

**Exhibit A  
PROJECT SPECIFICATIONS  
BID#023-077-07**

**Various School Site Roof Repairs**

**Love Elementary School Edison  
Elementary School Franklin  
Elementary School Longfellow  
Elementary School  
Ruby Bridges Elementary School**

**ALAMEDA UNIFIED SCHOOL  
DISTRICT (AUSD)  
2060 CHALLENGER DRIVE  
ALAMEDA, CA 94501  
510-337-7000**

**APRIL 2023**

**SPECIFICATIONS GROUP**

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**END OF SECTION**

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SECTION 01 11 00

SUMMARY OF WORK

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**PART 1 - GENERAL**

1.1 SUMMARY

- A. Project consists of design/build construction of the Alameda Unified School District (AUSD), Various School Site Roof Repairs, as indicated in Contract Documents.
  - 1. Items noted "NIC" (Not in Contract) will be furnished and installed by Owner or under separate contract.
    - a. Hazardous Materials Removal: Where materials suspected as being hazardous are encountered, inform Owner immediately. Work directly with Owner relating to hazardous materials.
      - 1) Owner's Representative and Architect of Record shall not be involved in determination, removal, or disposal of hazardous materials.
  - 2. Owner reserves right to remove and retain possession of existing items prior to start of Contract.

1.2 REQUIREMENTS INCLUDED

- A. This section includes administrative provisions:
  - 1. Work sequence.
  - 2. Contractor use of premises.
  - 3. Building occupancy.
  - 4. Lines and levels.
  - 5. Regulatory requirements and reference standards.
  - 6. Owner furnished Contractor installed (OFCl) products.

1.3 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Owner's Representative.
  - 1. Construct Work to accommodate Owner's occupancy requirements during construction period.
- B. Perform construction in phases as approved by Owner.

1.4 CONTRACTORS USE OF PREMISES

- A. Limit use of premises for Work and construction operations and to allow for:
  - 1. Building occupancy.
  - 2. Work by other contractors.
  - 3. Authorized access to restricted areas.
  - 4. Public access to public areas.
- B. Coordinate use of premises and access to site under direction of Owner.

**1.5 BUILDING OCCUPANCY**

- A. Contractor shall work to ensure Various School Site Roof Repairs (this project) will be done during summer vacation so buildings requiring roof work will not be occupied during construction. Other buildings on campuses may be occupied.
  - 1. Cooperate with Owner to minimize conflict and to facilitate building operations where portions of school sites are required to be occupied during summer vacation and where Project cannot be completed prior to school occupancy.

**1.6 LINES AND LEVELS**

- A. Establish lines and levels by use of recognized engineering practices.
- B. Locate and protect control and reference points.

**1.7 REGULATORY REQUIREMENTS AND REFERENCE STANDARDS**

- A. Regulatory Requirements:
  - 1. Architect-of-Record shall contact governing authorities and review design requirements of local, state, and federal agencies for applicability to Project.
  - 2. Contractor shall be responsible for contacting governing authorities directly for necessary information and decisions bearing upon performance of Work.
- B. Reference Standards:
  - 1. For Products specified by association or trade standards, comply with requirements of referenced standard in Bridging Documents, except when more rigid requirements are specified or are required by applicable codes.
  - 2. Applicable date of each standard is that in effect as of date on proposal or date on Contract where no proposal is available, except when a specific date is specified.

**1.8 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) PRODUCTS**

- A. Select products are to be furnished and paid for by Owner and installed by Contractor:
  - 1. AUSD supplied material through the CMAS (California Multiple Award Schedules) program.
  - 2. Materials List:
    - a. See Section 01 16 40 Owner Furnished Products
  - 3. Material or accessories required for installation of roof systems exceeding AUSD provided material shall be supplied by Contractor.
  - 4. Contractor shall determine precise quantities of material required for completion of Project; and to provide excess material, as required.

**B. Owner's Responsibilities:**

1. Arrange for and deliver shop drawings, product data, and samples to Contractor.
2. Arrange and pay for product delivery to site.
3. Inspect products jointly with Contractor on delivery.
4. Submit claims for transportation damage.
5. Arrange for replacement of damaged, defective, or missing items.
6. Arrange for manufacturer's warranties, inspections, and service.

**C. Contractor's Responsibilities:**

1. Review shop drawings, product data, and samples.
2. Receive and unload products at site.
3. Inspect jointly with Owner for completeness and damage.
4. Handle, store, and install products.
5. Finish products as required after installation.
6. Repair or replace items damaged by Work of this Contract.

**END OF SECTION**

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**SECTION 01 16 40**

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**OWNER FURNISHED PRODUCTS**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. DESCRIPTION: The Owner shall procure and provide certain products for installation as shown and specified per Contract Documents.
- B. RELATED WORK SPECIFIED ELSEWHERE:
  - 1. General: Products furnished and paid for by the Owner are described in the following technical sections and /or in the Drawings.
  - 2. 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.

## 1.2 DEFINITIONS

- A. GENERAL: The following are used to identify products as noted on the Drawings.
- B. OWNER FURNISHED CONTRACTOR INSTALLED (O.F.C.I.): Products or equipment furnished by the Owner for installation under this contract.
- C. OWNER FURNISHED OWNER INSTALLED (O.F.O.I.): Products or equipment to be provided and installed by the Owner, but requiring surfacing, backing, utility connections or other preparation under this contract, for proper installation.
- D. NOT IN CONTRACT (N.I.C.): Products or equipment to be provided and installed by Owner, not requiring surfacing, backing, utility connections or other preparation under this contract.

**PART 2 - PRODUCTS**

## 2.1 PRODUCTS

- A. ROOFING MATERIAL FURNISHED BY OWNER (O.F.C.I.): District supplied material through the CMAS (California Multiple Award Schedules) program. Related specification sections include; Section 075360 Modified Bituminous Membrane Roofing
- B. MATERIAL LIST
  - 1. Love Elementary School

1. Stressply Plus FR Mineral: 400 Rolls
  2. StressBase 80: 200 Rolls
  3. Pyramic Plus LO: 200 Buckets
  4. Weatherking Plus WC: 280 Buckets
  5. Flashing Bond: 20 Buckets
  6. Tuff-Stuff MS: 2 Cases
  7. Garla-Prime VOC: 10 Buckets
  8. Freight to jobsite: 1
2. Portables at other school sites

1. Stressply Plus FR Mineral: 40 Rolls
2. StressBase 80: 20 Rolls
3. Pyramic Plus LO: 20 Buckets
4. Weatherking Plus WC: 36 Buckets
5. Flashing Bond: 5 Buckets
6. Tuff-Stuff MS: 6 Cases
7. Garla-Prime VOC: 3 Buckets
8. White-Knight Plus WC: 55 Buckets
9. Uni-Bond ST 4": 12 Rolls
10. Rust-Go Primer: 8 Buckets
11. Versiply Mineral: 10 Rolls
12. Versiply 40: 3 Rolls
13. Liquitec: 40 Buckets
14. 6" Grip Polyester Soft: 10 Rolls
15. Freight to jobsite: 1

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. The cost to handle and break flashing metal from the District provided flat stock is contractor's responsibility.

**PART 3 - EXECUTION**

**2.2 OWNER'S RESPONSIBILITIES**

- A. **SUBMITTALS:** Arrange for and deliver necessary shop drawings, product data and samples to Contractor.
- B. **DELIVERY:**
  1. **General:** Arrange and pay for product delivery to site, in accordance with construction schedule.
  2. **Bill of Materials:** Deliver supplier's documentation to Contractor.
  3. **Inspection:** Inspect jointly with Contractor.



4. Claims: Submit for transportation damage and replacement of otherwise damaged, defective, or missing items.
- C. GUARANTEES: Arrange for manufacturer's warranties, bonds, service, inspections, as required.

### 2.3 CONTRACTOR'S RESPONSIBILITIES

- A. SUBMITTALS: Review shop drawings, product data and samples and submit to owner with notification of any discrepancies or problems anticipated in use of product.
- B. DELIVERY:
1. General: Designate delivery date for each product in Progress Schedule.
  2. Receiving: Receive and unload products at site. Handle products at site, including uncrating and storage.
  3. Inspection: Promptly inspect products jointly with Owner; record shortages, damaged or defective items.
  4. Storage: Protect products from damage or exposure to elements.
- C. INSTALLATION:
1. General: Assemble, install, connect, adjust and finish products, as stipulated in the respective section of Specifications.
  2. Repair and Replacement: Items damaged during handling and installation are responsibility of contractor.

\* End Section 01 16 40 \*

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**SECTION 01 23 00**

**ALTERNATES**

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**PART 1 - GENERAL**

1.1 SUMMARY

- A. This section includes a description of alternate work.
- B. Related Requirements:
  - 1. Pricing Documents: Quotation of cost of each alternate.
  - 2. Owner-Contractor Agreement: Alternates accepted by Owner for incorporation into the Work.
  - 3. Sections of Specifications identified in each Alternate.

1.2 PROCEDURES

- A. Alternates will be exercised at Owner's option.
- B. Coordinate Related Work: and modify surrounding work as required to complete Work, including changes under each alternate, when acceptance is designated in Owner-Contractor Agreement.

1.3 ALTERNATES

- A. Alternates: To be determined.

**END OF SECTION**

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**SECTION 01 25 00****SUBSTITUTION PROCEDURES**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. General: Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda.
  - 1. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.
    - a. Contract Amount: Base on materials and products included in Contract Documents.
    - b. Where materials are listed in Contract Documents, materials and products by manufacturers not listed shall not be used without Owner's and Owner's Representative's approval of Contractor's written request for substitution.
  - 2. Purpose: Substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to conditions beyond Contractor control.
    - a. Owner benefits either from a Contractor proposed reduction of Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.
    - b. List proposed cost or time reductions on request for substitution.
    - c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.
- B. Related Sections:
  - 1. Section 01 60 00: Product requirements.

## 1.2 SUBSTITUTIONS

- A. Within a period of 35-days after award of Contract, Owner and Owner's Representative will consider formal requests for substitutions only from Contractor as specified in 1.1 Summary.
  - 1. Owner and Owner's Representative will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.

2. After initial 35-day period, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
- B. Submit each request with sequentially numbered "Substitution Request Transmittal" acceptable to Owner and Owner's Representative; submit separate request for each product and support each request with:
  1. Product identification with manufacturer's literature and samples where applicable.
  2. Name and address of similar projects on which product has been used, and date of installation.
- C. Submit itemized comparison of proposed substitution with product specified and list significant variations.
- D. Submit data relating to changes in construction schedule.
- E. Note effect of substitution on other work, products, or separate contracts.
  1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details, or Specifications.
- F. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.
  1. Include costs to other contractors and costs for revisions to Drawings, details or Specifications.
- G. Substitutions will not be considered for acceptance when:
  1. They are indicated or implied on submittals without a formal request from Contractor.
  2. They are requested directly by a subcontractor or supplier.
  3. Acceptance will require substantial revision of Contract Documents.
- H. Substitute products shall not be ordered without written acceptance of Owner and Owner's Representative.
- I. Owner and Owner's Representative will determine acceptability of proposed substitutions and reserves right to reject proposals due to insufficient information.

**1.3 CONTRACTOR'S REPRESENTATION**

- A. Requests constitute a representation that Contractor:
  1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.

2. Will provide same warranty or longer warranty for substitution as for specified product.
3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
4. Waives claims for additional costs that subsequently become apparent.
5. Will pay costs of changes to Contract Documents, Drawings, details, and Specifications required by accepted substitutions.

**1.4 OWNER'S REPRESENTATIVE'S DUTIES**

- A. Review Contractor's requests for substitutions with reasonable promptness.
  1. Owner's Representative will recommend that Owner accept or reject substitution request.
- B. Notify Contractor in writing of decision to accept or reject requested substitution.

**END OF SECTION**

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**SECTION 01 30 00**

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**ADMINISTRATIVE REQUIREMENTS**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes general procedural requirements for ongoing submittals.
1. Construction progress schedules.
  2. Schedule of values.
  3. Product data and manufacturer's literature.
  4. Shop drawings.
  5. Samples.
  6. Manufacturers' certificates.
  7. Excess materials and attic stock.
  8. Design build (delegated design) procedures.
- B. Related Requirements:
1. Section 01 70 00: Manufacturers' instructions.
  2. Section 01 77 00: Closeout requirements including Project Record Documents.
  3. Section 01 78 00: Warranties.

## 1.2 GENERAL SUBMITTAL PROCEDURES

- A. Submittals: Transmit each item using form approved by Owner's Representative; submit sample to Owner's Representative for approval prior to use.
1. Identify Project, Contractor, subcontractor, major supplier.
    - a. Attach sequential identification number for each new submittal.
    - b. Identify each resubmittal using original submittal number and sequential identification clearly indicating item is resubmitted.
  2. Identify pertinent Drawing sheet and detail number, and Specification section number as appropriate.
  3. Identify deviations from Contract Documents.
  4. Provide space for Contractor and Owner's Representative review stamps.
  5. Contractor: Review and stamp submittals from subcontractors prior to submitting to Owner's Representative.
    - a. Review submittals and indicate where conflicts occur with Contract Documents and with work of other subcontractors.

- b. Return submittals that vary significantly from Contract Documents for correction and resubmittal prior to submitting to Owner's Representative.
  - c. Submittals that vary significantly from Contract Documents and that fail to indicate thorough Contractor review prior to submission to Owner's Representative will be returned without review.
  - d. Cursory review and stamping of subcontractor submittal by Contractor shall not be acceptable.
- B. Initial Schedules: Submit initial progress schedule and schedule of value in duplicate within 15 working days after award of Contract.
- 1. After review by Owner and Owner's Representative revise and resubmit where required.
- C. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.
- D. After Owner's Representative review of submittal, revise and resubmit as required, identify changes made since previous submittal.
- 1. Submittals Requiring Owner's Representative Response: Allow reasonable time for Owner's Representative review as well as time for preparation of resubmittals where required by Owner's Representative.
    - a. Do not delay submittals and do not consider Owner's Representative review time as part of Project schedule as multiple submittals and reviews may be required.
- E. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply.

**1.3 TYPES OF SUBMITTALS**

- A. General: Project requires various types of submittals to maintain communications, minimize misunderstandings, avoid unnecessary conflicts, and to ensure complete documentation for Project Record Documents.
- 1. Maintain complete set of submittals including required revisions.
- B. Construction Schedules: Submit construction progress schedules for Design Team and Owner review and to maintain entire team up to date on construction activities.
- C. Schedule of Values: Submit Schedule of Values indicating division of Work, subcontractors to perform work, products being used, and values attributed to each to inform Design Team and Owner.
- D. Action Submittals: Submittals relating to product data and manufacturer's literature, shop drawings, and samples for Design Team review and comment; do not begin fabrication, delivery, or installation until Design Team review is complete.

- E. Information Submittals: Submittals relating to certifications, qualifications, reports, including test reports, and instructions are for information; Design Team may choose to comment but action is not generally anticipated.
  - 1. Manufacturer installation instructions and recommendations shall be considered information submittals.
- F. Design/Build Submittals: Where portion of Work requires design by specialized professionals submit information necessary to ensure work complies with Contract Documents along with certifications signed by qualified professional.
  - 1. Calculations: Do not submit calculations unless specifically required by Contract Documents; submit calculations required by code directly to authorities having jurisdiction.
    - a. Submit certification by qualified professional indicating required calculations have been prepared and work conforms to Contract Documents and applicable codes and regulations.
- G. Maintenance Materials Submittals: Compile maintenance information and materials during Work to ensure complete set of documents, maintenance manuals, and operation instructions.
- H. Closeout Submittals: Compile closeout submittals, organize, and submit to Owner prior to or at time of Substantial Completion. Project will not be considered Substantially Complete until closeout submittals have been received by Owner.

#### 1.4 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit construction progress schedule with separate item for each major trade and operation, identifying first day of each week.
  - 1. Show complete sequence of construction by activity, identifying work of separate stages and logically grouped activities.
  - 2. Show projected percentage of completion for each item of Work as of time of each progress Application for Payment.
  - 3. "Submittal Schedule": Show Contractor submittal dates required for shop drawings, product data, and samples, and product delivery dates; deliver to Owner's Representative per approved "Submittal Schedule."
    - a. "Submittal Schedule" may be incorporated into construction progress schedule or may be separate, Contractor option.
    - b. Owner's Representative's Review Period: Owner's Representative will be expedient in review however Contractor shall schedule submittals recognizing possibility Owner's Representative may reject and may require resubmittal.
    - c. Contract extension shall not be allowed for Contractor's failure to properly schedule submittals to allow for Owner's Representative requiring resubmittal.



- B. Progress Schedule Format: Submit both horizontal bar chart and network analysis system using critical path method as approved by Owner.
  - 1. Submit revised progress schedules with each Application for Payment reflecting changes since previous submittal, not less than monthly.

**1.5 SCHEDULE OF VALUES**

- A. Submit typed schedule on AIA Form G703 or another Owner and Owner's Representative pre-approved 8-1/2" by 11" paper format; Contractor's standard media-driven printout will be considered on request. Submit within 15 days after award of Contract.
- B. Format: Table of Contents of this Project Manual, with modifications as pre-approved by Owner and Owner's Representative; identify each line item with number and title of major Specification sections.
- C. Include in each line item a directly proportional amount of Contractor overhead and profit.
- D. Revise schedule to list change orders for each Application for Payment.
  - 1. Submit subschedule for each Campus.

**1.6 PRODUCT DATA/MANUFACTURERS' LITERATURE**

- A. Action Submittals: Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.
- B. Information Submittals: Include manufacturers' installation instructions only when required by Specifications or specifically requested by Owner's Representative.
  - 1. Maintain copy of manufacturer installation instructions and recommendations in Contractor's field office for review.
- C. Product data shall be submitted as electronic PDF files unless otherwise noted or approved by Owner's Representative in advance.
  - 1. Where paper copies are permitted submit number of copies Contractor requires, plus one copy to be retained by Owner's Representative.

**1.7 SHOP DRAWINGS**

- A. Shop drawings to illustrate requirements of Contract Documents, accurately show relevant field conditions, dimensions, quantities, kinds of materials, methods of assembly, and data required for fabrication, erection, and installation.
- B. Shop drawings shall be submitted as electronic PDF files unless otherwise noted or approved by Owner's Representative in advance.
  - 1. Where prints are permitted submit one reproducible print, minimum sheet size 8-1/2" by 11".
- C. Distribution: After review, reproduce and distribute.

## 1.8 SAMPLES

- A. Submit full range of manufacturers' standard colors, textures, and patterns for Owner's Representative's selection.
- B. Submit samples to illustrate functional characteristics of Product, with integral parts and attachment devices.
- C. Coordinate submittal of different categories for interfacing work.
- D. Include identification on each sample, giving full information.
- E. Submit number of samples required by Contractor plus one to be retained by Owner's Representative.
  - 1. Maintain one set of approved samples at Project Field Office.
- F. Sizes: Provide following sizes unless otherwise specified.
  - 2. Flat or Sheet Products: Minimum 6" square, maximum 12" by 12".
  - 3. Linear Products: Minimum 6", maximum 12" long.
  - 4. Bulk Products: Minimum one pint, maximum one gallon.
- G. Full size samples may be used in the Work upon approval.

## 1.9 MANUFACTURERS' CERTIFICATES

- A. Submit certificates, in duplicate in accordance with requirements of each Specification section.

## 1.10 EXCESS MATERIALS AND ATTIC STOCK

- A. Excess Materials: Excess materials shall be considered property of Owner; inform Owner of extent of excess materials and methods required for handling and storage; remove from site excess materials not required by Owner for maintenance stock.
- B. Attic Stock: Owner may choose to obtain additional attic stock for maintenance purposes where excess materials are not considered adequate.
  - 1. Owner may require as much as 5% extra materials for maintenance purposes. Exact amount of each material shall be determined by Owner based on following meeting and additional costs determined by Contractor.
    - a. Contractor shall be prepared to order up to 5% extra materials on items that may not be readily available in future such as custom colors, offshore manufacture, anticipated life span under 5 years, and potential for damage.
      - 1) Do not order extra attic stock until extent is determined and agreed to by Owner including which materials require extra stock and exactly how much those materials will cost including shipping and handling.

- b. Excess Materials: Furnish excess materials only for materials that have a shelf-life of more than two years.
- 2. Meeting: Conduct meeting prior to beginning Work to discuss extent of materials Owner would like to receive at Project Closeout for attic stock for maintenance materials. Where available include personnel from Owner's maintenance crew.
  - a. Estimate excess materials to be anticipated to be ordered in addition to materials for handling and storage and how those materials will be invoiced and identified regarding material and location in Project.
  - b. Determine area necessary for adequate storage, handling, and identifying excess materials and attic stock and discuss with Owner.
  - c. Submit information regarding equipment necessary for handling of excess materials and attic stock due to weight, size, and storage requirements.
  - d. Assist Owner in determining where on-site or off-site additional attic stock for maintenance purposes will be delivered and stored.
- 3. Additional Costs: After meeting submit to Owner detailed listing of additional costs for each material Owner may like to receive for attic stock and assist Owner in modifying listing to determine acceptable final costs.
  - a. Include unit prices for desired attic stock where excess materials are not adequate for Owner maintenance stock.
- 4. Substantial Completion: Submit Construction Bulletin at Substantial Completion indicating changes to Contract Amount for attic stock including unit price totals for materials where excess materials are not adequate.
- 5. Final Completion: Ensure attic stock has been received, identified, cataloged, and stored at locations agreed upon with Owner based on Change Order indicating amounts finally agreed to by Owner.

**1.11 DESIGN/BUILD PROCEDURES**

- A. Design as Part of Means and Methods of Construction: Select Project components require construction team design as part of means and methods of construction as described in various sections.
  - 1. Terms commonly used such as Design/Build, Delegated Design, and Design/Assist are applicable to these procedures as determined by law but shall be generally referred to in these documents as Design/Build.
    - a. In general Design/Build includes design by licensed professionals with expertise beyond that allowed under standard architectural licensure, and outside of scope of work of other design professionals on the design team.
  - 2. Contractor may be required to provide design services as part of construction for specific work defined as design or design-build where special expertise is required that is not available in the Project design team.

3. Subcontractors, fabricators, and manufacturers may be required to provide design services as part of their work due to special expertise in design services for their specific components, refer to technical sections for Design/Build.
4. Contractor, subcontractors, fabricators, manufacturers, and suppliers shall be responsible for attachments, anchors, fasteners, adhesives, and connectors suitable to applications unless specific items are listed in Contract Documents.
  - a. Where specific items are listed in Contract Documents Contractor, subcontractors, fabricators, manufacturers, and suppliers shall review and submit comments where items listed are not acceptable.
  - b. Where no comments are received, listed items shall be considered acceptable.
- B. Contractor acknowledges and accepts responsibility for specialty design as part of means and methods of construction, as well as coordination of parties involved to achieve architectural design intent indicated in Contract Documents.
  1. Design-build work includes sizing, sequencing, and detailing for construction by professional licensed or registered engineer or design professional with special expertise applicable to portion of Work involved.
  2. Design-build work shall be constructed in compliance with building codes and regulations in effect and shall be fit and proper for intended use.
  3. Design-build work shall include drawings, specifications, and calculations prepared, stamped, and signed by qualified professional licensed or registered engineer licensed in the Project location as appropriate to design-build work.
    - a. Plans, specifications, and calculations shall be acceptable to Owner, Owner's Representative, and applicable authorities.
- C. Where required by Owner Contractor shall submit copies of current insurance policies covering errors and omissions of persons designing design-build work with deductibles and limits per occurrence as mutually agreed by Owner and Contractor.
  1. Provide endorsement to insurance providing for 30-day notice to Owner prior to cancellation or material reduction in coverage.
  2. Insurance shall be maintained for not less than applicable statute of limitations for claims of latent defects, if such insurance is not written on an occurrence basis during time design-build work is designed and constructed.
- D. Review proposed layouts with Design Team and with various trades prior to commencing work related to design-build work.

**END OF SECTION**

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**SECTION 01 31 00**

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**PROJECT MANAGEMENT AND COORDINATION**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Section Includes: Description of Project management and coordination including but not necessarily limited to the following:
  - 1. General Project coordination procedures.
  - 2. Staff names.
  - 3. Administrative and supervisory personnel.
  - 4. Project meetings.
  
- B. Related Sections:
  - 1. Section 01 30 00: Administrative requirements.
  - 2. Section 01 79 00: Demonstration and training.

## 1.2 COORDINATION

- A. Coordination: Coordinate construction operations included in various Specifications sections to ensure efficient and orderly installation of each part of Work.
  - 1. Coordinate construction operations that depend on each other for proper installation, connection, and operation.
  - 2. Coordinate work to assure efficient and orderly sequence of installation of construction elements.
  - 3. Make provisions for accommodating items installed by Owner or under separate contracts.
  
- B. Prepare memoranda for distribution to each party involved as needed, outlining special procedures required for coordination.
  - 1. Include required notices, reports, and list of attendees at meetings; include Owner's Representative and Owner in distribution.
  
- C. Verify characteristics of interrelated operating equipment are compatible; coordinate work having interdependent responsibilities for installing, connection to, and placing such equipment in service.
  
- D. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings.
  - 1. Follow routing shown for pipes, ducts, and conduits as closely as possible; make runs parallel with lines of building.
  - 2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- E. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.
- F. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other construction activities and activities of other contractors to avoid conflicts and ensure orderly progress of Work.

**1.3 SUBMITTALS**

- A. Staff Names: Immediately after receipt of notice to proceed or immediately after signing of Contract by Owner and Contractor, submit list of principal staff assignments, including superintendent and other personnel in attendance at Project site.
  - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

**1.4 SUPERVISORY AND ADMINISTRATIVE PERSONNEL**

- A. Provide supervisory personnel, in addition to Project Superintendent, as required for proper and timely performance of Work and coordination of subcontracts.
- B. Provide administrative staff as required to allow Project Superintendent and supervisory personnel to allocate maximum time to Project supervision and coordination.

**1.5 PROJECT MEETINGS**

- A. Schedule and administer Project meetings throughout progress of Work:
  - 1. Pre-construction meeting.
  - 2. Progress meetings at weekly intervals.
  - 3. Pre-installation conferences.
  - 4. Coordination meetings.
  - 5. Special meetings.
- B. Make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Owner's Representative, Owner, participants, and those affected.
- C. Attendance: Job superintendent, major subcontractors, and suppliers as appropriate to agenda; Owner's Representative, Owner, and Owner and Owner's Representative's consultants as appropriate to agenda topics for each meeting.
- D. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments, delivery schedules, submittals, requests for information, maintenance of quality standards, pending changes and substitutions, and issues needing resolution.

**END OF SECTION**

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**SECTION 01 50 00**

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**TEMPORARY FACILITIES AND CONTROLS**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes temporary construction facilities and temporary controls.
  - 1. Electricity and lighting.
  - 2. Water and sanitary facilities.
  - 3. Construction aids.
  - 4. Temporary enclosures.
  - 5. Barriers.
  - 6. Cleaning during construction.
  - 7. Project identification.
  - 8. Cellular telephone service.
  - 9. Storage.
  
- B. Related Requirements:
  - 1. Section 01 70 00: Progress cleaning and final cleaning.
  - 2. Section 01 74 10: Waste management.
  
- C. Provide temporary construction facilities and temporary controls as required to conform to authorities having jurisdiction and as required to complete Project in accordance with Contract Documents.
  - 1. Authorities Having Jurisdiction: Contact governing authorities to establish extent of temporary facilities and temporary controls required by authorities.
  - 2. Owner: Owner's Building Manager will furnish additional information requiring extent of temporary facilities and temporary controls required by Campus.

## 1.2 ELECTRICITY AND LIGHTING

- A. Provide electrical service required for construction operations, with branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.
  - 1. Connection to existing electrical service is permitted.
  - 2. Owner will pay costs of energy used from existing on-site services.
  
- B. Provide lighting for construction operations.
  
- C. Owner will pay costs of energy used from existing on-site services.

**1.3 WATER AND SANITARY FACILITIES**

- A. Provide water service required for construction operations; extend branch piping with outlets located so water is available by use of hoses.
  - 1. Connection to existing facilities is permitted.
  - 2. Owner will pay for water used from existing on-site services.
- B. Provide and maintain required sanitary facilities and enclosures.
  - 1. Existing facilities shall not be used.

**1.4 CONSTRUCTION AIDS**

- A. Noise, Dust and Pollution Control: Provide materials and equipment necessary to comply with local requirements for noise, dust, and pollution control.
- B. Fire Protection: Maintain on-site fire protection facilities as required by applicable authorities and insurance requirements.
- C. Security: Protect Site and Work; prevent unauthorized entry, vandalism, and theft.
  - 1. Coordinate with Owner's security program.
- D. Use of Existing Facilities: Verify availability of existing facilities for construction operations with Owner prior to beginning on-site construction.

**1.5 ENCLOSURES**

- A. Temporary Closures: Provide temporary weather-tight closures for roof openings required for Project for acceptable working conditions, for protection for materials, and to protect interior materials from dampness.

**1.6 BARRIERS**

- A. Barriers: Provide barriers as required to prevent public entry to construction areas and to protect adjacent properties from damage from construction operations.
- B. Barricades: Provide barricades as required by governing authorities.
- C. Tree Protection: Provide barriers around trees and plants designated to remain; protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

**1.7 CLEANING DURING CONSTRUCTION**

- A. Control accumulation of waste materials and rubbish. Recycle or dispose of off-site.
- B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.



1.8 PROJECT IDENTIFICATION

- A. Signs: Subject to approval of Owner's Representative and Owner.

1.9 CELLULAR TELEPHONE SERVICE

- A. Cellular Telephone Service: Furnish on-site Project Managers with cellular telephone. Ensure Owner and Owner's Representative ability to contact site during construction operations.
  - 1. Schedules: Submit schedules of on-site Project Managers with individual cellular telephone numbers to Owner and Owner's Representative; maintain schedules and cell phone numbers up to date during Project on-site operations.

1.10 STORAGE

- A. Storage for Tools, Materials, and Equipment: Limit on-site storage to Project area; provide weather-tight storage, with heat and ventilation for products requiring controlled conditions.
  - 1. Maintain adequate space for organized storage and access.
  - 2. Provide lighting for inspection of stored materials.

1.11 REMOVAL

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Restore existing facilities used during construction to specified or original condition.

**END OF SECTION**

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**SECTION 01 60 00**

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**PRODUCT REQUIREMENTS**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes basic product requirements governing material and equipment.
  - 1. General product requirements.
  - 2. Product list.
  - 3. Quality assurance.
  - 4. Delivery, storage, and handling.
- B. Related Requirements:
  - 1. Section 01 25 00: Substitution procedures.
  - 2. Section 01 30 00: Submittal of manufacturers' certificates.
  - 3. Section 01 77 00: Operation and maintenance data.

## 1.2 GENERAL PRODUCTS REQUIREMENTS

- A. Products include material, equipment, and systems.
- B. Comply with Specifications, referenced standards, and applicable codes and regulations as minimum requirements.
- C. Provide new materials except as specifically allowed by Contract Documents.
- D. Materials to be supplied in quantity within a Specification section shall be by one manufacturer, shall be the same, and shall be interchangeable.
- E. Provide equipment and systems composed of materials from a single manufacturer except where otherwise recommended by equipment or systems manufacturer or where otherwise indicated in Contract Documents.
- F. Manufacturers: Manufacturers listed in Specifications, on Drawings, on Schedules, and in Notes shall be considered acceptable to extent their products comply with Contract Documents requirements and are suitable for applications indicated.
  - 1. Manufacturer's representative shall be responsible for reviewing Contract Documents and verifying their specified products conform to Contract Documents, applicable codes, and regulations, and are suitable for applications indicated.
    - a. Where specified products are not recommended by manufacturer's representative, immediately notify Owner's Representative.
    - b. Where a different product by same manufacturer is recommended by manufacturer's representative as more suitable for applications indicated, immediately notify Owner's Representative.

2. Basis of Design: Following shall be considered as Basis of Design.
  - a. Specific manufacturers and products identified in Specifications as Basis of Design.
  - b. Specific manufacturers and products listed in Schedules.
  - c. Specific manufacturers and products listed on Drawings or in Notes.
  - d. Where more than one manufacturer or product is listed as Basis of Design immediately notify Owner's Representative and request clarification.
    - 1) Where more than one manufacturer or product is listed as Basis of Design in one location in Contract Documents clearly indicating either is acceptable, no clarification would be necessary.
- G. Contractor's Options: Comply with following options; requests for substitutions for named manufacturers and products shall comply with requirements specified in Section 01 25 00 – Substitution Procedures.
  1. Products Identified by Reference Standards: Select product meeting referenced standard for products specified only by reference standard.
    - a. Requests for Substitutions to be limited to products not complying with referenced standards.
      - 1) Submit justification for non-compliance with reference standards as part of Request for Substitutions; if product is foreign made submit rationale why foreign standards and basic materials indicates compliance.
  2. Named Manufacturers: Where names of manufacturers are specified select any named manufacturer product meeting Specifications for products specified by naming one or more manufacturers.
    - a. Submit Request for Substitution for any manufacturer not named.
  3. Named Manufacturers and Named Products: Select any named manufacturer named product meeting Specifications for products specified by naming one or more manufacturers and products.
    - a. Where only one manufacturer and product are named, together with additional manufacturers without specific products, Requests for Substitutions to be limited to products not comparable to that specified.
      - 1) Contractors, subcontractors, suppliers, and manufacturers shall take special care to ensure comparable products are being supplied based on design, performance, quality, and longevity.
      - 2) Substitutions: Submit Request for Substitution for any manufacturer not named and for products not comparable to those specified in design, performance, quality, and longevity.

4. Basis of Design: Where manufacturer or manufacturer and product both are indicated as Basis of Design, submit Request for Substitution for other manufacturers and products.
5. "Or Equal" Clauses: Submit request for substitution for manufacturer or product not specifically named in Specifications where terms "or equal", "or approved equal", or similar references are made.

**1.3 SUBMITTALS**

- A. Product List: Within 35-days after award of Contract, submit to Owner and Owner's Representative a complete list of major products proposed for installation, with name of manufacturer, trade name, and model.
  1. Tabulate products by Specification number and title.
- B. Substitutions: Refer to Section 01 25 00 – Substitution Procedures.

**1.4 QUALITY ASSURANCE**

- A. Comply with industry standards and applicable codes except when more restrictive tolerances or requirements indicate more rigid standards or precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Install products straight, true-to-line, and in correct relationship to adjacent materials, with hairline joints, free of rough, sharp, and potentially hazardous edges.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
  1. Seismic Anchors: Conform to code requirements.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer's unopened containers or packaging.
- B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- C. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- F. Arrange storage to provide access for inspection; periodically inspect to assure products are undamaged and are maintained under required conditions.

- G. Provide equipment and personnel to handle products by methods to prevent soiling and prevent damage.
- H. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
- I. Immediately remove from Project products damaged, wet, stained, and products with mold and products with mildew.
  - 1. Take special care to prevent absorbent products such as gypsum board and acoustical ceiling units from becoming wet.

**END OF SECTION**

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**SECTION 01 70 00****EXECUTION REQUIREMENTS**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes execution requirements.
  - 1. Installer qualifications.
  - 2. Examination.
  - 3. Manufacturer's instructions.
  - 4. Installation.
  - 5. Cleaning.
  - 6. Protection.
  
- B. Related Requirements:
  - 1. Section 01 50 00: Cleaning during construction.
  - 2. Section 01 77 00: Closeout procedures.
  - 3. Section 01 79 00: Demonstration and training.

## 1.2 INSTALLER QUALIFICATIONS

- A. Experienced Installers: Installers to have minimum five-years successful experience installing items like those required for Project, except for individuals in training under direct supervision of experienced installer.

## 1.3 EXAMINATION

- A. Acceptance of Conditions: Beginning installation of a product signifies installer has examined substrates, areas, and conditions for compliance with manufacturer requirements for tolerances and other conditions affecting performance.
  
- B. Field Measurements: Take field measurements as required to fit Work properly; recheck measurements prior to installing each product.
  - 1. Where portions of Work are to fit to other construction verify dimensions of other construction by field measurements before fabrication; allow for cutting and patching to avoid delaying Work.
  
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

## 1.4 MANUFACTURERS' INSTRUCTIONS

- A. Manufacturer's Recommendations: When work is specified to comply with manufacturers' recommendations or instructions, distribute copies to persons involved and maintain one set in field office.
  - 1. Conform to requirements specified in Section 01 30 00 for submittal of recommendations or instructions to Owner's Representative; submit to Owner's Representative only where specified or where specifically requested.

- B. Perform work in accordance with details of recommendations and instructions and specified requirements.
  - 1. Consult with Owner's Representative should a conflict exist between Specifications and recommendations, or Specifications and instructions.
- C. Where manufacturer's information notes special recommendations in addition to installation instructions, comply with both recommendations and instructions.

**1.5 INSTALLATION**

- A. Pre-Installation Meetings: Installers and suppliers are to attend pre-installation meetings scheduled by Contractor.
- B. Comply with manufacturers written recommendations and installation instructions unless more restrictive requirements are specified.
- C. Locate Work and components accurately, in correct alignment and elevation.
  - 1. Make vertical work plumb and horizontal work level.
  - 2. Install components to allow space for maintenance and ease of removal for replacement.
- D. Install products at time and under conditions to ensure best possible results; maintain conditions required for product performance until Substantial Completion.
- E. Conduct operations so no part of Work is subject to damaging operations or excessive loads during normal conditions.
- F. Securely anchor permanent construction in place, accurately located and aligned with other portions of Work.
- G. Allow for building movement including thermal expansion and contraction.
- H. Make joints of uniform width; arrange joints as indicated, for best visual effect where not otherwise indicated; fit exposed connections together to form hairline joints except where otherwise indicated.

**1.6 CLEANING**

- A. Cleaning During Construction: Specified in Section 01 50 00 - Temporary Facilities and Controls.
- B. Progress Cleaning: Keep installed areas clean using nontoxic cleaning materials specifically recommended by manufacturers of product being cleaned, where not otherwise recommended use nontoxic materials that will not damage surfaces.
  - 1. Remove debris from concealed spaces before enclosing space.

2. Supervise construction operations to assure no part of construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.
- C. Final Cleaning: Execute final cleaning at Substantial Completion.
  1. Clean equipment and fixtures to a sanitary condition, clean filters of mechanical equipment, replace filters where cleaning is impractical.
    - a. Clean ducts.
  2. Clean site; sweep paved areas.
  3. Remove waste, surplus materials and rubbish from Project and site; recycle to maximum extent feasible.

**1.7 PROTECTION**

- A. Protect products subject to deterioration with impervious cover. Provide ventilation to avoid condensation and trapping water.
- B. Take care to use protective covering and blocking materials that do not soil, stain, or damage materials being protected.
- C. After installation, provide coverings to protect products from damage from traffic and construction operations, remove when no longer needed.
- D. Protect interior materials from water damage; immediately remove wet materials from site to prevent growth of mold and mildew on site.

**END OF SECTION**



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**SECTION 01 73 00**

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**CUTTING AND PATCHING**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Contractor is responsible for cutting, fitting, and patching to complete Work and to:
1. Make its parts fit together properly.
  2. Uncover work to provide for installation of ill-timed work.
  3. Remove and replace defective work.
  4. Remove and replace work not conforming to Contract Documents.
  5. Remove samples of installed work as required for testing.
  6. Provide routine penetrations of non-structural surfaces for installation of piping.
  7. Provide routine penetrations of non-structural surfaces for installation of conduit.
- B. Related Requirements:
1. Section 02 41 20: Selective demolition for reroofing.

## 1.2 SUBMITTALS

- A. Submit written request well in advance of cutting or alteration which affects:
1. Work of Owner or separate contractor.
  2. Structural value or integrity of any element of Project.
  3. Integrity of weather-exposed or moisture-resistant elements.
  4. Efficiency, operational life, maintenance, or safety of operational elements.
  5. Visual qualities of sight-exposed elements.
- B. Request shall include:
1. Identification of Project and description of affected work.
  2. Necessity for cutting or alteration.
  3. Effect on work of Owner or separate contractor.
  4. Effect on structural integrity, or weatherproof integrity of Project.
  5. Alternatives to cutting and patching.
  6. Cost proposal, when applicable.
  7. Written permission of separate contractor whose work will be affected.
  8. Description of proposed work including:
    - a. Scope of cutting, patching, alteration, or excavation.
    - b. Products proposed to be used.
    - c. Extent of refinishing to be included.
- C. Should conditions of Work or schedule indicate a change of products from original installation, Contractor shall submit request for substitution as specified in Section 01 25 00 – Substitution Procedures.
- D. Submit written notice to Owner's Representative designating date and time work will be uncovered.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Comply with Specifications and standards for each specific product involved.
- B. Where Specifications and standards have not been provided, provide materials and fabrication consistent with quality of Project and intended for commercial construction.
- C. Provide new materials for cutting and patching unless otherwise indicated.

**PART 3 - EXECUTION**

3.1 INSPECTION

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to Owner's Representative in writing; do not proceed with work until Owner's Representative has provided further instructions.

3.2 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
  - 1. Provide services of licensed engineer for designing temporary support where required by applicable authorities for temporary supports and for shoring; submit engineering calculations directly to applicable authorities upon request.
- B. Protect other portions of Project from damage.

3.3 PERFORMANCE

- A. Execute cutting by methods that provide proper surfaces to receive installation of repairs and finishes.
- B. Employ same installer or fabricator to perform cutting and patching work as employed for new construction for:
  - 1. Weather-exposed or moisture resistant elements.
  - 2. Sight-exposed finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

- D. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- E. Fit work tight to pipes, sleeves, ducts, conduit, and penetrations through surfaces.
- F. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:
  - 1. For continuous surfaces, refinish to nearest intersection.
  - 2. For an assembly, refinish entire unit.

**END OF SECTION**

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**SECTION 01 74 10**

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**WASTE MANAGEMENT**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

A. Project requires special Waste Management Program.

1. Effect optimum control of solid wastes.
2. Prevent environmental pollution and damage.

B. Related Work:

1. Section 01 50 00: Temporary facilities and controls.

## 1.2 DEFINITIONS

A. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.

B. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.

C. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.

1. Rubbish: Includes both combustible and noncombustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, and bones.
2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings that result from construction or maintenance and repair work.

D. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.

E. Sanitary Wastes:

1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.
2. Sewage: Domestic sanitary sewage.

## 1.3 SUBMITTALS

A. Waste Management Program: Comply with Contract Documents and applicable code requirements for salvaging, recycling, and disposing of nonhazardous waste.

1. Prior to commencement of Work, schedule and conduct meeting with Owner and Owner's Representative to discuss proposed Waste Management Program.

2. Develop mutual understanding relative to details of recycling, and rebate programs.
3. Prepare and submit a written and graphic Waste Management Program including, but not limited to, the following:
  - a. Indicate procedures to be implemented.
  - b. Estimate total Project waste to be generated, and estimated cost of disposing of Project waste in landfills.
  - c. Estimate total cubic yards of following waste categories to be diverted from landfill.
    - 1) Clean dimensional wood, palette wood.
    - 2) Plywood, oriented strand board, and medium density fiberboard.
    - 3) Cardboard, paper, packaging.
    - 4) Other items as directed by Owner and Owner's Representative.
  - d. Estimate amounts of following waste categories in appropriate units (weight, feet, square yards, gallons).
    - 1) Metals.
    - 2) Other items as directed by Owner and Owner's Representative.
  - e. Submit permit or license and location of waste disposal areas.
  - f. Submit procedures for recycling/re-use program.
  - g. Submit procedures for rebate programs.
  - h. Revise and resubmit Waste Management Program as required by Owner and Owner's Representative.
    - 1) Review of Contractor's Waste Management Program will not relieve Contractor of responsibility for control of pollutants and other environmental protection measures.
- B. Submit summary of solid waste generated by Project with each application for progress payment, on form acceptable to Owner and Owner's Representative; include manifests, weight tickets, receipts, and invoices identifying Project and waste delivered to following locations.
  1. Recycling Centers.
  2. Class III landfills.
  3. Inert fills.
- C. Prepare rebate information and product documentation as required for Owner to qualify for rebate programs; submit with final closeout submittals.
  1. Where feasible submit in electronic format, otherwise in 3-ring binder.

1.4 RECYCLING PROGRAM

- A. Recycling: Implement recycling program that includes separate collection of waste materials of following types as applicable to Project requirements; recycling program to be applied by Contractors and subcontractors.
  - 1. Ferrous metal.
  - 2. Non-ferrous metal.
  - 3. Clean dimensional wood and palette wood.
  - 4. Plywood, oriented strand board, and medium density fiberboard.
  - 5. Paper - bond.
  - 6. Paper - newsprint.
  - 7. Cardboard and paper packaging materials.
  - 8. Plastics.
  - 9. Rigid foam.
  - 10. Beverage containers.
  - 11. Insulation.
  - 12. Others as appropriate.
  
- B. Handling: Keep materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
  - 1. Clean materials contaminated prior to placing in collection containers.
  
  - 2. Arrange for collection by or delivery to appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.
  
- C. Participate in Re-Use Programs: Rebates, tax credits, and other savings obtained for recycled or re-used materials shall accrue to Contractor.

**END OF SECTION**

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**SECTION 01 77 00**

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**CLOSEOUT PROCEDURES**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes Contract closeout procedures.
  - 1. Substantial Completion.
  - 2. Final Completion.
  - 3. Project record documents.
  - 4. Material and finish data.
  - 5. Maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 30 00: Administrative requirements including attic stock.
  - 2. Section 01 78 00: Warranties.

## 1.2 SUBSTANTIAL COMPLETION

- A. Immediately prior to Substantial Completion, schedule agency reviews as required for “temporary certificate of occupancy” or for “certificate of occupancy”.
- B. When Contractor considers Work, or a designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.
  - 1. List (“Punch List”): Format pre-approved by Owner and Owner’s Representative; tabular form with each space listed required.
- C. Within a reasonable time, Owner and Owner’s Representative will inspect status of completion and may add to “Punch List”.
- D. Should Owner and Owner’s Representative determine Work is not substantially complete, Contractor will be promptly notified in writing, giving reasons.
- E. Contractor shall remedy deficiencies and send a second written notice of substantial completion. Owner’s Representative will reinspect Work.
- F. When Work is determined to be substantially complete by Owner’s Representative, a Certificate of Substantial Completion will be prepared in accordance with General Conditions.

## 1.3 FINAL COMPLETION

- A. When Work is complete, submit written certification indicating:
  - 1. Work has been inspected for compliance with Contract Documents.

2. Work has been completed in accordance with Contract Documents and deficiencies listed (in 'Punch List') with Certificate of Substantial Completion have been corrected.
  3. Equipment and systems have been tested in presence of Owner's representative and are operational.
  4. Work is complete and ready for final inspection.
- B. Special Submittals: In addition to submittals required by Contract, submit following.
1. Provide submittals required by governing authorities to governing authorities with copies included in Project Record Documents.
  2. Submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

**1.4 PROJECT RECORD DOCUMENTS**

- A. Keep documents current; do not permanently conceal any work until required information has been recorded.
1. Owner will provide Contractor with a separate set of Drawings to maintain for Project Record Documents.
  2. Store reproducible Drawings, one set of Project Manual, and one copy of each Change Order separate from documents used for construction, for use as Project Record Documents.
  3. Indicate actual work on Drawings; indicate actual products used in Project Manual, including manufacturer, model number and options.
  4. Update Project Record Documents daily and allow for Owner's Representative inspection at least once a month.
- B. At Contract close-out submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.
- C. Final Completion Submittal: At Project Completion submit both Project Record Documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

**1.5 MATERIAL AND FINISH DATA**

- A. Provide data for primary materials and finishes.
- B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.
1. Electronic Format: Where available in electronic format, submit USB 3.0 flash drives with information required for material and finish data.



- C. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:
  - 1. Trade names, model, or type numbers.
  - 2. Cleaning instructions.
  - 3. Product data.
  - 4. Maintenance recommendations.

**1.6 MAINTENANCE MANUALS**

- A. Provide manuals for:
  - 1. Maintenance manuals provided as part of Submittals.
  - 2. Emergency manuals and instructions provided as part of Submittals.
- B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.
- C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.
- D. Arrange by Specification division and gives names, addresses, and telephone numbers of Subcontractors and suppliers. List:
  - 1. Appropriate design criteria.
  - 2. Shop drawings and product data.
- E. Electronic Format: Where available in electronic format, submit two USB 3.0 flash drives with information required for operation and maintenance manuals.

**END OF SECTION**

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**SECTION 01 78 00**

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**WARRANTIES**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Warranties: Compile required, and incidental warranties required by Contract Documents.
1. Manufacturer Warranties: Provide manufacturer's standard warranties where specified including inspections and services included or required as part of manufacturer's standard warranty.
  2. Special Warranties: Provide special warranties as required by Specifications sections.
  3. These warranties shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents, and which may be prescribed by law, regardless of wording of warranty.
- B. Extended Correction Period: Contractor shall correct failure of materials and systems to perform in a manner consistent with their intended use including but not limited to failure of waterproofing and roofing systems to resist penetration from water.
1. Standard Correction Period: One year after Substantial Completion or Beneficial Occupancy by Owner except where otherwise noted in Contract Documents; coordinate with General Conditions and Supplementary Conditions.
    - a. Items used by Contractor during construction operations shall not be considered substantially completed.
    - b. Correction of Work Period begins with Owner occupancy not completion of component.
  2. Extended Correction Period: Requirements are same as standard correction period but for an extended period as indicated in Specifications sections.
  3. Contractor Responsibilities: Bear cost of correcting failed work and replacing construction damaged by failure of materials and systems to perform in a manner consistent with their intended use during correction period.
    - a. Requirements for correction period shall apply to Subcontractors, suppliers, installers, and those responsible for failed work.
    - b. Owner and Design Team shall not be responsible for determining degree of responsibility of those involved.

4. Owner's Rights under Law: Correction period shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents, and which may be prescribed by law.

**1.2 FORM OF SUBMITTAL**

- A. Special Warranty and Extended Correction Period Forms: Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead without conditions or exceptions to requirements specified.
  1. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.
  2. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.
  3. Electronic Format: Submit USB 3.0 flash drives of warranties, in Microsoft Word.
- B. Manufacturer Warranty Forms: Use manufacturer's standard forms unless otherwise directed in Contract Documents; completed form shall not detract from or confuse interpretations of Contract Documents.
  1. Manufacturer's authorized representative shall sign manufacturer warranties.
  2. Subcontractor and installer shall countersign roofing systems warranties where specified.
- C. Submit final warranties prior to final application for payment.
  1. For equipment put into use with Owner's permission during construction, submit within ten days after first operation.
  2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
- D. Provide information for Owner's personnel regarding proper procedure in case of failure and instances that might affect validity of manufacturer warranty.
- E. Size: 8-1/2" by 11" for three-ring binder; fold larger sheets to fit.

**1.3 WARRANTIES AND CORRECTION OF WORK DOCUMENTS**

- A. Warranties and Correction of Work Documents are intended to protect Owner against failure of work and against deficient, defective, and faulty materials and workmanship, regardless of sources.
- B. Limitations: Warranties and correction of work requirements are not intended to cover failures that result from:
  1. Unusual or abnormal phenomena of the elements.

2. Owner's misuse, maltreatment, or improper maintenance of work.
  3. Vandalism after substantial completion.
  4. Insurrection or acts of aggression including war.
- C. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of work.
- D. Reinstatement: After correction of work reinstate warranty or extended correction period for corrected work to date of original expiration, but not less than half original period.
1. Correction of Work Period: The general correction of work period specified shall not be extended by corrective work except to extent required to correct failure and repair or replace materials damaged by failure.
- E. Replacement Cost: Replace or restore failing items without regard to anticipated useful service lives where part of correction of work period, extended correction of work period, and special warranty period unless otherwise noted.
- F. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

**END OF SECTION**

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**SECTION 02 41 20**

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**SELECTIVE BUILDING DEMOLITION**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Section Includes: Selectively remove materials, other than roofing materials, systems, components, fixtures, and equipment as designated and as required for completion of Project as indicated.
  - 1. Cap and identify active utilities.
- B. Related Sections:
  - 1. Section 01 11 00: Summary of work including hazardous materials requirements.
  - 2. Section 01 50 00: Temporary facilities including barriers and waste management.
  - 3. Section 01 73 00: Cutting and patching.
  - 4. Section 01 74 10: Waste management.
  - 5. Section 07 01 55: Existing modified bituminous roofing repair roofing removal.
  - 6. Section 07 01 57: Existing portable building roofing repair roofing removal.
  - 7. Section 07 52 00: Modified bituminous membrane roofing existing roofing removal.

## 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Prevent movement of structural components, provide and place bracing and be responsible for safety and support of structural components. Assume liability for movement, settlement, damage, or injury.
  - 2. Cease operations and notify Owner's Representative immediately if safety of structural components appears to be endangered; take precautions to properly support structures. Do not resume operations until safety is restored.
  - 3. Prevent dust from selective demolition from contaminating adjacent building areas, and clean construction dust from adjacent areas immediately upon notification by Owner's Representative, Owner, or authorities having jurisdiction.
- B. Design/Build: Provide special engineering to ensure compliance with applicable codes and Contract Documents for support systems.
- C. Scheduling: Do not close or obstruct roadways without permits. Conduct operations with minimum interference to adjacent traffic.

**1.3 SUBMITTALS**

- A. Action Submittals: Submit selective demolition operational sequence to ensure Project sequencing is consistent with Owner needs.
- B. Informational Submittals: Submit permits for transport and disposal of debris.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Debris: Maintain possession of materials being demolished except where noted as a material for reinstallation or a material to be retained by Owner. Immediately remove debris from site.
  - 1. Immediately remove from site wet materials and materials with water stains, with mold, and with mildew.
- B. Materials for Reinstallation: Carefully remove, store, and protect materials indicated to be reinstalled. Contact Owner and Owner's Representative prior to beginning demolition to determine extent of other materials that might be suitable for reinstallation.
  - 1. Inventory and record condition of items to be reinstalled.
- C. Owner Retained Materials: Contact Owner prior to beginning demolition to determine extent of materials to be retained. Carefully remove materials indicated to be retained by Owner; deliver and store where directed.
  - 1. Inventory and record condition of items to be retained by Owner.

**PART 3 - EXECUTION**

**3.1 EXISTING SERVICES**

- A. Disconnect or remove utility services as required for completion of Project; disconnect, stub off, and cap utility service lines not required for new construction.
  - 1. Do not remove utilities discovered during demolition but not indicated without first determining purpose for utility, coordinate with Owner's Representative and Engineers.
- B. Do not disrupt services to adjacent building areas not in Project.
- C. Place markers to indicate location of disconnected services; identify service lines and capping locations on Project Record Documents.

**3.2 DEMOLITION**

- A. Demolish indicated appurtenances as indicated and as required for Project completion in an orderly and careful manner.

1. Use methods that do not damage materials indicated to remain.
  2. Use impact tools only where specifically approved in advance.
  - B. Perform demolition in accordance with authorities having jurisdiction.
  - C. Remove demolished materials from site, unless otherwise directed.
    1. Remove from site, contaminated, vermin infested, and dangerous materials encountered and dispose of by safe means so as not to endanger health of workers or public.
  - D. Remove tools and equipment upon completion of work; leave area in condition acceptable to Owner and Owner's Representative.
- 3.3 REPAIR
- A. Repair damage to adjacent construction caused as result of this work.
  - B. Repair demolition beyond that required.

**END OF SECTION**

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**SECTION 07 05 63.1**  
**FLUID APPLIED ROOFING RESTORATION**  
**FOR LOVE ELEMENTARY SCHOOL**

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal Surface Roof Restoration
  - 1. Love ES Portable Building

1.2 REFERENCES

- A. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- B. ASTM C 1250 - Standard Test Method for Nonvolatile Content of Cold Liquid-Applied Elastomeric Waterproofing Membranes.
- C. ASTM D 92 - Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester.
- D. ASTM D 93 - Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester.
- E. ASTM D 562 - Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer.
- F. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- G. ASTM D 816 - Standard Test Methods for Rubber Cements.
- H. ASTM D 1002 - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal).
- I. ASTM D 1370 - Standard Test Method for Contact Compatibility Between Asphaltic Materials (Oliensis Test).
- J. ASTM D 1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.
- K. ASTM D 1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
- L. ASTM D 2196 - Standard Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield type) Viscometer.
- M. ASTM D 2369 - Standard Test Method for Volatile Content of Coatings.
- N. ASTM D 3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
- O. ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces



- P. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- Q. SRI - Solar Reflectance Index calculated according to ASTM E 1980.
- R. SMACNA Architectural Sheet Metal Manual.
- S. ANSI/SPRI ES-1 - Testing and Certification Listing of Shop Fabricated Edge Metal
- T. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual.

### 1.3 SYSTEM DESCRIPTION

- A. Metal Surface Roof Restoration: Renovation work includes:
  - 1. Surface preparation: Remove loose flaking rust, dust, dirt, debris, secure all gaped panels and replace all loose fasteners with next size larger. Coat entire roof with Rust-Go Primer.
  - 2. Metal Flashings: Repair/Replace metal flashings, pitch pockets, etc.
  - 3. Primer: Prime entire roof surface. (For all White-Knight system only)

### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
  - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
  - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
  - 3. Product reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- D. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, and color.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Manufacturer: Company specializing in manufacturing products specified in this section with documented ISO 9001 certification and minimum twelve years and experience.
- C. Installer Qualifications: Company specializing in performing Work of this section with

minimum five years documented experience and a certified Pre-Approved Garland Contractor.

- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

#### 1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installers of deck or substrate construction to receive roofing, installers of rooftop units and other work in and around roofing which must precede or follow roofing work including mechanical work, Architect, Owner, roofing system manufacturer's representative.
- C. Objectives include:
  - 1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
  - 2. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
  - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
  - 4. Review roofing system requirements, Drawings, Specifications and other Contract Documents.
  - 5. Review and finalize schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 6. Review required inspection, testing, certifying procedures.
  - 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
  - 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface. No wet or damaged materials will be used in the application.

- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

**1.8 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.
- B. Weather Condition Limitations: Do not apply roofing system during inclement weather or when a 40 percent chance of precipitation or greater is expected.
- C. 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.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:
  - 1. Close air intakes into the building.
  - 2. Have a dry chemical fire extinguisher available at the jobsite.
  - 3. Post and enforce "No Smoking" signs.
- F. Avoid inhaling spray mist; take precautions to ensure adequate ventilation.
- G. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75 degrees F (24 degrees C) and 50 percent relative humidity or until fully cured.
- H. Take precautions to ensure that materials do not freeze.
- I. Minimum temperature for application is 40 degrees F (4 degrees C) and rising for solvent based materials and 50 degrees F (10 degrees C) and rising for water based.

**1.9 WARRANTY**

- A. Upon completion of the work, provide the Manufacturer's written and signed limited labor and materials Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
  - 1. Warranty Period:
    - a. 10 Years
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
  - 1. Warranty Period:

- a. 3 years from date of acceptance.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: Garland Company, Inc. (The), which is located at: 3800 E. 91st St.; Cleveland, OH 44105; Toll Free Tel: 800-321-9336; Local Tel: 831-682-6827 Fax: 216-641-0633; Email:dclark@garlandind.com Web:[www.garlandco.com](http://www.garlandco.com)
- B. Material will be purchased and provided directly by the owner through CMAS.

**2.2 ROOF RESTORATION SYSTEM FOR METAL SURFACE ROOFS**

- A. Cold Applied White-Knight Plus WC:
  - 1. Primer: Rust-Go Primer:
  - 2. Coating: White-Knight Plus WC:
  - 3. Flashing: UNIBond Self Adhering Flashing or Grip Polyester Soft

**2.3 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS**

- A. 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.
- B. 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"
- C. Manufactured Roof Specialties: Manufactured 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.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

**3.2 ROOF PREPARATION AND REPAIR**

- A. General:
  - 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 wet, deteriorated, blistered or delaminated roofing membrane or 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. Existing roof surfaces shall be primed as necessary and allowed to dry prior to installing the roofing system.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Repair all defects such as deteriorated roof decks; separated seams, replace loose or brittle membrane or membrane flashings. Verify that exiting conditions meet the following requirements:
  - 1. Existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
  - 2. Application of roofing materials over a brittle roof membrane is not recommended.
- D. Remove all loose dirt and foreign debris from the roof surface. Do not damage roof membrane in cleaning process.
- E. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.
- F. Clean the entire roof surface by removing all dirt, algae, paint, oil, talc, rust or foreign substance. If Needed, Use a 10 percent solution of TSP (tri-sodium phosphate), Simple Green and warm water. Scrub heavily soiled areas with a brush. Rinse with fresh water to remove all TSP solution. Allow roof to dry thoroughly before continuing.
- G. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. All surface defects (cracks, blisters, tears) must be repaired with similar materials.
- H. Pre-Treatment of Known Growth - General Surfaces: Once areas of moss, mold, algae and other fungal growths or vegetation have been removed and surfaces have also been thoroughly cleaned, apply a biocide wash at a maximum spread rate of 0.2 gallons/square (0.08 liters/m), to guard against subsequent infection. Allow to dry onto absorbent surfaces before continuing with the application. On non-absorbent surfaces, allow to react before thoroughly rinsing to remove all traces of the solution.
- I. Power washing of metal roof surfaces to remove all loose rust or scale is mandatory before application. Use a high volume air broom or compressed air to remove residual dust rust perforations, etc. Deteriorated metal roof decks must be repaired or replaced prior to the application of the coating system.

### 3.3 INSTALLATION

- A. General Installation Requirements:
  - 1. Install in accordance with manufacturer's instructions. Apply to minimum coating thickness required by the manufacturer.
  - 2. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
  - 3. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
  - 4. Protect work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore work damaged by installation of the roofing system.
  - 5. All primers must be top coated within 24 hours of application. Re-prime If more time passes after priming.
  - 6. Keep roofing materials dry during application. Phased construction IS NOT allowed.
  - 7. Coordinate counter flashing, cap flashings, expansion joints and similar work with work specified in other Sections under Related Work.
  - 8. Coordinate roof accessories and miscellaneous sheet metal accessory items, including piping vents and other devices with work specified in other Sections under

## Related Work.

- B. Metal Surface Roof Restoration: Renovation work includes:
1. Surface Preparation: Remove loose flaking rust, dust, dirt, debris, secure all gaped panels and replace all loose fasteners with next size larger.
    - a. Remove rust by the most rigorous method suitable for the particular project and as approved by Garland.
    - b. Tighten all fasteners and verify that neoprene washers are in place, caulk with Tuff Stuff.
    - c. Replace missing fasteners using oversize fasteners as necessary.
    - d. Seal all fastener heads by applying a heavy dab of compatible sealant to the tops and around of all fastener heads.
      - 1) White-Knight Plus WC
  2. Flashings: Repair/Replace metal flashings, pitch pockets, etc.
  3. Primer:
    - a. Immediately after rust has been removed, prime surfaces with White-Knight Metal Primer/ Stallion Metal Primer at 1/4 gallon per 100 SF to prevent rust from reoccurring.
  4. Reinforcement: Base coat and treatment of field seams and around penetrations:
    - a. Application of White-Knight Plus Base Coat/ White-Stallion Plus Base Coat or White-Knight Plus Base Coat WC on field seams, flashings and around penetrations
      - 1) Verify that the surface to be coated is properly prepared.
      - 2) Restore the surface to a suitable condition if roof surface becomes contaminated with dirt, dust or other materials that will interfere with adhesion of the coatings.
      - 3) Apply materials at specified dry film thickness.
      - 4) Apply White-Knight Plus WC at minimum 6 inch wide stripes over all seams, flashings and around penetrations at 2.0 gallons per 100 SF.
      - 5) Immediately embed fabric reinforcement to all details and horizontal seams. Apply fabric reinforcement when panels are gapped and cannot be cured tightly together.
      - 6) Allow to dry for a minimum of 24 hours before applying finish coats.
      - 7) On vertical surfaces to achieve proper application rate cut your application into two coats to avoid sagging and runs of coating.
  5. Coating:
    - a. Material: Apply base coat in a uniform manner at 1.5 gallons per 100 SF over the entire roof surface.
    - b. Apply top coat in a uniform manner at 1.5 gallons per 100 SF over the entire roof surface.
      - 1) White-Knight Plus WC
    - c. Use special attention to coating flashings and other critical areas to build adequate membrane thickness.
    - d. Use multiple coats on verticals to prevent sagging.
    - e. Apply to Garland's minimum membrane thickness over the entire roof surface.

## 3.4 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Fabricated Flashings: Fabricated flashings and trim are provided as specified in Section 07620.
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, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in

Section 07710.

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.

3.5 CLEANING

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

3.6 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 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.

3.7 FIELD QUALITY CONTROL

- A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system.
- B. Perform field inspection and [and testing] as required under provisions of Section 01410.
- C. Correct defects or irregularities discovered during field inspection.

3.8 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, roofing system manufacturer's representative and others directly concerned with performance of roofing system.
- B. Walk roof surface areas, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. Identify all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. If core cuts verify the presence of damp or wet materials, the installer shall be required to replace the damaged areas at his own expense.
- D. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- E. Architect upon completion of corrections.

- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

### 3.9 PROTECTION

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

### 3.10 SCHEDULES

#### A. Coatings:

- 1. Coating: White-Knight Plus WC: highly reflective multi- purpose, single-component aliphatic urethane, liquid waterproofing membrane. VOC compliant and meets South Coast AQMD standards.
  - a. Tensile Strength: ASTM D 412, 2100 psi
  - b. Tear Resistance: ASTM D 624, 160 lbs./in
  - c. Elongation: ASTM D 412, 320%
  - d. Density @ 77 degrees F (25 degrees C, ASTM D 2939) 10.4 lb./gal (1.2 g/m3)
  - e. Flash Point: ASTM D 93, 110 degrees F min. (43 degrees C)
  - f. Non-Volatile: ASTM D 75, Typical 83%
  - g. Viscosity @ 77 degrees F (25 degrees C); Brookfield RVT, #4 Spindle 10 rpm9200 cP
  - h. Wet Film Thickness@ 2 gal./100 sq. ft. (0.82 l/m2)
  - i. VOC: 50 g/l
  - j. Reflectance: 0.87
  - k. Emittance: 0.89
  - l. SRI: 110

#### B. Flashings

- 1. Flashings: White-Knight Plus WC: highly reflective multi- purpose, single-component aliphatic urethane, liquid waterproofing membrane. VOC compliant and meets South Coast AQMD standards.
  - a. Tensile Strength: ASTM D 412, 2100 psi
  - b. Tear Resistance: ASTM D 624, 160 lbs./in
  - c. Elongation: ASTM D 412, 320%
  - d. Density @ 77 degrees F (25 degrees C, ASTM D 2939) 10.4 lb./gal (1.2 g/m3)
  - e. Flash Point: ASTM D 93, 110 degrees F min. (43 degrees C)
  - f. Non-Volatile: ASTM D 75, Typical 83%
  - g. Viscosity @ 77 degrees F (25 degrees C); Brookfield RVT, #4 Spindle 10 rpm9200 cP
  - h. Wet Film Thickness @ 2 gal./100 sq. ft. (0.82 l/m2)
  - i. VOC: 50 g/l
  - j. Reflectance: 0.87
  - k. Emittance: 0.89
  - l. SRI: 110

END OF SECTION



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**SECTION 07 05 63.2**  
**FLUID APPLIED ROOFING RESTORATION**  
**FOR MODIFIED BITUMEN SURFACE ROOF RESTORATION**

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## PART 1 GENERAL

## 1.1 SCOPE OF WORK

- A. The work under this contract shall include all labor, non owner supplied materials, tools, transportation, equipment, services, and facilities necessary for, and reasonably incidental to, the completion of the work as shown on the drawings and/or described in the specifications, for the following scope of work:
1. Mineral Modified Bitumen Surface Roof Restoration: Renovation work includes but is not limited to the following:
    - a. Remove and dispose of all base flashings.
    - b. Install new curbs as indicated by district.
    - c. Install new base flashings with Versiply 40 and Versiply Mineral membranes using Green-Lock Flashing Adhesive.
    - d. Patch and repair all blisters, mole runs, unadhered seams, and damaged membrane areas.
    - e. Patch in removed areas using Versiply 40 and Versiply Mineral in Green-Lock Flashing Adhesive.
    - f. Cut out caulking along counterflashing's and penetration details. Install new Green-Lock Sealant XL.
    - g. Powerwash entire roof system with simplegreen or tsp and water solution.
    - h. Apply Liquitec at 3 gallons per square to all details and membrane seams. Immediately roll grip polyester soft into the coating. Allow to cure.
    - i. Apply base coat of Liquitec at 2 gallons per square over entire roof surface.
    - j. Apply top coat of Liquitec at 2 gallons per square over entire roof surface.
    - k. At mechanical screen support penetrations, apply a 3 course of Liquitec and Polyester over the base and a minimum of 6" up support beam.
- B. School Site:
1. Franklin Elementary School Classroom Wing

## 1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Roof blocking installation and requirements.
- B. Section 07620 - Sheet Metal Flashing and Trim: Metal cap flashing and expansion joints.
- C. Section 07620 - Sheet Metal Flashing and Trim: Weather protection for base flashings.
- D. Section 07710 - Manufactured Roof Specialties: Counter flashing gravel stops, and fascia, scuppers, gutters and downspouts.

## 1.3 REFERENCES

- A. ASTM C 92 - Standard Test Methods for Sieve Analysis and Water Content of Refractory Materials.

- B. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- C. ASTM D 93 - Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester.
- D. ASTM D 562 - Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer.
- E. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- F. ASTM D 2240 - Standard Test Method for Rubber Property-Durometer Hardness.
- G. ASTM D 4212 - Standard Test Method for Viscosity by Dip-Type Viscosity Cups.
- H. ASTM D 4402 - Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer.
- I. ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
- J. SRI - Solar Reflectance Index calculated according to ASTM E 1980.
- K. SMACNA Architectural Sheet Metal Manual.
- L. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings including installation details of fluid applied roofing and flashing prior to job start.
- D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
  - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
  - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
  - 3. Product reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- E. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, and color.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturer's current Application and Installation Guidelines and the NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Manufacturer: Company specializing in manufacturing products specified in this section with documented ISO 9001 certification and minimum twelve years and experience.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

## 1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installers of deck or substrate construction to receive roofing, installers of rooftop units and other work in and around roofing which must precede or follow roofing work including mechanical work, Architect, Owner, roofing system manufacturer's representative.
- C. Objectives include:
  - 1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
  - 2. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
  - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
  - 4. Review roofing system requirements, Drawings, Specifications and other Contract Documents.
  - 5. Review and finalize schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 6. Review required inspection, testing, certifying procedures.
  - 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
  - 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Storage temperatures should be between 60 degrees F to 80 degrees F (15.6 degrees to 26.7 degrees C). Indoor ventilated storage is recommended. Ensure jobsite storage is in a shaded and ventilated area. Do not store in direct sunlight Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

**1.8 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.
- B. Weather Condition Limitations: Product application must not be done when rain or other conditions such as fog or heavy dew are possible within a 24 hour period. Roof surface must be at least 6 Fahrenheit degrees or 3 Celsius degrees above the dew point and rising.
- C. 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.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:
  - 1. Close air intakes into the building.
  - 2. Have a dry chemical fire extinguisher available at the jobsite.
  - 3. Post and enforce "No Smoking" signs.
- F. Avoid inhaling spray mist; take precautions to ensure adequate ventilation.
- G. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75 degrees F (24 degrees C) and 50 percent relative humidity or until fully cured.
- H. Take precautions to ensure that materials do not freeze.
- I. Minimum temperature for application of White-Knight Plus/ White-Stallion Plus, White-Knight Plus WC and LiquiTec coatings is 50 degrees F (10 degrees C) and rising.

**1.9 WARRANTY**

- A. Warranty Period: 15 years.
  - 1. Upon completion of the work, provide the Manufacturer's written and signed limited labor and materials Warranty, warranting that, if a leak develops in the roof during the

term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.

- B. Warranty Period: Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
  - 1. Warranty Period:
    - a. 3 years from date of acceptance.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. Local Representative: Doug Clark – (925) 784-6701; email: dclark@garlandind.com
  - 1. Materials to be furnished and provided by Alameda USD through CMAS.

### 2.2 MINERAL MODIFIED BITUMEN SURFACE ROOF RESTORATION

- A. LiquiTec:
  - 1. Base: LiquiTec
  - 2. Coating: LiquiTec.
  - 3. Flashing: LiquiTec.
  - 4. Reinforcement:
    - a. Partial Reinforcement: Apply in base coat on all membrane seams and details.
      - 1) Reinforcement Materials:
        - a) Grip Polyester Soft.
- B. Base Flashings and Roof Repairs:
  - 1. Base Sheet: Versiply 40
  - 2. Cap Sheet: Stressply Plus FR Mineral
  - 3. Adhesive: Green-Lock Flashing Adhesive

### 2.3 ACCESSORIES:

- 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, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.
- B. Urethane Sealant - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
  - 1. Tensile Strength, ASTM D 412: 250 psi
  - 2. Elongation, ASTM D 412: 950%
  - 3. Hardness, Shore A ASTM C 920: 35
  - 4. Adhesion-in-Peel, ASTM C 92: 30 pli
- C. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.
- D. Glass Fiber Cant - Glass Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended and furnished by the membrane

manufacturer.

- E. Coping:
  - 1. IMETCO: Snap on Perma-Edge Coping
    - a. 0.040 Aluminum

#### 2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. 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.
- B. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- C. Drain Flashing should be 4lb (1.8kg) sheet lead formed and rolled.
- D. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- E. Fabricated Flashing: 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.
- F. Manufactured Roof Specialties: Manufactured 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.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### 3.2 ROOF PREPARATION AND REPAIR

- A. General: All necessary field and flashing repairs must be done according to good construction practices, including the removal of all wet insulation and defective materials as identified through a moisture detection survey such as an infrared scan and replacement with like-materials.
  - 1. Remove all vertical roof flashings from curbs and parapet walls down to the surface of the roof. Remove damaged existing flashings at roof drains and roof penetrations.
  - 2. Remove all wet, deteriorated, blistered or delaminated roofing membrane or insulation and fill in any low spots with like materials 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. Existing roof surfaces shall be primed as necessary and allowed to dry prior to

installing the roofing system.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Repair all defects such as deteriorated roof decks, saturated materials, loose or brittle membrane or membrane flashings, etc. Verify that existing conditions meet the following requirements :
  - 1. Existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
  - 2. Application of roofing materials over a brittle, damaged or poor condition roof membrane is not permitted.
- D. Remove all loose dirt and foreign debris from the roof surface. Do not damage roof membrane in cleaning process.
- E. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.
- F. Confirm local water run-off ordinances and restrictions prior to cleaning roof. Clean the entire roof surface by removing all dirt, algae, mold, moss, paint, oil, talc, rust or other foreign substance. Use a bio-degradable cleaner like Simple Green Oxy Solve when necessary and warm water. Scrub heavily soiled areas with a brush. Power wash roof thoroughly with an industrial surface cleaner equipped with one piece balanced spray rotating jets for streak free close contact cleaning. Rinse with fresh water to completely remove all residuals. Allow roof to dry thoroughly before continuing.
- G. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. All surface defects must be repaired/renovated and be made watertight. Any repairs must be with be only with materials compatible with the fluid-applied roofing restoration system.

### 3.3 INSTALLATION

- A. General Installation Requirements:
  - 1. Install in accordance with manufacturer's current Application and Installation Guidelines and the NRCA Roofing and Waterproofing Manual.
  - 2. Adequate coating thickness is essential to performance. If the applicator is unfamiliar in gauging application rates, we suggest that a controllable area be measured and the specified material be applied. In all cases, all minimum specified material must be applied and proper minimum dry film thicknesses must be achieved. Care must be taken to ensure that all areas completed including all flashings, roof penetrations, etc. are coated sufficiently to ensure a watertight seal.
  - 3. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
  - 4. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
  - 5. Protect work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore adjacent work damaged by installation of the roofing system.
  - 6. Keep roofing materials dry during application.
  - 7. Coordinate counter flashing, cap flashings, expansion joints and similar work with work specified in other Sections under Related Work.
  - 8. Coordinate roof accessories and miscellaneous sheet metal accessory items, including piping vents and other devices with work specified in other Sections under Related Work.

- B. Mineral Modified Bitumen Surface Roof Restoration: Renovation work includes:
1. Surface preparation: Remove dirt, and debris.
    - a. Previously coated roofs with well-adhered polyurethane or polyurea coating surfacing must be solvent-wiped with acetone after cleaning to reactivate surface for overcoating.
  2. Liquid Flashings:
    - a. Fascia Edges: Cut back edges. Prime with Rust-Go Primer, apply Coating, embed fabric reinforcement apply Top Coating.
    - b. Parapets and Vertical Surfaces: Prime, apply Coating, embed fabric reinforcement apply Top Coating
    - c. Metal Flashings: Prime, apply Coating.
  3. Partially Reinforced System:
    - a. Reinforced Coating (Grip Polyester Soft)
      - 1) Always begin with flashing laps and details
      - 2) Apply coating at 3.0 gallons per 100 SF, extending 4" on each side of lap.
      - 3) Immediately roll 6 inch wide fabric reinforcement into the coating and completely saturate surface ensuring full encapsulation of fabric without pinholes, voids or openings.
      - 4) Allow to cure thoroughly before applying field coating layers
  4. Base Coat: Apply base coat at 2 gal./sq and let cure.
  5. Coating: Apply coating to entire roof surface. Use special attention to coating flashings and other critical areas to build adequate membrane thickness
    - a. LiquiTec:
      - 1) Apply Coating at 2.0 gallons per 100 SF over the entire roof surface.

### 3.4 REPAIR OF EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. General
1. Repair flashing in accordance with the requirements/recommendations of the Membrane manufacturer and as indicated on the manufacturer's standard drawings. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system.
  2. Install and repair flashings concurrently with the roofing as the job progresses.
  3. Terminate flashings as required by the membrane manufacturer.
- B. Manufactured Roof Specialties: Manufactured copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in Section 07710.
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. Repairs of Existing Roof Penetrations and Flashings
1. Metal Edge:
    - a. Inspect the nailers to assure proper attachment and configuration.
    - b. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at 8 inches (203 mm) o.c.
    - c. Install continuous cleat and fasten at 6 inches (152 mm) o.c.
    - d. Install new metal edge hooked to continuous cleat and set in bed of roof cement. Fasten flange to wood nailers every 3 inches (76 mm) o.c. staggered.
    - e. Prime metal edge at a rate of 100 square feet per gallon and allow to dry.
    - f. Strip in flange with base flashing ply covering entire flange in bitumen with 6 inches (152 mm) on to the field of roof. Assure ply laps do not coincide with metal laps.
    - g. 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. Seal outside edge with rubberized cement.
2. Scupper Through Roof Edge:
    - a. Inspect the nailer to assure proper attachment and configuration.
    - b. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at 8 inches (203 mm) o.c.
    - c. Install a scupper box in a 1/4 inch (6 mm) bed of mastic. Assure all box seams are soldered and have a minimum 4 inch (101 mm) flange. Make sure all corners are closed and soldered. Prime scupper at a rate of 100 square feet per gallon and allow to dry.
    - d. Fasten flange of scupper box to nailer every 3 inches (76mm) o.c. staggered.
    - e. Strip in edge with base flashing ply covering entire area in bitumen with 6 inches (152 mm) on to the field of the roof.
    - f. 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 seams.
  3. Scupper Through Wall:
    - a. Inspect the nailer to assure proper attachment and configuration.
    - b. Run one ply over nailer, into scupper hole and up flashing as in typical wall flashing detail. Assure coverage of all wood nailers.
    - c. Install a scupper box in a 1/4 inch (6 mm) bed of mastic. Assure all box seams are soldered and have a minimum 4 inch (101 mm) flange. Make sure all corners are closed and soldered. Prime scupper at a rate of 100 square feet per gallon and allow to dry.
    - d. Fasten flange of scupper box every 3 inches (76 mm) o.c. staggered.
    - e. Strip in flange of scupper box with base flashing ply covering entire area with 6 inch (152 mm) overlap on to the field of the roof and wall flashing.
    - f. 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 seams.
  4. Coping Cap:
    - a. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
    - b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
    - c. Install base flashing ply covering entire wall and wrapped over top of wall and down face with 6 inches (152 mm) on to field of the roof and set in cold asphalt. Nail membrane at 8 inches (203 mm) o.c.
    - d. 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 seams and allow to cure and aluminize.
    - e. Install coping cap per manufacturer's recommendations.
  5. Surface Mounted Counterflashing/Coping Cap:
    - a. Minimum flashing height is 8 inches (203 mm) above finished roof height. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
    - b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
    - c. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of roof.
    - d. 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 seams and allow to cure and aluminize.
    - e. 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.

- f. Secure counterflashing set on butyl tape above flashing. Fasten 8 inches (203 mm) o.c. and caulk top of counterflashing.
  - g. Attach tapered board to top of wall (minimum slope 1/4 -12). Do not use organic fiberboard or perlite.
  - h. Cover tapered board and all exposed wood with base flashing ply. Fasten inside and out at 8 inches (203 mm) o.c.
  - i. Install continuous cleat and fasten at 6 inches (152 mm) o.c. to outside wall.
  - j. Install new metal coping cap hooked to continuous cleat.
  - k. Fasten inside of cap 24 inch (609 mm) o.c. with approved fasteners and neoprene washers.
6. Surface Mounted Counterflashing:
- a. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
  - b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
  - c. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of the roof.
  - d. 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.
  - e. 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.
  - f. Secure counterflashing set on butyl tape above flashing at 8 inches (203 mm) o.c. and caulk top of counterflashing.
7. Equipment Support:
- a. 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.
  - b. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
  - c. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
  - d. 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. Attach top of membrane to top of 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.
  - e. 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.
  - f. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- D. 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 32 wet mil top coat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.

### 3.5 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.

- B. Remove coating markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

**3.6 PROTECTION**

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 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.

**3.7 FIELD QUALITY CONTROL**

- A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system.
- B. Perform field inspection and [and testing] as required under provisions of Section 01410.
- C. Correct defects or irregularities discovered during field inspection.

**3.8 FINAL INSPECTION**

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, roofing system manufacturer's representative and others directly concerned with performance of roofing system.
- B. Walk roof surface areas, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. Identify all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. If core cuts verify the presence of damp or wet materials, the installer shall be required to replace the damaged areas at his own expense.
- D. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- E. Notify Architect upon completion of corrections.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

**3.9 OWNER SUPPLIED MATERIALS**

- A. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.
- B. Any material or accessories required for the installation of the roof system in excess of the

Owner provided material must be supplied by the Contractor and added into the bid cost proposal. 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. The cost to handle and fabricate flashing metal from the Owner provided flat stock is contractor's responsibility and to be added into the bid cost proposal.

- C. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.
- D. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07550.
- E. Freight charges of owner supplied materials will be the responsibility of the Owner.
- F. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly protect, cover and store at jobsite.
- G. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07550.

1. Materials specifically provided by the Owner:

- a. Versiply Mineral: 10 Rolls
- b. Versiply 40: 3Rolls
- c. Liquitec: 40Buckets
- d. 6" Grip Polyester Soft 10 Rolls
- e. Freight to jobsite: 1

END OF SECTION

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**SECTION 07 05 63.3**  
**FLUID APPLIED ROOFING RESTORATION**  
**FOR METAL SURFACE ROOFS**

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## PART 1 GENERAL

## 1.1 SCOPE OF WORK:

- A. The work under this contract shall include all labor, non owner supplied materials, tools, transportation, equipment, services, and facilities necessary for, and reasonably incidental to, the completion of the work as shown on the drawings and/or described in the specifications, The scope of work includes but is not limited to:
1. Surface preparation: Remove loose flaking rust, dust, dirt, debris, secure all gaped panels and replace all loose fasteners with next size larger.
  2. Metal Flashings: Repair/Replace metal flashings, pitch pockets, gutters etc.
  3. Primer: Prime entire roof surface with Rust Go Primer.
  4. Apply Uni-Bond to all seams and details.
  5. Apply base coat over Uni-bond, details, and other areas as indicated by manufacturer.
  6. Apply top coat across entire roof section.
  7. Replace gutters, edge metal, and damaged details as required for a complete system.
- B. School Sites:
1. Edison Elementary School
  2. Longfellow Elementary School
  3. Ruby Bridges Elementary School

## 1.2 REFERENCES

- A. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- B. ASTM C 1250 - Standard Test Method for Nonvolatile Content of Cold Liquid-Applied Elastomeric Waterproofing Membranes.
- C. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- D. ASTM D 1002 - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal).
- E. ASTM D 1370 - Standard Test Method for Contact Compatibility Between Asphaltic Materials (Oliensis Test).
- F. ASTM D 1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.
- G. ASTM D 1863 - Standard Specification for Mineral Aggregate Used on Built-Up Roofs.
- H. ASTM D 1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
- I. ASTM D 2042 - Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene.
- J. ASTM D 2196 - Standard Test Methods for Rheological Properties of Non-Newtonian

Materials by Rotational (Brookfield type) Viscometer.

- K. ASTM D 2240 - Standard Test Method for Rubber Property-Durometer Hardness.
- L. ASTM D 2369 - Standard Test Method for Volatile Content of Coatings.
- M. SMACNA Architectural Sheet Metal Manual.
- N. ANSI/SPRI ES-1 - Testing and Certification Listing of Shop Fabricated Edge Metal
- O. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual.

### 1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
  - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
  - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
  - 3. Product reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. 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.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Manufacturer: Company specializing in manufacturing products specified in this section with documented ISO 9001 certification and minimum twelve years and experience.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.

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

**1.5 PRE-INSTALLATION CONFERENCE**

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installers of deck or substrate construction to receive roofing, installers of rooftop units and other work in and around roofing which must precede or follow roofing work including mechanical work, Architect, Owner, roofing system manufacturer's representative.
- C. Objectives include:
  - 1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
  - 2. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
  - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
  - 4. Review roofing system requirements, Drawings, Specifications and other Contract Documents.
  - 5. Review and finalize schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 6. Review required inspection, testing, certifying procedures.
  - 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
  - 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

**1.6 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. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable

storage.

1.7 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.
- B. Weather Condition Limitations: Do not apply roofing system during inclement weather or when a 40 percent chance of precipitation or greater is expected.
- C. 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.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:
  - 1. Close air intakes into the building.
  - 2. Have a dry chemical fire extinguisher available at the jobsite.
  - 3. Post and enforce "No Smoking" signs.
- F. Avoid inhaling spray mist; take precautions to ensure adequate ventilation.
- G. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75 degrees F (24 degrees C) and 50 percent relative humidity or until fully cured.
- H. Take precautions to ensure that materials do not freeze.
- I. Minimum temperature for application is 40 degrees F (4 degrees C) and rising for solvent based materials and 50 degrees F (10 degrees C) and rising for water based.

1.8 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed limited labor and materials Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
  - 1. Warranty Period:
    - a. 10 Years
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
  - 1. Warranty Period:
    - a. 3 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The), which is located at: 3800 E. 91st St.; Cleveland, OH 44105; Toll Free Tel: 800-321-9336; Tel: 216-641-7500; Fax: 216-641-0633; Local Representative: Doug Clark, (925) 784-6701; Email: dclark@garlandind.com



- B. Materials to be furnished by Alameda USD through CMAS.

**2.2 ROOF RESTORATION SYSTEM FOR METAL SURFACE ROOFS**

- A. Cold Applied White-Knight Plus WC:
  - 1. Primer: Rust Go Metal Primer:
  - 2. Coating: White-Knight Plus WC:
  - 3. Flashing: Replace Gutters & Downspouts
  - 4. Penetration Seam Laps: Uni-Bond SA Tape
  - 5. Surfacing: None

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

**3.2 ROOF PREPARATION AND REPAIR**

- A. General:
  - 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 wet, deteriorated, or delaminated roofing materials to create a smooth, even surface for application of new liquid roof membranes.
  - 3. Existing roof surfaces shall be primed as necessary and allowed to dry prior to installing the roofing system.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Repair all defects such as deteriorated roof decks; replace saturated insulation board, replace loose or brittle membrane or membrane flashings. Verify that existing conditions meet the following requirements:
  - 1. Existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
  - 2. Application of roofing materials over a brittle roof membrane is not recommended.
- D. Remove all loose dirt and foreign debris from the roof surface. Do not damage roof in cleaning process.
- E. Clean and seal all parapet walls, coping caps, and repair any damaged metal where necessary. Replace gutters with .040 Aluminum. Replace any loose metal roof neoprene washers and fasteners with one size larger than existing.
- F. Clean the entire roof surface by removing all dirt, algae, paint, oil, talc, rust or foreign substance. Use a 10 percent solution of TSP (tri-sodium phosphate), Simple Green and warm water. Scrub heavily soiled areas with a brush. Rinse with fresh water to remove all TSP solution. Allow roof to dry thoroughly before continuing.
- G. Pre-Treatment of Known Growth - General Surfaces: Once areas of moss, mold, algae and other fungal growths or vegetation have been removed and surfaces have also been thoroughly cleaned, apply a biocide wash at a maximum spread rate of 0.2 gallons/square

(0.08 liters/m), to guard against subsequent infection. Allow to dry onto absorbent surfaces before continuing with the application. On non-absorbent surfaces, allow to react before thoroughly rinsing to remove all traces of the solution.

- H. Power washing of metal roof surfaces to remove all loose rust or scale is mandatory before application. Use a high volume air broom or compressed air to remove residual dust rust perforations, etc. Deteriorated metal roof decks must be repaired or replaced prior to the application of the coating system.
- I. Apply White Knight Plus WC test kit to roof section for pull test adhesion approval.

### 3.3 INSTALLATION

#### A. General Installation Requirements:

1. Install in accordance with manufacturer's instructions. Apply to minimum coating thickness required by the manufacturer.
2. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
3. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
4. Protect work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore work damaged by installation of the roofing system.
5. All primers must be top coated within 24 hours of application. Re-prime If more time passes after priming.
6. Keep roofing materials dry during application. Phased construction can be allowed as long as no, more than 7 days pass between coats excluding primers.
7. Coordinate counter flashing, cap flashings, expansion joints and similar work with work specified in other Sections under Related Work.
8. Coordinate roof accessories and miscellaneous sheet metal accessory items, including piping vents and other devices with work specified in other Sections under Related Work.

#### B. Metal Surface Roof Restoration: Renovation work includes:

1. Surface Preparation: Remove loose flaking rust, dust, dirt, debris, secure all gaped panels and replace all loose fasteners with next size larger.
  - a. Remove rust by the most rigorous method suitable for the particular project and as approved by Garland.
  - b. Replace any loose fasteners using oversize fasteners and new butyl washer.
  - c. Seal all fastener heads by applying a heavy dab of Tuff Stuff sealant to the tops and around of all fastener heads.
2. Flashings: Seal with Uni-Bond and saturate with White Knight Plus WC
3. Primer:
  - a. Immediately after rust has been removed, prime surfaces with White-Knight Metal Primer/ Stallion Metal Primer at 1/4 gallon per 100 SF to prevent rust from reoccurring.
4. Reinforcement: Uni-Bond Tape at flashing seams.
  - a. Application of White-Knight Plus Base Coat WC on field seams, flashings and around penetrations
    - 1) Verify that the surface to be coated is properly prepared.
    - 2) Restore the surface to a suitable condition if roof surface becomes contaminated with dirt, dust or other materials that will interfere with adhesion of the coatings.
    - 3) Apply materials at specified dry film thickness.
    - 4) Apply White-Knight Plus WC Base Coat at minimum 6 inch wide Uni Bond stripes over all seams, flashings and around penetrations at 2.0

- gallons per 100 SF.
  - 5) Use Uni-Bond Tape reinforcement when panels are gapped and cannot be cured tightly together.
  - 6) Allow to dry for a minimum of 24 hours before applying finish coats.
  - 7) On vertical surfaces to achieve proper application rate cut your application into two coats to avoid sagging and runs of coating.
5. Coating:
- a. Material: Apply in a uniform manner at 2.0 gallons per 100 SF over entire roof surface.
    - 1) White-Knight Plus WC
  - b. Use special attention to coating flashings and other critical areas to build adequate membrane thickness.
  - c. Use multiple coats on verticals to prevent sagging.
  - d. Apply to Garland's minimum membrane thickness over the entire roof surface.

3.4 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Fabricated Flashings: Fabricated flashings and trim are provided as specified in Section 07620.
  - 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, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in Section 07710.
  - 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.

3.5 CLEANING

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

3.6 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 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.

3.7 FIELD QUALITY CONTROL

- A. Require attendance of roofing materials manufacturers' representatives at site during

installation of the roofing system.

- B. Perform field inspection and [and testing] as required under provisions of Section 01410.
- C. Correct defects or irregularities discovered during field inspection.

### 3.8 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, roofing system manufacturer's representative and others directly concerned with performance of roofing system.
- B. Walk roof surface areas, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. Identify all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. If core cuts verify the presence of damp or wet materials, the installer shall be required to replace the damaged areas at his own expense.
- D. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- E. Architect upon completion of corrections.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

### 3.9 PROTECTION

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

### 3.10 OWNER SUPPLIED MATERIALS

- A. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.
- B. Any material or accessories required for the installation of the roof system in excess of the Owner provided material must be supplied by the Contractor and added into the bid cost proposal. 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. The cost to handle and fabricate flashing metal from the Owner provided flat stock is contractor's responsibility and to be added into the bid cost proposal.
- C. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.
- D. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07550.
- E. Freight charges of owner supplied materials will be the responsibility of the Owner.
- F. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly

protect, cover and store at jobsite.

- G. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07550.

1. Materials specifically provided by the Owner:

a.	White-Knight Plus WC:	55 Buckets
b.	Uni-Bond ST 4”:	12 Rolls
c.	Rust-Go Primer:	8 Buckets
d.	Tuff Stuff MS:	5 Cases
e.	Freight to jobsite:	1

END OF SECTION

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**SECTION 07 22 16****ROOF INSULATION**

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**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Roof insulation and installation.
  - 1. HCFC FREE "Green" Polyiso Rigid board type roof insulation(s) for thermal protection as part of roofing assemblies.

**1.02 RELATED SECTIONS**

- A. Section 07 5550 - Modified Bitumen Roofing
- B. Section 07 6200 - Sheet Metal Flashing and Trim

**1.03 REFERENCES**

- A. ASTM A-167-94a Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip
- B. ASTM A- 653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc - Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
- C. ASTM B-29 Pig Lead
- D. ASTM B-32 Solder Metal
- E. ASTM C-165-95 Test Method for Measuring Compressive Properties of Thermal Insulation
- F. ASTM C-208-95 Specifications for Cellulosic Fiber Insulating Board
- G. ASTM C-209-92 Test Method for Cellulosic Fiber Insulating Board
- H. ASTM C-272-91 Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
- I. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- J. ASTM C-728-91 Specification for Perlite Thermal Insulation Board
- K. ASTM D-5 Test Method for Penetration of Bituminous Materials
- L. ASTM D-36 Test Method for Softening Point of Bitumen (Ring and Ball Apparatus)
- M. ASTM D-92 Test Method for Flash and Fire Pints by Cleveland Open Cup
- N. ASTM D-312 Specification for Asphalt Used in Roofing
- O. ASTM D-5147 Sampling and Testing Modified Bituminous Sheet Material
- P. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- Q. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- R. ASTM E 2114-01 - Standard Terminology for Sustainability Relative to the Performance of Buildings

- S. ASTM 2129 -01 - Standard Practice for Data Collection for Sustainability Assessment of Building Product
- T. FM Factory Mutual System, Norwood, Massachusetts
- U. NRCA National Roofing Contractors Association, Chicago, IL
- V. SMACNA Sheet Metal and Air Conditioning Contractors National Association
- W. UL Underwriter's Laboratories, Inc., Northbrook, Illinois
- X. FS HH-I-1972 Insulation Board, Polyisocyanurate
- Y. WH Warnock Hersey International, Inc. Middleton, WI

#### 1.04 DEFINITIONS

- A. HCFC FREE "Green" Polyiso Roof Board Insulation is defined as environmentally friendly, with Zero Global Warming, Zero Ozone Depletion (ODP) as in compliance with the US EPA requirements of January 1, 2003 requirement to eliminate production of HCFC 141b.
- B. LTTR (Long Term Thermal Resistance) is defined as using techniques from ASTM C1303, CAN/ULC S770 predicting a foam's R-Value that has been shown to be equivalent to the average performance of a permeably faced foam insulation product over 15 years. In Canada this method is used as the Design R-Value. This applies to ALL foam insulation products with blowing agents other than air, such as Polyiso, "Green" Polyiso, extruded polystyrene and polyurethane. The new method is based on consensus standards in the US and Canada. PIMA has reported this method as providing a better understanding of the thermal performance of foam.

#### 1.05 SUBMITTALS

- A. See Section 01 3300 - Submittals, for submittal procedures.
- B. Product Data: Manufacturer's specifications and installation instructions for each product specified.
- C. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
- D. Provide a sample of each insulation type.
- E. Shop Drawings:
- F. Indicate complete installation details of tapered insulation system, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
- G. Include: Outline of roof, location of drains and scuppers, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.
- H. Certifications: Submit all of the following;
  - 1. Roof manufacturer's certification that insulation fasteners furnished are acceptable to roof manufacturer.
  - 2. Roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
  - 3. Wind uplift calculation, per CBC, Chapter 15, 1504 utilizing ASCE 7. Wind uplift shall be provided by the roofing system manufacturer. Calculation shall be signed and sealed by a CA licensed Structural II engineer.

4. System Manufacturer's or insulation manufacturer's certification that HCFC FREE "Green" Polyiso materials meet Zero ODP (Ozone Depletion Potential) and Zero GWP (Global Warming Potential) specification requirements.

#### 1.06 DESIGN REQUIREMENTS

- A. No ponding of water on roof, all runoff flows to drain.
- B. All roof insulation overlaid with perlite board. No roofing installed over exposed insulation.

#### 1.07 PERFORMANCE REQUIREMENTS

- A. General: Fire Classification, ASTM E-108; Section specifies a roof system with an external fire rating. The descriptions given below are general descriptions. The insulation, recovery board, and all other components shall be included as required by the membrane manufacturer to provide a Factory Mutual Class 1A fire resistance rating or Listed by Underwriter's Laboratories or Warnock Hersey for external fire tests of ASTM - E - 108 Class A.
- B. Provide continuity of thermal barrier at building enclosure elements.
- C. Flame spread less than 25 when tested in accordance with ASTM E84.
- D. Smoke density less than 50 when tested in accordance with ASTM E84.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened packaging, with identifying tags or labels intact and legible.
- B. Coordinate scheduling for timely deliveries and prompt installation of materials.
- C. Store insulation and support system in a dry, protected area out of direct sunlight. If storage area is outdoors, store material off the ground and protected by a suitable waterproof cover.
- D. Remove insulation which is warped, broken or exposed from moisture from the site.

#### 1.09 ENVIRONMENTAL REQUIREMENTS

- A. Handle and install insulation system only under conditions and temperatures recommended by the manufacturer.
- B. Coordinate insulation placement to assure that material can be covered promptly with roof. Do not leave insulation exposed overnight or to inclement weather.

#### 1.10 WARRANTY

- A. Provide warranty coordinated with the requirements of other sections specifying roof products.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURER

- A. Acceptable Manufacturers:
  1. Viking Products Group, [www.vikingpg.com](http://www.vikingpg.com)
  2. Manville Roofing Systems, [www.jm.com](http://www.jm.com)
  3. Dow, [www.dow.com](http://www.dow.com)
  4. GAF, [www.gaf.com](http://www.gaf.com).
  5. U. S. Intec Inc., [www.usintec.com](http://www.usintec.com).
- B. Substitutions: See Section 01 6000 - Product Requirements.



**2.02 MATERIALS**

- A. Polyisocyanurate Roof Insulation: Provide thicknesses of insulation as indicated. Provide combination of types and thicknesses to provide a complete system.
  - 1. Surface Burning Characteristics: Provide assembly with composite flame spread rating of 25 or less and smoke developed of 50 or less, as determined in accordance with ASTM E 84.
  - 2. Closed cell polyisocyanurate foam.
    - a. R-Value: Minimum 11.
  - 3. Insulation board shall meet the following requirements:
    - a. UL, WH or FM listed under Roofing Systems
    - b. Federal Specification HH-I-1972, Class 1
    - c. Dimensional Stability ASTM D2126 2% max.
    - d. Compressive Strength ASTM D1621 25 psi min.
    - e. Vapor Permeability ASTM E-96 1 perm max.
    - f. Foam Core Density ASTM D1622 2.0 pcf min.
    - g. Water Absorption ASTM C209 <1 %
    - h. Flame Spread ASTM E 84, 25 max.
    - i. R-Factor HR per inch thickness ASTM C 518 (Design Value)
- B. Related Materials:
  - 1. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated or as required to achieve configurations shown, of perlite or organic fiberboard:
- C. Protection Board: preprimed gypsum board 1/2 inch thickness.
- D. Adhesive: Insul-Lock HR – The Garland Company.
- E. Sprayed in place backfill insulation: Dow Great Stuff or as approved by roofing system manufacturer.
- F. Fasteners:
  - 1. Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
  - 2. Factory Mutual Tested and Approved with 3 in. coated disc for 1-90 rating, length required to penetrate deck one inch.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that roof framing system is complete and ready to receive insulation system. Do not proceed with installation until unsatisfactory conditions have been corrected.
  - 1. Verify that work which penetrates roof deck has been completed.
  - 2. Verify that wood nailers are properly and securely installed.
  - 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
  - 4. Do not proceed until defects are corrected.
  - 5. Do not apply insulation until substrate is sufficiently dry, 12 percent moisture maximum, and ready to receive insulation and adhesive.
  - 6. Broom clean substrate immediately prior to application.
  - 7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.

**3.02 INSTALLATION**

- A. General: Install roof insulation in strict accordance with manufacturer's instructions and approved shop drawings.
- B. Roofing insulation attachment with mechanical fasteners:
  - 1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. Attachment shall be per roofing system manufacturer's wind uplift calculation.
  - 2. Place boards in a method to maximize contact bedding. Notch out undersides of insulation where insulation directly covers structural fasteners which are attached to the roof deck. Make notch equal to the length, width and depth of steel strap.
  - 3. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
  - 4. Provide spacing pattern of fasteners manufacturer's recommendations to meet wind uplift requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six inches.
  - 5. Minimum penetration into deck shall be as recommended by the fastener manufacturer, and one inch (1") minimum for wood or metal decks where not specified by the manufacturer
  - 6. Backfill around all conduit, junction boxes, etc. in roof insulation with spray foam insulation. Shave solidified spray foam even with boar insulation surface.
  - 7. Subsequent layers of insulation will be set in insulation adhesive. Stagger the joints of subsequent layers of polyisocyanurate and protection board over the initial layer.
  - 8. Adhere cover board in foam insulation adhesive.

**3.03 CLEANING AND PROTECTION**

- A. Remove debris and cartons from roof deck. Protect finished work to insure that insulation remains clean and dry, ready to receive roofing membrane.

**END OF SECTION**

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**SECTION 07 55 00.1**  
**MODIFIED BITUMINOUS MEMBRANE ROOFING**  
**FOR LOVE ELEMENTARY SCHOOL**

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## PART 1 GENERAL

## 1.1 SCOPE OF WORK

- A. The work under this contract shall include all labor, non owner supplied materials, tools, transportation, equipment, services, and facilities necessary for, and reasonably incidental to, the completion of the work as shown on the drawings and/or described in the specifications, for the following scope of work:
1. Remove and dispose of all roofing, gutters, coping, edge metal, and associated materials down to the structural deck.
  2. Inspect deck and perform repairs as needed.
  3. Mechanically fasten or adhere 2" polyisoand ½" densdeck prime per manufacturers ASCE-7 wind uplift calculations.
  4. Install new .040 aluminum gutters, counter flashing, detail flashings, coping, and edge metal.
  5. Install 2 ply modified bitumen StressPly system in cold applied asphalt. Allow roof to cure for 30 days.
  6. Apply Title 24 approved Pyramic Plus LO in 2 coats of 1.5 gallons per square (3 gal total).
  7. Paint all conduit lines with Pyramic Plus LO. Install conduits on new Dura-Block supports.
  8. Install new R-Mer Edge Coping in .040 aluminum per districts color choice.
- B. Location: Love Elementary School

## 1.2 REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- D. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- E. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
- 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 E 108 - Standard Test Methods for Fire Test of Roof Coverings
- J. Factory Mutual Research (FM): Roof Assembly Classifications.
- K. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- L. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- M. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- N. Warnock Hersey (WH): Fire Hazard Classifications.
- O. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- P. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- Q. UL - Fire Resistance Directory.
- R. FM Approvals - Roof Coverings and/or RoofNav assembly database.
- S. California Title 24 Energy Efficient Standards.

### 1.3 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
  - 1. Factory Mutual Class A Rating.
  - 2. Underwriters Laboratory Class A Rating.
  - 3. Warnock Hersey Class A Rating.
- C. Design Requirements:
  - 1. Uniform Wind Uplift Load Capacity
    - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
      - 1) Design Code: ASCE 7, Method 2 for Components and Cladding.
      - 2) Importance Category:
        - a) IV
      - 3) Importance Factor of:
        - a) 2.0
      - 4) Wind Speed: 120 mph
      - 5) Exposure Category:
        - a) B.
      - 6) Design Roof Height: 20 feet.
      - 7) Minimum Building Width: 130 feet.
      - 8) Roof Pitch: ½" :12.
      - 9) Roof Area Design Uplift Pressure:
        - a) Zone 1 - Field of roof 10.3psf
        - b) Zone 2 - Eaves, ridges, hips and rakes 17.9psf
        - c) Zone 3 – Corners 23.6psf
  - 2. Live Load: 20 psf, or not to exceed original building design.
  - 3. Dead Load:

- a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.
- D. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.
- E. LEED: Roof system shall meet the reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- F. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.
- G. Roof system shall have been tested in compliance with the following codes and test requirements:
  - 1. Cool Roof Rating Council:
  - 2. International Code Council Evaluation Service (ICC-ES):
  - 3. Underwriters Laboratories:
  - 4. Warnock Hersey
    - a. ITS Directory of Listed Products
  - 5. FM Approvals:
    - a. RoofNav Website

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.
- E. Wind uplift calculation per CBC using ASCE 7-10. Calculation shall diagrammatically show fastening pattern and be stamped by the roofing system manufacturer's CA licensed structural engineer.
- F. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio based materials.
- G. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- H. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- I. Test Reports: Submit test reports, prepared by an independent testing agency, for all

modified bituminous sheet roofing, indicating compliance with ASTM D5147.

- J. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwriters Laboratories (UL), Warnock Hersey (WH) or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
- K. Any material submitted as equal to or better than the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the Design and Performance criteria in this specification. Material substitutions may only be submitted by prime bidding contractors. Substitution requests submitted without a licensed engineer stamp or by non-prime bidding contractors will be rejected for non-conformance.
- L. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

#### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Manufacturers Inspections: Provide on manufacturers letterhead, a certification that a full time employee of the manufacturer will inspect the project a minimum 3 times per week as indicated in section (3.7). Letter must be signed and notarized by a corporate officer of the manufacturing company.
- G. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

#### 1.6 PRE-INSTALLATION MEETINGS

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

- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
  - 1. Record minutes of the conference and provide copies to all parties present.
  - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
  - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.8 COORDINATION

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

1.9 PROJECT CONDITIONS

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

1.10 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
  - 1. Warranty Period:
    - a. 30 years from date of acceptance.
    - b. Warranty shall cover the calculated windspeed of 120 mph.
    - c. Warranty must be provided solely by the manufacturer. No 3<sup>rd</sup> party insurance riders or 3<sup>rd</sup> party warranty holders will be accepted.

## PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. Local Representative: Doug Clark (925) 784-6701 Email: [dclark@garlandind.com](mailto:dclark@garlandind.com)  
Web Site: [www.garlandco.com](http://www.garlandco.com).
1. Materials to be furnished and provided by Alameda USD through CMAS.
- B. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
1. Bidder will not be allowed to change materials after the bid opening date.
  2. If alternate products are included in the bid, the products and specified overall performance requirements must be equal to or exceed the products and requirements specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
  3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
    - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
    - b. Will provide the same guarantee for substitution as for the product and method specified.
    - c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
    - d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
    - e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
    - f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
  4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
  5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.
  6. Any substitution requests must be provided to the architect 10 days before the original bid date. Substitutions outside of this timeline will not be considered.

## 2.2 COLD APPLIED 2-PLY SOLVENT FREE ASPHALT ROOFING -

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
1. StressBase 80:
- B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with interply adhesive.
1. StressPly Plus FR Mineral:
- C. Interply Adhesive: (Layer 1 and 2)
1. Weatherking Plus WC: 2.5 gallons per square.
- D. Flashing Base Ply: One ply bonded to the prepared substrate with Interply Adhesive:
1. StressBase 80:
- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:



1. StressPly Plus FR Mineral
- F. Flashing Ply Adhesive:
1. Weatherking Flashing Adhesive: 6 gallons per square.
- G. Surfacing: Requires 5 days wait before applying.
1. Surface Coatings
    - a. Pyramic Plus LO: 2 coats of 1.5 gallons per square. (3 gal/square total)
- 2.3 ACCESSORIES:

- A. Walkway Pads –TrafGuard by Viking Products Group.
- B. Urethane Sealant Hybrid - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
1. Tensile Strength, ASTM D 412: 250 psi
  2. Elongation, ASTM D 412: 450%
  3. Hardness, Shore A ASTM C 920: 35
  4. Adhesion-in-Peel, ASTM C 92: 30 pli
- C. Sealant - Green-Lock Structural Adhesive: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.
1. Elongation, ASTM D 412: 300%
  2. Hardness, Shore A, ASTM C 920: 50
  3. Shear Strength, ASTM D 1002: 300 psi
- D. Coverboard – 1/2" Densdeck Prime or approved equal.
- E. Coping; R-Mer Edge coping by The Garland Company.
1. 0.040 Aluminum

## PART 3 EXECUTION

### 1.1 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.

### 1.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
  2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
  3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
  4. Wherever necessary, all surfaces to receive roofing materials shall be power broom

and vacuumed to remove debris and loose matter prior to starting work.

5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.

B. Wood Deck:

1. Dimensional wood deck shall be minimum 1 inch (25 mm) thick, knotholes and cracks larger than 1/4 inch shall be covered with sheet metal. All boards shall be appropriately nailed and have adequate end bearing to the centers of beams/rafters. Lumber shall be kiln dried.
2. Plywood shall be a minimum 15/32 inch (11.9 mm) thick and conform to the standards and installation requirements of the American Plywood Association (APA).
3. If no roof insulation is specified, provide a suitable dry sheathing paper, followed by an approved base sheet nailed appropriately for the specified roof system, with 1 inch (25 mm) diameter caps and annular nails unless otherwise required by the applicable Code or Approval agency.
4. Insulation is to be mechanically attached in accordance with the insulation manufacturer's recommendations unless otherwise required by the applicable Code.
5. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer's recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
6. Light metal wall ties or other structural metal exposed on top of the wood deck shall be covered with one ply of a heavy roofing sheet, such as HPR Glasbase Base Sheet, extending 2 inches to 6 inches (51 mm to 152 mm) beyond the metal in all directions. Nail in place before applying the base ply.

1.3 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.

#### 1.4 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 2.5 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. Modified Cap Ply(s): Cut cap ply sheets into 18 foot lengths and allow plies to relax before installing. Install in interplay 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. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
  2. Solidly bond to the base layers with specified cold adhesive at the rate of 2.5 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. Care should be taken 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. Allow cold adhesive to set for 5 to 10 minutes before installing the top layer of modified membrane.
  6. Extend membrane 2 inches beyond top edge of all cants in full moppings of the cold adhesive as shown on the Drawings.
- 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. Nail lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
  4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.
- G. Flashing Base Ply: 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. Run first ply of membrane 4' up wall and secure with a termination bar fastened at 6 inches (152 mm) O.C. and sealed at top. Apply second ply with a minimum 8" overlap of lower ply and upper ply. Fasten and secure with termination bar fastened at 6 inches O.C. and sealed.
  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.
  7. 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. Run flashing cap ply 4 feet up wall and fasten with termination bar fastened every 6 inches O.C. Adhere additional cap ply on remaining wall section in specified adhesive with a minimum 8 inch overlap of lower flashing cap ply. Heat weld seam. 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. Surface Coatings: Apply roof coatings in strict conformance with the manufacturer's recommended procedures.
- J. Roof Walkways: Provide walkways in areas indicated on the Drawings.

#### 1.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

##### A. 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. 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. Attach top of membrane to top of 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. Use Tuff-Flash and polyester where necessary to fully seal detail areas.
6. 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.
7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

##### B. 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. Use Tuff-Flash and polyester where necessary to fully seal detail areas.
6. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

##### C. 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.

- D. 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.
- E. Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
  2. Taper insulation and or coverboard 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/copper 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.
- F. 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.
- G. 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.

## 1.6 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.

#### 1.7 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.

#### 1.8 FIELD QUALITY CONTROL

- A. Manufacturer Inspections:
  - 1. An inspection shall be made by a representative of the material manufacturer a minimum of three (3) times per week during performance of work to ensure that said project is installed in accordance with the manufacture's specifications and illustrated details. Written reports including pictures and comments shall be turned over to the Architect and Owner, on each Monday following the prior week.
    - a. The authorized material manufacturers field representative shall be responsible for:
      - 1) Keeping the Architect's representative informed after periodic inspections as to the progress and quality of the work observed.
      - 2) Calling to the attention of the contractor those matters observed which are considered to be in violation of the contract requirements.
      - 3) Reporting to the Architect's representative, in writing, any failure or refusal of the contractor to correct unacceptable practices called to his attention.
      - 4) Confirming, after completion of the work and based on his observation and test, that he has observed no application procedures in conflict with these specifications.

#### 1.9 OWNER SUPPLIED MATERIALS

- A. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.
- B. Any material or accessories required for the installation of the roof system in excess of the Owner provided material must be supplied by the Contractor and added into the bid cost proposal. 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. The cost to handle and fabricate flashing metal from the Owner provided flat stock is contractor's responsibility and to be added into the bid cost proposal.
- C. All required flashings as required per each specification section for plumbing, electrical, gas,

etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.

- D. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07550.
- E. Freight charges of owner supplied materials will be the responsibility of the Owner.
- F. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly protect, cover and store at jobsite.
- G. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07550.

1. Materials specifically provided by the Owner:

- a. StressPly Plus FR Mineral: 400 Rolls
- b. StressBase 80: 200Rolls
- c. Pyramic Plus LO: 200Buckets
- d. Weatherking Plus WC: 280 Buckets
- e. Flashing Bond: 20 Buckets
- f. Tuff-Stuff MS: 2Cases
- g. Garla-Prime VOC: 10Buckets
- h. Freight to jobsite: 1

END OF SECTION



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**SECTION 07 55 00.2**  
**MODIFIED BITUMINOUS MEMBRANE ROOFING**  
**FOR PORTABLE ROOF REPLACEMENT**

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## PART 1 GENERAL

## 1.1 SCOPE OF WORK

- A. The work under this contract shall include all labor, non owner supplied materials, tools, transportation, equipment, services, and facilities necessary for, and reasonably incidental to, the completion of the work as shown on the drawings and/or described in the specifications, for the following scope of work:
1. Remove and dispose of all roofing, gutters, edge metal, and associated materials down to the structural deck.
  2. Inspect deck and perform repairs as needed.
  3. Mechanically fasten ½" asphalt coated wood fiberboard per manufacturers ASCE-7 wind uplift calculations.
  4. Install new .040 aluminum gutters, detail flashings, and edge metal.
  5. Install 2 ply modified bitumen StressPly system in cold applied asphalt. Allow roof to cure for 30 days.
  6. Apply Title 24 approved Pyramic Plus LO in 2 coats of 1.5 gallons per square (3 gal total).
  7. Install new gutters in .040 aluminum per districts profile choice.
- B. Sites:
1. Love Elementary School
  2. Franklin Elementary School
  3. Longfellow Elementary School

## 1.2 REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- D. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- E. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
- 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 E 108 - Standard Test Methods for Fire Test of Roof Coverings
- J. Factory Mutual Research (FM): Roof Assembly Classifications.
- K. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- L. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- M. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- N. Warnock Hersey (WH): Fire Hazard Classifications.
- O. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- P. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- Q. UL - Fire Resistance Directory.
- R. FM Approvals - Roof Coverings and/or RoofNav assembly database.
- S. California Title 24 Energy Efficient Standards.

### 1.3 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
  - 1. Factory Mutual Class A Rating.
  - 2. Underwriters Laboratory Class A Rating.
  - 3. Warnock Hersey Class A Rating.
- C. Design Requirements:
  - 1. Uniform Wind Uplift Load Capacity
    - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
      - 1) Design Code: ASCE 7, Method 2 for Components and Cladding.
      - 2) Importance Category:
        - a) IV
      - 3) Importance Factor of:
        - a) 2.0
      - 4) Wind Speed: 120 mph
      - 5) Exposure Category:
        - a) B.
      - 6) Design Roof Height: 20 feet.
      - 7) Minimum Building Width: 130 feet.
      - 8) Roof Pitch: ½" :12.
      - 9) Roof Area Design Uplift Pressure:
        - a) Zone 1 - Field of roof 10.3psf
        - b) Zone 2 - Eaves, ridges, hips and rakes 17.9psf
        - c) Zone 3 – Corners 23.6psf
  - 2. Live Load: 20 psf, or not to exceed original building design.
  - 3. Dead Load:
    - a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.

- D. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.
- E. LEED: Roof system shall meet the reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- F. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.
- G. Roof system shall have been tested in compliance with the following codes and test requirements:
  - 1. Cool Roof Rating Council:
  - 2. International Code Council Evaluation Service (ICC-ES):
  - 3. Underwriters Laboratories:
  - 4. Warnock Hersey
    - a. ITS Directory of Listed Products
  - 5. FM Approvals:
    - a. RoofNav Website

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.
- E. Wind uplift calculation per CBC using ASCE 7-10. Calculation shall diagrammatically show fastening pattern and be stamped by the roofing system manufacturer's CA licensed structural engineer.
- F. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio based materials.
- G. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- H. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- I. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147.
- J. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwriters Laboratories (UL), Warnock Hersey (WH)

or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.

- K. Any material submitted as equal to or better than the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the Design and Performance criteria in this specification. Material substitutions may only be submitted by prime bidding contractors. Substitution requests submitted without a licensed engineer stamp or by non-prime bidding contractors will be rejected for non-conformance.
- L. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

#### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Manufacturers Inspections: Provide on manufacturers letterhead, a certification that a full time employee of the manufacturer will inspect the project a minimum 3 times per week as indicated in section (3.7). Letter must be signed and notarized by a corporate officer of the manufacturing company.
- G. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

#### 1.6 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
  - 1. Record minutes of the conference and provide copies to all parties present.
  - 2. Identify all outstanding issues in writing designating the responsible party for follow-up

- action and the timetable for completion.
3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.8 COORDINATION

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

1.9 PROJECT CONDITIONS

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

1.10 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
  1. Warranty Period:
    - a. 30 years from date of acceptance.
    - b. Warranty shall cover the calculated windspeed of 120 mph.
    - c. Warranty must be provided solely by the manufacturer. No 3<sup>rd</sup> party insurance riders or 3<sup>rd</sup> party warranty holders will be accepted.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. Local Representative: Doug Clark (925) 784-6701 Email: [dclark@garlandind.com](mailto:dclark@garlandind.com)

Web Site: [www.garlandco.com](http://www.garlandco.com).

1. Materials to be furnished and provided by Alameda USD through CMAS.
- B. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
1. Bidder will not be allowed to change materials after the bid opening date.
  2. If alternate products are included in the bid, the products and specified overall performance requirements must be equal to or exceed the products and requirements specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
  3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
    - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
    - b. Will provide the same guarantee for substitution as for the product and method specified.
    - c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
    - d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
    - e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
    - f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
  4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
  5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.
  6. Any substitution requests must be provided to the architect 10 days before the original bid date. Substitutions outside of this timeline will not be considered.

2.2 COLD APPLIED 2-PLY SOLVENT FREE ASPHALT ROOFING -

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
  1. StressBase 80:
- B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with interply adhesive.
  1. StressPly Plus FR Mineral:
- C. Interply Adhesive: (Layer 1 and 2)
  1. Weatherking Plus WC: 2.5 gallons per square.
- D. Flashing Base Ply: One ply bonded to the prepared substrate with Interply Adhesive:
  1. StressBase 80:
- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
  1. StressPly Plus FR Mineral
- F. Flashing Ply Adhesive:
  1. Weatherking Flashing Adhesive: 6 gallons per square.
- G. Surfacing: Requires 5 days wait before applying.
  1. Surface Coatings

- a. Pyramic Plus LO: 2 coats of 1.5 gallons per square. (3 gal/square total)

**2.3 ACCESSORIES:**

- A. Walkway Pads - Commercial Innovations Walkway Pads: As recommended and furnished by the membrane manufacturer set in approved adhesive to control foot traffic on roof top surface and provide a durable system compliant non-slip walkway.
- B. Urethane Sealant Hybrid - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
  - 1. Tensile Strength, ASTM D 412: 250 psi
  - 2. Elongation, ASTM D 412: 450%
  - 3. Hardness, Shore A ASTM C 920: 35
  - 4. Adhesion-in-Peel, ASTM C 92: 30 pli
- C. Sealant - Green-Lock Structural Adhesive: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.
  - 1. Elongation, ASTM D 412: 300%
  - 2. Hardness, Shore A, ASTM C 920: 50
  - 3. Shear Strength, ASTM D 1002: 300 psi
- D. Coverboard – High Density ½” 6 sided asphalt coated wood fiberboard. Blueridge or approved equal.

**PART 3 EXECUTION**

**1.1 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.

**1.2 PREPARATION**

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

of the primer and deck manufacturer.

- B. Wood Deck:
1. Dimensional wood deck shall be minimum 1 inch (25 mm) thick, knotholes and cracks larger than 1/4 inch shall be covered with sheet metal. All boards shall be appropriately nailed and have adequate end bearing to the centers of beams/rafters. Lumber shall be kiln dried.
  2. Plywood shall be a minimum 15/32 inch (11.9 mm) thick and conform to the standards and installation requirements of the American Plywood Association (APA).
  3. If no roof insulation is specified, provide a suitable dry sheathing paper, followed by an approved base sheet nailed appropriately for the specified roof system, with 1 inch (25 mm) diameter caps and annular nails unless otherwise required by the applicable Code or Approval agency.
  4. Insulation is to be mechanically attached in accordance with the insulation manufacturer's recommendations unless otherwise required by the applicable Code.
  5. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer's recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
  6. Light metal wall ties or other structural metal exposed on top of the wood deck shall be covered with one ply of a heavy roofing sheet, such as HPR Glasbase Base Sheet, extending 2 inches to 6 inches (51 mm to 152 mm) beyond the metal in all directions. Nail in place before applying the base ply.

### 1.3 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.

### 1.4 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 2.5 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. Modified Cap Ply(s): Cut cap ply sheets into 18 foot lengths and 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. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
  2. Solidly bond to the base layers with specified cold adhesive at the rate of 2.5 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. Care should be taken 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. Allow cold adhesive to set for 5 to 10 minutes before installing the top layer of modified membrane.
  6. Extend membrane 2 inches beyond top edge of all cants in full moppings of the cold adhesive as shown on the Drawings.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06114.
1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
  2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
  3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
  4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.

- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.
- G. Flashing Base Ply: 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. Run first ply of membrane 4' up wall and secure with a termination bar fastened at 6 inches (152 mm) O.C. and sealed at top. Apply second ply with a minimum 8" overlap of lower ply and upper ply. Fasten and secure with termination bar fastened at 6 inches O.C. and sealed.
  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.
  7. 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. Run flashing cap ply 4 feet up wall and fasten with termination bar fastened every 6 inches O.C. Adhere additional cap ply on remaining wall section in specified adhesive with a minimum 8 inch overlap of lower flashing cap ply. Heat weld seam. 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. Surface Coatings: Apply roof coatings in strict conformance with the manufacturer's recommended procedures.
- J. Roof Walkways: Provide walkways in areas indicated on the Drawings.

## 1.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. 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. 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. Attach top of membrane to top of 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. Use Tuff-Flash and polyester where necessary to fully seal detail areas.
  6. 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.
  7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- B. 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. Use Tuff-Flash and polyester where necessary to fully seal detail areas.
  6. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
  7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- C. 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.
- D. 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.

- E. Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
  2. Taper insulation and or coverboard 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/copper 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.
- F. 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.
- G. 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.

## 1.6 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.

## 1.7 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.

#### 1.8 FIELD QUALITY CONTROL

- A. Manufacturer Inspections:
  - 1. An inspection shall be made by a representative of the material manufacturer a minimum of three (3) times per week during performance of work to ensure that said project is installed in accordance with the manufacture's specifications and illustrated details. Written reports including pictures and comments shall be turned over to the Architect and Owner, on each Monday following the prior week.
    - a. The authorized material manufacturers field representative shall be responsible for:
      - 1) Keeping the Architect's representative informed after periodic inspections as to the progress and quality of the work observed.
      - 2) Calling to the attention of the contractor those matters observed which are considered to be in violation of the contract requirements.
      - 3) Reporting to the Architect's representative, in writing, any failure or refusal of the contractor to correct unacceptable practices called to his attention.
      - 4) Confirming, after completion of the work and based on his observation and test, that he has observed no application procedures in conflict with these specifications.

#### 1.9 OWNER SUPPLIED MATERIALS

- A. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.
- B. Any material or accessories required for the installation of the roof system in excess of the Owner provided material must be supplied by the Contractor and added into the bid cost proposal. 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. The cost to handle and fabricate flashing metal from the Owner provided flat stock is contractor's responsibility and to be added into the bid cost proposal.
- C. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.
- D. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07550.
- E. Freight charges of owner supplied materials will be the responsibility of the Owner.
- F. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly protect, cover and store at jobsite.
- G. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07550.
  - 1. Materials specifically provided by the Owner:

a.	StressPly Plus FR Mineral:	40 Rolls
b.	StressBase 80:	20Rolls
c.	Pyramic Plus LO:	20Buckets
d.	Weatherking Plus WC:	36 Buckets
e.	Flashing Bond:	5 Buckets
f.	Tuff-Stuff MS:	1Case
g.	Garla-Prime VOC:	3Buckets
h.	Freight to jobsite:	1

END OF SECTION

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**SECTION 07 60 00****FLASHING AND SHEET METAL**

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**PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Section Includes: Remove existing flashing and sheet metal required for completion of Project, repair existing flashing and sheet metal and provide new flashing and sheet metal including accessories required for complete weathertight installation.
  - 1. Provide concealed sealants used in conjunction with installation of metal flashing and sheet metal.
  - 2. Provide sheet membrane weather-barrier underlayment at flashing and sheet metal.
  - 3. Provide miscellaneous sheet metal flashing and reglets not provided by other trades or suppliers.
    - a. Where reglets are to be installed in conjunction with other work, provide in adequate time for installation.
    - b. Where reglets are to be surface applied, provide continuous gasket between reglet and surface.
    - c. Provide pitch pans and rain collars for penetrations in roofing.
    - d. Reuse existing drain flashing and plumbing stack flashing where undamaged and where not lead. Lead flashing is not allowed.

## 1.1 REFERENCES

- A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):  
Architectural Sheet Metal Manual.

## 1.2 SUBMITTALS

- A. Product Data: Furnish literature for manufactured products.
- B. Shop Drawings: Clearly indicate dimensioning, layout, general construction details including closures, flashings, locations and types of sealants, anchorages, and method of anchorage.
- C. Samples: Furnish samples of typical metal flashing fabrication indicating standard soldered joints and edge conditions.

## 1.3 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from wind and water penetration. Repair system and pay for or replace damaged materials and surfaces.
  - 1. Period: Two years.

**PART 2 - PRODUCTS**

## 2.1 MATERIALS

- A. System Description: Provide flashing and sheet metal including reglets and accessories as required for complete weathertight installation.
  - 1. Match existing as approved by Owner's Representative.
- B. Design Criteria: Allow for movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to 100-year seasonal temperature ranges.
- C. Flashing and Sheet Metal: Match existing unless otherwise indicated.
- D. Manufactured Reglets: Snap-on type, for two-piece flashing; metal to match flashing and sheet metal.
  - 1. Manufacturers:
    - a. Fry Reglet Corp./Springlok System.
    - b. W.P. Hickman Co./The Leading-Edge Drive Lock System.
    - c. Substitutions: Refer to Section 01 25 00.
- E. Form pitch pans of minimum 24-gage Type 304 non-magnetic stainless-steel, with soldered joints watertight, with minimum 4" upstand and 4" flanges; form pans minimum 6" wider than item passing through roof membrane.
- F. Form umbrella flashings of minimum 24-gage Type 304 non-magnetic stainless-steel, with soldered joints watertight, with minimum 2" overhang, to shed water away from pitch pans.
- G. Drain Flashing and Plumbing Stacks: Provide heavy-duty materials suitable for applications indicated, not less than 24-gage Type 304 non-magnetic stainless-steel at drain flashings and shop formed neoprene or comparable plumbing stack flashing.
- H. Solder and Fasteners: As recommended by SMACNA and complying with applicable codes and regulations; hot dipped galvanized minimum coating comparable to G90.
- I. Concealed Sealant: Butyl type for use in conjunction with sheet metal; non-staining; non-corrosive; non-shrinking and non-sagging; ultra-violet and ozone resistant for exterior concealed applications.



- J. Weather-Resistive Barrier/Underlay: Self-adhering rubberized sheet membrane with primers and seam sealers as required for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated.
1. Manufacturers:
    - a. GCP Applied Technologies (Grace).
    - b. Henry Company.
    - c. Carlisle Corp.
    - d. Substitutions: Refer to Section 01 25 00.
  2. Provide specific membrane types as recommended by system manufacturers for each type of application.
- K. Bituminous Paint: Acid and alkali resistant type; black color; asbestos free.
- L. Plastic Cement: Cutback asphaltic type; asbestos free.
- M. Sealing Compound: Type recommended by roofing manufacturer; asbestos free.
- N. Gaskets: Type suitable for use in conjunction with sheet metal; non-staining, non-corrosive, non-shrinking, non-sagging, ultra-violet resistant, and ozone resistant; for exterior concealed applications.
1. Manufacturers:
    - a. EMSEAL, a Sika Co./EMSEAL MST Multi-Use Sealant Tape.
    - b. Substitutions: Refer to Section 01 25 00.

## 2.2 FABRICATION

- A. Fabricate sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.
- B. Form sections square, true, and accurate to size, free from distortion and other defects detrimental to appearance or performance.
1. Fabricate corners and intersections in shop with solder joints for watertight fabrication.
- C. Form sections in maximum 10'-0" lengths; make allowance for expansion at joints.
- D. Hem exposed edges on underside 1/2".
- E. Back-paint flashings with heavy bodied bituminous paint where in contact with cementitious materials or dissimilar metals.

**PART 3 - EXECUTION****3.1 PREPARATION**

- A. Comply with SMACNA Architectural Sheet Metal Manual recommendations for examination and preparation of substrates to receive flashing and sheet metal.
- B. Install underlayment over surfaces that are dry, free of ridges, warps and voids that could damage underlayment and could be detrimental to flashing and sheet metal.

**3.2 INSTALLATION**

- A. Install weather-resistive barrier/underlayment in accordance with installation instructions and recommendations of manufacturer; comply with applicable code requirements.
  - 1. Flashing and Sheet Metal: Provide one-layer sheet membrane underlayment.
- B. Install metal flashing and sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.
  - 1. Install tight in place, with corners square, surfaces true and straight in planes, and lines accurate to profiles as indicated on Drawings.
  - 2. Lap joints in direction of water flow.
- C. Exercise care when cutting materials on site, to ensure cuttings do not remain on finished surfaces.
- D. Provide expansion joints concealed within system.
- E. Use concealed fasteners, continuous cleat type, except where specifically approved by Architect.
  - 1. Exposed fasteners may be used, where clearly indicated on shop drawings and approved by Architect, at areas not exposed at exterior walls nor in sight of interior spaces.
- F. Apply sealing compound at junction of metal flashing and felt flashing.
- G. Lock seams and end joints; fit flashing tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- H. Counter-flash mechanical and electrical items projecting through roof membrane.
- I. Install sealants where required to prevent direct weather penetration.
  - 1. Install continuous gasket behind surface applied reglets.
- J. Install pitch pans and fill with plastic cement.

- K. Install umbrella flashing with draw band collars with sheet metal sealant between penetrating item and flashing; use wood blocking at angle type penetrations and cover blocking with sealant.
- L. Completed installation shall be free of rattles, noise due to thermal and air movement, and wind whistles.

**END OF SECTION**