SECTION 07 41 13

METAL ROOF PANELS

PART 1 – GENERAL

1.01 DESCRIPTION:

A. Work described in this section includes factory finished complete Class A preformed metal roofing system including clips, perimeter and penetration flashing, ridge cap, edge stiffeners, closures, ridge cap, drip stiffener and gutters. (including gutter expansion joints).

1.02 SUBMITTALS: Comply with requirements of Submittal Section 01 33 00.

A. Shop Drawings: Show roofing system with flashings and accessories in plan and elevation; sections and details. Include metal thickness' and finishes, panel lengths, joining details, anchorage details, flashings and special fabrication provisions for termination and penetrations. Indicate relationships with adjacent and interfacing work. Shop drawings must be completed by the metal panel manufacturer's engineering department. Any and/or all changes recommended by the successful bidder must be approved by the manufacturer in writing prior to submittal.

B. Product Data: Include manufacturer's detailed material and system description, sealant and closure installation instructions, engineering performance data and finish specifications.

C. Design Test Reports:
1. Indicate fastener types of spacings; and provide fastener pullout values.
2. Submit copy of manufacturer's minimum design load calculations according to ASCE-7-10.
3. Submit copy of certification from manufacturer stating that specified system has been tested in accordance with ASTM-1592 requirements by an independent Engineering Firm. All test results must be submitted including Air (ASTM E 283) Infiltration Tests. These test results must meet or exceed those listed in Section 1.8 (Design and Performance Criteria) and be stamped by an independent Engineering Firm.

1.03 INSTALLER QUALIFICATIONS:

A. Installer:
1. Engage an experienced metal roofing contractor (erector) to install standing seam system who has a minimum of three (3) years experience specializing in the installation of structural standing seam metal roof systems.
2. Contractor must be certified by manufacturer specified a supplier of structural standing seam system and obtain written certification from manufacturer that installer is approved for installation of specified system. If requested, contractor must supply owner with a copy of this certification.

3. Successful contractor is required to maintain a full-time supervisor/foreman who is on the job-site at all times during installation of new roof system. Foreman

must have a minimum of five (5) years' experience with the installation of system similar to that specified.

1.04 MANUFACTURER QUALIFICATIONS:

A. The materials outlined in the Material and Method Specifications are based on the performance characteristics of the Rmer Span system by the Garland Company. Bidder will not be allowed to supply panels formed at the job-site on portable rollformers; metal panels must be pre-manufactured and engineered for this project. Bidder will not be allowed to change materials after the bid opening date. If the bidder wishes to propose an alternate manufacturer and/or material than that specified, the following manufacturer criteria must be submitted and approved in writing by the Architect and or Customer 10 days prior to bid due date. Failure to comply with this requirement is grounds for disqualification of Bid.

1. Submit certified test reports from a testing laboratory that bear the stamp of a registered California P.E. to show compliance with specified performance criteria. Test reports must meet the specified negative uplift pressures as listed per this specification for the gauge, panel width and clip spacing specified as confirmed by manufacturers ASTM-E-1592 test results.
2. Tests shall have been made identical systems within the ranges of specified performance criteria.
3. Empirical calculations for roof performance shall only be acceptable for positive loads.
4. Indicate fastener types and spacings and provide fastener pullout values.
5. Submit copy of manufacturer's Factory Mutual Certification for specified system.
6. Submit copy of certification from manufacturer stating that specified system has been tested in accordance with ASTM-1592 requirements by an independent Engineering Firm. All test results must be submitted including Air (ASTM E 283) Infiltration and meet or exceed those listed in Section 1.8 (Design and Performance Criteria).
7. A list of a minimum of five (5) jobs where the proposed alternate material was used under similar conditions. The reference list shall include date of project, size of project, address and contact telephone number.
8. A financial statement demonstrating a current ratio of 2:1 (current assets to current liabilities).
9. A written statement from the manufacturer stating that they will provide the building owner with a daily site inspection for a minimum of one (1) hour by an experienced, full time employee of the company.
10. A written statement from a corporate officer of the manufacturing company stating that he or she has reviewed the specifications and confirms that the proposed system meets or exceeds all performance requirements listed as well as meets the panel size, gauge, weight, clip design, sealant design, uplift pressures and height of the vertical seam.
11. A copy of manufacturer's 30 year NDL standing seam/modified built up warranty.

B. The following samples must be submitted by alternate manufacturers:
1. Submit sample of panel section, at least 6" x 6" showing seam profile and also a sampler of color selected.
2. Submit sample of panel clip.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Manufacturer's responsibility:
1. Protect components during fabrication and packing from mechanical abuse, stains, discoloration, and corrosion.

2. Provide protective interleaving between contact areas of exposed surfaces to prevent abrasion during shipment, storage, and handling.

B. Installer's responsibility:
1. Store materials off ground providing for drainage; under cover providing for air circulation; and protected from wind movement, foreign material contamination, mechanical damage, cement, lime or other corrosive substances.
2. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from the site.

1.06 JOB CONDITIONS:

A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for preformed metal roofing system.

B. Protection:
1. Provide protection or avoid traffic on completed roof surfaces.
2. Support no roof-mounted equipment directly on roofing system.

C. Ascertain that work of other trades which penetrates the roof or is to be made watertight by the roof is in place and approved prior to installation of roofing.

1.07 QUALITY CRITERIA:

A. Applicable standards:
1. American Iron and Steel Institute (AISI):
S100-07 Specification for the Design of Cold-Formed Steel Structural Members.
2. American Society for Testing and Materials (ASTM):
A792-03 Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
A653-04 Specification for Steel Sheet Zinc-coated (galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip process.
E283-93 Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
E1592-01 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual, Latest Edition.
4 Underwriters' Laboratories (UL):
Standard UL – 580 Tests for Wind-Uplift Resistance of Roof Assemblies.
Standard UL – 790 Class A Fire Rated Materials.

B. Applicable erection tolerances: Maximum variation from true planes or lines: ¼" in 20'-0"; 3/8" in 40'-0" or more.

1.08 DESIGN AND PERFORMANCE CRITERIA:

A. Thermal Movement:
1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
2. Interface between panel and clip shall provide for **unlimited** thermal movement in each direction along the longitudinal direction.

B. Uniform wind load capacity:

1. Capacity shall be determined using pleated airbag method in accordance with ASTM E 1592, testing of sheet metal roof panels as follows:
(7.1) Roof test specimens shall be either full length or representative of the main body of the roof, free from edge restraint or perimeter attachments, continuous over one or more supports, and containing at least five panel modules for standing seam roof.
(7.1.2) No attachments shall be permitted at sides or end perimeter other than those that occur uniformly throughout roof. Side and end seals shall be flexible and in no way restrain crosswise distortion of panels.
(7.2.1) Panels and accessories shall be production materials of same type and thickness proposed for use on project.
2. Installed roof system shall carry positive uniform design loads with a maximum system deflection of L/180 as measured at the rib (web) of the panel.

C. Underwriters' Laboratories, Inc., (UL) fire resistance P ratings for roof assemblies. Underwriters' Laboratories, Inc., (UL) Class A fire rated materials per UL 790.

D. ASTM E283: **Static pressure air infiltration:**

Pressure	**Leakage Rate**
1.57 PSF	0.0007 cfm/sq.ft.
6.24 PSF	0.0002 cfm/sq.ft.
20.0 PSF	0.0036 cfm/sq.ft.

E. Water penetration (dynamic pressure): No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of ASMA 501.1.

F. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range are not acceptable.

G. Cool Roof Features:
- Aged Solar Reflectance = 0.20 or higher
- Thermal Emittance = 0.75 or higher

Verify that colors selected meet this minimum criteria.

1.09 WARRANTIES:

A. Owner shall receive ONE (1) WARRANTY from manufacturer of roof panels covering ALL of the following criteria. Multiple warranties are NOT acceptable:

1. Manufacturer's 30 year NDL watertight warranty.
Manufacturer's warranty shall be a total systems warranty including all standing seam roofing, modified bitumen roofing, Elastomeric roof and wall coating and edge metal. The same company shall manufacture all roofing products for all new roof systems. This composite warranty shall provide the City with a single source of liability by guaranteeing all waterproofing systems against leaks for a period of 30 years.
2. Installer shall provide manufacturer with 5 year warranty covering roofing system installation and watertightness.

1.10 PRE-INSTALLATION CONFERENCE:

A. Conduct pre-installation meeting at project site before each construction activity that required coordination with installation of preformed metal roofing system.

B. Other trades involved in or affected by installation of metal roof system shall attend.

C. Advise Architect/Owner of scheduled meeting dates minimum of seven (7) days in advance.

D. Review progress of other construction activities and preparations for particular activity under construction at each pre-installation conference.

E. Record significant discussions and agreements/disagreements of each conference, along with approved schedule. Distribute record of meeting to everyone concerned, promptly, including Owner and Architect.

F. Do not proceed if conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene conference at earliest feasible date.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Metal Roofing System:
1. Whenever a particular make of material, trade name and/or manufacturer's name is specified herein, it shall be regarded as being indicative of the minimum standard of quality required. A bidder who proposes to quote on the basis of an alternate material and/or system will only be considered if the proposed alternate is submitted on time and is documented as being equivalent or superior in quality to the specified system as described in these specifications. Additionally, all manufacturer and contractor/fabricator guidelines must be met as specified.

B. Panel Material:
1. Panel material: 24 ga., Galvalume steel, type AZ-55, grade 50 B, smooth as per ASTM A792-96.

2. Flashing, gutters, and flat stock material: Fabricate in profiles indicated on drawings of same material, thickness, and finish as roof system, unless indicated otherwise.

C. Finish on surfaces:
1. Exposed surfaces on Galvalume: Metal roofing, gutters, ridge caps, drip stiffener, and flashing components shall receive factory applied Kynar 500 paint finish. Color shall be as selected by Architect from Manufacturer's standard or designer colors available.
2. Coating system shall provide nominal 1.0 mil dry film thickness, consisting of primer and color coat.
3. Color shall be as selected by Architect or Owner from manufacturer's stock colors available and shall match preformed metal roofing color Section 07430.

D. Characteristics:
1. Configuration: Standing seams incorporating mechanically interlocked, concealed anchor clips allowing unlimited thermal movement, and of configuration which will prevent entrance or passage of water.
   a. Panel/Cap configuration must have a total of four (4) layers of steel surrounding anchor clip for prevention of water infiltration and increased system strength designed to limit potential for panel blow-off.
   b. Profile of panel shall have mesa's every ½" o.c. continuous throughout panel which are a minimum of 1.5" wide. These will absorb thermal stresses, reduce oil canning in panel and increase load carrying capacity.
   c. Exposed fasteners, screws and/or roof mastic is unacceptable and will be rejected. System configuration only allows for exposed fasteners at panel overlap (if required) and trim details (as per manufacturer's guidelines).
   d. Panels must be furnished in continuous lengths from ridge to eave with no overlaps unless approved by manufacturer to length of run.
2. Seam must be 2-3/8" minimum height for added upward pressures and aesthetic appeal. Seam shall have continuous anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes. Integral (not mechanically sealed) seams are not acceptable.
3. Concealed Anchor Clips: Clips must be 16 gauge, 40,000 p.s.i. (G-90 galvanized steel) ONE (1) piece clip with projecting legs for additional panel alignment and provision for unlimited thermal movement in each direction along the longitudinal dimension.
   a. Two-piece (2) clips are NOT acceptable.
   b. Clip design must isolate sealant in panel cap from clip to insure that no sealant damage occurs from the clip during expansion and contraction.
   c. Clip must maintain a clearance of a minimum of 3/8" between panel and substrate for proper ventilation to help prevent condensation on underside of panel and eliminate the contact of panel fastener head to panel.
4. Seam cap: Snap-on cap shall be a minimum of 1" wide "T" shaped of continuous length up to 45 feet accordingly to job condition and field seamed by means of manufacturer's standard seaming machine.
   a. Cap shall be designed to receive continuous double bead of hot applied, foamed in place gasketing sealant which will not come in contact with the

anchor clip to allow unlimited thermal movement of panel without damage to cap sealant.

b. Sealant shall be non-fatigue, nitrogen injected water barrier.

5. Standing Seam Panel Width: 18”
6. Replaceability: Panels shall be of a symmetrical design with snap on cap configuration such that individual panels may be removable for replacement without removing adjacent panels.
7. Panel ends shall be panned at ridge, headwall, and hip conditions where applicable.

E. Accessories:
1. Gable anchor clips: Standing Seam styles galvanized minimum thickness 16 gauge.
2. Fasteners:
a. Concealed fasteners: Corrosion resistant steel screws designed to meet structural loading requirements. The normal minimum screw size shall be #12.
3. Closures: Factory pre-cut closed cell foam meeting ASTM D3575-93 a cross-linked closed cell polyolefin foam, enclosed in metal channel matching panels when used at hip and ridge.
4. Panel joint (endlap) sealant: Non-curing modified isobutylene tri-polymer tape of thickness to fully adhere to both surfaces being joined with indicated service life of 30 years.

2.02 ACCESSORY PRODUCTS:

A. Sealant:
1. Acceptable product:
a. Concealed Application: PT1-707 or Bostik Chem-Calk butyl sealant.
b. Exposed Application: The Garland Company, Tuff Stuff or Equal

B. Underlayment:
A. The Garland Company, Rmer Seal or Equal

2.03 FABRICATION:

A. Shop fabricate metal roofing, gutter, and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight, and uniform bends and rises. Hem exposed edges of flashings.

B. Form flashing components and gutters from full single width sheet in minimum 10’-0” sections. Provide mitered corners, joined using closed end pop rivets and joint sealant.

C. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.

PART 3 – EXECUTION

3.01 PREPARATION:

A. Inspection: Examine the alignment and placement of the building structure and substrate. Correct any objectionable warp, waves or buckles in the substrate before proceeding with

installation of the preformed metal roofing. The installed roof panels will follow the contour of the structure and may appear irregular if not corrected.

B. Establish straight side and crosswise benchmarks.

C. Use proper size and length fastener for strength requirements. Approximately 5/16" is allowable for maximum fastener head size beneath the panel.

D. Pre-roofing conference: Prior to beginning metal roofing work, a pre-roofing conference shall be held to review work to be accomplished.

1. Contractor, metal roofing subcontractor, metal roofing system manufacturer's representative and all other subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.

3.02 ROOFING AND FLASHING INSTALLATION:

A. All details will be shown on manufacturer's shop drawings to successful bidder; install roofing and flashings in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.

B. Install a high temperature peel and stick underlayment over the entire wood deck surface.

C. Install 3" x 5" (16 gauge) pre-punched bearing plates with the 16 gauge one piece panel clips as necessary to provide even panel seam height. Bearing plates shall possess two pre-slotted holes and be fastened into the deck. Clip spacing is at end of section.

D. Installation of Roof Panels: Roof panels can be installed by starting from either end and working towards the opposite end. Due to the symmetrical design of the specified panel system, it is also acceptable to start from the middle of the roof and work toward each end.

1. A stainless steel pop rivet shall be secured through the anchor reveal of the panel leg and extend into the arms of the panel clip located at the ridge of the system. This is done at each arm of the clip along the ridge. The panel is then anchored at both sides of the clip.
   a. Be sure to capture all drilling debris during this operation with a rag or cloth placed on the panels at the drilling operation.
2. The seam caps are shipped with two rolls of factory applied hot melt sealant located inside the caps. To install the caps, hook one side of the cap over the panel edge and rotate over the opposite panel leg. For ease of installation, start at one end of the panel and work toward the opposite end.
3. A hand crimping tool is used to crimp the cap around the top of two adjacent panels.
4. Caps shall then be permanently seamed with manufacturers mechanical seamer.

E. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.

F. Limit exposed fasteners to extent indicated on shop drawings.

G. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.

H. Seal laps and joints in accordance with roofing system manufacturer's product data.

I. Coordinate flashing and sheet metal work to provide weathertight conditions at roof terminations. Fabricate and install in accordance with standards of SMACNA Manual.

J. Provide temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.

K. Installed system shall be true to line and plane and free of dents, and physical defects with a minimum of oil canning.

L. Form joints in linear sheet metal to allow for ¼" minimum expansion at 20'-0" o.c. maximum and 8'-0" from corners.

M. At joints in linear sheet metal items, set sheet metal items in two ¼" beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.

N. Remove damaged work and replace with new, undamaged components.

O. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.

P. Install expansion joints on all gutters exceeding 50'-0" long or a minimum of 1 per 12 units. SMACNA Figure 1-7- Butt Type gutter expansion joint.

3.03 CLEANING:

A. Clean exposed surfaces of work promptly after completion of installation. To prevent rust staining on finished surfaces, immediately remove filings produced by drilling or cutting.

C. Clean roofs in accordance with manufacturer's recommendations.

D. Clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at Date of Substantial Completion for Project. Touch up minor abrasions and scratches in finish.

E. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.

F. Remove all scrap and construction debris from the site.

3.04 FINAL INSPECTION:

A. Final inspection will be performed by a firm appointed and paid for by the owner in accordance with general requirements.

3.05 OWNER SUPPLIED MATERIALS

A. Contractor must include in their base bid any additional materials to complete the roofing project. Contractor must provide all labor to install owner supplied materials as part of their bid. All materials not specifically including in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07 41 13. Freight charges of Owner supplied materials will be the responsibility of the Owner. Contractor must take delivery of materials, properly cover and store at jobsite or their shop. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07 41 13. The owner will supply the following materials and quantities.

Base Bid:

R-Mer Span, 18", 24g panels: 3,700 square feet
Flat Stock-24g-Standard Color-24 Sheets
Rmer Seal-2sq Roll-20 Rolls

END OF SECTION

SECTION 07 53 60

MODIFIED BITUMEN ROOFING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Remove all roofing to the structural deck.

B. Provide all labor, equipment, and non owner supplied materials to install modified bitumen roof system over the properly prepared substrate.

1.2 RELATED SECTIONS

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

B. Coordinate with related work specified elsewhere:

1. Division 6 Section "Rough Carpentry" for wood blocking and nails.
2. Division 7 Section "Flashing and Sheet Metal."
3. Division 7 Section “Metal Roof Panels”

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. D41, Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
2. D312, Specification for Asphalt Used in Roofing
3. D451, Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products
4. D1079, Terminology Relating to Roofing, Waterproofing, and Bituminous Materials
5. D1227, Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
6. D1863, Specification for Mineral Aggregate Used on Built-Up Roofs
7. D2178, Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
8. D2822, Specification for Asphalt Roof Cement
9. D2824, Specification for Aluminum-Pigmented Asphalt Roof Coating
10. D3019, Specification for Lap Cement Used with Asphalt Roll Roofing
11. D4601, Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing
12. D5147, 1991 Test Method for Sampling and Testing Modified Bituminous Sheet Materials
13. E108, Test Methods for Fire Test of Roof Coverings

B. ASCE-7 10 Wind uplifts requirements for geographical area.

C. Federal Specifications (FS)
1. TT-S-00230C

D. National Roofing Contractors Association (NRCA)
1. Roofing and Waterproofing Manual

E. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
   1. Architectural Sheet Metal Manual

F. Underwriters' Laboratories (UL)
   1. Fire Hazard Classifications
   2. Class 90-wind uplift.

G. California Building Code (CBC)

1.4 SUBMITTALS

A. Provide the following to the Owner prior to award of roofing work.
   1. Written certification from the roofing system manufacturer corporate officer certifying that the applicator is currently approved for installation of the specified roofing system.
   2. Descriptive product data including MSD sheets.
   3. Certification of Class A roof system.
   4. Sample copy of contractor's workmanship warranty.
   5. Sample copy of specified Manufacturer's warranty.
   6. Sample copy of Manufacturer's Architectural indemnification Agreement.

B. TEST REPORTS: Submit copies of the bitumen manufacturer's test reports of the following information for each batch of bitumen furnished:
   1. Softening Point: ASTM D36.
   2. Flashpoint: ASTM D92.
   3. Acceptable Bitumen Temperatures: As recommended by the bitumen manufacturer and label EVT on containers. Furnish to the Architect two hand held, "8F" thermometers per ASTM E1 for kettle temperature checking. Keep thermometers at the site and accessible at all times. Provide kettle with operating thermometer, keep thermometer clean of bitumen.

C. PRODUCT DATA: Submit brochures containing material samples, SDS, schedules, charts, literature, and illustrations to indicate the performance, fabrication procedures, product variations, and accessories.
   1. Within four (4) weeks of award of contract, submit:
      a. Minimum of two (2) samples of each sheet material and descriptive literature.
      b. Manufacturer's specifications and other independent test data according to ASTM designation D-5147-91 "Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material" needed to prove compliance with specified requirements.
      c. All other data and information to satisfy requirements of manufacturer on warranty needs.
      d. A written statement from the roofing materials manufacturers corporate officer approving the installer and stating the intent to guarantee the completed project as specified.
      e. Samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.
      f. Certified copy of ISO 9001 compliance.

D. SHOP DRAWINGS: Indicate size and materials. Show locations and installation procedures. Include details of joints, attachments, fastening patterns, and clearances. Submit 1 electronic original and retain approved copies at the Site.

E. MAINTENANCE PROCEDURES: Upon substantial completion of the project, deliver to Owner three (3) copies of manufacturer's printed instructions regarding care and maintenance of roof.

F. Wind uplift calculation: roofing system manufacturer's engineering department shall provide a ASCE 7-10 calculation per CBC, Chapter 15. Calculations hall be stamped by a CA licensed structural engineer. Calculation shall diagrammatically show fastening pattern for insulatin attachment.

G. Plumbing calculation: roofing system manufacturer's engineering department shall provide a primary drain and overflow drain or overflow scupper calculation per CBC, Chapter 11. Calculations shall be stamped by a CA licensed mechanical engineer.

H. Structural wind load calculation: underlayment manufacturer's engineering department shall provide a ASCE 7-10 calculation per CBC, Chapter 16. Calculations shall be stamped by a CA licensed structural engineer. Calculation shall diagrammatically show fastening pattern for structural deck attachment.
   1. Manufacturer shall provide on site verification structural deck meets loading requirements after roof have been removed.

I. Litigation and settlements: provide a notorized statement from a corporate officer stating roofing system manufacturer has not settled litigation or paid fines to a public agency in excess of $20 million dollars.

J. Inspection Reports: Written certification from the roofing system manufacturer corporate officer certifying that the manufacturer will provide a minimum of three job site inspections per week and provide a detailed report including pictures to architect or owner.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Roofing system manufacturer shall have a minimum of 10 years experience in manufacturing modified bitumen roofing products in the United States and be ISO 9001 certified.

B. Installer Qualifications: Installer (Roofing) shall be specializing in modified bituminous roof application with minimum 5 years experience and who is certified by the roofing system manufacturer as qualified to install manufacturer's roofing materials.
   1. Installer shall be California C-39 licensed.
   2. Install shall have an office with 75 miles of the District office in order to provide prompt leak response during contractor warranty period.

C. Regulatory Requirements:
   1. Classification by Underwriters' Laboratories, Inc. as a Class A roof covering.
   2. Roofing system shall be installed in accordance with ASCE-7 wind uplift requirements for geographical location and a 120 MPH 3-second gust wind speed zone with an importance factor of 1.15 based on IBC requirements. Wind-resistance loads listed below have a safety factor of 2.0 incorporated into the calculation.
   3. Follow local, state, and federal regulations of safety standards and codes. Refer to applicable building code or International Building Code for roofing system installation requirements and limitations.

D. Installer's Field Supervision: Require Installer to maintain a full-time Supervisor/Forman on job site during all phases of modified bituminous sheet roofing work and at any time roofing work is in progress, proper supervision of

workmen shall be maintained. A copy of the specification shall be in the possession of the Supervisor/Foremen and on the roof at all times.

E. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction.

F. Disqualification of Bidders: A bidder can be disqualified by the Architect or Owner for any of the following reasons, but not limited to:

1. The failure to attend the Pre-Bid conference at the time and place so described under Bidding Dates.
2. Incorrect use of the “Proposal” as provided by the Architect/Owner. Any changes in said format shall be accepted by the Architect/Owner only when requested and approved in writing prior to the bid opening. Changes in the Proposal after the opening of the bids will not be accepted.
3. Lack of proficiency as shown by past work or incomplete work under other contracts which, in the judgement of the Architect/Owner might hinder or prevent the prompt completion of additional work if so awarded or any involvement in any legal actions which relate to past or present performance. This includes, but is not limited to lawsuits, court appointed actions, and/or ongoing litigation.

G. Pre-installation Roofing Conference: Approximately 2 weeks before scheduled of commencement modified bitumen sheet roof system and associated work, meet at Project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in the around roofing that must precede or follow roofing work (including mechanical work if any), Architect/Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, test agencies, and governing authorities. Objectives to include:

1. Review foreseeable methods and procedures related to roofing work. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
2. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
3. Review roofing systems requirements (drawings, specifications, and other contract documents).
4. Review required submittals, both completed and yet to be completed.
5. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
6. Review required inspection, testing, certifying, and material usage accounting procedures.
7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
8. Record (contractor) discussion of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
9. Review notification procedures for weather or non-working days.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).

C. Do not leave unused rolled goods on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

D. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

1.7 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the Roofing System Manufacturer will provide the following:

1. Keep the Architect informed as to the progress and quality the work as observed.
2. Provide job site inspections minimum three days per week by a full time employee of the manufacturer.
3. Report to the Architect in writing, any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
4. Confirm, after completion of the project and based on manufacturer's observations and tests, that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.8 PROJECT CONDITIONS

A. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or when a 30% chance of precipitation is expected.

B. Do not apply roofing insulation or membrane to damp deck surface.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

D. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

1.9 SEQUENCING AND SCHEDULING

A. Sequence installation of modified bituminous sheet roofing with related units of work specified in other sections to ensure that roof assemblies, including roof accessories, flashing, trim, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

B. All work must be fully completed on each day. Phased construction will not be accepted.

1.10 WARRANTY

A. Membrane Manufacturer upon completion of installation, and acceptance by the Owner and Architect, the manufacturer will supply to the Owner the Thirty (30) Year "No Dollar Limit" watertight warranty.
   1. Warranty shall cover the calculated wind speed.
   2. Warranty shall be sole source warranty for modified bitumen, metal roofing, metal wall panels, edge metal, roof insulation and penetration flashing material.

B. Contractor will submit a minimum of a 5 year warranty to the membrane manufacturer with a copy directly to Owner.

C. Membrane manufacturer will provide an annual inspection at the annual request of the owner for the life of the warranty.

PART 2 - PRODUCTS

2.1 GENERAL

A. When a particular trade name or performance standard is specified it shall be indicative of a standard required.
   1. Design is based on Stressply, manufactured by Garland Co.
   2. Pre-approved equal as noted below.

B. Provide products as specified. Prime bidding contractors proposing substitutes shall submit all required submittal information under 07 53 60, PART 1, 1.4 to The Owner's representative at least 10 days prior to bid due date. All substitutions have to be approved prior to bidding. No substitutions will be accepted after bidding or contract award. All bidders will have an opportunity to bid on any substitute system that is approved. Substitution requests will not be accepted from anyone other than prime bidding contractors who have attended the prebid walkthrough.

C. Any item or materials submitted as an alternate to the manufacturer specified must comply in all respects as to the quality and performance, including job site investigation of the brand name specified. The Owner shall be the sole judge as to whether or not an item submitted as an equal is truly equal. Should the contractor choose to submit on the equal basis, he shall assume all risk involved, monetary or otherwise, should the Owner find it unacceptable. The Contractor is warned to obtained prior approval at least ten days prior to bid date of any material not specified. The following must be included for materials submitted for sustitutions: (five copies)

   1. Complete data substantiating compliance of proposed substitution with Contract Documents.
   2. For products:
      a. Product identification, including manufacturer's literature and manufacturer's name and address.
      b. Current certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials substantiating, SBS Rubber Content, Ash

Content, Low Temperature Flexibility, Tensile Strength of finished membranes according to ASTM D-5147. Test results must be dated, notarized, and on testing laboratory stationary.

c. A five gallon sample of any adhesive, coating, mastic or sealant and a 3' X 5', sample of any sheeting goods as may be specified. Manufacturer's labels must be on containers, smaller containers may be submitted if manufacturer's labels are attached.
d. Material Safety Data Sheets providing all pertinent data as to flammability, combustibility, toxicity, etc.
e. List of at least five (5) local jobs within 50 miles, where the proposed alternate material was used under similar conditions. These jobs must be available for inspection by the Owner. Names, phone numbers, and a copy of manufacturers warranty on each job are required for verification.
f. Notarized statement from the Roofing System Manufacturer, signed by a corporate officer of the Corporation with the Corporate Seal affixed thereto stating in writing that:

- All Bidding Documents have been inspected.
- The project site has been inspected.
- The roofing system manufacturer will provide field inspections a minimum of three times per week, on during, and until all construction work is completed and accepted by the Owner. Inspections shall be performed by a full time employee of the manufacturer. These inspections shall be provided to the Owner at no charge.
- Furnish the 30 year NDL "No Dollar Limit" warranty as stipulated in the Contract Documents. Warranty must cover calculated wind speed; warranty coverage cannot be provided by a third party.

3. For construction methods:
   a. Detailed description of proposed method.
   b. Drawings illustrating methods.
4. Itemized comparison of proposed substitution with product or method specified.
5. Data related to changes in construction schedule.
6. Relation to separate contracts.

D. In making request for substitution, Bidder / Contractor represents:

1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.
2. He will provide the same guarantee for substitution as for product or method specified.
3. He will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
4. He waives all claims for additional cost related to substitution which consequently become apparent.
5. Cost data is complete and includes all related cost under his contract or other contracts which may be affected by the substitution.
6. He will reimburse the Owner for all redesign cost substitute may require.

E. Substitutions will not be considered if:

1. Product or method to be considered does not have a minimum of ten (10) years of successful performance in roofing and reroofing applications in the United States.

2. Any discrepancies in the test data, or if the tests or submittals are incomplete.
3. They are indicated or implied on Shop Drawings or Project Data Submittals without formal request submitted in accordance with Paragraph 2.01.
4. Acceptance will require substantial revision of Contract Documents.

2.2 BITUMINOUS MATERIALS

A. Asphalt Primer: V.O.C. compliant, ASTM D-41. Garla-Prime VOC by Garland or pre approved equal.

B. Asphalt Roofing Mastic: V.O.C. compliant, ASTM D-2822, Type II. Flashing Bond by Garland or pre approved equal.

C. Asphalt: Shall meet ASTM Specification D-312 Type IV.

D. Elastomer: V.O.C. compliant, Trowelable asphalt elastomeric mastic. Garla-Flex by Garland or pre-approved equal.

2.3 SHEET MATERIALS

A. Roofing Membranes
1. Modified Roof Membrane (Base Ply): 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing membrane with high strength, fiberglass reinforcement. Flexbase 80 by Garland, or pre-approved equal.
2. Modified Roof Membrane (Finish Ply): urethane resin modified roof membrane reinforced with asphalt-coated glass fiberglass scrim, with granulated surface. Stressply EUV FR Mineral by Garland or pre-approved equal.
3. Finish Surfacing (CRRC): Single-component, urethane-dispursion liquid coating, White Knight Plus WC by Garland, or pre-approved equal.

B. Flashing Membrane: Two ply modified base flashing system.
1. Base Ply: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing membrane with high strength, polyester/fiberglass reinforcement. Flexbase Plus 80 by Garland, or pre-approved equal.
2. Finish Ply: Urethane resin modified roof membrane reinforced with asphalt-coated glass Fiberglass scrim with granulated surface. Stressply EUV FR Mineral by Garland or pre-approved equal.
3. Finish Surfacing (CRRC): Single-component, urethane liquid coating, White Knight Plus WC by Garland, or pre-approved equal.

2.4 INSULATION

A. Polyisocyanurate Roof Insulation for low slope asphalt roofing system:

Provide thicknesses of insulation as indicated, and tapered insulation where indicated on plans. Provide combination of types and thicknesses to provide a complete system.
1. Surface Burning Characteristics: Provide assembly with composite flame spread rating of 25 or less and smoke developed of 50 or less, as determined in accordance with ASTM E 84.
2. Closed cell polyisocyanurate foam.
   a. R-Value: 11 min.
3. Insulation board shall meet the following requirements:

a. UL, WH or FM listed under Roofing Systems
b. Federal Specification HH-I-1972, Class 1
c. Dimensional Stability ASTM D2126 2% max.
d. Compressive Strength ASTM D1621 25 psi min.
e. Vapor Permeability ASTM E-96 1 perm max.
f. Foam Core Density ASTM D1622.
g. Water Absorption ASTM C209 <1 %
h. Flame Spread ASTM E 84, 25 max.
i. R-Factor: 5.6 per inch thickness ASTM C 518 (Design Value).
j. Tapered insulation slope: ¼" per 12".

B. Asphalt roof Protection Board: Premolded Gypsum Fiber board 1/2 inch thickness.
1. ½" USG Secure Rock by Commercial Innovations or approved equal.

2.5 RELATED MATERIALS

A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes / shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.

B. Fasteners:
1. Shall be Factory Mutual approved and as recommended by the manufacturer for the specific application.
2. Fastener for Brick: Shall be 1/4 inch x 2 inches, stainless steel nail, one piece unit, flat head, as manufactured by Rawl Zamac Nailin, or approved equal.
3. Fastener for Wood: Shall be a #14 Factory Mutual approved fastener, fluorocarbon coated, with CR-10 coating. A minimum 0.200 inch diameter shank and 0.250 inch diameter thread. To be used with Factory Mutual approved, round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to 30 Kesternich cycles (DIN 50018) shows less than ten percent (10%) red rust which surpasses Factory Mutual Approval Standard 4470 as manufactured by Olympic Manufacturing Group, Inc., or pre-approved equal.
4. Roofing Nails: Stainless steel, 316, type, size as required to suite application, minimum 11 gauge with 3/8 inch diameter head, minimum 1-1/2 inches in length.
5. Iron-Lok Toggle: Shall be a toggle bolt with minimum 0.215 inch diameter shank and minimum 20 threads per inch, with a 2-1/2 inch wing span, with wing activated adhesive and pressure plate, as manufactured by OMG or Tru-fast

C. Metal Discs: Flat discs or caps of plastic sheet metal not lighter than 28 gauge an not less than 1-inch in diameter. Discs shall be formed to prevent dishing. Bell or cup-shaped caps are not acceptable.

E. Pipe supports: Zinc Jacks by Commercial Innovation or Equal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate surfaces to receive modified bitumen sheet roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing modified bitumen sheet system.

B. Insurance / Code Compliance: Where required, install and test modified bitumen sheet roofing system to comply with governing regulations and specified insurance requirements.

C. Protect other work from spillage of modified bitumen roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace or restore other work damaged by installations of modified bituminous sheet roofing system work.

D. Coordinate installing roofing system components so that insulation and roofing plies are not exposed to precipitation or left exposed overnight. Provide cut-offs at end of each day's work to cover exposed ply sheets and insulation with two courses of #15 organic felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work.

E. Substrate Joint Penetrations: Prevent bitumen from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

F. Apply roofing materials as specified herein unless recommended otherwise by manufacturer's instructions. Keep roofing materials dry before and during application. Do not permit phased construction. Complete application of roofing plies, modified sheet and flashing in a continuous operation. Begin and apply only as much roofing in one day as can be completed that same day.

G. Asphalt Bitumen Heating: Heat and apply bitumen according to EVT Method as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 5 ºF at point of application) more than 1 hour prior to time of application. Determine flash point, finished blowing temperature, EVT, and fire-safe handling temperature of bitumen either by information from manufacturer or by suitable test. Do not exceed recommended temperature limits during bitumen heating. Do not heat to a temperature higher than 25º below flash point. Discard bitumen that has been held at temperature exceeding finishing blowing temperature (FBT) for more than 3 hours. Keep kettle lid closed except when adding bitumen.

H. Bitumen; Mopping Weights: For interply mopping, apply bitumen at the rate of approximately 25lb of asphalt per roof square (plus or minus 25 percent on a total job average basis).

3.3 INSULATION INSTALLATION

A. Wood decks shall be covered with a rosin sheet, prior to mechanically fastening insulation as follows:

1. Install in accordance with manufacturer's current published application instructions and stamped ASCE-7 wind uplift calculation. Submit perimeter, field and corner fastening patterns and cite all ASCE-7 data pertaining to the fastening pattern to the Architect for review.
2. Mechanically attach base layers of thermal insulation and mop the cover board if thermal insulation is installed.
3. If no thermal insulation to be installed mechanically attach cover board to structural deck.

3.4 STANDARD ROOFING SHEET INSTALLATION

A. BASE PLY INSTALLATION
1. Install modified membrane in 25-30 lbs. per square of bitumen, shingled. Shingle in proper direction to shed water on each area of roof.
2. Lap ply sheet ends eight inches. Stagger end laps twelve inches minimum.
3. Extend plies two inches beyond top edges of cants at wall and projection bases.
4. Install base flashing plies to all perimeter and projections details.

B. MODIFIED MEMBRANE APPLICATION
1. The modified membrane shall then be solidly bonded to the base layers with specified asphalt at the rate of 35 lbs. per 100 square feet.
2. The roll must push a puddle of asphalt in front of it with asphalt slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.
3. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.
4. Subsequent rolls of modified shall be installed across the roof as above with a minimum of 4" side laps and 8" end laps. The end laps shall be staggered. The modified membrane shall be laid in the same direction as the underlayers, but the laps shall not coincide with the laps of the base layers.
5. Apply asphalt no more then five feet ahead of each roll being embedded.
6. Extend membrane 2” beyond top edge of all cants in full moppings of the specified asphalt as shown on the drawings.
7. Broadcast minerals into the bleed out of asphalt while bitumen is still hot to achieve uniform color throughout.
8. Coat entire roof with 1 gallon per sq. per coat. 2 coats.

C. PLUMBING STACK
1. Minimum stack height is 8”.
2. Run base ply system over the roof. Seal the base of the stack with elastomer.
3. Prime flange of new sleeve. Install properly sized sleeves set in a 1/4” bed of roof cement.
4. Install base ply in bitumen.
5. Install stripping membrane in bitumen.
6. Install modified roof membrane.
7. Caulk the intersection of the membrane and the with elastomeric sealant.
8. Turn sleeve a minimum of 1” down inside of stack.

3.5 FLASHING MEMBRANE INSTALLATION

A. All curb, wall and parapet flashings shall be sealed with an application of mastic and mesh on a daily basis. No condition should exist that will permit moisture entering behind, around, or under the roof or flashing membrane.

B. Prepare all masonary walls, penetrations and expansion joints to be flashed and where shown on the drawings, with asphalt primer at the rate of one gallon per 100 square feet Allow primer to dry tack free.
   1. At wood walls mechanically attach a Type II base sheet to wall.

C. The two ply modified flashing system will be used as the flashing membrane and will be adhered to the underlying substrate by heat fusing unless otherwise noted in these specifications and nailed off 8” O.C. at all vertical surfaces. All base flashing shall extend up wall or curb in the machine direction of the membrane.

D. The entire sheet of flashing membrane must be solidly adhered to the substrate.
   1. Install base flashing in hot and cap sheet in mastic.

E. Counter flashing, cap flashings, expansion joints, and similar work to be coordinated with modified bitumen roofing work are specified in other sections.

F. Roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices to be coordinated with modified bituminous roof system work are in other sections.

3.6 FLASHING AT WALLS AND PENETRATIONS

A. Minimum flashing height is 8". Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.

B. Set cant in bitumen. Run all plies over cant a minimum of 2".

C. Install bottom flashing ply covering wall or penetration with 6" on to field of roof. After all laps have been tested, and a complete positive bond has been achieved, the applicator shall heat the seam edge and trowel along the seam edge. Troweling shall continue until a sloped, beveled edge has been produced. All base flashing shall extend up wall or curb in the machine direction of the membrane.

D. The second ply shall be modified top flashing ply installed over the bottom flashing ply and 9" on to field of roof in mastic. . After all laps have been tested, and a complete positive bond has been achieved, the applicator shall heat the seam edge and trowel along the seam edge. Troweling shall continue until a sloped, beveled edge has been produced. . All base flashing shall extend up wall or curb in the machine direction of the membrane.

E. Secure termination bar through flashing and into wall 8" O.C. and seal top edge to prepared surface with a three course application of PVC mesh and asphaltic mastic.

F. Coat base flashings after 30 days.

3.9 FIELD QUALITY CONTROL

A. Testing:
   1. Re-test until roof is shown to be watertight.

B. Manufacturer Field Services: Provide three times weekly site inspection for a minimum of one (1) hour during active roofing operations by an experienced, full time employee of the roofing manufacturer. Submit written reports weekly.

3.10 CLEANING

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

B. Touch up minor abrasions and exposed fasteners with matching paint provided by panel manufacturer. Remove and replace panels that cannot be satisfactorily touched up.
1. No exposed sealant or visible raw metal.

C. Sweep and remove chips, shavings, and dust from roof on a daily basis during installation period. Leave installed work clean, free from grease, finger marks and stains.

D. Upon completion of installation, remove scraps and debris from project site.

3.11 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

3.12 OWNER SUPPLIED MATERIALS

A. Contractor must include in their base bid any additional materials to complete the roofing project. Contractor must provide all labor to install owner supplied materials as part of their bid. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07 53 60 - 13. Freight charges of Owner supplied materials will be the responsibility of the Owner. Contractor must take delivery of materials, properly cover and store at jobsite or their shop. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07 53 60 - 13. The Owner will supply the following materials and quantities.

Base Bid:

Flexbase Plus 80: 17 Rolls

Stressply EUV FR Mineral:20 rolls

White Knight Plus WC:6-5g

Flashing Bond:3-5g

Tuff Stuff:5 Tubes

END OF SECTION

SECTION 07550
MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Torch Applied 2-Ply Asphalt Roofing

1.2 REFERENCES

A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.

C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.

D. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection.

E. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.

F. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.

G. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

H. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings

I. Factory Mutual Research (FM): Roof Assembly Classifications.

J. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.

K. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.

L. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.

M. Warnock Hersey (WH): Fire Hazard Classifications.

N. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.

O. ASCE 7, Minimum Design Loads for Buildings and Other Structures

P. UL - Fire Resistance Directory.

Q. FM Approvals - Roof Coverings and/or RoofNav assembly database.

R. California Title 24 Energy Efficient Standards.

1.3 DESIGN / PERFORMANCE REQUIREMENTS

A. Perform work in accordance with all federal, state and local codes.

B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
   1. Factory Mutual Class A Rating.
   2. Underwriters Laboratory Class A Rating.
   3. Warnock Hersey Class A Rating.

C. Design Requirements:
   1. Uniform Wind Uplift Load Capacity
      a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
         1) Design Code: ASCE 7, Method 2 for Components and Cladding.
         2) Importance Category:
            a) III.
         3) Importance Factor of:
            a) 1.0
         4) Wind Speed: 120 mph
   2. Warnock Hersey
      a. ITS Directory of Listed Products
   3. FM Approvals:
      a. RoofNav Website

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation instructions.

C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.

D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins. Report shall be signed and sealed by a Professional Engineer registered in the State of the Project who has provided roof system attachment analysis for not less than 5 consecutive years.

E. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
   2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
   3. Product reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.

F. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio based materials

G. Verification Samples: For each modified bituminous membrane ply product specified, two

samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

H. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.

I. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.

J. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwritters Laboratories (UL), Warnock Hersey (WH) or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.

K. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.

C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.

D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.

E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.

F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.6 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to commencing Work of this section.

B. Review installation procedures and coordination required with related Work.

C. Inspect and make notes of job conditions prior to installation:
   1. Record minutes of the conference and provide copies to all parties present.
   2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.

3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.

B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.

C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.

D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.

E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

F. Adhesive storage shall be between the range of above 40 degree F (4 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.8 COORDINATION

A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

1.9 PROJECT CONDITIONS

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

1.10 WARRANTY

A. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
   1. Warranty Period:
      a. 30 years from date of acceptance.
   2. Contractor Warranty:
      a. 5 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 216-641-7500. Fax: 216-641-0633. Web Site: www.garlandco.com.

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

C. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
   1. Bidder will not be allowed to change materials after the bid opening date.
   2. If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
   3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
      a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
      b. Will provide the same guarantee for substitution as for the product and method specified.
      c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
      d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
      e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
      f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
   4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
   5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

2.2 TORCH APPLIED 2-PLY ASPHALT ROOFING

A. Base (Ply) Sheet:
   1. HPR Torch Base:

B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with interplay adhesive.
   1. StressPly IV Plus UV Mineral:

C. Surfacing:
   1. Finish Surfacing (CRRC): Single-component, urethane-dispursion liquid coating, White Knight Plus WC by Garland, or pre-approved equal.

2.3 ACCESSORIES:

A. Urethane Sealant Hybrid - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
   1. Tensile Strength, ASTM D 412: 250 psi
   2. Elongation, ASTM D 412: 450%
   3. Hardness, Shore A ASTM C 920: 35
   4. Adhesion-in-Peel, ASTM C 92: 30 psi

B. Dens-Deck Roof Board
   a. Qualities: Nonstructural glass mat faced, noncombustible, water-resistant treated gypsum core panel.

b. Board Size: Four feet by eight feet (4'x8').
c. Thickness: Half Inch (1/2) inch.
d. R-Value: .56
e. Compliances: UL, WH or FM listed under Roofing Systems.

C.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.

C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.

D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. General: Clean surfaces thoroughly prior to installation.
1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.

B. Insulation: Roof insulation is specified in Section
1. All joints between layers should be staggered when multiple layers of insulation are installed. Insulation greater than 2.5 inches shall be installed in multiple layers.
2. Insulation shall be kept dry at all times. Install only as much insulation as can be covered with completed roofing membrane before the end of the day's work or prior to onset of inclement weather.
3. Edges shall butt tightly and all cuts shall fit neatly against adjoining surfaces to provide a smooth overall surface. Gaps of greater than 1/4 inch width shall be filled with insulation.
4. Install tapered insulation around roof drains and penetrations to provide adequate slope for proper drainage.
5. Mechanically attached insulation shall be fastened in accordance with code and insurance requirements for the applicable geographic zone with the required number and type of fasteners and plates.

6. When asphalt or cold adhesive attachment is specified, the proposed insulation shall be compatible with the roof substrate, the proposed bitumen and the requirements of the specific membrane.
7. Hot asphalt application:
   a. Maximum 4 foot by 8 foot insulation boards shall be attached with hot asphalt.
   b. Asphalt for insulation attachment shall meet ASTM D 312 Type III or IV criteria, as dictated by the roof slope or other design conditions.
   c. Expanded polystyrene (EPS) materials shall not be installed with hot bitumen products.

3.3 INSTALLATION - GENERAL

A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.

B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
   1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
   2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.

C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water

D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

3.4 INSTALLATION TORCH APPLIED 2-PLY ASPHALT ROOFING

A. Base Ply: Install torch base sheet to a properly prepared substrate. Shingle in proper direction to shed water on each area of roofing.
   1. Lay out the roll in the course to be followed and unroll 6 feet (1.8 m).
   2. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
   3. After the major portion of the roll is bonded, re-roll the first 6 feet (1.8 m) and bond it in a similar fashion.
   4. Repeat this operation with subsequent rolls with side laps of 4 inches (101 mm) and end laps of 8 inches (203 mm).
   5. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.

6. Extend underlayment 2 inches (50 mm) beyond top edges of cants at wall and projection bases.
7. Install base flashing ply to all perimeter and projections details.

B. Modified Cap (Ply) Sheet: Over torch base sheet underlayment, lay out the roll in the course to be followed and unroll 6 feet (1.8 m). Stagger seams over the torch base sheet seams.
1. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
2. After the major portion of the roll is bonded, re-roll the first 6 feet (1.8 m) and bond it in a similar fashion.
3. Repeat this operation with subsequent rolls with side laps of 4 inches (101 mm) and end laps of 8 inches (203 mm).
4. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.

C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.

D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06114.
1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.

E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.

F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.

G. Flashing Base Ply: Seal all curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
1. Prepare all walls, penetrations, expansion joints, and other surfaces to be flashed with asphalt primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
2. Adhere modified flashing base to the underlying base flashing ply with specified flashing ply adhesive. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
3. Solidly adhere the entire sheet of flashing membrane to the substrate. Tops of all flashings that are not run up and over curb shall be secured through termination bar 6 inches (152 mm) and sealed at top
4. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and fiberglass mesh.

5. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work.
6. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work. When using mineralized cap sheet all stripping plies type IV base shall be installed prior to cap sheet installation.

H. Roof Walkways: Provide walkways around all mechanical unit areas indicated on the Drawings.

3.5 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.

3.6 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. Protect exposed surfaces of finished walls with tarps to prevent damage.

C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 3/4 inch (19 mm) thick.

D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.

E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.7 FIELD QUALITY CONTROL

A. Inspection: Provide manufacturer's field observations at start-up and a minimum of 3 times per work week. Provide a final inspection upon completion of the Work.
1. Warranty shall be issued upon manufacturer's acceptance of the installation.
2. Field observations shall be performed by a Sales Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
3. Provide observation reports from the Sales Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
4. Provide a final report from the Sales Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.8 OWNER SUPPLIED MATERIALS

A. Contractor must include in their base bid any additional materials to complete the roofing project. Contractor must provide all labor to install owner supplied materials as part of their bid. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07 53 60 - 13. Freight charges of Owner supplied materials will be the responsibility of the Owner. Contractor must take delivery of materials, properly cover and store at jobsite or their shop. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07 53 60 - 13. The Owner will supply the following materials and quantities.

Base Bid:

HPR Torch Base: 140 Rolls

Stressply Plus IV UV Mineral:185 Rolls

White Knight Plus WC:72 5g

Insul Lock HR-21 cart

Tuff Stuff:30 Tubes

Flashing Bond: 10 5g

Tuff Flash:4-3g

24g-Standard Color Flat Stock-17 Sheets

END OF SECTION

SECTION 07563
RESTORATION FOR MINERAL SURFACE BUR

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provide all labor, equipment, and materials to install a cold applied, modified asphalt and Acrylic based, restoration system over the properly prepared Metal roof system. Scope of work shall include but not be limited to:

1. Power wash the entire roof surface with commercial cleaning equipment.
2. Prime entire roof surface with primer at a rate of ½ gallon per square.
3. Reseal all pipe penetrations with a 3 course application of mastic/mesh.
4. Restrip drains with a 3 course application of polyurethane and polyester.
5. Apply two coats of Title 24 approved white roof acrylic/urethane hybrid at 3 gallons per square. 1.5 Gallons Per Coat
6. Apply Rust Inhibiting Primer/Top Coat to all exterior walls applications at 3 gallons per square.(see roof plan)
7. Coat all gutters with 3 coat application of rust inhibiting primer, aliphatic Urethane base coat, and aliphatic urethane top coat. Embed poly tape reinforcement at all gutter joints
8. Tie-ins, details, clean up, etc.

1.2 RELATED SECTIONS

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

1.3 REFERENCES

ASTM D - 41	Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
ASTM D - 1079	Terminology Relating to Roofing, Waterproofing, and Bituminous Materials
ASTM D – 2822	Specification for Asphalt Roof Cement
ASTM D – 5147	Specification of SBS Modified Membranes
ASTM E - 108	Test Methods for Fire Test of Roof Coverings
FM	Factory Mutual
NRCA	National Roofing Contractors Association
UL	Underwriters Laboratories

1.4 SUBMITTALS

A. Submit under provisions of the Submittals Section. Must be submitted and approved by the Architect one week prior to bid in order to be considered as an acceptable system for bidding.

B. Product Data for each type of product specified include manufacturer's technical product data, installation instructions, and recommendations for each type of

restoration product required. Include data substantiating that materials comply with specified requirements.

C. Any material submitted as an equal to specified material must also submit a list of three jobs where the proposed material has been used in a similar roofing system as that which is specified and within a one hundred mile radius from the location of the specified job. In addition, the three jobs must be at least three years old and be available for the Owner or Owner's Representative to inspect.

D. Show evidence that the products and materials are manufactured in the United States and that materials provided conform to all requirements specified herein, and are chemically and physically compatible with each other and are suitable for inclusion within the total restoration system specified herein.

E. Show evidence that the Installer specializes in bituminous roof restoration application with a minimum 5 years experience and who is certified by the roofing system manufacturer as qualified to install manufacturer's roofing materials.

F. Unexecuted Manufacturer's warranty.

G. Certified copy of ISO 9001 compliance.

H. Any deficiencies in performance, warranty terms or improper submittal procedure will constitute grounds for immediate rejection of alternate.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Roofing system manufacturer shall have a minimum of 10 years experience in manufacturing bituminous roofing products in the United States and be ISO 9001 certified. Reinforced coating system shall possess an ASTM E-108 Class A fire rating.

B. Installer Qualifications: Installer (Roofing) shall be specializing in roof application with minimum 5 years experience and who is certified by the roofing system manufacturer as qualified to install manufacturer's roofing materials.

C. Installer's Field Supervision: Require Installer to maintain a full-time Supervisor/Forman on job site during all phases of bituminous sheet roofing work and at any time roofing work is in progress, proper supervision of workmen shall be maintained. A copy of the specification shall be in the possession of the Supervisor/Foremen and on the roof at all times.

D. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction.

E. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

F. Pre-application Roofing Conference: Approximately 2 weeks before scheduled commencement of roof system installation and associated work, meet at Project site with Installer, installer of each component of associated work, installers of deck or

substrate construction to receive roofing work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work. Objectives to include:

1. Review foreseeable methods and procedures related to roofing work.
2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
4. Review roofing systems requirements (drawings, specifications, and other contract documents).
5. Review required submittals, both completed and yet to be completed.
6. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).

C. Do not leave unused rolled goods on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

D. It is the responsibility of the contractor to secure all material and equipment on the job site. If any material or equipment is stored on the roof, the contractor must make sure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor will be the sole responsibility of the contractor and will be repaired or replaced at his expense.

1.7 MANUFACTURERS INSPECTIONS

A. When the project is in progress, the Roofing System Manufacturer will provide the following:

1. Keep the Architect and Owner informed as to the progress and quality the work as observed.
2. Provide job site inspections a minimum of three days a week.
3. Report to the Owner in writing, any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
4. Confirm, after completion of the project and based on manufacturer's observations and tests, that manufacturer has observed no applications procedures in conflict with the

specifications other than those that may have been previously reported and corrected.

1.8 PROJECT CONDITIONS

A. Weather Condition Limitations: Do not apply materials during inclement weather or when a 40% chance of precipitation is expected.

B. Materials shall be stored at room temperature until immediately prior to application when the ambient temperature is 40^{o} F or below. Discontinue the application if the material can not be stored at a temperature which permits even distribution during application

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

D. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

E. When applying materials with spray equipment, take precautions to prevent overspray from damaging or defacing surrounding walls, building surfaces, vehicles or other property.

F. Avoid inhaling spray mist; take precautions to ensure adequate ventilation.

G. Protect completed roof sections from foot traffic until fully cured.

1.9 SEQUENCING AND SCHEDULING

A. Sequence application of coating with related units of work specified in other sections to ensure that roof assemblies, including roof accessories, flashing, trim, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

B. All work must be fully completed on each day.

1.10 WARRANTY

A. Coating System Manufacturer: Upon completion of installation and acceptance by the Owner, the manufacturer will supply to the Owner a 10 year leak warranty.

B. Contractor will submit a minimum of a three year warranty to the system manufacturer with a copy directly to Owner.

C. All components of the coating system including primer, mastic, mesh, polyurethane coating, polyether flashing adhesive, polyester, modified turn up base flashings, and Title 24 coating shall be manufactured by a single source of manufacture, providing the owner with ensured product compatibility and a single source of liability against leaks for a period of 10 years.

PART 2 PRODUCTS

2.1 GENERAL

A. When a particular trade name or performance standard is specified it shall be indicative of a standard required.

B. The coating system's performance characteristics are based on the Pyramic Plus LO Coating System as manufactured by The Garland Company. Area Rep.: Joe Salazar (925) 890-6509. Bidders proposing substitutes shall submit and have approved all required information under the Submittals Section to the District at least 10 days prior to bid due date.

C. Any item or materials submitted as an alternate to the manufacturer specified must comply in all respects as to the quality and performance of the brand name specified. The Owner shall be the sole judge as to whether or not an item submitted as an equal is truly equal. Should the contractor choose to submit on the equal basis, he shall assume all risk involved, monetary or otherwise, should the Owner find it unacceptable.

2.2 BITUMINOUS MATERIALS

A. Asphalt Primer: V.O.C. compliant, ASTM D-41. Garla Block or equal.

B. Asphalt Roofing Mastic: V.O.C. compliant, ASTM D-2822, Type II. Flashing Bond or equal.

C. Polyether Flashing Adhesive: V.O.C. compliant, ASTM D-512. Keelock Mastic or equal.

D. Title 24 Acrylic Coating: V.O.C. compliant, ASTM D-2370. Pyramic Plus LO or equal.

E. Aliphatic Urethane Coating: V.O.C. compliant, ASTM D-412 White Knight Plus WC or equal.

F. Rust Inhibiting Primer: V.O.C. compliant, ASTM D-41 Rust Go Primer or equal

G. Rust Inhibiting Top Coat: V.O.C. compliant, ASTM D-2370 Rust Go Top Coat or equal

2.3 REINFORCEMENT

A. Drain Reinforcement: soft polyester mat. Grip Poly soft or equal.

B. Field Splits: Anomalies under 6" in diameter: Fiberglass mesh. Garmesh or equal.

C. Curb Flashings: SBS modified membrane. Stressply Plus FR Mineral or equal.

D. Gutter Joint Reinforcement: Pressure sensitive tape. Unibond ST or equal

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate surfaces to receive coating and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the maintenance system.

B. Insurance/Code Compliance: Where required, install and test the roofing system to comply with governing regulations and specified insurance requirements.

C. Protect other work from spillage of roofing materials, and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installations of the roofing system.

D. Coating shall be applied per manufacturers application instructions for the type of coating used.

E. Apply roofing materials as specified herein unless recommended otherwise by manufacturer's instructions. Keep roofing materials dry before and during application. Do not permit phased construction.

3.3 CLEANING AND SURFACE PREPARATION

A. All defects such as deteriorated roof decks must be repaired or replaced prior to beginning the restoration system application.

B. Remove any foreign debris from the roof surface prior to pressure washing.

C. Do not damage roof membrane in cleaning process. Pressure wash the roof with commercial cleaning equipment to provide a clean surface for coating application.

D. Apply primer to roof surface at a rate of 1/2 gallon per one hundred (100) square feet.

E. All surface defects (cracks, blisters, tears) must be repaired:

1. Blister/Split Repair
   a. Spud all delaminated ply back to the point of solid asphalt attachment. Clean the area with a roof brush. Prime the area at a rate of ½ gallon/square with asphalt primer.
   b. All blisters must be cut and opened down to the solidly adhered plies of the existing roof system. Use a roofer's knife to open the blister with an "X" or "H" cut. Fold the flaps and remove any existing moisture. Permit the area to dry before applying repair materials.
   c. Apply a liberal coating of bituminous material into the blister. Firmly press the flaps into the bituminous material and trim the edges to ensure proper fit.
   d. Apply:
      1) Anomalies less than 6″ in diameter: A coating of bituminous material over the repaired area extending a minimum of eight (8) inches beyond the cuts. Embed a strip of mesh into the bituminous material and

brush or roll firmly. Apply a second coat of bituminous material over the fabric and onto the roof surface.

2) Anomalies over 6" in diameter: Adhere one (1) ply of smooth surface SBS membrane in cold adhesive. Strip in the edges with a three course mastic and mesh application.

2. Roof Penetrations
   a. Clean the outside of the jack out twelve (12) inches onto the filed of the roof. Prime the area with asphalt primer.
   b. Apply a liberal coating of mastic around the jack extending a minimum of six (6) inches onto the horizontal roofing surface.
   c. Cut four (4) strips of mesh. Each strip should be six (6)inches wide and be of sufficient length so as to extend a minimum of six (6) inches beyond the jack.
   d. Embed a strip into the mastic along each side of the jack. Brush or roll the mesh into place to ensure proper embedment.
   e. Top dress the area with mastic.
3. Turn Up Base Flashing Detail Repair
   a. All Flashings shall receive a layer of smooth SBS modified membrane over the existing primed base flashing. Extend a minimum 6" onto the field of the roof.
   b. Set modified membrane in polyether adhesive at a rate of 2-3 gal/sq.

3.4 COATING APPLICATION

A. Brush or spray Low VOC Acrylic coating onto the roof surface at a rate of:
   1. Three (3) gallons of coating material per one hundred (100) square. Coating must be applied in a 2 coat application of 1.5 Gallons per coat allowing for proper cure time between coats.

3.5 FINAL INSPECTION

A. At completion of roofing installation and associated work, meet with Installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with per performance of roofing system.

B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each parting attending.

C. Repair or replace (as required) deteriorated or defective work found at time above inspection to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. The Contractor is to notify the Owner upon completion of corrections.

E. Following the final inspection, acceptance will be made in writing by the material manufacturer.

3.6 Owner Supplied Material:

A. Contractor must submit to the Owner as part of the submittal package all quantities of owner supplied materials needed to complete this project per specification section 075200 a minimum of (6) weeks prior to project start date. Contractor must provide all labor to install owner supplied materials as part of their bid. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07520. Contractor must return all overages to the Owner and under estimated quantities will be the full responsibility of the contractor to supply and install in full compliance with this section. Freight charges of Owner supplied materials will be the responsibility of the Owner. Contractor must take delivery of materials, properly cover and store at jobsite in a secured container Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07520.

B. Materials specifically provided by the Owner thru the CMAS program;

10 - Tuff Stuff Sealant 10.3oz Tubes
3 – Pyramic top coat 55 gal
7 – Rust Go Primer 5 gal
13—Rust Go Top Coat 5 gal
1– KeyLock Flashing Adhesive 3.5 gal
4 –Unibond 4” roll
10-Polyester Soft-6” roll

END OF SECTION

DEPARTMENT OF PUBLIC WORKS

ANTIOCH CALIFORNIA
OPPORTUNITY LIVES HERE

MULTIPLE SITE ROOF REPLACEMENT - BID NO. 770-0224-20A
PRE-BID WALK SIGN IN SHEET
1201 W. 4th Street, Antioch, CA 94509

Company	Attendee - Print & Initial	Email Address - Required
City of Antioch	James Pflueger	jpflueger@ci.antioch.ca.us
City of Antioch	Christine Raposo	craposo@ci.antioch.ca.us
Waterproofing Associates	Rob Wyllie	rob@roofwa.com
B&M Tearoff	Felipe Bernal	felipe@bmtearoff.com
Pac Shield Roof Services	Elmer Wheeler	rjlapizco@pacshield.com
Solano County Roofing	Dan Davis	sanscr@sbcglobal.net
Central Roofing	ANGEL Rodriguez	Central.Roofing@YAHOO.com
Andys Roofing	Jesus Garcia	jan@andysroofin.com
I&A Contractor Inc	Alan Iberia	Alan@iacontractorinc.com
WESTERN ROOFING	OLIVER WONG	Owong@westroof.com
GARLAND	Kyle Lattanzio	Klattanzio@garlandind.com
Alliance Corp	Tim Hickman	timhickman40@gmail.com
Joe Salazar	Garland	JSALAZAR@GARLANDIND.com
BEST CONTRACTING	Emigdio Robles	estimating@bestcontracting.com

DEPARTMENT OF PUBLIC WORKS

ANTIOCH CALIFORNIA
OPPORTUNITY LIVES HERE

MULTIPLE SITE ROOF REPLACEMENT - BID NO. 770-0224-20A
PRE-BID WALK SIGN IN SHEET
1201 W. 4th Street, Antioch, CA 94509

Company	Attendee - Print & Initial	Email Address - Required
Pioneer Roofing	Feliciano Avila	chano@pioneercontracts.com
Stronger Building S.	Ismael Avila	ismael@strongerbuilding.com
SBS	Baldomero Ricalday	baldomero@strongerbuilding.com

ANTIOCH
CALIFORNIA

REQUEST FOR PROPOSAL
BID NO. 770-0224-20A
MULTIPLE SITE ROOF REPLACEMENT
BID DUE DATE: Monday, February 24, 2020 @ 2:00 PM

==========

Addressing Prospective Bidders Questions Post Job Walk

Q: What type of roofing will be used to replace the Lower Non-Metal Portion of the Old Yard Roof?
A: Please refer to specification 07 53 60 Garland Modified Bitumen Roofing

Q: Who will be responsible to remove and replace the signs on the siding of the Antioch Public Works Stores Building?
A: The City of Antioch will remove and replace the signs on the Stores Building

Q: Are the Antennas staying, or will they be removed from the A-Plant Building at the Water Treatment Plant?
A: The antenna's located on the A-Plant Building will remain as they are actively in use.

Q: Has Hazmat testing been done on any of the roofs?
A: No. It will be at the bidder's discretion if they would like to do so.

Q: Will the skylight hatch be replaced by a new hatch on the A-Plant Building?
A: No, the original skylight hatch will remain.