

Attachment L
Drawings and Specifications

ROOFING REPLACEMENT

CENTRAL DETENTION FACILITY

1901 D STREET, SE
WASHINGTON DC



BLUEFIN LLC CORPORATE OFFICE
6312 S. Fiddlers Green Circle Suite 100E
Greenwood Village, CO 80111
TEL: 866-735-0728

MID-ATLANTIC OFFICE
2134 Espey Court Suite 14
Crofton, MD 21114
TEL: 410-881-0221

DISTRICT OF COLUMBIA DEPARTMENT OF CORRECTIONS



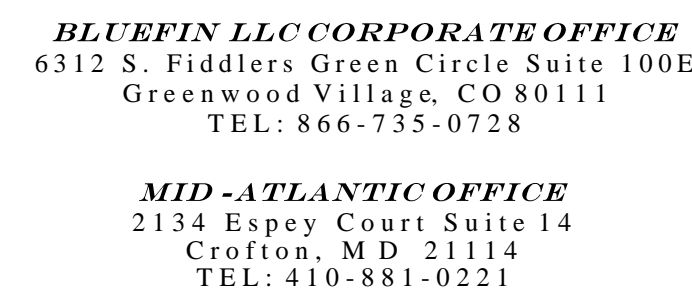
AERIAL SITE PHOTO

DRAWING INDEX

- C1.0 COVER PAGE
- R1.0 KEY ROOF PLAN - PHASES AND ROOF TYPES
- R1.1 PHASE 2 ROOF PLANS
- R1.2 PHASE 3 ROOF PLAN
- R1.3 PHASE 4 ROOF PLANS
- R1.4 ROOF DETAILS - TYPE 1 ROOF
- R1.5 ROOF / TYPICAL DETAILS - TYPE 3 ROOF
- R1.6 ROOF DETAILS - TYPE 2 ROOF
- R1.7 TYPICAL ROOF DETAILS - TYPE 1 ROOF
- R1.8 TYPICAL ROOF DETAILS - TYPE 2 ROOF

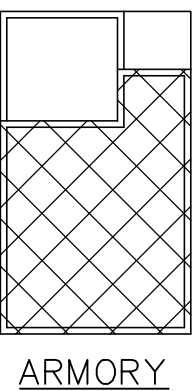
DRAWING TITLE
COVER PAGE

SHEET NUMBER
C1.0



Central Detention Facility
1901 D Street, SE
Washington DC

**District of Columbia
Department of Correction**

[illegible]

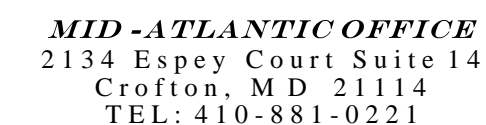
DRAWING TITLE

KEY ROOF PLAN PHASES AND ROOF TYPES

SHEET NUMBER

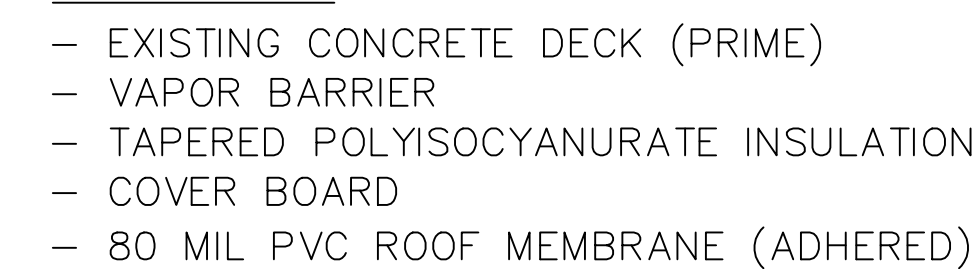
R1.0

Actual Size to read at scale



Central Detention Facility
1901 D Street, SE
Washington DC

**District of Columbia
Department of Corrections**



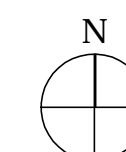
GUARD SHACK ROOF AREA
TYPE 3 ROOF

ARMORY ROOF AREA
TYPE 3 ROOF

SKYWALK ROOF AREA

MAIN BUILDING ROOF AREAS

PHASE 2 ROOF PLANS



KEY

	- ROOF AREA DESIGNATION
	- ROOF DRAIN
	- THRU-WALL SCUPPER
	- ROOF EDGE SCUPPER
	- GUTTER EDGE
	- CURBED OPENING
	- H.V.A.C. CURB
	- ROOF HATCH
	- SKYLIGHT
	- CURBED STACK
	- CHIMNEY
	- PIPE PORTAL CURB
	- ROOF LADDER
	- PIPE VENT
	- SOIL STACK
	- SMALL PIPE PENETRATION
	- PITCH PAN
	- EXPANSION JOINT
	- SLOPE TRANSITION
	- DRAINAGE TRANSITION

DRAWING DATES		
NUMBER	DATE	COMMENTS

IN-PROGRESS
NOT FOR
CONSTRUCTION

3/11/16 95% REVIEW SET

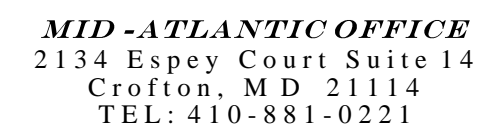
DRAWING TITLE

PHASE 2 ROOF PLANS

SHEET NUMBER

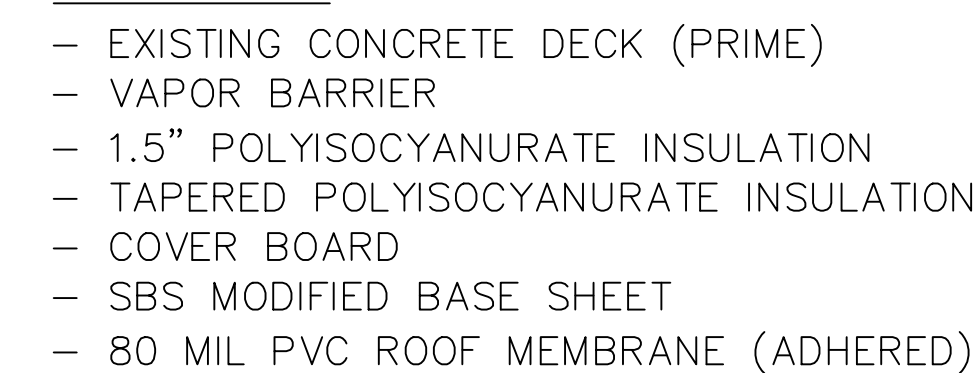
R1.1

Actual Size to read at scale



Central Detention Facility
1901 D Street, SE
Washington DC

**District of Columbia
Department of Corrections**



MAIN BUILDING ROOF AREAS

DRAWING DATES		
NUMBER	DATE	COMMENTS

IN-PROGRESS
NOT FOR
CONSTRUCTION

3/11/16 95% REVIEW SE

DRAWING TITLE

PHASE 3

ROOF PLAN

SHEET NUMBER

R1.2

KEY

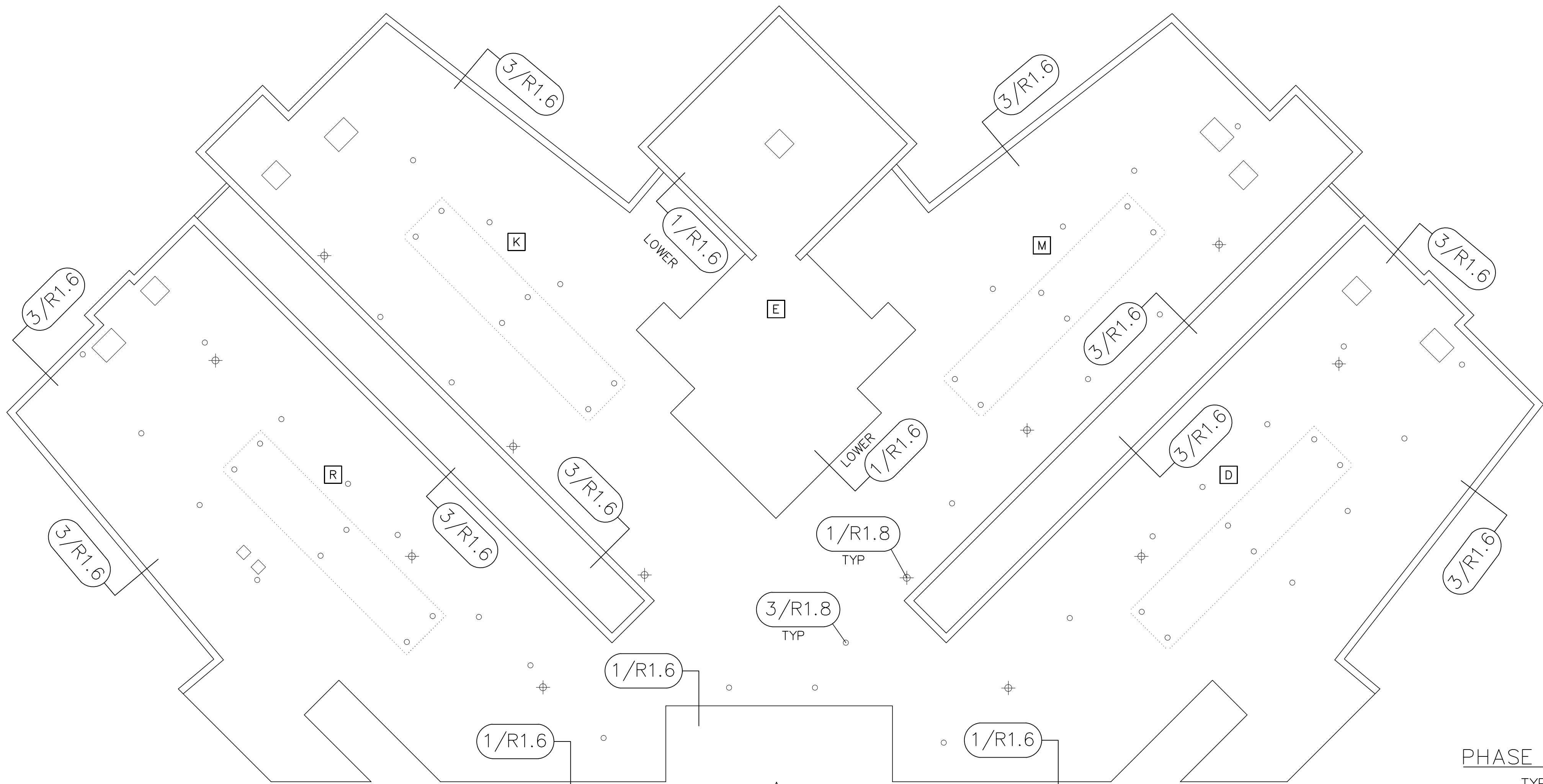
+	— ROOF AREA DESIGNATION
□	— ROOF DRAIN
+	— THRU—WALL SCUPPER
+	— ROOF EDGE SCUPPER
+	— GUTTER EDGE
□	— CURBED OPENING
⊗	— H.V.A.C. CURB
⊗	— ROOF HATCH
⊗	— SKYLIGHT
⊗	— CURBED STACK
⊗	— CHIMNEY
⊗	— PIPE PORTAL CURB
⊗	— ROOF LADDER
○	— PIPE VENT
○	— SOIL STACK
■	— SMALL PIPE PENETRATION
■	— CHIMNEY
—	— EXPANSION JOINT
—	— SLOPE TRANSITION
AB	— ABANDONED EQUIPMENT

Actual Size to read at scale

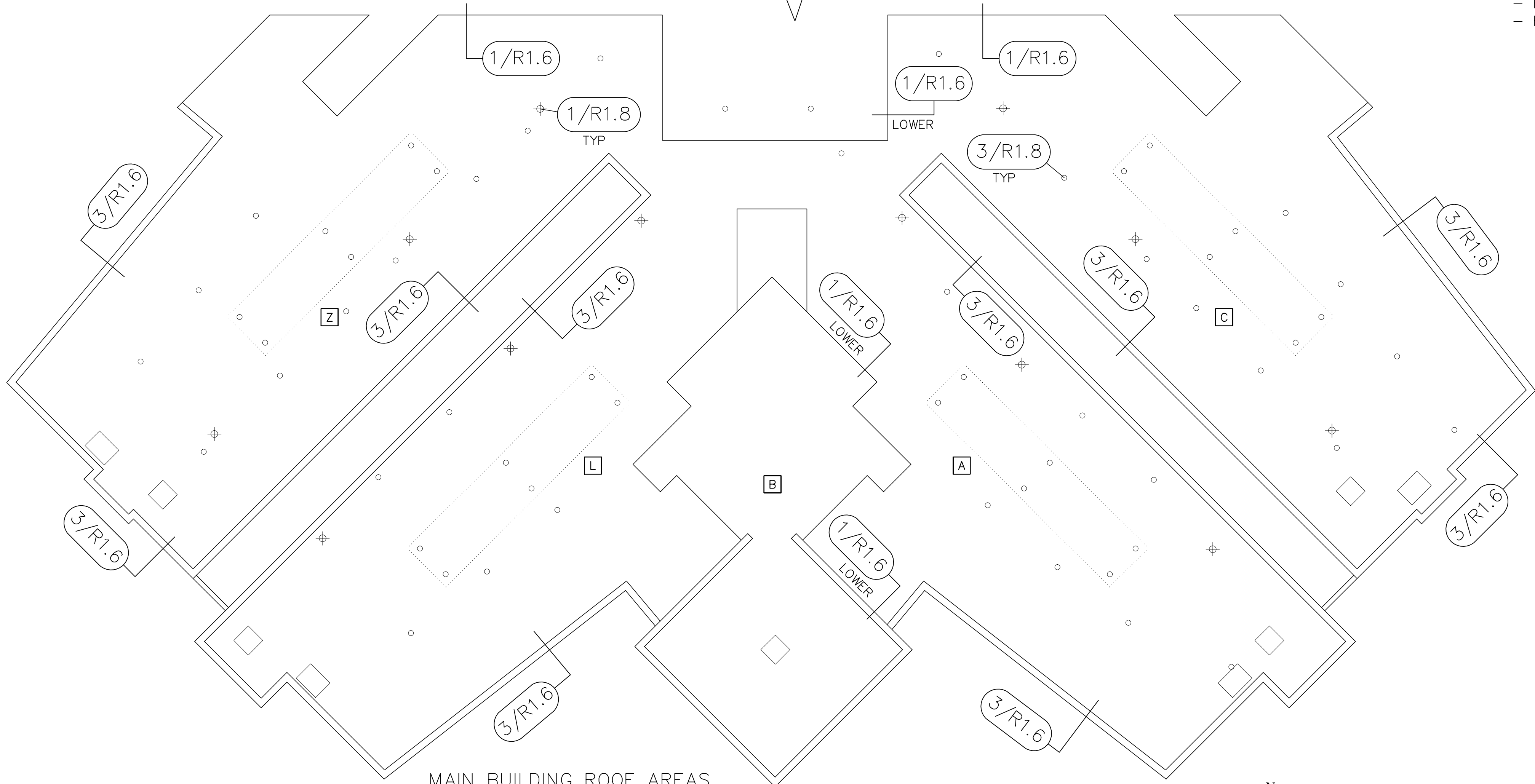
PROJECT
ROOFING REPLACEMENT

Central Detention Facility
1901 D Street, SE
Washington DC

**District of Columbia
Department of Corrections**



PHASE 4
TYPE 2 ROOF
- EXISTING CONCRETE DECK (PRIME)
- HOT RUBBERIZED ASPHALT
- REINFORCED HFA SYSTEM WITH SBS CAP SHEET



MAIN BUILDING ROOF AREAS
TYPE 2 ROOF

PHASE 4 ROOF PLANS
N.T.S

KEY

□	- ROOF AREA DESIGNATION
+	- ROOF DRAIN
+	- THRU-WALL SCUPPER
+	- ROOF EDGE SCUPPER
+	- GUTTER EDGE
+	- CURBED OPENING
+	- ROOF HATCH
+	- H.V.A.C. CURB
+	- SKYLIGHT
+	- CURBED STACK
+	- CHIMNEY
+	- PIPE PORTAL CURB
+	- ROOF LADDER
+	- PIPE VENT
+	- SOIL STACK
+	- SMALL PIPE PENETRATION
+	- PITCH PAN
+	- EXPANSION JOINT
+	- SLOPE TRANSITION
+	- ABANDONED EQUIPMENT

DRAWING DATES

NUMBER	DATE	COMMENTS
--------	------	----------

IN-PROGRESS
NOT FOR
CONSTRUCTION

3/11/16 95% REVIEW SET

DRAWING TITLE
**PHASE 4
ROOF PLANS**

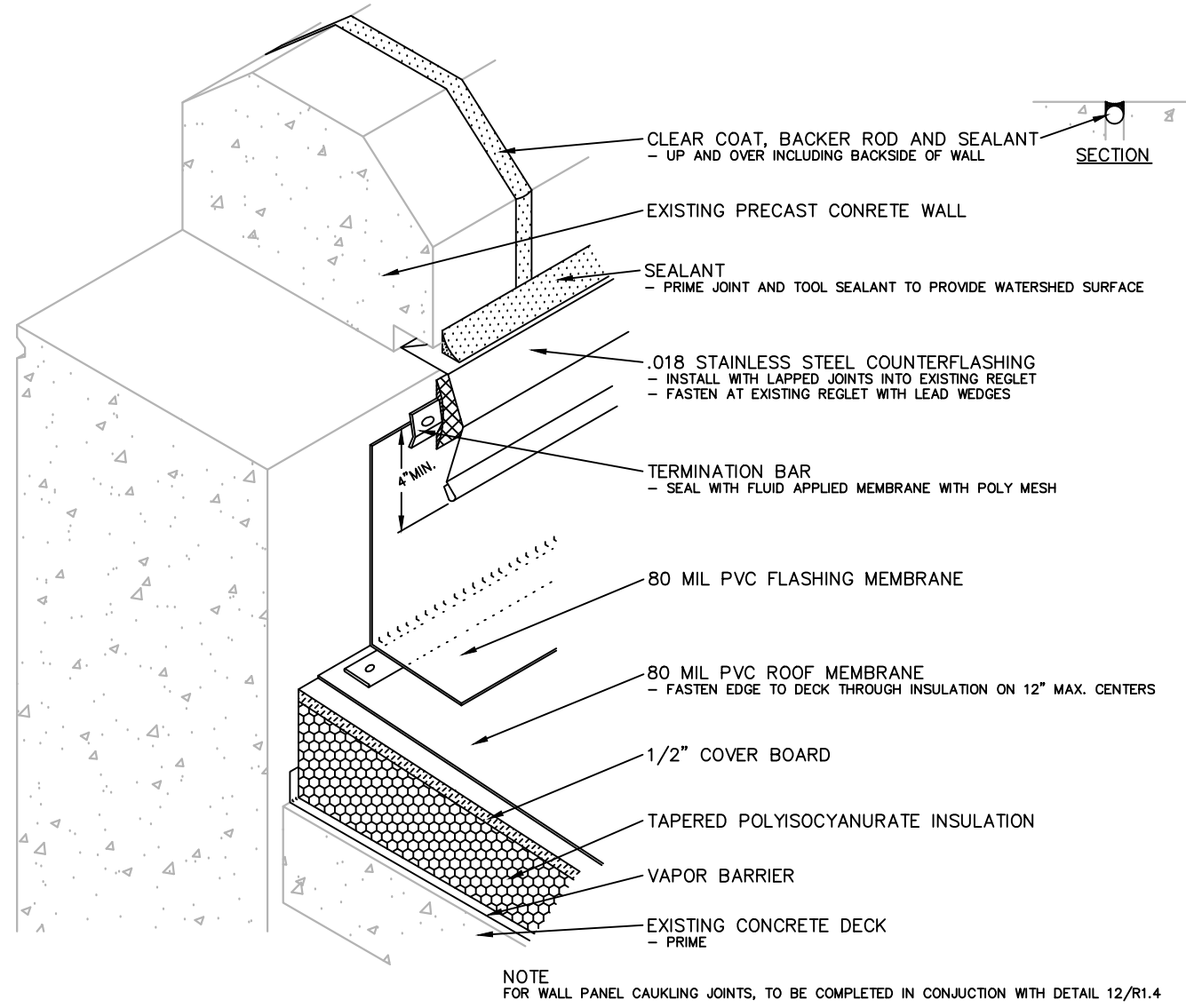
SHEET NUMBER
R1.3

Actual Size to read at scale
0 IN 1 IN 2 IN

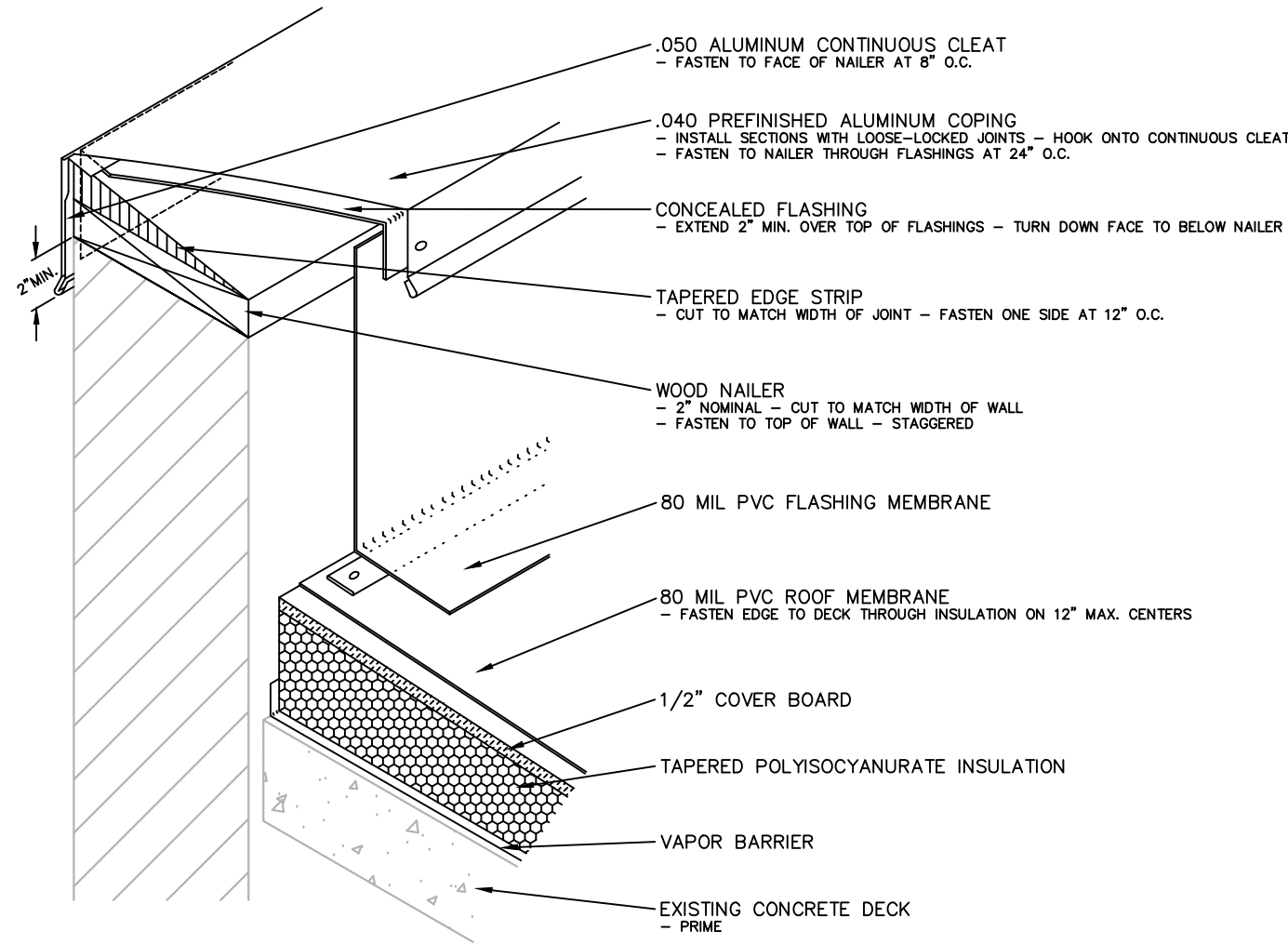
PROJECT
ROOFING REPLACEMENT

Central Detention Facility
1901 D Street, SE
Washington DC

**District of Columbia
Department of Corrections**



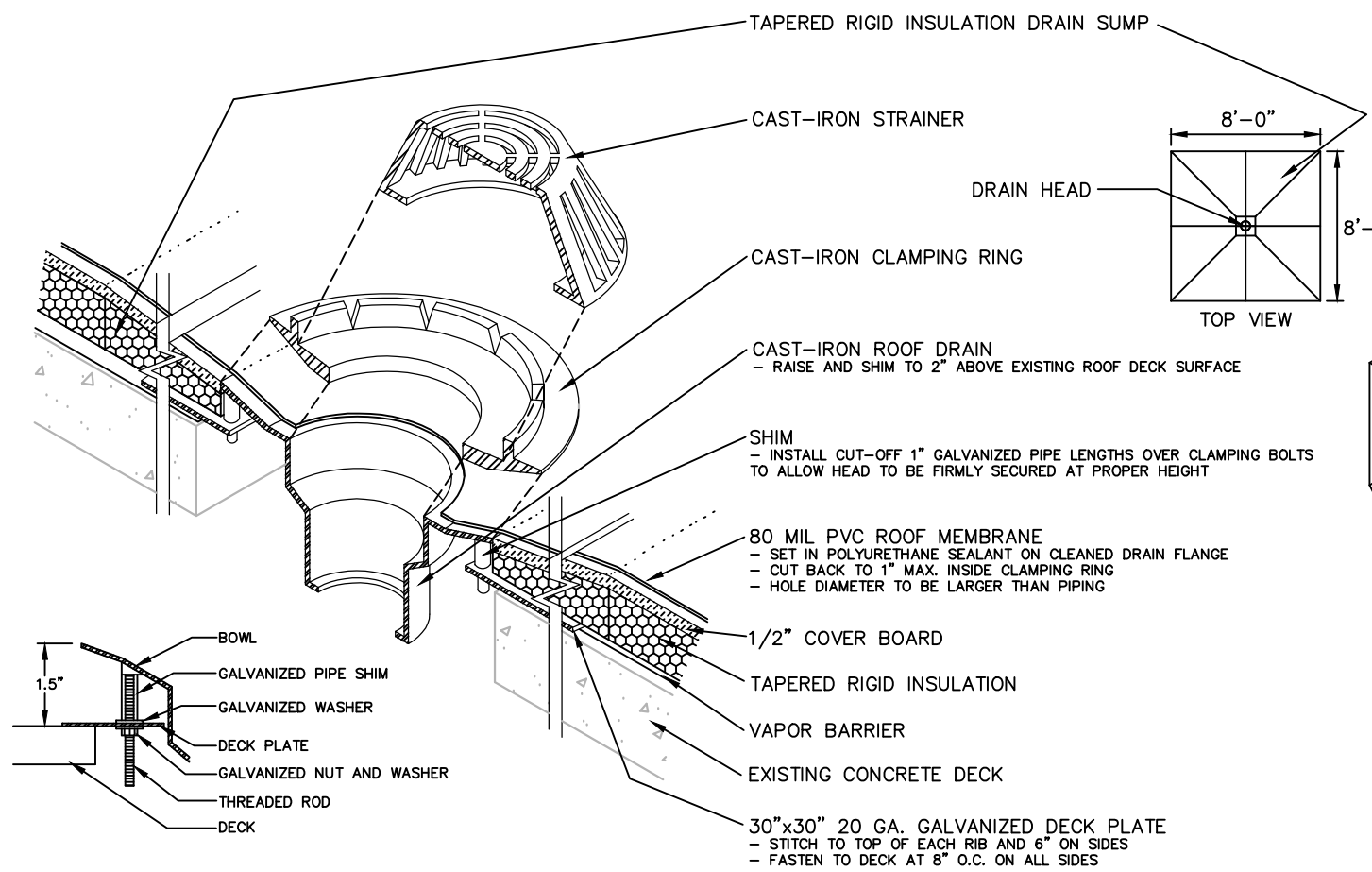
1 PARAPET FLASHING
N.T.S.



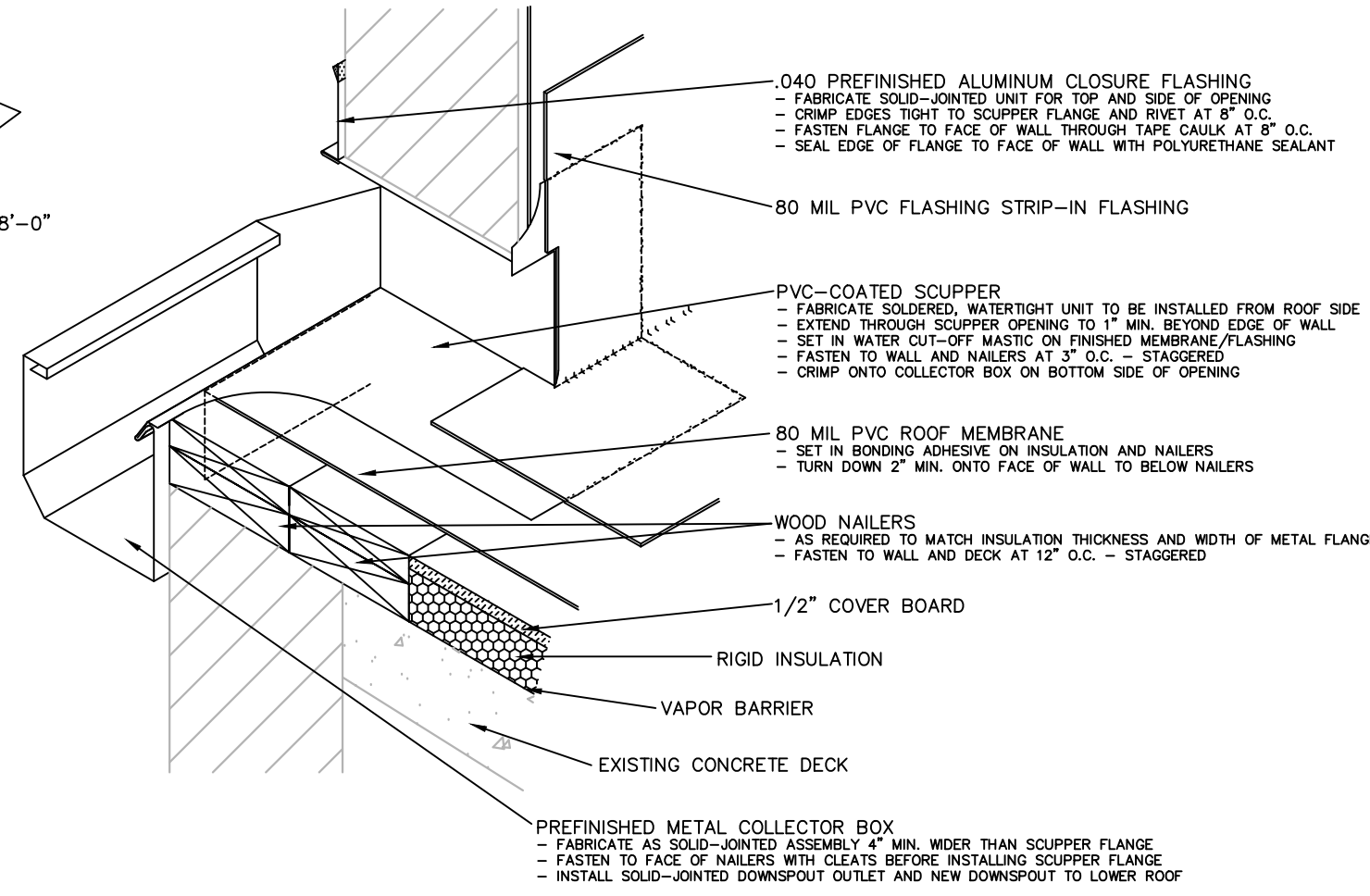
2 PARAPET FLASHING
N.T.S.

3 NOT USED
N.T.S.

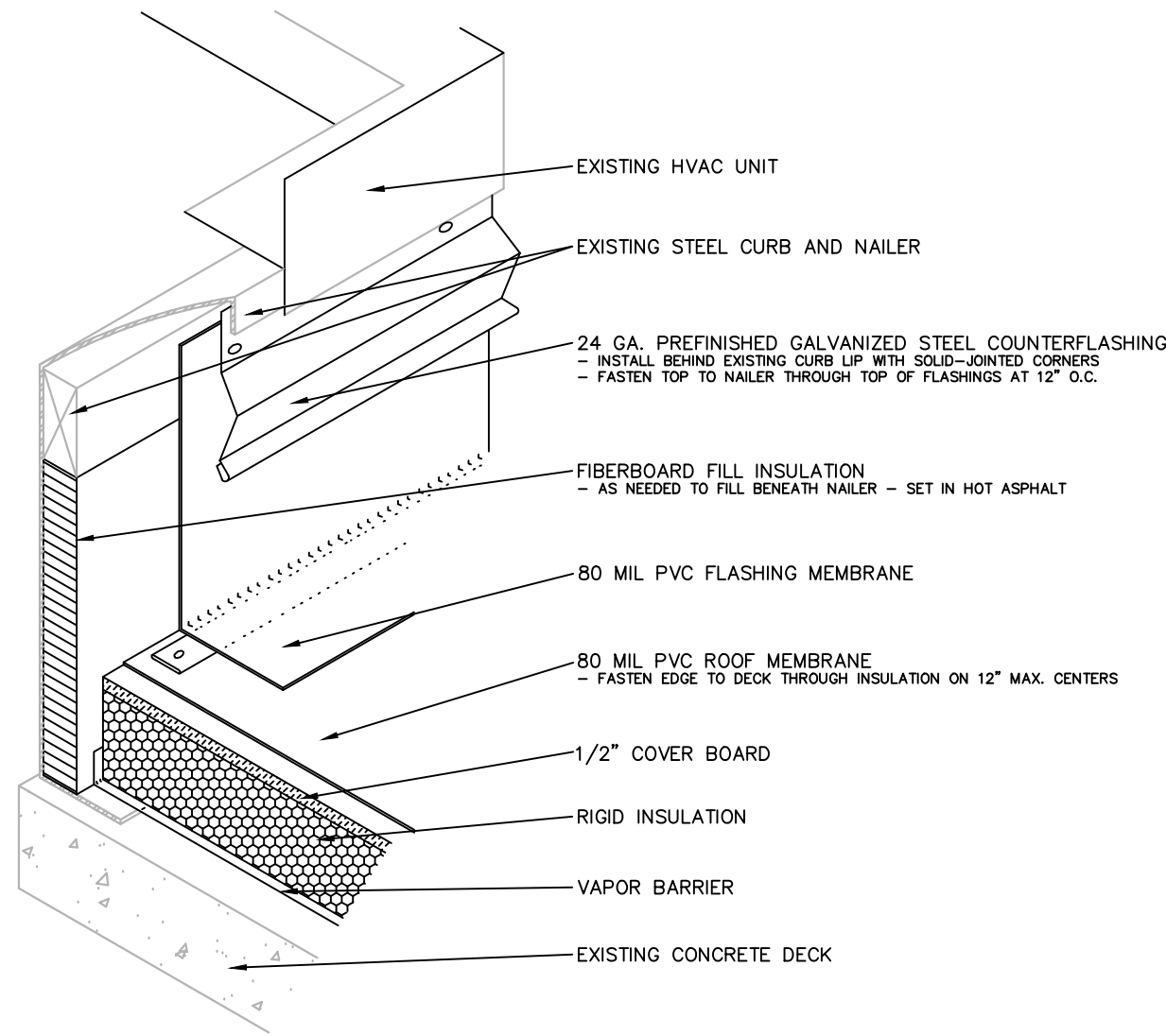
4 NOT USED
N.T.S.



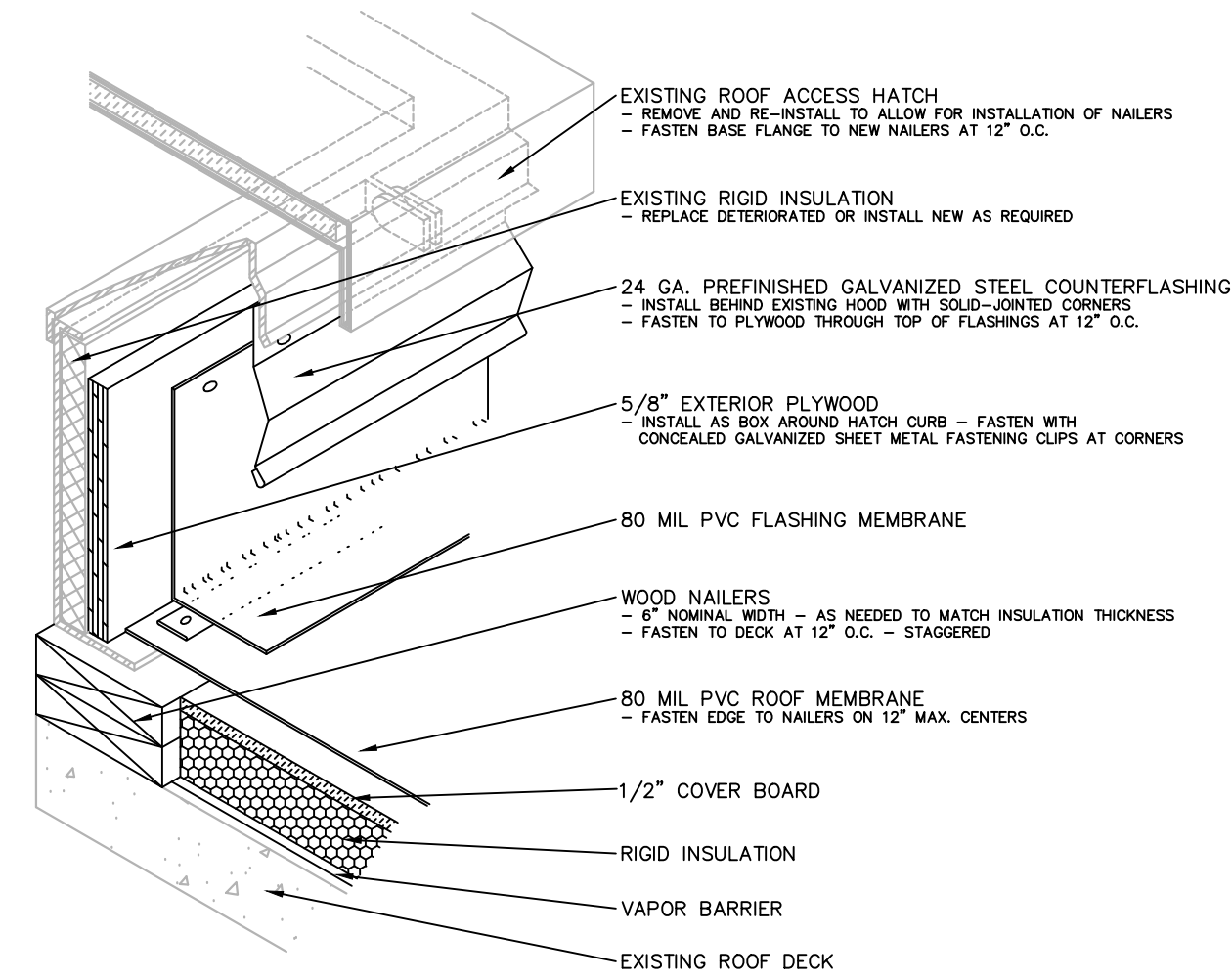
5 TYPICAL ROOF DRAIN
N.T.S.



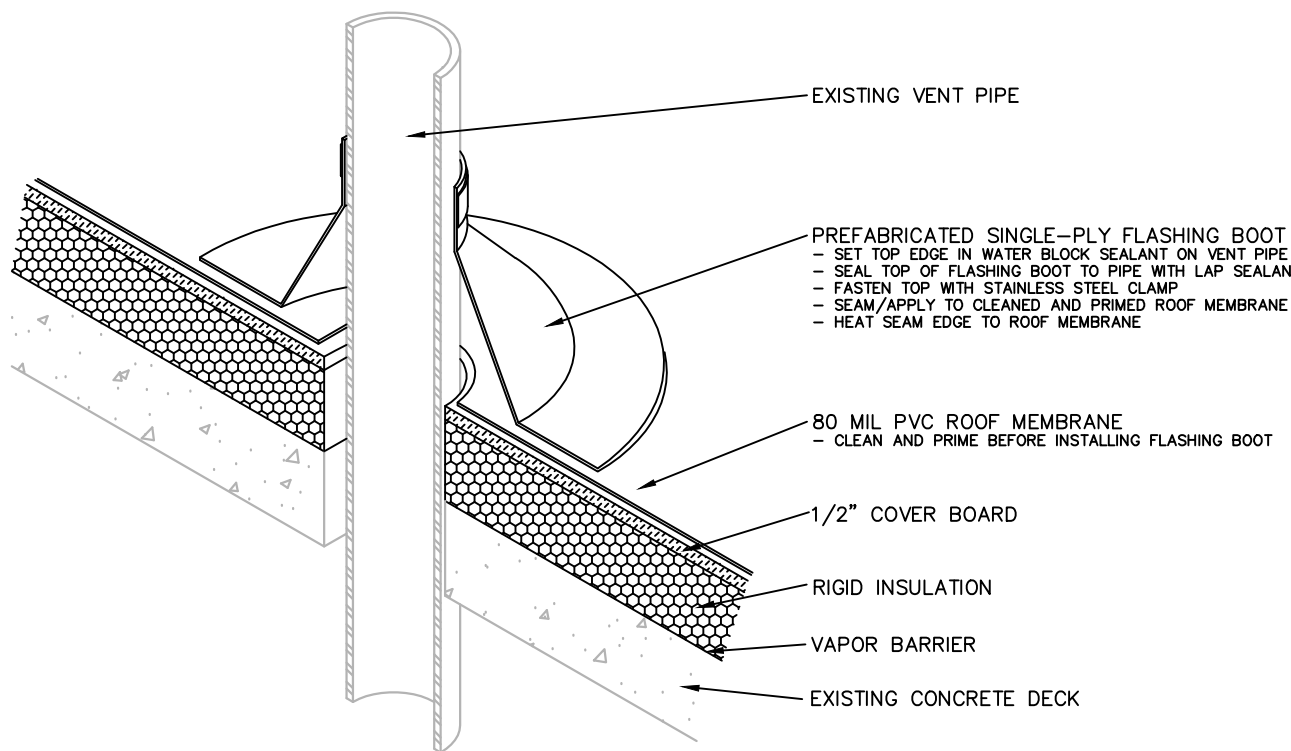
6 TYPICAL SCUPPER
N.T.S.



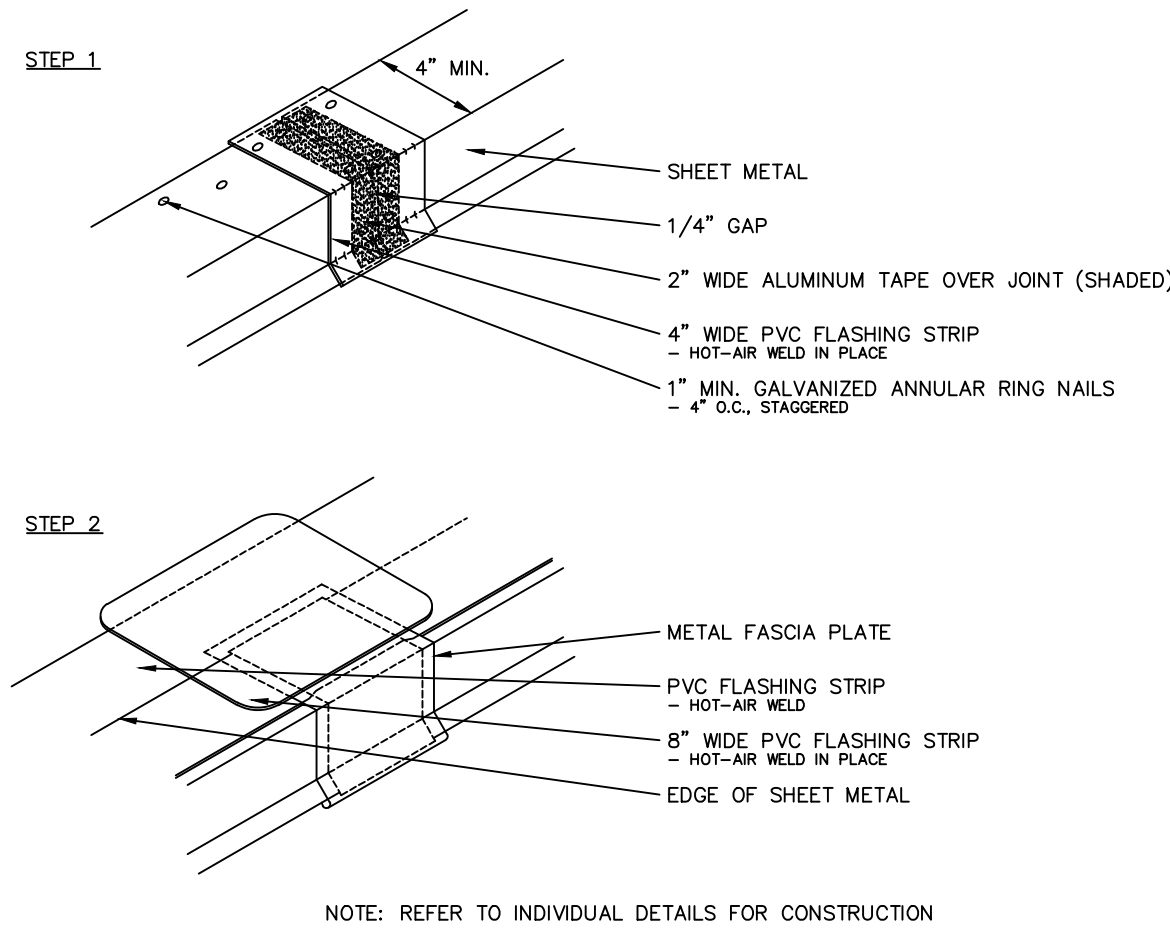
7 TYPICAL HVAC CURB
N.T.S.



8 TYPICAL ROOF HATCH
N.T.S.



9 TYPICAL VENT PIPE
N.T.S.



10 TYPICAL METAL JOINT FABRICATION
N.T.S.

11 NOT USED
N.T.S.

12 NOT USED
N.T.S.

NUMBER	DATE	COMMENTS
--------	------	----------

IN-PROGRESS
NOT FOR
CONSTRUCTION

DRAWING TITLE
**ROOF / TYPICAL
DETAILS -
TYPE 3 ROOF**

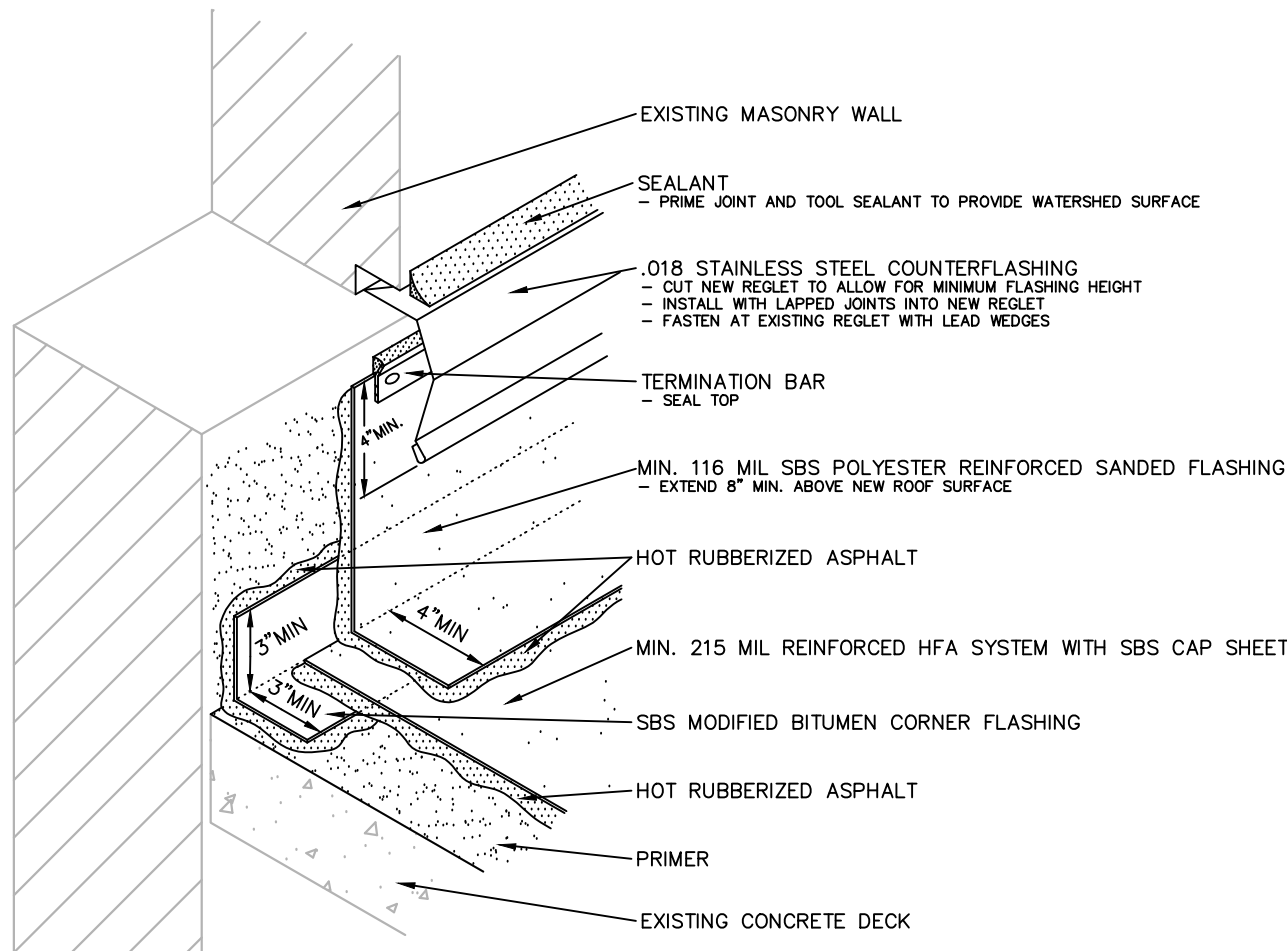
SHEET NUMBER

R1.5

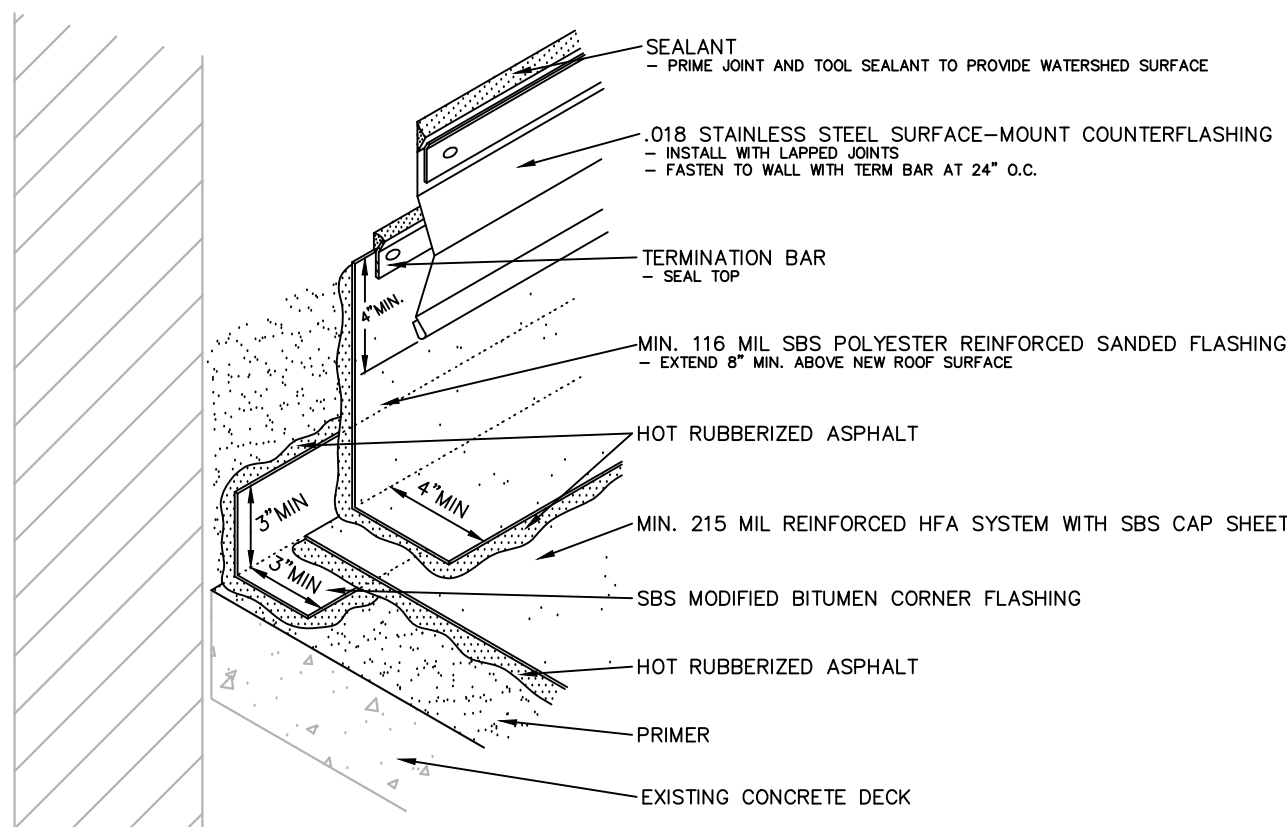
PROJECT
ROOFING REPLACEMENT

Central Detention Facility
1901 D Street, SE
Washington DC

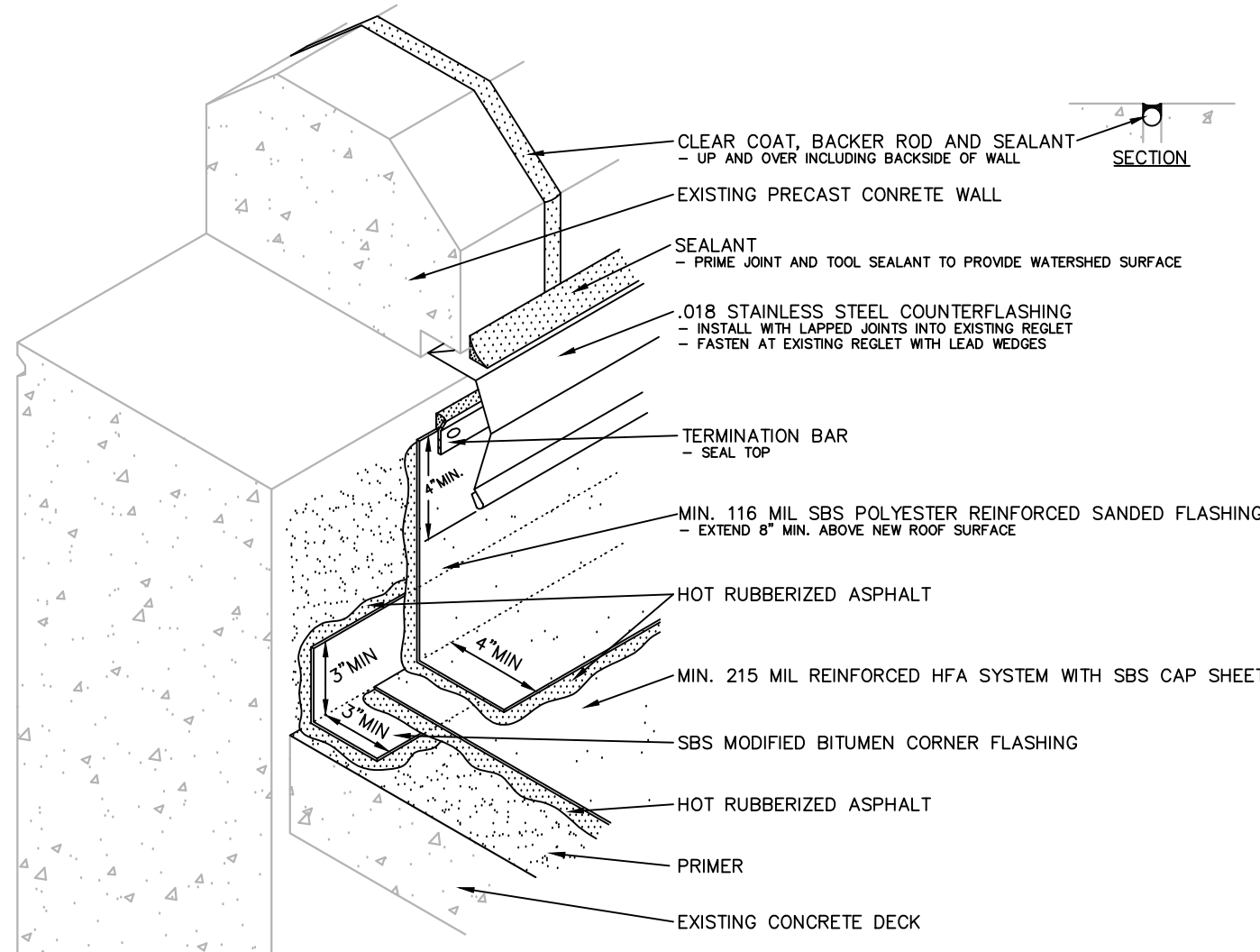
**District of Columbia
Department of Corrections**



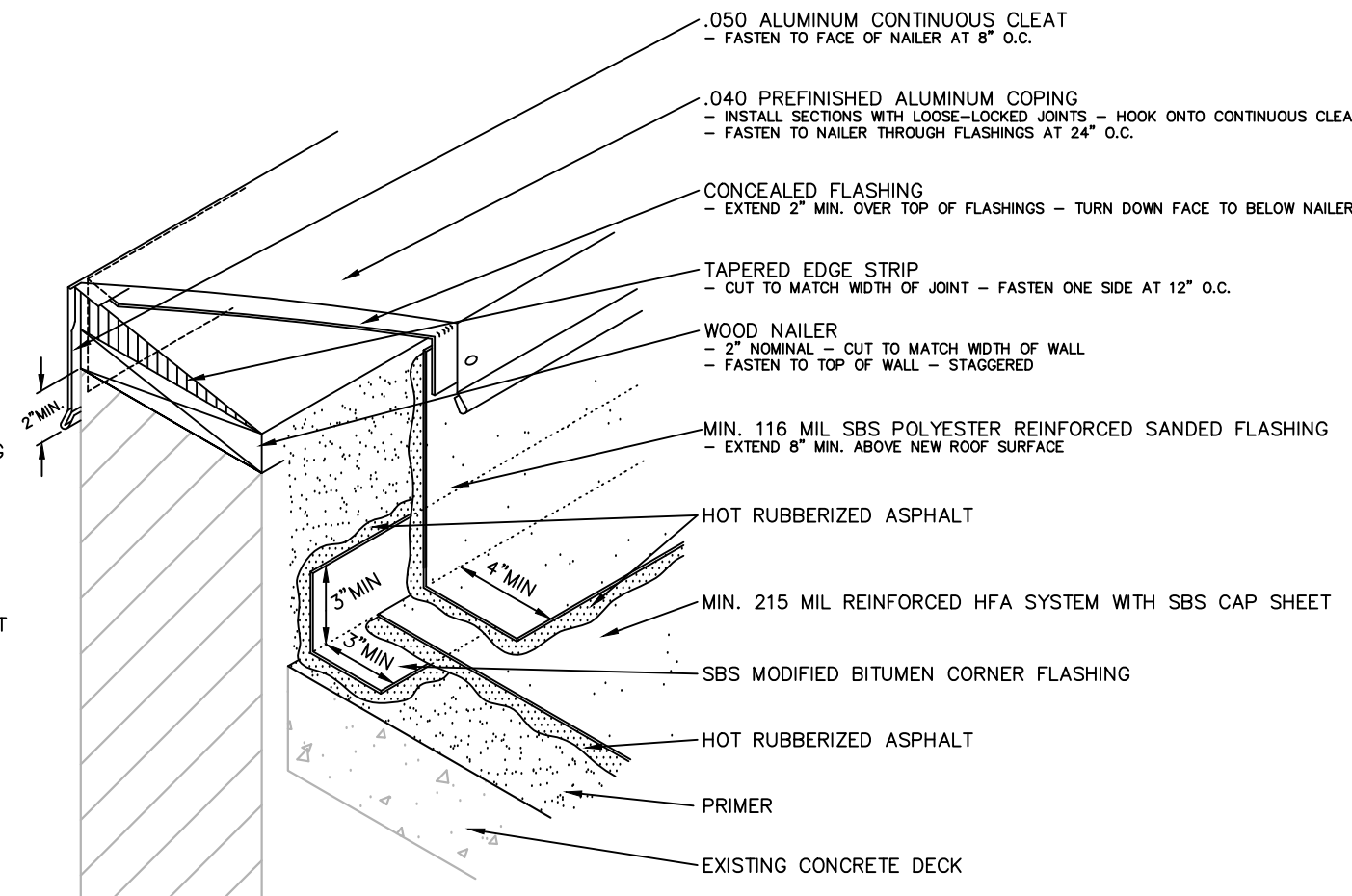
1 WALL FLASHING
N.T.S



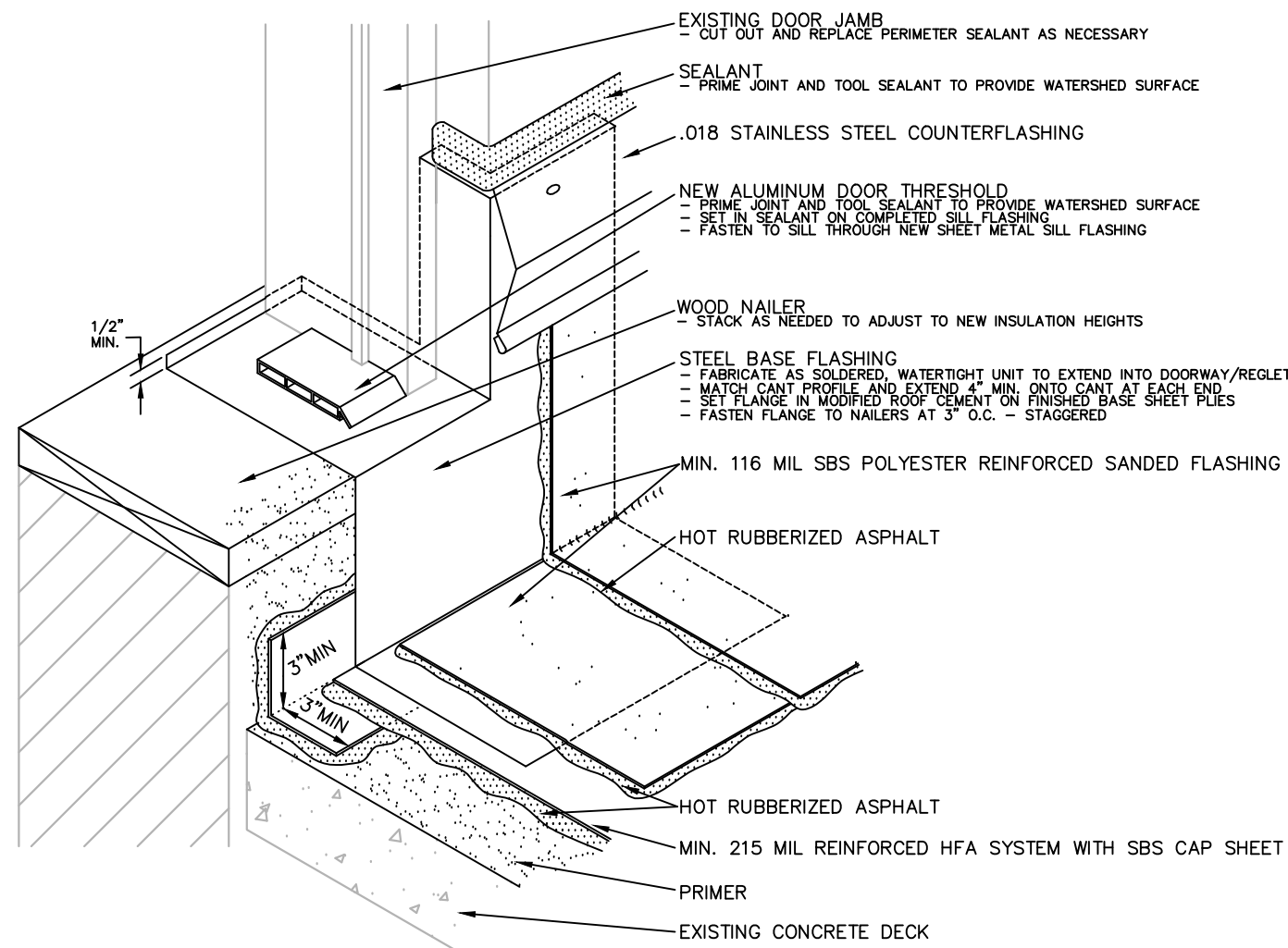
2 WALL FLASHING
N.T.S



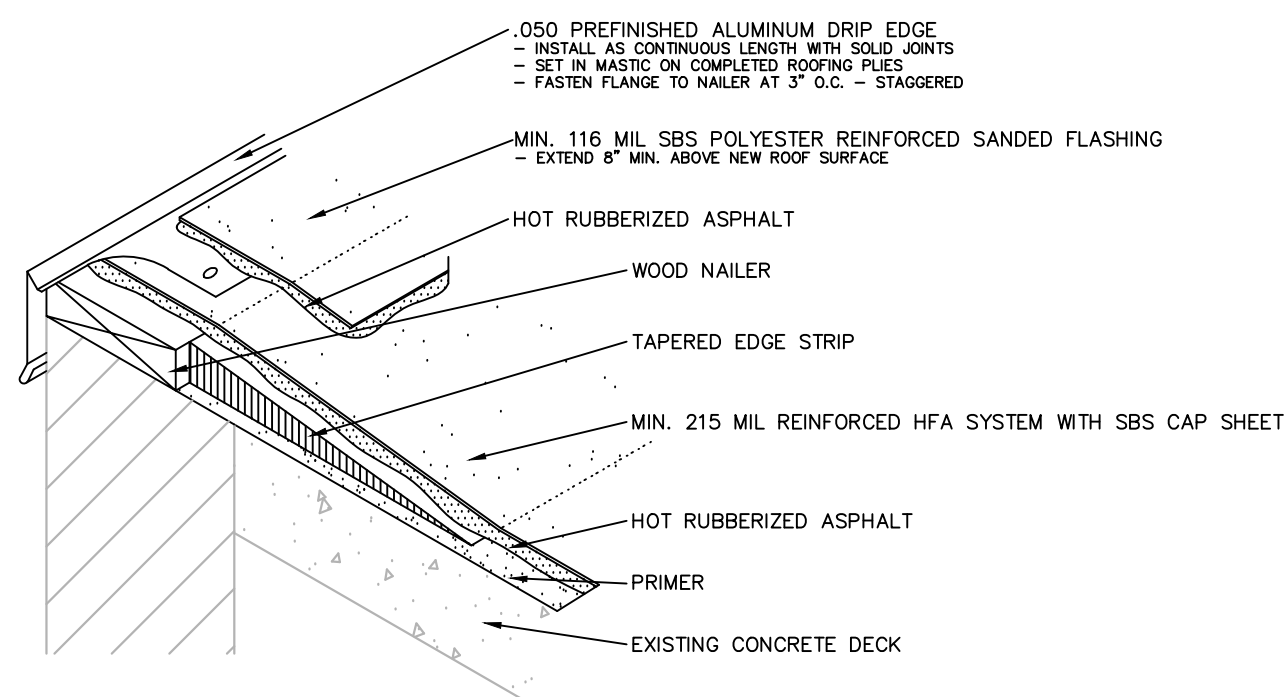
3 PARAPET FLASHING
N.T.S



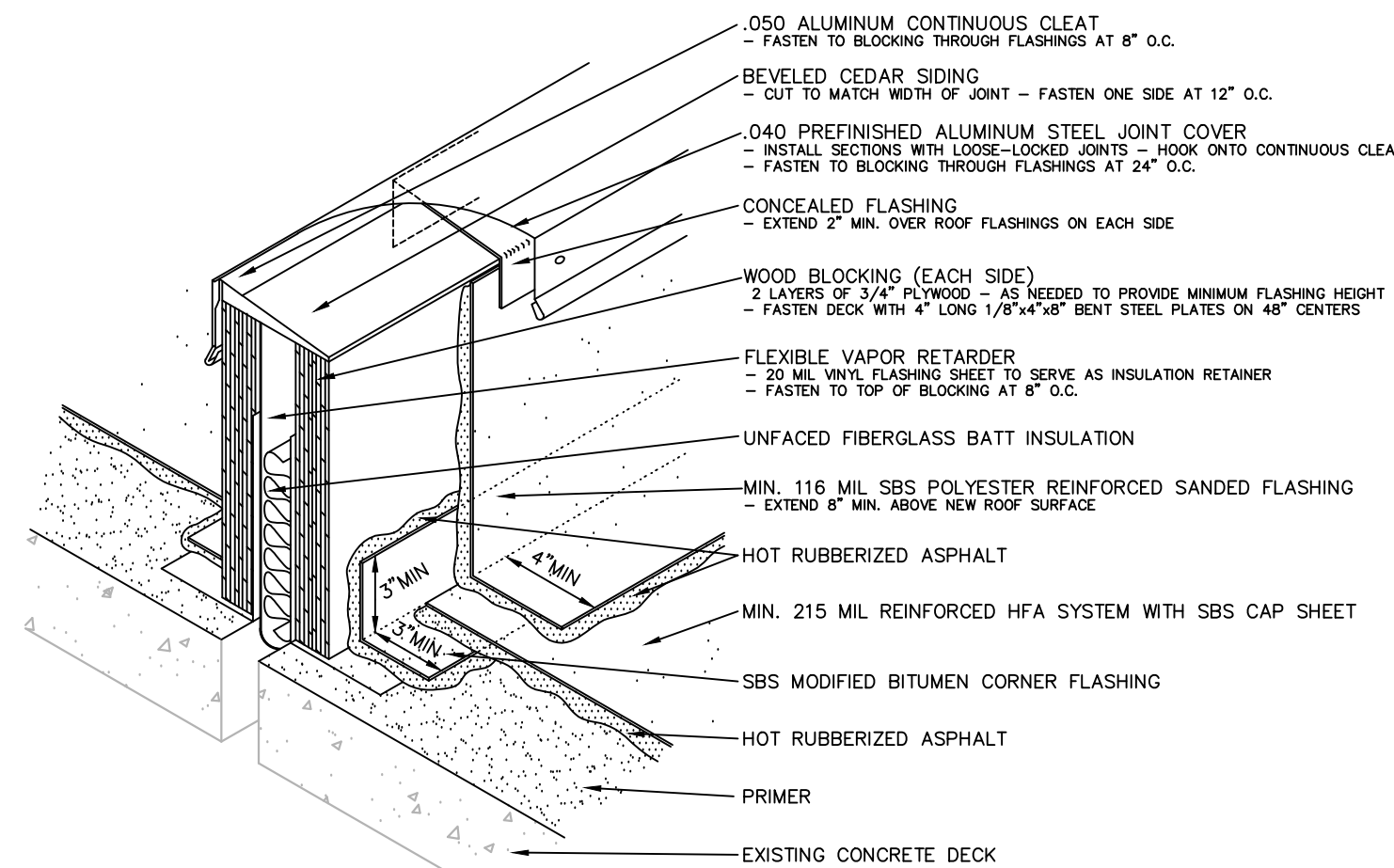
4 PARAPET FLASHING
N.T.S



5 DOOR THRESHOLD FLASHING
N.T.S



6 ROOF EDGE FLASHING
N.T.S



NOTE:
CONSTRUCTION IS SIMILAR ON EACH SIDE

7 CONTROL JOINT FLASHING
N.T.S

8 NOT USED
N.T.S

9 NOT USED
N.T.S

10 NOT USED
N.T.S

11 NOT USED
N.T.S

12 NOT USED
N.T.S

DRAWING DATES		
NUMBER	DATE	COMMENTS

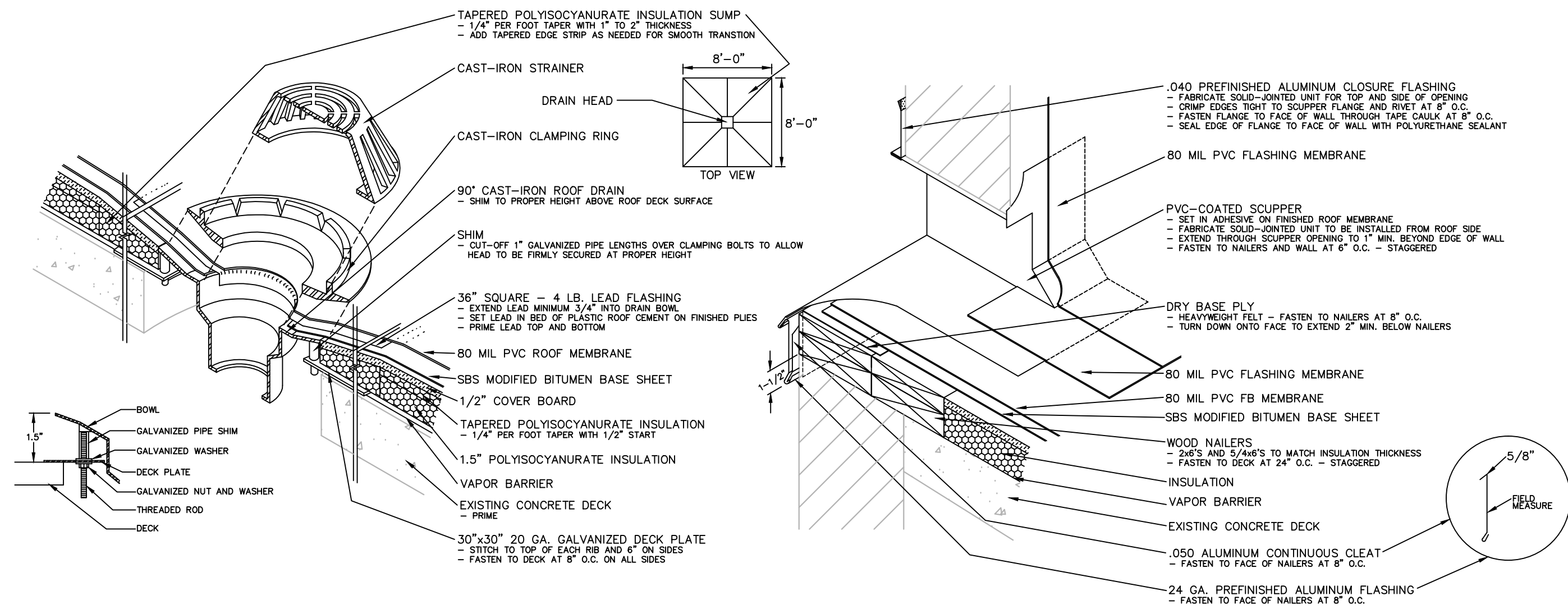
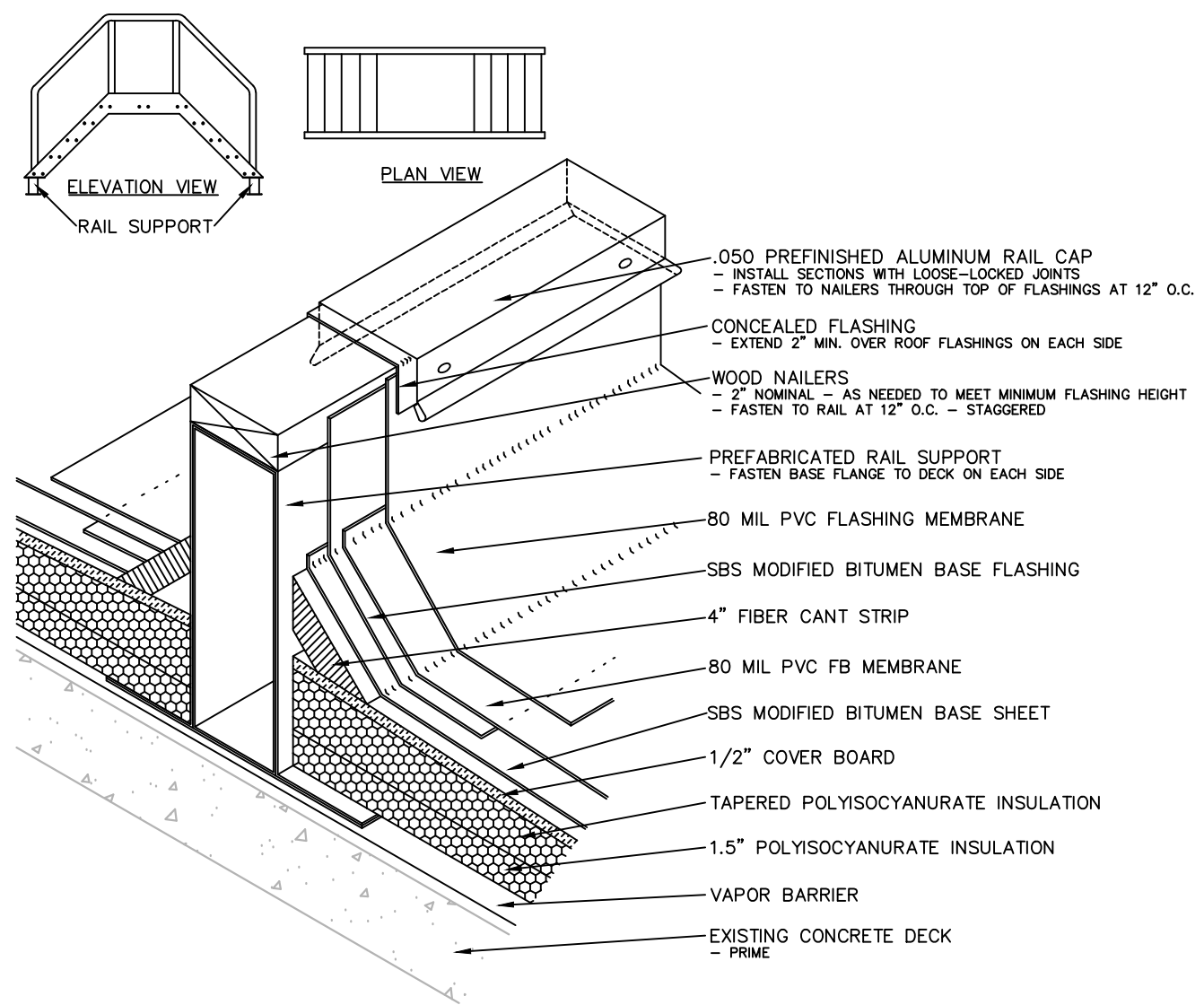
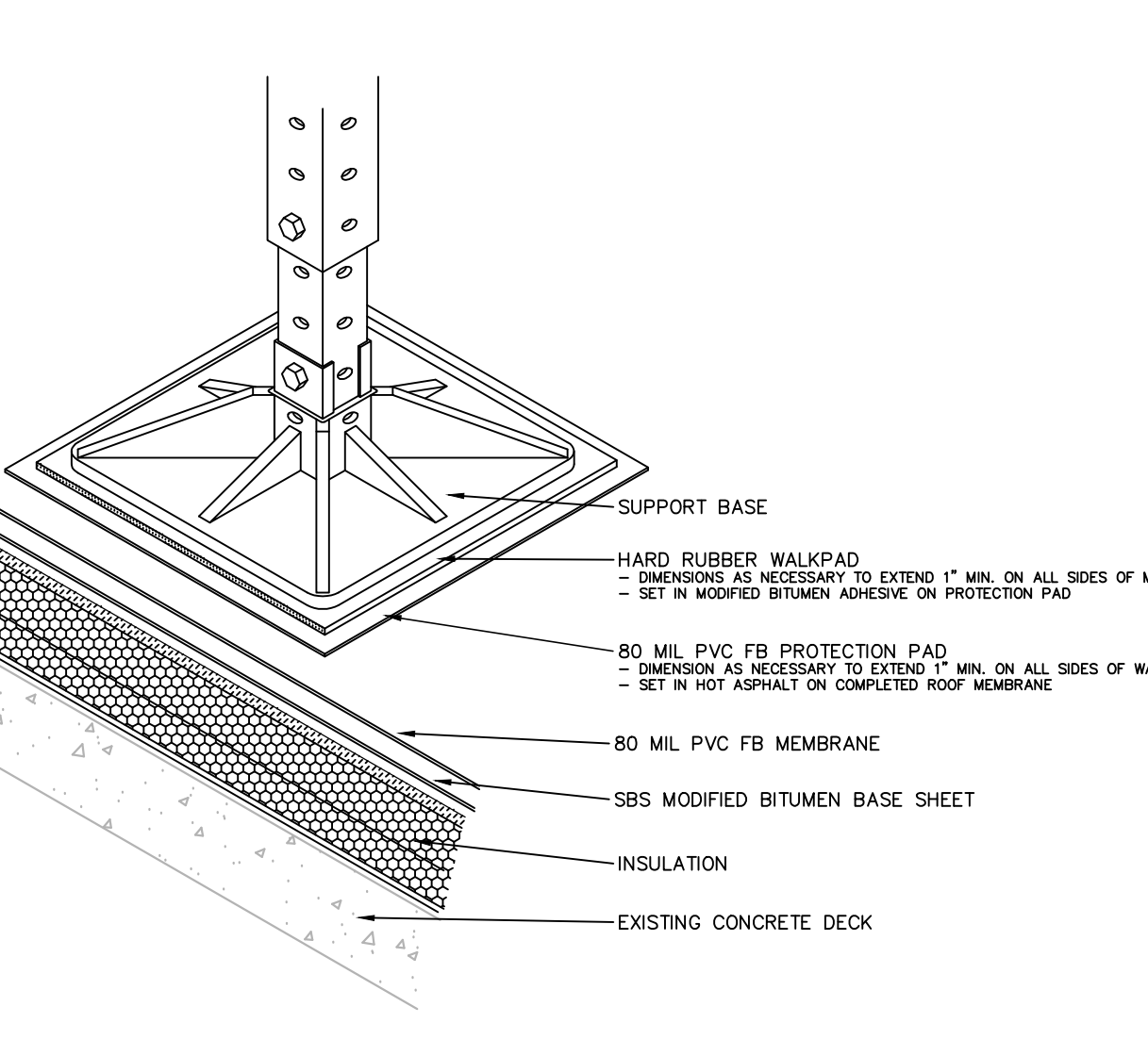
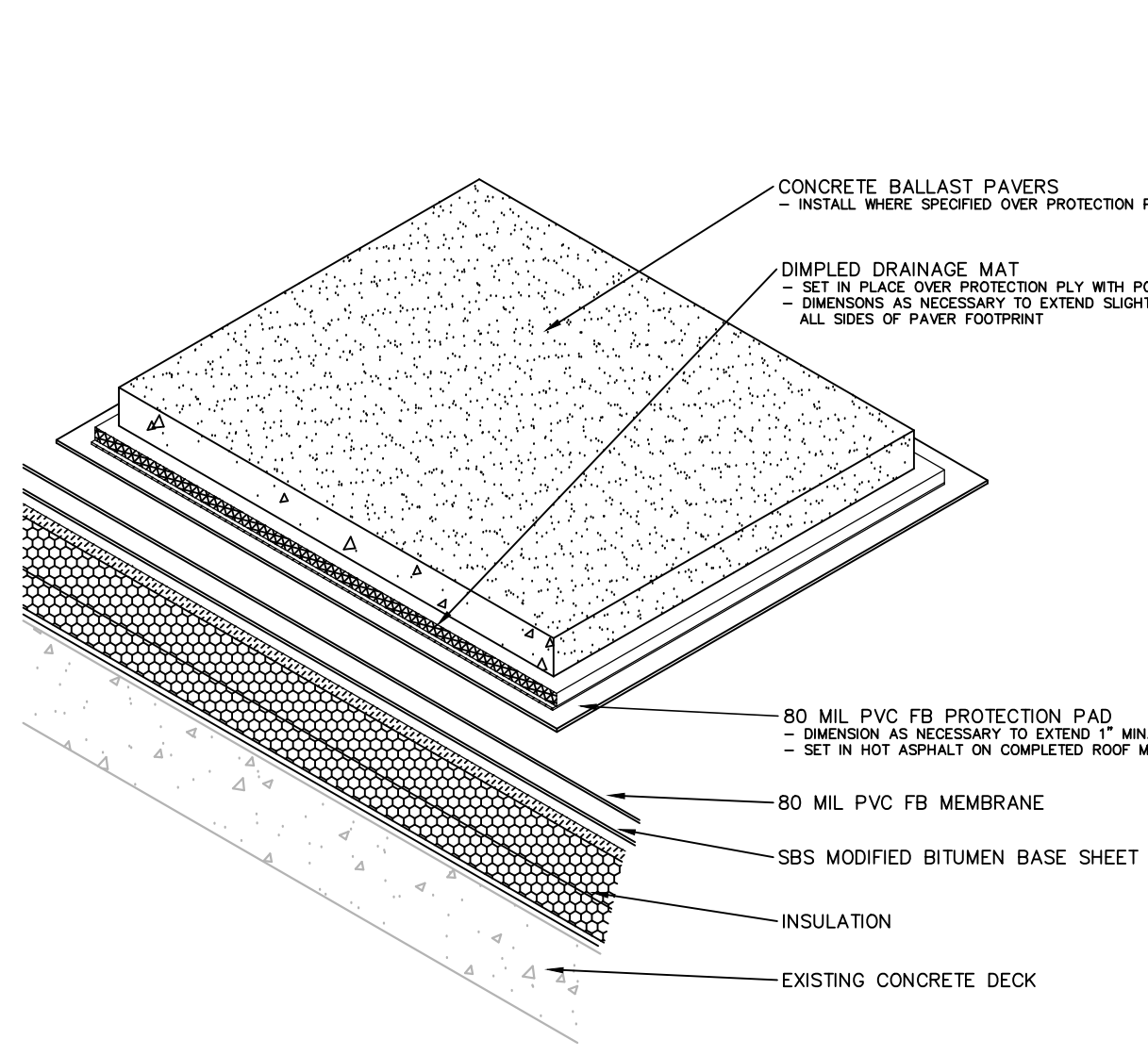
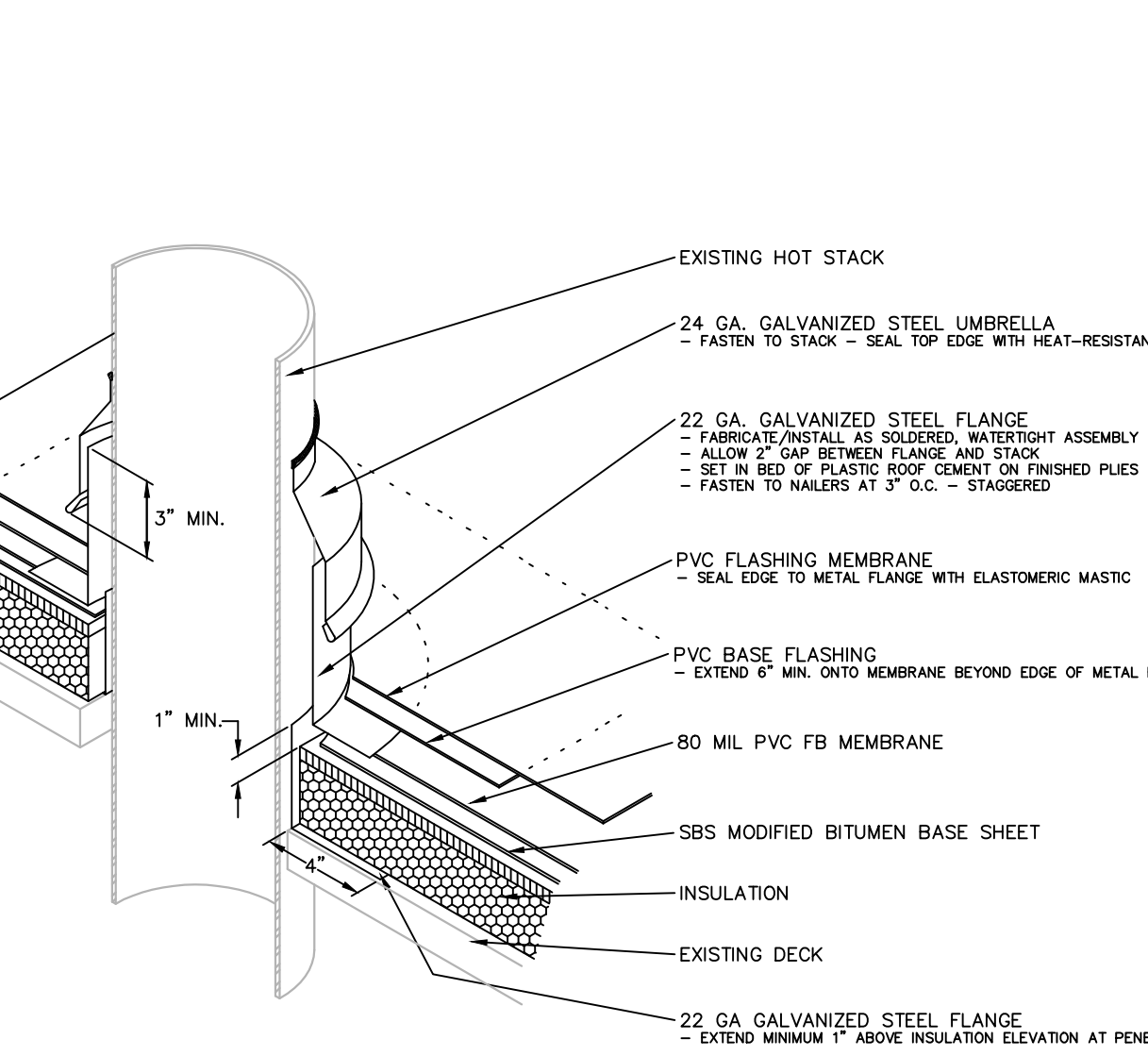
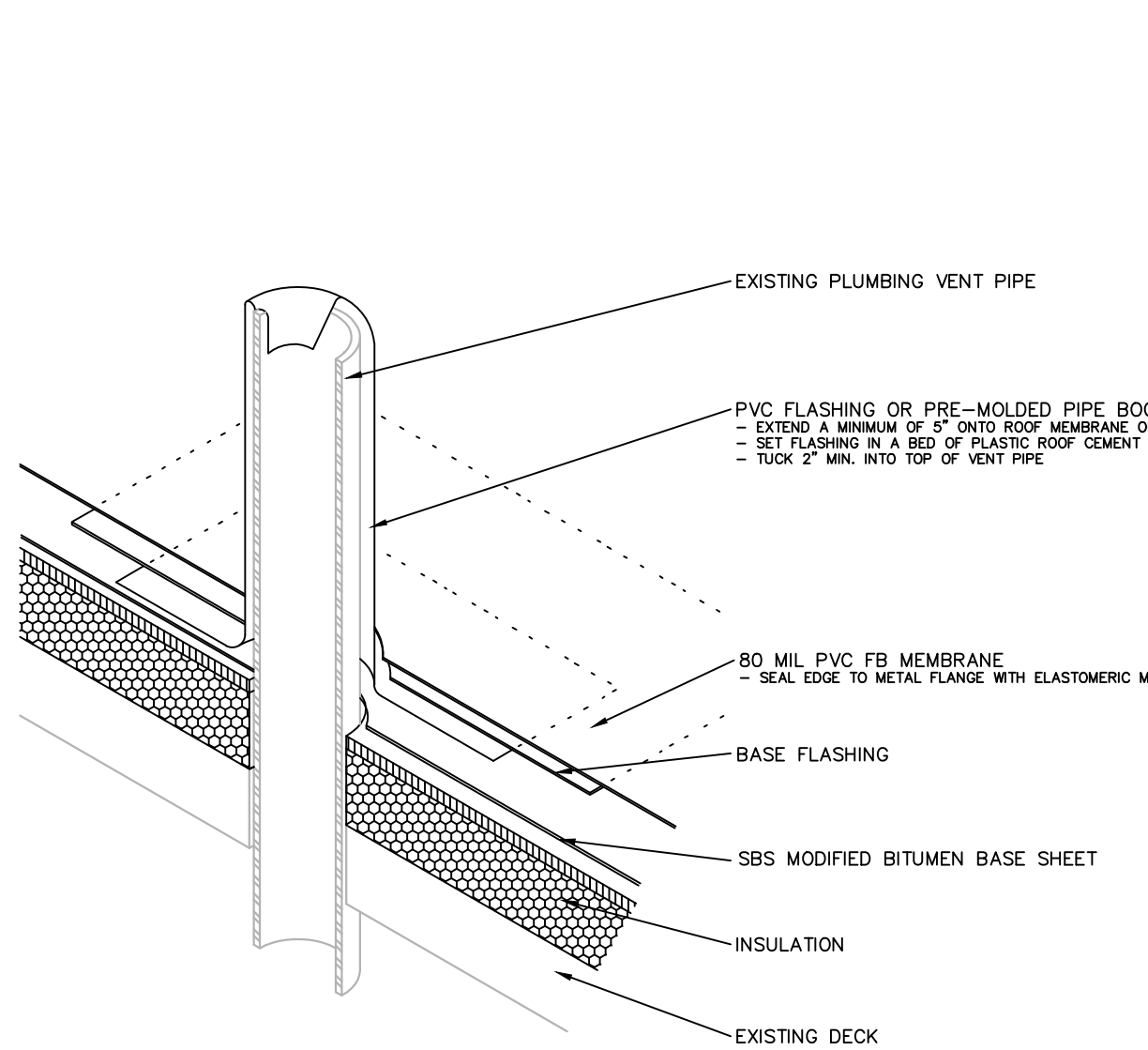
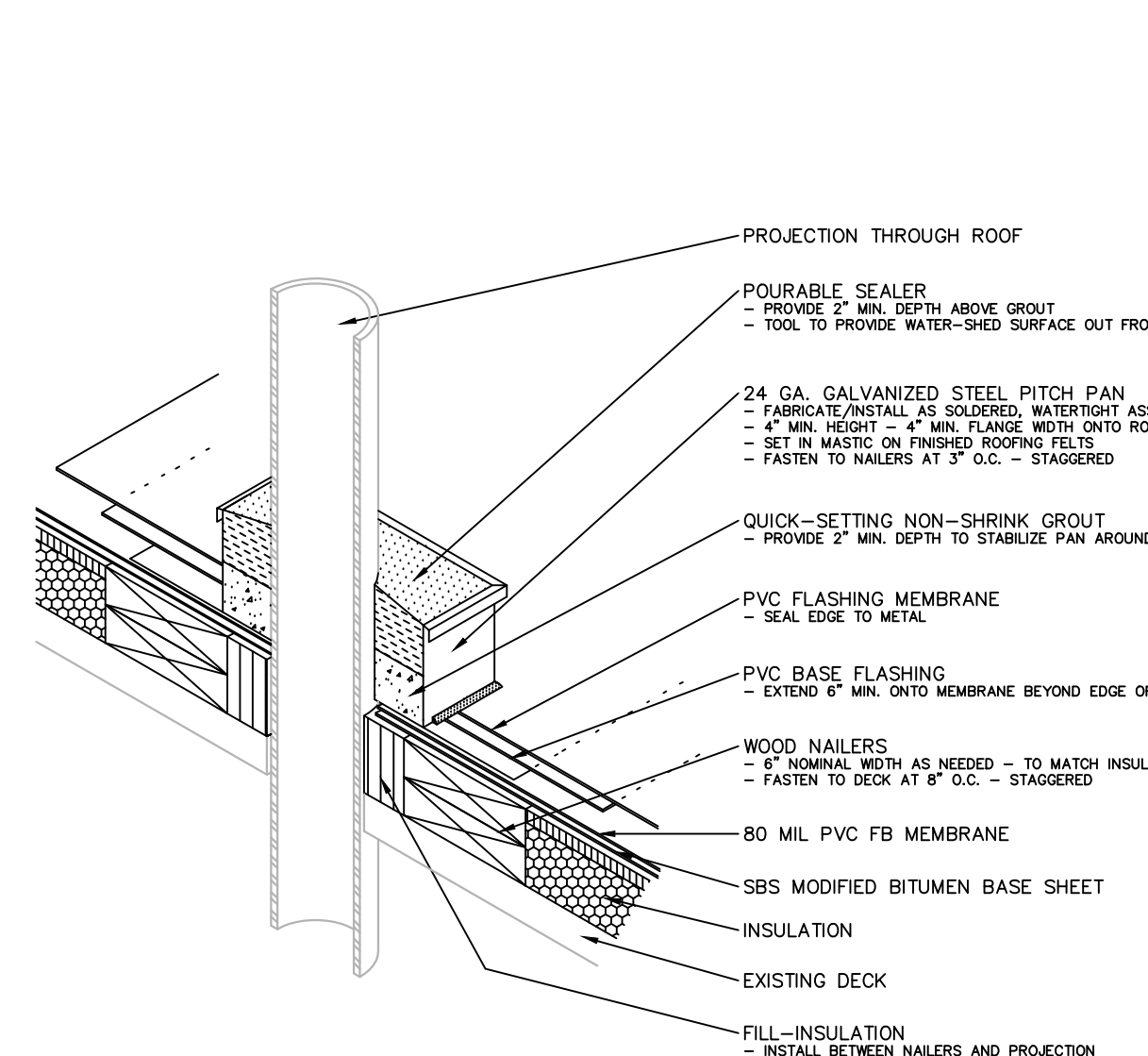
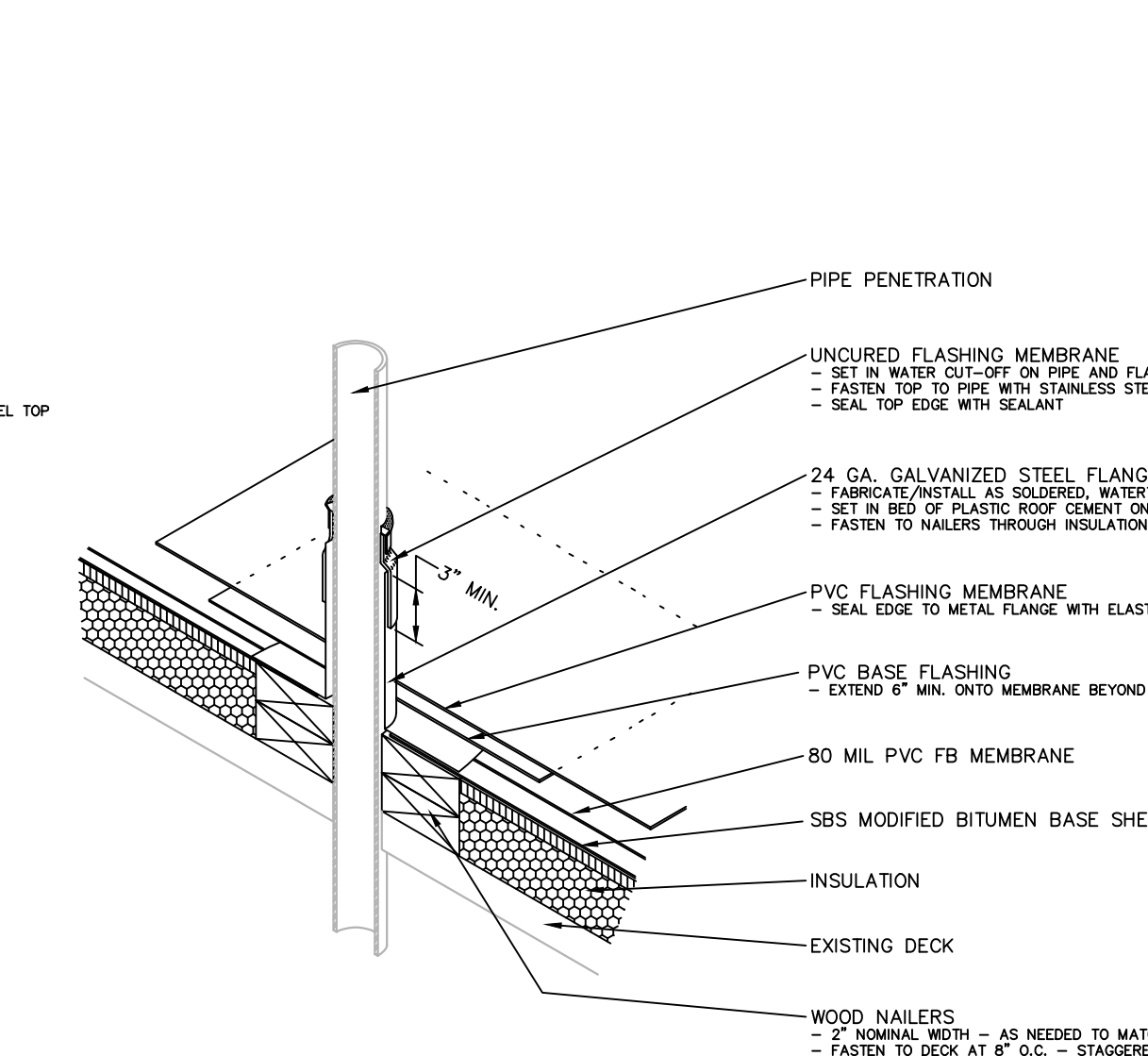
IN-PROGRESS
NOT FOR
CONSTRUCTION

3/11/16 95% REVIEW SET

DRAWING TITLE
**ROOF DETAILS -
TYPE 2 ROOF**

SHEET NUMBER

R1.6

PROJECT
ROOFING REPLACEMENTCentral Detention Facility
1901 D Street, SE
Washington DCDistrict of Columbia
Department of Corrections**2 TYPICAL SCUPPER**
N.T.S.NOTE:
CONSTRUCTION IS SIMILAR ON EACH SIDE
3 TYPICAL EXHAUST CURB
N.T.S.**3 TYPICAL EXHAUST CURB**
N.T.S.**4 TYPICAL HVAC CURB**
N.T.S.**5 ROOF HATCH FLASHING**
N.T.S.**6 RAIL CURB SUPPORT**
N.T.S.**7 SUPPORT BASE**
N.T.S.**8 PAVER MEMBRANE PROTECTION**
N.T.S.**9 TYPICAL HOT STACK**
N.T.S.**10 TYPICAL SOIL STACK**
N.T.S.**11 TYPICAL PITCH PAN**
N.T.S.**12 TYPICAL PIPE PENETRATION**
N.T.S.

DRAWING DATES		
NUMBER	DATE	COMMENTS

IN-PROGRESS
NOT FOR
CONSTRUCTION

3/11/16 95% REVIEW SET

DRAWING TITLE
**TYPICAL
ROOF DETAILS -
TYPE 1 ROOF**

SHEET NUMBER

R1.7



DRAWING TITLE

**TYPICAL
ROOF DETAILS -
TYPE 2 ROOF**

SHEET NUMBER

R1.8

Actual Size to read at scale

TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 0102 - PROJECT INFORMATION	2
SECTION 00 4100 - BID FORM	3

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 1000 - SUMMARY	4
SECTION 01 2200 - UNIT PRICES	6
SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS	7
SECTION 01 4000 - QUALITY REQUIREMENTS	11
SECTION 01 4216 - DEFINITIONS	14
SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS	15
SECTION 01 6000 - PRODUCT REQUIREMENTS	16
SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS	18

DIVISION 02 - EXISTING CONDITIONS

SECTION 02 4100 - DEMOLITION	22
------------------------------------	----

DIVISION 03 - CONCRETE

SECTION 03 0100 - MAINTENANCE OF CONCRETE	23
---	----

DIVISION 05 - METALS

SECTION 05 5213 - PIPE AND TUBE RAILING SYSTEMS.....	25
--	----

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

SECTION 06 1000 - ROUGH CARPENTRY	32
SECTION 06 1500 - WOOD DECKING	34

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 0150.19 - PREPARATION FOR RE-ROOFING	35
SECTION 07 1401 - HOT-APPLIED RUBBERIZED ASPHALT	37
SECTION 07 2100 - THERMAL INSULATION	45
SECTION 07 5360 - PVC HYBRID 1	47
SECTION 07 5400 - THERMOPLASTIC MEMBRANE ROOFING	59
SECTION 07 5419 - FULLY ADHERED PVC.....	60
SECTION 07 6200 - SHEET METAL FLASHING AND TRIM	Error! Bookmark not defined.
SECTION 07 9005 - JOINT SEALERS.....	74

SECTION 00 0102 - PROJECT INFORMATION

PART 1 GENERAL

1.01 PROJECT IDENTIFICATION

- A. Project Name: Central Detention Facility, located at:
- B. Washington DC - Department of Corrections Central Project Number: **xxx**.
1901 D Street SE.
Washington DC, District of Columbia 20003-2534.
- C. The Owner, hereinafter referred to as Washington DC - Department of Corrections: Charles Floc
- D. Washington DC - Department of Corrections' Project Manager: BLUEFIN LLC.

1.02 PROJECT DESCRIPTION

- A. Summary Project Description: This project consists of the removal and replacement of existing roofing on a high security detention facility for the Washington DC - Department of Corrections. All work will require daily sign in and sign out of contractor personnel and tools that travel to and from the project. All tools and equipment scheduled to remain on site must be locked and secured daily. Additional security measures may be adjusted by DGS / DOC as required for the safety of the facility, employees, and inmates. Work will also include the removal and disposal of all clearly marked unused equipment and debris. In addition, contractor will be required to coordinate with subcontractors for the replacement of all roof drains, specified plumbing connections and piping, and the temporary disconnection and reinstallation of several electrical components and HVAC units as needed to accommodate the specification requirements.
 - 1. Project will have one add alternate scope of work which will consist of the replacement of identified pre-cast concrete panel sealant joints.
- B. Contract Terms: Lump sum TBD by DGS/DOC Procurement.

1.03 PROJECT CONSULTANTS

- A. Owner's Design Criteria Consultant: Bluefin LLC.
 - 1. Address: 2134 Espey Court Ste. 14
 - 2. City, State, Zip: Crofton, MD 21114.
 - 3. Phone/Fax: Norm Crouse 443-257-1612.

1.04 PROCUREMENT DOCUMENTS

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
 - 1. From Washington DC - Department of Corrections at the Project Manager's address listed above.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 00 4100 - BID FORM

Please see RFP-Form of Offeror Letter

END OF BID FORM

SECTION 01 1000 - SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Central Detention Facility
- B. Washington DC - Department of Corrections Name: Charles Floca.
- C. BLUEFIN LLC's Name: Norm Crouse.
- D. The Project consists of the replacement of _____multiple roof sections on the Department of Corrections - Central Detention Facility with a new hybrid modified bitumen roof system with tapered insulation. Additional work will include, but is not limited to, the removal of all marked roof top units which will include the coordination of mechanical, electrical, and plumbing trades, and the removal and replacement of identified building sealant joints at the precast concrete panels.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5000 - Contracting Forms and Supplements.

1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is specified in Section 02 4100.
- B. Plumbing: All roof drains will be replaced with new cast iron bowls and associated plumbing connections, in strict accordance with local plumbing codes.
- C. Electrical Power and Lighting: Restore existing system and equipment to operational condition.
- D. Security Camera System: Coordinate any units that require movement from their fixed locations, restore existing system and equipment to operational condition.
- E. Electrical alterations and modifications
 - 1. Electrical conduit and flood lighting.
- F. Removal and replacement of all identified precast concrete panel joints with new backer rod and silicone sealant.
- G. The Add Alternate will include the installation of safety rails as shown on the roof plans.

1.04 WORK BY CONTRACTOR

- A. Remove existing roofing, insulation, flashings, and perimeter sheet metal down to the existing concrete roof deck.
- B. Examine and repair all concrete deck defects in accordance with section 03 01 00.
- C. Carefully remove all perimeter electrical conduit, flood light supports, etc as necessary to allow for base flashing installations. Remount upon completion.
- D. Replace all existing roof drain assemblies prior to commencing roofing installation.
- E. Provide all necessary wood nailers and blocking where shown or as required in the contract documents.
- F. Replace all roof drains as designated by the roof plans.
- G. Clean and prime roof deck and allow to dry thoroughly.
- H. Install Self Adhering Vapor Barrier to the prepared substrate.
- I. Provide approved tapered polyisocyanurate roof insulation system using the manufacturers approved adhesive over the installed vapor barrier.
- J. Provide specified coverboard, adhered in manufacturer approved adhesive, over the installed tapered base layers of insulation.
- K. Provide SBS modified bitumen base sheet and approved 80 mil PVC Hybrid roof system in accordance with manufacturer's recommended cold-process adhesives with all field and end laps hot-air welded.

- L. Upon completion, clean the final membrane of all scuffs, spills and other undesirable marks as directed by the manufacturer and BLUEFIN, LLC.
- M. Other requirements shall include:
 - 1. Painting of all galvanized surfaces as described during the pre-bid conference and addendum.
 - 2. The removal of all debris, unused equipment, and penetrations as noted during pre-bid conference.
 - 3. The cleaning and re-caulking of the vertical pre-cast concrete wall joints approximately one (1) foot down the exterior of the perimeter parapet walls.

1.05 WORK BY OWNER

- A. Owner will provide a list of subcontractors who are authorized to conduct work on the project, if applicable.

1.06 OWNER OCCUPANCY

- A. Washington DC - Department of Corrections intends to continue to occupy all portions of the existing building during the entire construction period.
- B. Cooperate with Washington DC - Department of Corrections to minimize conflict and to facilitate Washington DC - Department of Corrections' operations.
- C. Schedule the Work to accommodate Washington DC - Department of Corrections' occupancy.

1.07 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Washington DC - Department of Corrections:
 - 1. All contractor's employees, subcontractors, and associates that are scheduled to work on the CDF premises will be required to submit to a background check specifically for CDF / DOC before being approved to work on the site.
 - 2. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 3. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Time Restrictions:
 - 1. Comply with all CDF work hours restrictions and regulations.
- D. Utility Outages and Shutdown:
 - 1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days' notice to Washington DC - Department of Corrections and authorities having jurisdiction.
 - 2. Prevent accidental disruption of utility services to other facilities.

1.08 WORK SEQUENCE/PHASING

- A. Coordinate construction schedule and operations with Washington DC - Department of Corrections.

END OF SECTION

SECTION 01 2200 - UNIT PRICES

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Site mobilization meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Progress photographs.
- F. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Submittal procedures.

1.02 PROJECT COORDINATION

- A. Project Consultant: BLUEFIN, LLC.
- B. Cooperate with the Site Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for security access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Site Project Coordinator.
- D. Comply with Site Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Site Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to BLUEFIN LLC, Project Consultant:
 - 1. Requests for interpretation.
 - 2. Shop drawings, product data, and samples.
 - 3. Design data.
 - 4. Manufacturer's instructions and field reports.
 - 5. Applications for payment and change order requests.
 - 6. Progress schedules.
 - 7. Coordination drawings.
 - 8. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. BLUEFIN LLC will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Washington DC - Department of Corrections.
 - 2. BLUEFIN LLC.
 - 3. Contractor.
 - 4. All subcontractors.
 - 5. Manufacturer's Representative, if required.
 - 6. Washington DC – Department of General Services.
- C. Agenda:
 - 1. Execution of Washington DC - Department of Corrections-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.

3. Distribution of Contract Documents.
 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract, including emergency contact information and BLUEFIN LLC.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to BLUEFIN LLC, Washington DC - Department of Corrections, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

- A. BLUEFIN LLC will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
1. Contractor.
 2. Washington DC - Department of Corrections.
 3. BLUEFIN LLC.
 4. Contractor's Superintendent.
 5. Major Subcontractors.
 6. Project foreman_____.
 7. Manufacturer's representative, if necessary._____.
- C. Agenda:
1. Use of premises by Washington DC - Department of Corrections and Contractor.
 2. Washington DC - Department of Corrections' requirements.
 3. Construction facilities and controls provided by Washington DC - Department of Corrections.
 4. Temporary utilities provided by Washington DC - Department of Corrections.
 5. Security and housekeeping procedures.
 6. Schedules.
 7. Application for payment procedures.
 8. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to BLUEFIN LLC, Washington DC - Department of Corrections, participants, and those affected by decisions made.
- E. Contractor is encouraged to photograph or otherwise document existing conditions of adjacent construction and site improvements that might be construed as damage caused by work performed under this contract. Deliver documentation of pre-existing conditions to the Consultant and/or Owner prior to start of Work.

3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work on a weekly basis.
- B. Attendance Required:
1. Contractor.
 2. Washington DC - Department of Corrections.
 3. BLUEFIN LLC.
 4. Contractor's Superintendent.
 5. Major Subcontractors.
- C. Agenda:
1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.

5. Maintenance of progress schedule.
 6. Corrective measures to regain projected schedules.
 7. Planned progress during succeeding work period.
 8. Maintenance of quality and work standards.
 9. Effect of proposed changes on progress schedule and coordination.
 10. Other business relating to Work.
- D. Record minutes and distribute copies within two days after meeting to participants, with ____ copies to BLUEFIN LLC, Washington DC - Department of Corrections, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 10 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

3.05 PROGRESS PHOTOGRAPHS

- A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- B. Photography Type: Digital; electronic files.

3.06 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Shop drawings.
 2. Tapered insulation layout drawings.
 3. Metal color chart for selection.
 4. Samples for selection.
- B. Submit to BLUEFIN LLC for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection by Owner.

3.07 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Project Contact List
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for BLUEFIN LLC's knowledge as contract administrator or for Washington DC - Department of Corrections.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout:
 1. Project record documents.

2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Waste manifests, if applicable.
6. Final lien waiver(s).
7. Other types as indicated.

3.09 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
 1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches (215 x 280 mm): Submit the number of copies that Contractor requires, plus two copies that will be retained by BLUEFIN LLC.
 2. For tapered insulation lay-outs: Not Less Than 11 x 17 inches.
- B. Documents for Information: Submit two copies.

3.10 SUBMITTAL PROCEDURES

- A. Shop Drawing Procedures:
 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- B. Transmit each submittal with a copy of approved submittal form electronically to Bluefin Consultant at: ncrouse@bluefinllc.com.
- C. Provide a sequentially-numbered transmittal form.
 1. Identify Project Name and Number(s), Submittal Date, and Contractor's information.
 2. Identify pertinent drawing and detail number, and specification section number, as appropriate on each copy.
 3. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- D. Schedule submittals to expedite the Project and coordinate submission of related items.
- E. Clearly identify any variations from Contract Document requirements and reasons for same (acceptance of substitutions, negotiated changes with Owner, etc. Identify any Product/Material or system limitations that may be detrimental to successful performance of the completed Work.
- F. Where applicable, if revised for resubmission, identify all changes made since previous submission.
- G. Consultant will distribute reviewed submittals as appropriate. Affected parties are instructed to promptly report any inability to comply with requirements.
- H. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Quality assurance submittals.
- C. Mock-ups.
- D. Control of installation.
- E. Tolerances.
- F. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

- A. Document 00 3100 - Available Project Information: Soil investigation data.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures.
- C. Section 01 4216 - Definitions.
- D. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REGULATORY REQUIREMENTS

- A. Comply with all applicable Federal, State, and local codes and ordinances in force at the project site.
- B. Apply, obtain, and pay for required local and regional building permits and fees to legally execute the Work of this Contract.
- C. Airborne asbestos fibers, lead, and PCB compounds, if encountered, have been determined to be hazardous to health. Compliance with all possible Federal, State, and Local regulations as they relate to handling these materials is the Contractor's responsibility.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Consultant, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.04 REFERENCES AND STANDARDS

- A. For products or workmanship specified by association, trades, or other consensus standards, comply with requirements of the standard, except when more stringent requirements are specified or are required by applicable codes.
- B. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- C. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- D. Obtain copies of standards where required by product specification sections.
- E. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- F. Should specified reference standards conflict with Contract Documents, request clarification from BLUEFIN LLC before proceeding.

- G. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of BLUEFIN LLC shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 INSTALLERS QUALITY ASSURANCE

- A. Contractor shall take complete charge of the work under this contract and coordinate the work of all trades on the project.
- B. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.
- C. Should manufacturer's instructions conflict with Contract Documents, request and receive clarification from the Consultant before proceeding.
- D. Perform Work by persons qualified to produce required and specified quality.
- E. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- F. Contractor shall obtain complete data at the site and inspect surfaces that are to receive the Work before proceeding with fabricating, assembling, fitting, or erecting the work. The Contractor shall be solely responsible for the accuracy of measurements and laying out of the work and shall make good any errors, defects due to faulty measurements taken, information obtained, layout, or failure to report discrepancies.
- G. The Contractor shall notify the Consultant in writing in case of discrepancies between existing work and drawings, and defects in such surfaces that are to receive the work. The Consultant will evaluate the notice and direct what remedial action will be taken.
- H. Contractor shall apply, install, connect, erect, use, clean, and condition manufactured articles, materials, and equipment as recommended by the manufacturer, unless specified to the contrary.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from BLUEFIN LLC before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.

- D. Where mock-up has been accepted by BLUEFIN LLC and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by BLUEFIN LLC.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from BLUEFIN LLC before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to BLUEFIN LLC 30 days in advance of required observations.
 - 1. Observer subject to approval of BLUEFIN LLC.
 - 2. Observer subject to approval of Washington DC - Department of Corrections.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of BLUEFIN LLC, it is not practical to remove and replace the Work, BLUEFIN LLC will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4216 - DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Provide: To furnish and install.
- E. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES - SEE SECTION 01 5100

- A. Washington DC - Department of Corrections will provide the following:
 - 1. Electrical power, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. Existing facilities may not be used.

1.03 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Washington DC - Department of Corrections' operations from unauthorized entry, vandalism, or theft.

1.06 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Washington DC - Department of Corrections.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.07 WASTE REMOVAL

- A. Provide daily waste / debris removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage, and protection.
- C. Product option requirements.

1.02 RELATED REQUIREMENTS

- A. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. DO NOT USE products having any of the following characteristics:
 - 1. Containing lead, cadmium, asbestos.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period and the documents required. Comply with requirements specified in Section 00 2113.
- B. BLUEFIN LLC will consider requests for substitutions only within 15 days after date of Agreement.
- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- E. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.

3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Washington DC - Department of Corrections.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- F. Substitution Submittal Procedure (after contract award):
1. Submit one copy of request for substitution for consideration. Limit each request to one proposed substitution.
 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 3. BLUEFIN LLC will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Cutting and patching.
- D. Cleaning and protection.
- E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Section 01 60 00 - Product Requirements: Substitution procedures.

1.03 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Coordinate completion and clean-up of work of separate sections.
- D. After Washington DC - Department of Corrections occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Washington DC - Department of Corrections' activities.

1.04 CLOSEOUT SUBMITTALS

- A. Upon "Substantial Completion" of project, the Contractor shall submit the below listed item to the Consultant for presentation to the Owner.
 - 1. Twenty (20) year Manufacturer's no dollar limit (NDL) system warranty requirements for project location.
 - 2. Twenty (20) year sheet metal Manufacturer's finish warranty.
 - 3. Two (5) year Contractor's material and labor warranty.
 - 4. Waste manifests (for ACM), if applicable.
 - 5. Contractor's as-built drawings showing changes to the contract documents, if applicable.
 - 6. Signed punch list, indicating completion of any outstanding items.
 - 7. Such other written guarantees or warranties, as required by the technical sections.
 - 8. Final Waivers of Lien.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on visual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to BLUEFIN LLC before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated in specification documents
 - 2. Relocate items indicated on drawings.
- C. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages. This shall include all plumbing related activities.
 - b. Provide temporary connections as required to maintain existing systems in service where possible
 - 3. Verify that abandoned services serve only abandoned facilities.
 - 4. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- D. Protect existing work to remain.
 - 1. Perform cutting to accomplish removals neatly and as specified for cutting new work.

- 2. Repair adjacent construction and finishes damaged during removal work.
- E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- F. Clean existing systems and equipment.
- G. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- H. Do not begin new construction in alterations areas before demolition is complete.
- I. Comply with all other applicable requirements of this section.

3.05 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work with new products, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.06 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.08 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.09 FINAL CLEANING

- A. Clean new and adjacent roof surfaces, including storm drainage systems, of debris.
- B. Remove sealants, adhesive, bitumen, grease, and other foreign material from finish surfaces of the building.
- C. Repair, patch or touch-up marred surfaces, to match adjacent surfaces.
- D. Use cleaning materials that are nonhazardous.
- E. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- F. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to BLUEFIN LLC and Washington DC - Department of Corrections.
- B. Notify, in writing, BLUEFIN LLC when work is considered ready for BLUEFIN LLC's Substantial Completion inspection.
- C. Conduct Substantial Completion inspection and create Final Correction Punch List containing BLUEFIN LLC's and Contractor's comprehensive list of items identified to be completed or corrected and submit to BLUEFIN LLC.
- D. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Washington DC - Department of Corrections-occupied areas.
- E. Complete items of work determined by BLUEFIN LLC listed in executed Certificate of Substantial Completion.
- F. When the Work has been deemed complete, to the satisfaction of the Owner and Consultant, Contractor will be instructed to complete the Close-out Submittals.

END OF SECTION

SECTION 02 4100 - DEMOLITION

PART 1 GENERAL

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Do not close or obstruct roadways or sidewalks without permit.
 - 6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
- B. Do not begin removal until receipt of notification to proceed from Washington DC - Department of Corrections.
- C. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.

3.02 DEBRIS AND WASTE REMOVAL – DAILY REMOVAL REQUIRED

- A. Remove debris, junk, and trash from site daily.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 0100 - MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cleaning of existing concrete surfaces.
- B. Repair of exposed structural, shrinkage, and settlement cracks.
- C. Resurfacing of concrete surfaces having spalled areas and other damage.
- D. Repair of deteriorated concrete.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

- A. Degreaser:
 - 1. Products:
 - a. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc.; CITREX: www.lmcc.com.
 - b. SpecChem, LLC; Citrus Cleaner: www.specchemllc.com.
 - c. W.R. Meadows, Inc.; Ultrite Degreaser: www.wrmeadows.com.
- B. Detergent: Non-ionic detergent.

2.02 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
 - 1. Adhesives Technology Corporation: www.atcepoxy.com.
 - 2. ARDEX Engineered Cements: www.ardexamericas.com.
 - 3. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 4. Dayton Superior Corporation: www.daytonsuperior.com.
 - 5. Kaufman Products Inc.: www.kaufmanproducts.net.
 - 6. Prospec, an Oldcastle brand: www.prospec.com.
 - 7. The QUIKRETE Companies: www.quikrete.com.
 - 8. SpecChem, LLC: www.specchemllc.com.
 - 9. Stauf USA LLC: www.staufusa.com.
 - 10. W.R. Meadows, Inc: www.wrmeadows.com.
- B. Bonding Slurry: Water-based latex admixture complying with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.
 - 1. Admixture Products:
 - a. Dayton Superior Corporation; Acrylic Bonding Agent J40: www.daytonsuperior.com.
 - b. The QUIKRETE Companies; QUIKRETE® Concrete Bonding Adhesive: www.quikrete.com.
 - c. SpecChem, LLC; Acrylic Bonder: www.specchemllc.com.
 - d. W.R. Meadows, Inc.; Acry-lok: www.wrmeadows.com.
- C. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.
 - 1. In-place material resistant to freeze/thaw conditions.
 - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
 - 3. Integral corrosion inhibitor.
 - 4. Recommended Thickness: Feather edge to 1/8 inch (Feather edge to 3 mm).
 - 5. Color: Light gray.
 - 6. Products:
 - a. Kaufman Products Inc.; Patchwell Deep Light: www.kaufmanproducts.net.
 - b. Prospec, an Oldcastle brand; CR Concrete Resurfacer: www.prospec.com.
 - c. SpecChem, LLC; Duo Patch: www.specchemllc.com.
 - d. Xypex Chemical Corporation; XYPEX Megamix II: www.xypex.com.

- D. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
 - 1. In-place material resistant to freeze/thaw conditions.
 - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
 - 3. Dry Material: Complies with ASTM C928/C928M.
 - 4. Products:
 - a. Adhesives Technology Corporation; HARD-ROC Jet Patch: www.atcepoxy.com.
 - b. Kaufman Products Inc.; Patchwell Deep Light: www.kaufmanproducts.net.
 - c. The QUIKRETE Companies; QUIKRETE® FastSet Repair Mortar: www.quikrete.com.
- E. Pre-Blended Concrete Mix for Small Projects: Construction-grade Portland cement uniformly blended with aggregates and other approved concrete ingredients, requiring only the addition of water.
 - 1. Products:
 - a. The QUIKRETE Companies; QUIKRETE® Fast Set Concrete Mix: www.quikrete.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

3.02 CLEANING EXISTING CONCRETE

- A. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
 - 1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
 - 2. Clean out cracks and voids using same methods.
- B. The following are acceptable cleaning methods, in order from gentlest to less gentle:
 - 1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.
 - 2. Increasing the water washing pressure to maximum of 400 psi.
 - 3. Adding detergent to washing water; with final water rinse to remove residual detergent.

3.03 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

- A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.
- B. Apply coating of bonding agent to entire concrete surface to be repaired.
- C. Fill voids with cementitious mortar flush with surface.
- D. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch (6 mm) over entire surface, terminating at a vertical change in plane on all sides.
- E. Trowel finish to match adjacent concrete surfaces.

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 4000, will perform field inspection and testing, if required.

END OF SECTION

SECTION 05 5213 - PIPE AND TUBE RAILING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Permanent roof edge protection.
- B. Weighted base guardrails.
- C. PRS guardrail-stainless steel.
- D. PRS guardrail-powder coated steel.
- E. PRS standing seam guardrail.
- F. PRS wall mount guardrail.
- G. Roof hatch guardrail.
- H. Skylight guardrail.
- I. Domed skylight fall protection screens.
- J. Ladder to roof access point.
- K. Integrated lightning protection.

1.02 RELATED SECTIONS

- A. Section 07 50 00 - Membrane Roofing.
- B. Section 07 70 00 - Roof and Wall Specialties and Accessories.
- C. Section 07 72 30 - Rooftop Pipe Support*.

1.03 REFERENCES

- A. American Society for Testing of Materials (ASTM):
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- B. Occupational Safety and Health Administration (OSHA):
 - 1. 29 CFR 1926.500 - Scope, Application and Definitions Applicable to this Subpart.
 - 2. 29 CFR 1926.501 - Duty to Have Fall Protection.
 - 3. 29 CFR 1926.502 - Fall Protection Systems Criteria and Practices.
 - 4. 29 CFR 1926.503 - Training Requirements.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets for products and assemblies specified.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Cleaning methods.
- C. Shop Drawings:
 - 1. Indicate profiles, sizes, connections, size and type of fasteners, accessories.
 - 2. Show location of rails and guardrails including plans, details of components, and anchor details.
 - 3. Field Verified Measurements: Verify dimensions indicated on Drawings.
- D. Verification Samples: For each finish specified, two samples representing actual colors specified.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.

- B. Store materials in manufacturer's original sealed, labeled packaging until ready for installation and in accordance with manufacturer's instructions. Protect finishes on rails and uprights from damage.

1.06 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Field Measurements: Where horizontal rails and uprights are indicated to fit to other construction, check actual dimensions or other construction by accurate field measurements prior to ordering and installation; show recorded measurements on final Shop Drawings.

1.07 SEQUENCING AND SCHEDULING

- A. Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation.
 - 1. Where field measurements cannot be made without delaying the system fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery and installation.

1.08 WARRANTY

- A. Warranty: Provide manufacturer's standard one year warranty against defects in materials and manufacturing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Leading Edge Safety, LLC, which is located at: 1345 Taney St.; North Kansas City, MO 64116; Toll Free Tel: 888-990-2990; Fax: 816-472-0822; Email: request info (sales@leadingedgesafety.net), Web: www.leadingedgesafety.net, www.raptorsafety.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.02 PROJECT CONSTRUCTION - WEIGHTED BASE GUARDRAILS (NOT FOR PERMANENT USE)

- A. Product: Weighted Base Guardrails-Powder Coated Steel as manufactured by Leading Edge Safety.
 - 1. System Design: Weighted Base Guardrails. Heavy weighted bases ensure stability and can be configured to meet almost any project condition. Meets and exceeds OSHA Standard CFR 29 1926.502(b) for guardrail systems.
- B. Components:
 - 1. Uprights: 42 inches x 1.625 inches x .065 inch (ASTM C1008/1010) steel tube.
 - 2. Bases: 23 inches x 23 inches Class 35 Gray Iron.
 - 3. Horizontal Rails: 1.625 inches x .065 inch and 1.375 inches x .065 inch (ASTM C1008/1010) steel tube for adjustable rails.
 - 4. Finish: Powder coated steel.
 - 5. Colors: Numerous colors to match Kynar sheet metal, building components and RAL components.
 - 6. Hardware: 3/8 inch-16 x 1 inch zinc plated steel.
 - 7. Toe Boards: 2 x 4 pressure treated lumber.
 - 8. Labels: Applicable safety warnings and manufacturer's contact information.
 - 9. Sizes: Uprights: 42 inches top rail and 21 inches mid rail standard.
 - 10. Horizontal Rails: 9 feet-10 inches o.c., 8 feet-0 inch o.c.; 120 inches to 70 inches, 70 inches to 43 inches, 42 inches to 29 inches adjustable.
 - 11. Weight: Base: 99.6 lbs.
 - 12. Post: 5 lbs.

13. Horizontal Rails: 1 lbs / lineal foot +/-.

2.03 PRS GUARDRAIL-POWDER COATED STEEL - IBC 20/LB/FT

- A. Product: PRS Guardrail-Powder Coated Steel as manufactured by Leading Edge Safety.
 1. System Design: PRS Guardrail provides permanent full-perimeter fall protection, installing under standard roofing and sheet metal details including coping caps, drip edges, gravel stops and inside most commercial gutters. Powder coated steel colors available to match Kynar sheet metal or other building components in RAL colors. PRS Guardrail meets and exceeds OSHA Standards.
- B. Components:
 1. Uprights: 1.66 inches x .140 inch schedule 40 pipe (ASTM A53) welded to 2 inches x 3 inches x 3.5 inches steel block (ASTM A36) and 3/16 inch steel plate (ASTM A36) bracket with pre-punched holes and slots for permanent structural attachment.
 2. Horizontal Rails: 1.625 inches x .065 inch and 1.375 inches x .065 inch (ASTM C1008/1010) steel tube adjustable slide rails.
 3. Finish: Powder coated steel.
 4. Colors: Numerous colors to match Kynar sheet metal, building components and RAL colors.
 5. Hardware: 3/8 inch-16 x 1 inch zinc plated steel. (Consult PRS for approved structural attachment fasteners).
 6. Labels: Applicable safety warnings and manufacturer's contact information.
 7. Sizes: Uprights custom designed per project to OSHA Standards.
 8. Horizontal Rails: 8 feet-0 inch o.c.; 120 inches to 70 inches, 70 inches to 43 inches, 42 inches to 29 inches adjustable.
 9. Corners: 20.5 inches o.c. Outside Corner; 12.5 inches o.c. Inside Corner.
 10. Toe Boards and Brackets: 18 gauge steel (ASTM A1008 CS Type B)
 11. Fasteners for Structural Attachment: As recommended by Leading Edge Safety.
 - a. For Wood Attachment: RSS Structural Screws by GRK Fasteners
 - 1) T-Star Washer Head Powerlag by SPAX.
 - b. For Concrete Attachment: Caliburn PH Concrete Pan Head Screws by GRK Fasteners.
 - c. Others Fasteners as approved by Leading Edge Safety
 12. Weight: Uprights: 12 lbs +/-.
 13. Horizontal Rails: 1 lbs / lineal foot +/-.
 14. Corners: 2 lbs +/-.

2.04 PRS GUARDRAIL-POWDER COATED STEEL - 50 LB/FT

- A. Product: PRS Guardrail-Powder Coated Steel as manufactured by Leading Edge Safety.
 1. System Design: PRS Guardrail provides permanent full-perimeter fall protection, installing under standard roofing and sheet metal details including coping caps, drip edges, gravel stops and inside most commercial gutters. Powder coated steel colors available to match Kynar sheet metal or other building components in RAL colors. PRS Guardrail meets and exceeds OSHA Standards.
- B. Components:
 1. Uprights: 1.625 inches x .25 inch tube (ASTM A-513-5-08A DOM Grade 1026) welded to 2 inches x 3 inches x 3.5 inches steel block (ASTM A36) and 1/4 inch steel plate (ASTM A572) bracket with pre-punched holes and slots for permanent structural attachment.
 2. Horizontal Rails: 1.625 inches x .065 inch and 1.375 inches x .065 inch (ASTM a-513 DOM Grade 1020) steel tube adjustable slide rails.
 3. Finish: Powder coated steel.
 4. Colors: Numerous colors to match Kynar sheet metal, building components and RAL colors.

5. Hardware: 3/8 inch-16 x 1 inch zinc plated steel. (Consult PRS for approved structural attachment fasteners).
6. Labels: Applicable safety warnings and manufacturer's contact information.
7. Sizes: Uprights: Custom designed per project to OSHA Standards.
8. Horizontal Rails: 8 feet-0 inch o.c.; 120 inches to 70 inches, 70 inches to 43 inches, 42 inches to 29 inches adjustable.
9. Corners: 20.5 inches o.c. Outside Corner; 12.5 inches o.c. Inside Corner.
10. Toe Boards and Brackets: 18 gauge steel (ASTM A1008 CS Type B).
11. Fasteners for Structural Attachment: As recommended by Leading Edge Safety.
 - a. For Wood Attachment: RSS Structural Screws by GRK Fasteners
 - 1) T-Star Washer Head Powerlag by SPAX
 - b. For Concrete Attachment: Caliburn PH Concrete Pan Head Screws by GRK Fasteners.
 - c. Others Fasteners as approved by Leading Edge Safety
12. Weight: Uprights: 12 lbs +/-.
13. Horizontal Rails: 1 lbs / lineal foot +/-.
14. Corners: 2 lbs +/-.

2.05 PRS GUARDRAIL - STAINLESS STEEL- OPTION 2

- A. Product: PRS Guardrail-Stainless Steel as manufactured by Leading Edge Safety.
 1. System Design: PRS Guardrail provides permanent full-perimeter fall protection, installing under standard roofing and sheet metal details including coping caps, drip edges, gravel stops, and inside most commercial gutters. Passivated and electro polished finish for maximum corrosion resistance. PRS Guardrail meets and exceeds OSHA Standards.
- B. Components:
 1. Uprights: 1.625 inches x .065 inch stainless steel tube (ASTM A269 T304) welded to 2 inches x 3 inches x 3.5 inches stainless steel block (ASTM A276 T304) and 3/16 inch stainless steel plate (ASTM A240 T304) bracket with pre-punched holes and slots for permanent structural attachment.
 2. Horizontal Rails: 1.625 inches x .065 inch and 1.375 inches x .065 inch (ASTM A269 T304) stainless steel tube fixed and adjustable slide rails.
 3. Finish: ASTM A967.
 4. Colors: Chrome appearance.
 5. Hardware: 3/8 inch-16 x 1 inch 18-8 stainless steel. (Consult PRS for approved structural attachment fasteners)
 6. Labels: Applicable safety warnings and manufacturer's contact information.
 7. Sizes: Uprights: Custom designed per project to OSHA Standards.
 8. Horizontal Rails: 8 feet-0 inch o.c.; 120 inches to 70 inches, 70 inches to 43 inches, 42 inches to 29 inches adjustable.
 9. Corners: 20.5 inches o.c. Outside Corner; 12.5 inches o.c. Inside Corner.
 10. Toe Boards and Brackets: 16 gauge stainless steel (ASTM 240 T304)
 11. Fasteners for Structural Attachment: As recommended by Leading Edge Safety.
 - a. For Wood Attachment: PHEINOX RSS Stainless Steel Structural Screws by GRK Fasteners
 - b. For Concrete Attachment: Caliburn PH Concrete Pan Head Screws by GRK Fasteners.
 - c. Others Fasteners as approved by Leading Edge Safety
 12. Weight: Uprights: 12 lbs +/-.
 13. Horizontal Rails: 1 lbs / lineal foot +/-.
 14. Corners: 2 lbs +/-.

2.07 PRS WALL MOUNT GUARDRAIL

- A. Product: PRS Wall Mount Guardrail-Powder Coated Steel as manufactured by Leading Edge Safety.
 - 1. System Design: PRS Wall Mount Guardrail provides permanent full-perimeter fall protection, allowing direct mounting to interior parapet walls using a dual plate mounting system that assures water-tight installation. Backup plates, target patches, and upright plates creates a compression attachment to prevent water infiltration around mounting studs. Powder coated steel colors available to match Kynar sheet metal or other building components in RAL colors. PRS Guardrail meets and exceeds OSHA Standards.
- B. Components:
 - 1. Uprights: 1.25 inches schedule 40 steel pipe (ASTM A53) - 1.66 inches O.D. x .140 inch wall
 - 2. Mounting Bracket: 3/16 inch steel plate (ASTM A36) bracket with pre-punched holes for mounting stud attachment.
 - 3. Horizontal Rails: 1.625 inches x .065 inch and 1.375 inches x .065 inch (ASTM C1008/1010) steel tube adjustable slide rails.
 - 4. Finish: Powder coated steel.
 - 5. Colors: Numerous colors to match Kynar sheet metal, building components and RAL colors.
 - 6. Hardware: 3/8 inch-16 x 1 inch zinc plated steel. (Consult PRS for approved structural attachment fasteners).
 - 7. Labels: Applicable safety warnings and manufacturer's contact information.
 - 8. Sizes: Uprights: Custom designed per project to OSHA Standards and IBC code requirements.
 - 9. Horizontal Rails: 8 feet-0 inches o.c.; 120 inches to 70 inches, 70 inches to 43 inches, 43 inches to 29 inches Adjustable.
 - 10. Corners: 20.5 inches o.c. Outside Corner; 12.5 inches o.c. Inside Corner.
 - 11. Weight: Uprights: 12 lbs +/-.
 - 12. Horizontal Rails: 1 lbs/lf +/-.
 - 13. Corners: 2 lbs +/-.
 - 14. Standards: Meets and exceeds OSHA Standard 29 CFR 1910.23, 29 CFR 1926.501, 29 CFR 1926.502 and IBC code requirements.

2.08 ROOF HATCH GUARDRAIL

- A. Product: Roof Hatch Guardrail-Powder Coated Steel as manufactured by Leading Edge Safety.
 - 1. System Design: Roof Hatch Guardrail with patented GrabSafe horizontal hand-holds and self-closing gate provides safe egress and ingress through roof hatches in addition to providing protection against accidental falls through the roof opening while the roof hatch is open. GrabSafe horizontal hand-holds act as an extension of the ladder for more comfortable and safe climbing and allows pass-through to the roof surface. Guardrail extensions create a landing area for safe transition to the roof surface before operating the gate. Self-closing gate ensures full perimeter protection.
 - 2. Standards: Meets and exceeds OSHA standard CFR 29 1910.23, CFR 29 1910.27, CAL-OSHA 3212, CAL-OSHA 3209, ANSI/ASSE A1264.1-2007, ANSI/ASSE A14.3-2008 section 5.3.4.3 and US Army Corps of Engineer Requirement EM 385-1-1.
- B. Components:
 - 1. Uprights: 1.625 inches x .065 inch steel tube (ASTM C1008/1010) welded to 10 gauge steel (ASTM A1011 CS Type B) bracket with 3/8 inch pre-punched slots for thru-bolt attachment.
 - 2. Horizontal Rails: 1.625 inches x .065 inch (ASTM C1008/1010) and 1.375 inches x .065 inch (ASTM C1008/1010) steel tube adjustable slide rails.
 - 3. GrabSafe: 1 inch x 10.5 inches steel tube (ASTM A513) welded to 10 gauge steel (ASTM A1011 CS Type B) bracket.

4. Self-Closing Gate: 1.625 inches x .065 inch steel tube (ASTM C1008/1010), 16 gauge steel plate (ASTM A1008 CS Type B).
5. Finish: Powder coated steel.
6. Colors: Numerous colors to match Kynar sheet metal, building components and RAL colors.
7. Hardware: 3/8 inch-16 x 1 inch zinc plated steel.
8. Labels: Applicable safety warnings and manufacturer's contact information.
11. Size: 30 inches x 36 inches.
12. Size: 30 inches x 54 inches.
13. Size: 30 inches x 96 inches.
14. Size: 36 inches by 36 inches.
15. Size: Custom.
16. Weight: 110 lbs.

2.12 LADDER TO ROOF ACCESS POINT

- A. Product: PRS Ladder to Roof Access Point as manufactured by Leading Edge Safety.
 1. System Design: Ladder to Roof Access Point provides permanent fall protection, a controlled access zone, and safe step-on and step-off for both temporary and fixed ladder points. Each unit features patented GrabSafe handholds and self-closing gate to ensure a safe controlled access zone at the ladder.
- B. Components:
 1. Uprights: 1.66 inches x .140 inch schedule 40 pipe (ASTM A53) welded to 2 inches x 3 inches x 3.5 inches steel (ASTM A36) block and 3/16 inch steel plate (ASTM A36) bracket with pre-punched slots for permanent structural attachment.
 2. Horizontal Rails: 1.625 inches x .065 inch (ASTM C1008/1010) and 1.375 inches x .065 inch (ASTM C1008/1010) steel tube adjustable slide rails.
 3. GrabSafe: 1 inch x 5.5 inches steel bar (ASTM A36).
 4. Self-Closing Gate: 1.625 inches x .065 inch steel tube (ASTM C1008/1010), 16 gauge steel plate (ASTM A1008 CS Type B)
 5. Weighted Bases: 23 inches x 23 inches x 1 inch steel plate (ASTM A830 C1045)
 6. Finish: Powder coated steel.
 7. Colors: Numerous colors to match Kynar sheet metal, building components and RAL colors.
 8. Hardware: 3/8 inch-16 x 1 inch zinc plated steel.
 9. Labels: Applicable safety warnings and manufacturer's contact information.
 10. Sizes: 5 feet-6 inches w x 4 feet-8 inches to 6 feet-11 inches adjustable.
 11. Weight: 230 lbs.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Inspect and prepare substrates and nailers using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions. Verify that nailers and other structural components of the building are securely fastened and capable of withstanding loads applied by the guardrail system.
- B. Do not proceed with installation until substrates and nailers have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions including the following.

- B. Permanent Roof Edge Protection:
 - 1. Set uprights, horizontal rails and corners accurately in location, alignment and elevation, measured from established lines and levels and per installation drawings.
 - 2. Install fasteners as recommended by manufacturer in holes provided on the upright bracket.
 - 3. Inspect final installation and test for capacity in accordance with manufacturer's recommendations.
- C. PRS Guardrail shall be installed on roof edge perimeters without penetrating the roof membrane and mounted under the outside perimeter sheet metal as detailed.
- D. PRS Wall Mount Guardrail shall provide water-tight installation through wall flashings on parapet walls with the use of backup plates, target patches and wall mount brackets. Target patches shall be field fabricated to fit around backup plate mounting studs and provide roof manufacturers recommended seam width around perimeter of target patch. Mounting studs shall be sealed behind target patch with non-curing butyl or manufacturers recommended sealant.
- G. Roof Hatch Guardrail shall be installed mounting to the vertical cap flashing of the roof hatch without penetrating the roof membrane. Roof hatches without vertical cap flashing thru-bolt the side of the roof hatch and require counter-flashing to conceal fasteners by others.
- K. Ladder to Roof Access Point shall be installed ladder points without penetrating the roof membrane and mounted under the outside perimeter sheet metal detail.

3.03 PROTECTION

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

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Roofing cant strips.
- D. Preservative treated wood materials.
- E. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

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

2.02 DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.02 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

END OF SECTION

SECTION 06 1500 - WOOD DECKING

PART 2 PRODUCTS

1.01 WOOD MATERIALS

- A. Wood fabricated from old growth timber is not permitted.

END OF SECTION

SECTION 07 0150.19 - PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of existing roofing system in preparation for a new roof membrane system.

1.02 RELATED REQUIREMENTS

- A. Section 03 01 000: Maintenance of Concrete.
- B. Section 06 10 53 - Miscellaneous Rough Carpentry
- C. Section 07 52 16 - SBS Modified Bitumen Sheet Roofing

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with affected mechanical, plumbing, and electrical work associated with roof penetrations.
- B. Pre-Construction Meeting: Convene one week before starting work of this section.
- C. Schedule work to coincide with commencement of installation of new roofing system.

1.04 FIELD CONDITIONS

- A. Do not remove existing roofing membrane when weather conditions threaten the integrity of the building contents or intended continued occupancy.
- B. Maintain continuous temporary protection prior to and during installation of new roofing system.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Verify that existing roof surface is clear and ready for work of this section.

2.02 PREPARATION

- A. Sweep roof surface clean of loose matter.
- B. Remove loose refuse daily and dispose off-site.

2.03 MATERIAL REMOVAL

- A. Remove only existing roofing materials that can be replaced with new materials the same day.
- B. Provide temporary plumber's plugs at roof drains within demolition area(s). Remove temporary plumber's plugs by the end of the work day or before inclement weather. Take care to maintain proper drainage on areas throughout progress of the Work.
- C. Reroofing Work, once begun, will leave building subject to leakage and therefore must be considered in state of emergency when weather threatens.
 - 1. Existing building shall be protected by Contractor from water infiltration through any roof, parapet, or wall area under repair for the life of the project.
- D. Remove only as much roofing, flashings, and insulation as can be made watertight each day.
 - 1. Make an effective watertight seal between the existing roof system and new roof system at the end of each day's Work.
- E. Remove sheet metal flashings from areas involved in the Work.

2.04 FIELD QUALITY CONTROL

- A. Contractor shall verify that:
 - 1. The substrate is smooth, dry, and properly installed prior to installing the roof system.
 - 2. New Roof drain body assemblies are clean and prepared to receive flashing.
 - 3. New Roof drain body assembly components which are damaged or missing, have been replaced.
 - 4. Projections and penetrations within the roof system less than eight (8) inches in height are modified and raised to a height of eight (8) inches, minimum, above the finished height of the roof system.

- a. Plumbing vent piping shall be raised using no-hub connectors and schedule 40 plastic piping to a height of not less than eight (8) inches nor more than twelve (12) inches above the finished height of the roof system.
- 5. Items not specified to be removed and replaced, but necessary for proper installation of the Work, have been properly coordinated for removal and replacement.
- B. Do not proceed until unsatisfactory conditions have been corrected.

END OF SECTION

SECTION 07 1401 - HOT-APPLIED RUBBERIZED ASPHALT – (TYPE 2 ROOF)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.

1.02 RELATED SECTIONS

- A. DIVISION 2 - Sitework Section 02500/02870
- B. DIVISION 3 - Concrete Section 03300 - Deck Surface/Substrate. Coordination of this section is required to facilitate the preparation, proper sequence, and successful installation of the waterproofing membrane system.
 - Cast In Place Concrete/Composite Deck
 - 1. Strength/Density: Minimum 2,500 psi (17,235 kPa) Compressive Strength Minimum 115 pcf (1842 kg/m³) Density
 - 2. Finish: Wood-Float or Wood-Troweled finish. Steel trowel finish is not acceptable or recommended.
 - 3. Concrete Cure:
 - a. Water cure, wet coverings, paper sheets, plastic sheets, or sodium silicate compound.
 - b. Duration of Cure:
 - 1) Structural Weight Concrete: minimum 14 days, recommend 28 days, prior to application of the waterproofing membrane.
 - 2) Lightweight Structural Concrete: minimum 28 days, recommend 60 days, prior to application of waterproofing membrane. Venting of the deck from the underside is strongly recommended to facilitate drying.
 - 3) Cure times may vary due to thickness of slab, ambient temperature, relative humidity, region and season.
 - c. Form Release Agents: Petroleum based products, distillates are not to be used.
 - d. Refer to Section 3.02 Substrate Preparation.
- C. DIVISION [04 00 00] – Masonry
- D. DIVISION [06 10 00] – Wood Blocking and Curbing
- E. DIVISION [07 20 00] – Insulation
- F. DIVISION [07 60 00] – Sheet Metal Flashing and Trim
- G. DIVISION [07 90 00] – Caulking and Sealants
- H. DIVISION [22 00 00] – Plumbing Specialties

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. Underwriters Laboratories (UL)
- C. Canadian General Standards Board CGSB- 37.50-M89, Standard for "Asphalt, Rubberized, Hot Applied for Roofing and Waterproofing"
- D. International Organization for Standardization (ISO) 9001:2000 Quality Standard

1.04 SYSTEM DESCRIPTION

- A. Furnish and install a Waterproofing System or Assembly, vertically or horizontally, including substrate primer, a monolithic, fully reinforced rubberized asphalt membrane, flashings, separation layer, and all required accessories [protection course (if required), drainage course (if required), extruded polystyrene insulation (if required), solid core protection layer (if required), pavers & paver pedestals (if required)]. All products shall be purchased from a single-source manufacturer except as approved by Consultant.

1.05 SUBMITTALS

- A. Certification from an independent testing laboratory, that the material meets the CGSB-37.50-M89 standard for rubberized asphalt membranes, including all applicable ASTM procedures.
- B. Evidence verifying full time quality control of production facilities; that each batch of material is tested and conforms with the manufacturer's published physical properties.
- C. Evidence that extruded polystyrene insulation is free from CFC's.
- D. Confirmation that all waterproofing components are being supplied and warranted by a single-source manufacturer
- E. Provide three (3) copies of the most current technical data sheets. These documents must describe the physical properties of the specified materials and explanations about product installation, including installation techniques, restrictions, limitations, and any other manufacturer recommendations.

1.06 QUALITY ASSURANCE

- A. Refer to Section 1.04 SYSTEM DESCRIPTION and Section 1.05 SUBMITTALS
- B. The Waterproofing Contractor shall demonstrate qualifications to perform the work of this Section by submitting the following documentation:
 - 1. Certification or license by the membrane manufacturer confirming the waterproofing contractor is an authorized applicator of the product the installer intends to use.
 - 2. List of at least three (3) projects, satisfactorily completed within the past five (5) years, of similar scope and complexity.
- C. Refer to Section 1.04 SYSTEM DESCRIPTION. Include single-source for all components from the manufacturer.
- D. The rubberized asphalt membrane product shall contain an inert clay filler to enable the product to be resistant to acids (fertilizers, building washes and acid rain).
- E. Membrane manufacturer shall have available technical staff to assist the contractor, when necessary, in application of the products and final inspection of the assembly.
- F. Membrane Manufacturer Qualification:
 - 1. Membrane manufacturer shall show evidence that the specified rubberized asphalt has been manufactured by the same source for ten (10) years and successfully installed on a yearly basis for a minimum of ten (10) years on projects of similar scope and complexity.
 - 2. Membrane manufacturer offering the single-source warranty must have a full-time technical support staff to provide the installer with technical assistance in the installation of the products included in the warranty.
 - 3. All materials specified herein are cited as a minimum standard of quality, but shall not preclude consideration of superior materials or components.
- G. Pre-Construction Conference: The membrane manufacturer will have a representative meet with all parties, as necessary, at the jobsite for a review of project conditions and sequence of events as they relate to the integrity of the waterproofing assembly.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original unopened containers clearly labeled with manufacturer's name, product name, and instructions for use. Refer to Product Data Sheets.
- B. Materials shall be stored on pallets in a clean, dry area protected from the elements.
- C. Store all adhesives at temperatures between 60°F (15.5°C) and 80°F (26.6°C).
- D. The membrane and accessories shall not during its service life be exposed to a constant temperature above 180°F (82°C).
- E. Do not breathe adhesive vapors or use near an open flame. Adhesives are extremely flammable; please consult container package, Product Data Sheets and Material Safety Data Sheets for written installation instructions and safety information.

1.08 PROJECT CONDITIONS

- A. Application of membrane shall be in a well ventilated area and shall not commence nor be continued during inclement weather. All surfaces shall be free of water, frost, snow, and ice and the ambient temperature shall not be below 0°F (-17.7°C).
- B. Exposure to chemical discharges, airborne contaminants, and waste products including, but not limited to; grease, oil, hydraulic fluid, other petroleum distillates, solvents, fats, vegetable oil, and mineral oil is prohibited.
- C. Substrate Preparation: Refer to Section 1.02 RELATED SECTIONS and 3.02 SUBSTRATE PREPARATION.
- D. It is the General Contractor's responsibility to assure adequate protection during installation of the waterproofing assembly and to properly sequence system installation requirements.

1.09 WARRANTY

- A. Upon completion of work, the contractor shall supply the owner with a 15 year Single-Source Warranty issued by the manufacturer of the waterproofing system/assembly.

PART 2 - PRODUCTS

2.01 GENERAL

- A. The waterproofing membrane system components and accessories shall be furnished by a single-source waterproofing membrane manufacturer to ensure total system compatibility and integrity. Please note these specifications are subject to change by the manufacturer without prior notice.

2.02 WATERPROOFING MEMBRANE

- A. Primary Waterproofing Membrane: A modified, hot fluid applied rubberized asphalt composed of a specialty blend of refined asphalts, recycled crumb rubber, inert clay, and other mineral stabilizers which meets CGSB 37.50- M89 and the following physical properties:

Properties	Standards	Requirements
Low Temp. Crack Bridging	ASTM D-92	Pass 10 Cycles
Water Vapor Permeability	ASTM E-96	1.7ng/Pa.m²s
Flow	ASTM D-1191	Max 3mm at 60°C (140°F) on a 75° angle for 5 hours
Resilience	ASTM D5329	40% min
Softening Point	ASTM D36	83°C (181°F) min.
Elongation	ASTM 5329	One pinhole max.

2.03 ACCESSORY PRODUCTS

- A. Primer and Surface Conditioner
 - 1. Asphalt Primer conforming to ASTM D 41.
- B. Flashing Reinforcements
 - 1. Reinforcing Fabric: thermally bonded spunlaid polyester/nylon composite mat.
 - 2. 60 mil thickness; uncured neoprene.
- C. Membrane Flashing Options
 - 1. Reinforcing Fabric: thermally bonded spunlaid polyester/nylon composite mat. (must encapsulate)
 - 2. 110mil thickness; SBS Modified Bitumen Flashing
 - 3. Fluid Applied Membrane: Single component polyurethane resin & polyester reinforcement
 - 4. Fluid Applied Membrane: Fully adhered, reinforced cold fluid applied (PMMA) polymethyl-methacrylate liquid resin flashing.
- D. Adhesives for Flashings
 - 1. Bonding Adhesive to adhere uncured neoprene flashing to substrate.
 - 2. Splicing Adhesive to bond end laps of uncured neoprene flashings.

3. Lap Seam Sealant to caulk lap edges.
- E. Sealants
 1. Sealant at top of termination bar.
 2. Alternates as approved
- F. Separation Layer
 1. 90 mil thickness; 180 gram polyester reinforced SBS modified bitumen to be used.
- G. Protection Course
 1. 90 mil thickness; 180 gram polyester reinforced SBS modified bitumen to be used.
 2. Solid core asphalt protection board.
 3. Rigid extruded polystyrene insulation products.
 4. Alternates as approved by BLUEFIN, LLC
- H. Drainage Course
 1. PREFABRICATED DRAINAGE BOARD: shall be a composite drainage board consisting of a post-industrial recycled polypropylene core of fused, entangled filaments covered with a geocomposite filter fabric on its upper surface to allow water to pass into the drainage core while restricting the movement of soil particles and suitable for use in select vertical and horizontal applications.
 2. PREFABRICATED DRAINAGE BOARD consisting of a post-industrial recycled polypropylene core of fused, entangled filaments covered with a geocomposite filter fabric bonded to both sides.
- I. Insulation
 1. Rigid, extruded polystyrene insulation board for waterproofing assemblies meeting ASTM C-578 Type VI or Type VII criteria.
 - a. Insulation must be 60 psi compressive strength when tested in accordance with ASTM D-1621 criteria.
 - b. Water Absorption must be maximum 0.1% by volume when tested in accordance with ASTM C-272 criteria.
 - c. The foam blowing agent used in the manufacture of the insulation must provide at least a 90% reduction in ozone potential as compared with standard CFC blowing agents. It shall be certified by the foam manufacturer to be CFC free.
 - d. The insulation must offer min R-5.0 per inch at 75° F mean temperature when tested in accordance with ASTM C-518 and be warranted by the manufacturer to retain at least 80% of its published R-value for the warranty period.
- J. Filter Fabric Sheet
 1. A needle-punched, non-woven, calendared 100% polypropylene fabric allowing high capacity drainage flow.
- K. Topping Materials
 1. Architectural Pavers:
 - a. Type One Terrace Paver: Precast concrete pavers with beveled edged.
 - 1) Nominal size 24 inches by 24 inches by 2 inches thick.
 - 2) Compressive strength: 8500 psi. per ASTM C-140; 1,750 pounds minimum center load required.
 - 3) Flexural strength: 1100 psi. per ASTM C-293
 - 4) Water absorption: = 5% per ASTM C-140.
 - 5) Freeze-thaw: No breakage and not more than one percent loss in dry weight after 50 cycles in accordance with ASTM C-67.
 - 6) Color & Finish:
 - 7) Adjustable height and fixed height pedestals as recommended or approved
 2. Roofing Ballast:
 - a. Type

PART 3 - EXECUTION

3.01 SUBSTRATE INSPECTION

- A. Prior to the installation of any new materials, the waterproofing contractor shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies be determined, the Architect, Owner or General Contractor shall be given written notice and corrections will be made.
- B. The waterproofing contractor shall not proceed with the installation of the specified waterproofing assembly until all surface deficiencies and unsatisfactory conditions have been corrected.

3.02 SUBSTRATE PREPARATION

- A. Surfaces shall be clean, dry, smooth, and free of voids per ASTM D 5295 "Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems." Unapproved curing compound, form release agents, petroleum distillates and other contaminants are not allowed to come into contact with any approved substrate.
 - 1. Cast in-Place Concrete; Composite Deck/ Wall
 - a. All poured in place concrete shall be smooth and free of voids. All areas shall be free of honeycombs, sharp protrusions, fins, laitance, and will be free of damaged, spalled areas.
 - b. If the concrete pour is not monolithic, dissimilar materials, if any, must receive reinforcing membrane.
 - 2. Precast Concrete Decks
 - a. All precast units shall be mechanically secured and all joints between units shall be grouted.
 - b. All joints shall be treated with uncured neoprene, or fabric reinforcing prior to full membrane application.
 - 3. Renovation/Tear-Off Application
 - a. All existing membrane (existing waterproofing systems, coatings, coal tar pitch, and asphalt, etc.) shall be removed, restoring the substrate to a pristine condition.
 - b. All surface areas shall be inspected and approved prior to the application of the new waterproofing system.
 - 4. Plywood decks
 - a. Minimum thickness of 1/2" (12.7 mm) is required with adequate structural support.
 - b. Tongue and groove joint edges are required.
 - c. Adequate number and type of fasteners shall be used to comply with applicable codes and maintain structural integrity.
 - 5. Other
 - a. Metal, and Gypsum substrates, as approved.
- B. Substrate cleaning
 - 1. Verify the substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D-4263.
 - a. The substrate shall be swept, then blown clean to remove all loose debris.
 - b. Prior to beginning the membrane installation, apply a test patch of Colphene H to the prepared substrate to confirm bond and adhesion.

3.03 SYSTEM INSTALLATION

- A. Asphalt Primer/Conditioner Application
 - 1. Apply the specified primer to all horizontal and all vertical surfaces to be waterproofed. Apply at the rate of 300 to 600 sq.ft. per gallon, depending upon the porosity of the substrate. The primer coat should be tan in color, splatter pattern.
 - 2. Prior to application of the waterproofing system, the primer must be allowed sufficient time to thoroughly dry.
- B. Hot Fluid Applied Rubber Membrane
 - 1. Heat rubberized asphalt membrane in an oil or air jacketed melter with mechanical agitator, specifically designed for heating rubberized asphalt.

2. Membrane shall be heated to, and maintained at a temperature range between 350°F (176°C) and 400°F (204°C).
 3. All rubberized asphalt membrane heated and maintained in excess of the specified temperature ranges must be discarded and removed from the site.
- C. Flashing/Detailing Installation
1. All detailing and flashing shall be accomplished according to the membrane manufacturers written instructions and standard guideline details.
 2. All detailing and flashing reinforcement shall be accomplished prior to the installation of the field membrane.
 3. Route, clean and prepare all cracks in the concrete deck for repair
 4. For non-moving joints or cracks not exceeding 1/8 inch (3mm) wide: Embed a strip of reinforcing fabric extending a minimum of 3 inches (76mm) on each side of the non-moving joint or crack, embedded in, and then coated with hot rubberized asphalt.
 5. For non-moving joints or cracks exceeding 1/8 inch (3mm) wide: Embed a strip of uncured neoprene or other specified reinforcement (not fabric), extending a minimum of 3 inches (76mm) on each side of the non-moving joint or crack, embedded in, and then coated with hot rubberized asphalt.
 6. Substrate board joints, blemishes, and other imperfections shall be pre-detailed with membrane and appropriate reinforcing prior to the application of the field membrane.
 7. All drains require uncured neoprene (or approved alternate) reinforcement properly installed, extending a minimum of 6 inches past the drain bowl onto the surrounding substrate. Drain clamping rings must be properly secured while hot rubberized asphalt is still free flowing. Refer to membrane manufacturer details for specific installation instructions.
 8. Refer to membrane manufacturer's installation guidelines for all detail flashing requirements.
- D. Membrane Application
1. Apply hot rubberized asphalt to the substrate and adjoining surfaces of previously installed flashing reinforcement and detailing. Apply a monolithic coat of hot rubberized asphalt, 90 mil (approximately 2.3 mm) thick; immediately embed a layer of reinforcing fabric, overlapping sheets 1 inch to 2 inches (25.4 mm – 50.8 mm) insuring membrane is applied between sheets at laps. Follow with an additional monolithically applied 125 mil uniform, (approximately 3.2 mm) thick layer of hot rubberized asphalt membrane, providing a reinforced, seamless membrane averaging 215 mils (approximately 5.5 mm) total thickness (180 mils minimum).

3.04 SEPARATION LAYER INSTALLATION

- A. Separation layer shall be immediately installed as follows:
1. Embed the separation layer into the waterproofing membrane detailed above, while it is still hot, to insure full adhesion.
 2. Install this layer in conjunction with the 125 mil top coating previously detailed, insuring there are no dry lap edges. Overlap separation layer a minimum of 2 inches (50.8 mm) at all side laps and 4 inches (102 mm) at all end laps. If rigid insulation board materials are used they shall not be overlapped, but will be embedded in the still hot membrane to achieve full adhesion.
 3. It is recommended that the completed waterproofing assembly be covered with subsequent topping materials as soon as possible to avoid any unnecessary damage to the newly installed waterproofing system. Topping materials must be installed no later than 30 days from completion of the waterproofing assembly.

3.05 FLOOD TEST

- A. Flood Testing: Flood test each deck area for leaks, according to recommendations in ASTM D-5957, Standard Guide for Flood Testing Horizontal Waterproofing Installations. After completing and protecting waterproofing, but before overlaying construction is placed, install temporary containment assemblies, plugging all drains and flood with water.

1. Flood entire area to a minimum depth of 2 inches for a period of 48 hours.
- B. VERIFY that the structure can support the dead load weight of the areas to be water tested before flooding.
- C. After flood testing, repair any leaks in the waterproofing system; repeat flood test.
- D. In lieu of flood testing, Electronic Breach Detection is an acceptable alternative.
- E. Owner may engage an independent testing agency to observe flood testing procedures and results.

3.06 PROTECTION OR DRAINAGE COURSE/INSULATION/PAVER PLACEMENT

- A. General
 1. Examine all areas to receive topping materials. Insure that all areas are free from defect and successfully completed a flood test. Verify that all components of the system are properly installed, fully completed, undamaged, and intact.
 2. The protection course, drainage course, insulation, and all other topping materials shall be installed as each area is completed. Adhered as required with HV-III Adhesive, or other methods as approved.
- B. Protection Course
 1. Multi-ply, semi-rigid asphaltic board composed of a mineral fortified asphaltic core formed between two asphaltic saturated fiberglass liners.
 2. All vertical flashings shall receive one layer spot adhered with hot rubberized asphalt.
 3. Install protection course to lay flat. Cut to fit all penetrations, curbs and perimeters within 3/4 inch (19 mm). Spot adhere as required with hot rubberized asphalt.
- C. Drainage Course Installation (if required)
 1. Install the specified drainage course directly on horizontal and vertical surfaces with the filter fabric up in accordance with the membrane manufacturer's written instructions.
 2. Properly position drainage course, carefully cutting and fitting panels to fit the surface. Cut and snugly fit the drainage course at all perimeters, curbs and penetrations, following the membrane manufacturer's installation procedures.
 3. Adhere each geotextile fabric overlap edge to adjacent drainage courses with an adhesive acceptable to the membrane manufacturer.
- D. Insulation Placement (if required)
 1. Install one or more layers of rigid insulation to required thickness and/or R-value. Stagger all joints, cut and fit to within 3/4 inch (19 mm) of all projections, perimeter walls and penetrations. Insulation is to be loose laid and tightly butted with joints not greater than 3/8 inch (9.5 mm).
 2. Multi-layer insulation applications require the bottom layer of insulation to be the thickest layer and shall be a minimum of 2" thick (50.8 mm). All layers shall be loose laid with the joints of the second layer staggered and offset from all joints of the preceding layer. Each successive layer shall be offset from the underlying layer(s).
- E. Architectural Paver Placement (walkway and RTU protection only)
 1. Architectural pavers will be installed on approved paver tab or pedestal system in accordance with the pedestal system manufacturer's specifications, recommendations, project requirements, and as defined in the architectural layout.
 2. Ensure the finished paver surface is spaced and butted properly, level and free from tripping hazards.
 3. Fabric can be installed under full paver systems to mask insulation color seen at joints between pavers. Black fabric shall not be left exposed in temperatures greater than 90° F.

3.07 JOB COMPLETION

- A. The Waterproofing Contractor and the Manufacturer's Representative shall inspect the completed waterproofing assembly. All defects as discovered shall be corrected.
- B. Clean all adjacent surfaces using cleaning agents and procedures approved by the membrane manufacturer of the affected systems, products, or finishes.

- C. Remove from the premises all rubbish, debris, and surplus materials resulting from the work.

END OF SECTION

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation and integral vapor retarder at perimeter foundation wall and over roof deck.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Field-applied termiticide for concrete slabs and foundations.
- B. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.
- C. Section 07 5200 - Modified Bituminous Membrane Roofing: Insulation specified as part of roofing system.

1.03 REFERENCE STANDARDS

- A. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Insulation:
 - 1. As approved by roof system manufacturer.

2.02 APPLICATIONS

- A. Insulation Over Roof Deck: Polyisocyanurate board.

2.03 FOAM BOARD INSULATION MATERIALS

- A. Polyisocyanurate Board Insulation with Facers Both Sides: (Tapered)
 - 1. Rigid cellular foam insulation board, conforming to ASTM C1289, Type II, Class 1 and Grade 2, tapered to provide slope-to-drain.
 - 2. Rate of taper: 1/4 inch per lineal foot.
 - 3. Taper starting thickness: 1" inch.
- B. Polyisocyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 2.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Compressive Strength: 25 psi (172 kPa)
 - 3. Board Size: 48 x 48 inch (1220 x 2440 mm).
 - a. Exception: Insulation to be attached using adhesive may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
 - 4. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
 - 5. Board Thickness: 1.5 inch (37.5 mm).minimum
 - 6. Thermal Resistance: R-value (RSI-value) of minimum average R-25.

2.04 FIBER BOARD INSULATION MATERIALS

- A. Recover board:
 - 1. High-density fiberboard, conforming to ASTM C208 and C209, or high-density perlite board, conforming to ASTM C728.
 - 2. Thickness: 1/2 inch.

2.05 ACCESSORIES

- A. Sheet Vapor Retarder: Specified in Section 07 2500.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of irregularities or materials or substances that may impede adhesive bond.

3.03 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A. Board Installation over Roof Deck, General:
 - 1. See applicable roofing specification section for specific board installation requirements.
 - 2. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
 - 3. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
 - 4. Do not apply more insulation than can be covered with roofing in same day.

3.04 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 5360 - PVC HYBRID 1 – (TYPE 1 ROOF)

1.01 SECTION INCLUDES

- A. The Work generally involves providing a hybrid SBS/PVC membrane system. Flashings are done with PVC. These systems are fully adhered with manufacturer's approved adhesives. Systems are typically placed over an approved insulation substrate on an approved deck type such as steel, concrete, lightweight concrete, poured or plank gypsum, wood plank or plywood wood, or cementitious wood fiber or hybrid decking complete with flashings, scuppers, expansion joints, control joints, cant strips, edge strips, crickets, insulation, and performing such incidental or other work as may be required by these operations and called for by the drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE: (THE FOLLOWING ITEM MAY BE COVERED IN OTHER SECTIONS OF THE SPECIFICATIONS.)

- A. Section 03100: Roof Deck Surface Substrate
- B. Section 06100: Rough Carpentry
- C. Section 06114: Wood Blocking and Curbing
- D. Section 072100: Insulation
- E. Section 076200: Sheet Metal
- F. Section 077200: Roof Hatches
- G. Section 07810: Skylights
- H. Section 15430: Plumbing Specialties

1.03 DEFINITIONS

- A. Roofing Terminology: Refer to the following publications for terms related to roofing work not otherwise defined in this section.
 - 1. ASTM D 1079: Definitions of Terms Relating to Roofing, Waterproofing, and Bituminous Materials.
 - 2. NRCA Roofing and Waterproofing Manual
 - 3. Roof Consultants Institute Glossary of Terms

1.04 REFERENCES

- A. American Society of Civil Engineers - Reference Document ASCE 7-95, Minimum Design Loads for Buildings and Other Structures
- B. American Society of Testing and Materials (ASTM).
 - 1. ASTM C 165 - Compressive strength
 - 2. ASTM C 203 - Flexural strength
 - 3. ASTM C 208 - Specification for Insulating Board (Cellulosic Fiber), Structural and Decorative
 - 4. ASTM C 209 - Physical properties
 - 5. ASTM C 355 - Water vapor permeance
 - 6. ASTM C 518 - Thermal resistance
 - 7. ASTM C 726 - Specification for Mineral Fiber Roof Insulation Board
 - 8. ASTM C 728 - Specification for Perlite Thermal Insulation Board
 - 9. ASTM C 1177 - Water Absorption
 - 10. ASTM D 41 - Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
 - 11. ASTM D 226 - Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
 - 12. ASTM D 312 - Specification for Asphalt Used in Roofing
 - 13. ASTM D 1621 - Compressive strength
 - 14. ASTM D 1622 - Density
 - 15. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection

16. ASTM D 2126 - Dimensional Stability
17. ASTM D 2178 - Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
18. ASTM D 2829 - Sampling and Analysis of Built-Up Roofs
19. ASTM D 2626 - Specification for Asphalt Saturated and Coated Organic Base Sheet Used in Roofing
20. ASTM D 3447 - Emulsified asphalt adhesive
21. ASTM D 4586 - Specification for Asphalt Roof Cement, Asbestos Free
22. ASTM D 4601 - Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing
23. ASTM D 5147 - Test Method for Sampling and Testing Modified Bituminous Sheet Material
24. ASTM E 84 - Flame spread
25. ASTM E 96 - Water vapor transmission
26. ASTM E 108 - Spread of flame
- C. CGSB 37GP56M Classification: Type 2, Class C, Grade 2.
- D. DIN 50018 - Testing in a saturated atmosphere in the presence of sulfur dioxide.
- E. Factory Mutual Research Corporation
 1. Factory Mutual Research Corporation - Loss Prevention Data Sheets 1-7; 1-28; 1-28R; 1-29; 1-29R; 1-49
 2. Factory Mutual Research Corporation - (FMRC) Approval Guide - Roof Coverings
 3. Factory Mutual Research Corporation Standard 4470 - Approval Standard for Class I Roof Covers
- F. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual-4th Edition.
- G. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- H. The South Florida Building Code
 1. Dade County Test Protocol PA 105 - Withdrawal Resistance Test Procedure
 2. Dade County Test Protocol PA 114 - Standard 4450/4470, As Modified for the South Florida Building Code
 - a. Appendix 'A' - Above Deck Combustibility - ASTM E 108 for Class I Roof Covers
 - b. Appendix 'C' - Uplift Pressure Test Standard for Class I Roof Cover
 - c. Appendix 'D' - Uplift Pressure Test Standard for Adhered Class I Roof Covers
 - d. Appendix 'E' - Corrosion Test Procedure for Fasteners, Batten Bars and Stress Distribution Plates
 - e. Appendix 'F' - Susceptibility to Hail Damage Test Standard for Approved Roof System Assemblies
 3. Dade County PA 117, Appendix 'A' - Withdrawal Resistance Performance of Mechanical Fasteners Used in Roof System Assemblies
 4. Dade County PA 117, Appendix 'B' - Dynamic Pull-Through Performance of Roofing Membranes Over Fastener Heads or Fasteners with Metal Bearing Plates
- I. Underwriters Laboratories (UL) - Roofing Materials and Systems Annual Directory

1.05 CODE AND TEST REQUIREMENTS

- A. The roof system which is bid shall have been tested in compliance with the following codes and test requirements.
 1. Underwriters Laboratories Class external fire classification.
 2. Factory Mutual Research Corporation windstorm classification [I-60] [I-90] [1-105] [1-120]
 3. The roof system assembly shall have test data in compliance with test criteria set forth in [Factory Mutual Test Standard 4470] [Dade County Test Protocol PA 114] to support uplift pressure resistance to design pressures calculated in compliance with ASCE 7-95.
 4. The roof system assembly shall be approved for application within the [South Florida Building Code] [Uniform Building Code] [Southern Building Code Congress International (SBCCI)] [Building Official Congress Association (BOCA)] jurisdiction.

5. The roof system assembly shall be installed in compliance with all local building and safety requirements adopted by the local building code jurisdiction.
6. All metal flashings shall be in compliance with recommendations set forth in [Factory Mutual Research Corporation Loss Prevention Data Sheet 1-49] [Metro-Dade County Application Standard PA 111].

1.06 SUBMITTALS

- A. Submit the following in compliance with contract Conditions and Division 1 Specification Sections.
 1. Confirmation of Manufacturer and Applicator requirements enumerated in 1.07.
 2. Fire classification compliance data specified in 1.05.
 3. Wind uplift resistance data specified in 1.05.
 4. Upon request from [Building Owner] [Architect] [Roofing Consultant] [Engineer], manufacturer shall supply, at their expense, physical property test data in compliance with CGSB 37-GP-56M. Test data shall be provided by an independent laboratory in a report signed by a Professional Engineer or Registered Roof Consultant.
 5. Design pressure calculations for the roof area in compliance with ASCE 7-93 and local Building Code requirements.
 6. Samples:
 - a. 12" x 12" square sample of each ply sheet material installed under the exposed membrane.
 - b. Vapor Retarder
 - c. All roof insulation types used
 - d. Flashing materials
 - e. All fastener types used
 7. Submit 4 copies of the manufacturer's current: Published installation instructions; flashing and roofing specifications; Product Data Sheets for all products; and Material Safety Data Sheets for all products used in the assembly of the roof system.
 8. Manufacturer's complete recommended maintenance procedures for roofing system, including precautions and warnings to prevent damage to, and deterioration of roofing system, and any safety precautions published by the roof system manufacturer.
 9. Shop Drawings:
 - a. Provide complete installation details of roofing, flashing, fastening and insulation, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane.
 10. Submit fastening calculations for attachment of wood nailers in compliance with FM 1-49.
 11. Submit Roofing Manufacturer's Field Fastener Testing Report in general compliance with Metro Dade Test Protocol PA 105.
 12. Certificates:
 - a. Manufacturer's written approval of: 1.) The roof system to be applied over the submitted insulation and deck type; 2.) Contract documents; 3.) Applicator and; 4.) Warranty conditions specified.
 - b. Insulation manufacturer's certification that the product is compatible with the proposed roof system and meets specification requirements.
 - c. At completion of roof application: Roof membrane [Building Owner] [Architect] [Roofing Consultant] [Engineer] [Manufacturer]'s field inspection reports; punch lists; as-built drawings.
 - d. Certification from the membrane manufacturer at job completion confirming the installed roof assembly is in compliance with the approved submittals.

1.07 QUALIFICATIONS

- A. Applicator's Qualifications:
 1. Approved by the manufacturer prior to the bidding period and throughout the installation and able to present a copy of his certification upon request by the Architect or Owner.

2. Applicator must have installed at least five roofs of the same materials and methods specified for this project.
 3. Maintain a permanent office within 150 miles of project site;
 4. Maintain a full-time supervisor/foreman experienced with the specified roof system on-site when roof system application is in progress. Certification of general experience specific roof system experience shall be included in the submittal;
 5. Be equipped with a trained crew and with all capital equipment required to perform work of this section.
 - a. Maintain all equipment and tools in good working order;
 - b. Equip all kettles and tankers with accurate, fully readable thermometers;
 - c. Provide written safety plan and equipment to the work force and specify, in writing, proper clothing.
 6. Shall declare on the bid document the roof system assembly bid.
 7. Shall appoint a safety coordinator who shall be a member of the roofing installation crew. The appointment shall be conveyed to the [Building Owner] [Architect] [Roofing Consultant] [Engineer] in writing including all qualifications for the appointment;
 8. Maintain a daily job log to be kept on site at all times from the pre-roofing conference. The job log shall include:
 - a. Copies of all submittals;
 - b. Safety coordinator appointment with emergency telephone numbers; fall protection plan and material safety data sheets for all products.
 - c. Daily crew attendance and time records;
 - d. A summary of each day's work including any photographs or detail revisions;
 - e. Accident reports;
 - f. Material delivery records; and
 - g. A visitor register.
- B. Manufacturer's Qualifications:
1. Must have a minimum of 15-year experience manufacturing SBS modified bitumen and PVC roofing membranes.
 2. Provide a factory trained technician to attend site meetings and to perform final inspections of the roofing system.
 3. Provide a warranty upon satisfactory installation of the roofing system.
 4. Submit all alternate systems, complying the aforementioned requirements, 14 days in advance of the bid date for consideration of approval. .

1.08 PRE-INSTALLATION CONFERENCE

- A. Convene less than five days prior to commencing work of this section at a time and location to be determined by the architect, contractor, manufacturer's field representative, owner and/or owner's representative
1. All parties responsible for work of this section are required to attend including the Architect, Owner, Contractor and any other trades involved in the roofing work.
 2. Review installation procedures and coordination required with related work.
 3. Inspect and make notes of job conditions prior to installation.
 - a. Minutes shall be taken at the conference and provided to all parties present.
 - b. All outstanding issues shall be noted in writing designating the responsible party for follow-up action and the timetable for completion.
 - c. Application of roofing system will not take place until all outstanding issues are completed.
- B. No work will begin until a NOTICE TO PROCEED is issued following the pre-roofing conference. This notice shall include information concerning acceptable staging areas; suitable parking and access points; placement of trash conveyances; sanitary requirements; any and all working hour restrictions (day/night, weekends, holidays); noise restrictions and project complaint procedure between contractor and building owner (occupants).

1.09 DELIVERY, HANDLING AND STORAGE

- A. Deliver all materials and store in their unopened original packaging, bearing the manufacturer's name, related standards and any other specification or reference accepted as standard.
 - 1. When stored outdoors, insulation is to be stacked on pallets or dunnage at least four (4) inches above ground level and covered with "non-sweating" tarpaulins.
- B. Protect and permanently store all materials in a dry, well-vented and weatherproof location. Only materials to be used the same day shall be removed from this location. During winter, store materials in a heated location with a 50° F. minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- C. Carefully store on end materials delivered in rolls with selvage edges up, a minimum of 6-inches above grade. Store metal flashings and counterflashings in such a way as to prevent wrinkling, twisting, scratching and other damage.
- D. Avoid stockpiling of materials on roofs without first obtaining acceptance from an Architect/Engineer.
- E. Adhesive storage must be between the range of above 40° and below 80° F. Area of storage shall be suitable for flammable storage.
- F. All materials determined to be damaged shall be removed from job site and replaced.

1.10 QUALITY ASSURANCE

- A. Submit certification by the manufacturer of the system materials used that these Specifications and the Drawing Details are acceptable to them for the deck and surfacing to which they are to be applied.
 - 1. If details for any manufacturer's systems proposed in the Contract Documents are not acceptable to the manufacturer, submit corresponding details proposed for the particular application, together with the manufacturer's reasons for not accepting the conditions depicted in the Specifications or Drawings. No alternate details will be considered without evidence of valid objections on the part of the manufacturer to the Contract requirements.
 - 2. No deviation is to be made from this Specification without prior written approval by the manufacturer; submit such approval to the Architect.
- B. Inspection: Prior to, during installation and at completion of the installation, an inspection shall be made by a representative of the manufacturer in order to ascertain that the roofing system has been installed according to their published specifications, standards and details.
 - 1. Warranty will be issued upon approval of the installation (See 1.12 of this section).

1.11 WARRANTY

- A. Upon completion of the work, furnish to the Owner the manufacturer's written and signed standard warranty, certifying the performance of his products and the consistency of the properties of such products affecting their performance for a period of (20) years from date of acceptance.
- B. The Contractor is to cover damages to the building resulting from failure to prevent penetration of water during construction.
- C. The Contractor is to guarantee all work against defects in materials and workmanship for a period of 2 years following final acceptance of the Work.

1.12 LABORATORY TESTING

- A. Upon request from the Owner or Architect the elastomeric membrane manufacturers shall supply, at their expense, the results of mechanical and chemical testing performed on the elastomeric asphalt materials supplied.
- B. The tests shall be performed to certify compliance with the standards referenced under this section.

1.13 SITE PROTECTION

- A. During roofing work, exposed surfaces of finished walls shall be protected with tarps in order to prevent damage. Contractor shall assume full responsibility for any damage.

PART 2 PRODUCTS

2.01 GENERAL

- A. Suggested Manufacturers: Soprema, Sarnafil, and Fibertite
- B. Applicators seeking approvals for substitute materials shall submit their request in writing to the Architect seven (7) days prior to bid opening.

2.02 VAPOR RETARDER

- A. SBS-modified bitumen self-adhered vapor retarder, air barrier membrane with release film on the bottom surface and a tri-laminate woven polyethylene film top surface reinforcement
 1. Thickness: 31.5 mils (0.80 mm)
 2. Width: 45 in (1.14 m)
 3. Length: 133 ft (40.8 m)

2.03 SBS BASE MEMBRANE PLY:

- A. Base membrane field ply shall be a SBS-modified bitumen membrane sanded on both top and bottom surfaces with a non-woven polyester reinforcement.
 1. Meets or exceeds ASTM D6164, Type I, Grade S.
 2. Components: Reinforcement shall be 3.68 lbs/sq. non-woven polyester. Elastomeric asphalt shall be a mix of selected bitumen and SBS polymer.
 3. SBS Bitumen Physical Properties:
 - a. Average elongation: 1500%
 - b. Average softening: 265° F
 - c. Average low temperature flexibility: -22° F
 - d. Average penetration (40 (in 1/10 units at 5 sec.))
 - e. Average homogeneity > level 6 (Soprema method utilizing fluorescence microscopy at 250 x magnification)
 4. Membrane Weight and Measurement:
 - a. Approximate Weight Per Square Foot: .81 lbs.
 - b. Approximate Thickness: 118 Mils

2.04 PVC MEMBRANE

- A. Polyester reinforced, thermoplastic polyvinyl chloride membrane with a heavy fleece back underside.
 1. Thickness: 80 mils (2.0 mm)
 2. Width: 10 ft (3.0 m)
 3. Length: 65 ft (20 m)
 4. Physical Properties ASTM D4434.
 - a. Breaking Strength, lbf/in
 - 1) 525 (MD) 400 (XMD)
 - b. Elongation at Break %
 - 1) 25 (MD) 25(XMD)
 5. Color: white

2.05 FASTENERS

- A. Wood: Roofing nails of galvanized steel, long enough to penetrate the wood by at least 3/4-inch on flashings and parapet walls.
- B. Masonry: Nail-in expansion type device with zinc body, plated steel nail, mushroom head, and long enough to embed into the masonry a minimum of 1-inch.
- C. Insulation: Mechanical fasteners for securement of insulation to decking shall be approved by the insulation manufacturer for the system specified and be Factory Mutual approved and be in compliance with Appendix "E" of FM 4470 for corrosion resistance.

1. The same brand fastener is to be used throughout the work.
2. Number of fasteners and layout will be as recommended by the manufacturer and as per FM Approval Guide for (I-60) (I-90) wind uplift.
3. Length of fastener shall be determined by the thickness of the decking and any fill, and will vary with the thickness of the insulation. Fasteners shall be of appropriate length to achieve a minimum of 1-inch penetration.

2.06 WOOD BLOCKING

- A. All nailers and blocking material to be free of wane, shake, decay or checks, and pressure treated with water-borne preservatives for above ground use, AWPB LP-2.
 1. Blocking shall be not less than Construction Grade, Southern Pine.
 2. For conduit supports and miscellaneous light weight items, a sheet of Soprawalk between wood blocking and membrane is acceptable.

2.07 ROOF INSULATION

- A. Rigid insulation shall be Polyisocyanurate-Foam Board Insulation. Insulation may be applied in [one] [two] layers providing an R value of _ is maintained.
 1. Polyisocyanurate
 - a. Density, ASTM D 1622, (nominal 2 pcf)
 - b. Compressive Strength, ASTM D 1621, (min. 18 lbs./inch²)
 - c. Water Vapor Transmission, ASTM E 96, (< 1.0 perm)
 - d. Dimensional Stability, ASTM D 2126, (< 2%, 7 days)
 - e. Thermal Resistance, ASTM C 518/PIMA CP 101 (Report)
 - f. Flame Spread, ASTM E 84, (25)
 - g. Spread of Flame, ASTM E 108 (Class A or B with roof)
 - h. Water Absorption, ASTM C 209 (< 1%)
 - i. Combined aged R-Value of all Polyisocyanurate layers: [-]
- B. Tapered Insulation
 1. The tapered insulation system shall have a minimum thickness of [-] and an average R-value of [-] as shown on details.
 2. The roof shall have a slope of not less than [1/2"] [1/4"] [1/8"]:12 and a minimum thickness of [-] as shown on the drawings.
 3. The tapered boards shall be factory formed units of the specified insulation board.
- C. Coverboard
 1. Shall be high compressive strength, multi-ply, semi-rigid asphaltic roofing substrate underlayment board composed of a mineral fortified asphaltic core formed between two asphaltic saturated fiberglass liners, with the following characteristics:

a. Board Weight	0.9 lb/sq. ft [1/8] inch, 1.7 lb/sq. ft [1/4] inch
b. Board Size	[48 x 48] [48 x 60] [48 x 96] inches
c. Board Thickness	1/8 inch, 1/4 inch
d. Compressive Strength	630 psi [1/8] inch, 440 psi [1/4] inch as determined @ 15% ASTM D 545
e. Board Edges	square

2.08 PRIMER

- A. Asphalt Primer:
 1. Polymer emulsion primer, meeting low VOC requirements for the preparation of membrane substrates to receive adhesive and flashing cement applications and shall be of the type as required by manufacturer
 2. Primer shall be applied on all dissimilar materials except insulation.

2.09 ADHESIVE TO BOND SBS BASE SHEET TO COVERBOARD

- A. Premium, non-toxic, low odor, solvent-free, polymeric membrane adhesive for use with all SBS-modified bitumen sanded base ply and all Cap Sheet membrane applications.
 1. VOC Content: 32 g/L or less VOC Content.

2. Meets or exceeds ASTM D7379

2.10 PVC COATED METAL

- A. Vinyl Coated Metal: 24 gauge galvanized sheet steel with a 20 mil, UV-resistant PVC coated topside.
 1. Vinyl Coated Metal: PVC coated metal.
 - a. Width: 4 ft (1.219 m)
 - b. Length: 10 ft (3.048 m)
 - c. Color: white
- B. Sheet metal flashing materials and fasteners shall be compatible with adjacent materials, to accommodate all project related exposures.

2.11 MISCELLANEOUS

- A. Expansion Joint system: as produced by the membrane manufacturer.
- B. Traffic Topping: walk-pads as approved by membrane manufacturer.
- C. Two-component low-rise, fast-cure, low-VOC insulation adhesive as approved by membrane manufacturer.
- D. PVC accessories as required by manufacturer including bonding adhesives, flashing membranes, cut-edge mastic, etc.

PART 3 EXECUTION

3.01 SURFACE INSPECTION AND PREPARATION

- A. Before commencing work, all surfaces shall be smooth, clean, dry and free of any debris that would adversely affect the installation of the membrane.
 1. See 1.11 of this section.
- B. Before commencing work, the Owner's representative, together with the roofing contractor, shall inspect and approve the deck condition (slopes and nailing supports if applicable) as well as verticals on parapet walls, roof drains, stack vents, vent outlets and others, building joints, etc. If defective conditions exist work shall not begin until corrected or a non-compliance notice shall be submitted to the contractor so that adjustments can be made. Commencement of work shall imply acceptance of surfaces and conditions.
- C. Verify that the work of other trades has been properly completed.
- D. Do not install materials in conditions of inclement weather.

3.02 SURFACE PREPARATION

- A. Verify slope and condition of concrete decking.
 1. Verify that openings, penetrations and projections are sealed
 2. Check for moisture, spalling and other deterioration. Report adverse findings to owner.
 3. Follow manufacturer's general requirements.

3.03 INSTALLATION

- A. Install roofing membrane on clean and dry surfaces, in accordance with the manufacturer's requirements and recommendations.
- B. Perform roofing work on a continuous basis as surface and weather conditions allow.
- C. Protect adjoining surfaces against any damage that could result from roofing installation.
- D. Install only as much roofing as can be completed in one day. If weather conditions do not permit such completion, exposed areas shall be temporarily weatherproofed to prevent any water or snow infiltration from damaging other materials already installed, in particular, the thermal insulation.

3.04 EQUIPMENT

- A. Maintain all equipment and tools in good working order.

- B. Hot-air welding shall include heating the specified membrane ply using electric hot-air welding equipment. The contractor shall determine when and where conditions are appropriate to utilize hot-air welding equipment. When conditions are determined by the contractor to be unsafe to proceed, materials and methods shall be utilized to accommodate requirements and conditions
- C. Refer to NRCA CERTA recommendations, local codes and building owner's requirements for hot work operations.

3.05 ASPHALT PRIMER APPLICATION

- A. Prime all dissimilar surfaces to which asphalt or membrane will come in contact. Apply at the rate of 150 - 200 sq. ft. gallon or per manufacturer's guidelines.

3.06 VAPOR RETARDER INSTALLATION

- A. Unroll vapor barrier and apply by removing self-adhesive backing.
- B. Architect or Engineer should verify the proper location of the vapor barrier by performing any calculations required to determine the Dew point location.

3.07 WOOD BLOCKING

- A. Install nailers, of minimum one inch (1") thickness and minimum three inch (3") width, as detailed in Dade County Application Standard PA 111 and in compliance with the detail drawings. The maximum unsupported overhang for all applications shall not exceed two inches (2").
- B. Nailers shall be firmly anchored to the deck using fastener devices and spacing in compliance with Dade County Application Standard PA 111, that is, anchors shall be spaced to provide a design value of not less than 250 lbf/ft for perimeters and 300 lbf/ft at corners after application of the appropriate margin of safety.
- C. A ½" vent space shall be provided between adjacent lengths of nailers.
- D. Height of nailers shall match the surface level of the recovery insulation boards and the new roof membrane, or a tapered edge shall be installed to bridge the varying heights.
- E. If the compressive strength of the concrete deck is less than 2,500 psi or the concrete thickness is less than 2½", an on-site test shall be carried out to confirm anchor performance.
- F. Attachment of wood blocking to standard masonry block the top two courses shall be filled with ASTM C 270 mortar and allowed to cure for 28 days.
- G. Attachment of wood blocking to nailable decks (lightweight (aggregate, Cellular, Hybrid), gypsum (plank and poured) and cementitious wood fiber) should:
 - 1. Be capable of being clamped to the underside of the deck or attaching to a structural member
 - 2. Or the selected wood blocking anchor can achieve an average withdraw resistance of not less than 450 lbf. with a minimum characteristic value of 390 lbf.

3.08 INSTALLATION OF INSULATION WITH ADHESIVE

- A. Install insulation in accordance with the manufacturer's requirements. The insulation shall provide a smooth, in-plane surface to accept the roof membrane.
- B. Apply only as much insulation to the roof as can be covered the same day with roofing membrane. At the conclusion of each day's work, seal exposed edges of the insulation. Cut and remove seal upon continuation of the work.
- C. The first layer or insulation layer must be placed down on the ribbons of insulation adhesive which have been deposited with the insulation applicator. If a second or subsequent layers of insulation are used the insulation joints must be staggered-a minimum of 6"- in both directions.
 - 1. Spec Note: Board dimensions are limited to a maximum of 4 'x 4'. If the boards are out of plane more than 3/8" then one of the following two methods must be used to correct this defect. One, extra adhesive must be applied to those areas which are significantly out-of-plane (3/8") to a degree which insures long term attachment. Two, a relief cut through the

cross section of the board must be made at the point in the deck or substrate that is sending the board out-of-plane.

- D. Place tapered insulation (crickets, saddles, tapered edge) in accordance with manufacturer's recommendations and according to approved shop drawings. (if applicable)
- E. Taper boards a distance of 18 inches back from roof drains for positive drainage.
 - 1. SPEC NOTE: Additional ribbons of adhesive are required along the perimeter and in the corner areas. An increase of 70% and 160% respectively are required.

3.09 FIELD BASE MEMBRANE PLY INSTALLATION

- A. Unroll dry base ply membrane on insulation for alignment. Each strip shall have three (3) inch side laps and six (6) inch end laps.
 - 1. Begin at low point of roof.
 - 2. Place membrane so edge lap will be centered on drain.
- B. Reroll base ply (halfway) one end at a time in accordance with recommendations of manufacturer onto the coverboard.
- C. Roll the membrane into membrane adhesive applied per manufacturer's instructions.
- D. Application shall provide a smooth surface, free of air pockets, wrinkles, fishmouths or tears.
- E. Run membrane tight up against any vertical surfaces such as curbs, parapets, and vents.
- F. Detail side and end laps per manufacturer's requirements using adhesive and/or hot air welder.

3.10 PVC INSTALLATION

- A. Apply PVC membrane to SBS field base sheet that is clean, dry and without voids or other defects.
- B. Before commencing work each day, the contractor shall prepare all roofing substrates to ensure conditions are satisfactory to proceed with the installation of specified roofing materials. Preparation of substrates includes, but is not limited to, substrate repairs, securement of substrates, eliminating all incompatible materials, and cleaning.
- C. Where conditions are found to be unsatisfactory, work shall not begin until conditions are made satisfactory to begin work. Commencing of work shall indicate contractor's acceptance of conditions.

3.11 HOT-AIR WELDING

- A. The Contractor is responsible for project safety. Hot-air shall be used to seal membrane side and end laps. Refer to NRCA CERTA, local codes and building owner's requirements for hot work operations.
- B. Position the membrane so that it overlaps the adjacent membrane at the required side lap width. Ensure the laps are dry, clean and free of foreign material.
- C. Weld the laps together with an automatic welding machine or hand welder maintaining a minimum 1.5 in continuous weld. All seams shall be inspected for a continuous weld.
- D. At end-laps of bare back membranes, round the corners by cutting a radius on both corners.
- E. Fleece back membrane end laps shall be butted to one another and a 6 in membrane coverstrip welded on top.
- F. T-Joint Patches shall be hot-air welded to the membrane at all t-joint intersections. Chamfer the welding seam prior to installing T-Joint patches using an edging tool or by heating the edge and rolling.
- G. Cut Edge Sealant shall be installed at all non-factory cut edges.

3.12 FULLY ADHERED PVC MEMBRANE APPLICATION

- A. The ambient temperature shall be above 50°F (10°C).
- B. Use solvent resistant rollers with appropriate sized nap as approved by manufacturer for applying PVC bonding adhesive.

- C. Apply adhesive to clean, dry and prepared substrates.
- D. Apply adhesive at the application rate published on the product data sheet and in a manner required by membrane manufacture to ensure complete bonding between fleece back of PVC sheet and the SBS modified base sheet.
- E. Mate the membrane to the substrate avoiding any air entrapment or wrinkles, and apply pressure with a roller or push broom to ensure complete bonding.
- F. At the end of the sheet where it terminates at roof edges, walls and curbs, fasten the perimeter of the membrane with appropriate fasteners and seam plates to the deck or vertical surface at the base of the upstand.
- G. Hot-air weld all side and end laps.

3.13 FLASHINGS

- A. Install PVC flashings using manufacturer's materials and methods. Use pre-formed flashings where possible. Hot-air weld all seams and laps.
- B. Ensure that termination bars, clamps and other mechanical means necessary for proper installation are securely anchored. Use materials and install methods approved by manufacturer.

3.14 WALKWAYS

- A. At areas outlined on the drawings and around the perimeter of all rooftop equipment and at all door and stair landings, install walkways approved by manufacturer.
- B. Layout sheets dry, adjusting spacing to be uniform, cut and trim pieces as required to fit conditions, direction changes and closing.
- C. Align the sheets to be straight and true, using a straight edge or snap lines as required.
- D. Adhere the center of walkway to the membrane. Mate the membrane to the substrate avoiding any air entrapment or wrinkles. Apply pressure with a roller or push broom to ensure complete bonding.
- E. Hot-air weld the entire perimeter of the walkway pad to the membrane.

3.15 SHEET METAL

- A. Refer to sheet metal flashing detail drawings, and follow product data sheets and published general requirements for installation instructions.
- B. Follow the most recent edition of the SMACNA Architectural Sheet Metal Manual for fabrication and installation requirements.
- C. Use PVC coated metal as approved by manufacturer.

3.16 WATER CUT-OFF

- A. At the end of the day's work, and when precipitation is eminent, a water cut-off shall be constructed at all open edges. Construct the cut-off per requirements of the manufacturer. Cut-off must be able to withstand extended periods of wet weather. The water cut-off shall be completely removed prior to resuming the installation of the roofing system.

3.17 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.18 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8- inch thick.

- C. In addition to the plywood listed above, an underlayment of minimum 1/2-inch recover board is required on new roofing.
 - 1. Special permission must be obtained from the Manufacturer before any traffic will be permitted over new roofing.

3.19 FIELD CONTROL

- A. Field inspection will be performed as outlined under 1.10 of this section.

END OF SECTION

SECTION 07 5400 - THERMOPLASTIC MEMBRANE ROOFING – (TYPE 3 ROOF)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Adhered system with thermoplastic roofing membrane.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2012.

1.04 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 ROOFING - UNBALLASTED APPLICATIONS

- A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
 - 1. Minimum 2 layers of cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.
 - 2. Bottom layer of cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, composite, or cellular glass board covered with single layer of cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.
- C. Acceptable Insulation Types - Tapered Application: Any of the types specified.
 - 1. Tapered polyisocyanurate, perlite, or extruded polystyrene board.
 - 2. Tapered polyisocyanurate, perlite, extruded polystyrene, or cellular glass board covered with uniform thickness cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.
 - 3. Uniform thickness cellulose, perlite, composite, polyisocyanurate, extruded polystyrene, molded polystyrene, glass fiber, or cellular glass board covered with tapered polyisocyanurate, extruded polystyrene, or perlite board.

2.02 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane:
 - 1. Material: Polyvinyl chloride complying with ASTM D4434/D4434M.
 - 2. Reinforcing: Internal fabric.
 - 3. Thickness: 0.040 inch (1 mm), minimum.
 - 4. Sheet Width: Factory fabricated into largest sheets possible.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Flexible Flashing Material: Same material as membrane.

END OF SECTION

SECTION 07 5419 - FULLY ADHERED PVC

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE OF WORK

- A. Roofing system shall include a roofing manufacturer's 20 year labor and materials warranty and a roofing installers 5 year workmanship warranty. Roof assembly shall be designed and installed to satisfy 99 miles per hour wind speed. This application shall also require a manufacturer's one and a half inch 1.5" hail impact warranty.
- B. Fully adhered roof and flashing membrane in compliance with these documents and as required by membrane manufacturer to satisfy warranty requirements.
- C. Roof assembly shall satisfy FM uplift requirements and UL Class A Fire ratings.
- D. Sustainable requirements shall include LEED / Green Globe criteria for region of application. Low VOC materials are required for this installation.

1.03 SUMMARY

- A. Section Includes:
 - 1. Vapor/air retarder membrane
 - 2. Roof Insulation
 - 3. Cover board
 - 4. Sheet Metal Flashing
 - 5. Adhered Polyvinyl - Chloride (PVC) Roof Membrane
 - 6. Traffic surfaces
 - 7. Manufacturer's 20 year System Roof Warranty
 - 8. Applicators Five (5) year Workmanship and Performance Warranty
 - 9. 99 miles per hour wind speed coverage
 - 10. One and a half (1.5") inch hail warranty
- B. Related Sections:
 - 1. [Section 061000 "Rough Carpentry"] for wood nailers, curbs, and blocking.
 - 2. Section 061500 "Sheathing" for wood-based, structural-use roof deck panels.
 - 3. Section 070150.19 "Preparation for Re-Roofing" for recover board beneath new membrane roofing.
 - 4. Section 072100 "Thermal Insulation" for insulation beneath the roof deck.
 - 5. Section 07015.19 "Preparation For Re-Roofing"
 - 6. Section 076200 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter flashings.
 - 7. Section 079005 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.04 DEFINITIONS

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

1.05 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication or installation. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

- C. Provide a membrane system that has been tested under IBC for 90 mph, 3 second max wind gust. The complete roof system assembly shall be rated and installed to resist wind loads calculated in accordance with ASCE 7 and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Do not install non-rated systems, except as approved by the Contracting Officer.
 - 1. Fire/Windstorm Classification Class 1A-90.
 - 2. Hail Resistance: SH – Severe Hail.
- D. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. Sustainability Requirements:
 - 1. Energy Performance:
 - 2. Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for slope roof products.
 - 3. Energy Performance: Provide roofing system with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRR-
 - 4. Provide roofing system with a minimum insulation assembly of two layers of 2.6 inch thick coated glass faced poly-isocyanurate.
- F. Energy savings, sustainable, waste and water management, recyclability and nontoxic:
- G. Membrane shall be certified as NSF/ANSI 347 Platinum, verifying environmental expectations that include water, waste, energy savings, recyclability and nontoxic manufacturing management.
- H. Platinum level NSF/ANSI 347.
- I. Membrane shall be Underwriters Laboratories Environmental certified as containing and average of 10% recycled content.
- J. Manufacturer must have the following quality and safety certifications:
- K. ISO 14001
- L. RC 14001

1.06 ACTION SUBMITTALS

- A. Manufacturer's standard published product data sheets for each type and reference indicated:
 - 1. Membrane must:
 - 2. a. Be a balanced sheet with reinforcement centered between the top and bottom of the membrane surfaces.
 - 3. b. Have a minimum weatherproof polymer thickness over top surface of reinforcement:
 - 4. 72 mils shall have a minimum of 35 mils
 - 5. Membrane total thickness shall be guaranteed. No manufacturing variance allowed (ASTM +/- 10% nominal thickness is not accepted on this project).
 - 6. Have been manufactured in facilities and on equipment owned and operated by marketing manufacture for a minimum of fifteen (15) years.
- B. Action submittals shall include sustainability requirements as stated under "1.5 Performance Requirements – E. Sustainability Requirements".
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacing and patterns for fully adhered membrane roofing.
 - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 - 5. Gypsum board adhesion rates for corner, perimeter and field-of-roof locations.
 - 6. Number and orientation of peel stops as required by manufacturer to meet project's wind requirements.
 - 7. Vapor barrier as required to meet project performance criteria.

- D. Samples for Verification: For the following products:
1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
 2. Roof insulation.
 3. Walkway pads or rolls.
 4. Metal termination bars.
 5. Peel Stop.
 6. Six insulation fasteners of each type, length, and finish.
 7. Vapor barrier.

1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and manufacturer:
1. Membrane Manufacturer has a minimum Twenty five (25) years of documented experience in the manufacturing of Polyvinyl Chloride roofing products. Experience criteria requires the marketing manufacturer to have produced membrane within a facility and on equipment owned and operated by the marketing membrane manufacturer. Membranes that have been produced and private labeled for marketing manufacturer do not satisfy this requirement.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
1. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.
 2. Field quality and control reports as follows:
 - a. Copy of project Notice of Award (Pre-installation Notice) and Acceptance of N.O.A.
 - b. Copies of Technical Representative's site visit reports.
- C. Warranties: Sample of specified warranties.

1.08 CLOSEOUT SUBMITTALS

- A. Installation and Maintenance Data: Include the following submittals in Manufacturer's Roof Plan Binder:
1. Copy of Bid Document (Specification)
 2. Installation History (Notice of Award / Accepted Notice of Award)
 3. Warranties (Installer and Manufacturer)
 4. Maintenance forms and requirements.

1.09 QUALITY ASSURANCE

- A. Manufacturer: A qualified manufacturer that specializing in manufacturing the products specified in this section with a minimum of 25 years of documented experience. Provide evidence that identical systems have been satisfactorily used on a minimum of three (3) projects of similar size, scope and type. In addition, the roofing manufacturer shall participate in the following:
1. Attend the following:
 - a. Preliminary Roofing Conference to review existing and future installation conditions.
 - b. Pre-Roofing Conference on site.
 - c. One in-progress meeting to verify compliance with Owner and Manufacturer's specified requirements. Additional site visits may be specified or required. These visits should be identified in this bid document or discussed and agreed upon during the pre-construction meeting.
 - d. Final inspection meeting to review complete installation. If a return inspection is required, technician compensation for time and travel shall be paid by the party responsible for the return visit.
- B. Installer:
1. A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

2. Project Foreman or Superintendent shall have supervised a minimum of three (3) projects of similar size and scope as this project within the previous five (5) years.
 3. Installer shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the roofing system requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the part of the workers.
- C. Roof Assembly
1. Source Limitations: Obtain all components for membrane roofing system from same manufacturer as stated on the manufacturer's warranty.
 2. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Pre-installation Roofing Conference: Conduct conference at Project site.
- E. Meet with Owner, Architect, Owner's insurer (if applicable), testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
1. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 4. Review structural loading limitations of roof deck during and after roofing.
 5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 6. Review governing regulations and requirements for insurance and certificates, if applicable.
 7. Review temporary protection requirements for roofing system during and after installation.
 8. Review roof observation and repair procedures after roofing installation.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Insulation and cover board materials shall be elevated on pallets and fully protected from moisture with tarpaulins. Manufacturer's shipping packaging is not considered adequate protection from moisture. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
- E. Materials, having been determined by the owner/owner's representative and roofing manufacturer to be damaged, shall be immediately removed from the construction site and replaced at no cost to the owner.

- F. Recycle clean membrane scraps, when possible. Document quantity and/or weight of recycled membrane.

1.11 PROJECT CONDITIONS

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

1.12 WARRANTY

- A. Manufacturer's System Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
- B. Special warranty includes cost of both material and labor to repair or replace all roofing manufacturer supplied components of membrane roofing system.
- C. Warranty Period: Thirty (20) years from date of Substantial Completion.
- D. Warranty shall include One and a half (1.5") inch hail coverage (20 years Max).
- E. Warranty shall have no exclusions for ponding water.
- F. Warranty shall include wind speed coverage up to 99 mph.
- G. Applicator's Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section (or as required by Owner), signed by Installer, covering the Work of this Section, including all components of membrane roofing for the following warranty period:
 - 1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PVC MEMBRANE ROOFING

- A. ADHERED PVC Sheet: ASTM D 4434, Type II, Grade I, glass fiber reinforced.
 - 1. Products <<http://www.specagent.com/LookUp/?ulid=5095&mf=04&src=wd>>: Provide the following:
 - a. Membrane shall be a balanced sheet with reinforcement centered between top and bottom surfaces. ASTM nominal thickness testing is not allowed. Minimum manufacturing thickness variances shall comply with the following:
 - b. Thickness over fiber reinforcement:
 - c. .72 mil membrane shall have .35 mils over reinforcement.
 - d. G459 Asphalt resistant membrane shall be used in all locations where non-compatible contact with membrane is expected.
 - 2. Membrane Color: White
- B. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
 - 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Single-Ply Roof Membrane Adhesives: 250 g/L.
 - f. Other Adhesives: 250 g/L.
 - g. PVC Welding Compounds: 510 g/L.
 - h. Adhesive Primer for Plastic: 650 g/L.
 - i. Single-Ply Roof Membrane Sealants: 450 g/L.
 - j. Non-membrane Roof Sealants: 300 g/L.

- k. Sealant Primers for Nonporous Substrates: 250 g/L.
 - l. Sealant Primers for Porous Substrates: 775 g/L.
- 3. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, and color as PVC sheet membrane except as directed by Membrane Manufacturer such as in conditions listed below:
 - 1. When a different color is specified by Owners representative.
 - 2. G459 is used when asphalt or asphalt residue will come in direct contact with underside of membrane. If used in an inverted installation as a protection/sacrificial layer over roofing membrane to protect it from non-compatible materials.
- D. Coated Metal Flashing: Manufacturer's standard coated sheet metal formed to satisfy drawings and environmental conditions. 20 mils of PVC membrane laminated to 25 gauge galvanized sheet metal. Fabricated to satisfy project conditions.
 - 1. Color shall be: Energy Smart White.
 - 2. Membrane joint cover strip: Color shall match selected coated metal flashing. Thickness 60 mil.
 - 3. Aluminum Tape: Bond breaker at each coated metal joint prior to welding membrane cover strips.
 - 4. Multipurpose tape: Seals hold down cleat to substrate as an air/moisture barrier.
 - 5. Hold down cleat: 18 - 24 gauge galvanized sheet metal as directed by technical department to satisfy specified wind-speeds.
 - 6. Fasteners: As directed by technical department to satisfy specified wind-speeds.
- E. Bonding Adhesive: Manufacturer's standard water/latex based product if permissible during proposed insulation schedule, or manufacturer's solvent based adhesive.
- F. Metal Reglet Termination: Manufacturer's standard, predrilled extruded aluminum bars with interior gripping ridges, sealant track, Inside/Outside corners with anchors and sealant.
- G. Terminations:
 - 1. Aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide, pre-punched.
 - 2. Extruded PVC cord used in conjunction with secured membrane behind anchored bars. Hot air application.
 - 3. Coverstrip: Precut membrane cover strips used to cover and seal termination bars.
- H. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.02 VAPOR/AIR RETARDER

- A. Self-Adhered Rubberized Asphalt with a woven Polyethylene film surface: ASTM E 1745, 31 mils thick, minimum, with maximum rating of 0.017 Perms. coated with rubberized asphalt membrane.
 - 1. Can be used as a Temporary roof and left in place up to 90 days.
 - 2. Primer should be used to enhance adhesive bond with substrates such as concrete and wood. Primer is not typically used for contact with steel decking. Consult technical department regarding application.
 - 3. Butt and end joint support. A 24 gauge galvanized strip of sheet metal shall be fastened in locations over fluted steel decking to support vapor/air barrier overlaps from sagging.

4. Sealant: Sika 1a sealant to be used to seal cut and termination edges to be exposed during a long time period.

2.03 ROOF INSULATION

- A. General: Preformed roof insulation boards provided by PVC membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 2, Grade 2 with a coated fiberglass facer on both top and bottom surfaces.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.04 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Bead-Applied Adhesive: Roofing manufacturers recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof cover board to insulation.
- D. Cover Board:
 1. ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 5/8 inch thick, factory primed. Subject to compliance with requirements, provide the following:
 - a. Georgia-Pacific Corporation
<<http://www.specagent.com/LookUp/?uid=123456822602&mf=04&src=wd>>; Dens Deck Prime.
- E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

2.05 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, surface-textured walkway rolls, provided by the membrane roofing system manufacturer.
 1. Continuous roof protection. Adhesively applied with perimeter hot air weld to the roof surface.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
- B. Notify the Owner of any and all conditions detrimental to the proper and timely execution of this roofing. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. All construction debris shall be removed from the construction site and legally disposed of off-site.

3.03 VAPOR/AIR-RETARDER/ TEMPORARY ROOF INSTALLATION

- A. Composite Vapor/Air-retarder: Install composite vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively. Bond vapor retarder to substrate as follows:
 - 1. Mechanically fasten a six inch wide strip of 24 gauge (min) over open steel deck flutes and open areas to support overlapping side and end laps.
 - 2. Apply primer to substrate and allow primer to cure prior to application of composite vapor retarder (if required).
 - 3. Remove film backing and set into primed substrate ensuring a secure bond.
 - 4. Roll vapor retarder with weighted roller to ensure adhesion. Hand roller over laps to ensure air/watertight seal.
 - 5. Installations where the vapor retarder will remain exposed for long periods of time or when the composite retarder is intended as a temporary roof, seal all cut edges and terminations with sealant.
- B. Seal all obstructions, and penetrations to prevent air movement into membrane roofing system.

3.04 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten insulation according to requirements by Roofing Manufacturer to satisfy project requirements.
 - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- H. Adhered Cover Boards: Install cover boards over insulation with joints in continuous straight lines with end joints staggered between rows. Off-set joints of cover boards a minimum of six (6) inches from underlying insulation joints.
 - 1. Apply low rise foam adhesive to exposed surface of installed roof insulation. Consistency and spacing shall be as directed by membrane manufacturer. Allow adhesive to cure as directed by membrane manufacturer then set cover boards in place as required providing offset joints and pattern as required.

2. Do not allow gaps between cover board junctions.

3.05 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. When possible, start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer.
- D. Bonding Adhesive: Apply to substrate and/or underside of membrane roofing at rate and method required by manufacturer. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity.
 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- I. Hurricane/High Wind Peel Stop Bars: Position bars a minimum of four (4) feet inside of the perimeter of the roof edge. Bars can be set in a chevron pattern if required for drainage. Secure bars to substrate. Fasten spacing shall be directed by local manufacturers technical representative. Space bar ends to allow for thermal movement and roof drainage. Install PVC bumper cord where and if directed by technical. Hot air weld coverstrip over bars.

3.06 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions. Ensure that membrane does not come in contact with non-compatible surfaces.
- B. Apply bonding adhesive as directed by Roofing Manufacturer. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners as directed by Roofing Manufacturer.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.07 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated on plans or as directed by Owner.

3.08 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation upon completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.09 PROTECTING AND CLEANING

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

3.10 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: <Insert name of Owner>.
 - 2. Address: <Insert address>.
 - 3. Building Name/Type: <Insert information>.
 - 4. Address: <Insert address>.
 - 5. Area of Work: <Insert information>.
 - 6. Acceptance Date: <Insert date>.
 - 7. Warranty Period: <Insert time>.
 - 8. Expiration Date: <Insert date>.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. Lightning;
 - b. Peak gust wind speed exceeding <Insert wind speed> mph;
 - c. Fire;
 - d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. Vapor condensation on bottom of roofing; and
 - g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 - 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 - 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

END OF SECTION

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.
- C. Reglets and accessories.
- D. Sheet metal splash pans.

1.02 RELATED REQUIREMENTS

- A. Section 07 7100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- B. Section 07 7200 - Roof Accessories: Manufactured metal roof curbs.
- C. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.
- D. Flashing sleeves and collars for mechanical items protruding through roofing membrane.
- E. Flashing sleeves and collars for electrical items protruding through roofing membrane.

1.03 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- B. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- E. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2014.
- F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples 4' feet long to the correct field sample size illustrating metal finish color.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 10 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Aluminum: ASTM B209 (ASTM B209M); .050" inch thick; mill finish.
- B. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); .050" inch thick; plain finish shop pre-coated with modified silicone coating.
 - 1. Kynar Coating: Pigmented Organic Coating System
 - 2. Color: As selected by Architect from manufacturer's standard colors.
- C. Lead Sheet: ASTM B749, 3/64 (0.047) inch (1.19 mm) minimum thickness; UNS Number L51121.
- D. Stainless Steel: ASTM A666, Type 304, soft temper, .018" inch thick; smooth No. 4 finish.

2.02 ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Protective Backing Paint: Zinc molybdate alkyd.
- C. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- D. Solder: ASTM B32; Sn50 (50/50) type.

2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of matching type sheet metal, minimum one (1) gauge greater than the specified finish material inches, interlocking with fabricated metal.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 5/8" min. inch, miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

2.04 GUTTER AND DOWNSPOUT FABRICATION

- A. Gutters: SMACNA (ASMM), Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- D. Splash Pans: Same metal type as downspouts for inverted pan placement.
- E. Seal metal joints.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION

- A. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.

- B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- C. Apply approved sealant compound between metal flashings and membrane flashings.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Seal metal joints watertight.
- F. Solder metal joints for full metal surface contact for stainless miters. After soldering, wash metal clean with neutralizing solution and rinse with water.
- G. Secure gutters and downspouts in place using concealed fasteners.
- H. Set splash pans under downspouts. Set in place with membrane straps or approved sealant.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 SCHEDULE

- A. Gutters and Downspouts:
- B. Scuppers:
- C. Coping, Cap, Parapet, Sill and Ledge Flashings:
- D. Sheet Metal Roof Expansion Joint Covers, and Roof-to-Wall Joint Covers:
- E. Counterflashings at Roofing Terminations into cut reglet (over roofing base flashings):
- F. Counterflashings at Curb-Mounted Roof Items, including skylights and roof hatches:
- G. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports:

END OF SECTION

SECTION 07 9005 - JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.

1.02 REFERENCE STANDARDS

- A. ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle).
- B. ASTM C 920 - Specification for Elastomeric Joint Sealants.
- C. ASTM C 1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants.
- D. ASTM C 1184 - Standard Specification for Structural Silicone Sealants.
- E. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
- F. ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants.
- G. ASTM C 1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- H. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness.
- I. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.

1.03 ADMINISTRATIVE REQUIREMENTS

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

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
- D. Warranty Period for Silicone Sealants: [20] years date of Substantial Completion.
- E. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Provide joint sealant products manufactured by Dow Corning Corp., Midland MI; (877) SEALANT, (877) 732-5268; email: construction@dowcorning.com; website:

www.dowcorning.com/construction, [or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements].

2.02 SEALANTS

- A. Joint Sealant Standard: Comply with ASTM C 920 and other specified requirements for each liquid-applied joint sealant.
 - 1. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior joints for which no other sealant is indicated.
 - 2. Polyurethane Products:
- A. Single-Component, Nonsag, Neutral-Curing Silicone: ASTM C 920, Type S, Grade NS, Class 50, for Use NT; SWRI validation.
 - 1. Basis of Design Product: **DOW CORNING® 795 Silicone Building Sealant.**
 - 2. Hardness, ASTM D 2240: 35 - 45 durometer Shore A, minimum.
 - 3. Volatile Organic Compound (VOC) Content: 32 g/L maximum.
 - 4. Staining, ASTM C 1248: None on concrete, marble, granite, limestone, and brick.
 - 5. Color: [As selected by Architect from manufacturer's full line of not less than 10] [Match Architect's custom color].
- B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
- C. Type ____ - Nonsag Tamper-Resistant Sealant: ASTM C920, Grade NS, Class 12-1/2, Uses M, G, and A; single or multi- component.
 - 1. Type: Polyurethane.
 - 2. Products:
 - a. Pecora Corporation; DynaFlex Flexible Polyurethane Security Sealant: www.pecora.com.

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
 - B. Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
 - C. Joint Backing: Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
6. Install bond breaker tape over substrates when sealant backings are not used.
- D. Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths between 1/4 and 1/2 inch (6.4 and 12.7 mm) unless otherwise recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 - a. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 - b. Using tooling agents approved by sealant manufacturer for application.
 - E. Joint Sealant Rehabilitation: Apply thin capping bead of silicone sealant not less than 0.125 inch (3 mm) thick over existing cured and prepared sealant. Dry tool sealant with appropriate spatula in single smooth stroke to provide smooth, uniform sealant finish.

3.04 CLEANING

- A. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 - a. Remove masking tape immediately after tooling joint without disturbing seal.
 - b. Remove excess sealant from nonporous surfaces while still uncured.

3.05 PROTECTION

- A. Protect sealants until cured.

END OF SECTION

