ADDENDUM NO. 1

March 29, 2022

DSA Application No.: 04-120740

To Drawings dated 03/03/2022

EL CAMINO HIGH SCHOOL TRUAX EXTERIOR IMPROVEMENTS ROOFING/HVAC/ACCESS LADDER

Oceanside Unified School District

Prepared by: LEAF Engineers
8163 Rochester Avenue, Suite 100
Rancho Cucamonga, CA 91730

LEAF Engineers Project No.: P2136900ME

Notice to Bidders:

A. Receipt of this Addendum shall be acknowledged on the Bid Form.

B. This Addendum forms part of the Contract documents for the above referenced project and shall be incorporated integrally therewith.

C. Each Bidder shall make necessary adjustments and submit his bid with full knowledge of all modifications, clarifications, and supplemental data included therein. Where provisions of the following supplemental data differ from those of the original Contract Documents, this Addendum shall govern.

Pre-BID RFI's

Item No. 1.01: Question: Other than the obvious locations for roof sheathing removals around the existing RTU's to access the head out framing, what quantity of additional rotten / degraded roof sheathing and replacement should be included in the base bid, since this condition is currently unknown?
Answer: Repair any damaged decking as required. Contractor to include 7% deck replacement in the base bid. If the amount of deck replacement exceeds 7%, the contractor is to receive a change order equal to the unit price for deck replacement per sq ft multiplied by the sq ft in excess of the base bid amount. If the amount of deck replacement is less than 7%, the contractor is to provide a credit to the District equal to the unit price of deck replacement per sq ft multiplied by the sq ft less than the base bid amount.

Item No. 1.02: Question: What specific work scope is the $20k allowance to be utilized for?
Answer: Owners' discretion.

Item No. 1.03: Question: Please confirm the existing roof section profile, specifically, is there currently insulation under the roof, and layers of roofing material currently in place.
Answer: Existing roof section is described on plans, see detail 16/A.10. There is no insulation, just built-up roof or Mod bit system over wood deck.

Item No. 1.04: Question: Is the final roof spec finalized, including all insulation over deck requirements?
Answer: See attached herein revised roof spec section.

Item No. 1.05: Question: Will there be another opportunity to have a 2nd look at the roofs, and also the electric panels that feed the current units. We were not able to access the panels at the first job walk.
Answer: No additional job walk will be scheduled.

Item No. 1.06: Question: 01 10 00 Summary of Work item 1.02.3 states in part "The contractor is to install new ladders with cages or Tack Weld new cages to existing ladders." In the interest of apples to apples bids, please clarify if existing ladders are to be demolished and replaced with new ladders with cages OR modify existing ladders with new cages tack welded in place?
Answer: Provide and install new ladders and cages.

Item No. 1.07: Question: 01 10 00 Summary of Work item 1.02.4 states in part "All damaged plywood sheathing MUST be identified and replaced by the Prime Contractor". During Mandatory job walk, plywood sheathing was not observable to determine quantity requiring replacement. How is this to be addressed in bid submittal? Are we to provide a unit cost for sheathing replacement? Will quantities be provided prior to bid submittal? Are there roof core results for reference? Please clarify.
Answer: Repair any damaged decking as required. Contractor to include 7% deck replacement in the base bid. If the amount of deck replacement exceeds 7%, the contractor is to receive a change order equal to the unit price for deck replacement per sq ft multiplied by the sq ft in excess of the base bid amount. If the amount of deck replacement is less than 7%, the contractor is to provide a credit to the District equal to the unit price of deck replacement per sq ft multiplied by the sq ft less than the base bid amount.

Item No. 1.08: Question: 01 10 00 Summary of Work item 1.02.14 During course of job walk, PM confirmed that existing HVAC curbs are to remain and be reused. Drawings call for a curb adapter to set new units. Please provide data on existing units which will determine size and type of adapter required for new equipment.

Answer: To clarify: AC-3 new pad. AC-4 existing curb with new curb adapter. AC-5 new pad. AC-6 new pad with custom curb. AC-7 new pad with custom curb. AC-4, exact dimensions of adapter required shall be field verified based on the equipment submitted. AC-6 & 7, please reference details 1 and 2 on sheet M.50 for adapter kit and curb information.

Item No. 1.09: Question: During course of job walk, PM stated that District anticipates multiple mobilizations. Roofing must be done over the summer months, however, current lead time estimate for HVAC units is 22-25 weeks which would require remobilization around October 2022. Please advise if it would be acceptable to demo and re-roof the two "upper roofs" over the summer break and leave the "lowest roof" to be completed when remobilize for HVAC install. If not, please provide temporary detail for terminating new roof adjacent to existing curbs tying into existing roofing until HVAC units can be replaced.
Answer: This is a means/methods question. Attached are details for temporary install of roofing pre HVAC unit install and post HVAC install for final roof installation. Details AD-01 and AD-02.

Specifications:

Item No. 1.10: Reference Revised Section

A) The following specification section is hereby Replaced:

07 52 16 Modified Bitumen Membrane Roofing System

Drawings:

Item No. 1.11: Reference Revised Drawing

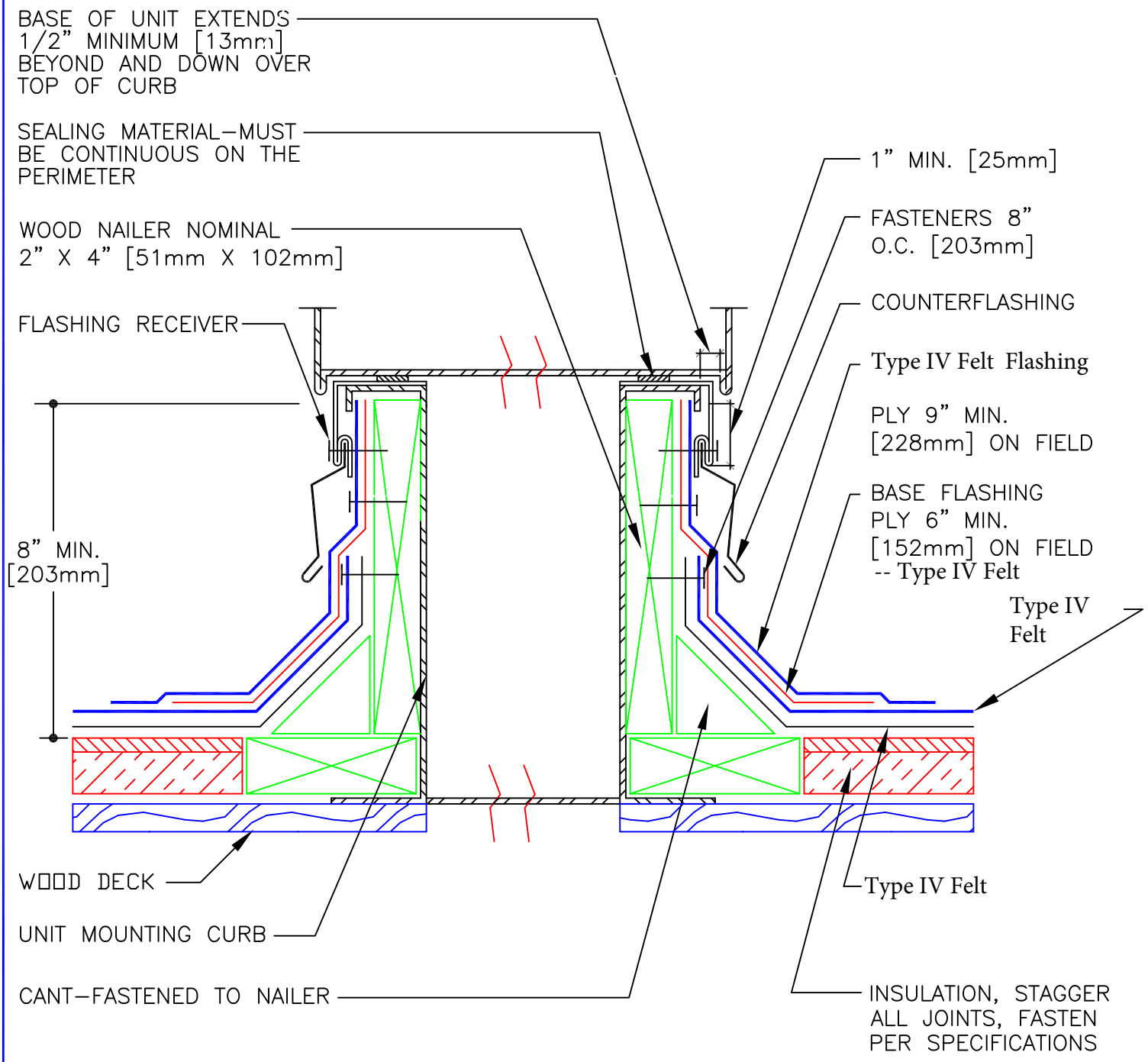
A) Detail 17 on sheet A.10 has been revised, see attached detail AD-03.

LEAF Engineers // BEAM Professionals

END OF ADDENDUM NO. 01

8163 Rochester Ave, Suite 100 \\ Rancho Cucamonga, California 91730 \\ P 909.987.0909 \\ LEAFengineers.com

PRE HVAC INSTALL DETAIL AD-01



GARLAND since 1895

THE GARLAND COMPANY, INC.

GARLAND CANADA, INC.

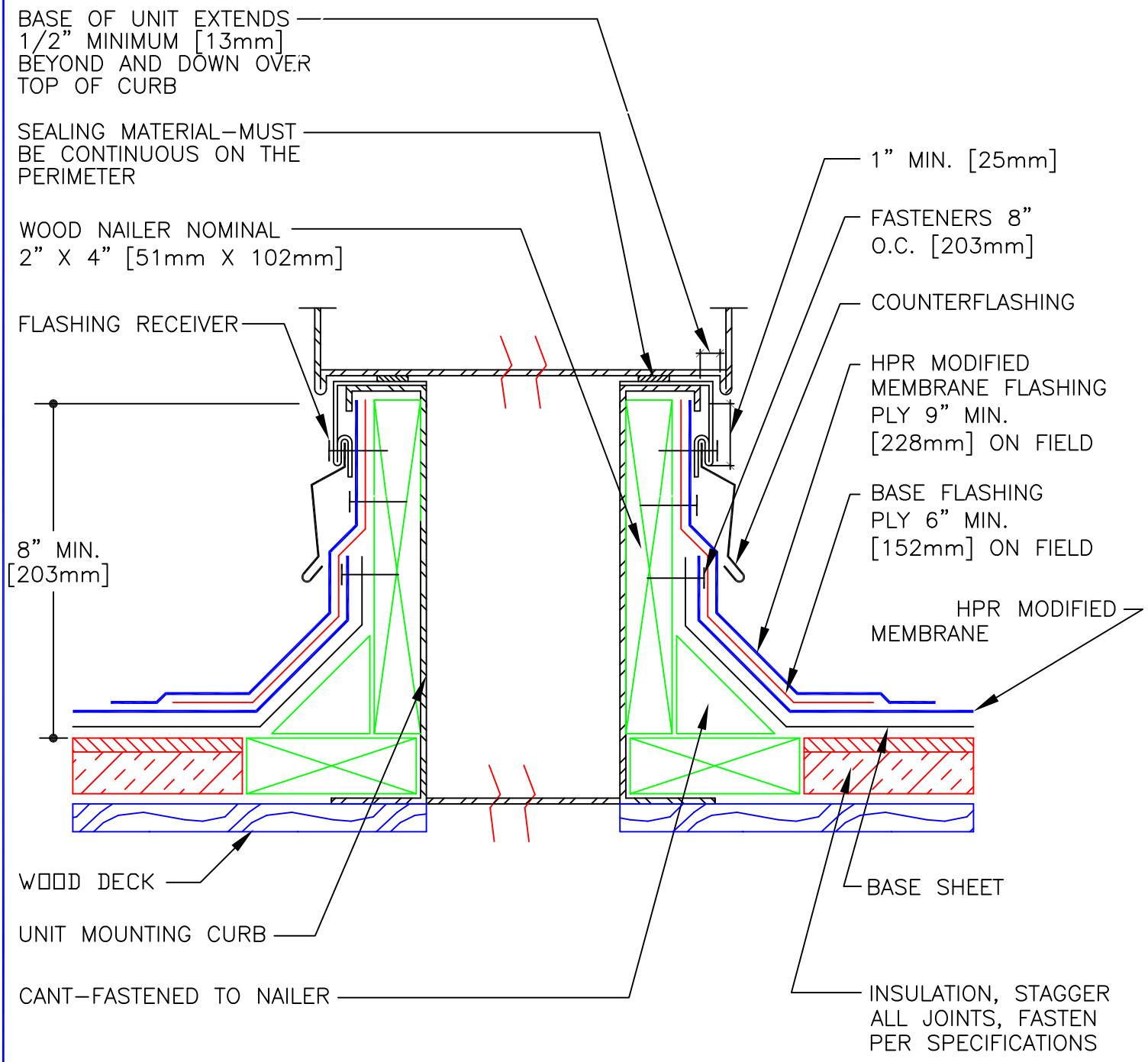
THE GARLAND COMPANY UK, LTD

DETAIL:

CURB DETAIL / HANDLING STATION

TORCH APPLIED

POST HVAC INSTALL DETAIL AD-02



THE GARLAND COMPANY, INC.

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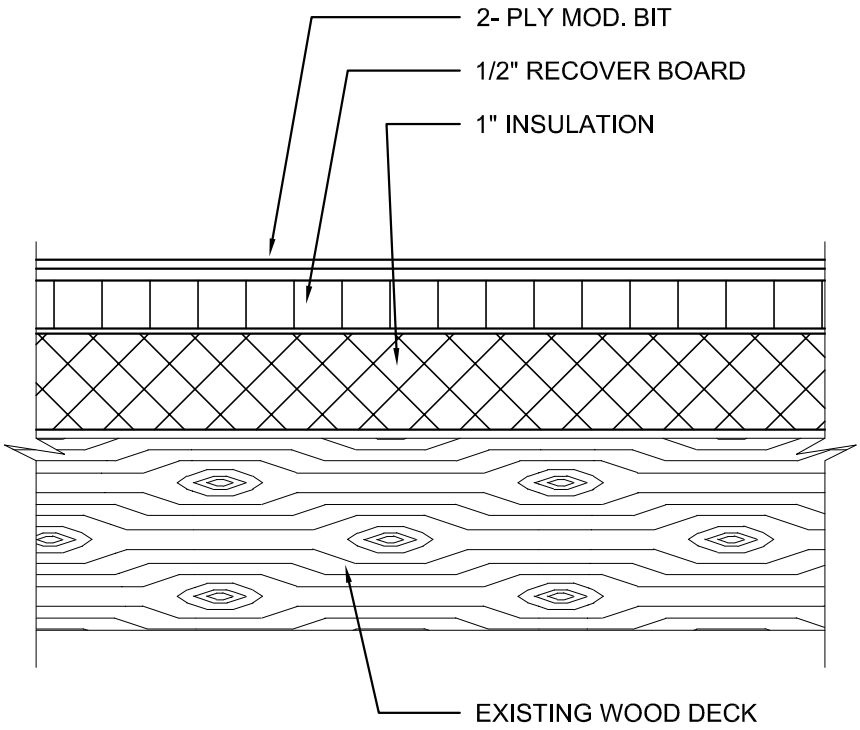
DETAIL:

CURB DETAIL / HANDLING STATION

TORCH APPLIED

A



17 NEW NOMENCLATURE

NOT TO SCALE

Reference Drawing 17/A.10

BEAM PROFESSIONALS

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Project: EL CAMINO HIGH SCHOOL TRUAX EXTERIOR IMPROVEMENTS ROOFING/ HVAC/ ACCESS LADDER	Sketch No.
Project No. 2136900ME	AD_03
Description: ADDENDUM NO. 1	
Date: 03/29/22	

SECTION 07 52 16

MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Modified Bituminous Membrane Roofing
2. Nails and Fastener
3. Copping and Flashing: For areas immediately adjacent to roofing membrane.

B. Scope of Work:

1. Remove the existing roof system to the structural deck. Comply with abatement report.
2. Repair any damaged decking as required. Contractor to include 7% deck replacement in the base bid. If the amount of deck replacement exceeds 7%, the contractor is to receive a change order equal to the unit price for deck replacement per sq ft multiplied by the sq ft in excess of the base bid amount. If the amount of deck replacement is less than 7%, the contractor is to provide a credit to the District equal to the unit price of deck replacement per sq ft multiplied by the sq ft less than the base bid amount.
3. Mechanically fasten 1” polyiso insulation with ½” recover board.
4. Apply 80 mil SBS modified underlayment – Stressbase 80 -- in hot asphalt at rate of 25 lbs per sq.
5. Apply dual fiberglass-reinforced SBS modified, UV Resistant cap sheet – Stressply Plus FR Min UV -- in hot asphalt at rate of 30 lbs per sq.
6. Flashings:
    a. Apply SBS-modified flashing ply in all flashing areas –80 mil SBS modified underlayment. Flashing ply to extend min 6” onto the roof field. Apply dual fiberglass-reinforced SBS modified cap sheet flashing cap ply in all flashing areas extending a min 9” onto the roof field.
    b. Three course with mastic all vertical seams.
    c. All flashing plies to be terminated with a termination bar set in butyl tape and fastened every 6” o.c. Caulk above the termination bar.
    d. HVAC / Equipment / Roof Hatch: Flashing plies to be terminated with a termination bar set in butyl tape. Fasten every 6” o.c. Caulk above termination bar. Install 22 gauge, galvanized skirt metal to the existing counterflashing metal.
    e. Existing Counterflashing Metal: Flashing plies to be terminated with a termination bar set in butyl tape. Fasten every 6” o.c. Caulk above termination bar. Install new 22 gauge, galvanized surface mount

counterflashing. Caulk above the surface mount counterflashing. Fill in the wall flutes with caulking. Apply three course white liquid flashing along the counterflashing surface to ensure a water tight condition.

f. Coping Cap Metal: Remove the existing coping cap metal. Install wood nailer if needed. Flashing plies to extend up and over the parapet wall to the leading edge. Install new, kynar, 22 gauge coping cap metal. District to determine color. Seal with caulking at the wall and coping intersection.

7. No pitch pockets on roof. Lead flash all penetrations. Roofing contractor to supply and install all lead flashings. Install umbrella cover over all caulked clamps. Caulk umbrella.
8. All conduit to be placed on rubber walkpads.
9. All vents to be replaced with new vent covers.
10. All drains to receive new drain rings and drain covers. Sump insulation to the drains.
11. Metal Pans / Vents: Remove any loos paint. Wirebrush any rust. Apply Silicone at 2 gal per sq over the units.
12. Ladder mount penetrations to be sealed liquid flashed.
13. Install downspout splash pans where existing downspouts drain on the roof.
14. Contractor to apply silicone at a rate of 3 gal per sq to any ponding water areas.

1.02 REFERENCES

A. American Society of Civil Engineers (ASCE):

1. ASCE 7-05, Minimum Design Loads for Buildings and Other Structures.

B. American Society for Testing and Materials (ASTM):

1. ASTM 0451 Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
2. ASTM D 1079 Standard Terminology Relating, to Roofing, Waterproofing and Bituminous Materials.
3. ASTM D 1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
4. ASTM D1863 Standard Specification tor Mineral Aggregate Used as a Protective Coating for Roofing.
5. ASTM D4S86 Standard Specification for Asphalt Roof Cement.
6. ASTM D2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coating.
7. ASTM DSI47 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.

8. ASTM D6162 Standard Specification tor Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
9. ASTM D6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
10. ASTM E108 Standard Test Methods for Fire Test of Roof Coverings.

C. Factory Mutual Research (FM):

1. Roof Assembly Classifications.

D. National Roofing Contractors Association (NRCA):

1. Roofing and Waterproofing Manual.

E. Underwriters Laboratories, Inc. (UL):

1. Fire Hazard Classifications.

F. Warnock Hersey (WH):

1. Fire Hazard Classifications.

1.03 SUBMITTALS

A. Product Data:

1. Submit manufacturer product data for all products necessary for completion of roofing system and as specified including manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with minimum specified requirements.

B. Test Data and Certifications:

1. Submit independent test data according to ASTM designation D-SI47-91 "Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material", substantiating that materials comply with specified requirements.
2. Submit independent test data that indicates the cap sheet complies with CRCC and title 24 requirements.
3. Submit certification that the roof system furnished is approved by Factory Mutual, Underwriters Laboratories, or Warnock Hersey for external fire E-108 Class IA and that the roof system is adhered properly to meet or exceed 1-90.
4. Submit copy of ISO 9001 certified compliance.

C. Calculations:

1. Submit engineered wind-uplift calculations, stamped by a registered California engineer, that membrane manufacturer warranting wind uplift speeds of up to 90 mph for all components of field assembly and perimeter flashing systems.

D. Manufacturer Qualification’s:

1. Submit list of facilities where the proposed material has been used in a similar roofing system as that which is specified and within one hundred mile radius from the location of the specified job. Include a minimum of three projects at least three years old and that are available for OUSD to inspect.

2. Submit manufacturer's inspector qualifications with certification to perform inspections signed by an officer of the company for this specific project. Also, show evidence that roofing manufacturer has five years of experience performing daily site inspections during construction and preparing daily inspection reports with a full time employee of that manufacturer. Contact information will be required for verification.

E. Installer Qualifications:

1. Submit installer qualifications; refer to Quality Assurance article below.

F. Samples:

1. Submit samples of each product being proposed for use. Provide a wet sample of the membrane adhesive and provide third party testing for zero VOC membrane adhesive.

G. Warranty:

1. Submit unexecuted Manufacturer's Thirty-year High-Performance Edge-to-Edge No Dollar Limit (NDL) warranty covering LABOR AND MATERIALS for ALL components of the roofing system required against leaks, edge to edge (perimeter metal) and deck up (all base sheets, flashing components and insulation. Warranty covers: Metal Coping, Counter flashing, and Edge metal where applicable, insulation, base ply, cap, coating, lead flashings, and any and all miscellaneous roof flashings.

H. Shop Drawings:

1. Submit manufacturer engineered stamped shop drawings, layouts, and coordinated details.

1.04 QUALITY ASSURANCE REQUIREMENTS

A. Manufacturer Qualifications: Roofing system manufacturer shall have a minimum of 30 years' experience in manufacturing bitumen roofing products in the United States and be ISO 9001 certified and Manufacturer must have local references and have 5 years' experience in daily site inspections and daily inspection reports forwarded to manufacturer.

B. Installer Qualifications: Installer (Roofer) shall be specializing in modified bituminous roof application with minimum 10 years' experience and who is currently approved (within the last three years) 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/Foreman 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. In addition, a minimum two-hour fire watch is required on each day that torch applied membranes are installed. 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 General Contractor / Roof Contractor's responsibility to respond immediately to correction of roof leakage during construction. If the Roof Contractor does not respond within 24 hours, OUSD has the right to hire a qualified Roof Contractor and back charge the original General Contractor / Roof Contractor.

E. Pre-application Roofing Conference: Before scheduled commencement of modified bitumen roof system installation and associated work meet at project site with 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 must precede or follow roofing work (including mechanical work if any), OUSD, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) OUSD's insurers, test agencies, and governing authorities.

1. Objectives to include:

a. Review foreseeable methods and procedures related to roofing work.

b. Tour representative areas of roofing substrates (decks), inspect, accept or identify any deficiencies of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.

c. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.

d. Review roofing system requirements (drawings, specifications and other contract documents).

e. Review approved submittals and shop drawings.

f. Review and finalize construction schedule related to roofing work and verify availability of material, Installer's personnel, equipment and facilities needed to make progress and avoid delays.

g. Review required inspection, testing, certifying and material usage accounting procedures.

h. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).

i. 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.

j. Review notification procedures for weather or non-working days.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged. Any damaged material to be noted at delivery and returned at no cost to OUSD.

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 materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

1.06 MANUFACTURER'S DUTIES TO DISTRICT

A. During the installation of the roofing, the Manufacturer will provide the following:

1. Keep DISTRICT informed as to the progress and quality or the work as observed.

2. Job site inspections a minimum of five days a week. Daily inspection reports sent to OUSD representatives and contractor each day.

3. Report 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 that no application procedures are in conflict with the specifications other than those that may have been previously reported and corrected.

5. A qualified roofing inspector to conduct inspections of the roofing installation on the project.

B. Upon completion of the project, the Manufacturer will provide the following:

1. Provide warranty to DISTRICT at no additional charge.

2. Provide a minimum of two inspections annually of the roof during the warranty period. Notify OUSD prior to any inspections. Provide a written report of findings and schedule of work and or repairs, if any should be necessary, within 10 days of inspection.

3. Provide all future necessary work and or repairs at no cost to OUSD. Manufacturer to acknowledge this requirement with a signed document from an officer of the company.

1.07 PROJECT CONDITIONS

A. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or when a 40% change 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.

E. All slopes greater than 2: 12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank one (1) inch cap nails, or screws and plates at a rate of one (1) fastener per ply (including the membrane) at each insulation stop. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to

facilitate back nailing. Install four (4) additional fasteners at the upper edge of the membrane when strapping the plies.

1.08 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 acceptable.

1.09 WARRANTY

A. Roofing Contractor will provide a minimum of a five year no limit warranty to the membrane manufacturer with a copy directly to OUSD.

B. Manufacturer will provide manufacturer's Thirty Year High-Performance No Dollar Limit (NDL) warranty covering 100% labor and materials for all components installed by roofing contractor.

C. Membrane manufacture will provide a minimum of two inspections annually or the roof for the entire warranty period and will provide all work necessary for warranty at no cost to OUSD.

D. Single source warranty from the manufacturer covering all membranes, coatings and specified perimeter roof flashings in other sections that meet ANSI SPRI ES I code requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. The design is based upon the OUSD Board Approved Standard for Roofing system -- The Garland Company:

The Garland Company
3800 East 91st Street
Cleveland, Ohio 44105
Miles Taylor
310-367-7655

2.02 DESCRIPTION

A. Modified bituminous roofing materials:

1. Base (Ply) Sheet:

a. Stressbase 80

2. Modified Cap (Ply) Sheet:

a. Stressply Plus FR Mineral UV

3. Interply Adhesive:

a. Type III Asphalt:

4. Flashing Base Ply:
   a. Stressbase 80
5. Flashing Cap (Ply) Sheet:
   a. Stressply Plus FR Mineral UV
6. Flashing Ply Adhesive:
   a. Type III Asphalt:

2.03 SHEET MATERIALS - PERFORMANCE CHARACTERISTICS

A. Styrene-Butadiene-Styrene (SBS) Roofing Membrane:

1. ASTM D 6163 Type III Grade G
2. Tensile Strength (ASTM D-5147)
   a. 2 in/min.@ 73.41+/- 3.6°F MD 310 lbf/in CMD 310 lbf/in
3. Tear Strength (ASTM D-5147)
   a. 2 in/min.@ 73.41+/- 3.6°F MD 500lbf CMD 500 lbf
4. Elongation at Maximum Tensile (ASTM D-5147)
   a. 2 in/min. @ 73.4+/- 3.6°F MD 6.0% CMD 6.0%
   b. 50 mm/min. @ 23 +/- 3°C
5. Low Temperature Flexibility (ASTM D-5147) Passes -40°F (-23°C)

2.04 SURFACINGS

A. No Surface Coating accepted except in waterways and drain areas. Cap Sheet UV Minerals, cap sheet must be title 24, CRCC certified.

1. Reflectance .73
2. Emittance .89
3. SRI 90

2.05 RELATED MATERIALS

A. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, r addition plates should be used. Fasteners shall be self-clinching type of penetrating type as recommended by the manufacturer of the deck material. Nails and fasteners shall be flush-driven through flat metal discs of not less than one (1) inch diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than one (1) inch diameter are used.

B. Walkway Pads: As recommended and furnished by the membrane manufacturer set in approved adhesive to control foot traffic on rooftop surface and give a durable system compliant non-slip walkway.

C. Walkway Pad Adhesive: Adhesive used to adhere approved walk way pads as recommended and furnished by the membrane manufacturer.

D. Coping Cap Metal: 22 gauge, galvanized, Kynar coated coping cap sheet metal. Must meet ANSI SPRI ES I code requirement and be manufactured and warranted by membrane manufacturer.

E. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.

F. 4lb lead Jacks for flashing penetrations, no lead will be accepted on this project.

PART 3 – EXECUTION

3.01 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 Roof System Manufacturer and Installer.

3.02 GENERAL INSTALLATION REQUIREMENTS

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

B. Insurance/Code Compliance: Where required, install and test the roofing system to comply with governing regulation 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 modified bituminous 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 (2) plies of#15 organic roofing felt with joints and edges sealed with roofing cement and other jointly agreed upon tie-in detail. Remove cut-offs immediately before resuming work.

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

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. Cut-Offs: At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary covering of two 1 plies torch smooth roofing membrane with joints and edges sealed or other jointly agreed upon tie-in detail.

H. A minimum two-hour fire watch to remain daily after installation of last torch applied membrane for each day that torch-applied membranes are installed.

3.03 INSTALLATION HOT APPLIED ROOF SYSTEM

A. Mechanically fasten per wind uplift requirements R8 polyiso insulation and ½ perlite coverboard.

B. Base/Felt Ply(s): Install Stressbase 80 in twenty five (25) lbs (11.3kg) per square of bitumen shingled uniformly to achieve one or more plies over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on base rolls until asphalt has cooled, fish mouths should be cut and patched.

1. Lap ply sheet ends 8 inches (203 mm). Stagger end laps 2 inches (304mm) minimum.
2. Install base flashing ply to all perimeter and projection details after membrane application.
3. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
4. Install base flashing ply to all perimeter and projection details.
5. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.

C. Modified Cap Ply(s): Solidly bond the modified membrane to the base layers with specified material at the rate of 25 to thirty 30 lbs. (11-13kg) per 100 square feet.Roll must push a puddle of hot material in front of it with material slightly visible at all side laps. Use care to eliminate air entrapment under the membrane. Exercise care during application to eliminate air entrapment under the membrane.

1. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.
2. Install subsequent rolls of modified membrane as above with a minimum of 4 inch (101 mm) side laps and 8 inch (203 mm) end laps. Stagger end laps. Apply membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.
3. Apply hot material no more than 5 feet (1.5 m) ahead of each roll being embedded.
4. Extend membrane 2 inches (50 mm) beyond top edge of all cants in full moppings of the specified hot material.

D. 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.

E. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips

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.

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

G. 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 6 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.

H. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.Seal 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 surfaces to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
2. Adhere to the underlying base flashing ply with specified hot material unless otherwise noted in these specifications. 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.
4. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and mesh.
5. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work as specified.
6. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.

I. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the cap ply.

1. Seal 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.
2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.

5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
6. All stripping shall be installed prior to flashing cap sheet installation.
7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.

J. Surface Coatings: No surface coating required.

3.04 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. Fabricated Flashings: Fabricated flashings and trim as needed per scope of work.

1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the Copper Development Association "Copper in Architecture - Handbook" as applicable.

B. Manufactured Roof Specialties: Manufactured copings, facia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in Section

1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the National Roofing Contractor's Association "Roofing and Waterproofing Manual" as applicable.

C. Counterflashing / Skirt Metal Flashing.

1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of the roof.
4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
6. At existing reglet counterflashing, mechanically fasten new 22 gauge, galvanized skirt metal to the existing counterflashing metal.
7. Where new reglet metal ins required, cut reglet in masonry one joint above flashing. Secure reglet counterflashing with expansion fasteners and caulk reglet opening.

D. Curb Detail/Air Handling Station:

1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
5. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

E. Pre-manufactured Curb For Equipment Support:

1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Run all field plies over cant of the pre-manufactured equipment support a minimum of 2 inches.
3. Install base flashing ply covering pre-manufactured curb with 6 inches (152 mm) on to field of the roof.
4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
5. Install pre-manufactured cover. Fasten sides at 24 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

F. Exhaust Fan:

1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering curb with 6 inches (152 mm) on to field of the roof.
4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course

application of mastic and mesh at all vertical seams and allow to cure and aluminize.

5. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation.

G. Passive Vent/Air Intake:

1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering curb with 6 inches (152mm) on to the field of the roof.
4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
5. Install passive vent/air intake over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendations.

H. Roof Drain:

1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
3. Run roof system plies over drain. Cut out plies inside drain bowl.
4. Set lead flashing (30 inch square minimum) in 1/4 inch bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
5. Install base flashing ply (40 inch square minimum) in bitumen.
6. Install modified membrane (48 inch square minimum) in bitumen.
7. Install clamping ring and assure that all plies are under the clamping ring.
8. Remove drain plug and install strainer.

I. Plumbing Stack:

1. Minimum stack height is 12 inches (609 mm).
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
4. Install base flashing ply in bitumen.
5. Install membrane in bitumen.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Turn sleeve a minimum of 1 inch (25 mm) down inside of stack.

J. Heat Stack:

1. Minimum stack height is 12 inches (609 mm).
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
4. Install base flashing ply in bitumen.
5. Install modified membrane in bitumen.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Install new collar over cape. Weld collar or install stainless steel draw brand.

K. Liquid Flashing:

1. Mask target area on roof membrane with tape.
2. Clean all non-porous areas with isopropyl alcohol.
3. Apply 32 wet mil base coat of liquid flashing over masked area.
4. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
5. Apply 48-64 wet mil top coat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.
6. Apply minerals immediately or allow the liquid flashing material to cure 15-30 days and then install reflective coating.

3.05 SURFACING

A. No Surfacing required.

3.06 APPLICATION OF SURFACING

A. Prior to installation of surface, obtain approval from manufacturer as to work completed Roof besides mastic can be coated immediately upon approval of punch list items.

B. Reflective Coating: No coatings on this project. Installed sheet must meet title 24 requirements.

C. Sawtooth Valleys: Apply cold process polymer modified coal tar restoration top coating – Black Knight Cold (or equal) – at a rate of 5 gal per sq. Embed 400 lbs per sq of Title 24 compliant, white gravel into the coating. Surface coating to extend the width of the valley.

3.06 CLEANING

A. Remove drippage of bitumen from all walls, windows, floors, ladders and finished surfaces.

B. In areas where finished surfaces are soiled by asphalt or any other sources of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

3.07 FINAL INSPECTION

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

B. Inspect 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. OUSD reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the Contractor at no additional cost to OUSD.

D. If core cuts verify the presence of damp or wet materials, the Contractor shall be required to replace the damaged areas at his own expense.

E. 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.

F. The Contractor is to notify OUSD upon completion of corrections.

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

END OF SECTION 07 52 16