SECTION 07550
MODIFIED BITUMINOUS MEMBRANE ROOFING

BURBANK UNIFIED SCHOOL DISTRICT
SUMMER 2025 ROOFING PROJECTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cold Applied 2-Ply Thermoplastic Hybrid Roof System (KEE-Stone HP).

B. Accessories.

C. Edge Treatment and Roof Penetration Flashings.

1.2 SCOPE OF WORK

A. Provide all labor, equipment, and miscellaneous materials to install District purchased and furnished roofing materials over the properly prepared substrate.

B. DISTRICT SUPPLIED MATERIAL

Note that this project includes the installation of owner-supplied material; the District has acquired roofing material through the CMAS (California Multiple Award Schedules) program.

C. All products listed in 2.1, D will be furnished by the District. All products not listed in 2.1, D are to be furnished by the Contractor. All products listed in 2.1, D will be manufactured by The Garland Company and purchased by Burbank Unified School District. Any material or accessories required for the installation of the roof system in excess of the district provided material must be supplied by the Contractor. It is up to the Contractor to determine the precise amount of material required for the completion of this project; and to provide excess material, as required.

D. Contractor to comply with Roof Site Maps to determine scopes of work for each building. Contractor responsible to determine deck type. Color-coded site map for reference only.

E. Roof Recover Scope of Work (Buildings highlighted in orange and yellow)
1. Prior to any work, the contractor is to test the drains. Contractor to ensure the drains are not clogged and are not leaking. Drains to be tested and approved by the District before any installation.
2. Prep the roof for recover:
    a. Remove all non-functioning equipment and any marked curbs no longer in use. Deck these areas in.
    b. Remove and replace all areas of wet insulation in like-kind, as noted on project documents. Tie-in to existing roof. Additional areas of wet insulation replacement to be priced per square foot.
    c. Clean roofs of all dust, dirt, and debris. Remove all loose, flaking, or deteriorated coatings. Remove all silicone coatings and sealants.
    d. Remove all blisters, wrinkles and mole runs in roof membrane. Patch in like-kind materials to tie-in to existing roof.
    e. Install crickets on high side of all equipment as needed to eliminate ponding.

Wood / Metal Decks: Mechanically fasten new ½" perlite coverboard per approved wind uplift pattern.

f. Exception for all wood deck canopies/walkways: Adhere new ½" perlite coverboard with Insul-Lock HR per approved wind uplift adhesive spacing.
g. Metal deck canopies/walkways to receive fasteners in valleys with no fasteners exposed on underside.

Concrete Deck: Adhere new ½" perlite coverboard with Insul-Lock HR per approved wind uplift adhesive spacing.

3. Install one ply Flexbase E 80 set in GreenLock membrane adhesive applied at a minimum 2.5 gal/100sf
    a. If the slope exceeds 3:12, contractor to install Greenlock Flashing Adhesive at a rate of 3 gal per sq.
4. Install one ply KEE-Stone HP set in KEE-Lock spatter spray foam adhesive applied per product wind uplift criteria and datasheets.
5. Flashings:
    a. Base Flashing Ply: Flexbase E 80.
    b. Base Flashing Adhesive: Greenlock Flashing Membrane applied at 3 gal per sq.
    c. Cap Sheet Flashing ply: KEE Stone NF Flashing
    d. Cap Sheet Adhesive: KEE Lock WB Flashing Adhesive applied at a rate of 1 gal per sq.
    e. Flashing Plies: All flashing plies to be terminated with termination bar set in butyl tape. Fasten termination bar every 2" o.c. Caulk above the termination bar.
    f. Edge Metal: Replace all. Comply with manufacturer detail. Edge metal to sit on Flexbase E 80 sheet, set in mastic, and primed. Install Flexbase E 80 strip-in sheet. KEE Stone HP sheet and KEE Stone NF Flashing to be applied above.
    g. Counterflashing: All flashing plies to be terminated as high as possible under the existing counterflashing metal with termination bar set in butyl tape. Caulk above the termination bar. Fasten termination bar every 2" o.c. Install 22 gauge, galvanized skirt metal flashing to existing counterflashing metal.
    h. Parapet Walls: Wrap the flashing plies up and over the wood nailer, extending down the exterior wall 2". Cap sheet flashing ply to be on walls in excess of 2.5 feet, Flexbase E 80 set in Greenlock Flashing adhesive only to extend up the wall 2.5 feet and terminate with a termination bar. KEE Stone NF Flashing ply to extend up the entire wall set in KEE Lock WB Flashing Adhesive.
    i. Lead Flashings: Install new KEE Boots. Clamp and caulk and install an umbrella cover, clamped and caulked. No pitch pockets permitted. All "L" metal to receive a wood block prior to the pipe boot install.
    j. Expansion Joint: Install new rubber expansion joints in the field. Patch and repair expansion joints at the vertical wall to field.
    k. Drains: Install lead flashings per manufacturer detail.
    l. Scuppers: Install new metal lining per manufacturer details. Seal exterior leader head.
6. Duct Work & Metal Pans: All seams / fasteners / joints to be sealed with 4" Unibond ST tape and Cool-Sil coating at 2 gallons per 100SF. Coat all equipment, duct, and metal pans with Cool-Sil at 2 gallons per 100SF.

7. Sheet Metal: All sheet metal to be ANSI SPRI ES-1 compliant. All metal to be manufactured by The Garland Company.
    a. Coping: Replace all existing coping cap, as well as install coping cap metal at all parapet walls. Install wood nailer as required. Install 22 gauge, kynar coping – fabricated from RMER SS Flat Stock. Coping to be fastened with metal cleats per approved wind-uplift calculations. No exposed fasteners. District to determine color.
    b. Gutters: Replace all existing gutters. Install 22 gauge, kynar gutters – fabricated from RMER SS Flat Stock. All gutters to be 5”x5”x5” box gutters.
    c. Perimeter Edge: Remove and replace all edge metal. Install new edge metal- fabricated from RMER SS Flat Stock. Abrade metal surface and prime with Garla-Prime prior to application of roofing membrane.
    d. Add Alternate: Metal Fascia: All metal fascia is to be replaced with new metal fascia. Color to be selected by District. Fabricate from RMER SS Flat Stock to match existing style.
    e. Wood fascia replacement to be priced per linear foot. All new fascia to be primed and painted to match existing color.
    f. Interior Walls: Install new 22 gauge, reglet skirt metal flashing. Flashing plies to be set as high as possible. Terminate materials with termination bar set in butyl tape fastened every 6” o.c.. Seal above the term bar with Tuff-Stuff MS Sealant. Fasten skirt metal to existing counterflashing metal. Fabricate from RMER SS Flat Stock
8. Place all conduit on new rubber blocks, no wood supports.
9. Remove and replace all rusted and damaged vent covers.
10. All fasteners to be fastened to the vertical side of the edge metal. No penetrations on horizontal side of edge metal or coping.
11. All drains to be sumped where possible. All broken or damaged drains to be replaced. Drain domes and drain rings to be replaced. Copper drains are not permitted. Lead flash all drains as per manufacturer detail.
12. Install Garland WPG KEE Walkways around all mechanical units. Walkways are not to be installed over field seams.
13. Install new splash pans for all internal downspouts.
14. Replace metal pans that are rusted. Replace all damaged pans with new seamless sheet metal.
15. Interior walls and parapets- Seal all voids and penetrations with Tuff-Stuff MS Sealant. Coat walls with Tuff Coat applied in a two coat application at 1 gallon per 100SF per coat for a total of 2 gallons per 100SF of coverage. Color to be selected by District.
16. White roofs only- all products used are to be white in color unless otherwise specified. Any significant markings left on roof to be removed and/or coated white.
17. The contractor is responsible for ensuring positive drainage and no ponding conditions

F. Roof Replacement Scope of Work (Buildings highlighted in blue)

1. Prior to any work, the contractor is to test the drains. Contractor to ensure the drains are not clogged and are not leaking. Drains to be tested and approved by the District before any installation.
2. Remove the existing roof system to the structural deck. District to mark any non-functioning equipment. All marked equipment to be removed during demolition.
3. 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 amount included in the base bid amount. If the amount of deck replacement is less than 7%, the contractor is to provide a credit.

4. If insulation is previously installed, Install new polyiso insulation to match existing height. Mechanically fasten ½" Perlite coverboard per approved wind-uplift pattern. If no insulation, Mechanically fasten Type-II Base Sheet.
5. Install one ply Flexbase E 80 set in GreenLock membrane adhesive applied at a minimum 2.5 gal/100sf.
    a. If the slope exceeds 3:12, contractor to install Greenlock Flashing Adhesive at a rate of 3 gal per sq.
6. Install one ply KEE-Stone HP set in KEE-Lock spatter spray foam adhesive applied per product wind uplift criteria and datasheets.
7. Flashings:
    a. Base Flashing Ply: Flexbase E 80.
    b. Base Flashing Adhesive: Greenlock Flashing Membrane applied at 3 gal per sq.
    c. Cap Sheet Flashing ply: KEE Stone NF Flashing
    d. Cap Sheet Adhesive: KEE Lock WB Flashing Adhesive applied at a rate of 1 gal per sq.
    e. Flashing Plies: All flashing plies to be terminated with termination bar set in butyl tape. Fasten termination bar every 2" o.c. Caulk above the termination bar.
    f. Edge Metal: Replace all. Comply with manufacturer detail. Edge metal to sit on Flexbase E 80 sheet, set in mastic, and primed. Install Flexbase E 80 strip in sheet. KEE Stone HP sheet and KEE Stone NF Flashing to be applied above.
    g. Counterflashing: All flashing plies to be terminated as high as possible under the existing counterflashing metal with termination bar set in butyl tape. Fasten termination bar every 2" o.c. Caulk above the termination bar. Install 22 gauge, galvanized skirt metal flashing to existing counterflashing metal.
    h. Parapet Walls: Wrap the flashing plies up and over the wood nailer, extending down the exterior wall 2". Cap sheet flashing ply to be on walls in excess of 2.5 feet, Flexbase E 80 set in Greenlock Flashing adhesive only to extend up the wall 2.5 feet and terminate with a termination bar. KEE Stone NF Flashing ply to extend up the entire wall set in KEE Lock WB Flashing Adhesive.
    i. Lead Flashings: Install new KEE Boots. Clamp and caulk and install an umbrella cover, clamped and caulked. No pitch pockets permitted. All "L" metal to receive a wood block prior to the pipe boot install.
    j. Expansion Joint: Install new rubber expansion joints in the field. Patch and repair expansion joints at the vertical wall to field.
    k. Drains: Install lead flashings per manufacturer detail.
    l. Scuppers: Install new metal lining per manufacturer details. Seal exterior leader head.
8. Duct Work & Metal Pans: All seams / fasteners / joints to be sealed with 4" Unibond ST tape and Cool-Sil coating at 2 gallons per 100SF. Coat all equipment, duct, and metal pans with Cool-Sil at 2 gallons per 100SF.
9. Sheet Metal: All sheet metal to be ANSI SPRI ES-1 compliant. All metal to be manufactured by The Garland Company

a. Coping: Replace all existing coping cap, as well as install coping cap metal at all parapet walls. Install wood nailer as required. Install 22 gauge, kynar coping – fabricated from RMER SS Flat Stock. Coping to be fastened with metal cleats per approved wind-uplift calculations. No exposed fasteners. District to determine color.
b. Gutters: Replace all existing gutters. Install 22 gauge, kynar gutters – fabricated from RMER SS Flat Stock. All gutters to be 5”x5”x5” box gutters.
c. Perimeter Edge: Remove and replace all edge metal. Install new edge metal- fabricated from RMER SS Flat Stock. Abrade metal surface and prime with Garla-Prime prior to application of roofing membrane.
d. Add Alternate: Metal Fascia: All metal fascia is to be replaced with new metal fascia. Color to be selected by District. Fabricate from RMER SS Flat Stock to match existing style.
e. Wood fascia replacement to be priced per linear foot. All new fascia to be primed and painted to match existing color.
f. Interior Walls: Install new 22 gauge, reglet skirt metal flashing. Flashing plies to be set as high as possible. Terminate materials with termination bar set in butyl tape fastened every 6” o.c.. Seal above the term bar with Tuff-Stuff MS Sealant. Fasten skirt metal to existing counterflashing metal. Fabricate from RMER SS Flat Stock

10. Place all conduit on new rubber blocks, no wood supports.
11. Remove and replace all rusted and damaged vent covers.
12. All fasteners to be fastened to the vertical side of the edge metal. No penetrations on horizontal side of edge metal or coping.
13. All drains to be sumped where possible. All broken or damaged drains to be replaced. Drain domes and drain rings to be replaced. Copper drains are not permitted. Lead flash all drains as per manufacturer detail.
14. Install Garland WPG KEE Walkways around all mechanical units. Walkways are not to be installed over field seams.
15. Install new splash pans for all internal downspouts.
16. Replace metal pans that are rusted. Replace all damaged pans with new seamless sheet metal.
17. Interior walls and parapets- Seal all voids and penetrations with Tuff-Stuff MS Sealant. Coat walls with Tuff Coat applied in a two coat application at 1 gallon per 100SF per coat for a total of 2 gallons per 100SF of coverage. Color to be selected by District.
18. White roofs only- all products used are to be white in color unless otherwise specified. Any significant markings left on roof to be removed and/or coated white.
19. The contractor is responsible for ensuring positive drainage and no ponding conditions.

G. Site Specific Instructions:

1. Burbank High School
    a. Building 2- Remove and dispose of all pool heating equipment.
2. Burroughs High School
    a. Building 5 South- Remove and dispose of all pool heating equipment.
3. Luther Burbank Middle School
    a. Cafeteria- Tear-off perimeter and install tapered crickets to drain. White fasteners to be used.
    b. Admin Upper: remove all surface coatings prior to installing Insul-Lock HR adhesive.

c. Auditorium Entry: Install tapered crickets as needed to promote positive drain flow.
d. Gym: Score coverboard as needed. White fasteners to be used. Remove lower flat sections of roof and replace all rusted and damaged metal with Garland RMER SS Flat Stock.

4. John Muir Middle School
   a. CR 200s: District to remove and reinstall solar array.
   b. Gymnasium (upper sections): re-attach loose metal panels at window. Remove all existing, deteriorated window gaskets and/or sealants. Solvent wipe the adjacent substrate surfaces to remove all debris and residual sealant. Install Garland's All-Sil, silicone sealant in accordance with industry standards and the manufacturer's specifications (new sealant color to be selected by District from manufacturer's standard color chart).
   c. Lunch Shelter: No exposed fasteners to be shown on underside.
5. George Washington Elementary School
   a. Building 1: Replace metal expansion joint cover with 22 Gauge RMER SS Flat Stock.
   b. Ensure all HVAC units are installed on proper equipment platforms. Install new platforms as needed.
6. Ralph Waldo Emerson Elementary School
   a. Cafeteria: Remove all existing, deteriorated window gaskets and/or sealants. Solvent wipe the adjacent substrate surfaces to remove all debris and residual sealant. Install Garland's All-Sil, silicone sealant in accordance with industry standards and the manufacturer's specifications (new sealant color to be selected by District from manufacturer's standard color chart).

1.3 REFERENCES

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

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

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

D. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.

E. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.

F. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

G. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.

H. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

I. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.

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

K. ASTM D 6754 - Standard Specification for Ketone Ethylene Ester (KEE) Sheet Roofing.

L. ASTM D 6757 - Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing.

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

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

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

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

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

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

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

T. UL - Fire Resistance Directory.

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

V. California Title 24 Energy Efficient Standards.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

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

B. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.

C. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.

D. Roof system shall have been tested in compliance with the following codes and test requirements:
   1. Cool Roof Rating Council (CRRC)

1.5 SUBMITTALS

A. 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.

B. Shop Drawings: Submit shop drawings if submitting an alternate roof system other than the basis of design 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, a minimum of 7 days prior to bid opening. Shop drawings must be signed and sealed by a professional engineer licensed in the state of CA.

C. 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. If submitting an alternate to the basis of design, contractor is to submit design pressure calculations a minimum of 7 days prior to bid opening that are signed and sealed by a professional engineer licensed to practice in the state of CA

D. Provide a notarized letter stating that a full-time representative of the roofing manufacturer will perform the site inspections listed in section 3.9

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

F. 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.

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

H. 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.

I. 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.

1.6 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. Installer must submit a Certified Pre-approval letter from Garland with bid form.

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.

1.7 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.

1.8 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 Garland

F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.9 COORDINATION

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

1.10 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.

1.11 WARRANTY

A. Upon completion of the work, provide the Manufacturer's written and signed System 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 installer, 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 including Garland Metal Components.
   a. Warranty Period: 40 Year No-Dollar-Limit Warranty

B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work. Contractor will submit warranty to the membrane manufacturer with a copy directly to Burbank USD.
   1. Warranty Period: 5 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. Web Site: www.garlandco.com.

Tony DeMartinis
(818) 900-3000
tdemartinis@garlandco.com

B. Roofing Contractor to be responsible for all Garland materials in excess of District purchased and furnished amount. District to provide material quantities matching the specified amount below. Any additional Garland material required to complete the project is the responsibility of the roofing contractor. Roofing Contractor responsible for purchasing additional materials required, including all freight and tax charges.

C. Roofing contractor to be at delivery of District purchased roof materials. The District has no responsibility to provide any equipment for handling and / or loading the materials to the Contractor's trucks. Upon signature of delivery, the roofing contractor assumes full responsibility for all District purchased roof materials. Any materials lost or stolen are the responsibility of the roofing contractor to replace. Roofing Contractor responsible for freight and tax on the replaced materials.

D. Listed in the tables below are quantities of district provided material. Any material or accessories required for the installation of the roof system in excess of the district provided material must be supplied by the Contractor. It is up to the Contractor to determine the precise amount of material required for the completion of this project; and to provide excess material, as required. Maximum quantity of the OFCI materials to be provided for all roofing which will be provided to the Contractor is as follows:

Burbank High School

Material	Amount	Unit Size
Flexbase E 80	1471	100 sf Roll
KEE Stone HP	184	800 sf Roll

John Burroughs High School

Material	Amount	Unit Size
Flexbase E 80	666	100 sf Roll
KEE Stone HP	84	800 sf Roll

Monterey High School

Material	Amount	Unit Size
Flexbase E 80	246	100 sf Roll
KEE Stone HP	31	800 sf Roll

Magnolia Park School

Material	Amount	Unit Size
Flexbase E 80	62	100 sf Roll
KEE Stone HP	8	800 sf Roll

Luther Burbank Middle School

Material	Amount	Unit Size
Flexbase E 80	1466	100 sf Roll
KEE Stone HP	184	800 sf Roll

John Muir Middle School

Material	Amount	Unit Size
Flexbase E 80	1290	100 sf Roll
KEE Stone HP	162	800 sf Roll

Joaquin Miller Elementary School

Material	Amount	Unit Size
Flexbase E 80	516	100 sf Roll
KEE Stone HP	65	800 sf Roll

George Washington Elementary School

Material	Amount	Unit Size
Flexbase E 80	409	100 sf Roll
KEE Stone HP	52	800 sf Roll

Ralph Waldo Emerson Elementary School

Material	Amount	Unit Size
Flexbase E 80	80	100 sf Roll
KEE Stone HP	10	800 sf Roll

Thomas Jefferson Elementary School

Material	Amount	Unit Size
Flexbase E 80	662	100 sf Roll
KEE Stone HP	83	800 sf Roll

2.2 COLD APPLIED 2-PLY THERMOPLASTIC HYBRID ROOF SYSTEM - KEE-Stone HP

A. Insulation: WPG Polyiso attached per ASCE 7-16 and tapered as necessary to eliminate any ponding conditions

B. Coverboard: ½" Perlite attached per engineered wind uplift calculations.

C. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
   1. FlexBase E 80

D. Thermoplastic Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive (2):
   1. KEE-Stone HP

E. Interply Adhesive: (1)
   1. Green-Lock Plus Membrane Adhesive

F. Interply Adhesive: (2)
   1. KEE-Lock Foam Spatter Spray

G. Flashing Base Ply: One ply bonded to the prepared substrate with Flashing Ply Adhesive:
   1. FlexBase E 80

H. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Flashing Ply Adhesive:
   1. KEE-Stone NF 60 Flashing

I. Flashing Ply Adhesive (1):
   1. Green-Lock Plus Flashing Adhesive

J. Flashing Ply Adhesive (2):
   1. KEE-Lock WB Flashing Adhesive

K. Flashing Ply Adhesive (3):
   1. KEE-Lock Foam

L. Vertical Wall Coating:
   1. Tuff Coat applied in a two-coat application at 1 gallon per 100 sf per coat

2.3 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

A. Coping Cap: R-Mer 22GA flat sheet fabricated and installed per ANSI/SPRI ES-1. Requires wood nailer and continuous cleat

B. Add Alternate Fascia: R-Mer 22GA flat sheet fabricated and installed per ANSI/SPRI ES-1.

C. Edge Metal: R-Mer 22GA flat sheet fabricated and installed per ANSI/SPRI ES-1.

D. Flashing Boot - KEE Flashing Boot: Solarbrite KEE pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.

E. Conduit Supports – WPG C-port foam block supports to be installed to replace all wood blocks to support all conduit throughout the roof.

F. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.

G. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.

H. Liquid Flashing - Tuff-Flash: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
   1. Tensile Strength, ASTM D 412: 400 psi
   2. Elongation, ASTM D 412: 300%
   3. Density @77 deg. F 8.5 lb/gal typical

I. Fabricated Flashings: Fabricated flashings and trim are specified in Section 07620.
   1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.

J. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
   1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

K. Walk pads: WPG KEE Walkway Roll heat welded directly to the KEE roof membrane installed in all high foot traffic areas
   1. Thickness 5/32 in
   2. Roll Size 30 in x 50 ft
   3. Breaking Stength 56 lbs
   4. Elongation 205

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 400 lbs. (136 k) per fastener.

B. Re-Roofing Applications:
   1. Remove existing roof flashings from curbs and parapet walls down to the surface of the roof. Remove existing flashings at roof drains and roof penetrations.
   2. Remove all roofing membrane and insulation and fill in any low spots occurring as a result of removal work to create a smooth, even surface for application of new roof membranes.
   3. Install new wood nailers as necessary to accommodate insulation/recovery board or new nailing patterns.
   4. When mechanically attached, the fastening pattern for the insulation/recovery board shall be as recommended by the specific product manufacturer.
   5. When adhered, the adhesive pattern for the insulation/recovery board shall be as recommended by the specific product manufacturer.

C. Overlay Applications:
   1. Remove all existing roof blisters and wrinkles down to stable bonded surface.
   2. Patch areas in like-kind materials to tie-in to existing roof system.
   3. Remove all vertical flashings and cant strips down to substrate.
   4. Mechanically remove all loose/flaking/peeling coatings down to stable surface.
   5. Clean and remove all dirt, dust, and debris from roof surface.

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 COLD APPLIED ROOF SYSTEM

A. Base Ply: Cut base ply sheets into 18 foot lengths and allow plies to relax before installing.

Install base sheet in Interply Adhesive: applied at the rate required by the manufacturer. Shingle base sheets uniformly to achieve one ply throughout over the prepared substrate. Shingle in proper direction to shed water on each large area of roofing.

1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
2. Solidly bond to the substrate and adjacent ply with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Use care to eliminate air entrapment under the membrane.
4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
5. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
6. Install base flashing ply to all perimeter and projection details.
7. 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.

B. Thermoplastic Cap Ply: Allow plies to relax before installing. Install in interply adhesive applied at the rate required by the manufacturer. Shingle sheets uniformly over the prepared substrate to achieve the number of plies specified. Shingle in proper direction to shed water on each large area of roofing.

1. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
2. All field seams must be clean and dry prior to initiating any field welding. Remove foreign materials from the seams (dirt, oils, etc.) with acetone or authorized alternative. Use CLEAN WHITE COTTON cloths and allow approximately five minutes for solvents to dissipate before initiating the automatic welder. Do not use denim or synthetic rags for cleaning.
3. Contaminated areas within a membrane seam will inhibit proper welding and will require a membrane patch or strip.
4. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld. The lap or seam area of the membrane may be intermittently tack welded to hold the membrane in place.
5. The back interior edge of the membrane shall be welded first, with a thin, continuous weld to concentrate heat along the exterior edge of the lap during the final welding pass.
6. Follow local code requirements for electric supply, grounding and surge protection. The use of a dedicated, portable generator is highly recommended to ensure a consistent electrical supply, without fluctuations that can interfere with weld consistency.
7. Properly welded seams shall utilize a 1.5 inch wide nozzle, to create a homogeneous weld, a minimum of 1.5 inches in width.

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 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, set in butyl tape, 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: Install flashing sheets by the same application method used for the base 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 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. Solidly adhere the entire flashing ply to the substrate. Secure the tops of all flashings that are not run up and over curb through termination bar fastened at 6 inches (152 mm) O.C. and sealed at top.
5. Seal all vertical laps of flashing ply with a three-course application of trowel-grade mastic and fiberglass mesh.
6. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
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.

H. Flashing 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.

I. Roof Walkways: Provide WPG KEE Walkway Roll and install around all mechanical units.

3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. Coping Cap: Designed per approved architectural details
   1. Install continuous cleat first nailed 3” O.C. staggered
   2. Position base flashing ply over the wall edge covering nailers completely, fastening 8 inches on center. Install base ply and thermoplastic cap ply with proper material and procedure according to manufacturer's recommendations.

3.6 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.

3.7 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 5/8 inch (16 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.

3.8 FIELD QUALITY CONTROL

A. Inspection: Provide manufacturer's field observations at start-up and at intervals of 3 days per working 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.

B. Correct defects or irregularities discovered during field inspection.

3.9 SCHEDULES

A. Base (Ply) Sheet:
   1. FlexBase E 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base

sheet reinforced with a fiberglass and polyester composite scrim, performance requirements according to ASTM D 5147.
a. Tensile Strength, ASTM D 5147
1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 550 lbf/in XD 550 lbf/in
2) 50 mm/min. @ 23 +/- 2 deg. C MD 96.2 kN/m XD96.2 kN/m
b. Tear Strength, ASTM D 5147
1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 1,000 lbf XD 1,000 lbf
2) 50 mm/min. @ 23 +/- 2 deg. C MD 4,448 N XD 4,448 N
c. Elongation at Maximum Tensile, ASTM D 5147
1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 9% XD 9%
2) 50 mm/min. @ 23 +/- 2 deg. C MD 9% XD 9%
d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)

B. Thermoplastic Cap (Ply) Sheet:
1. KEE-Stone HP: 60 mil thermoplastic, ketone ethylene ester (KEE) roofing membrane with polyester scrim. ASTM D6754
a. Breaking Strength, ASTM D 751, Proc. B, strip
1) 375 lbf. (1,668 N)
b. Tear Strength ASTM D 751
1) 150 lbf. min. (667 N)
c. Elongation at Break (%), ASTM D 751, Proc. B, Strip
1) 40.0%

C. Interply Adhesive:
1. Green-Lock Plus Membrane Adhesive: Cold applied solvent free membrane adhesive: zero V.O.C. compliant performance requirements:
a. Non-Volatile Content ASTM D 4586 100%
b. Density ASTM D 1475 11.4 lbs./gal. (1.36 g/m3)
c. Viscosity Brookfield 20,000-50,000 cPs.
d. Flash Point ASTM D 93 400 deg. F min. (232 deg. C)
e. Slope: up to 3:12
2. KEE-Lock Foam Spatter Spray: Dual component, single bead (spatter applied) urethane insulation/membrane adhesive.
a. Tensile Strength (ASTM D 412) 250 psi
b. Density (ASTM D 1875) 8.5 lbs./gal.
c. Viscosity (ASTM D 2556) 22,000 - 60,000 cP
d. Peel Strength (ASTM D 903) 17 lb./in.
e. Flexibility (ASTM D 816) Pass @ -70 deg. F (-56.7 deg. C)

D. Flashing Base Ply:
1. FlexBase E 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass and polyester composite scrim, performance requirements according to ASTM D 5147.
a. Tensile Strength, ASTM D 5147
1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 550 lbf/in XD 550 lbf/in
2) 50 mm/min. @ 23 +/- 2 deg. C MD 96.2 kN/m XD96.2 kN/m
b. Tear Strength, ASTM D 5147
1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 1,000 lbf XD 1,000 lbf
2) 50 mm/min. @ 23 +/- 2 deg. C MD 4,448 N XD 4,448 N
c. Elongation at Maximum Tensile, ASTM D 5147
1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 9% XD 9%
2) 50 mm/min. @ 23 +/- 2 deg. C MD 9% XD 9%
d. Low Temperature Flexibility, ASTM D 5147
1) Passes -40 deg. F (-40 deg. C)

E. Flashing Cap (Ply) Sheet:

1. KEE-Stone HP NF 60 Flashing: 60 mil thermoplastic, ketone ethylene ester (KEE) roofing membrane with polyester scrim. ASTM D 6754.
    a. Breaking Strength, ASTM D 751, Proc. B, strip
        1) 375 lbf
    b. Tear Strength ASTM D 751
        1) 145 lbf. minimum.
    c. Elongation at Break (%), ASTM D 751, Proc. B, Strip
        1) 35.0%

F. Flashing Ply Adhesive:
1. KEE-Lock WB Flashing Adhesive: Acrylic, pressure-sensitive adhesive.
    a. Density (ASTM D 1475) 8.5 lbs./gal.
    b. Viscosity (ASTM D 2556) 6,600 cP
    c. Adhesion: 4 PLI
2. Green-Lock Plus Flashing Adhesive: Cold applied solvent free flashing adhesive: zero V.O.C.
    a. Non-Volatile Content ASTM D 4586 100%
    b. Density ASTM D 1475 11.8 lbs./gal. (1.17 g/m3)
    c. Viscosity Brookfield 400,000 cPs.
    d. Flash Point ASTM D 93 400 deg. F min. (232 deg. C)

END OF SECTION