



**US Army Corps
of Engineers**
Louisville District

Solicitation for Roof Replacement
FACID MI029, Buildings SF002, SF007 and SF008
Southfield, Michigan



Corrected Final Design
01 August 2017

W912QR-14-D-0020
PN: 462827

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I N T E R N A T I O N A L

MI029

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SECTION 01000 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: The project consists of 23,728 SF of roof system retrofit and replacement on three (3) buildings at MI029 Southfield, Michigan Reserve Center.
- B. Project Location: 26402 West 11 Mile Road, Southfield, Michigan 48304.
- C. Project Owner: U.S. Army Corps of Engineers.
- D. Furnish all labor, materials, tools, equipment, devices, appliances, utilities, transportation, and other work and services necessary to accomplish the work described in these specifications.

1.3 CONTRACT

- A. The "Contract" shall be issued by Change Order per the Federal Acquisition Regulation (FAR).

1.4 PERMITS

- A. Obtain all necessary licenses and permits required by law to accomplish the work. Submit evidence of all required licenses and permits prior to starting work.

1.5 REMOVAL OF ASBESTOS-CONTAINING ROOFING MATERIALS

- A. The base flashings, roof cement, roofing felts, underlayment, and roof membrane on Roof Area 002 on OMS Building at the facility do not contain asbestos.
- B. The Contractor shall follow the requirements of Michigan state law concerning the removal of asbestos-containing materials. The Contractor is required to obtain the services of a licensed, insured, and certified Asbestos Consultant to prepare the asbestos removal plan. The Contractor shall obtain the services of a remediation contractor that holds the appropriate license in the state of Michigan for this type of work and has been licensed in the state of West Virginia for a minimum of five (5) years to perform the removal of the base flashing known to contain asbestos-containing materials.
- C. Air monitoring during the work shall be performed in accordance with current regulations and the approved work plan. All field records and test results associated with the monitoring program shall be submitted at the end of the project to the Owner.
- D. At a minimum, the contractor shall wet and double-bag all ACM prior to placing materials in a dumpster double-lined with minimum 6 mil sheathing. Manifest of site that has received the ACM shall be provided to the Owner and COR at the conclusion of the project.

- E. All roof-mounted mechanical equipment shall be shut down during abatement, as allowable by the Owner. Seal off all air intake ports, discharge ports, independent fans, etc. with tape and polyethylene film. Install fully enclosed chutes, use crane/lift, or make other arrangements for the removal of ACM from the roof areas that comply with current regulations. Coordination with the Owner will be necessary for this scope of work. A minimum notification must be given to the COR a minimum of 48 hours in advance prior to any preapproved roof-mounted equipment shut downs.

1.6 ADEQUACY OF DRAWINGS AND SPECIFICATIONS

- A. The complete requirements of the Work to be performed under the Contract shall be set in Drawings and Specifications supplied by the Owner. No guarantee is given or implied that the number and location of units, curbs, utility lines, other rooftop features or roof dimensions shown are absolutely correct, or that other curbs, penetrations, drains and features in addition to those shown may be encountered. The site is made available for inspection and it is the responsibility of the Contractor to inspect and verify quantities, footages and varying site conditions.
- B. Figured dimensions on the Drawings will be used in preference to scaling the Drawings. Where dimensions are not shown on the Drawings and are required for the Contractor to properly construct the work, he shall be responsible for obtaining such dimensions by field measurement.
- C. Any discrepancies found between the Drawings and Specifications and site conditions or any errors or omissions in the Drawings or Specifications shall be immediately reported to the COR or the COR who shall promptly correct such error or omission in writing. For differences between the specifications and the drawings, the specifications shall prevail. Where there is a discrepancy between the drawings and specifications and the requirements of a manufacturer to meet the requirements of the guarantee, the more stringent detail shall be followed.
- D. Where reference is made in the Specifications to specifications or standards of any technical society or association such as the NRCA or SMACNA, it is understood and agreed that such details or standards are a part of the Specification as though fully repeated herein. The Contractor shall secure copies of such standards and make them available at the job site.
- E. One complete set of all Drawings and Specifications, submittals, manufacturers installation manuals and other data prepared, shall be maintained at the job site and shall be available at all times.

1.7 SEPARATE CONTRACTS

- A. The Owner may let other contracts in connection with the Work of the Contractor to other trades if the Project so requires. The Contractor shall cooperate with the other Contractors with the storage of materials and execution of their work. It shall be the Contractor's responsibility to inspect all Work by other Contractors affecting his Work and to report to the Contracting Officer or the COR any irregularities which will not permit him to complete his Work in a satisfactory manner. Failure to notify the CO or COR of any such irregularities shall indicate the Work of other Contractors has been satisfactorily completed to receive his Work.

1.8 ORAL AGREEMENTS

- A. No oral agreement, order, objection, claim or notice by any party shall affect or modify any of the terms or obligations contained in any of the Contract Documents, and none of the provisions of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by an agreed to waiver or modification thereof in writing. All agreements and instructions must be in writing.

1.9 LANDS BY THE OWNER

- A. The Owner shall provide the lands upon which the Contractor and the Work of the Contract is to be performed and/or which is to be used for the rights-of-way or access. All as shown on the Drawings.

1.10 PRIVATE PROPERTY

- A. The Contractor shall not enter upon adjacent private property for any purpose without obtaining written permission. All copies of such written permission shall be furnished to the CO or the COR. The Contractor shall be responsible for the preservation of all private property, trees, monuments, fences, etc., along the adjacent street, right-of-way, etc., and shall take precautions necessary to prevent damage or injury thereto.

1.11 LAWS TO BE OBSERVED

- A. The Contractor shall give notice and comply with all federal, state and local laws, ordinances or regulations that in any manner affect the conduct of the Work. The contractor shall indemnify and hold harmless the Owner against any claim or liability arising from, or based on, the violation of any such law, ordinance, regulation, order or decree, whether by himself, his employees or Subcontractors.

1.12 PROJECT SCHEDULE

- A. Submit schedule and roof plan for removal and reroofing to COR for approval prior to starting work, so that, if necessary, inside operations can be coordinated with the roofing work. Work shall not begin until schedule is approved by COR.
- B. A schedule must be submitted and approved prior to certification of the first request for payment.
- C. A roof plan outlining daily estimated production and progress by area is acceptable.

1.13 QUALITY CONTROL

- A. The contractor shall follow the U. S. Army Corps of Engineers QA/QC program outlined in the Contract Documents.

1.14 ROOF WARRANTY PLACARD

- A. Provide new placard which identifies the roofing contractor, roof manufacturer and warranty/guarantee effective dates.
- B. Fabricate to size shown on drawings using 22-gauge galvanized steel sheet. Paint white using exterior paint manufactured for the purpose and use black lettering.
- C. Secure placard at corners using drive pins with waterproof sealing washers and stainless-steel nail inserts.
- D. Install placard near ladder access area. Confirm placard location with facility manager.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01000

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Project consists of Replacing Existing Roof systems on three (3) buildings at MI029 Southfield, Michigan Reserve Center.

- 1. Project Location: MI029 – 26402 West 11 Mile Road, Southfield, Michigan 48304.
- 2. Owner: U.S Army Corps of Engineers

- B. Furnish all labor, materials, tools, equipment, devices, appliances, utilities, transportation, and other facilities and services necessary to accomplish the work described herein.

- C. The Work under MI029 includes the following:

- 1. Roof Area SF002 - Remove the existing built-up roofing, bituminous inter-ply, and roof insulation down to the metal decking, and discard.
- 2. Roof Areas SF007 and SF008: Secure existing metal panels and trim elements to remain for installation of new retrofit single ply membrane.
- 3. Remove the existing gutters, downspouts, and accessories, and discard.
- 4. Remove all existing metal penetration flashing and pitch pans, and discard.
- 5. Modify and raise existing curbs to provide a minimum 8-inch flashing height.
- 6. Roof Areas SF007 and SF008: Furnish and install new fill insulation, insulation, cover board, and fully adhered single ply roof system as specified herein.
- 7. On Roof Area SF002: Furnish and install new insulation, cover board, and modified bitumen roofing, as specified herein.
- 8. Furnish and install new parapet liners, coping, single ply flashings, bituminous flashings, and metal flashings, as specified herein.
- 9. Furnish and install new gutters and downspouts, as specified herein.
- 10. Furnish and install new penetration, risewall, parapet, and metal edge flashings as specified herein.
- 11. Furnish and install any miscellaneous items, as specified herein and as indicated on roof plans.

1.3 START AND COMPLETION

- A. Work shall begin on a date given in a Notice to Proceed. Materials may be delivered to the site prior to the start of work upon approval by the Owner.
- B. Any extension of contract time considered necessary by the Contractor must be submitted in writing to the COR with complete details of conditions necessitating extension and specific time of extension requested. Any extension must be specifically authorized by the COR in writing.

1.4 CONTRACTS

- A. Project will be constructed under a general construction contract.

1.5 DESCRIPTION OF THE EXISTING SYSTEMS

- A. Information in this Section is provided only to establish general description and is not necessarily accurate. The Contractor shall be responsible for becoming satisfied as to the existing conditions, size of roof areas, etc. before preparation and submission of bid. Receipt of bid will be considered evidence Contractor has become satisfied on all details relating to the work.
- B. Existing Facility and Systems:
1. SF002 OMS Maintenance Building – (3) ply built-up roof membrane over ½” inch wood fiber insulation, and 1 ½” polyisocyanurate insulation over metal roof deck.
 2. SF007, Formed corrugated roof panels over metal roof deck over open frame structural system.
 3. SF008, Formed corrugated roof panels over metal roof deck over open frame structural system.
 4. Roof slopes, eave heights, and elevation changes indicated on drawings.
- C. Contractor shall be responsible to document all existing damage to facility prior to beginning work and producing documentation acceptable to the COR prior to starting work. Damage discovered during the project which was not documented and which is not clearly the responsibility of others may be presumed by the COR as the responsibility of the contractor. Documentation may be in the form of written statements and/or drawings but must also be supported with photographs and/or video tape supplied by contractor.
- D. Contractor is responsible to become familiar with the locations, purposes and types of service utilities present and to ensure that all lines are properly protected during the work, remain in service during the work, and are repositioned in their appropriate places at the conclusion of the work unless specifically indicated otherwise herein or on drawings. Contractor is to carefully coordinate any activities relating to such lines with the Owner prior to conducting such activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01140 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 USE OF PREMISES

- A. Security Procedures: Contractor shall be required to follow all security procedures established by the Owner, including scheduling requirements, limited use of electronic and photographic equipment, etc. See separate section entitled "Security Regulations."
- B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. User Occupancy: Allow for User occupancy of site and use by the public.
 - 2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to User, User's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Building: Maintain existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.
- D. Prior to starting work, Contractor shall obtain approval of the Owner for locations of work operations at ground level, such as material storage, hoisting, dumping, etc. Work will be restricted to approved locations. Finalized locations of work operations at ground level will be coordinated at the Prebid Conference.
- E. Submit plans for removal and replacement to Owner for his approval prior to starting work so that, if necessary, inside operations can be coordinated with the work.
- F. Contractor will note that building will remain occupied during work. Contractor is responsible for protecting building, contents and personnel from damage or injury from his operations, and from water entry into the building during construction. Dirt and dust must be kept to a minimum. Contractor must provide all protective structures, barriers, or other means of protection necessary to assure the public safety and to fulfill all requirements by governmental authorities.
- G. All debris and removed material shall be removed from the site in a timely manner to minimize accumulation.
 - 1. Owner reserves the right to judge whether debris is being removed in a timely manner.
 - 2. In the event debris is not removed from the site as required to maintain the site in a manner acceptable to the Owner, the Owner reserves the right to engage other contractor(s) or its own forces to clean the areas and deduct costs of such operations from this contract.
- H. Contractor will be responsible for any damage to grounds and landscaping. In the event of damage, he shall restore damaged property to a condition equivalent to that at time of start of operations.

- I. At the conclusion of each day's work, Contractor shall carefully inspect work including temporary daily tie-offs to ensure system is completely water tight; all stored materials are suitably protected from the weather and all equipment is stored in such a manner as not to interfere with facility operations.
- J. On normal workdays when contractor does not work due to inclement weather or other reasons, Contractor's superintendent shall visit the site no later than his normal start time and verify that the system is completely water tight; all stored materials are suitably protected from the weather and all equipment is stored in such a manner as not to interfere with facility operations. Contractor shall be prepared to implement emergency repairs as necessary to prevent leakage into the facility.
- K. Contractor shall use whatever means necessary to isolate Contractor's equipment from non-contractor personnel, including if necessary, the construction of a 6-foot-tall chain link fence with integral lockable gate which completely surrounds the equipment. Owner reserves the right to judge adequacy of contractor's methods to isolate equipment and may, at any time, demand construction of the fence as compliance with this requirement. Should the Owner demand the construction of the fence, such shall be accomplished at no additional cost to the Owner.

1.3 OCCUPANCY REQUIREMENTS

- A. Full User Occupancy: User will occupy site and existing building during entire construction period. Cooperate with User during construction operations to minimize conflicts and facilitate User usage. Perform the Work so as not to interfere with User's operations.
- B. The Contractor shall notify Owner, User and all concerned utility companies 48 hours prior to the start of construction. Additional notification shall be given by the Contractor to all the above-mentioned parties 48 hours prior to crossing, connecting to, or working near any right-of-way utility owned or controlled by any of the concerned parties.
- C. Contractor will be stopped if construction operations interfere with User operations. Contractor must coordinate all operations with the User.

1.4 SAFETY AND PROTECTION

- A. The Contractor shall adhere to and enforce on the job site all pertinent requirements of OSHA and the US Army Corps of Engineers Safety Manual EM385-1-1.
- B. The Contractor shall provide adequate signs, fences, barricades, signal lights, fire extinguishers and watchmen, and shall take all necessary precautions for the protection of the Work and safety of the public. Said warning and protection devices shall comply with the requirements of the governing agencies involved. All damage, injury or loss to any property caused, directly or indirectly in whole or in part, by the Contractor, and Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, will be remedied by the Contractor.
- C. The Contractor shall at all times conduct his Work as to insure the least possible obstruction to the general public and the residents near the Work. Local, State and Federal laws, ordinances, rules, and regulations pertaining to the kind, use and loading of apparatus, equipment, and material shall be complied with as well as all other reasonable precautions. Fire hydrants, water supply valves and gas valves on or adjacent to the Work shall be accessible at all times.
- D. The Contractor will be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. He will take all necessary precautions for the safety of, and will provide the necessary precaution to prevent damage, injury or loss to:
 - 1. All employees on the work and other persons who may be affected thereby.

2. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and,
 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement during construction.
- E. All equipment shall be in good working order. Any equipment found to be unsafe by the COR shall be repaired or removed from the project immediately.

1.5 USE OF SUBCONTRACTORS

- A. At the time specified by the Contract Documents the Contractor shall submit in writing to the Contracting Officer the names of any Subcontractors proposed for the scheduled Work. Once submitted, subcontractors may not be changed without the consent of the Contracting Officer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01140

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- B. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- C. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- D. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- E. "Provide": Furnish and install, complete and ready for the intended use.
- F. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- G. "Act of God": An earthquake, cyclone, or other cataclysmic phenomenon of nature. Rain, wind, flood or other natural phenomenon of normal intensity for the locality shall not be construed as an Act of God and no payment shall be made to the Contractor for damages to the Work resulting there from.
- H. "Addenda": Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings, and Specifications, by additions, deletions, clarifications or corrections.
- I. "Agreement": The Contract executed by the Contracting Officer and Contractor covering the performance of the Work described in the Contract Documents.
- J. "Bid": The offer Proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- K. "Bidder": Any person, firm, or corporation submitting a Bid for the Work.
- L. "Change Order": A written amendment of the Contract between the Contracting Officer and the Contractor, authorizing an addition, deletion, or revision in the work within the general scope of the Contract Documents, or authorizing an adjustment in the contract price or contract time.
- M. "Contract Amount": The total amount of money payable to the Contractor under the terms and conditions of these Contract Documents.

- N. "Contract Documents": The contract, including Advertisement, Instructions to Bidders, Proposal, Contract, Bonds, Certificate of Insurance, Contractors Declaration, General Conditions, Submittals, Contractors Qualifications, Construction Specifications, Supplemental Specifications, Drawings, Addenda, Notice of Award, Notice to Proceed, Change Orders and those documents necessary for the Project.
- O. "Contract Time": The number of calendar days stated in the Proposal for the completion of the work.
- P. "Contractor": The person, firm or corporation with whom the contracting officer executes the agreement.
- Q. "Field Order": Written directives issued by the Contracting Officer or the Contracting Officer Representative. Field orders may take the form of instructions or authorizations in reference to performance of the Work. Field orders may also be interpretations or clarifications of the Contract Documents. Field orders do not change the content, nor shall they be interpreted as a change in the Contract Documents.
- R. "Governing Agency": The United States Army Corps of Engineers Designated Representatives
- S. "Incidental to the Project": Incidental items of Work required but not specifically listed in the Proposal and for which no separate payment will be made. The costs associated with such incidental items are to be included in the Gross Proposal Amount.
- T. "Notice of Award": The written notice of the acceptance of the Bid from the Contracting Officer to the successful low bidder.
- U. "Notice to Proceed": Written communication issued by the Contracting Officer to the Contractor to proceed with the Work and establishing the commencement date and completion date for the Work.
- V. "User": The United States Army Reserve
- W. "Owner": The United States Army Corps of Engineers and/or the Contracting Officer who performs as the Agent in the administration of the Work under Contract.
- X. CONTRACTING OFFICER'S REPRESENTATIVE- A duly appointed representative delegated to assist in the administration of the Contract.
- Y. "Plans": Drawings which show the characteristics and scope of the Work to be performed and which are a part of the Contract Documents.
- Z. "Project": The undertaking to be performed as provided in the Contract Documents.
- AA. "Proposal": The offer of a bidder to perform the Work described in the Contract Documents when made out and submitted on the Prescribed Proposal Forms- properly signed and guaranteed.
- BB. "Punch List": A list of uncompleted work given to the Contractor by the Contracting Officer or the COR.
- CC. "Shop Drawings": All drawings, diagrams, illustrations, brochures, schedules, and other data prepared by the Contractor, a subcontractor, Manufacturer, Supplier or distributor which illustrates how specific portions of the Work shall be fabricated and/or installed.
- DD. "Specifications": A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

- EE. "Subcontractor": An individual, firm, or corporation having a direct contract with the Contractor, or with another Subcontractor, for the construction of a part of the project.
- FF. "Substantial Completion Date": That date as certified by the Contracting Officer when the construction of the Project is sufficiently completed in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purpose for which it is intended.
- GG. "Supplier": Any person or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.
- HH. "Work": All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the Project.
- II. "Written Notice": Any notice to any party of the CONTRACT relative to any part of this agreement delivered in writing and posted by certified or registered mail to the said party or his authorized representative.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWPA	American Wood-Preservers' Association www.awpa.com	(817) 326-6300
CO	Contracting Officer	

COR	Contracting Officer's Representative	
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
IN	Inches	
LBS	Pounds	
LEED	Leadership in Energy and Environmental Design www.usgbc.org/LEED	(202) 742-3780
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NBS	National Bureau of Standards	
NDL	No Dollar Limit	
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
OC	On Center	
QA/QC	Quality Assurance/Quality Control	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPEC	Specification	
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SRI	Solar Reflectance Index	
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
USGBC	U. S. Green Building Council www.usgbc.org	(202) 828-7422
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 548-0112
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	Building Officials Congress of America	
ICC	International Code Council, Inc. (Formerly: CABO - Council of American Building Officials) www.intlcode.org	(703) 931-4533
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
SBCCI	Southern Building Code Congress International, Inc. www.sbcci.org	(205) 591-1853
UBC	Uniform Building Code	

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

SECTION 01500 - TEMPORARY FACILITIES, CONTROLS AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities, controls, protection and disconnects, including temporary utilities, support facilities, security facilities.
- B. Related Sections include the following:
- C. Division 7 Section "PVC Single Ply Membrane Roofing"

1.3 SUBMITTALS

- A. Submit plans for work for approval prior to starting work so that, if necessary, inside operations can be coordinated with the work.

1.4 TEMPORARY UTILITIES

- A. Water Service: At the Contractor's expense and in a manner satisfactory to the COR, provide and maintain necessary temporary connections, distribution lines, and meter bases for all water usage. The government will not provide any water for the Contractor's use. The Contractor shall remove any such temporary connections, distribution lines, and meter bases upon completion of the project, restoring conditions prior to work.
- B. Electric Power Service: At the Contractor's expense and in a manner satisfactory to the COR, provide and maintain necessary temporary connections, distribution lines, and meter bases for all electricity usage. The government will not provide any electric power for the Contractor's use. The Contractor shall remove any such temporary connections, distribution lines, and meter bases upon completion of the project, restoring conditions prior to work.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities and drinking-water fixtures. Locate at sites approved by the Owner. Facilities in existing buildings are off-limits.
- D. Lunchroom Facilities: On-site facilities are not available to Contractor personnel.

1.5 TOBACCO PRODUCTS

- A. Tobacco products will not be allowed on site at any time. Enforce the tobacco policy of the Army Reserve with regard to Contractor's personnel. Non-compliance by any of Contractor's personnel will be justification for removal of those individuals from this project.
- B. Tobacco products will be allowed on site only in areas designated by the Army Reserve and only upon specific written approval of the Army Reserve. Enforce the tobacco policy of the Army Reserve with regard to Contractor's personnel. Non-compliance by any of Contractor's personnel will be justification for removal of those individuals from this project.
- C. No smoking is allowed on the roof.

1.6 PROTECTION OF BUILDINGS AND PROPERTY

- A. Note that building will remain occupied during work. Take all precautions necessary to protect building, contents and personnel from damage or injury from operations and from water entry into the building during construction. Keep dust and dirt to a minimum.
- B. At conclusion of each day's work, carefully inspect work including temporary daily tie-offs to ensure system is completely water-tight, all stored materials are suitably protected from the weather and all equipment is stored in such a manner as not to interfere with facility operations.
- C. On normal workdays when no work is accomplished due to inclement weather or other reasons, visit the site no later than normal start time and verify that the system is completely water-tight, all stored materials are suitably protected from the weather and all equipment is stored in such a manner as not to interfere with facility operations. Be prepared to implement emergency repairs as necessary to prevent leakage into the facility.
- D. Prior to starting work, obtain approval from COR for locations of work operations at ground level, such as material storage, hoisting, dumping, etc. Restrict work to approved locations.
- E. Prevent any work which could reasonable be deemed to be hazardous from taking place over or adjacent to occupied areas. Coordinate with the COR the vacating of such affected areas of all occupants and give the COR adequate notice to allow time to comply. Post a watchman inside the building in the affected area(s) at all times during the work to ensure no one enters or remains in the affected area(s).
- F. Remove debris and other material from the site in a timely manner to minimize accumulation.
- G. The COR reserves the right to judge whether debris is being removed in a timely manner. In the event debris is not removed from the site as required to maintain the site in a manner acceptable to the COR, the COR reserves the right to engage other contractor(s) or its own forces to clean the areas and deduct costs of such operations from this Contract.
- H. Protect grounds and landscaping from damage. In the event of damage, restore damaged property to a condition equivalent to that at time of start of operations.
- I. Document all existing damage to facility prior to beginning work and produce documentation acceptable to the COR prior to starting work. Damage discovered during the project which was not documented and which is not clearly the responsibility of others may be presumed by the COR as the responsibility of the Contractor. Documentation may be in the form of written statements and/or drawings but must also be supported with photographs and/or video tape supplied by the Contractor.
- J. Isolate heating fuels and electrical equipment from non-Contractor personnel by whatever means necessary, including the construction of a six-foot tall chain link fence (which completely surrounds the equipment, material storage and personnel necessary to maintain the equipment) with integral lockable gate. The COR reserves the right to judge adequacy of Contractor's methods to isolate equipment and may, at any time, demand construction of the fence as compliance with this requirement. Should the COR demand the construction of the fence, such shall be accomplished at no additional cost to the COR.
- K. Initiate, maintain and supervise all safety precautions and programs in connection with the work. Take all necessary precautions for the safety of, and provide the necessary precaution to prevent damage, injury or loss to:
 - 1. All employees on the work and other persons who may be affected thereby.
 - 2. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site.

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement during construction.
- L. Comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. Remedy all damage, injury or loss to any property caused, directly or indirectly in whole or in part, by the Contractor, and Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

1.7 DISCONNECTS

- A. In the event it is necessary to disconnect any electrical wiring or connections, plumbing lines or other building services, notify the COR at least 48 hours prior to planned disconnect. Do not disconnect or connect services unless authorized in writing by the COR.
- B. Include in Base Bid all costs required for modification of existing curbs, service piping, wiring and duct work required in connection with the lifting, removal or relocation of roof-mounted equipment.
- C. All associated work is to be accomplished by appropriately licensed personnel in accordance with all applicable codes and regulations.
- D. Review roof-top equipment usage with the COR and facility user at beginning of project. Disable equipment determined to be essential to the operations of the facility only at those times prescribed by the COR. This may require work to be done at other than normal operating hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01500

SECTION 01600 - PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 STORAGE

- A. Deliver all materials to site in original containers bearing manufacturers' name and type of material. All materials used in roof membrane must have appropriate UNDERWRITERS' LABORATORIES, INC. labels.
- B. Supply and keep all materials dry at all times prior to application.
- C. Store all insulation, sheet metal, lumber/plywood and roofing in dry, covered storage, on platforms, with weatherproof coverings, or in trailers or other approved weather proof enclosures. Coverings shall be waterproof breathable type material such as heavy canvas. Manufacturer's shipping wrappers are not sufficient. Materials which are not stored under specified covers are subject to removal from the site at COR's discretion.
- D. Store all roll goods on end on clean floors or platforms. Do not use flattened rolls or rolls with ends damaged.
- E. Materials which, in the opinion of the COR, have been prematurely exposed to the weather are subject to immediate removal by the contractor and replaced with new materials at contractor's expense.
- F. Store sealant and other materials in dry, cool storage. Partially used containers shall have sealed lids to prevent escape of solvents.
- G. Store solvent bearing materials in dry, cool storage and keep lids tight on partially used containers to prevent escape of solvents.

NOTE: OPEN SOLVENT CONTAINERS SHOULD NOT BE LEFT NEAR BUILDING AIR INTAKE EQUIPMENT.

- H. Store all solvents in dry storage at temperatures above 45°F. Provide heated storage as required to protect stored and roof top materials prior to installation.
- I. Sealants and adhesives must be stored in an area where temperatures are above 40°F. Store insulation adhesives and associated adhesive dispensers in an area where temperatures are between 60°F and 80°F. Provide heated storage as required to protect stored and roof top materials prior to installation.
- J. Felt, membrane, flashing, cover board, or insulation damaged by water or moisture shall be removed from the jobsite. A moisture meter or gauge may be employed to detect excess moisture.
- K. All materials used in the work shall be new and shall meet the requirements of the respective specification. No material shall be used until it has been approved by the CO or COR. All associated materials not otherwise specifically indicated shall be furnished by the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Eave blocking.
 - 3. Parapet blocking
 - 4. Wood nailers.
 - 5. Related Sections include the following:
 - 6. Division 1 Section "Allowances" for work associated with allowances.
 - 7. Division 1 Section "Unit Prices" for work associated with unit prices.
 - 8. Division 7 Section "Polyvinyl Chloride (PVC) Roofing"
 - 9. Division 7 Section "SBS Modified Bituminous Membrane Roofing".
 - 10. Division 7 Section "Sheet Metal Flashing and Trim".

1.3 DELIVERY, STORAGE AND HANDLING

- A. Supply and keep all materials dry at all times prior to application.
- B. Store all lumber in dry, covered storage, or on platforms, and with weatherproof, breathable coverings (such as heavy canvas). Materials which are not stored under specified covers are subject to removal from site at COR'S discretion.

1.4 SUBMITTALS

- A. **Government approval is required for submittals with a "G" designation. Submittals not having a "G" designation are for contractor quality control, for information only, etc. Submittals with "G" designation are listed in the submittal register.**
- B. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
- C. Submit catalog cut sheets for each material listed in the submittal register. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

- A. Lumber: No. 2 grade (or better) southern yellow pine or douglas fir unless specifically noted otherwise. Each piece of lumber shall bear the inspection stamp of the Southern Pine Inspection Bureau (SPIB) or the Western Wood Products Association (WWPA) indicating the grade and type of lumber.

- B. Plywood: Plywood: APA Rated Sheathing (CDX) with waterproof glue for exterior applications in thicknesses specified. All plywood shall comply with the requirements of U.S. Product Standard PS1-83 and each sheet shall clearly bear the APA trademark of the American Plywood Association. Minimum span rating for 1/2-inch plywood shall be 32/16 and shall be so marked on each sheet.
- C. Wood Preservative: Alkaline Copper Quaternary (ACQ) pressure-treatment conforming to AWPA Standard C-2 (above ground). Retention of preservative shall be 0.25 pcf. All material shall be kiln dried after treatment to 19 percent or less moisture content. Field cuts and holes shall be treated at job site during construction in accordance with AWPA Standard M-4 when lumber thickness exceeds 2 inches.
- D. Wood Fiber Tapered Edge Strips: ASTM C208, Type II, Grade 1, C209. Approved for use by approved roofing system manufacturer.

2.2 FASTENERS

- A. Fasteners: For securing new lumber to new lumber or new plywood/OSB to new lumber, stainless steel ring shank nails of sufficient length to penetrate a minimum of 1-1/2 inches into the underlying member but not smaller than 8d nails. Where circumstances warrant shorter fasteners, consult COR. Use 16d nails where material being secured is 1½ to 2 inches thick. Nails shall be installed at spacings not to exceed 12 inches on-center, staggered pattern unless specified otherwise.
- B. Fasteners: For securing new lumber to existing lumber or new plywood/OSB to existing lumber/framing, minimum #12 stainless steel self-tapping wood screws of sufficient length the penetrate substrate a minimum of 1-1/2 inch into underlying member. Where circumstances warrant shorter fasteners, consult COR. Screws shall be installed at spacings not to exceed 12 inches on-center, staggered pattern unless specified otherwise.
- C. Anchor Bolts: ½ inch diameter, length to embed in concrete a minimum of 4 inches, with appropriately-sized nuts and washers.
- D. Masonry Anchors: Drive-pin fastener with alloy sleeve and stainless-steel nail insert for use in concrete, brick or concrete masonry units, 3/16-inch diameter, 1-1/4-inch length, mushroom head.
- E. Masonry Anchors: Stainless steel screw anchor for use in concrete, brick or concrete masonry units manufactured with threads for cutting into walls of pre-drilled opening to provide tight friction fit, 3/16-inch diameter, 1-1/4-inch length.

PART 3 - EXECUTION

- 3.1 INSTALLATION, GENERAL: Install the minimum number of layers to satisfy the total thickness requirements shown on drawings or specified herein. Locate two fasteners approximately 2 inches from the end of each board.
 - A. Eaves: Furnish and install new 6-inch wide wood blocking on top of the existing wood blocking or roof deck to match the height of the new roof insulation adjacent to the eave. Secure the first layer of wood blocking to the existing substrate using specified screws, anchor bolts, toggle bolts, masonry anchors, or dowels and nuts. Secure additional layers of new wood blocking using specified nails. Refer to Drawings.
 - B. Expansion Joints: Furnish and install new wood blocking as required to provide a minimum flashing height of 8 inches above roof level. New wood blocking shall match the width of the curb. Secure the first layer of wood blocking to the existing wood blocking or roof substrate

deck using specified screws or toggle bolts. Secure additional layers of new wood blocking using specified nails. Refer to Drawings.

- C. Parapets: Furnish and install new wood blocking as required to provide a minimum flashing height of 8 inches above roof level. New wood blocking shall match the width of the parapet. Secure the first layer of wood blocking to the existing wood blocking or roof panel/substrate using specified screws, anchor bolts, toggle bolts, or as required to secure to substrate. Secure additional layers of new wood blocking using specified nails. Furnish and install new wood fiber tapered edge strips at the top of the parapets. Edge strips shall provide a minimum slope of $\frac{1}{2}$ " per foot across the parapet. Secure the wood fiber using two equally spaced rows of specified nails and offset the nail locations a minimum of 6 inches between rows. Refer to Drawings.
- D. On Roof Areas 007 and 008 - Metal Roof Panels: Furnish and install new nominal 6-inch-wide wood blocking at all eaves, edges, ridges, and openings as required for blocking to finish flush with the top rib of the existing metal roof panels. Apply continuous wood blocking at eaves to fill flutes and bevel ends to ensure the wood blocking is tight to all surfaces. Over the top of the wood blocking, furnish and install additional continuous wood blocking and/or plywood to match the thickness of the new roof insulation. Secure the first layer of wood blocking through the metal roof panels to the structure below using specified screws. Secure additional layers to the previous layer using specified nails.
- E. Stagger fasteners when securing nominal 6-inch-wide lumber or wider.
- F. Discard material with defects which might impair quality of work or of inadequate size to minimize joints. Set carpentry work accurately to required levels and lines, with members plumb and true for precision fit.
- G. Securely attach carpentry work to substrate by anchoring and fastening by recognized standards. Use common wire nails, except as otherwise indicated. Select fasteners of size that will not penetrate thru members where opposite side will be exposed to view or will receive finish materials.
- H. Make tight connections between members. Install fasteners without splitting wood (pre-drill if required).

3.2 EXISTING WOOD

- A. Inspect all existing wood blocking and curbs carefully. If there is existing wood which requires replacement, notify the COR. Do not proceed with removals until directed by COR. Install new wood blocking and curbs using the same size and thickness as existing where removed.
- B. Remove all existing loose, wet, damaged or deteriorated wood blocking and curbs, and discard. Install new wood blocking and curbs using the same size and thickness as existing.

3.3 ROOF EQUIPMENT

- A. Install new wood blocking at all roof-mounted equipment, hatches, and curbs as required to provide a minimum flashing height of 8 inches above finished roof level.
- B. Install blocking under integral equipment curbs as required to maintain full cant face above roof level and/or to allow installation of new cant strips.
- C. At units less than 30" in width where wood blocking cannot be installed beneath the units, new pressure-treated wood blocking may be installed on top of the existing curb. The wood blocking shall match the curb in width.

- D. At those locations where the fan unit is either too large or too small relative to the existing curb, remove the existing curb and discard. Furnish and install a new wood or pre-fabricated curb that matches the size of the fan cover that sits on top of the curb.
 - 1. Contractor shall submit a shop drawing to the Designer of the proposed curb for review and approval prior to the start of this work.
 - 2. The size of the curb shall also consider the additional space required to install base flashings prior to the installation of the curb.

- E. Extending and/or modifying ductwork, wiring, and/or plumbing as part of this work shall be included in the Base Bid. This work shall be accomplished by a mechanical, electrical, or plumbing contractor, as applicable, licensed to perform this work in the state of Michigan for no less than 5-years.

- F. The cost for raising curbs or installing curb extensions shall be included in the Base Bid.

END OF SECTION 06100

SECTION 07000 - REROOFING PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Removals.
2. Preparations.
3. Deck repairs.

- B. Related Sections include the following:

1. Division 1 Section "Allowances" for work associated with allowances.
2. Division 1 Section "Unit Prices" for work associated with unit prices.
3. Division 7 Section "Polyvinyl Chloride (PVC) Roofing".
4. Division 7 Section "SBS Modified Bituminous Membrane Roofing".
5. Division 7 Section "Sheet Metal Flashing and Trim".

1.3 SUBMITTALS

- A. **Government approval is required for submittals with a "G" designation. Submittals not having a "G" designation are for contractor quality control, for information only, etc. Submittals with "G" designation are listed in the submittal register.**
- B. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
- C. Submit catalog cut sheets for each material listed in the submittal register. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.

PART 2 - PRODUCTS

2.5 GENERAL REPAIR MATERIALS

- A. Sheet Metal: 22-gauge galvanized steel, except where indicated as different gauge on plans or details.
- B. Metal Panel Primer: Ospho rust inhibitor/primer or approved equal.

2.6 METAL ROOF PANEL PREPARATION MATERIALS

- A. Ridge Vent Closure: 16 ga. ASTM A 792, aluminum-zinc alloy-coated by the hot dipped process.

- B. Metal Roof Panels: No existing panels require replacement. For panels damaged by Contractor operations at sole cost to Contractor: To match existing profile, ASTM A792, aluminum-zinc alloy-coated by the hot dipped process. Minimum section properties:
 - 1. Panel Coverage: To match existing.
 - 2. Panel Height: To match existing.
 - 3. Thickness: To match existing, minimum 24 gauge.
- C. Panel-to-Joist Fastener: ASTM A240, 410 stainless steel, self-drilling minimum #12 stainless steel screw with a nominal head diameter of 0.430. Screws shall be one size larger than the existing.
- D. Panel Side Lap Screws: ASTM A240, 410 stainless steel, self-drilling minimum #10 stainless steel screw with a nominal head diameter of 0.415 inches. Screws shall be one size larger than the existing.
- E. Vapor Retarder: ASTM C1136-90: Consist of polypropylene film, fiberglass yarn, and kraft paper. The vapor retarder shall be loose laid/spot adhered as required by roof system manufacturer to metal roof panels.
- F. Masonry Anchors: Stainless steel screw anchor for use in concrete, brick or concrete masonry units manufactured with threads for cutting into walls of pre-drilled opening to provide tight friction fit, 3/16-inch diameter, 1-1/4-inch length.
- G. Steel Plate: Minimum 11 ga. ASTM A 653, galvanized steel

2.7 STEEL DECK REPAIR MATERIALS

- A. Steel Deck: ASTM A 653, galvanized G-90 deck, manufactured in accordance with the requirements of the Steel Deck Institute, Inc. for deep rib (Type N). Minimum section properties:
 - 1. Yield strength = 33 ksi.
 - 2. Section Modulus: 0.382 in³ (positive).
 - 3. Moment of Inertia: 0.772 in⁴.
 - 4. Thickness: 22 gauge.
- B. Deck Fastener: ASTM A240, 410 stainless steel, self-drilling minimum #12 stainless steel screw with a nominal head diameter of 0.430. Screws shall be a minimum one size larger than the existing.
- C. Side Lap Screws: ASTM A240, 410 stainless steel, self-drilling minimum #10 stainless steel screw with a nominal head diameter of 0.415 inches. Screws shall be a minimum one size larger than the existing.

2.8 MISCELLANEOUS MATERIALS

- A. Conduit Supports: Specifically manufactured to provide support for roof-mounted conduit, adjustable height, polycarbonate rectangular base, such as Pillow Block Pipestand Model 3-RAH as manufactured by Miro Industries, Inc. or approved equal.
- B. Pipe Supports: Adjustable height base/strut supports, Model Nos. 12 and 16 (or equivalent), equipped with steel bases, as manufactured by Miro Industries, Inc., phone: 800-768-6978.

- 2.9 LADDER STABILIZING BRACE: Wall mounted brace, fabricated with 3" x 3" x 1/4" steel angles as shown on Drawings.

PART 3 - EXECUTION

3.1 REMOVALS

- B. Refer to Section 01100.
- C. Lift or remove all existing rooftop equipment where required to ensure that existing flashings can be totally removed and new flashings installed.
- D. Carefully relocate all electrical, co-axial, telephone, fiber optic, intercom and miscellaneous wires, cables, etc. as required to accomplish work specified herein. Accomplish such relocation without interrupting the service provided by these lines except as specifically authorized by the U.S. COR. Become familiar with each line and the level of precaution necessary to relocate them or work around them. Upon completion of roofing work, relocate lines to their original positions and secure them as originally secured unless indicated otherwise in these specifications or on the project drawings.
- E. Remove and replace rusted hot vent pipe components at two (2) locations with new fabrication to match existing.
- F. Remove and replace ridge caps, rake fascia, metal edge fascia, transition covers, copings, gutters, and outlets and downspouts with new fabrications and flashings in accordance with the detail drawings.
- G. Inspect and replace all missing anchorage screws/bolts and components as required to secure all metal roof panels and fabrications to remain, and all roof top fans, exhaust vents and related components to prevent damage or displacement by wind storms.

3.2 PREPARATION, GENERAL

- A. Prior to commencement of work, inspect and thoroughly water test all existing underground leaders for free flow operation with COR and Army Reserve maintenance personnel present. Report underground leader restrictions to COR. Army Reserve's maintenance personnel shall perform repairs to remove any restrictions found. Should underground leaders become clogged at any time after the start of work, the Contractor shall correct the condition at no additional contract expense.
- B. Prior to the installation of any new roofing, flashings, and metal flashings, clean surfaces of all rust dust, dirt and other foreign matter.
- C. Extend all existing vents through the roof to the height required by the local plumbing code but not less than 8 inches above finished roof level.

3.3 ROOF PANEL AND ROOF DECK REPAIR

- A. Inspect the roof panel and roof deck carefully. If there are roof panel or roof deck areas which require repair or replacement, notify the COR. Do not proceed with repair or replacement until directed by the COR.
- B. At all abandoned roof penetrations or damaged roof deck is less than 12 inches on the largest side, secure a piece of 20 ga. galvanized steel to the existing roof panel or roof deck using specified fasteners at spacings not to exceed 6 inches on center and located approximately one inch from the edge of the opening. The sheet metal shall extend onto the existing roof panel or roof deck a minimum of 6 inches.

3.4 METAL ROOF PANEL REPAIR

- A. At removed ridge vents, furnish and install new ridge vent closure that shall extend across the ridge framing at each metal roof panel. Prior to installing the steel plate, furnish and install new continuous vapor retarder and batten insulation to fill the ridge opening with the vapor retarder facing the inside of the building. Tape all the vapor retarder joints to the substrate to create an air tight seal. Lap new plate over the metal roof panels not less than 6 inches. Install so that sides extend over structural framing below. Secure to new wood blocking with specified fasteners at 12 inches on center.
- B. Where metal roof panels are rusted but remains structurally sound, thoroughly clean deck units of rust and foreign matter with a wire brush. Paint with specified metal primer.
- C. Where abandoned roof penetrations or damaged roof deck are more than 12 inches on the smallest side install new angle framing supports matching existing, close the deck opening. Remove damaged, deteriorated, or affected metal roof panels.
- D. Install new panel of the same type and gauge as the existing. Lap new panel over the existing the same manner as originally installed but not less than 6 inches. Lap ends only over structural framing. Secure to structural framing using specified fasteners at 6 inches on center at each framing member for every roof zone. Secure panel side laps using specified fastener spaced not more than 30 inches on center at every roof zone.
- E. Re-secure all existing metal roof panels to roof framing members by replacing all missing or loose existing fasteners using specified fasteners spaced not more than 6 inches on center at each available framing member at all roof zones (Zones 1, 2, and 3) of the roof.
- F. Re-secure all existing metal roof panel side laps by replacing all missing or loose existing fasteners with specified fasteners not more than 30 inches on center.

3.5 STEEL DECK REPAIR

- A. Where steel deck is rusted but remains structurally sound, thoroughly clean deck units of rust and foreign matter with a wire brush. Paint with specified metal primer.
- B. Where steel deck is damaged or rusted through in small areas less than 6" in diameter, clean deck units of rust with a wire brush. Paint with specified metal primer. Install over the damaged area a steel plate secured to the existing steel deck with sheet metal screws around the perimeter of the plate at 6 inches on center. Extend the new steel plate a minimum of 6 inches onto the surface of the existing steel deck beyond the damaged area.
- C. Where abandoned roof penetrations or damaged roof deck are more than 12 inches on the smallest side, close the deck opening with new angle supports and new roof decking. Remove damaged, deteriorated, or affected steel roof deck.
- D. Install new decking of the same type and gauge as the existing. Lap new deck units over the existing the same manner as originally installed but not less than 6 inches. Lap ends only over structural framing. Secure to structural framing with specified fasteners at 6 inches on center at each framing member. Secure deck side laps at not more than 30 inches on center.
- E. Secure all existing steel deck to the roof framing members using specified fasteners placed 6 inches on center at each available framing member at the perimeter (Zone 2) and in the corners (Zone 3) of the roof. Install fasteners even if welds are in place.
- F. Secure metal deck side laps with specified fasteners at spacings not exceeding 36 inches from each other or nearest deck support.

3.6 CONDENSATE LINE INSTALLATION

- A. At air conditioning units, provide new PVC condensate drains with integral P-trap as specified herein.
- B. Route condensate drain line to nearest roof drain.
- C. Provide new conduit supports and underlying walkpad at new and existing condensate drain line locations. Space conduit supports at 4 feet on center maximum.
- D. Cut strips of walkway units for installation under conduit supports from new full-size walkway units. Cut strips a minimum of 6 inches wider and longer than conduit support.
- E. Adhere walkpad to membrane with adhesive.
- F. Provide metal brackets to secure line to support.

3.7 PAINTING OF ROOF-MOUNTED EQUIPMENT

- A. Where rusted and/or galvanized steel equipment is present on roof, remove loose rust by wire brushing and apply rust-inhibitor primer. Provide two (2) coats of paint in a color to suit the U.S. COR.

3.8 LADDER STABILIZING BRACE INSTALLATION

- A. Furnish and install a total of three (3) ladder stabilizing braces. Install at locations as coordinated with the COR.
- B. Store ladder stabilizing brace to provide protection from damage and abuse prior to installation.
- C. Install ladder stabilizing bracket in strict accordance with manufacturer's installation instructions and approved shop drawings.
- D. Paint to suit Owner.
- E. Protect installed products until completion of project.
- F. Touch-up, repair or replace damaged products prior to Final Acceptance.

END OF SECTION 07000

SECTION 07540 – 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 other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Adhered fleece-back polyvinyl chloride (PVC) membrane roofing system over existing metal roof panels.
 - 2. Roof insulation.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim."
 - 2. Division 6 Section "Rough Carpentry".
- C. PERFORMANCE REQUIREMENTS
 - 1. Provide a roofing system that complies with the requirements of Underwriters' Laboratories, Inc. for a Class A roof covering.
 - 2. Provide a roofing system that complies with the requirements of the FM Global ratings shown on plans.
 - 3. Roof cover shall provide a minimum Solar Reflectance Index (SRI) of 0.83 as calculated according to ASTM C1549 or 111 as calculated according to ASTM E 1980.

1.3 SUBMITTALS

- A. **Government approval is required for submittals with a "G" designation. Submittals not having a "G" designation are for contractor quality control, for information only, etc. Submittals with "G" designation are listed in the submittal register.**
- B. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
- C. Submit catalog cut sheets for each material listed in the submittal register. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.
- D. Tapered Insulation Shop Drawings: Submit proposed tapered insulation and cricket system for approval prior to start of work. Provide drawings for each area and include, at a minimum, concise tapered layouts, material identification, cross sections of typical sections with each board labeled, board stagger pattern, slopes and cricket widths.
- E. Installation Instructions: Manufacturer's latest printed installation instructions.
- F. RoofNav Assembly Number: Provide documentation from Factory Mutual Global indicating that the roofing system proposed has been tested and approved for use to resist the minimum field of roof uplift ratings/pressures shown on plans.

- G. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized and licensed by manufacturer to install roofing system.
- H. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
- I. Manufacturer Certificates: Original document signed by a responsible officer of the manufacturing firm, notarized, on manufacturer's standard letterhead, certifying materials furnished for project comply with the referenced standard. Certificate shall specifically reference the project and applicable compliance standard.
- J. Warranties: Special warranties specified in this Section.
- K. Sample Warranty: Specimen copy of manufacturer's warranty.
- L. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- M. Roof Vent Layout: Provide a copy of proposed roof vent layout.
- N. Manufacturers Certificate: Certification that PVC membrane is within 0.02 mil thickness of the specified membrane thickness. ASTM D 751 or D 638 nominal thickness of +/- 10 percent will not be acceptable.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to site in original containers bearing manufacturers' name and type of material. Provide appropriate Underwriters' Laboratories, Inc. and Factory Mutual labels on all materials.
- B. Supply and keep all materials dry at all times prior to application.
- C. Store all insulation, insulating board cants, and tapered edge strips in dry, covered storage, or on platforms, and with weatherproof, breathable coverings such as heavy canvas. Insulation wrappers are not sufficient. Materials which are not stored under specified covers are subject to removal from the site.
- D. Store all roll goods on end on clean floors or platforms. Do not use flattened rolls or rolls with ends damaged.
- E. Materials which have been prematurely exposed to the weather are subject to immediate removal and replacement with new materials at contractor's expense. Materials may be marked with paint or other indelible materials while they remain on-site.
- F. Store solvent bearing materials in dry, cool storage and keep lids tight on partially used containers to prevent escape of solvents.
- G. Store all emulsions in dry storage at temperatures above 40°F.

1.5 WARRANTIES

- A. Warranties/Guarantees shall comply with the requirements of the United Facilities Criteria (UFC) Roofing, UFC 3-110-03 dated 01 May 2012 with Change 2, 01 Jan 2017.
- B. Special Warranty: Manufacturer's standard form without monetary limitation, in which

manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, walkway products and other components of roofing system.
 2. Warranty Period: Twenty (20) years from date of Substantial Completion.
- C. Installer's Warranty: Installer's warranty, on form at end of this Section, signed by roofing Installer, properly executed and printed on Installer's letterhead form.
1. Installer's Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Listed in this section are specifications for materials required generally for use in accomplishing the work specified. Materials not listed may also be required.
- B. Except as specifically noted herein, all reference standards included herein are to be presumed to be the latest published editions of such standards available as of the issue date of these specifications.
- C. Brand or manufacturer names are used as standards of quality where no other appropriate reference is available. Submit substitution requests under requirements listed in other Sections.
- D. Where a generic product or a general manufacturer's product is specified and more than one such product is offered by the manufacturer, provide the manufacturer's premium materials.
- E. LEED/EPA Requirements
 1. Roofing materials and work shall qualify for Leadership in Energy and Environmental Design (LEED) certification points as defined by the US Green Building Council (USGBC), where possible, including minimum Solar Reflectance Index (SRI) as calculated according to ASTM E 1980.
 2. Roofing shall comply with the requirements of the U.S. EPA Energy Star® program and meet the reflectance and emittance requirements of Title 24 Part 6 for the state of California. Contractor shall submit CRRC Product ID number.

2.2 MANUFACTURER

- A. For purposes of these documents, the roof system manufacturer is defined as the manufacturer of the primary roof membrane. The roof system is intended to encompass, but is not necessarily limited to, all components above the deck including underlayment and/or vapor retarder components, roof insulation, roof membrane, membrane flashings and any proprietary flashing/components of the system manufacturer. Subject to compliance with the material specifications of these documents, all materials are to be supplied by the same manufacturer.
- B. All materials used in systems to be covered by a Manufacturer's Guarantee must be supplied by the same manufacturer, unless the manufacturer issuing the guarantee waives this requirement in writing.

- C. The project design is based on using materials supplied by Sarnafil, Inc. The following material manufacturers are approved for this project. Such approval does not relieve the Contractor from the requirement to supply materials which meet all other requirements of these Specifications.
1. Sarnafil, Inc.
 2. Seaman Corporation
 3. Carlisle SynTec Incorporated

2.3 MEMBRANE MATERIALS

- A. PVC Sheet: ASTM D 4434, Type II, Grade 1, fiber reinforced, as follows:
1. Thickness: 115 mils, minimum.
 - a. Sarnafil G-410, felt backed.
 - b. Fibertite by Seaman Corporation, fleece-backed
 - c. Sure-Flex by Carlisle, fleece-backed.
 2. Exposed Face Color: To match existing metal wall panels.
- B. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- C. A PVC extrusion used to emulate the appearance of a standing seam metal rib roof system. Each rib is 1-inch high with a base width of 1-3/8 inch and a profile width of 1/2 inch. Ribs are 10 feet (long) and weigh approximately 1.8 lbs (817 g).
- D. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as sheet membrane.
- E. Membrane Roofing Adhesive: Single or double low-rise polyurethane foam as manufactured by the approved roofing system manufacturer. For use to adhere roofing fleece-back membrane substrate.
- F. Membrane Flashing Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for fleece-backed membrane, and solvent-based bonding adhesive for base flashings.
- G. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.
- H. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- I. Walkpads: Slip-resistant, heat-weldable to membrane.
1. SarnaTred
 2. Tuff-Trac
- J. Snow Guards: 304 stainless steel, PVC-coated snow retention system designed for membrane attachment with integrated square or round bar(s). Such as PVC Membrane Attachment Sno Barricade® Deck Mount Bar System as manufacturer by Sno Gem, Inc., 4800 Metalmaster Way, McHenry, IL 60050.
1. Ground Snow Load: 80 psf (verify with snow guard manufacturer and local codes).
 2. Utilize the number of retention bars recommended by the manufacturer for anticipated snow loads.

3. Color: As selected by Owner from manufacturer's full range.

2.4 INSULATION / BOARD GOODS

- A. Gypsum Cover Board: ASTM C 1177, non-structural board, glass mat embedded, water resistant gypsum core, factory primed, 1/2-inch-thick, 4' x 8' board size, such as Dens-Deck Prime as manufactured by Georgia Pacific.
- B. Polyisocyanurate Roof Insulation: ASTM C 1289, Type II, with felt or glass-fiber mat on both major surfaces, manufactured to meet the following requirements:
 1. Nominal Compressive Strength: 20 psi.
 2. Dimensional Stability: 2% maximum linear change when conditioned at 158°F and 97% relative humidity.
 3. Minimum Curing Time: 24 hrs. plus 24 hrs. for each inch of thickness at a minimum of 60°F before shipment from manufacturer.
 4. Maximum Board Thickness: 2 inches.
- C. Insulation Adhesive: Two component, low rise polyurethane foam, approved by membrane manufacturer for insulation and substrates on this project.

2.5 FASTENERS

- A. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions of FM 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- B. Galvanized Steel Roofing Nails: 11 or 12-gauge stainless steel with ring shank, minimum 3/8-inch diameter head, minimum 1-1/4-inch length. Shall be able to penetrate the substrate a minimum of 1 inch.
- C. Insulation Fasteners and Plates: Plated steel fastener and 3-inch diameter round or 3-inch square steel plate as manufactured by or specifically recommended by the roof system manufacturer. Fasteners and plates must be Factory Mutual approved for 1-135 construction with the specified insulation.
- D. Termination Bar: Extruded aluminum bar, 1-inch wide, 1/8-inch-thick, with pre-punched holes at 6 inches on center.
- E. Screw-Type Fastener: ASTM A240, 410 stainless steel, self-drilling minimum #12 stainless steel screw with a nominal head diameter of 0.430.
- F. Masonry Anchors: Drive-pin fastener with alloy sleeve and stainless-steel nail insert for use in concrete, brick or concrete masonry units, 3/16-inch diameter, 1-1/4-inch length, mushroom head.
- G. Masonry Anchors: Stainless steel screw anchor for use in concrete, brick or concrete masonry units manufactured with threads for cutting into walls of pre-drilled opening to provide tight friction fit, 3/16-inch diameter, 1-1/4-inch length.

PART 3 - EXECUTION

3.1 SYSTEM SCHEDULE

- A. Refer to Table 1 for a general schedule of the primary roof components (described from the

bottom up) for each roof area. Methods of installation and related materials are in other sections of these specifications.

Table 1

Roof Area	007 and 008
Existing Roof Panels	R-Panels
Flute Fill Insulation	Isocyanurate Insulation shall fill flutes of existing metal roofing and end flush with the top of the metal panel roofing ribs, mechanically attached.
Insulation Fill	Isocyanurate Insulation shall be installed adhered to the mechanically attached insulation using low rise foam adhesive
Dens-Deck Cover Board	½" thick cover board mechanically attached to the roof panels
Adhered PVC Membrane	Minimum 115 mil, fleece-backed PVC membrane adhered using low-rise foam adhesive.

3.2 EXAMINATION

- A. Inspect all surfaces to receive work specified herein. Application of materials constitutes approval of the substrate as being satisfactory.
- B. Do not proceed with roofing until all vents, curbs, blocking, nailing strips, and projects through the roof deck have been installed.

3.3 INSTALLATION, GENERAL

- A. Do not apply materials on wet or damp surfaces, over dust, dirt or other foreign matter.
- B. Accomplish application of roofing materials so that each area will be complete at the end of each workday.
- C. Protect edges and incomplete flashings against water entry at all times. Remove cutoffs and temporary protection prior to resumption of work.
- D. Set insulating board tapered edge strips in a generous bed of insulation adhesive so that they are tightly cemented to both horizontal and vertical surfaces.
- E. Fill all gaps and voids between substrate components that are wider than ¼ inch. Fill gaps with same materials as substrate.

3.4 INSULATION APPLICATION, GENERAL

- A. Clean roof panels surface of all dirt, dust and other foreign matter.
- B. Apply insulation with end joints staggered approximately one-half the length of the units.
- C. Offset insulation joints from the preceding layer a minimum of six (6) inches.
- D. Fit all insulation units snugly to each other and to all vertical surfaces.

- E. Mechanical Attachment: Secure each board to the metal roof panels using plates and fasteners in accordance with the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone and the approved RoofNav assembly number. However, there shall be a minimum of 2 fastener/plates per 4 square feet for the field (Zone 1), 2 fastener/plates per 3 square feet at the perimeter (Zone 2), and 1 fastener/plates per 1 square feet at the corners (Zone 3). Zone definition is indicated on drawings. Partial units less than 4 square feet shall be secured with a minimum of 4 fasteners/plates. Provide insulation fasteners of lengths sized to engage the metal roof panels a minimum of ¾ inch and a maximum of 1-1/2 inches.

- F. General Requirements: Crickets/Saddles
 - 1. Start cricket construction by striking chalk lines for outer edges of tapered units. Install the first row along the chalk lines, mitering and fitting at the points where lines break.
 - 2. Complete the cricket assembly using tapered isocyanurate and isocyanurate fill units. Fill unit shall not exceed 2 inches in thickness.
 - 3. The thin edge of the tapered insulation shall be ½" and shall be located at the valley created by the tapered insulation and the roof insulation.
 - 4. Utilize tapered wood fiber edge strips that transition from 0" to 1/2" as the first layer of tapered insulation to provide a smooth transition. Set wood fiber on top of the insulation in one continuous band of low-rise foam adhesive.

- G. Remove and replace all damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness.

3.5 INSULATION APPLICATION, ROOF AREA 007 and 008

- A. Apply isocyanurate insulation to fill the flutes of the metal roof panels and loose lay.

- B. Furnish and install tapered insulation to move water from walls, form valleys/crickets, as shown on roof plans, using factory-tapered isocyanurate units and isocyanurate fill units. Tapered insulation shall provide a minimum finished slope of 1/2 inches per foot.

- C. Furnish and install one layer of cover board over all isocyanurate insulation and secure by mechanical attachment.

3.6 MEMBRANE APPLICATION

- A. Install membrane in strict accordance with manufacturer's recommendations. Start installation of sheet in presence of roofing system manufacturer's technical personnel.

- B. Install sheet membrane per manufacturer's requirements to obtain manufacturer's 20-year full system (NDL) warranty.

- C. Sweep the substrate with a stiff broom to remove materials that will interfere with the proper installation of the membrane.

- D. Unroll membrane and allow to relax before installing. Roll membrane in half along its width prior to adhering.

- E. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimension required by manufacturer. Stagger side laps.

- F. Install membrane with side laps parallel to the flow of water.

- G. Secure the fleece or felt back membrane to the substrate using adhesive in accordance with

the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone. Zone definition is indicated on drawings.

- H. Immediately after application into adhesive, press the membrane to ensure full contact and using a water-filled, foam covered lawn roller, firmly press the membrane to ensure full contact with the adhesive layer by frequent rolling in two directions.
- I. Membrane shall be smooth to the substrate, and wrinkles in the membrane shall be grounds for rejection.
- J. Adhesive shall fully cover on all surfaces.
- K. Repeat the process, lapping subsequent, adjacent rolls a minimum of 3 inches. Do not apply bonding adhesive between the lapped sections.
- L. Furnish and install the roofing system manufacturer's termination bar at the base of all tapered edge strips and at transitions, peaks, and valleys as required by the manufacturer in details and application instructions. Strip in the termination bar in accordance with the manufacturer's approved written instructions.
- M. At vertical surfaces, turn the membrane up the vertical surface a minimum of 2 inches and fully adhere using the manufacturer's approved adhesive. Secure the membrane to the substrate using the roofing system manufacturer's approved termination bar or membrane fasteners/plates. Secure in accordance with their written instructions at spacings not to exceed 8 inches on-center. Fasteners shall penetrate the substrate at spacings and depths approved by the roofing system manufacturer.
- N. At eaves, extend the membrane to the exterior edge of the wood blocking. Furnish and install new flashing membrane that extend down past the edge of the wood blocking a minimum of 1 inch and onto the field membrane a minimum of 3 inches. Fully weld the flashing splices to the field membrane a minimum of 2 inches on all sides.
- O. At joints in the fleece-back membrane without a selvage edge, butt the membrane together at the splice location. Furnish and install an unsupported membrane strip over the joint and extend it past the joint a minimum of 3 inches in every direction.
- P. Furnish and install the roofing system manufacturer's patches at all required locations such as intersection field seams. Apply the manufacturer's approved seam caulk, as required, at locations specified by the roofing system manufacturer.
- Q. Securement around perimeter and rooftop penetrations
 - 1. Around all perimeters, at the base of walls, curbs, vent pipes, or any other roof penetrations, manufacturer's fasteners and metal bar or plates shall be installed. Fasteners and securement bar shall be installed according to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturer's recommended fastening tools with depth locators.
 - 2. PVC membrane flashings shall extend a minimum of 3 inches past the securement bar or plates and is hot air welded to the PVC field sheet.
- R. Flash all curbs and interior walls in strict accordance with approved manufacturer's instructions.

3.7 FLASHING APPLICATION

- A. All flashings shall be installed concurrently with the roofing membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and PVC Manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.
- B. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- C. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- D. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- E. Clean splice areas, weld side and end laps to ensure a watertight seam installation.
- F. Test lap edges with probe to verify seam weld continuity. Apply lap sealant, if required by roofing manufacturer, and seal exposed edges of sheet flashing terminations per manufacturer's requirements.
- G. At horizontal terminations, fasten top of flashing with specified fasteners through continuous termination bar on a line approximately 1 inch below top edge and spaced not over 6 inches on center.
- H. At vertical terminations, furnish and install new 4-inch-wide PVC-coated metal closures with an exterior edge caulking cove. The closure shall be set in water cut-off mastic and fastened to the substrate using appropriate fasteners at spacings not to exceed 12 inches on center. Completely hot air weld the base flashings to the PVC-coated metal. Apply a non-shrinking sealant, such as NP-1 or approved equal, to the caulking cove at the exterior edge of the closure. Completely remove all residual asphalt from the substrate prior to installing any sealant or caulking
- I. Unless specifically stated otherwise in these specifications or on Drawings, all base flashings are required to extend a minimum of 8 inches above finished roof level. Include costs for modifying parapets, equipment curbs, expansion joint curbs, etc. to meet this requirement.
- J. At a minimum, extend base flashings up and over the top horizontal surface of curbs and inside the curb a minimum of 1 inch, unless otherwise stated in specification or shown on drawings.

3.8 HOT-AIR WELDING

- A. All field seams must be clean and dry prior to initiating any field welding. Use the manufacturer's provided splice cleaner prior to welding. Bonding adhesive is not to be applied at lap seams.
- B. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
- C. Contractor is responsible for daily inspections of all field welds. All welds are to be accomplished by qualified personnel and in accordance with roofing manufacturer's instructions.

- D. Membrane is to be inspected daily and defects repaired without delay.
- E. Probe seams daily to ensure seams have been completely welded.
- F. Contractor shall clean and remove all dust and debris, loose and/or bonded, from new roof surfaces. Excessive bonding adhesive is to be cleaned from roof surface.

3.9 WALKWAY APPLICATION

- A. Install new walkway at all locations indicated on Drawings and/or as specified herein.
- B. All defects in field membrane must be repaired prior to the installation of walkway.
- C. Install new walkway on all sides of all major equipment (motorized equipment, scuttles, or any rooftop unit with any single dimension greater than 4 feet).
- D. Adhere flexible walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions. Apply adhesive to back of walkway and on field membrane.
- E. Membrane shall be clean and dry.
- F. Place chalk lines on field membrane to indicate location of walkway.
- G. Press walkway into place with a water-filled, foam-covered lawn roller.
- H. Clean the field membrane in areas to be welded. Hot-air weld the entire perimeter of the walkway.
- I. Check all welds of the walkway with a rounded screwdriver. Re-weld any inconsistencies.
- J. Cut strips of walkway units for installation under conduit supports. Cut strips a minimum of 6 inches wider and longer than base of conduit support.

3.10 SNOW GUARD INSTALALTION

- A. At low eaves, furnish and install new snow guards in accordance with the snow guard manufacturer recommendations from the region.
- B. Install snow guards in group(s) and patterns recommended by snow guard manufacturer to resist anticipated snow load.
- C. Set the snow guard in a continuous bead of compatible sealant around the edge of the plate and set the guard on the roofing membrane. Fasten the snow guard to the deck using fasteners recommended by the snow guard manufacturer through pre-drilled holes. Strip in the snow guard flange with PVC membrane that butts against the vertical flange and extends past the snow guard flange a minimum of 4 inches in all directions. Fully adhere the membrane to all substrates using hot-air.
- D. Begin snow guard application directly over the load bearing walls at low eaves and install new snow guards in accordance with the snow guard manufacturer written instructions.
- E. Refer to snow guard manufacturer's written installation instructions for additional information and requirements.

WARRANTY

Owner: Army Reserve

Installer:

Location of Building:

Name of Building:

Roof Areas:

Date of Substantial Completion:

Know all men by these presents, that we, Installer as defined above, having installed insulation, roofing, flashings and sheet metal work, and having accomplished certain other work on the roof areas identified above under contract between Owner and Contractor, warrant to Owner, with respect to said work that for a period of five years from date of Substantial Completion of said work, the roofing including insulation, roofing membrane, flashings and sheet metal work, shall be absolutely watertight and free from all leaks, provided however that the following are excluded from this warranty:

Defects or failures resulting from abuse by the Owner.

Defects in design involving failure of (1) structural frame, (2) load-bearing walls, and (3) foundations.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars riots or civil commotion.

We, Installer, agree that should any leaks occur in the roofing we will promptly remedy said leaks in a manner to restore the roof to a watertight condition by methods compatible to the system and acceptable under industry standards and general practice.

We, Installer, further agree that for a period of five years from date of Substantial Completion referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including but not limited to blisters, open laps, wrinkles, ridges, splits, warped insulation and loose flashings in a manner compatible to the system and acceptable under industry standards and general practice.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this day of _____, _____ 20_____.

(Installer)

WITNESS:

by

President

Notary Public

END OF SECTION 07540

SECTION 07552 - SBS-MODIFIED BITUMEN MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. SBS-modified bituminous membrane roofing.
 - 2. Roof insulation.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim."

1.3 PERFORMANCE REQUIREMENTS

- A. Provide a roofing system that complies with the requirements of Underwriters' Laboratories, Inc. for a Class A roof covering.
- B. Provide a roofing system(s) that complies with the requirements of FM Global Ratings shown on drawings.
- C. Roof cover shall provide the minimum Solar Reflectance Index (SRI) listed below as calculated according to ASTM C1549 or ASTM E 1980.

1.4 SUBMITTALS

- A. **Government approval is required for submittals with a "G" designation. Submittals not having a "G" designation are for contractor quality control, for information only, etc. Submittals with "G" designation are listed in the submittal register.**
- B. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
- C. Submit catalog cut sheets for each material listed in the submittal register. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.
- D. Tapered Insulation Shop Drawings: Submit proposed tapered insulation and cricket system for approval prior to start of work. Provide drawings for each area and include, at a minimum, concise tapered layouts, material identification, cross sections of typical sections with each board labeled, board stagger pattern, slopes and cricket widths.
- E. Installation Instructions: Manufacturer's latest printed installation instructions.
- F. RoofNav Assembly Number: Provide documentation from Factory Mutual Global indicating that the roofing system proposed has been tested and approved for use to resist the minimum field of roof uplift ratings/pressures shown on plans.

- G. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized and licensed by manufacturer to install roofing system.
- H. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
- I. Manufacturer Certificates: Original document signed by a responsible officer of the manufacturing firm, notarized, on manufacturer's standard letterhead, certifying materials furnished for project comply with the referenced standard. Certificate shall specifically reference the project and applicable compliance standard.
- J. Warranties: Special warranties specified in this Section.
- K. Sample Warranty: Specimen copy of manufacturer's warranty.
- L. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- M. Base Flashing Instructions: Submit manufacturer's base flashing installation instructions.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to site in original containers bearing manufacturers' name and type of material. Provide appropriate Underwriters' Laboratories, Inc. and Factory Mutual labels on all materials.
- B. Supply and keep all materials dry at all times prior to application.
- C. Store all insulation, insulating board cants, and tapered edge strips in dry, covered storage, or on platforms, and with weatherproof, breathable coverings such as heavy canvas. Insulation wrappers are not sufficient. Materials which are not stored under specified covers are subject to removal from the site.
- D. Store all roll goods on end on clean floors or platforms. Do not use flattened rolls or rolls with ends damaged.
- E. Materials which have been prematurely exposed to the weather are subject to immediate removal and replacement with new materials at contractor's expense. Materials may be marked with paint or other indelible materials while they remain on-site.
- F. Store cartons and drums of asphalt on level surface, in upright position. Do not stack cartons. Protect open top containers from dirt and precipitation.
- G. Store solvent bearing materials in dry, cool storage and keep lids tight on partially used containers to prevent escape of solvents.
- H. Store all emulsions in dry storage at temperatures above 40°F.

1.6 WARRANTIES

- A. Warranties/Guarantees shall comply with the requirements of the United Facilities Criteria (UFC) Roofing, UFC 3-110-03 dated 01 May 2012 with Change 2, 01 Jan 2017.
- B. Special Warranty: Manufacturer's standard form without monetary limitation, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories roof insulation, fasteners, cover boards, walkway products and other components of roofing system.
 2. Warranty Period: Twenty (20) years from date of Substantial Completion and without financial limitation (“No Dollar Limit”).
- C. Installer’s Warranty: Installer’s warranty, on form at end of this Section, signed by roofing Installer, properly executed and printed on Installer’s letterhead form.
1. Installer’s Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Listed in this section are specifications for materials required generally for use in accomplishing the work specified. Materials not listed may also be required.
- B. Except as specifically noted herein, all reference standards included herein are to be presumed to be the latest published editions of such standards available as of the issue date of these specifications.
- C. Brand or manufacturer names are used as standards of quality where no other appropriate reference is available. Submit substitution requests under requirements listed in other Sections.
- D. Where a generic product or a general manufacturer’s product is specified and more than one such product is offered by the manufacturer, provide the manufacturer’s premium materials.
- E. LEED/EPA Requirements
 1. Roof cover shall provide the minimum Solar Reflectance Index (SRI) listed below as calculated according to ASTM C1549 or ASTM E 1980.
 2. Roofing shall comply with the requirements of the U.S. EPA Energy Star® program and meet the reflectance and emittance requirements of Title 24 Part 6 for the state of California. Contractor shall submit CRRC Product ID number.

2.2 MANUFACTURERS

- A. For purposes of these documents, the roof system manufacturer is defined as the manufacturer of the primary roof membrane. The roof system is intended to encompass, but is not necessarily limited to, all components above the deck including underlayment and/or vapor retarder components, roof insulation, roof membrane, membrane flashings and any proprietary flashing/components of the system manufacturer. Subject to compliance with the material specifications of these documents, all materials are to be supplied by the same manufacturer.
- B. All materials used in systems to be covered by a Manufacturer’s Guarantee must be supplied by the same manufacturer, unless the manufacturer issuing the guarantee waives this requirement in writing.
- C. The following material manufacturers are approved for this project. Such approval does not relieve the Contractor from the requirement to supply materials which meet all other requirements of these Specifications.
 1. Siplast, Inc.
 2. Johns Manville International, Inc.
 3. Soprema, Inc.

2.3 BASE SHEET MATERIALS

- A. Fiber Glass Base Sheet: ASTM D 4610, Type II, unperforated, asphalt-impregnated and coated, glass-fiber sheet, dusted with mineral surfacing on both sides.
- B. Gypsum Base Sheet Fasteners: Dual high tensile coated steel wire encased in a minimum 1.8" long galvanized steel tube with a minimum 2.7" diameter galvalume steel plate: OlyLok Locking Impact Nail as manufactured by OMG Roofing Products or approved equal prior to bid.
- C. Lightweight Concrete Base Sheet Fasteners: Minimum 1.75" long one-piece, dual galvanized steel legs with a minimum 2.75" diameter galvalume steel plate: CR Base Sheet fasteners as manufactured by OMG Roofing Products or approved equal prior to bid.
- D. Wood Base Sheet Fastener: With a minimum 1-5/8" cap diameter and an average pull-out resistance of 190 pounds in 2" thick pine plank wood: Simplex Mega Cap Nails or approved equal.

2.4 MEMBRANE MATERIALS

- A. Vapor Retarder: Self-adhered membrane consisting of tri-laminate woven polyethylene film over a high-quality SBS rubber and asphalt blend rated to provide temporary weather protection for a minimum of 90-days.
- B. Base Membrane/Base Ply: ASTM D 5147 and D 6164, Type I, Grade S, SBS-modified asphalt sheet with polyester mat reinforcing, suitable for application method specified. Minimum 110 mils thick.
- C. Cap Sheet: ASTM D 5147 and D 6164, Type II, Grade G, SBS-modified asphalt sheet with polyester mat reinforcing, granular surfaced, suitable for application method specified and as follows:
 - 1. Granule Color: White granules that provide a minimum initial year solar reflectance of 0.70 and minimum initial year thermal emittance of 0.75.
 - 2. Minimum 157 mils thick.
- D. Flashing Sheet: ASTM D 6298, glass fiber reinforced, SBS-modified asphalt sheet; metal-foil surfaced, suitable for torch application, and as follows:
 - 1. Foil Finish: Aluminum.
 - 2. Minimum 157 mils thick.
- E. White Coating: ASTM D 6083-05 (withdrawn), high solids content, white acrylic coating. Approved for use by approved roofing system manufacturer. Base coat as required for roller application.
- F. Three-Course Liquid Flashing: Two-component, elastomeric, liquid applied flashing material and stitch-bonded polyester scrim, as provided or approved for use by the approved roofing system manufacturer

2.5 BITUMINOUS MATERIALS

- A. Asphalt Primer: ASTM D 41.
- B. Black Plastic Roof Cement (Asphalt): ASTM D2822-91(1997), Class I. Class II cement will be used if applied to damp or wet surfaces. Approved for use by approved roofing system manufacturer.

- C. Flashing Cement: ASTM D 4586, Type II, asbestos-free.

2.6 INSULATION / BOARD GOOD

- A. Thermal Barrier: ASTM C 1177, non-structural board, glass mat embedded, water resistant gypsum core, factory primed, 5/8-inch-thick, 4' x 8' board size, such as Dens-Deck Prime as manufactured by Georgia Pacific.
- B. Gypsum Cover Board: ASTM C 1177, non-structural board, glass mat embedded, water resistant gypsum core, factory primed, 1/2-inch-thick, 4' x 8' board size, such as Dens-Deck Prime as manufactured by Georgia Pacific.
- C. Polyisocyanurate Roof Insulation: ASTM C 1289, Type II, with felt or glass-fiber mat on both major surfaces, manufactured to meet the following requirements:
 - 1. Nominal Compressive Strength: 20 psi.
 - 2. Dimensional Stability: 2% maximum linear change when conditioned at 158°F and 97% relative humidity.
 - 3. Minimum Curing Time: 24 hrs. plus 24 hrs. for each inch of thickness at a minimum of 60°F before shipment from manufacturer.
 - 4. Maximum Board Thickness: 2 inches.
- D. Cant Strips: ASTM C 728, wood cant cut to fit at 45° with minimum 4-1/2-inch face.
- E. Tapered Edge Strips: ASTM C 208, Grade 1, wood fiberboard, 0-inch thick at thin edge and maximum 1-1/2 inch at thick edge.
- F. Insulation Adhesive: Two component, low rise polyurethane foam, approved by membrane manufacturer for insulation and substrates on this project.

2.7 FASTENERS

- A. Galvanized Steel Roofing Nails: 11 or 12-gauge stainless steel with ringed shank, minimum 3/8-inch diameter head, minimum length to penetrate substrate a minimum of 1 inch with 1-inch cap such as Simplex cap nails.
- B. Masonry Anchors: Drive-pin fastener with alloy sleeve and stainless-steel nail insert for use in concrete, brick or concrete masonry units, 3/16-inch diameter, 1-1/4-inch length, mushroom head.
- C. Masonry Anchors: Stainless steel screw anchor for use in concrete, brick or concrete masonry units manufactured with threads for cutting into walls of pre-drilled opening to provide tight friction fit, 3/16-inch diameter, 1-1/4-inch length.
- D. Insulation Fasteners and Plates: Plated steel fastener and 3-inch diameter round or 3-inch square steel plate as manufactured by or specifically recommended by the roof system manufacturer. Fasteners and plates must be Factory Mutual approved for 1-90 construction with the specified insulation.
- E. Low-Rise Foam Adhesive: double or single-component low-rise polyurethane adhesive as approved by the roofing system manufacturer for adhering insulation to meet uplift and warranty requirements.
- F. Termination Bar: Extruded aluminum bar, 1-inch wide, 1/8-inch-thick, with pre-punched holes at 6 inches on center.

PART 3 - EXECUTION

3.1 SYSTEM SCHEDULE

- A. Refer to Table 1 for a general schedule of the primary roof components (described from the bottom up) for each roof area. Methods of installation and related materials are in other sections of these specifications.

Table 1

Roof Area	002
Deck	Presumed 22 ga. steel deck with nominal 3-inch-deep ribs. Type N
Base sheet	N/A
Thermal Barrier	5/8-inch gypsum sheathing mechanically attached.
Vapor Retarder	Self-Adhered Modified Bituminous Sheet
1st Layer Insulation	2 inches polyisocyanurate insulation, loose laid.
2 nd Layer Insulation	2 inches polyisocyanurate insulation mechanically attached
3 rd Layer Insulation	2 inches polyisocyanurate insulation adhered by low-rise foam adhesive.
Cover Board	1/2-inch gypsum sheathing adhered by low-rise foam adhesive.
Surfacing	2 ply SBS-modified bitumen membrane adhered by torch application

3.2 EXAMINATION

- A. Inspect all surfaces to receive work specified herein. Application of materials constitutes approval of the substrate as being satisfactory.
- B. Do not proceed with roofing until all vents, drains, curbs, cants, blocking, nailing strips, and projects through the roof deck have been installed.

3.3 INSTALLATION, GENERAL

- A. Do not apply materials on wet or damp surfaces, over dust, dirt or other foreign matter. Foaming of hot bitumen at application is evidence that the surface is too wet for application.
- B. Do not apply bituminous materials when ambient air temperature is below 40°F unless equipment can be operated and materials handled without exceeding maximum allowable temperatures and without damage to materials, and then only with approval of the COR.
- C. Do not apply emulsions when ambient air temperature is below 40°F or is expected to be below freezing within 24 hours after application.
- D. Accomplish application of roofing materials so that each area will be complete at the end of each workday.

- E. Protect edges and incomplete flashings against water entry at all times. Remove cut-offs and temporary protection prior to resumption of work.
- F. Prime all concrete, masonry and metal surfaces to receive bituminous materials, using approximately one gallon of primer per 100 square feet of surface. Allow primer to dry thoroughly before application of bituminous materials.
- G. Set insulating board cant strips and tapered edge strips in a generous bed of black plastic roof cement so that they are tightly cemented to both horizontal and vertical surfaces.
- H. Torch apply base ply, cap sheet, and base flashing.

3.4 TORCH OPERATIONS

- A. All torch operations are to comply with Certified Roofing Torch Applicator (CERTA) and NRCA requirements. Torch operators shall be fully certified by CERTA. Contractor shall provide copy of certification for all torch applicators.
 1. For a minimum of two hours following daily completion of torch applications, maintain a fire watch inside and outside the building in the area of torch application. Utilize a fully-functional hand-held infrared device suitable for detecting areas of elevated temperature.
 2. Contractor shall maintain two (2) fully operational fire extinguishers at the site at all times.
 3. Apply two-ply base flashing backer sheet at wood curbs. Take all measures necessary to protect wood curbs from open flames.
 4. Contractor shall use "torch-and-flop" method at all base flashings.

3.5 INSULATION APPLICATION, GENERAL

- A. Clean roof deck surfaces of all dirt, dust and other foreign matter.
- B. Apply insulation with end joints staggered approximately one-half the length of the units.
- C. Offset insulation joints from the preceding layer a minimum of six (6) inches.
- D. Fit all insulation units snugly to each other and to all vertical surfaces.
- E. Low-Rise Foam Adhesive: Secure each board to the substrate using low-rise adhesive beads at spacings in accordance with the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone and the approved RoofNav assembly number. However, spacings shall not to exceed 12 inches on-center in the field (Zone 1), 6 inches on center for the perimeter (Zone 2), and 4 inches on center for the corner (Zone 3). Zone definition is indicated on drawings. Ensure insulation contact with adhesive by weighting units. Prior to applying adhesive bead, apply one continuous bead of adhesive around the perimeter of the of the insulation board not further that 4 inches from the edge.
- F. Mechanical Attachment: Secure each board to the metal roof panels using plates and fasteners in accordance with the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone and the approved RoofNav assembly number. However, there shall be a minimum of 1 fastener/plates per 4 square feet for the field (Zone 1), 1 fastener/plates per 2 square feet at the perimeter (Zone 2), and 1 fastener/plates per 1 square feet at the corners (Zone 3). Zone definition is indicated on drawings. Partial units less than 4 square feet shall be secured with a minimum of 4 fasteners/plates. Provide insulation fasteners of lengths sized to engage the metal roof panels a minimum of $\frac{3}{4}$ inch and a maximum of 1-1/2 inches.
- G. General Requirements: Crickets/Saddles

1. Start cricket construction by striking chalk lines for outer edges of tapered units. Install the first row along the chalk lines, mitering and fitting at the points where lines break.
 2. Complete the cricket assembly using tapered isocyanurate and isocyanurate fill units. Fill unit shall not exceed 2 inches in thickness.
 3. The thin edge of the tapered insulation shall be 1/2" and shall be located at the valley created by the tapered insulation and the roof insulation.
 4. Utilize tapered wood fiber edge strips that transition from 0" to 1/2" as the first layer of tapered insulation to provide a smooth transition. Set wood fiber on top of the insulation in one continuous band of low-rise foam adhesive.
- H. Remove and replace all damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness.

3.6 THERMAL BARRIER INSTALLATION

- A. Furnish and install one layer of nominal thermal barrier to the deck by mechanical attachment.
- B. Secure each board to the metal deck using specified insulation fasteners and plates approved by the materials manufacturer. Secure boards in accordance with the approved RoofNav Assembly Number. However, at a minimum use one fastener per four (4) square feet in the field with a minimum of one fastener at each corner of each insulation unit, but not closer than 6 inches to longest edges and 12 inches to the shortest edges of the unit.
- C. At the perimeters, use one fastener per 2 square feet with a minimum of one fastener at each corner of each insulation unit, but not closer than 6 inches to the edges and 6 inches to the ends of the unit. Fasteners shall penetrate through decking a minimum of 3/4 inch, unless roofing manufacturer's requirements are more stringent. Perimeters extend for 30 feet from the eaves/parapets/walls above roof level.
- D. At corners, use one fastener per 1 square feet with a minimum of one fastener at each corner of each insulation unit, but not closer than 6 inches to the edges and 6 inches to the ends of the unit. Fasteners shall penetrate through decking a minimum of 3/4 inch, unless roofing manufacturer's requirements are more stringent. Corners extend for 60 feet from the eaves/parapets/walls above roof level.
- E. Fasteners shall penetrate through the upmost flute of the metal decking a minimum of 3/4 inch but no more than 1-1/2.
- F. Fit panels snugly to each other and to all vertical surfaces.
- G. Stagger board end joints a minimum of half the board length.
- H. Remove and replace damaged units with new panels or repair to provide a smooth surface and uniform thickness.

3.7 VAPOR RETARDER INSTALLATION

- A. Check roof surface carefully for damage and application defects and make appropriate repairs and corrections prior to application of the vapor barrier.
- B. Prime the substrate in accordance with the approved RoofNav assembly number and manufactured requirements, as required.
- C. Roll out membrane and allow to "relax" in accordance with roofing system manufacturer's written instructions.

- D. Beginning at the lowest point of the roof, apply one-ply of the vapor retarder without voids. Use a stiff broom or weighted steel roller to ensure full contact of the vapor retarder with the substrate.
- E. Take care not to damage the vapor retarder during application or pressing.
- F. Lap sides and ends in accordance with the roofing system manufacturer's written requirements. However, side laps shall be lapped a minimum of two (2) inches and end laps a minimum of six (6) inches.
- G. Whenever possible, the entire roll shall be applied in a continuous manner.
- H. Finished membrane must have a uniform appearance throughout.
- I. All membrane shall be turned up curbs and walls above roof level to end flush with the top of the roof insulation. Continue the vapor retarder over wood nailers at eaves and onto the exterior cladding a distance to match the new edge metal or gutter, whichever is further. Fully adhere the vapor retarder to the substrate.
- J. At locations where it is not practical to turn up the membrane, and extend the membrane to the edge of the deck and cut off neatly. Where the membrane is cut at the end of the deck, form a sleeve from membrane, and flash penetrations so that the top of the flashing with flush with the top of the roof insulation. Extending flashing onto the vapor barrier a minimum of two (2) inches.
- K. Seal the edge of the vapor barrier with roofing cement.

3.8 INSULATION APPLICATION, ROOF AREA 002

- A. Apply one layer of 1.5-inch-thick isocyanurate insulation to substrate and secure by mechanical attachment.
- B. At the primary scuppers sumps shown on the plans, apply 1/2 inch per foot tapered isocyanurate, and isocyanurate fill units that extends from the scupper opening to a width that matches the size of the sump. [Prior to installing the tapered insulation, furnish and install new flat isocyanurate insulation that ends approximately 1/2 inch below the scupper. Secure each flat board to the substrate in accordance with Paragraphs 3.6.A above. The thin edge of the tapered insulation shall be located adjacent to the scupper opening. Fill units shall not exceed 1 inch in thickness. The insulation thickness adjacent to the drain shall be nominal 1/4 inch. Increase the thickness of the tapered insulation until it matches the thickness of the new isocyanurate insulation. Remove and replace damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness. Apply the tapered insulation to the flat insulation secure using low-rise adhesive.
- C. Furnish and install tapered insulation to move water from walls, form valleys/crickets, as shown on roof plans, using factory-tapered isocyanurate units and isocyanurate fill units. Tapered insulation shall provide a minimum finished slope of 1/2 inches per foot.
- D. Furnish and install one layer of cover board over all isocyanurate insulation and secure by mechanical attachment.

3.9 MEMBRANE APPLICATION

- A. Apply new SBS modified bitumen material fully adhered by torch application in strict accordance with manufacturer's latest printed instructions except as amended in this section.
- B. Lap ends at least 6 inches and sides at least 4 inches.

- C. Stagger end laps a minimum of 3 feet.
- D. Offset cap sheet side laps from base ply side laps a minimum of 18 inches. Offset set cap sheet end laps from base ply end laps a minimum of 3 feet.
- E. Cut base ply and cap sheet in strips not over 18 feet long, lay flat and allow all strips to flatten completely before using. Do not use damaged, abused or distorted roll ends.
- F. Where stripping plies are specified, they are to be installed prior to application of cap sheet. Where base flashings are specified, terminate cap sheet neatly along top of cant and apply base flashing over cap sheet.
- G. Check roof surface carefully for damage and application defects and make appropriate repairs and corrections.
- H. Starting at low point in roof, apply base ply continuous over the substrate in shingle fashion. Apply uniformly and without voids. Press into full contact with substrate.
- I. Beginning at the saddle and cricket valleys created with tapered insulation, apply one ply of granule-surfaced SBS modified bitumen cap sheet without voids and fully adhere by torch application. Install cap sheet at valley so that water will run across the lap. Starting at low point in roof, apply cap sheet. Apply uniformly and without voids. Press into full contact with substrate.
- J. Torch Application:
 - 1. Heat the underside of the membrane to a molten state and unroll the membrane onto the cover board.
 - 2. Do not walk on the membrane until the molten asphalt has solidified and the sheet is cool.
 - 3. Utilize a steel roller to press laps of the membrane to ensure proper adhesion and bleed-out.
- K. Heat weld all laps using the torch. Be sure to prime and/or heat any granules and embed in underlying asphalt at laps.
- L. Seams shall be tested in accordance with the roofing system manufacturer's instructions and evaluated for seam integrity. Seams that fail this test shall be subject to additional test cuts, as directed by the Designer and/or roofing system manufacturer, to further quantify the extend of the deficient condition. Repairs to deficient seams and/or test cut locations shall be performed by the Contractor at no additional cost to the Owner.
- M. At eaves, the membrane shall extend to the exterior edge of the wood blocking and be cut neatly.
- N. Install in all asphalt over-runs roofing granules matching the cap sheet surface. Finished surfaces must be reasonably uniform without streaks or spots.
- O. Take measures as required to ensure that base ply and cap ply are fully adhered.
- P. Whenever possible, the entire roll shall be applied in a continuous manner.

3.10 BASE FLASHING APPLICATION – TORCH APPLICATION

- A. Install metal foil modified bitumen flashings at all curbs, walls and vertical surfaces where other types of flashings are not specified or shown on Drawings.

- B. Prior to application of base flashings, carefully inspect membrane plies and all surfaces to which flashings are to be applied. Clean surfaces of dust, dirt or any residue which may interfere with application or adhesion of flashings. Ensure that all plies are solidly adhered to each other and to the cant and the cant is solidly affixed to horizontal and vertical surfaces. Base flashings must be tight and fully bonded to the substrate. Loose spots, loose laps or blisters are not acceptable.
 - C. Prior to installation of base flashings at wood substrates, furnish and install new fiber glass base sheet. Lap ends of base sheet 4 inches. Secure using specified fasteners spaced 6 inches on center in every direction.
 - D. Carefully remove all deleterious amounts of bituminous cements.
 - E. Apply new torch grade modified bitumen base flashing material in strict accordance with manufacturer's latest printed instructions except as amended herein.
 - F. Fasten the bituminous flashings top edge with flashing nails or appropriate fasteners on a line approximately one (1) inch below the top edge and spaced not over four (4) inches apart. Where it is not possible to secure the top of the bituminous flashings with flashing nails, furnish and install continuous termination bar fastened to the substrate with appropriate fasteners at spacings not to exceed six (6) inches on center. If multiple termination bar sections are used, leave a ¼ inch gap between sections.
 - G. Cover the top edges and fasteners with a nominal 1/8-inch-thick troweling of cement.
 - H. Offset base ply and cap ply flashing laps a minimum of 18 inches.
 - I. At inside and outside corners, extend the base flashing from 1st side of the corner to 4 inches onto the 2nd side of the corner. The base flashing from the 2nd side of the corner shall extend onto the base flashing at the 1st side of the corner a minimum of 4 inches. Notch extensions at cants and where membrane extends onto roofing. Fully adhere base flashing in accordance with membrane manufacturer recommendations and this section of the specification. This process shall be accomplished for all base flashings layers and flashing extension.
 - J. Heat weld all laps using the torch. Be sure to prime and/or heat any granules and embed in underlying asphalt at laps. The use of bituminous adhesive at laps is not permitted.
 - K. Immediately thereafter cover top edge and fasteners with a continuous 1/8-inch-thick troweling of flashing cement.
 - L. At vertical terminations, furnish and install a new vertical termination bar located 1 inch from the edge of the flashing and secure to the substrate using specified fasteners at spacings not to exceed 6 inches on-center. Counter the termination be with counterflashing as specified elsewhere.
 - M. Check all laps as required by the manufacturer's specifications, reheat and seal as required to obtain full adhesion.
 - N. Unless specifically stated otherwise in these specifications or on Drawings, all base flashings are required to extend a minimum of 8 inches above finished roof level. Include costs for modifying parapets, equipment curbs, expansion joint curbs, etc. to meet this requirement.
- 3.11 STRIPPING APPLICATION
- A. Strip flange of pitch pans, lead boot, lead flashings, eave flashings, and roof vent bases with one ply of base ply material in accordance with membrane manufacturer's latest printed instructions. Extend stripping from vertical surface to 12 inches onto the roof surface.

- B. Strip drain lead one ply of base ply material in accordance with membrane manufacturer's latest printed instructions. Extend stripping a minimum of 12 inches beyond lead.
- C. Torch-apply metal-foil surfaced modified bitumen flashing over base ply stripping at drains. All cuts and terminations at mineral surfaced cap sheets are to be neat and square.

3.12 MISCELLANEOUS PENETRATIONS

- A. At penetrations through new roofing that cannot receive lead flashings, furnish and install new three-course flashing in lieu of pitch pans.
- B. Mask target area a minimum of 8" into the field with tape or other material.
- C. Prime all nonporous areas requiring the liquid membrane and allow to dry.
- D. Apply liquid flashing base coat a minimum of 8" into the field of the roof and 8" up the vertical substrate.
- E. Cut scrim sheet as to have approximately 2" of basecoat on both the field and vertical side of the sheet and completely embed the scrim sheet into the liquid flashing base coat.
- F. Apply liquid flashing finish coat 2" beyond the scrim outline.
- G. Apply granules to wet finish coat to match new field membrane.
- H. Apply in accordance with manufacturer written recommendations.

3.13 WALKWAY APPLICATION

- A. Install new walkway at all locations as specified herein.
- B. Install new walkway on all sides of all major equipment (motorized equipment, scuttles, or any rooftop unit with any single dimension greater than or equal to 3 feet).
- C. Install new walkway pads at all roof access locations.
- D. Install new walkway pads at all non-penetrating supports or stands.
- E. Install new walkway pads at all mechanical units.
- F. Adhere walkway units by torch application over cap sheet surface.
- G. Cut strips of walkway units for installation under conduit supports from new full-size walkway units. Cut strips a minimum of 6 inches wider and longer than conduit supports to be supported.
- H. Set units so that long edges are aligned and units are spaced about 2 inches apart.

WARRANTY

Owner: Army Reserve

Installer: _____

Location of Building: _____

Name of Building: _____

Roof Areas: _____

Date of Substantial Completion: _____

Know all men by these presents, that we, Installer as defined above, having installed insulation, roofing, flashings and sheet metal work, and having accomplished certain other work on the roof areas identified above under contract between Owner and Contractor, warrant to Owner, with respect to said work that for a period of five years from date of Substantial Completion of said work, the roofing including insulation, roofing membrane, flashings and sheet metal work, shall be absolutely watertight and free from all leaks, provided however that the following are excluded from this warranty:

Defects or failures resulting from abuse by the Owner.

Defects in design involving failure of (1) structural frame, (2) load-bearing walls, and (3) foundations.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars riots or civil commotion.

We, Installer, agree that should any leaks occur in the roofing we will promptly remedy said leaks in a manner to restore the roof to a watertight condition by methods compatible to the system and acceptable under industry standards and general practice.

We, Installer, further agree that for a period of five years from date of Substantial Completion referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including but not limited to blisters, wrinkles, ridges, splits, warped insulation and loose flashings in a manner compatible to the system and acceptable under industry standards and general practice.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this _____ day of _____, 20 _____.

(Installer)

WITNESS:

by _____
President

Notary Public

END OF SECTION 07552

SECTION 07620 - 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 other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Sheet metal flashing and trim.
- B. Related Sections include the following:
 - 1. Division 7 Section "SBS-Modified Bituminous Membrane Roofing."

1.3 SUBMITTALS

- A. **Government approval is required for submittals with a "G" designation. Submittals not having a "G" designation are for contractor quality control, for information only, etc. Submittals with "G" designation are listed in the submittal register.**
- B. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
- C. Submit catalog cut sheets for each material listed in the submittal register. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.
- D. Submit shop drawings of all specified types of metal shapes, showing details of proposed installation, including complete dimensions, metal types and fastening, where appropriate.
- E. Submit two 6-inch-long samples of each metal shape.
- F. Manufacturer Certificates: Original document signed by a responsible officer of the manufacturing firm, notarized, on manufacturer's standard letterhead, certifying materials furnished for project comply with the referenced standard. Certificate shall specifically reference the project and applicable compliance standard.
- G. Color Chart: Manufacturer's standard range of colors for prefinished metals, including available gauges.
- H. Obtain approval of shop drawings, samples and certifications prior to fabrication and installation.
- I. Do not purchase, fabricate or install any sheet metal item until all required shop drawings and related submittals for each item are approved. Items purchased, fabricated and/or installed which are not in compliance with approved shop drawings are subject to immediate removal from the project at contractor's expense.

1.4 STORAGE

- A. Restrict on-site storage to minimum for work in progress. Protect all stored metal from exposure to weather and physical damage.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. Aluminum-Zinc (Galvalume) Alloy-Coated Steel Sheet: ASTM A 792/A792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
- B. Stainless Steel: ASTM A 167, chromium-nickel steel sheet, AISI Type 304.
- C. Solder: ASTM B 32, with 50% lead and 50% tin unless otherwise specified herein.
- D. Lead: 4 lb. soft lead.
- E. Exposed Finish: Kynar® 500 based fluoropolymer coating, containing not less than 70% polyvinylidene fluoride resin by weight. Mask metal with protective plastic film.
- F. Color: As selected by Owner from manufacturer's full range.

2.2 AUXILIARY MATERIALS

- A. PVC Stripping: 20 mil PVC.
- B. Sealant: ASTM C 920, Type S, Grade NS, Class 25, one-part polyurethane sealant.
- C. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos-free.
- D. Self-Adhering Membrane: ASTM D 1970, polyethylene film laminated to a layer of rubberized asphalt adhesive, with slip-resistant surface and release paper backing, such as Grace Ice and Water Shield.

2.3 SHEET METAL SCHEDULE

- A. Base Flashing Closure: 24 ga. PVC coated and prefinished aluminum-zinc coated steel
- B. Cleat: Minimum 22 ga. and two gauges thicker than metal flashing. Unfished metal of same type as metal flashing.
- C. Coping: 24 ga. prefinished aluminum-zinc coated steel
- D. Counter Flashing: 24 ga. prefinished aluminum-zinc coated steel
- E. Downspout: 24 ga. prefinished aluminum-zinc coated steel
- F. Eave Flashings: 24 ga. PVC coated and prefinished aluminum-zinc coated steel
- G. Face Extender: 24 ga. prefinished aluminum-zinc coated steel
- H. Gravel-Stop Fascia: 24 ga. prefinished aluminum-zinc coated steel
- I. Gutter: 24 ga. prefinished aluminum-zinc coated steel

- J. Metal Flashing Closures: 24 ga. prefinished num-zinc coated steel.
- K. Sheet Metal Hood: 24 ga. unfinished stainless steel
- L. Scupper Liner: 24 ga. unfinished stainless steel
- M. Scupper Exterior Flange: 24 ga. prefinished galvanized steel
- N. Vent Stack Bases: 24 ga. unfinished stainless steel

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Inspect all surfaces to which metal is to be applied. Do not install metal unless surfaces are even, sound, clean, dry and free from defects that might affect the application.
- B. Follow recommendations of Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Architectural Sheet Metal Manual Seventh Edition, 2012 for fabricating in-shop and on-site, and for installation, unless otherwise specified herein or on Drawings.
- C. Follow published instructions of the product manufacturer for installation of extruded or proprietary metal products, unless otherwise specified herein or on Drawings.
- D. Use nails, screws, bolts, cleats or other fasteners of the same material or, if approved by COR, of material chemically compatible with the contacted metal.
- E. Fabricate cleats to be a minimum of one gauge heavier than fascia metal.
- F. Secure cleats to substrate with fasteners specifically manufactured for the purpose at spacings of 6 inches on center. Provide ring shank fasteners or screws at wood substrates. Locate fasteners as close to hem of cleat as practical but no more than 2 inches from hem unless specifically indicated otherwise herein or on Drawings.
- G. Solder metal, where required, using standard industry techniques in accordance with the requirements of the metal manufacturer and the SMACNA Architectural Sheet Metal Manual for the types of metal to be soldered. Thoroughly sweat joints to ensure full penetration of solder in the joint and to ensure a secure connection. Fully solder rivet joints to eliminate rivet holes or potential for corrosion.
- H. Do not place dissimilar metals in direct contact or in positions where water sheds across both metals.
- I. Where aluminum is in contact with masonry or concrete, coat the contacting surface with bituminous paint.
- J. Install metal to be water- and weathertight with lines, arises and angles sharp and true and with plane surfaces free of waves or buckles. Hem all raw edges of exposed or finish sheet metal.
- K. Install shop-formed metal in 10-foot lengths maximum and with minimum number of pieces in each straight run.
- L. Miter and seal all inside and outside corners of coping cap. Shop fabricated corner pieces are preferable.
- M. Shop form all metal shapes, which are to be formed of prefinished metal, with protective plastic film in place. Do not remove plastic film until just prior to (or, if possible, after) installation.

- N. At all corners, shop form corner pieces of coping cap with 18-inch legs (joints no more than 18 inches from corner). Seal joint of corner piece.
- O. Prime all metal components that will be in contact with bituminous materials.
- P. Flat Drive Cleats: Refer to SMACNA Architectural Sheet Metal Manual Figure No. 3-2, Detail 4 and Drawings. Lap vertical sections a minimum of 3 inches, and hem the top of the sections. Apply the flat drive cleat and fold down the outside face of both sides of the coping 1 inch, snug to the vertical flange of the coping. Trim excess flat drive cleat from the vertical face of the coping.
- Q. Flat Lock Seams: Refer to SMACNA Architectural Sheet Metal Manual Figure No. 3-2, Detail 2 and Drawings.
- R. Lapped Sections: Lap sections a minimum of 3 inches so that water runs across the lap. Apply two beads of sealant between lapped sections. Application of sealant at the joint after sections have been lapped is not acceptable.

3.2 BASE FLASHING CLOSURE INSTALLATION

- A. Install new base flashing closures where base flashings abruptly end as specified herein.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Completely seal all joints to be watertight.
- D. Install closures over roof membrane and under base flashings.
- E. Extend closures up under counterflashing, where present or specified.
- F. Secure the closure over the substrate using appropriate fasteners at spacings not to exceed 8 inches on center. Strip in the closure and fasteners with base flashing membrane.
- G. Form a cove at the outside edge of the closure and seal to substrate with specified sealant.
- H. Install closures to completely seal ends of base flashings and membrane as well as end joints of eave flashing, if present.
- I. Apply metal closures at the end of the cant strips and set the cant strip closures in sealant against the gravel-stop closure and rivet to the gravel-stop closure using appropriate stainless-steel pop rivets at spacings not to exceed 1 inches on-center. Prime the cant strip closure and set the cant strip in roofing cement inside the closure. Apply flashings over the closure using metal asphalt primer as required.

3.3 COPING INSTALLATION

- A. Form new coping cap. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 3-4A, and Drawings. Any deviations to this basic design shall be submitted to the Designer for approval along with documentation that the revised detail meets the ANSI/SPRI ES-1 wind uplift requirements.
- B. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the exterior vertical flange and interior vertical flange of the coping shall not be more than 5 inches and 3 inches, respectively. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.

- C. Prior to the installation of the coping cap, ensure the roof membrane extends up and over the parapet. The membrane shall extend across the top of the blocking and extend down the outside face approximately the length of the vertical sections of the coping cap and/or fascia extension. Fully weld all laps in the roof membrane and secure the membrane using cap nail until the installation of the coping
- D. Prior to the installation of the coping cap, apply a strip of self-adhered modified bitumen membrane across the top of the blocking and extend down the outside and inside face approximately the length of the vertical sections of the coping cap and/or fascia extension. Use strips if practical, lapping the ends 6 inches and cemented with flashing cement. Secure the membrane with cap nails until the installation of the coping.
- E. Use maximum 10-foot lengths and a minimum number of pieces in each straight run.
- F. Secure both vertical legs of the coping with a continuous cleat nailed to the wood blocking. The coping drip edge shall be folded snugly over the cleat. Cleats shall be secured with nails that penetrate the wood a minimum of 1 inch at spacings not to exceed 6 inches on center. Nails shall be applied along the vertical face of the wood blocking.
- G. Join sections with flat drive cleats.
- H. At locations where coping intersects at corners, join sections with flat drive cleats.
- I. At locations where new coping intersects existing coping, the Contractor shall join sections with flat drive cleats.
- J. Furnish and install new closures as shown on drawings.
- K. Where expansion joints intersect coping, install a coping end joint centered over the joint with a 2-inch gap between section ends. Furnish and install a full profile cover plate over the joint that extends onto the coping sections a minimum of 3 inches. Set the cover plate in two continuous beads of sealant at each section. Fasten the cover plate to through its vertical flanges using specified screws through one section of coping. Do not secure the coping at the other side of the joint.
- L. At the end of the parapets, furnish and install an end cap. The end cap shall be formed from the same material as the coping. Lap the coping over the end cap a minimum of 1 inch, and set the lap in a continuous bead of sealant. Secure the end cap to the coping using stainless steel pop rivets to match the coping in color at spacings not to exceed 1 inch on-center

3.4 COUNTERFLASHING INSTALLATION

- A. Refer to sheet metal schedule for gauge and metal type.
- B. Install new continuous surface-mounted counterflashing at all rooftop units and other locations as shown on drawings. Refer to SMACNA Architectural Sheet Metal Manual Figure 4-6 and 4-8C. Extend flange down a minimum of 4 inches over base flashing. Secure counterflashing to vertical surface using specified fasteners at 4 inches on center.
 - 1. Set flange against vertical surface in a solid bed of caulk. Furnish and install a nominal 1" x ¼" flat bar and secure over the counterflashing using appropriate fasteners at spacings not to exceed 8 inches on center.
 - 2. A flat bar is not required at units.
 - 3. Form a cove at the top of the counterflashing and fill the cove with non-shrinking sealant, such as NP-1 or approved equal.
- C. Install new continuous single-piece raggle counterflashing at locations as shown on drawings. Refer to SMACNA Architectural Sheet Metal Manual Figure 4-4B and 4-8A. Extend flange

down a minimum of 4 inches over base flashing. Secure counterflashing in the raggle using a driven lead wedge at spacings not to exceed 12 inches on-center. Seal the top of the counterflashing using a non-shrinking sealant, such as NP-1 or approved equal.

- D. Install new continuous two-piece raggle counterflashing at locations as shown on drawings. Refer to SMACNA Architectural Sheet Metal Manual Figure 4-4C and 4-8B. Extend flange down a minimum of 4 inches over base flashing. Secure counterflashing to the receiver using stainless steel fasteners at spacings not to exceed 8 inches on-center. It is acceptable to provide premanufactured snap-lock counterflashing. Secure the receiver in the raggle using a driven lead wedge at spacings not to exceed 12 inches on-center. Seal the top of the receiver using a non-shrinking sealant, such as NP-1 or approved equal. Notch and solder receiver at corners.
- E. Notch and lap counterflashing joints and inside corners. Notch and seam outside corners. Do not rivet or otherwise secure joints and corners.
- F. Lap ends of counter flashing 4 inches. Crimp hem of overlapping section around hem of underlapping section.

3.5 DOWNSPOUT INSTALLATION

- A. Install new downspouts at existing exterior downspout locations as specified herein. Refer to SMACNA Architectural Sheet Metal Manual Figures 1-32E and 1-32H.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Size downspouts in accordance with drawings.
- D. Install downspouts at existing downspout locations.
- E. Lap sections a minimum of 3 inches and secure sections with a minimum of 2 stainless steel sheet metal screws.
- F. Form downspout hangers from the same material as downspouts using material not less than 2 gauges heavier than downspouts.
- G. Secure downspout hangers to wall with appropriate fasteners spaced not more than 5 feet on center and within 12 inches of the top and bottom of the downspout. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-32G.
- H. Where downspouts terminate at lower roof areas, extend downspout to gutter. Where necessary, provide slope in downspouts to allow positive drainage.
- I. Where downspouts terminate at grade or roof below with no gutter, provide new precast concrete splash blocks. Set blocks on grade with uniform solid support. Provide elbows at base of downspouts which turn out at 45°. Install a walkway pad beneath the splash block at roofing that extends past the splash block a distance that matches the splash block on all sides.
- J. Form or provide new round to rectangular downspout metal transition pieces to tie into existing underground drainage system formed from the same material as the downspouts.
- K. Refer to SMACNA Architectural Sheet Metal Manual Figure No.1- 36.

3.6 EAVE FLASHING (Shingles Roofing)

- A. At locations shown on drawings, furnish and install new T-style flashing with a 5-1/2-inch horizontal flange. At gutters, flashing shall extend into gutter a minimum of 2 inches. Refer to SMACNA Architectural Sheet Metal Manual Figures 4-18C and 4-18D.
- B. The vertical length of the flashing shall match the existing or be a minimum of 3 inches, whichever is greater.
- C. The horizontal flange shall extend past the vertical flange a minimum of 1 inch.
- D. Use maximum 10-foot lengths and a minimum number of pieces in each straight run.
- E. Prime both sides of the horizontal flange and set horizontal flange in a continuous bed of black plastic roof cement on top of the felt underlayment.
- F. Lap sections 3 inches and set laps in a bead of caulking. Lap sections as to shed water.
- G. Nail through horizontal flange near center. Space nails 3 inches on-center staggered 1/2-inch minimum. Do not apply nails in section laps.
- H. At eaves, extend rake flashing over the low-eave flashing and set in a solid application of roof cement.
- I. Strip in the flange with self-adhered modified bitumen membrane. The membrane shall extend past the edge of the flange a minimum of 6 inches.
- J. Fit modified bitumen peel and stick membrane snugly to the exterior edge of the edge flashing.

3.7 EAVE FLASHING (Single-Ply Roofing)

- A. At locations shown on drawings, furnish and install new L-type flashing with a 4-1/2-inch horizontal flange. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 2-1B. At gutters, flashing shall extend into gutter a minimum of 2 inches. At the expansion joints, flashing shall cover the top edge of base flashings a minimum of 3 inches.
- B. At locations shown on drawings, furnish and install new A-type flashing with a 180-degree bend that extends a minimum of 2-inches above the roof level. The flashing shall have a 4-1/2-inch horizontal flange. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 2-1B. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the vertical flange of the flashing shall not be more than 8 inches. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.
- C. Prior to installing the flashing, ensure that membrane extends behind the gutter a distance that matches the depth of the gutter. At locations where there is no gutter, ensure that membrane extends down past the top edge of the wall a minimum of 1 inch.
- D. Use maximum 10-foot lengths and a minimum number of pieces in each straight run.
- E. A continuous cleat is not required at gutter and expansion joint locations.
- F. Flashing shall engage a continuous cleat that shall be secured to the substrate with appropriate fasteners at spacings not to exceed 6 inches on center and approximately 1-3/4 inch from the bottom edge of the cleat.

- G. Set flashing in a continuous bead of sealant on top of the membrane. Lap section a minimum of 3 inches so water runs across the lap and set in two continuous beads of sealant. First, apply roofing system manufacturer aluminum tape over the joint. Then, apply unsupported membrane strip over the lapped sections that extend a minimum of 2 inches past the tape on both sides and fully welded to both metal sections.
 - H. Nail through horizontal flange near center. Space nails 3 inches on-center staggered pattern and locate nails approximately 1 inches from the edge of the flange. Do not nail in lapped sections.
 - I. Strip in the flange with membrane per manufacturer's written instructions by fully welding the membrane to the metal flashing.
 - J. Apply membrane manufacturers approved sealant along the edge of the membrane.
- 3.8 FACE EXTENDER: Furnish and install new face extender and continuous cleat, if necessary. The cleat shall be secured to the substrate using specified fasteners at spacings not to exceed 6 inches on-center. Lap face extender pieces a minimum of 3 inches. Fasten the face extender approximate $\frac{3}{4}$ " from the top edge flashing to the substrate using specified fasteners at spacings not to exceed 12 inches on-center. Offset face extender laps from flashing joints a minimum of 12 inches. Single face extender shall not exceed 8 inches in height.
- 3.9 GRAVEL-STOP FASCIA INSTALLATION:
- A. At locations shown on Drawings, furnish and install new A-type flashing. The flashing shall extend a minimum of 1 inch above the roof level. The flashing shall have a 4-1/2-inch horizontal flange. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 2-1B. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the vertical flange of the flashing shall not be more than 8 inches. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.
 - B. At gutters, flashing shall extend into gutter a minimum of 2 inches.
 - C. Any deviations to this basic design shall be submitted to the Designer for approval along with documentation that the revised detail meets the ANSI/SPRI ES-1 wind uplift requirements.
 - D. Prior to installing the fascia and gutter, furnish and install new self-adhered modified bitumen membrane that shall extend onto the roofing a minimum of 6 inches down the exterior face of the wall a distance to the match the gutter.
 - E. At edges where gutters are located, install gutters before gravel-stop fascia.
 - F. Apply a strip of 20 mil PVC in a continuous bed of black plastic roof cement across the top of the blocking and extending down the outside face approximately the width of the vertical section of the gravel-stop fascia. Sheeting shall extend into gutter. Lap sections a minimum of 3 inches and seal with black plastic roof cement.
 - G. Use maximum 10-foot lengths and a minimum number of pieces in each straight run.
 - H. A continuous cleat is not required at gutter locations.
 - I. At high gravel stop locations, gravel-stop fascia shall engage a continuous cleat that shall be secured to the substrate with appropriate nails that penetrate the wood blocking a minimum of 1 inch at spacings not to exceed 6 inches on center and approximately 1 inch from the top edge of the cleat. Any deviations to this basic design shall be submitted to the Engineer for approval along with documentation that the revised detail meets the ANSI/SPRI ES-1 wind uplift requirement.

- J. Set horizontal flange in a continuous bed of black plastic roof cement on top of PVC stripping.
- K. Leave a ¼ inch opening between sections. Center the cover plate over the opening, set in black plastic roof cement and nail with 2 nails through opening between sections. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 2-5A and Drawings.
- L. Nail through horizontal flange near center. Space nails 3 inches on-center staggered 1/2-inch minimum. Refer to SMACNA Architectural Sheet Metal Manual Figure 2.1.
- M. Form new gravel stop-fascia closures from 24 ga. galvanized steel with Kynar 500 finish. Refer to Drawings.
- N. Strip in the flange with two plies of membrane. The first ply shall extend past the edge of the flange a minimum of 6 inches. The second ply shall extend past the first ply a minimum of 6 inches.
- O. Fit membrane snugly to the inside edge of the gravel stop.

3.10 GUTTER INSTALLATION

- A. Install new gutters as specified herein. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-2, Style A.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Size gutters to in accordance with drawings (6"x6"). Gutters shall be 1 inch higher in the back than in the front.
- D. Provide butt-type expansion joints in gutters at spacings required for the type material used to fabricate gutters. However, spacings shall not exceed 40 feet. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-7.
- E. Provide prefinished aluminum gutter brackets sized at 1-1/2 inch by 1/4 inch spaced 18 inches on center. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-12.
- F. Provide prefinished galvalume gutter spacers sized at 1 inch by 1/8 inch spaced 18 inches on center. Continuous nominal ¼" x 1" galvanized steel or aluminum flat bar shall be installed at the front of the gutter and secured with stainless steel bolts and nuts at spacer locations. Offset and center spacers from brackets. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-12.
- G. Furnish and install gutter outlet tubes in accordance with SMACNA Architectural Sheet Metal Manual Figure No. 1-24C

3.11 METAL FLASHING CLOSURES

- A. Form closures as shown on drawings. Closure shall extend beneath roofing system components a minimum of 6 inches and 8 inches onto other substrates.
- B. Any seams or laps in the closures shall be set in sealant and pop riveted with stainless steel rivets at spacings not to exceed 1 inch on-center.
- C. Apply a continuous strip of self-adhered membrane over the substrates at the closure locations a minimum of 6 inches in all directions.
- D. Set the closures against bituminous roofing in a solid application of roof cement. Prime the closure as required.

- E. Set the closure against non-bituminous surfaces in two continuous beads of sealant.
- F. Secure the closure to the substrate using appropriate fasteners located approximately 1 inch from the edge of the closure at spacings not to exceed 6 inches on-center.
- G. Extend the closure a minimum of 6 inches in all direction or beneath the point of counter flashing a minimum of 2 inches.
- H. Apply metal closures at the end of the cant strips and set the cant strip closures in sealant against the other closures and rivet to the closure using appropriate stainless-steel pop rivets at spacings not to exceed 1 inches on-center. Prime the cant strip closure and set the cant strip in roofing cement inside the closure. Apply flashings over the closure using metal asphalt primer as required.
- I. Seal the opening between the closure and other metal flashings using a non-shrinking sealant.
- J. Submit detail to Engineer for approval prior to application.

3.12 MISCELLANEOUS FLANGED FLASHING INSTALLATION

- A. Set flange on top of roofing membrane in solid bed of roofing cement.
- B. Set flange in solid bed of roofing cement. If flange width exceeds 12 inches, secure to deck with sheet metal screws or other suitable fasteners placed near each corner and at center of each side.
- C. Except at plumbing vents or other locations where flashing is turned into top of pipe or otherwise integrally secure against water entry, install bonnet flashing extending below and beyond edges of flashing riser and secure mechanically to roof penetration so that connection is watertight. Securement by sealant alone is not acceptable.
- D. At sanitary vents using lead sleeve flashing, turn top sleeves neatly into inside of pipe at least one inch. Prefabricated sleeve caps may be used. Refer to SMACNA Architectural Sheet Metal Manual Figure 8-9B.

3.13 SHEET METAL HOOD

- A. At the existing curb where conduits penetrate the roofing at the existing sheet metal hood. Replace the sheet metal hood.
- B. Raise the existing curb, as necessary, in accordance with this specification.
- C. Furnish and install a new 24 ga. stainless steel three-piece sheet metal hood in accordance SMACNA Architectural Sheet Metal Manual Figure No. 8-9A. The vertical flanges shall fit snugly to the curb, and over the base flashings a minimum of 2 inches. The top of the vertical flange where the conduits enter the opening shall extend 12 inches past the bottom, and the vertical flanges shall transition in a diagonal manner. Secure the two vertical flanges of the hood to the curb using stainless steel screws with stainless steel bonded neoprene washers. Lap the vertical flanges a minimum of 2 inches, rivet using stainless steel pop rivets at spacings not to exceed 1 inch on-center, and complete solder the joint.
- D. Furnish and install a single-piece 24 ga. stainless steel removable cap with heavy cross breaks to shed water. The cap shall have vertical flanges that shall extend over the hood vertical flanges a minimum of 2 inches. Set the laps in sealant and rivet using stainless steel pop rivets at spacings not to exceed 6 inches on-center.
- E. Furnish and install a new continuous stainless-steel bird screen where the conduits enter the hood.

3.14 SCUPPER LINER INSTALLATION

- A. Form new scuppers. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-26A and 1-26B. Refer to Drawings for scupper size.
- B. Any necessary seams shall be set in sealant, lapped a minimum of 1 inch, and pop riveted with stainless steel pop rivets at spacings not to exceed 1 inch on-center. Fully weld all seams of the scupper prior to delivering to the site.
- C. Prior to installing the scupper, and after applying the base ply of base flashing, apply a strip of self-adhering modified bitumen membrane over the opening that shall extend a minimum of 12 inches past the scupper flange on the sides. The top of the membrane shall extend to beneath the coping, and the bottom of the membrane shall extend a minimum of 2 inches on to the cant. Set the scupper flange over the membrane and wall in a minimum 1/8" thick bed of black plastic roof cement.
- D. Strip in the vertical flange of the scupper with base ply membrane in the same manner as the base flashing is applied. Extend the stripping membrane to the scupper opening and a minimum of 12 inches past the scupper flange.
- E. Set the exterior flange against the wall in a bead of non-shrinking sealant. Secure the exterior flange to the wall with a row of fasteners located approximately one inch from the edge, at spacings not to exceed 6 inches on center. Hem the scupper liner to the exterior flange and set the seam in continuous sealant. Hem the exterior edges of the exterior flange towards the wall and seal the top edge to the cladding.
- F. Furnish and install a section of surface mounted counterflashing above the exterior scupper flange in accordance the Specification. The counterflashing shall extend a minimum of 1" beyond the ends of the scupper flange.

3.15 VENT STACK BASE

- A. Form new vent stack bases using membrane-clad at existing vent stack locations in accordance with SMACNA 7th Edition Figure 8-9C. Ensure a minimum flashing height of 8 inches above the finish roof surface.
- B. Secure the vent stack flanges to the form deck using insulation fasteners.
- C. Fill the void between the vent stack base and the penetration using continuous batt insulation.
- D. Fully weld membrane flashing over the base, and secure the top edge of the using a draw-band clamp.
- E. Install new a new stainless-steel counterflashing over the base in accordance with SMACNA 7th Edition Figure 8-9C. Lap counter flashing a minimum of 3 inches. Create cove at the top of the counter flashing and fill the cove with a high temperature sealant. Secure the counter flashing to the vent stack using a draw-band clamp.

3.16 VENT STACK BASE

- A. Furnish and install new stainless-steel bases in accordance SMACNA Architectural Sheet Metal Manual Figure No. 8-9C and 8-11A with a minimum flange that extends 6 inches past the opening. The vertical flanges shall fit snugly to the penetration. The base shall provide a minimum flashing height of 8 inches.
- B. All seams in the base shall be fully soldered.

- C. Set the base in a solid bed of roofing cement over the [base ply] [roofing felts]. Fasten to roof deck with suitable fasteners through flange placed near each corner and at center of each side
- D. Strip in the flange in accordance with this specification.
- E. Install new a new stainless-steel counterflashing over the penetration pocket in accordance with SMACNA 7th Edition Figure 8-9C. Lap counter flashing a minimum of 3 inches. Create cove at the top of the counter flashing and fill the cove with a high temperature sealant. Secure the counter flashing to the vent stack using a draw-band clamp

END OF SECTION 07620

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Construction joints in the capstone.
- B. Related Sections include the following:
 - 1. Division 1 Section "Summary."
 - 2. Division 7 Section "PVC Membrane Roofing."

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
- B. Submit catalog cut sheets for each material listed in the submittal register. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.
- C. Installation Instructions: Submit manufacturer's latest written installation instructions.
- D. Installer Certificates: Signed by sealant system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install sealant system.
- E. Manufacturer Certificates: Original document signed by a responsible officer of the manufacturing firm, notarized, on manufacturer's standard letterhead, certifying materials furnished for project comply with the referenced standard. Certificate shall specifically reference the project and applicable compliance standard.
- F. Warranties: Special warranties specified in this Section.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
- B. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer, or when ambient air temperature is below 40°F.
- C. When joint substrates are wet.

- D. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
- E. When contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
- F. Store all materials in dry storage at temperatures above 40°F. Do not use wet or damaged materials or containers.

1.6 QUALITY ASSURANCE

- A. Sealant, sealer, and backer rod installation shall be performed by a qualified and experienced installer having at least 5 years of experience in this type of work acceptable to the COR.
- B. Manufacturer shall have a minimum of 10 years of continuous, concurrent experience providing specified materials including the current year. Manufacturer is required, at a minimum, to perform site inspections to assess the work performed by the Contractor and provide written documentation to COR of findings and resolution of any deficient areas of work or issues. These inspections shall be performed at the first day of installation, at 50% complete installation, and a final installation inspection.
- C. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- D. Contractor shall retain the services of a material testing agency to perform destructive and a non-destructive adhesion test in accordance with the latest edition of ASTM C1521. Test shall be documented with photographs. Test results and photographs shall be composed into a report that shall be issued to the COR within 24 hours of the test. Adhesion test shall be performed by a licensed third-party firm with a minimum of 5 years' experience in material testing. A minimum of 4 destructive tests (1 for each elevation) shall be performed. All sealant shall be tested nondestructively. Each destructive test shall be performed on a minimum of 12 linear inches of sealant. Any repairs to sealant as a result of failure under this paragraph shall be performed by the Contractor at no additional cost to the Owner.
- E. Mock-Up: At the time of the pre-construction meeting, the Contractor shall have in place a full-scale mockup of construction techniques and materials to be used at the job site at no additional cost to the government at one metal cap. Mockups shall be complete and represent the final product produced by the work under this specification to include cleaning, preparation, and application of construction products in accordance with this specification and manufacturer requirements. To the full extent possible, mockups shall be constructed at the job site at a location agreed upon by the COR. Mockups shall not be constructed at completed locations or locations not scheduled for the work under this specification. Mockups shall remain in place through the duration of the work.

1.7 WARRANTIES

- A. Special Warranty: Manufacturer's standard form 20-year warranty in which manufacturer agrees to repair or replace components of the sealant system that fail in materials within specified warranty period. Limited Weatherseal Warranty as provided by Dow Corning or similar warranty as provided by preapproved manufacturers.
- B. Installer's Warranty: Installer's warranty, on form at end of this Section, signed by sealant Installer, properly executed and printed on Installer's letterhead form.
- C. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.5 GENERAL

- A. Listed in this section are specifications for materials required generally for use in accomplishing the work specified. Materials not listed may also be required.

2.6 SEALANTS

- A. Silicone, non-sagging, non-staining, low modulus sealant for joining concrete to concrete or prefinished metal; ASTM C 920, Type S or M, Grade NS, Class 100/50, for Use NT, M, G, A, and O:
 1. Dow Corning Corporation; 790 Silicone Building Sealant
 2. Sika Corporation; SikaSil WS-290
 3. Tremco; Spectrum 1.

2.7 AUXILIARY MATERIALS

- A. General: Provide sealant backings of materials and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backing: ASTM C 1330, Type C (closed-cell), of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Do not use materials impregnated with oil, bitumen or similar materials. Approximately 1.25 – 1.33 times larger than the openings, unless manufacturer has more stringent requirements.
- C. Primer: As recommended by sealant manufacturer.
- D. Masking Tape: Nonstaining, nonabsorbent materials compatible with joint sealants and surfaces adjacent to joints.
- E. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.
- F. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

PART 3 - EXECUTION

3.5 INSTALLATION, GENERAL

- A. Use solvents to clean equipment, tools and smears that are recommended by the sealant manufacturer. Solvents such as mineral spirits, kerosene or paint thinner shall not be used. Such cleaning should be accomplished as work progresses.

3.6 PREPARATION

- A. Remove all existing sealant and bond breaker down to original substrate. Removal of sealant with knife alone is not acceptable. Wire brush or grind all concrete or masonry joints and solvent wipe metal joints.
- B. Remove lacquer coating from new metal surface joints with a solvent wipe.

- C. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Ensure surface roughness inside joints is as necessary for sealant application in accordance with joint sealant manufacturer written instructions.
 3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 4. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primer to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
 5. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- D. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- E. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- F. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability:
1. Install cylindrical backings with blunt object to not puncture. Repair damaged areas.
 2. Do not leave gaps between ends of sealant backings.
 3. Do not stretch, twist, puncture, or tear sealant backings.
 4. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
 5. Set depth of backing in accordance with manufacturer written instructions for optimal joint depth.
- G. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant adhesion and movement capability.
- H. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- I. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 INSTALLATION OF JOINT SEALANTS

- A. Install new sealant at all removed locations.
- B. Do not apply any more bond breaker material than can be sealed in a day's time.
- C. Use manual or air-operated caulking guns adaptable for either cartridge or bulk loading.
- D. Apply new sealant under pressure with power actuated or manual gun. Gun must have correct nozzle size and pressure to fill joint completely.
- E. Tool joints immediately with a rounded wood or metal spatula. Do not use wet tool method. Tooling must be accomplished before sealant begins to skin.
- F. All finished work must be uniform, clean, neat and free of overlapping.

SEALANT WARRANTY

Owner: _____

Installer: _____

Location of Building: _____

Name of Building: _____

Areas: _____

Date of Substantial Completion: _____

Know all men by these presents, that we, Installer as defined above, having furnished labor, materials, equipment or supplies, installed new bond breaker, backer rod, sealant and certain other work on areas identified above under contract between Owner and Contractor, warrant to Owner, with respect to said work that for a period of five years from date of Substantial Completion of said work, the joint sealant, bond breaker, backer rod and related materials shall be absolutely watertight, airtight and free from all leaks, provided however that the following are excluded from this warranty:

Defects or failures resulting from abuse by the Owner.

Defects in design involving failure of (1) structural frame, (2) load-bearing walls, and (3) foundations.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars riots or civil commotion.

We, Installer, agree that should any leaks occur in the building joint sealant we will promptly remedy said leaks in a manner to restore the roof to a watertight and airtight condition by methods compatible to the system and acceptable under industry standards and general practice.

We, Installer, further agree that for a period of five years from date of Substantial Completion referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including but not limited to cohesive and adhesive failure, outgassing, voids and staining in a manner compatible to the system and acceptable under industry standards and general practice.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this _____ day of _____, 20 _____.

(Installer)

WITNESS:

by _____
President

Notary Public

END OF SECTION 07920

PHOTOGRAPHS – SF002



Vent Stack



Exhaust Vent



Soil Stack



Scupper



HVAC Equipment



Round Penetration



Equipment Curb

PHOTOGRAPHS – SF007 and SF008



Gutter



Ridge



Rake Edge



Equipment Curb

ROOF DRAWINGS