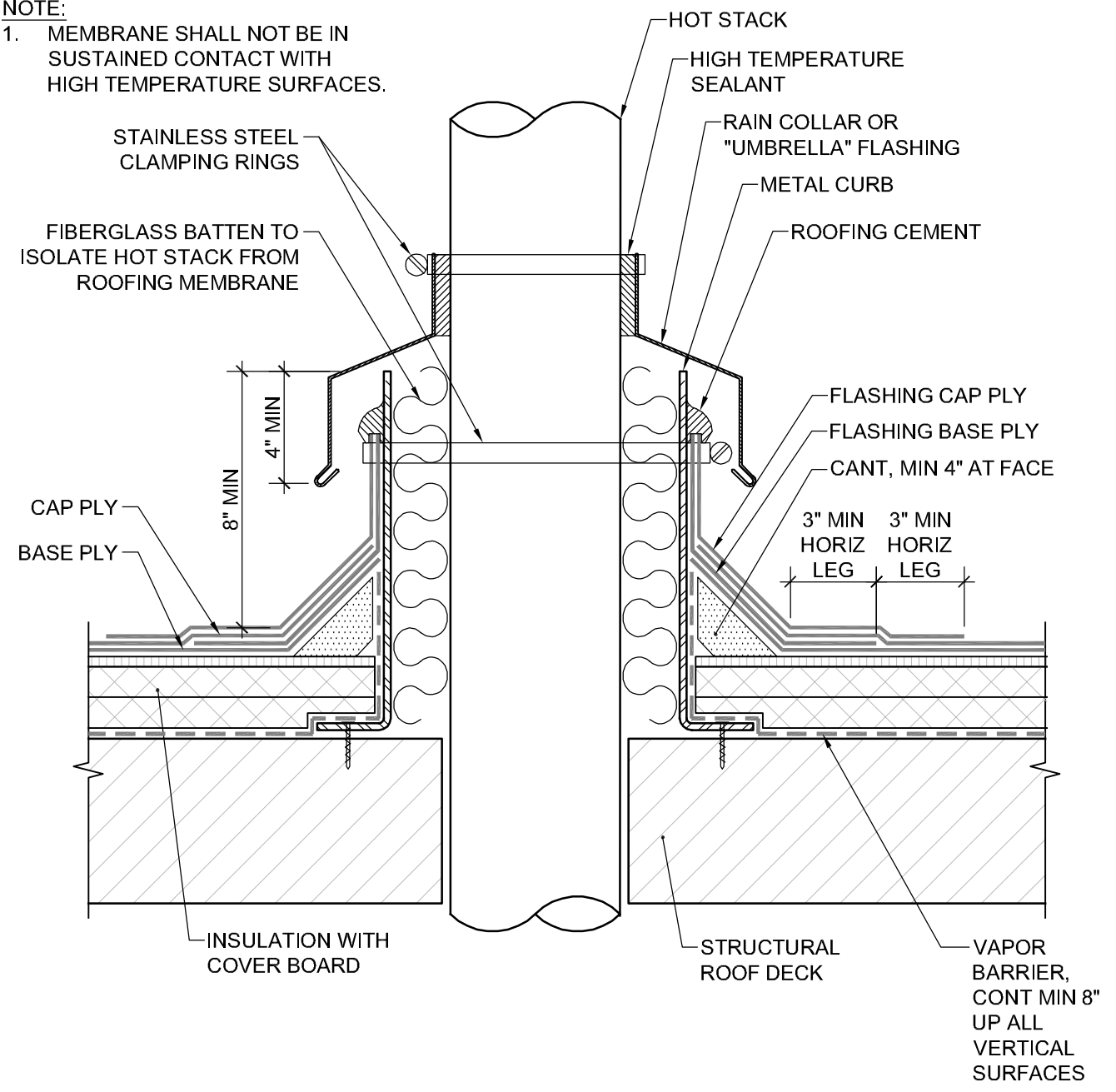
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TYPICAL - 2-PLY MOD BIT - FLASHING AT PARAPET COPING

NTS

NOTE:

1. MEMBRANE SHALL NOT BE IN SUSTAINED CONTACT WITH HIGH TEMPERATURE SURFACES.

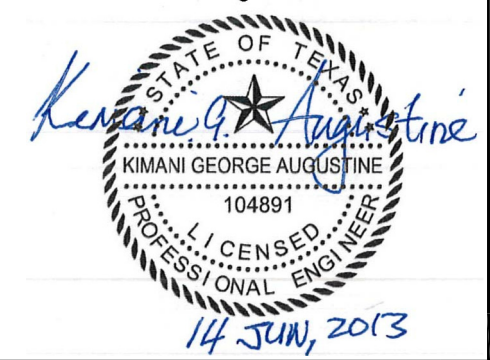


1

TYPICAL - 2-PLY MOD BIT - FLASHING AT HEATED VENT STACK

NTS

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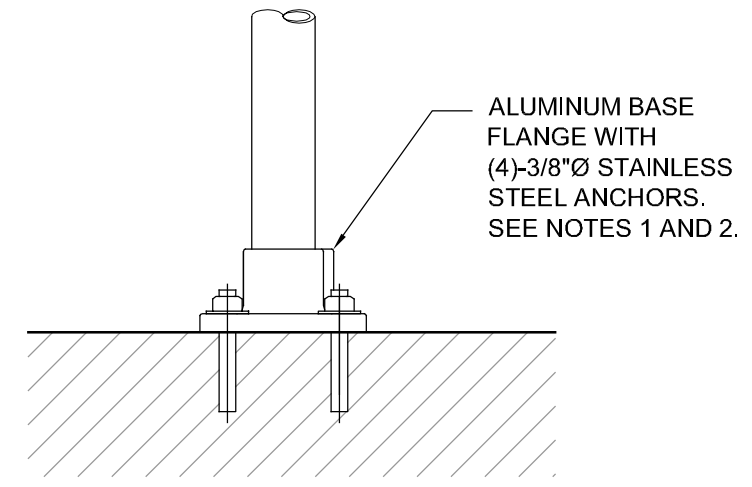
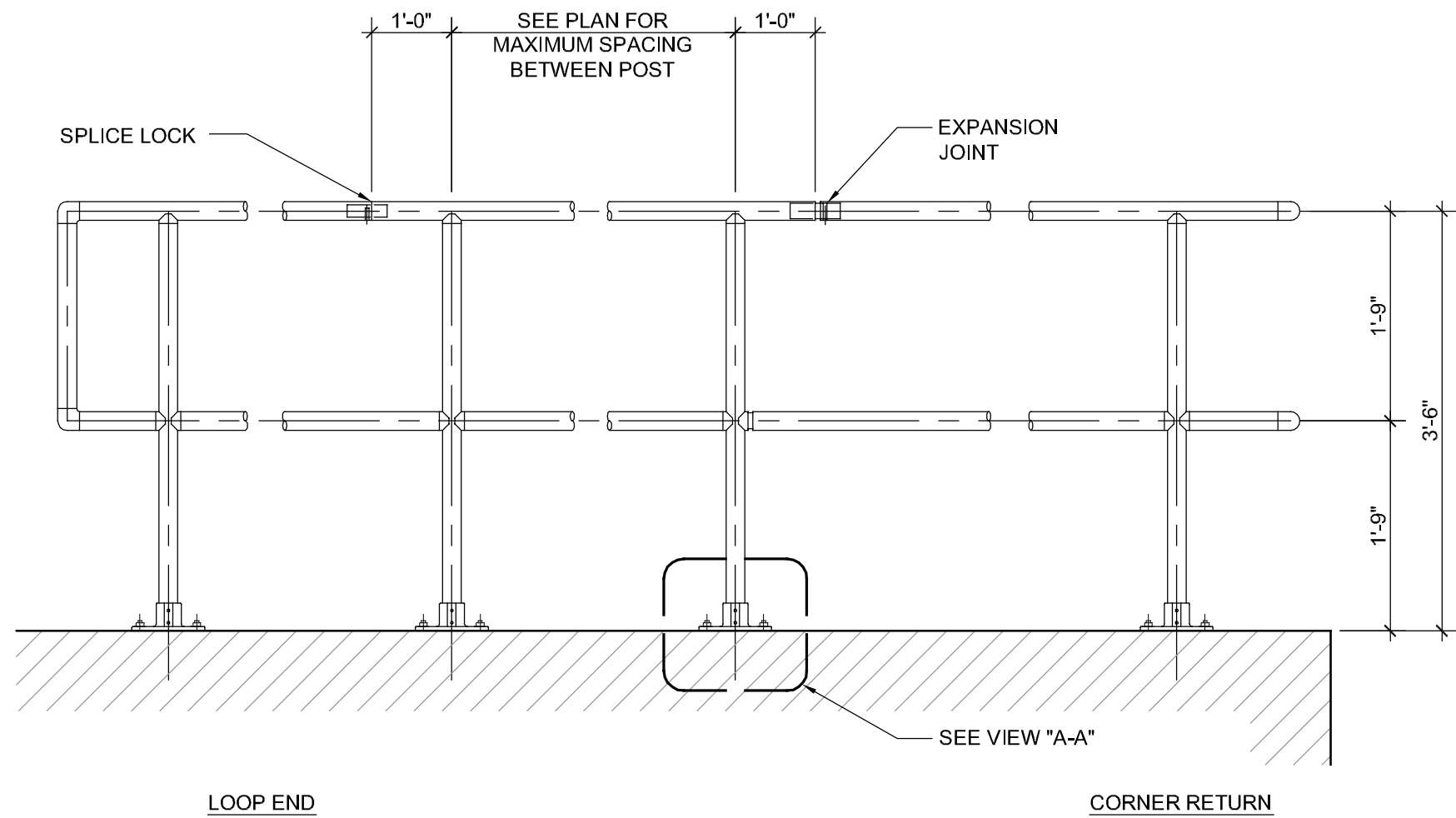
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VIEW "A-A"

NOTES:

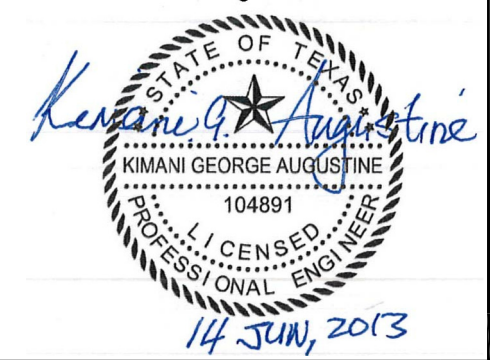
1. GUARDRAIL IS SHOWN CONCEPTUALLY FOR BIDDING PURPOSES. FINAL DESIGN OF CONNECTIONS, GUARDRAIL POSTS, HANDRAILS, SPLICES, AND EXPANSION JOINTS SHALL BE PER THE GUARDRAIL MANUFACTURER.
2. ROOFING SYSTEM NOT SHOWN FOR CLARITY. SEE DETAIL 1/S-3.1 (SIMILAR) FOR FLASHING OF GUARDRAIL POSTS.

1

TYPICAL GUARDRAIL DETAIL

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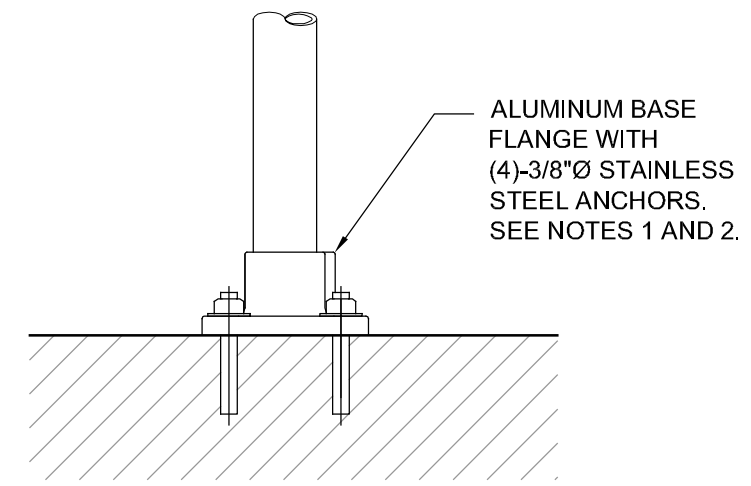
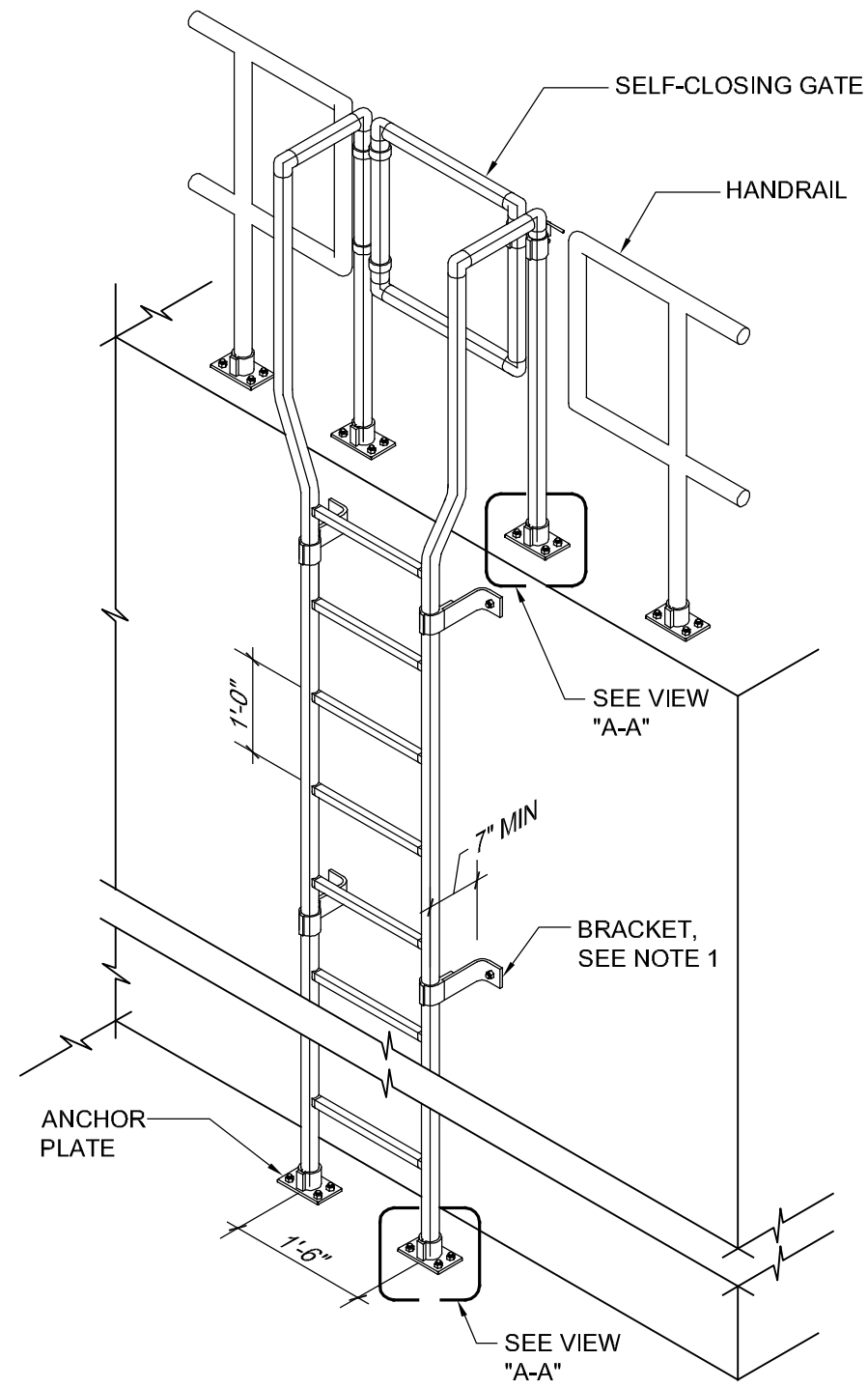
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VIEW "A-A"

- NOTES:**
1. ACCESS LADDER IS SHOWN CONCEPTUALLY FOR BIDDING PURPOSES. FINAL DESIGN OF CONNECTIONS, LADDER ASSEMBLY, SPLICES, AND EXPANSION JOINTS SHALL BE PER THE ACCESS LADDER MANUFACTURER.
 2. ROOFING SYSTEM NOT SHOWN FOR CLARITY. SEE DETAIL 1/S-3.1 (SIMILAR) FOR FLASHING OF LADDER SIDE RAILS.

1 ISOMETRIC VIEW - ACCESS LADDER
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