

VICINITY MAP
NOT TO SCALE

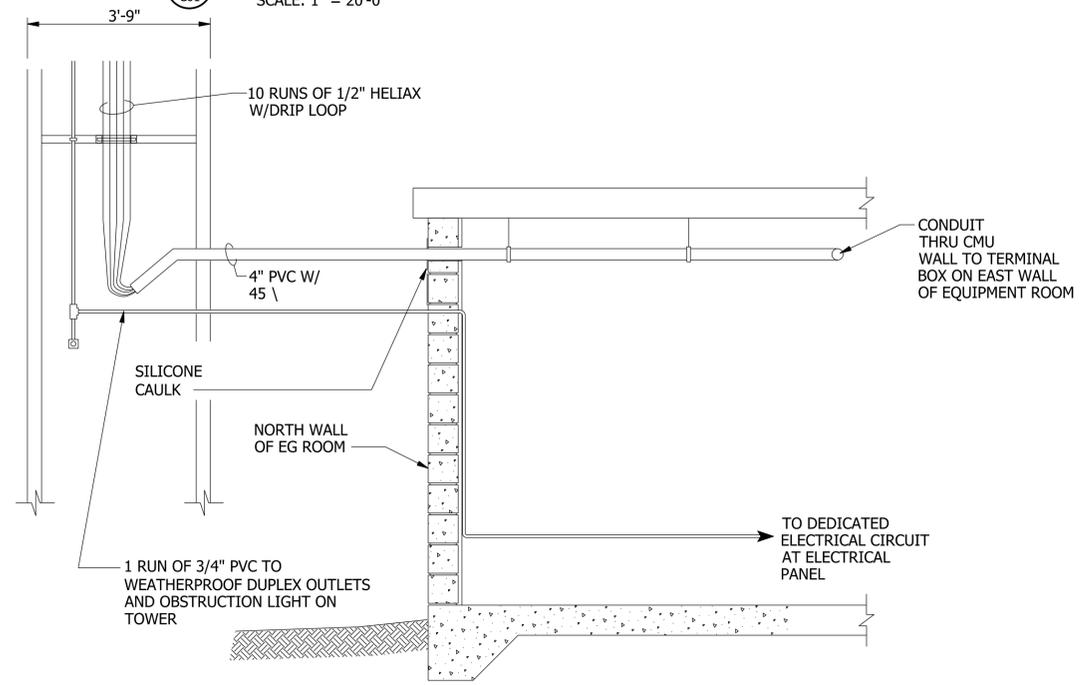
NOTES:

- ① NO.4/0 BARE COPPER COUNTERPOISE - MAINTAIN 2' CLEAR FROM FOOTING.
- ② 2 COPPER AIR TERMINALS WITH THOMPSON NO.32 DOWN CONDUCTORS TO GROUND COUNTERPOISE - SECURE DOWN CONDUCTORS TO TOWER AT 3' INTERVALS - AIR TERMINALS TO PROVIDE 45° CONE OF PROTECTION. SEE SWS-D-RCF-G02 FOR DETAIL OF AIR TERMINAL.
- ③ GRAVEL AND GRADE SITE TO ORIGINAL CONDITION IN DISTURBED AREAS.
- ④ NOT USED
- ⑤ SUBCONTRACTOR SHALL NOT INTERFERE WITH THE OPERATION OF THE EXISTING TOWER UNTIL THE NEW TOWER IS OPERATIONAL. TWO WEEKS WILL BE REQUIRED TO INSTALL THE ELECTRONICS ON THE NEW TOWER (BY THE FAA). ONCE THE ERECTION, GROUNDING, LIGHTING PROTECTION, ELECTRICAL AND CABLING IS COMPLETED BY THE SUBCONTRACTOR THE FAA WILL BE NOTIFIED TWO WEEKS IN ADVANCE TO INSTALL THE ELECTRONICS. ONCE THE NEW TOWER IS OPERATIONAL THE OLD TOWER WILL BE DISASSEMBLED AND REMOVED BY THE SUBCONTRACTOR.

SCOPE OF WORK:

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO START OF CONSTRUCTION.
2. REMOVE ALL EXISTING ROOFING MATERIAL INCLUDING BUT NOT LIMITED TO ROOFING MEMBRANE, INSULATION, FLASHING AND FASCIA, AND NAILER BOARD AROUND PERIMETER; REMOVE ALL MATERIALS DOWN TO THE BARE METAL DECK. CONTRACTOR SHALL ASSUME EXISTING ROOF CONTAINS ASBESTOS CONTAINING MATERIAL.
3. FURNISH AND INSTALL NEW PVC ROOF SYSTEM PER THE MANUFACTURER RECOMMENDATIONS INCLUDING VAPOR BARRIER, 1 1/2" THICK POLYISOCYANURATE INSULATION, 1/2" DENSDECK PRIME ROOFBOARD, A FULLY ADHERED 80-MIL SINGLE-PLY PVC MEMBRANE, AND PVC COATED METAL EDGE FLASHING.
NOTE: VERIFY THE EXISTING SLOPE AND MAINTAIN SLOPE FOR RAIN RUNOFF.
4. FURNISH AND INSTALL NEW PRESSURE-TREATED NAILER BOARD AROUND ROOF PERIMETER.
5. PROPERLY FLASH AND SEAL OPENINGS ON THE ROOF. CONTRACTOR SHALL HAVE A SUBMITTAL DETAIL PER THE MANUFACTURER SPECIFICATIONS FOR REVIEW AND APPROVAL.
6. FURNISH AND INSTALL NEW FASCIA AND SOFFIT.
7. REMOVE, CLEAN AREA, AND REPLACE SIDING BACE FLASHING AROUND THE PERIMETER OF THE BUILDINGS.
8. CLEAN PROJECT SITE AND WORK AREA DAILY. DISPOSE OF DEBRIS AT APPROVED WASTE SITE AND IN ACCORDANCE WITH LOCAL REGULATIONS. RESTORE ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY OR VEHICLES PER SPECIFICATIONS.
9. PARTICIPATE IN CAI AND ADDRESS PUNCH LIST ITEMS IF ANY.

① RCAG SITE PLAN
SCALE: 1" = 20'-0"



④ FOR REFERENCE ONLY
SCALE: 1/2" = 1'-0"

ONLY LOOPED ITEMS APPLY TO THIS CONTRACT.



1" = 20'-0"
SCALE IN FEET



1/2" = 1'-0"
SCALE IN FEET



SCALE: 1/8" = 20'-0"
SCALE IN FEET

DRAWING QCM-D-RCAG-C003 , DATED 8 / 25 / 08 , SUPERSEDES
DRAWING QCM-RCAG-C01-01 , REVISION , DATED 2 / 25 / 95

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
ATO - TECHNICAL OPERATIONS CENTRAL SERVICE AREA

RCAG

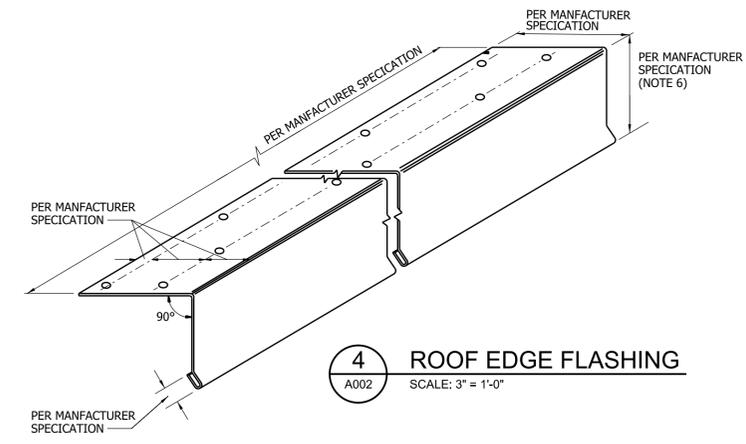
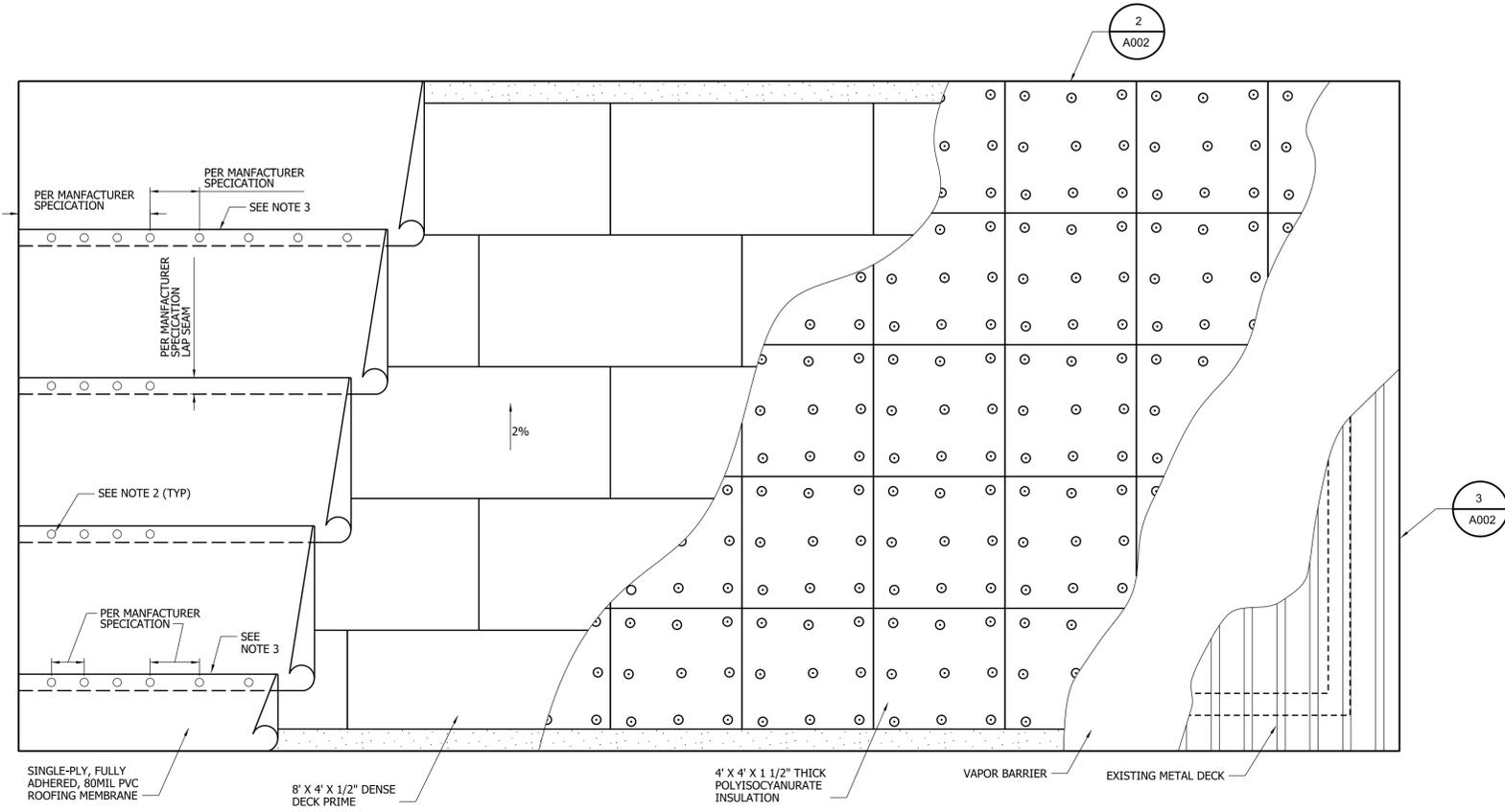
SITE PLAN

CAMERON COUNTY		TX	
REVIEWED BY	SUBMITTED BY	APPROVED BY	
PROJECT ENGINEER	DESIGNED	ISSUED BY	MGR: ENGINEERING - FORT WORTH
DRAWN		DATE	01/18/2022
		JCN	19000301
CHECKED		DRAWING NO	QCM-D-RCAG-C005

MICHELLE SHERMAN

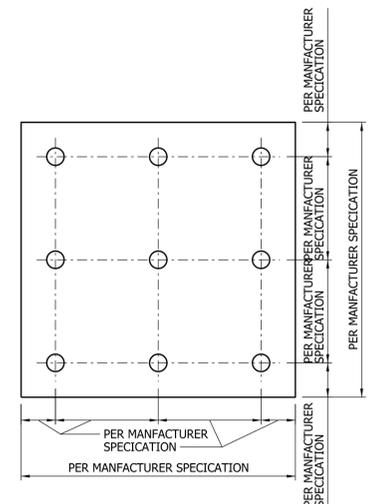
ISSUED FOR: CONSTRUCTION

- NOTES:**
- REMOVE EXISTING BUILT-UP ROOFING DOWN TO THE BARE METAL DECK AND INCLUDING ALL FLASHING AND FASCIA MATERIALS. PROVIDE NEW 10 MIL VAPOR BARRIER, 1 1/2" RIGID INSULATION, 5/8" COVER BOARD, NAILER ATTACHMENTS, 80 MIL PVC MEMBRANE, FLASHING, FASCIA, AND SOFFIT.
 - MECHANICALLY FASTEN SINGLE-PLY MEMBRANE ALONG EACH EDGE OF EACH SHEET PER THE MANUFACTURERS SPECIFICATIONS.
 - MECHANICALLY FASTEN SINGLE-PLY MEMBRANE ALONG FIRST SHEET OF MATERIAL AT THE NORTH AND SOUTH EDGE OF THE ROOF PER THE MANUFACTURERS SPECIFICATIONS.
 - CONTRACTOR SHALL FURNISH ALL MATERIALS AND INSTALL PER THE MANUFACTURERS SPECIFICATIONS. SAMPLE DETAILS ARE SHOWN, BUT CONTRACTOR SHALL SUBMIT A MANUFACTURER DETAIL FOR MEMBRANE TERMINATION FOR APPROVAL.
 - PITCH ROOF TO THE SOUTH, SEE SPECIFICATIONS FOR DETAILS.
 - DUE TO THE VARIATIONS IN NOMINAL WOOD THICKNESS, THE CONTRACTOR SHALL VERIFY THE EXACT THICKNESS OF THE ROOF EDGE AFTER NAILERS ARE INSTALLED. A TEST PIECE OF THE ROOF EDGE FLASHING SHALL BE FORMED AND TEMPORARILY INSTALLED FOR THE COR'S OR PROJECT ENGINEER'S APPROVAL.
 - FLASHING SHALL BE FABRICATED FROM SARNAFIL SARNACLAD METAL.

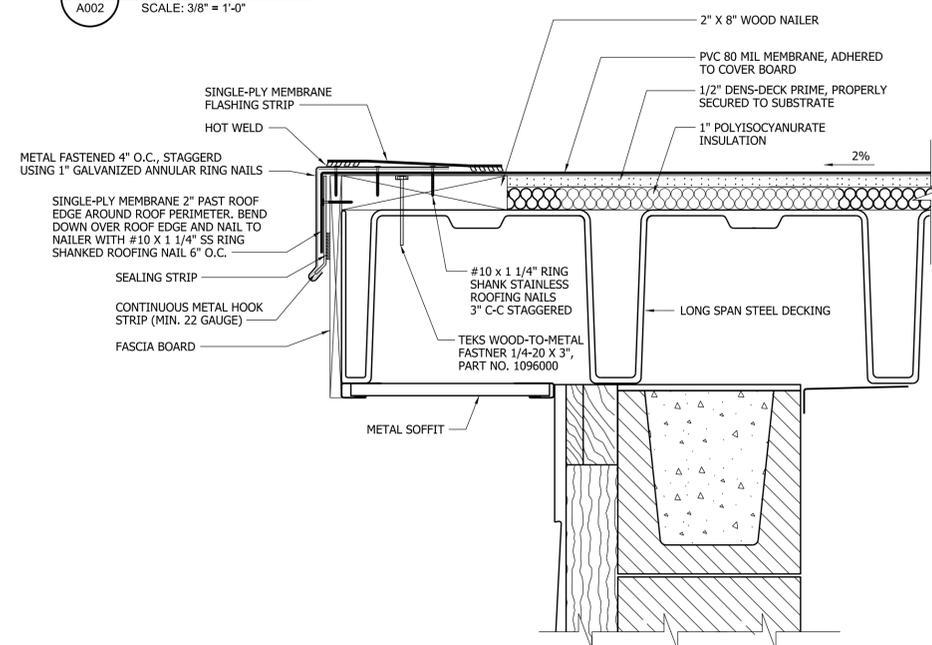


1 ROOF LAYOUT
A002 SCALE: 3/8" = 1'-0"

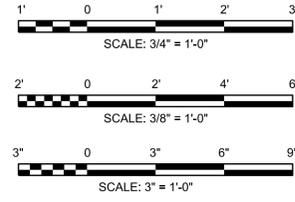
4 ROOF EDGE FLASHING
A002 SCALE: 3" = 1'-0"



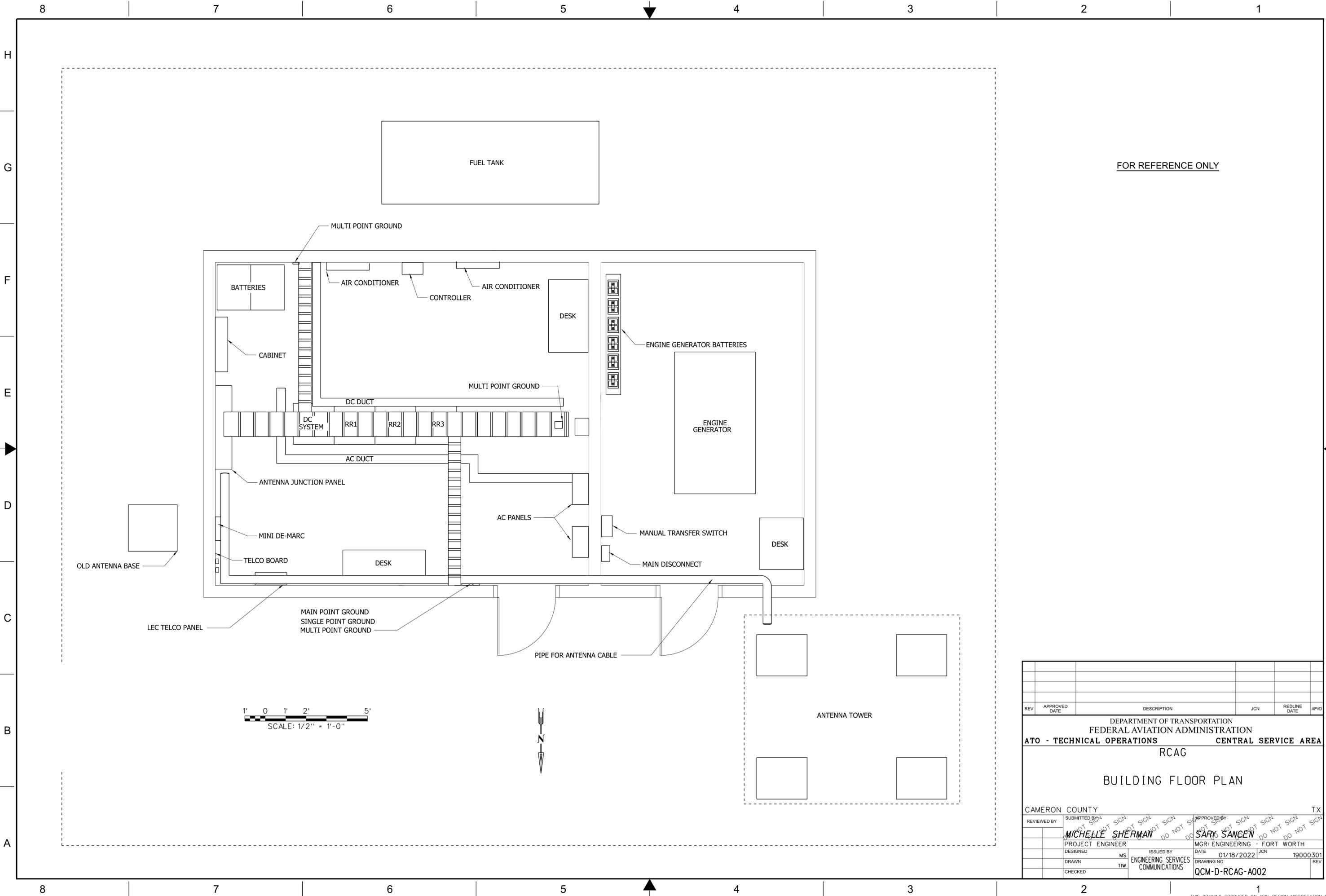
2 FASTENER SPACING IN DENS DECK
A002 SCALE: 3/4" = 1'-0"



3 END WALL DETAIL
A002 SCALE: 3" = 1'-0"



REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS CENTRAL SERVICE AREA RCAG ROOF PLAN LAYOUT					
CAMERON COUNTY					
REVIEWED BY	SUBMITTED BY	DESIGNED	ISSUED BY	MGR: ENGINEERING - FORT WORTH	TX
	MICHELLE SHERMAN	MS	TSW	DATE: 01/18/2022	19000301
CHECKED		ENGINEERING SERVICES COMMUNICATIONS		DRAWING NO: QCM-D-RCAG-A001	REV



FOR REFERENCE ONLY

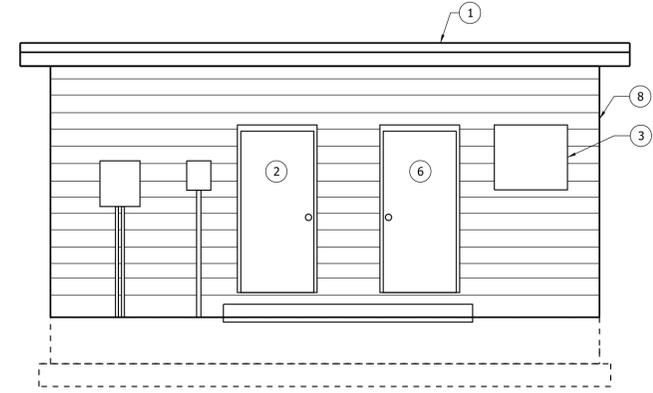
REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS CENTRAL SERVICE AREA RCAG BUILDING FLOOR PLAN					
CAMERON COUNTY					
REVIEWED BY	SUBMITTED BY	APPROVED BY	TX		
DESIGNED	ISSUED BY	MGR: ENGINEERING - FORT WORTH	DATE		JCN
			01/18/2022		19000301
DRAWN		ENGINEERING SERVICES COMMUNICATIONS	DRAWING NO		REV
			QCM-D-RCAG-A002		
CHECKED					

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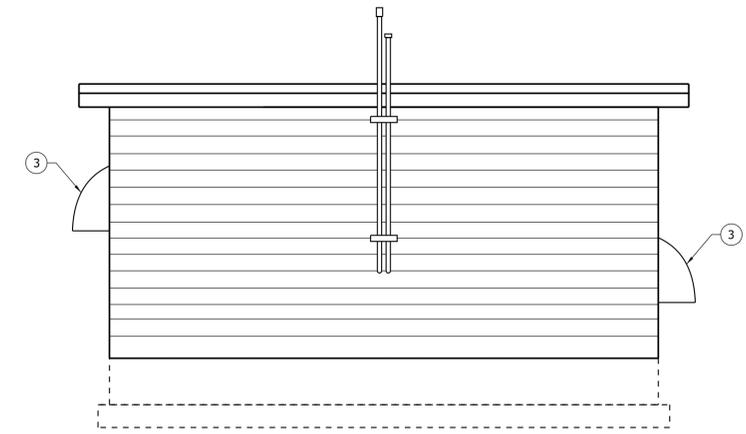
ISSUED FOR CONSTRUCTION

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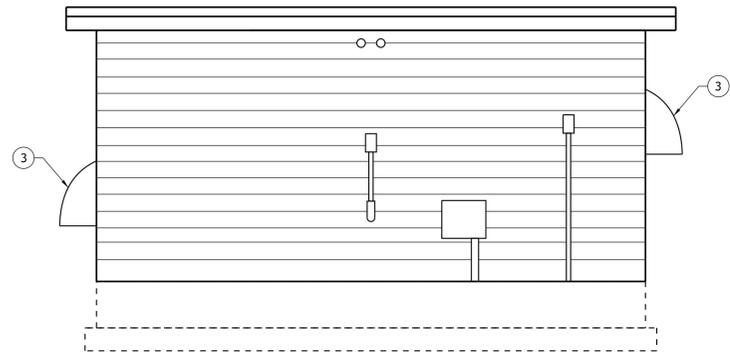
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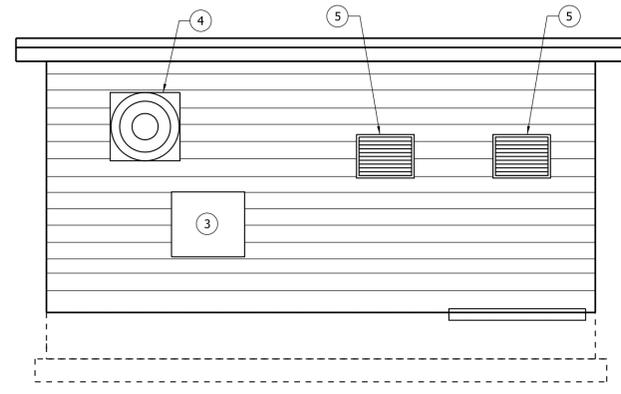
1 FRONT ELEVATION
A001 SCALE: 1/4" = 1'-0"



2 RIGHT ELEVATION
A001 SCALE: 1/4" = 1'-0"



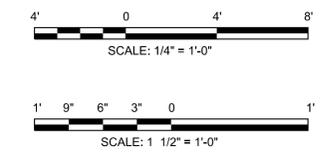
4 LEFT ELEVATION
A001 SCALE: 1/4" = 1'-0"



3 REAR ELEVATION
A001 SCALE: 1/4" = 1'-0"

- NUMBERED LEGEND:**
- ① 2" OF FOAM-IN-PLACE POLYURETHANE INSULATION AND TWO COATS OF ANCHOR ELASTOMERIC COATING URE-SHIELD NO 6005. SEE NOTE 1.
 - ② HOLLOW METAL DOOR. ENTRANCE TO EQUIPMENT ROOM
 - ③ DAMPER. PARALLEL BLADE
 - ④ VENT FAN, SIDEWALL CENTRIFUGAL, EXHAUSTER
 - ⑤ WINDOW UNIT AIR CONDITIONER
 - ⑥ HOLLOW METAL DOOR. ENTRANCE TO ENGINE GENERATOR ROOM
 - ⑦ NOT USED
 - ⑧ ALLUMINUM SIDING. SEE DETAIL "A" FOR CROSS SECTION OF WALL

FOR REFERENCE ONLY



REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS CENTRAL SERVICE AREA RCAG BUILDING EXTERIOR					
CAMERON COUNTY					
REVIEWED BY	SUBMITTED BY	APPROVED BY	TX		
	MICHELLE SHERMAN	SARY SANGEN			
DESIGNED	CHIEF ELECTRONIC ENGR BR	ISSUED BY	MGR: ENGINEERING - FORT WORTH		
DRAWN	MS	DATE	01/18/2022	JCN	19000301
CHECKED	TIW	DRAWING NO	ENGINEERING SERVICES COMMUNICATIONS	QCM-D-RCAG-A003	REV

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ISSUED FOR CONSTRUCTION EDM: qcm-d-rcag-a003.dgn

8 7 6 5 4 3 2 1 THIS DRAWING PRODUCED ON ASW REGION MICROSTATION SYSTEM

SECTION 075419 - POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Furnish the labor, materials, and tools required to remove and replace existing built up flat roof with a single-ply membrane, fully adhered, Polyvinyl Chloride (PVC) roofing membrane, insulation, roof board, flashing, and metal soffit for the RCAG Building roof in Brownsville, TX in accordance with specification, contract drawings, codes and standards.

- B. The work consists of, but not limited to the following:

1. Contractor shall submit shop drawings for review and approval prior to start of construction.

2. Remove all existing roofing material including but not limited to roofing membrane, insulation, flashing and fascia, and nailer board around perimeter; remove all materials down to the bare metal deck. Contractor shall assume existing roof contains asbestos containing material.

4. Furnish and install new PVC roof system per the manufacturer recommendations including vapor barrier, 1½” thick polyisocyanurate insulation, ½” Densdeck Prime Roofboard, a fully adhered 80-mil single-ply PVC membrane, and PVC coated metal edge flashing.

NOTE: Verify the existing slope and maintain slope for rain runoff.

5. Furnish and install new pressure-treated nailer board around roof perimeter.

6. Properly flash and seal openings on the roof. Contractor shall have a submittal detail per the manufacturer specifications for review and approval.

7. Furnish and install new fascia and soffit.

8. Remove, clean area, and replace siding base flashing around the perimeter of the building.

9. Clean project site and work areas daily. Dispose of debris at approved waste site and in accordance with local regulations. Restore all areas disturbed by construction activity or vehicles per specifications.

10. Participate in CAI and address punch list items if any.

- C. Use of premises

1. General: The construction site has a secured perimeter fence with gate. The Contractor shall coordinate with the Contracting Officer Representative (COR) or local FAA access to the facility at the Pre-Construction meeting scheduled by the Contracting Officer (CO).
2. Ingress and egress to work area: Ingress and egress to the work areas and contractor parking will be discussed at the preconstruction meeting. Keep all vehicles, working equipment and materials within the area designated by the COR or local FAA.

D. Work Restrictions

1. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7 a.m. to 5 p.m., Monday through Friday, except otherwise indicated.
 - a. No work will be performed on weekends and federal holidays.
 - b. Work shall be performed during a scheduled work week of 40 hours.
 - c. Any work outside of the shift will be considered overtime work. The Contractor may work overtime provided the Contractor notifies the COR a minimum of 48 hours in advance of any weekend, holiday, or overtime work.
 - d. The start and stop times shall typically be coordinated with the schedules of the FAA COTR or facility personnel to minimize or prevent the need for overtime work by FAA personnel.
2. Expected job duration: Fifteen (15) business days, including delay due to weather.
3. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances or outdoor air intakes.

E. Section Includes:

1. Adhered PVC membrane roofing system.
2. Mechanically fastened PVC membrane roofing system.
3. Vapor retarder.
4. Roof insulation.

F. Related Sections:

1. Division 07 Section "Preparation for Re-Roofing" for recover board beneath new membrane roofing.
2. Division 07 Section "Thermal Insulation" for insulation beneath the roof deck.
3. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
4. Division 07 Section "Manufactured Roof Expansion Joints" for proprietary manufactured roof expansion-joint assemblies.
5. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
6. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 COORDINATION

1. Requests for Information: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified to the COR.

2. All correspondence between the contractor and FAA must be through the FAA's Contracting Officer (CO) or the Contracting Officer's Representative (COR).
3. At no expense to the FAA, procure all construction and working permits required by local and state agencies.
4. Pre-Construction Conference: The contractor shall attend a pre-construction conference when required by the contracting officer. The contractor shall abide by all agreements reached at the conference regarding safety practices, access to site, deference to air traffic if necessary, and any other operational procedures.
5. Safety Meeting: Contractor shall hold a tailgate safety meeting prior to commencement of work each day, in the presence of the COR to discuss possible safety hazards and mitigation.
6. All work must be accomplished by experienced workers in accordance with the highest standards of the various work trades involved. Workers must abide by safety requirements, set forth by OSHA, that correspond to the type of work being performed.

1.5 CONTRACTOR FURNISHED MATERIAL

- A. The Contractor is responsible for furnishing all materials. There will be no FAA furnished materials under this contract.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 3. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

- E. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

1.7 PROJECT CONDITIONS

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

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Contractor's Warranty: The contractor shall supply the FAA with a two-year workmanship warranty. In the event any work related to roofing, flashings, or metalwork is found to be defective or otherwise not in accordance with the contract documents within two years of completion, the roofing contractor shall remove and replace at no cost to the FAA.
 - 2. Manufacturer's Warranty: The manufacturer's materials shall be guaranteed against defects and be leak free for a period of 30 years after completion. This warranty shall be a No-Dollar-Limit Warranty, and identifying the FAA as the owner of the facility. The location of the facility and the effective starting date of the warranty shall be indicated on Warranty documents.

1.9 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - c. Sweep floors broom clean in unoccupied spaces.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on FAA's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

PART 2 - REMOVAL OF EXISTING ROOFING MATERIAL

2.1 SCOPE OF WORK

- A. Notify FAA each day of extent of roof tear-off proposed that day.
- B. The existing roofing system must be removed down to the existing deck.
- C. Remove all roofing debris from the deck and clean and prepare the bare deck for installation of the new roofing system in accordance with the manufacturer's written instructions.
 - 1. The Contractor shall assume the existing roofing materials contain asbestos and shall plan to dispose of it appropriately at the Contractor's expense. The Contractor may choose to test for asbestos but must be from an accredited asbestos inspector and laboratory. Test results shall be submitted to the COR or Project Engineer. If the Contractor assumes or it is proven to be Asbestos Containing Material through test results, the Contractor must use appropriate precautions and work practices during the removal process, dispose of materials properly, and work must be conducted by workers with proper asbestos training.
- D. Drive and properly secure any loose nails or screws securing the decking prior to installing the new roofing system.
- E. Temporary covering over the roof must be provided until new roof is installed.
- F. Maintain access to existing walkways into the building.

2.2 REMOVAL METHOD

- A. The contractor must utilize plywood or other approved methods as necessary to prevent roofing materials being removed from falling on or damaging building walls, hoods, HCAV equipment, conduits, door, canopies, etc.
- B. Utilize heavy duty tarps to collect debris and minimize the amount of nails and small debris in or on the ground.
- C. The Contractor must pick up and remove all debris from the roofing removal. The Contractor must have a sufficient quantity of heavy duty tarps to cover the roof any time it is left incomplete or if rain threatens or occurs from the beginning of the removal until the completion of the new roof.
- D. Coordinate with FAA to shut down air-intake equipment in the vicinity of the work. Cover air-intake louvers before proceeding with roof work that could affect indoor air quality or activate any smoke detectors.
- E. Verify that substrate is visibility dry and free of moisture. The roofing system cannot be installed over a wet substrate. The Contractor and the COR shall take such action needed to provide a dry substrate.
- F. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

PART 3 - SIDING BASE FLASHING

3.1 SCOPE OF WORK

- A. Remove base flashing around building exterior siding wall. Clean and remove all debris.
- B. Install new flashing at bottom of exterior walls and properly integrate the flashing with the existing siding and CMU wall to direct water down and out of the wall. Add or re-place weep screed or insect screen if necessary.
 - 1. Materials:
 - a. PVC Coated Metal

PART 4 - INTERIOR STEEL DECK PANELS

4.1 SCOPE OF WORK

- A. Replace missing interior steel deck panels located in void between the top of CMU wall and bottom of steel deck if any missing.
 - 1. Materials:
 - a. Match that of existing panels

PART 5 - PRODUCTS

5.1 GENERAL

- A. The components of the fully adhered single-ply roof system are to be products of one manufacturer.
- B. Components to be used that are other than those supplied or manufactured by the roof membrane manufacturer shall be submitted for review and acceptance. Roof membrane manufacturer's acceptance of any other product is only for a determination of compatibility with products and not for inclusion in the membrane manufacturer's warranty. The specifications, installation, instructions, and/or restrictions of the respective manufacturer's must be reviewed by the FAA COR for acceptability for the intended use with membrane manufacturer's product.
- C. Polyethylene film sheeting to protect equipment inside building.
 - 1. Thickness: 6 mils thick
 - 2. Color: transparent
 - 3. Size: width suitable to adequately cover the equipment

5.2 SUMMARY/WOOD/LUMBER

- A. The contractor is to replace all deteriorated wood decking, wood framing, and fascia material.

- B. Lumber: Lumber shall be pressure treated with preservative Chromate Copper Arsenate (CCA) such as “Osmose K-3” or “Wolmanized” and dried after treatment. Retention of preservative shall not be less than 0.40 lbs/cubic foot.
- C. When ACQ treated wood is used on steel deck or with metal edge detailing, a separation layer must be placed between the metal and treated wood.

5.3 NAILS

- A. Nails for decking shall be 16 penny hot dipped galvanized

5.4 NAILERS AND FASTENERS

- A. The wood nailers shall be attached to existing decking with 302, 304, or 410 stainless steel fasteners or fasteners specially coated to be used in CCA treated lumber.
- B. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long.
- C. Wood Nailer thickness shall be as required to match the insulation and cover board height (thickness) to allow a smooth transition.
- D. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing
- E. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end.
- F. All Wood Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction.
- G. Two fasteners shall be installed at ends of nailer lengths.

5.5 PVC MEMBRANE ROOFING

- A. PVC Sheet: ASTM D 4434, Type II, Grade 1, Standard for Polyvinyl Chloride Sheet Roofing
 - 1. Manufacturers: Membrane shall be a fiberglass-reinforced flexible PVC sheeting. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Carlisle SynTec, Incorporated.
 - b. Cooley Engineered Membranes; Div. of Cooley Group.
 - c. Custom Seal Roofing.
 - d. Duro-Last Roofing, Inc.
 - e. Flex Membranes International, Inc.
 - f. GAF Materials Corporation.
 - g. GenFlex Roofing Systems.
 - h. Johns Manville.
 - i. Mule-Hide Products Co., Inc.
 - j. Sarnafil Inc.

- k. Stevens Roofing Systems.
 - l. Versico Incorporated.
 2. Thickness: 80 mils, nominal.
 3. Exposed Face Color: White Energy Smart), initial reflectivity of .83, initial emissivity 0.90, solar reflective index (SRI) of > 104.
 4. Wind uplift: 140mph
 5. Building roof is about 18ft by 30ft; 10ft high
- B. This roofing specification is based on installation of a PVC membrane roofing system with a 30-year warranty as manufactured by Sika Sarnafil. Equal roofing systems of other manufacturer's will be considered if they can be demonstrated to be an equal product with the same warranty. The Contractor shall comply with all the specific roofing manufacturer's installation details/requirements.
- C. PERFORMANCE REQUIREMENTS
- D. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- E. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- F. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
 1. Corner Uplift Pressure: 108lb/sq. ft.
 2. Perimeter Uplift Pressure: 80lb/sq. ft.
 3. Field-of-Roof Uplift Pressure: 60lb/sq. ft.
- G. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
- H. Fire/Windstorm Classification: [Class 1A-60] [Class 1A-75] [Class 1A-90] [Class 1A-105] [Class 1A-120] <Insert class>.
- I. Hail Resistance: [MH] [SH].
- J. SUBMITTALS
 1. Product Data: For each type of product indicated.
 2. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 - a. Base flashings, flashing for roof penetration, and membrane terminations.
 - b. Tapered insulation, including slopes.
 - c. Roof plan showing orientation or roof deck and orientation of membrane roofing.

- d. Insulation fastening patterns for corner, perimeter, and field of roof locations.
3. Processing Time: Allow 15 days for submittal review. A resubmittal would require additional time. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
4. Procurement Before Approval: The contractor is advised not to procure any item for which submittal approval is required but not yet granted. If approval is denied, the contractor will be prevented from installing the disapproved item(s). The contractor must transmit a new submittal package for the new items replacing the disapproved items, and must procure only approved items. The contractor shall take responsibility for the delivery and installation of any items installed before submittal approval is granted. The FAA reserves the right to discontinue field work on any item furnished without submittal approval. Procuring and/or installing material which is later disapproved could result in substantial losses of money and time for the contractor.
5. Maintenance Data: For roofing system to include in maintenance manuals.
6. Warranties: Sample of special warranties.

K. QUALITY ASSURANCE

1. Manufacturer Qualifications: A qualified manufacturer that is [UL listed] [FM Approvals approved] for membrane roofing system identical to that used for this Project.
 2. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
 3. Source Limitations: Obtain components including [roof insulation] [fasteners] <Insert products> for membrane roofing system [from same manufacturer as membrane roofing] [or] [approved by membrane roofing manufacturer].
 4. Manufacturer's Quality Control Inspection: The Manufacturer's Technical Representative shall review the on-going work on the first day of the roofing production and a minimum of one (1) in-progress inspection every 10 working days. The Technical Representative shall:
 - a. Communicate with the COR or local FAA, i.e. before entering the work area.
 - b. Note all defects noted non-compliance with the specifications or the recommendations of the thermoplastic manufacturer should be itemized in a punch list. Pictures of the punch list items and the roof area inspected shall accompany the inspection report. The punch list items must be corrected immediately by the contractor to the satisfaction of the COR or local FAA.
 - c. Ensure the roofing contractor has received a copy of each In-Progress Inspection Report within two days of the inspection. The roofing contractor is to forward the Project On-site COR a copy of the In-Progress Inspection Report.
- L. Installer's Responsibility: Any failure by the local FAA or COR or roofing system manufacturer's Representative to detect, pinpoint, or object to any defect or noncompliance of these specifications of work in progress or completed work shall not relieve the Installer, or reduce, or in any way limit, his responsibility of full performance of work required of the Installer under these specifications.
- M. PROJECT CONDITIONS
1. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

2. When inclement weather forces a work stoppage or when the contractor leaves the work site for the night, over the weekend, or any other time the roof shall be covered with the specified tarpaulin securely tied down and weighted with sand bags or similar means to prevent the wind from blowing the tarpaulin off. It shall be the responsibility of the contractor to insure the tarpaulin is leak free. Roofing materials damaged from wind or rain during construction shall be replaced at the contractor’s expense.

N. WARRANTY

1. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 - a. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of membrane roofing system.
 - b. Warranty for roofing system shall be a no dollar limit for labor and materials.
 - c. Warranty Period: 30 years from date of Substantial Completion.

O. ROOF MEMBRANE TYPICAL PHYSICAL PROPERTIES:

	ASTM	Minimum ASTM
Parameters	Test Method	Requirement
Overall Thickness, min., inches (mm)	D638	0.045 (1.14)
Tensile Strength, min., psi (MPa)	D638	1500 (10.4)
Elongation at Break, min. (machine x tranverse)	D638	250% / 230%
Seam strength*, min. (% of tensile strength)	D638	75
Retention of Properties After Heat Aging	D3045	-
Tensile Strength, min., (% of original)	D638	90
Elongation, min., (% of original)	D638	90
Tearing Resistance, min., lbf (N)	D1004	10 (45.0)
Low Temperature Bend, -40° F (-40° C)	D2136	Pass
Accelerated Weathering Test (Xenon Arc)	D2565	5,000 Hours
Cracking (7 x magnification)	-	None
Discoloration (by observation)	-	Negligible
Crazing (7 x magnification)	-	None
Linear Dimensional Change	D1204	0.10%
Weight Change After Immersion in Water	D570	± 3.0%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass
*Failure occurs through membrane rupture not seam failure.		

5.6 AUXILIARY MEMBRANE ROOFING MATERIALS

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

2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesive: 80 g/L.
 - f. Other Adhesives: 250 g/L.
 - g. PVC Welding Compounds: 510 g/L.
 - h. Adhesive Primer for Plastic: 650 g/L.
 - i. Single-Ply Roof Membrane Sealants: 450 g/L.
 - j. Nonmembrane Roof Sealants: 300 g/L.
 - k. Sealant Primers for Nonporous Substrates: 250 g/L.
 - l. Sealant Primers for Porous Substrates: 775 g/L.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
 1. Membrane coated flashing material shall be Sarnaclad, G410-L, 25 gauge galvanized steel, coated with 0.02 inch thick coating of PVC film or approved equal. This material shall be used for edge flashing around the perimeter of the roof.
- C. Pre-Finished Edge Grip Fascia: A two part assembly with a rigid terminator base plate and decorative snap on fascia cover. The fascia will be formed 24 ga. Kynar 500 coated galvanized steel and with concealed splices plates. Retainer base plate will be 20 gauge galvanized steel with 9/23" pre-punched holes for fasteners at 12" (304.8 mm) on center in 10' - 0" (304.8 mm) standard lengths. Color should match that of existing.
- D. Bonding Adhesive: Sarnafil Sarnacol 2170 solvent-based, elastomeric adhesive or approved equal. Shall be used to attach membrane, polyester felt, and Sarnatred protection mat to the substrates specified.
- E. Fasteners:
 1. Fasteners for attaching the insulation board and overlayment board shall be "Buildex" Roofgrip fasteners, #14 diameter with Climaseal coating or approved equal. Fasteners shall be 3" long.
 2. Any screws, nails or miscellaneous hardware for attaching flashing shall be 302, 304, or 18-8 stainless steel alloy.
 3. Any screws, fasteners, etc., to attach the treated wood nailers to deck shall be stainless steel or similar corrosion resistant fasteners designed to be used in treated wood as shown in the drawings.
- F. Distribution Plates: The distribution plates shall be three inch diameter plastic plates manufactured by TRU FAST, or approved equal and approved by roofing system manufacturer. Metal distribution plates will not be allowed.
- G. Pre-Fabricated Corner Flashing: "Sarnacorners," prefabricated universals corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-weldable to membrane or "Sarnaclad" base flashings.

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

5.7 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, **Type X**, 5/8 inch thick.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Georgia-Pacific Corporation; Dens Deck.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

5.8 VAPOR RETARDER

- A. Sheet Vapor Retarder: SBS modified bitumen, 32 mils (can use Sarnafil vapor retarder this is 106 mil, Vapor Retarder SA106), with a self-adhesive backing; having a maximum perm rating of 0.0017 perms. Include manufacturer's recommended primer for substrate preparation.
 - 1. SBS Modified: The top surface is a high-density polyethylene grid laminated between two layers of polyethylene film. A silicone release plastic film covers the self-adhesive.
 - 2. Approved Primer: Manufacturer's Self-Adhered Primer. A primer used to prime substrates different substrates prior to the application of Self-Adhered vapor barrier.

5.9 ROOF INSULATION

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Rigid Tapered Insulation Board: Rigid insulation shall be a polyisocyanurate foam core bonded to a glass fiber mat facers such as MG 1279 or GAF ULTRA and approved by the membrane manufacturer for a fully adhered membrane system meeting the Factory Mutual I-90 uplift requirement. The rigid insulation sheets shall be 4 feet by 8 feet by 1 1/2 inches thick and shall have an average aged R value of 30 using the ASTM C518 test at 75 degree F. The insulation must meet the following Typical Physical Properties:
 - 1. Overall Density: ASTM D 1622, 2.0 lbs./cubic foot (nominal)
 - 2. Compressive Strength: ASTM D 1621, 20 psi (average)
 - 3. Flame Spread, Core: ASTM E 84, 25 or less
 - 4. Moisture Vapor Transmission: ASTM E 96, Less than 2 Perm
 - 5. Dimensional Stability: ASTM D 2126, 7 Days, 158 degree F, 95% rh, Less than 2% linear change
 - 6. Service Temperature: -40 deg F to +250 deg F

- C. Two insulation products that are generally acceptable to PVC roofing membrane manufacturers and meet the Typical Physical Properties are as follows:
 - 1. JOHNS MANVILLE ENRGY 3 25 PSI with MG 1289 or GAF ULTRA Facers
 - 2. RMAX MULTIMAX FA with GAF ULTRA Facers
- D. Tapered Insulation:
 - 1. Base layer thickness: 1.5 inches.
 - 2. Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per foot as indicated on the plans.
- E. Wet broken warped, or bent insulation boards are not acceptable. Any damaged insulation boards are to be replaced with new insulation boars.

5.10 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

5.11 TARPAULIN

- A. A waterproof tarpaulin capable of covering the entire roof and having a minimum lap over the edge of 1 ½" shall be furnished by the contractor.
- B. The roof tarpaulin shall be fabricated from a urethane or plastic coated reinforced fabric with double sewn and sealed seams. The coating shall have an ultraviolet (UV) inhibitor protecting it from ultraviolet rays.
- C. The tarpaulin shall weigh a minimum of 8 ounces per square yard with a rope sewn in the hem and brass grommets around the edge at 2' on centers. The tarpaulin shall remain the property of the contractor. A suggested source for the tarpaulin is Maurition, Inc.
- D. Hold-down ropes shall be provided by the contractor.
- E. Stakes must be provided and sized by the contractor to withstand the forces necessary to hold the tarpaulin in place

PART 6 - EXECUTION

6.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that deck is acceptable for installation of roofing system
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

6.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Close all fresh air intakes/louvers where dust and odors from the roofing activities could enter the building.
- D. Coordinate with the COR the timing of the roofing removals and installation activities with the least potential for disruption of building operations.
- E. Verify that steel deck is securely fastened with no projecting fasteners; no holes, ridges, voids, uneven or misaligned surfaces or conditions, gaps, or other irregularities exist, and deck and substrates are smooth and free of sharp edges.
- F. Verify that the roofing system can be installed with proper drainage of minimum slopes indicated at all areas of roof, without ponding.
- G. Do not commence work until decking and substrates are in full compliance with roof system manufacturer's requirements, deck and substrate conditions are sound.
- H. Commencement of work indicates roofing contractor's acceptance of conditions and responsibility for all corrections required to meet the project contract requirements.

6.3 INSULATION & OVERLAYMENT BOARD

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Roofing system manufacturer's technical representative must be on the jobsite during the first initial day of installation of the roofing system.
- D. The "metal fasteners" are to have a minimum 3/4-inch and a maximum 1- inch penetration through the substrate decking. On steel decks, all securement fasteners should be fastened only

through the top rib of the steel decking. No insulation or securement fasteners are to penetrate the bottom flute of the steel decking.

- E. The first layer of the insulation edges shall be supported on the top rib of the steel deck. The insulation board shall lay transverse to the direction of the steel decking ribs. Insulation boards edges shall be as close as practical to the center of the rib, with a minimum of 1½-(1.5) inches bearing on the rib. Stagger end joints of boards a minimum of 1/3 of overall length.
- F. The surface of substrate shall be inspected prior to installation of the cover board.
- G. Install insulation sheets and overlay boards using fasteners and distribution plates as specified by the approved roofing manufacturers specifications and drawings.
- H. Fastener location shall be countersunk using a ½” spade drill bit. The fastener pattern is shown on the contract drawings. A minimum of one fastener per two square feet will be required.
- I. Insulation joints shall not be wider than 1/8”. When insulation is cut to fit irregular shapes, the insulation shall be cut to fit the desired shape accurately with true square edges.
- J. The cover board sheeting shall be laid transverse to the top layer of the insulation board, with joints staggered at least 1/3 of overall length from those of the insulation layer.
- K. Roofing Contractor shall ensure the “flat stock” and tapered insulation has been installed to where there will not be any ponding of water anywhere on the roofing system (roof area) after 24 hours of rainfall. Any ponding of water after 24 hours will not be acceptable to the FAA and shall be corrected by the Roofing Contractor at no charge to the FAA.
- L. Any conflicts between the contract documents and the approved roofing manufacturers drawings and specifications shall be brought to the COR’s or Project Engineer’s attention.

6.4 VAPOR BARRIER

- A. Install over a clean and dry substrate. Do not install when it is raining, snowing, or on wet/humid surfaces. Install in temperatures 32°F (0°C) and above.
- B. Begin application at the bottom of the slope. Unroll Self Adhering Vapor Barrier / Air Barrier onto the substrate without adhering for alignment. Overlap each preceding sheet by 3 in. (75 mm) lengthwise following the reference line and by 6 in. (150 mm) at each end. Stagger end laps by at least 12 in. (300 mm).
- C. Use a 75 lb. (34 kg) roller to press Self Adhering Vapor Barrier / Air Barrier down into the substrate including the laps.
- D. Do not cut the membrane to remove air bubbles trapped under the laps. Squeeze out air bubbles by pushing the roller to the edge of the laps.
- E. Consult manufacturer for proper alignment and securement of Self Adhering Vapor Barrier /Air Barrier to the project’s substrate.

6.5 MEMBRANE ROOFING INSTALLATION

- A. Lap Seams Shingle Fashion: The contractor shall begin at the north edge of the roof and lay the PVC membrane west-east towards the south end of the roof. This will allow the roof to drain over the laps in a shingle fashion.
- B. Fully Adhered Membrane: Carefully follow the PVC membrane manufacturer's instructions for using adhesive to install a fully adhered membrane system. The membrane shall be smooth and free from wrinkles, air bubbles, puckers, and similar irregularities that leave an unsightly appearance. Membrane laid that is not acceptable to the COR shall be replaced or repaired in a manner that is acceptable to the COR. The membrane shall be installed in strips as long as possible in order to minimize the number of end laps and short pieces.
- C. Additional Wind Uplift Protection: The first seam from the north and south edge of the starting strip shall have a row of deck screws with plastic plates set on 12-inch centers prior to hot air welding the seams. The first four feet from the roof edge shall have deck screws with plastic plates set on 12-inch centers. See the project drawings for additional wind uplift fastener locations.
- D. Mechanical Fastening: Mechanically fasten membrane securely at all transitions, at points of terminations, and at the perimeter of roof in order to meet Manufacturer's Technical requirements for properly securing the specified roofing system. This is an addition to fully adhering the membrane.
- E. Joining Overlapped Roof Membrane: All joints shall be made by hot air welding with electric hot-air welding equipment meeting the membrane manufacturers approval. Lap areas shall be a minimum of 6 inches wide and hot-air welded in its entirety. No adhesive shall be present within the lap area. Machine welding shall be used on all seams where possible. Hand welding shall only be used where seams are not accessible for machine welding.

6.6 WELDING

- A. General
 1. All mechanics intending to use the automatic welding equipment shall have successfully completed a training course provided by the Roofing System manufacturer's Technical Representative prior to welding.
 2. All membrane to be welded shall be clean and dry.
- B. Machine welding shall be achieved by the use of an automatic welding machine approved by the membrane manufacturer. When using this equipment, the manufacturer's instructions shall be followed and local code for the electric supply, grounding, and overcurrent protection observed. The automatic welding machine requires 218 to 230 volts at 30 amps. (The use of a portable generator is recommended.)
- C. Hand Welding: The equipment shall be allowed to warm up for at least one minute prior to the start of welding. The lap shall be welded every three feet to hold the material in place. The back edge of the lap shall be welded with a thin, continuous weld to prevent loss of hot air during the final welding. The hot-air nozzle shall be inserted into the lap, keeping the welding equipment at a 45-degree angle to the side lap. Once the proper welding temperature has been reached and the material starts to flow, the hand roller shall be applied at a right angle to the

welding gun and pressed lightly. For straight laps, the 1 1/2 inch wide nozzle shall be used. For corners and compound connections, the 3/4 inch wide nozzle shall be used.

6.7 FLASHING

- A. A. Install flashings concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the COR and membrane manufacturer's representative. Acceptance shall only be for specific locations on specific dates. If water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Contractor's expense.
- B. The roof edge fascia flashing shall be fabricated from Sarnafil Sarnaclad metal or approved equal. Flashing details are shown on the project drawings. The roof edge fascia flashing shall be attached to the solid wood nailers with two rows of #10 x 1 1/4 inch long annular ring stainless steel nails set 3 inches on center in a staggered pattern as shown on the drawing details. The PVC Membrane flashings shall extend a minimum of 3 inches past the securement bar and shall be hot air welded to the PVC membrane.
- C. Only area, which can be completely covered in the same day's operations, shall be flashed.
- D. Adhesive for Membrane Flashing
 - 1. Over the properly installed and prepared flashing substrate, the adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs, or similar inconsistencies. Only an area that can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
 - 2. No adhesive shall be applied in seam areas that are to be welded.
 - 3. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. Where applicable, roofing system manufacturer's pre-fabricated corners shall be used.
 - 4. The membrane flashing shall be completed adhered to the substrate with no unadhered areas.
- E. Daily test lap edges with probe to verify seam weld continuity of all membrane flashings.
- F. No excessive repairs to seams or flashings will be permitted. Remove and replace membrane, and if required the roofing components, in entire area affected as directed by the COR.

6.8 TARPAULIN

- A. Hold-down ropes shall be installed around the perimeter of the tarpaulin at evenly spaced locations to secure the tarpaulin to stakes driven into grade around the perimeter of the building.
- B. Locate underground power and control cables prior to driving the stakes that will hold down the tarpaulin. An alternate method of fastening is to draw the tarpaulin edges together under the roof deck.

CAUTION: Make sure the tarpaulin clears the engine generator exhaust system to prevent catching on fire.

- C. During inclement weather and during periods when work is not being performed, the tarpaulin shall be secured in place using the rope hold-down system.
- D. Provide sandbags on the roof to counteract negative pressure exerted by wind that would cause uplift on the tarpaulin to eliminate this problem.
- E. When work is being performed on the roof, roll back the tarpaulin upon the roof, thereby exposing the decking. Weigh down the tarpaulin as needed to secure the unrestrained parts of the tarpaulin.

6.9 SEAM INSTALLATION

A. General

- 1. All seams shall be hot air welded. Seam overlaps should be 6 inches (75 mm) wide.
- 2. The Installer shall provide and use approved Automatic Welding Equipment for machine welding the specified PVC membrane. All mechanics intending to use the automatic welding equipment shall have successfully completed a training course provided by a Roofing system manufacturer's Technical Representative prior to welding.
- 3. All membrane to be welded shall be clean and dry.

B. Hand-Welding:

- 1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
- 2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
- 3. The nozzle shall be inserted into the seam at a 45-degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½-inch (40-mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.

C. Machine Welding:

- 1. Machine welded seams are achieved by the use of PVC manufacturer's approved hot air welding machine. When using the hot air welding equipment, Installer shall follow manufacturer's instructions on proper operation of the hot air welding machine.
- 2. All applicable building local codes for electric supply, grounding and over current protection shall be observed. A dedicated portable generator is recommended for machine welding. No other equipment shall be operated off the generator during the time of machine welding.
- 3. Metal tracks may be used over the field membrane and under the machine welder to minimize or eliminate wrinkles along the seam.

6.10 FIELD QUALITY CONTROL

- A. The Roofing Contractor shall assign a qualified, full, non-working Quality Control Supervisor to be on Project site at all times during installation of Work. This QC supervisor is to have good communication skills and be able to communicate with the FAA COR and with Contractor's Employees.

1. At the end of the work day, the Quality Control Supervisor shall inspect all installed Work, particularly roofing tie-ins, membrane seams, and completed flashings to ensure water-tightness of the roofing system.
 2. The Quality Control Supervisor shall prepare a daily report which describes each major portion of Work or operation. The Quality Control Supervisor shall confirm all of the completed work has been thoroughly inspected to ensure the water-tightness of the roofing system. The daily report shall include pictures of Work completed “that” day.
 3. The Quality Control Supervisor shall use a Roof Plan to indicate each day’s completed Work, the sequence of Work, and with previous completed Work dates.
 4. All Quality Control Supervisor’s daily electronic reports shall be submitted to the FAA’s COR at the end of the work week. Each daily report shall be properly dated.
 5. At the end of the work week, the Quality Control Supervisor shall submit a written electronic report / schedule or bar chart indicating where the “next week’s” work will occur, and any information needed to be coordinate the FAA’s COR, i.e. raising of equipment, required disconnects of equipment, and when applicable any supply deliveries.
- B. Quality Control of Welded Seams:
1. The Installer shall designate a Quality Control Supervisor to check all welded seams for continuity by using a rounded screwdriver.
 2. On-site evaluation of welded seams shall be made by the Installer at locations as directed by the FAA's COR or roofing system manufacturer’s technical representative.
 3. One inch (25-mm) wide cross-section samples of welded seams of the membrane and membrane flashing shall be taken at a minimum of three (3) times a day by the Installer.
 4. Installer shall label each seam test cut with the time, date, and location of the test cut. At the close of project, all seam test cuts are to be submitted to the FAA’s COR for review.
 5. Retain test cuts for the roofing system manufacturer’s technical representative’s and FAA’s COR’s inspection and evaluation.
 6. Correct welds display failure from shearing of the membrane prior to separation of the weld.
 7. Repair cold welds, tears, voids, and wrinkles in the over lapped seams of the roofing membrane and membrane flashing which do not meet manufacturer’s requirements for a quality seam weld.
 8. Each test cut shall be patched by the Installer at no extra cost to the FAA or to roofing systems manufacturer.
 9. All membrane seams, both field and flashings, shall be hot air welded and probed on a daily basis. NO EXCEPTIONS.
- C. Roofing system manufacturer's technical representative: Installer shall arrange to have the system manufacturer’s technical representative on site of the first day of installation of the roofing system. The Technical Representative shall note:
1. Conduct a site inspection on the first day of production.
 2. After the first day of inspection, the roofing system manufacturer’s technical representative shall perform a minimum of one (1) in-progress inspection every 10 working days for the duration of the project.
 3. At the completion of the project, the technical representative shall perform a final inspection of the completed work.
 4. A copy of each In-Progress Inspection Report shall be sent to the FAA’s COR within two days after date inspections are performed.

- D. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to FAA COR.
 - 1. Notify FAA COR 48 hours in advance of date and time of inspection.
 - 2. All defects noted non-compliance with the specifications or the recommendations of the thermoplastic manufacturer should be itemized in a punch list. These items must be repaired or removed and replaced by the contractor to the satisfaction of the FAA and manufacturer.
 - 3. The roofing contractor is to forward a copy of Final Inspection Report to the Nestlé On-site COR within two days after date inspection(s) is performed.
- E. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements..

6.11 ASBESTOS FREE CERTIFICATION

- A. The Contractor shall provide the Contracting Officer (CO) a signed statement stating that to the best of his/her knowledge; no asbestos-containing roofing materials were used during the construction of the roof.
- B. The Contractor shall submit to the CO Material Safety Data Sheets (MSDS), prior to construction, for all materials and/or products to be utilized during the course of the project accomplishment. During the course of the project, both the COR and the Contractor shall routinely check products utilized on-site to ensure only products which have had MSDS submitted are utilized. Copies of all MSDS shall be turned over to the local FAA office for their records.
- C. If the Contractor does not submit the required information described above, the FAA shall have a complete building survey performed by a qualified testing firm prior to acceptance. The cost of the survey and any subsequent removal/replacement of any asbestos-containing material shall be deducted from the Contractor's payment.

6.12 HAZARDOUS MATERIAL AND SAFETY

- A. The Contractor shall provide workers protection per OSHA 29 CFR 1926.62.
- B. The Contractor shall be responsible for safety on the work site. It is the responsibility of the Contractor to eliminate hazards which may result in tripping, electrical shock, fire, falling objects, environmental hazards, vehicular accidents, etc. The Contractor shall comply with all safety precautions required by OSHA. The Contractor shall have two 15 lb. Class B and C fire extinguishers at the work area through the progress of welding, metal cutting, or any other process involving a spark or fire hazard.
- C. See EOSH Attachments included the Appendix for additional information and requirements.

6.13 PROTECTING AND CLEANING

- A. Carefully cover the equipment so that no water can enter the cabinets and damage the equipment. Equipment in service that generate heat and require ventilation shall have wood

frame constructed above the equipment and covered with polyethylene film sheeting, All temporary polyethylene covering shall be approved by the COR.

- B. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- C. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- D. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

6.14 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

- A. The contractor shall be responsible for the preservation of all public and private property. The contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in its manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the work is completed and accepted.
- B. When or where any direct or in-direct damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at its own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing or otherwise restoring as may be directed by the COR, or it shall make good such damage or injury in an acceptable manner, at no additional cost to the Government.