

Contract M20076

ROOFING MAINTENANCE SERVICES

Volume 2

Technical Specifications

Issued for Bid
10/7/2020



Solutions that move you

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DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01 10 00 –SUMMARY OF WORK

- **PART I - GENERAL**

1.01 DESCRIPTION:

- A. The Work, as defined in **Section 1.3 of the Contract Documents**, is more fully described in these Technical Specifications.
- B. Contractor will perform ongoing maintenance and repair services at the VTA facilities. Certain portions of the Work will be performed on an on-call basis (“On-Call”), meaning that VTA may request unscheduled maintenance or repair/replacement services.
- C. Any On-Call type of Work performed under this Contract will be authorized via the issuance of a written Work Order.
- D. This Contract is formatted as an estimated value contract, meaning that VTA does not guarantee a minimum number of Work Orders to be issued hereunder. VTA has set aside a fixed amount of funding on an annual basis for the Work contained herein. VTA will spend a portion of or all the funding allotted per year at the discretion of the assigned VTA Authorized Representative.

Contractor shall provide hourly rates on Bid Form #1. Unscheduled repairs and emergency call-outs will be billed either on a fixed price basis as described in Proposals or on a time and materials basis as agreed to in the Contract.

1.02 Not Used

1.03 Protecting Existing Facilities and Landscaping

- A. Contractor shall adequately protect all existing facilities, structures, materials, landscape, piping, supply, and electrical systems. Any facility, asset, structure, utility, and/or landscaping damaged by any operation of Contractor, or its sub-contractor, as determined by VTA, shall be replaced or repaired by Contractor at Contractor’s sole expense. As necessary for particular types of work, Contractor shall supply a Traffic & Pedestrian Safety Plan (“Safety Plan”) that will encompass all appropriate items from paragraphs C & D under this section 1.03. Work will not begin until this Safety Plan is approved by VTA’s Authorized Representative (as defined **Section 7.24, Authorized Representatives**).
- B. For Work that occurs at the Guadalupe Light Rail Transit facility, workers must follow VTA Railway Worker Protection (“RWP”) training guidelines and requirements set forth in the Contract.

Contractor may charge (on an hourly basis as indicated on Bid Form 1) for the time required to meet the aforementioned regulatory requirements. Contractor’s Allowance (as defined in **Section 01 22 16 Unit Price Payments, Section 1.02 Allowances**) for meeting these regulatory requirements is limited in the following ways:

1. Except for Contractor’s Authorized Representative, for each worker attending RWP training, Contractor will be paid for the number of hours each employee

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spends in the RWP training class, not to exceed 5 hours of time for each employee per year.

2. Contractor's Authorized Representative may charge up to two (2) hours of time for Track Allocation Meetings.
 3. If work requires permitting outside of the annual permits described in the Contract Documents, Contractor will submit direct costs incurred by Contractor for such permits to VTA for reimbursement.
 4. Notwithstanding the foregoing, Contractor's total Allowance for RWP training and Track Allocation Meetings for all employees will not exceed the maximum amount indicated on Bid Form 1.
- C. During performance of Work, Contractor must assure safe operation of VTA functions and prevent unnecessary downtime. Contractor must check in and out with VTA's on-site designated contacts. Contractor is responsible for coordinating safety while conducting Work to minimize risk of injury or damage to personnel, property, and/or equipment.
- D. All demolished materials, unclaimed leftover materials, or any debris manufactured by Contractor during performance of the Work must be removed and disposed of in a manner permitted/required by law. All debris or materials unclaimed by VTA will be the sole responsibility of Contractor. All debris and material disposal costs are included in the various items of Work on Bid Form 1, and no additional compensation will be paid for such.

1.04 WORK ORDER PROCEDURES DESCRIPTION

- A. If, during the course of performing any Work (whether On-Call or PM), Contractor discovers any safety or operating deficiency issues, Contractor will notify the VTA Designated Contact in writing of such so that VTA can determine whether a Work Order is needed. In such written notice, Contractor will provide a cost estimate of the needed repairs. The VTA Authorized Representative or Designated Contact must approve, pursuant to the Work Order procedures set forth herein, the course of action to be taken, if any.
- B. The only persons authorized to issue Work Orders on behalf of VTA, and the only persons from whom Contractor may accept Work Orders, are the VTA Authorized Representative or persons designated in writing as an approved contact by VTA's Authorized Representative (each a "Designated Contact").
- C. If VTA determines that On-Call type Work is needed, VTA will first assess the estimated cost of the needed On-Call type Work. The VTA Authorized Representative or Designated Contact may, in his or her sole discretion, confer with Contractor to assess the required scope of work for On-Call Work before a Work Order is issued to complete the underlying On-Call Work. Contractor must not proceed with On-Call Work until VTA authorizes such On-Call Work via a Work Order.
- D. VTA will issue a Work Order to Contractor describing the specific scope of work to be performed, and Contractor will perform the work described therein pursuant to the time and materials pricing terms and conditions of this Contract.

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- E. VTA reserves the right to competitively bid any On-Call type Work in excess of \$5,000.00.
- F. VTA does not guarantee a minimum number of Work Orders to be issued hereunder for On-Call type Work, and any quantities of On-Call type Work set forth in the Contract are estimates only. On-Call type Work will be billed either on a (i) fixed price basis or (ii) time and materials basis, as agreed to in writing by both parties in the relevant Work Order.
- G. All On-Call type Work must be performed pursuant to the schedule agreed to in the relevant Work Order.
- H. Most VTA facilities operate 24 hours per day, 7 days per week. Following receipt of a Work Order, unless a different schedule is agreed upon between the parties in the Work Order or a more prompt response is required (i.e., emergency), Contractor will give a minimum of 2 working days' notice to VTA before any On-Call Work may begin in order to allow for logistical preparations and notifications at said facilities.
- I. For any equipment replaced during On-Call type Work, Contractor must supply VTA with the applicable Original Equipment Manufacturer ("OEM") Manuals for the replacement equipment upon completion of the equipment replacement.

1.05 Specifications

- A. All Work and materials shall be performed in full accordance with applicable provisions of the American Society for Testing and Materials ("ASTM"), American National Standards Institute ("ANSI"), and the relevant manufacturer's application specifications, and all applicable California State and Santa Clara County Building, Fire, Health and Safety Codes, except as may be specifically modified by the Contract Documents. Contractor must perform all Services under this Agreement in accordance with the standard of care generally exercised by like professionals under similar circumstances and in a manner reasonably satisfactory to VTA.

1.06 Traffic Control

- A. Traffic control will consist of providing, posting, and maintaining signs; erecting barricades or any other necessary equipment required to safely control all types of traffic through the Worksite. Contractor will perform traffic control in compliance with all applicable standards.
- B. Contractor's special attention is directed to Section 7.38, **Public Convenience and Safety**, herein. Nothing in these Technical Specifications will be construed as relieving Contractor of its responsibility as provided therein.
- C. Suitable barricades must always be used to protect all Worksites. Prior to performing any Work affecting the flow of traffic, whether vehicular or pedestrian, Contractor shall prepare and submit to the VTA's Authorized Representative, a written traffic control plan for approval. Contractor will not detour any traffic until the VTA's **Authorized Representative** or **Designated Contact** approves the traffic control plan in writing.
- D. Contractor will not receive separate payments from VTA for complying with these requirements. Contractor must include such costs into the Contract Price or individual Proposal, as applicable.

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END OF SECTION 01 11 00

SECTION 01 22 16 UNIT PRICE PAYMENT(S)

1.01 DESCRIPTION

- A. Except as otherwise specified in these Contract Documents, all Work will be paid for at a Contract price per unit measurement, as indicated in **Bid Form 1 Schedule of Quantities and Prices**.
- B. The number of units and quantities contained in the **Bid Form 1, Schedule of Quantities and Prices**, are estimated and approximate only, and final payment will be made for the actual number of units and quantities incorporated in the Work and required by VTA.
- C. In addition to other applicable terms set forth in the Contract, all Work performed under this Contract will be billed according to the procedures described in this Section.

1.02 ALLOWANCES

- A. An "Allowance" means a Work item that will be paid by VTA to Contractor for **(i) the actual cost for the performance of the Work item, (ii) a mutually agreed upon lump sum amount, or (iii) on a time and materials basis (based on the rates indicated in Bid Form 1)**, up to the maximum value specified in the Contract Documents (see Bid Form 1). A Work item will be treated as an Allowance only if specifically designated as such in these Contract Documents or in a specific Work Order.

1.03 BILLING

- A. All pricing per unit will be on a fixed dollar per unit listed on **Bid Form 1, Schedule of Quantities and Prices**. Contractor must bill all PM as a flat rate service. All On-Call type Work will be billed pursuant to the underlying Work Order..
- B. Materials Mark-Ups: For simplicity, Contractor must bill all materials in bulk as described on **Bid Form 1, Schedule of Quantities and Prices**. This Allowance will form the basis for all materials purchased under this Contract.
- C. In addition to the other invoicing requirements set forth in these Contract Documents, all invoices submitted under this Contract must comply with the following:
 - a. Invoices will be sent via email only to the VTA Accounts Payable Department at VTA.AccountsPayable@vta.org.
 - b. Each invoice must be a separate PDF document, no combined files will be accepted, and invoice must be in the format of the sample invoices attached hereto.
 - c. Contractor must label invoices with the proper (i) VTA Authorized Representative or VTA Designated Contact and (ii) facility location.
 - d. Invoices will contain the following information:
 - 1. The Work Order number (if applicable),

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2. The labor rate and number of hours worked per employee assigned to the Work Order (if applicable), and
 3. Any materials purchased by Contractor to perform the Work. Contractor will list individually by line item the type of material purchased, identifying each part by part/model number and the price charged to VTA for said part. Incidentals such as gloves, tape, sandpaper, etc. may be listed in aggregate unless VTA determines that the aggregate is large enough to cause significant costs under incidentals, in which case Contractor will provide an itemized list of incidentals upon VTA's request.
- D. Contractor is solely responsible for the expense of travel and associated costs. This cost should be included in Contractor's Total Contract Price and no additional compensation will be allowed.
- E. Only charges for the Work performed will be accepted; Contractor may not bill for any other charges, including but not limited to, un-itemized materials or parts fees, undocumented disposal fees, or undocumented environmental disposal or HAZMAT fees. Any invoices received by VTA that include travel time or extraneous fees will not be processed and instead will be returned for corrections.
- Charges for Work performed under a Work Order may begin only when Contractor arrives at the Worksite and must end when Contractor leaves the Worksite. Charges for anything other than (i) the mechanics' labor, (ii) the materials used to complete the work order or proposal, and (iii) appropriate or pre-approved disposal fees will be accepted. Change Orders or additional Work due to changing site conditions or under instruction of the VTA Authorized Representative will be handled as described in the General Conditions in Sections 7.65, 7.66, and 7.67.
- F. A sample invoice has been included on the following page:

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SAMPLE PREVENTATIVE MAINTENANCE INVOICE

Due Date	Date	Invoice No.
XX/XX/2020	XX/XX/2020	XXXX

Customer
Santa Clara Valley Transportation Authority 3331 North First Street San Jose, CA 95134 Attn: Accounts Payable

Project Location
Santa Clara Valley Transportation Authority Division Title Preventative Maintenance Division Representative

Customer PO	Terms	Contract Number	PM Designation	
M20076	Net 30	N/A	Type of PM – Quarterly, Etc.	
Description	Date	Worker Qty.	Man Hours	Total
Preventative Maintenance – <i>Quarterly, Semi-Annual, or Annual</i> at River Oaks (or the appropriate division descriptor.)	xx/xx/20	2	8	16
	xx/xx/20	1	4	4
Total Man Hours				20

Invoice Total \$ Flat Rate

Payments/Credits	\$ XXX.XX
Balance Due	\$ Flat Rate

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SAMPLE ON-CALL WORK INVOICE

Due Date	Date	Invoice No.
XX/XX/2020	XX/XX/2020	XXXX

Customer	Project Location
Santa Clara Valley Transportation Authority 3331 North First Street San Jose, CA 95134 Attn: Accounts Payable	Santa Clara Valley Transportation Authority Division Title/Building Designation Area of Work Requestors Name

Customer PO	Terms	Work Order	Project	
M20076	Net 30	XXXXXX	Building # and Area of Work	
Description	Date	Worker Qty.	Man Hours	Total
Replace HP-4A – River Oaks Building A	xx/xx/20	2	8	16
	xx/xx/20	1	4	4
Total Man Hours				20

Invoice Total \$ XXX.XX

Payments/Credits	\$ XXX.XX
Balance Due	\$ XXX.XX

END OF SECTION 01 22 16

SECTION 01 31 14 FACILITY SERVICES COORDINATION

1.01 PM Schedule of Work

A. Inspections will be conducted on the first week of each calendar quarter or by appointment with the VTA Authorized Representative or individual VTA Designated Contact. Contractor will contact the VTA Authorized Representative or individual VTA Designated Contact to set up a yearly PM cycle to start with the first annual inspection.

B. A check-off list must be signed and dated by Contractor's technician upon completion of the inspection/maintenance and must be signed off by the VTA Authorized Representative or VTA Designated Contact.

1.02 Minor Repairs

For purposes of this Contract, "Minor Repairs" means repairs outside of the scope of the annual PM inspection that do not exceed \$5,000.00 in total. Contractor will give a written estimate to the VTA Authorized Representative for any necessary Minor Repairs identifies. Contractor may not begin any Minor Repairs until receiving written approval from the VTA Authorized Representative. For any equipment replaced pursuant to Minor Repairs, Contractor must supply OEM Manuals to the VTA Authorized Representative or appropriate Designated Contact upon completion of the equipment installation.

1.03 Unscheduled Repairs

Unexpected requirements for repairs and replacements will likely occur and, therefore, "Unscheduled Repairs" will be a requirement of this Contract. The VTA Authorized Representative or Designated Contact will inform Contractor which unit has broken and needs repair. The VTA Authorized Representative or VTA Designated Contact will also have the right to determine the cost-benefit analysis of and refuse repair on any unit after receiving a written or oral estimate from Contractor. For any Unscheduled Repairs estimated by VTA to exceed \$25,000.00, VTA reserves the right to obtain such repairs through a competitive procurement process. Any unscheduled repair approved by VTA via a Work Order to be undertaken by Contractor will not exceed \$25,000.00 unless otherwise approved by the VTA Authorized Representative or VTA Designated Contact in such Work Order. For any equipment replaced pursuant to Unscheduled Repairs, Contractor must supply OEM Manuals to the VTA Authorized Representative or appropriate VTA Designated Contact upon completion of the equipment replacement.

ON-CALL RESPONSE TIMES

A. Non-Emergency Service Requests: When a service is designated as a non-emergency by the VTA Authorized Representative or Designated Contact, Contractor must respond within the following periods:

1. For service requests made before 10 AM PST, Contractor must report to the relevant VTA Worksite within 4 hours of VTA notification to Contractor.

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2. For service requests made between 10 AM PST and 12 PM PST, Contractor must report to the relevant VTA Worksite before 5:30 PM on that same day.
 3. For service requests made after 12 PM PST, Contractor must arrange a response time with the VTA Authorized Representative.
- B: Emergency Service Request: Contractor must have a Designated Representative on call, twenty-four (24) hours a day, seven days a week, to provide emergency repair services needed by VTA. A service request will be designated as emergency by VTA when appropriate, including but not limited to instances where units fail to operate, a hazardous condition exists, an unsafe condition exists, an unsafe environmental condition exists, or execution of operational requirements are severely limited or prohibited due to safety conditions. VTA reserves the right to determine in its sole discretion what constitutes an emergency service request. No emergency repairs will exceed \$5,000.00 unless approved in advance in writing by the VTA Authorized Representative or VTA Designated Contact. When a service request is designated as an emergency by the VTA Authorized Representative or VTA Designated Contact, Contractor must report to the relevant VTA Worksite within two (2) hours of VTA notification to Contractor. Contractor must provide a contact phone number that will be continually monitored in order to respond as required by this Section 1.05.

END OF SECTION 01 31 14

SECTION 01 40 00 CONTRACT DEFINITIONS

Part 1 General

1.01 Definitions

The following words and terms are used in these Technical Specifications and are defined as:

Approved: As accepted by the VTA in writing.

Approved equal: As accepted by VTA as being of equivalent/acceptable quality, utility, and appearance.

As applicable: As appropriate for the particular condition, circumstance, or situation.

As required: As required by the regulatory requirements, by referenced standards, by existing conditions, by generally accepted construction practice, by VTA, or by the Contract Documents.

Directed: As instructed by VTA or Owner's Representative in writing.

Drawings: "Drawings", as used in these Contract Documents, has the same meaning as the word "Plans", as defined in the General Conditions.

Indicated: As shown and or noted on the plans or pictures.

Owner: Santa Clara Valley Transportation Authority (VTA). The use of the word "Owner" or "VTA" in these Contract Documents is **synonymous with Santa Clara Valley Transportation Authority**.

Provide: Furnish and/or install.

Unit: Includes any machinery that is used by VTA to heat, cool, ventilate, refrigerate, reclaim refrigerants, or any other process that involves the movement, storage, or application of air or any other gaseous material.

END OF SECTION 01 40 00

SECTION 01 42 00 REFERENCE STANDARDS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

- A. This section includes abbreviations and acronyms of various industrial associations, trade associations, societies, organizations, and regulatory agencies and their meanings as used in these Contract Documents.
- B. The requirements specified herein are in addition to the requirements specified in the 2016 California Standard Building Codes (Title 24 of the California Code of Regulations).

1.02 REFERENCES

- A. The Contract Documents contain references to various standard specifications, codes, practices, and requirements for materials, Work quality, installation, inspections, and tests. Such references are hereby made a part of the Contract Documents to the extent required.
- B. All specifications and standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the various sections by abbreviation and number only. (Not by title) They are not further identified, because it is assumed that Contractor is familiar with, and has ready access to, specified ASTM and ANSI specifications and standards.
- C. When the effective date of a reference standard is not given, it shall be understood that the current edition or latest revision thereof and any amendments or supplements thereto in effect on the date of issue of these contract documents, as indicated on the cover, will govern the work.
- D. Reference standards are not furnished with the Contract Documents because Contractor and its subcontractors, manufacturers, suppliers, and the trades involved are assumed to be familiar with their requirements.
- E. Contractor shall obtain, at its own cost, copies of the referenced standards direct from publication sources as needed for proper performance and completion of the Work. The VTA Authorized Representative will furnish, upon request, information as to how copies of the specified standards may be obtained.

Contractor will provide and maintain referenced standards at the Worksite field office as needed for proper performance and completion of the Work.

The VTA Authorized Representative may require reference to or review such standards at the Worksite, as applicable. Upon request, Contractor must make all applicable standards available to the VTA Authorized Representative immediately and without charge.

END OF SECTION 01 42 00

SECTION 01 45 00 QUALITY CONTROL

PART 1 - GENERAL REQUIREMENTS

1.01 REQUIREMENTS INCLUDED

This Section includes the general requirements for quality control for the Work. The requirements specified herein are in addition to quality control requirements specified elsewhere in these Contract Documents. Unless otherwise specified, this section imposes obligations on Contractor, not on VTA.

1.02 WORKMANSHIP

- A. Contractor will comply with industry standards except when more restrictive tolerances or specified requirements prescribe more rigid standards or more precise workmanship.
- B. Upon request, Contractor will present manufacturer's certifications to VTA.

1.03 MANUFACTURER'S INSTRUCTIONS

Comply with instructions in full detail, including each step, in sequence. Should instructions conflict with the Contract Documents, request clarification from VTA's Authorized Representative or Designated Contact before proceeding with the assigned Work.

1.04 MANUFACTURER'S CERTIFICATE

- A. When required by an individual Technical Specification Section or the VTA Authorized Representative or Designated Contact, submit manufacturers' certificates, that all products meet or exceed specified requirements.
- B. Bidder will supply manufacturers certificates at the time of the bid indicating that the bidder is franchised or otherwise authorized to install or repair roofing systems from GAF, Tremco, and Duro-Last.**

1.05 FIELD MEASUREMENTS AND TEMPLATES

- C. Contractor shall obtain all field measurements required for the accurate fabrication and application of the Work included in this Contract. Exact measurements are Contractor's responsibility.
- D. Contractor shall also furnish or obtain templates, patterns, and setting instructions as required for the installation of all the Work.

1.06 MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS

- A. Unless otherwise indicated or specified, all manufactured materials, products, processes or the like will be supplied by a manufacturer's specializing in the manufacture of all appropriate materials. All materials will be applied in accordance with the manufacturer's instructions, directions, or specifications. Said application will be in accordance with printed instructions furnished by the manufacturer of the materials concerned for the use under conditions similar to those at the Worksite.

- B. Any deviation from the manufacturer's printed recommendations shall be explained and acknowledged as correct and appropriate for the circumstances, in writing by the particular manufacturer. Contractor will be held responsible for applications contrary to the manufacturer's recommendations.

1.07 WORK QUALITY

- A. Craftsmen or skilled workers with experience in the fabrication and application of the work will be involved shop or fieldwork. All Work on this Project shall be performed in accordance with the best and accepted practices of the trades involved.
- B. Finished Work shall be free from defects or damage.
- C. VTA reserves the right to reject any materials and Work quality that is not considered to be up to the highest standards of the various trades involved. Such inferior material or Work quality shall be repaired or replaced, as directed, at no additional cost to VTA.

1.08 NOT USED

1.09 NOT USED

1.10 NOT USED

1.11 WARRANTY/GUARANTEE

The following provisions apply in addition to the warranty provisions found elsewhere in these Contract Documents:

- A. Upon completion of each particular task and acceptance by the VTA Authorized Representative or Designated Contact, Contractor will guarantee the Work for a period of one year (1 year).
- B. Defects noticed during the warranty period will be repaired by Contractor at no cost to VTA.
- C. Contractor must include along with the Warranty the name, address and phone number of the manufacturer's representative.

END OF SECTION 01 45 00

SECTION 06 01 10 MAINTENANCE OF ROUGH CARPENTRY

PART 1 – GENERAL

1.01 DESCRIPTION

This Section includes specifications for providing miscellaneous rough carpentry, including wood nailers, backing, and blocking, as indicated or required.

1.02 REFERENCE STANDARDS

- A. American Plywood Association (APA): U.S. Product Standard PS 1 for Construction and Industrial Plywood.
- B. American Society for Testing and Materials (ASTM): ASTM E84 Test Method for Surface Burning Characteristics of Building Materials
- C. American Wood Preservers Association (AWPA): AWPA C2 Lumber, Timbers, Bridge Ties and Mine Ties, Pressure Treatment AWPA C20 Structural Lumber, Fire Retardant Pressure Treatment AWPA C27 Plywood, Fire-Retardant Pressure Treatment.
- D. Federal Specifications (FS): TT-W-550 Wood Preservative, Chromated Copper Arsenate Mixture TT-W-571 Wood Preservation: Treating Practices.
- E. West Coast Lumber Inspection Bureau (WCLB): WCLB No. 17 Standard Grading Rules.

1.03 DELIVERY, STORAGE, AND HANDLING

Keep wood products under cover and dry. Protect against exposure to moisture and contact with damp or wet surfaces. Stack material in a manner that promotes air circulation.

PART 2 – PRODUCTS

2.01 WOOD NAILERS, BACKING, AND BLOCKING

- A. Wood nailers or nailing strips, backing, and blocking shall be "Construction" or "No. 1" grade Douglas fir as defined in WCLB No. 17, of size and dimensions indicated or required. Moisture content must not exceed 19 percent at time of installation.
 - 1. Fire Retardant Treatment: Wood nailers, backing, and blocking shall be pressure-impregnated with an AWPA C20 fire-retardant chemical suitable for the purpose. Each treated member shall be stamped with the AWPA approved trademark and, in addition, the Classification Marking of the Underwriters

Laboratories, Inc. for Fire Hazard Classification shall be affixed to the back of each member. Wood nailers and blocking members shall be pre-cut to size and shape before being treated to preclude the need for field cutting and thus exposing untreated surfaces at cut ends. Any members which must still be cut in the field shall be dipped, after cutting, in the same fire-retardant chemical that was used in the pressure treating process.

2. Preservative Treatment: Where wood members are indicated or required, to be treated with preservative material, provide pressure-treated "Construction" or "No. 1" grade Douglas fir, treated in accordance with FS TT-W-550 for preservative material (CCA) and FS TT-W-571 or AWPA C2 for pressure treating.

B. Plywood shall be Group 1 Species meeting requirements of U.S. Product Standard PS-1, of sizes and thickness indicated or required. Minimum thickness shall be 5/8 inch. Each panel shall carry the APA grade trademark. Plywood shall be Exterior Grade or manufactured with Exterior Glue, with C-C or C-D (plugged) faces.

1. Fire-Retardant Treatment: Plywood shall be fire retardant treated in accordance with AWPA C27 to have a flame spread rating of less than 25 when tested in accordance with ASTM E84. Comply also with applicable requirements specified above for wood nailers and blocking.

2.02 ANCHORS AND FASTENERS

- A. Wood nailers, backing, and blocking shall be anchored to metal decking with self-drilling, self-tapping, tempered steel screws manufactured for the purpose of securing items to metal decking.
- B. Wood and plywood backing and blocking shall be secured to metal framing for gypsum board walls and partitions with self-drilling, self-tapping tempered steel drywall screws of type and size required for the installation.
- C. Toggle bolts or screws may be employed to secure wood members to metal framing and substrates through drilled holes, providing the winged anchor is not visible in the finished work.
- D. All anchors and fasteners shall be stainless steel, galvanized, or specially treated to prevent corrosion as approved by the Engineer.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install wood nailers, backing, and blocking where indicated and where required for attachment and anchorage of other work.

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- B. Coordinate location of wood members with other work involved. Provide wood nailers to be embedded in concrete for installation in formwork at the proper time.
- C. Attach wood members to substrates as required to support applied loading. Countersink bolt heads and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION 06 01 10

SECTION 07 01 50.16 ROOF MAINTENANCE PROGRAM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Perform roofing repair and replacement services at the designated VTA facilities including but not limited to, biannual roofing maintenance, re-roofing designated buildings, emergency leak repairs, ceramic tile and flashing repairs or replacements, skylight repair or replacements, gutter repair and replacements, single-ply roofing repairs and modifications. The majority of VTA roofs are BUR but as title 24 cool roofs become more predominate at VTA, Contractor or its appropriate subcontractor must be certified as a single-ply roof installer to maintain and modify within the manufacturers' specification and warranty requirements of various roofing systems such as, but not limited to, Tremco, GAF, and Duro-Last roofing systems.

- B. The intent of this Contract is to provide roofing services to all VTA facilities in the form of scheduled maintenance and repair/replacement services. Examples would be: 1.) Administrative and Operational Facilities; 2.) VTA Transit Centers and other passenger facilities; and 3.) VTA contracted or leased facilities that VTA maintains.

END OF SECTION 07 01 50.16

**SECTION 07 05 00 COMMON WORK RESULTS FOR THERMAL AND MOISTURE
PROTECTION**

PART 1 – DESCRIPTION

1.01 PREVENTATIVE MAINTENANCE SCHEDULING

- A. All fixed VTA structures will receive biannual maintenance services. These facilities will be grouped in order to simplify organization of the maintenance scheduling and services.
- B. Preventative Maintenance (PM) will occur in the spring and fall. The schedule will be determined by agreement between Contractor and the VTA Authorized Representative. All PM services require a minimum of 72 hours' notice for each facility so appropriate logistical and security arrangements shall be made. A written global schedule may be submitted on an annual basis scheduling all PM's at Contractor's discretion. All PM work at the River Oaks Administrative Campus must be scheduled for off hours or weekends and all associated overtime costs integrated into the prices quoted on Bid Form 1.
- C. The requirements for each type of maintenance are listed below. Whenever a requirement uses the passive voice, Contractor, not VTA, has the obligation to fulfill the requirement.

Bituminous B.U.R. Roofing Biannual Maintenance

- 1. Clear and remove all litter and accumulated leaves, dirt, plants, or any other material that has been deposited on the roof and in the gutters. Dispose of such materials a manner required by law.
- 2. Check all pitch pan fillers, caulking and seam sealants. Remove and replace or recover all damaged, cracked, split, aged sealants, or sealants that have pulled away from wall or other seams. Repairs that do not meet the PM specifications shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.
- 3. Drains and gutters shall be kept clear. All drains and gutters shall be checked and cleared of debris or litter. All drain and gutter screens shall be cleaned and re-secured. Missing drain screens will be noted, replaced, and billed as an unscheduled repair. Flat roofs with internal drains will be checked at the ground level exit to ensure no blockages shall prevent water from draining from the roof.
- 4. Parapet walls shall be inspected for deteriorated copings, riglets, cracked or open mortar joints, and other signs of wear and tear. Repairs that do not meet the preventative maintenance specifications shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.

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5. Inspect the exterior of the building for open mortar joints, poor laps in sidings or other structural materials, concrete spalling, loose facias, or general degradation. Report all possible leak inducing problems to the VTA Authorized Representative.
6. Inspect all Tie-Ins to insure that seams, caulking, and mechanical fasteners remain watertight. Reseal any areas that do not meet Best Management Practices for water-tightness.
7. With a ballasted system check all ballast to make sure that remains evenly distributed. Review corners, penetrations, and roof perimeters for bare spots or uneven distribution. Redistribute ballast in uneven areas taking precautions not to damage the underlying membrane.
8. Check all B.U.R. roofs for blisters and splits in the membrane. Report all defects to the VTA Authorized Representative for determination if repairs shall be designated as unscheduled or submitted for warranty repair.

Single-Ply Cool Roofing Biannual Maintenance

1. Clear and remove all litter and accumulated leaves, dirt, plants, or any other material that has been deposited on the roof or in the gutters. Dispose of such materials a manner required by law.
2. Check all pitch pan fillers, caulking and seam sealants. Remove and replace or recover all damaged, cracked, split, aged sealants, or sealants that have pulled away from wall or other seams. Repairs that do not meet the PM specifications shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.
3. Drains and gutters shall be kept clear. All drains and gutters shall be checked and cleared of debris or litter. All drain and gutter screens shall be cleaned and re-secured. Missing drain screens will be noted, replaced, and billed as an unscheduled repair. Flat roofs with internal drains will be checked at the ground level exit to ensure no blockages shall prevent water from draining from the roof.
4. Parapet walls shall be inspected for deteriorated copings, riglets, cracked or open mortar joints, and other signs of wear and tear. Repairs that do not meet the preventative maintenance specifications shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.
5. Inspect the exterior of the building for open mortar joints, poor laps in sidings or other structural materials, concrete spalling, loose facias, or general degradation. Report all possible leak inducing problems to the VTA Authorized Representative.

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6. Inspect all Tie-Ins to ensure that seams, caulking, and mechanical fasteners remain watertight. Reseal any areas that do not meet Best Management Practices for water-tightness.
7. Inspect roofs for seam splits, tears, punctures, or any damage caused by natural or manmade objects. Repair minor damages as required by the manufacturer to maintain the manufacturer's warranty. Large repairs or damage shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.
8. Inspect all curbs and penetrations for debris or sharp objects left behind by other trades working on the roofs. Dispose of such materials a manner required by law. Identify and report any possible problems that may require attention from other trades to prevent damage to the roofing system such as, but not limited to, improperly secured HVAC door or equipment, unauthorized or improper roof modifications, damaged or unsecured radio and electrical equipment.
9. **All single-ply cool roofs shall be washed annually during the spring PM.** Contractor shall use a power washer with plain water and soft bristle brooms to wash and scrub the roofs. In most cases water will be available on site, the VTA Authorized Representative will be able to identify sites where onsite water will not be available. **All water runoff must be handled in accordance with California environmental regulations and must not be allowed to enter storm drains. It may be diverted by any number of methods, please arrange this with the VTA Authorized Representative.**

Standing Seam Metal Roof Biannual Maintenance

1. Clear and remove all litter and accumulated leaves, dirt, plants, or any other material that has been deposited on the roof or in the gutters. Dispose of such materials a manner required by law.
2. Check all pitch pan fillers, caulking and seam sealants. Remove and replace or recover all damaged, cracked, split, aged sealants, or sealants that have pulled away from wall or other seams. Note broken or deteriorated screw or nail seals and report quantities to the VTA Authorized Representative to determine if it should be classified as an unscheduled repair. Repairs that do not meet the PM specifications shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.
3. Drains and gutters shall be kept clear. All drains and gutters shall be checked and cleared of debris or litter. All drain and gutter screens shall be cleaned and re-secured. Missing drain screens will be noted, replaced, and billed as an unscheduled repair. Roofs with internal drains will be checked at the ground level exit to ensure no blockages shall prevent water from draining from the roof.

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4. Standing seam building walls, parapets, and roof deck shall be inspected for deteriorated copings, cracked or open seams, bent or damaged panels, and other signs of wear and tear. Check parapet wall for interference with any internal gutters, note any anomaly or damage to the VTA Authorized Representative. Repairs that do not meet the preventative maintenance specifications shall be reported to the VTA Authorized Representative and classified as an unscheduled repair.
5. Report rust, oxidation, punctures, or other damage to the VTA Authorized Representative to determine if repair work should be classified as an unscheduled repair or referred to the manufacturer as a warranty claim.

END OF SECTION 07 05 00

SECTION 07 21 13 BOARD INSULATION

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes rigid insulation for applications on combustible roof decks with mechanically fastened single-ply membranes or B.U.R Bituminous roofs
Types of rigid expanded polystyrene include:
 - a. R-Control expanded polystyrene rigid insulation.
 - b. Polyisocyanurate foam rigid insulation
 - c. Wood particulate insulation

- B. Related Sections: Sections related to this section include:
 - 1. Roofing: DIVISION 7 roofing sections

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store the product according to insulation manufacturer's recommendations.

- B. Deliver insulation in original unopened packaging.

- C. Store above ground, protected from moisture and sunlight.

- D. Product should not be exposed to open flame or other ignition sources.

PART 2 – PRODUCTS

2.01 MATERIAL COMPATABILITY

The insulation must be compatible with all components of the roof assembly and the roofing membrane system.

2.02 INSULATION

- A. R-Control expanded polystyrene insulation: ASTM C578 expanded polystyrene thermal rigid board insulation.
 - 1. Minimum physical properties.
 - a. Thermal performance: R-17 values of 4.4 per inch minimum at 25 degrees Fahrenheit, 40 degrees Fahrenheit and 75 degrees Fahrenheit respectively (ASTM C518)
 - b. Water absorption: Maximum 3.0% (ASTM C272)
 - c. Compressive strength: 15 psi (ASTM 1621)
 - d. Water vapor permanence: less than 3.5 perm

- B. R-Control expanded polyisocyanurate insulation: ASTM C1289 expanded polyisocyanurate thermal rigid board insulation.
 - 1. Minimum physical properties.
 - a. Thermal performance: LTTR R-25 at of 4-inch minimum.
 - b. Water absorption: Maximum 3.0% (ASTM C272)
 - c. Compressive strength: Grade 1,16 psi
 - d. Water vapor permanence: less than 3.5 perm

- C. Wood Fiber Insulation / Intermediate Barrier:
 - 1. Minimal physical properties:
 - a. Thermal performance: R-1.63 at ½ inch or 12.7 mm.
 - b. Water Absorption: 3.75% by volume over 2 hours.
 - c. Compressive Strength: 18.6 psi @ 10% deformation.
 - d. Density: 15 lbs./ per cubic B.F.

2.03 THERMAL BARRIER

Must be installed as required by local codes. Product must be compatible with both the roofing membrane and R-Control insulation.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Cut and remove area of roof membrane and insulation to be removed as described in SECTION 07501.

- B. Repair or replace damaged roof deck as described in SECTION 06100.

- C. Sweep and remove all loose particles and debris from the roof deck surface. The roof deck should be sound, smooth, and free of moisture.

- D. If a vapor barrier is required, it should be applied before the installation of the roof insulation. Thermal barrier shall be installed where code requires.

3.02 INSTALLATION

- A. Lay insulation with all joints tightly butted and secured per membrane manufacturer's recommendations. If multiple layers of insulation are used to meet the required R-Value, direction shall be changed for succeeding layers to be perpendicular to the one below.

- B. All crickets and/or tapered insulation shall be installed per approved insulation manufacturer's shop drawings. Crickets shall be installed near all parapet drains to facilitate drainage.

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- C. Thermal cover board shall be installed as required by manufacturer.
- D. Membrane shall be installed per membrane manufacturer's recommendations.

END OF SECTION 07 21 13

SECTION 07 12 00 BUILT-UP BITUMINOUS WATERPROOFING

PART 1 – GENERAL

NOT USED

PART 2 – PRODUCTS

2.01 ROOFING REPAIR PRODUCTS

- A. Capsheet Built-up roof repairs
 - 1. Coatings:
 - a) Elastomeric emulsion, Tremlastic S by Tremco or approved equal.
 - b) White elastomeric reflective coating, Polarcote by Tremco or approved equal.
 - 2. Mastics:
 - a) Fibrated asphalt mastic, ELS by Tremco or approved equal.
 - b) Elastomeric mastic, Polyroof LV by Tremco or approved equal.
 - 3. Primer: Water based Asphalt primer, Tremprime WB by Tremco or approved equal.
 - 4. Reinforcements:
 - a) Emulsion: Polyester reinforcing fabric, Polyester mat CP by Tremco or approved equal.
 - b) Mastics: Non-shrinking, non-rotting woven glass mesh, Burmesh by Tremco or approved equal.
 - 5. Sealants: One-part general-purpose sealant, Tremseal GP by Tremco, or approved equal.
 - 6. Metal Roof Repair Products:
 - a) Rust Inhibitor: Tremlite Primer by Tremco or approved equal.
 - b) Repair mastic: Tremlite mastic by Tremco or approved equal.
 - c) Mastic Coating: Tremlite Coating by Tremco or approved equal.

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d) Reinforcing Membrane: Tremlite polyester reinforcement by Tremco or approved equal.

e) Caulking Sealant: Tremseal GP by Tremco or approved equal.

B. Gutter Repair and/or Replacement:

1. Repair: Clean the gutter of any loose dirt, rust, rocks, and debris. Apply rust prohibitive paint as specified in SEC. 2.01: Metal Roof Repair Products.
2. Gutter Replacement: Remove the damaged section of gutter, repair any damaged joints or ends, then install new gutter, as specified below.
 - 1) The gutter must be comprised of pre-painted, minimum twenty-four (24) gauge, galvanized steel, conforming to Federal Specification QQ-S775 Type 1, class D, ASTM 526, or lock forming quality ASTM A527 with a G90 coating in accordance with ASTM A525. All sheet metal is to be pre-painted.
 - 2) The paint finish on the exposed side must be a factory applied, baked-on finish, comprised of two coats of weatherproofing coatings. The first coat must be comprised of 70% resin fluorocarbon, (Polyvinylidne fluoride PVF2) by Kynar 500 or approved equal. This is applied over a smooth coat of corrosion-resistant epoxy based primer. The color is to match the existing structure where the replacement is occurring.
 - 3) The finish on the underside will be a wash-coat over a coat of corrosion resistant epoxy based primer.
 - 4) Repaint all existing sheet metal scheduled for re-use. This will be comprised of two (2) coats of Alkyd Semi-Gloss Enamel over one (1) coat of galvanized steel primer.

C. Roof System Applications: where roofing must be removed in order to install new gutters.

- 1) Install three (3) plies of pre-cut, relaxed ply sheet, single fashion, overlap starter strips twenty-six (26) inches with the first ply, then overlap each succeeding ply by twenty-four and five-eighths (24 5/8ths) inches. Place ply sheets to ensure water will flow over the edge, or parallel to the edge, but never against the exposed edge.
- 2) Immediately after the installation, broom-clean and/or roll the ply sheets. Complete and continuous seal must be ensured between the adhesive layers and the felts, including ends, edges, and laps, without wrinkles, fish

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mouths, or blisters. The broom or roller must be of a minimum width of 34 inches.

- 3) Apply uniform and continuous pressure to the exposed edge and end laps of the repair to ensure complete adhesion.
- 4) Avoid walking on any plies or the repair until the adhesive has set.
- 5) Lap-ply each membrane end by four (4) inches, stagger the lap ends by three- (3) feet minimum.
- 6) Embed each ply in a uniform and continuous application of cold process inter-ply adhesive. The application rate must be a minimum of 35 square feet per gallon.

D. Rust proofing of the existing gutters.

1) Surface Preparation for metal surfaces:

- A) Solvent clean with SSPC-SP1-82
- B) Hand tool clean with SSPC-PC2-82

2) Clean all loose or poorly bonded material from all metal surfaces.

E. METAL SURFACES

- 1) Metal surfaces must be painted with a VTA approved primer/rust prohibitive paint. It will be applied by spray at an approximate rate of 300 to 350 square feet per gallon over the entire surface.
- 2) All seams will be cleaned, primed and sealed with a three- (3) course application of elastomeric sealant and reinforcing membrane. All ducting or gutters identified by the VTA Authorized Representative will be straightened or repaired.
 - a. Remove any loose or rusted material from the joint.
 - b. Prime with epoxy primer.
 - c. Install three (3) course mastic and reinforcing membrane as specified by the VTA Authorized Representative. Coverage of the mastic material will be at approximately 40 square feet per gallon with a 200-mil membrane application. Allow the three- (3) course fill to dry.

PART 3 – EXECUTION

3.01 GENERAL PREPERATION AND APPLICATION PROCEDURES

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- A. Recommended Tools: 1) Trowels; 2) scissors or knife; 3) Rags; 4) Mineral Spirits; 5) Brooms; 6) Containers for Trash; 7) Ropes for hoisting materials.
- B. All surfaces must be clean and smooth. Contractor's work crews must take care not to damage roof felts. Broom all surfaces effected and then inspect. All wet or ponded areas must be dried sufficiently to allow repairs.
- C. Determine the type of existing surface or roofing material.
- D. All asphalt surfaces that are to be repaired will be cleaned and primed with quick drying asphalt primer. The primer must be allowed to dry prior to the application of mastics and adhesives.
- E. Remove all loosely bonded or failing materials during the substrate preparation. Re-secure roofing materials with as mechanical fastener where needed.
- F. Whenever felts are removed, they must be replaced with an equal number of felts and set in the specified mastic.

3.02 REPAIR PROCEDURES CAPSHEET BUILT-UP ROOFING

- A. Cleaning all roof debris:
 - 1) Clean all effected roof surfaces of debris, including but not limited to, dirt, oil, garbage, broken glass, screws, nails, vegetation, repair parts, or abandoned contractors' items and supplies.
 - 2) Place all debris into garbage bags and dispose of them off-site.
 - 3) Thoroughly clean all drains and gutters.
 - 4) If necessary, use high-pressure water spray or air pressure to clean roofs.
- B. Repair of conduits and round projections:
 - 1) Repair any damaged flanges.
 - 2) Prime all areas to be sealed.
 - 3) Install three- (3) course repair around the round projections using elastomeric mastic and reinforcing membranes.
 - 4) After the repair has cured, coat with a reflective coating.
- C. Three course metal edging:

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- 1) Remove all dirt and clean the surface to a point on the roof membrane eight (8) inches past any existing flashing. Inspect the metal edges, remove loose fasteners and re-secure with longer nails or screws. Remove the defective metal and replace with material of similar quality and dimensions.
 - 2) Prime all metal edges and allow them to dry until tack-free.
 - 3) Reinforce all laps of metal edging with six-by-six (6X6) inches of mesh set between applications layers of asphalt mastic. The minimum application rate is 1/16 of an inch.
 - 4) Cut and remove any loose or protruding roof felts. Apply a layer of asphalt mastic four (4) inches past the existing flashing, center the six (6) inch wide mesh reinforcing over the metal flange edge and roof membrane and embed into the mastic. Dry trowel the reinforcing mesh tight and wrinkle free.
 - 5) Cover the weave of the reinforcing mesh with a second application of mastic.
- D. Three course metal flanges:
- 1) Remove all dirt and clean the surface to a point on the roof membrane eight (8) inches past the existing flashing. Inspect the metal flange, remove any loose fasteners then re-secure with a longer nail or screw.
 - 2) Prime the metal flange and allow the primer to dry until tack-free.
 - 3) Cut out and remove any loose or protruding felt. Apply a layer of asphalt mastic four (4) inches past the existing flashing, center the six (6) inch wide reinforcing mesh over the metal flange and roof membrane, then imbed in the mastic. Dry trowel the reinforcing mesh tight and wrinkle free.
 - 4) Cover the weave of the membrane with a second application of asphalt mastic.
- E. Repair base flashings:
- 1) Remove any dirt and clean surfaces at the base of the flashing to a point six (6) inches out onto the roof membrane, past the termination point of the existing flashing.
 - 2) Re-secure the flashing with mechanical fasteners if it is necessary. Examine the metal counter flashing, where present. Re-secure any counterflashing that has pulled away from a wall.
 - 3) Cut out any blisters or water-soaked areas of flashing, replace with a material of like quality and dimension, set all repairs in asphalt mastic. Replace areas of

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missing or defective counterflashing with material of like quality and dimensions. Where no counterflashing exists, reinforce the termination point on the vertical surface with six (6) inch wide mesh reinforcing membrane between application layers of asphalt mastic

- 4) Cut loose or protruding felts to lie flush with the surrounding area. Prime the entire area of the repair from the top of the flashing out on to the roof membrane and allow the primer to dry tack free. When practical, remove the metal portion of the projection and/or equipment to provide complete access to the base flashing. Install three (3) course flashing reinforcement, extend reinforcement mesh from the top edge of the flashing to six (6) inches onto the existing roofing. Lap all ends by four (4) inches.
- 5) Set all ply laps in asphalt mastic applied in continuous 1/16-inch thick applications. Ensure complete bonding and continuity without wrinkles or voids.

F. Reinforcing Drain Areas:

- 1) Provide three- (3) course 36 X 36-inch reinforcement to the drain.
- 2) Prime area and allow it to dry until tack free.
- 3) Apply a layer of asphalt mastic to primed area in a 1/8inch thick application.
- 4) Center and embed reinforcement over the drain. Apply a second layer of asphalt mastic to the reinforcement. Re-clamp the flashing collar to the drain in a bed of mastic. If any bolts are broken, they must be drilled out and re-tapped. Cut and remove any excess membrane within the drain.

G. Topping out pitch pockets:

- 1) Prime areas to be filled and allow them to dry until tack free.
- 2) Fill the pitch pocket and crown for drainage.
- 3) Extend the mastic from the projection to the pocket edge.

H. Roof Membrane Repairs:

- 1) Remove all dirt and clean a minimum of six (6) inches around the surface of the area to be repaired.
- 2) Cut out any blisters or water soaked areas of the flashings. Replace them with a material of like quality and dimensions set in asphalt mastic. Replace damaged or defective counter-flashings with a material of like quality and dimensions.

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Where no counter-flashing exists, reinforce the termination point on the vertical surfaces with six- (6) inch wide mesh reinforcing membrane between layers of asphalt mastic.

- 3) Cut any loose or protruding felts to lie flush with the surrounding areas. Prime the entire area of the repair from the top of the flashing out onto the roof membrane and allow the primer to dry until tack free. Where practical remove the metal portions of the projection and/or equipment to allow complete access to the base flashing. Install three (3) course flashing reinforcement. Extend the reinforcement mesh from the top edge of the flashing and six (6) inches onto the existing roofing. Lap all ends four (4) inches.
 - 4) Set plies and laps in asphalt mastic applied in continuous 1/16-inch thick applications. Ensure a complete bond and continuity without wrinkles or voids.
- I. Localized coating of roof membranes:
- 1) Remove dirt and clean all areas to be coated.
 - 2) Prime the entire area to be coated and allow the primer to dry until tack free.
 - 3) Apply the surface emulsion with a brush at approximately 40 square feet per gallon.
 - 4) Embed reinforcing membrane into the wet emulsion. Dry-brush the reinforcement into the emulsion. Lap all edges and end laps with a minimum of two (2) inches of emulsion.
 - 5) Apply the surfacing emulsion over the reinforcement mesh at a rate of approximately 40 square feet per gallon. Apply the emulsion in a uniform and continuous manner.
- J. Caulking and/or re-attaching loose counter-flashing:
- 1) For repairs to these areas, replace fasteners in the same holes using longer fasteners. If replacement fasteners are needed, assure that the fastener is long enough for positive attachment.
 - 2) Caulk the metal counter-flashing joint with a specified sealant.
- K. Resealing coping joints:
- 1) Clean the joint of previously applied sealants. Use a skill saw with a carborundum disk where necessary to remove all sealant from the sides of a joint.

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- 2) When the joint is clean, insert a closed cell joint backer under minimum 30% compression. Prime with Tremco Primer #1 or approved equal.
 - 3) Joints less than 1 ¼ inch wide may be sealed with Tremseal GP, the maximum joint depth will be no deeper than 3/8 of an inch. Any joints larger than the 1 ¼ inch width, use Tremseal HP, mixed in accordance with the labeled instructions. Maximum joint size for this material will be two (2) inches wide and no deeper than 5/8 of an inch.
 - 4) Apply the sealant to the prepared joint. Tool the sealant firmly into place.
- L. Replacing drain strainers:
- 1) Replace any lost or broken strainers with one of like quality and size.
 - 2) Most VTA drains are of the Josem type between six (6) and ten (10) inches in diameter.
- M. Seal flashing laps:
- 1) Prime all areas to be sealed.
 - 2) Install three (3) course repair over flashing laps using asphalt mastic and four (4) inch wide reinforcing membrane.
- N. Repair of blisters:
- 1) Cut out delaminated felts until firmly laminated felts are located along the edges of the repair area.
 - 2) Remove embedded gravel, debris, and dust from an area extending at least eight (8) inches beyond the perimeter of the depressed area. Square the corners and make sure the repair area is completely dry.
 - 3) Prime the area and allow the primer to dry until tack free.
 - 4) Fill the depression with alternating layers of asphalt mastic and ply sheets. Match the number of plies removed.
 - 5) Cover the layers of mastic/felt with two (2) layers of reinforcing mesh. One layer will be made of six- (6) inch strips and one layer will be made of twelve (12) inch strips. These strips will be embedded between dry trowel applications of the asphalt mastic. Extend the repair area at least six (6) inches beyond the filled depression. Overlap all reinforcing mesh by at least two- (2) inches. Cover all mesh with an even coat of mastic, leaving no wrinkles or voids.

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- 6) Graveled roofs will have the mastic troweled over the entire surface of the repair and embed clean gravel in the mastic, overlapping into and matching the adjacent areas.

O. Repairs of splits:

- 1) Remove embedded gravel, debris, and dust from area extending at least eight (8) inches beyond the perimeter of the split. Assure that all areas are completely dry.
- 2) Prime the effected area and allow the primer to dry until tack free.
- 3) Trowel a 1/8-inch application of asphalt mastic over the splits, approximately six (6) inches wide.
- 4) Embed reinforcement mesh into the mastic and dry trowel.
- 5) Apply a second application of asphalt mastic to the mesh. Cover the mesh completely.
- 6) Graveled roofs will have clean gravel embedded in the asphalt mastic, matching the surrounding area.

3.02 REPAIR PROCEDURES FOR STANDING SEAM METAL ROOFING

A. Cleaning roofs of all debris:

- 1) Clean the roof surface of all debris, including but not limited to dirt, oil, garbage, broken glass, screws, nails, vehicle parts, and any vegetation.
- 2) Place all debris into garbage bags and dispose of off site.
- 3) If necessary, use high-pressure water or air to clean the roof.
- 4) Thoroughly clean all drains of debris.

B. Repairs of conduits and round projections:

- 1) Clean and prime all surfaces with two- (2) part epoxy primer.
- 2) Apply repair mastic at approximately 16 square feet per gallon, leaving no voids. Apply the top coating after 30 minutes or the mastic has flashed over.

C. Three course metal edging:

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- 1) Clean and prime the surfaces with two- (2) part epoxy primer. Let the primer cure completely.
 - 2) Apply the repair mastic at approximately 16 square feet per gallon, then embed the reinforcing mesh.
 - 3) Apply the repair mastic at approximately 16 square feet per gallon, over the top of the reinforcing mesh, leaving no voids. Apply the top coating after 30 minutes or the mastic has flashed over.
- D. Three course metal flanges:
- 1) Clean and prime all surfaces with two- (2) part epoxy primer. Let the primer cure completely.
 - 2) Apply the repair mastic at approximately 16 square feet per gallon, embedding the reinforcing mesh into the mastic.
 - 3) Apply the repair mastic at approximately 16 square feet per gallon, leaving no voids. Apply the top coating after 30 minutes or after the mastic has flashed over.
- E. Resealing bolts and bolt holes:
- 1) Clean and prime all surfaces with two- (2) part epoxy primer. Allow the primer to dry completely.
 - 2) Caulk the bolt head with repair mastic, covering it with a minimum of ¼ inch of mastic.
- F. Apply a rust proof coating at approximately 300 –350 square feet per gallon. The VTA recommends spraying this application.
- G. General caulking will occur after cleaning and priming all surfaces to be sealed. Install the polyurethane sealant in a single bead application. Tool the bead to insure proper adhesion.

END OF SECTION 07 12 00

SECTION 07 13 54 THERMOPLASTIC SHEET WATERPROOFING

PART 1 – GENERAL

1.01 SUMMARY

This Section includes:

1. Mechanically fastened sheet roofing.
2. Fire protection board.

1.02 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 for definition of terms related to roofing work not otherwise defined in this Section.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Install sheet membrane roofing and base flashing that are watertight; will not permit the passage of liquid water; will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a single-ply roofing system that complies with roofing system manufacturer's written design instructions and with the following:
1. SPRI's "Wind Design Guide for Mechanically Fastened Roofing Systems."
 - a) Exposure Category: Exposure C
 - b) System Design: System 2
- D. Installer Certificates: Signed by roofing system manufacturer certifying that installer is approved, authorized, or licensed by manufacturer to install or repair the specified roofing system(s).
- D. Maintenance Data: For roofing system, include maintenance manuals/pamphlets specified in DIVISION 01.
- E. Warranty: Special warranties specified in this section.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Contractor shall have a superintendent experienced with installing or repairing the roof system specified, familiar with the requirements of

this project. Contractor shall use adequate amounts of qualified workmen to install or repair the specified roofing system.

- B. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or other testing and inspecting agency acceptable to VTA. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A, ASTM E 108 for application and slopes indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Work Site in original containers with seals unbroken and labeled with manufacturer's name, product brand and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by the roofing system manufacturer. Protect stored liquid materials from direct sunlight.
- C. Protect roof fire protection board materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with manufacturers written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.06 PROJECT CONDITIONS

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

PART 2 – PRODUCTS

2.01 PVC/CPA SHEET

- A. PVC Sheet: Uniform flexible sheet formed from polyvinyl chloride with plasticizers and modifiers, complying with ASTM D4434, Type IV, Thickness 50 mils minimum, texture and color to match existing or at the VTA Authorized Representative's discretion..

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- B. PVC Sheet must meet "CRRC" requirements. ASTM E1980-01 SRI Rating of +105.00
- C. Physical Properties: Provide thermoplastic sheets with the following minimum properties as determined by ASTM test method indicated:
 - a. Type IV: Coated Reinforced Fabric
 - (1) Breaking Strength: 350 lbs/in, ASTM D751, Procedure A.
 - (2) Elongation at Break: 35 percent, ASTM D751.
 - (3) Tearing Strength: 75 percent, minimum, of breaking strength of unseamed sample, ASTM D751, Procedure B.
 - (4) Resistance to Heat Aging: 90 percent retention of breaking strength and elongation at break after 56 days at 176 deg F or after 28 days at 185 deg F, ASTM D3045.
 - (5) Low-Temperature Bend: Pass at minus 40 deg F, ASTM D2136.
 - (6) Accelerated Weathering Test: No cracking or crazing after 5000 hours, ASTM D4434.
 - (7) Linear Dimensional Change: 0.5 percent maximum after 6 hours at 176 deg F, ASTM D1204.
 - (8) Water Absorption: Less than 3 percent mass change after 168 hours immersion at 158 deg F, ASTM D570.
- D. Pre-Manufactured Seams: To the extent possible, all sheeting material shall be pre-assembled at the factory to facilitate minimizing on site seaming. All such pre-manufactured seams will be stamped with a control number and registered by the manufacturer detailing date of assembly, material type, and manufacturing facility.
- E. Custom Manufactured Curb and Penetration Boots: All roof penetrations, curbs, drains, scuppers, etc. will be pre-measured by Contractor and submitted to the manufacturer for construction of such boots in the manufacturer's facility. All such pre-manufactured boots will be stamped with a control number and registered by the manufacturer detailing date of assembly, material type, and manufacturing facility.

2.02 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing material.
- B. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- C. Sheet Flashing: Manufacturer's standard sheet flashing of the same material, type, thickness, and color as sheet membrane.

- D. Bonding Adhesive: Manufacturer's standard bonding adhesive.
- E. Slip Sheet: Manufacturer's recommended slip-sheet of type required for application.
- F. Termination Bars: Manufacturer's standard bars, approximately 1 to 1.5 inches wide, formed, and pre-punched.
- G. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provision of FM4470, designed for fastening sheet to substrate, and acceptable to roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed pipe sheet flashings, preformed inside and outside corner sheet flashings, stainless steel bands, termination riglets, and other accessories recommended by roofing manufacturer for intended use. These accessories are to be covered by the roofing systems manufacturer's system warranty for the warranty period.

2.03 THERMAL BARRIER

- A. Thermal Barrier: Glass-mat, water-resistant gypsum board, ASTM C1177, of type and thickness indicated below:
 - 1. Type and Thickness: Regular, ¼-inch.
 - 2. Product: Subject to compliance with requirements, provide "Dens-Deck" manufactured by Georgia-Pacific Corporation.

2.04 WALKWAYS AND WORK PADS

Walkway and Work Pads: Factory-formed, nonporous, heavy-duty, slip-resistant, surface-textured pads, approximately 1/8-inch thick, minimum, of materials acceptable to roofing system manufacturer. All walkways will be continuous with no more than a ¼ inch gap between walkway pads.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with installer present, for compliance with requirements.
- B. After removal of existing roofing, examine all roof deck surfaces for damaged and defective decking, any abandoned vents and sleepers will be removed and patched in a manner consistent with damaged decking, including the removal of all curbs from the abandoned vents. Damaged or defective decking shall be repaired or replaced as required to provide substantial substrate surfaces conducive to the

installation of new roof deck insulation and roofing. Substrate surfaces shall be clean and dry before beginning re-roofing work. Decking repairs will conform to **06 01 10 MAINTENANCE OF ROUGH CARPENTRY.**

- C. Replace all rotted or damaged sleepers under equipment to remain.
- D. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- E. Verify that wood nailers are in place and secured and match thickness of the underlayment as required.
- F. If necessary, raise curb heights for vents, skylights, penetrations, etc. to accommodate new insulation and Densdeck. HVAC equipment is excluded at the VTA Authorized Representative's discretion.
- G. Do not proceed with installation until unsatisfactory conditions have been corrected and approved by the VTA Authorized Representative.

3.02 PREPARATION

- A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections. Re-nail any backed out nails in wood deck and walls.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no roof work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system and the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 THERMAL BARRIER

Install thermal barrier with long joints in continuous straight lines, perpendicular roof slopes with end joints staggered between rows. Tightly butt thermal barrier boards together. Stager joints a minimum of 6" from plywood or insulation joints.

3.04 MECHANICALLY FASTENED SHEET INSTALLATION

- A. Install thermoplastic sheet over area to receive roofing according to roofing system manufacturer's written instructions. Unroll sheet and allow it to relax for a minimum of 30 minutes.

- B. Install sheet according to manufacturer's instructions.
- C. Start installation in the presence of roofing system manufacturer's technical personnel.
- D. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Mechanically fasten sheet securely at terminations and perimeter of roofing.
- F. Apply roofing sheet with side laps shingled with slope of roof deck where possible.
- G. Spread sealant bed over deck drain flange at deck drains and securely seal roofing sheet in place with clamping ring.
- H. In-Seam Attachment: Secure one edge of the sheet using fastening plates- centered within the membrane seam and mechanically fasten sheet to roof deck. Field-weld seam according to manufactures requirements.
- I. Install sheet and auxiliary materials to tie in to existing roofing.

3.05 SEAM INSTALLATION

- A. Clean seam areas, overlap sheets, and weld side and end laps of sheets and flashings according to manufacturer's written instructions to ensure a watertight seam installation. Weld seam as follows:
 - 1. Weld Method: Hot air, no chemical welds permitted.
- B. Test lap edges with probe to verify seam weld continuity.
- C. Repair tear's, voids, and lapped seams in roofing that do not meet requirements.

3.06 FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories with mechanical fasteners, sealant and termination bar.
- B. Flash penetrations and pre-manufactured inside and outside corners with sheet flashing as recommended by manufacturer.
- C. Clean seam areas, overlap sheets and hot air seal. Weld side and end laps to ensure a watertight seam installation.
- D. Test lap edges with probe to verify seam weld continuity. Test each weld at end of each day.

- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.07 WALKWAY AND WORK PAD INSTALLATION

Walkways and Work Pads: Install pads in locations indicated. Heat weld or adhere walkway pads to substrate with compatible adhesive according to roofing system manufacturer's written instructions. All walk pads will have no more than ¼" gap between individual pad's creating a continuous walk surface.

3.08 FIELD QUALITY CONTROL

- A. Verify field strength of seams a minimum of twice daily, according to manufacturer's written instructions, and repair seam sample areas.
- B. Upon completion, Contractor shall arrange for roofing system manufacturer's representative to inspect roofing installation and submit report to the VTA Authorized Representative stating the roof has been properly installed and meets the manufacturer's warranty compliance.
 - 1. Notify the VTA Authorized Representative 48 hours in advance of the date and time of warranty and compliance inspection.

3.09 PROTECTION AND CLEANING

- A. Protect sheet membrane roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report with 6 copies to the VTA Authorized Representative.
- B. Correct all deficiencies and remove roofing that does not comply with requirements. Repair substrates, reinstall roofing, and repair sheet flashings to a condition free of damage and deterioration according to warranty requirements.

3.10 WARRANTY:

- A. Repairs and modifications to existing roofing systems: Contractor will provide a one-(1) year warranty for all work performed under this contract. This warranty will guard against any defects in materials and/or workmanship during the one (1) year period. All repairs or modification must meet the roofing systems manufacturer's warrantee guidelines for continuation of the existing manufacturers warranty.
- B. Warranty for new installations: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within 15-year warranty period. Failure includes roof leak.

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END OF SECTION 07 13 54

SECTION 07 72 00 ROOF ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. The work of this section consists of the furnishing of all labor, equipment, materials and devices required in conjunction with the installation of supports for all Mechanical, Electrical and Plumbing piping or conduit, HVAC Air Ducts and HVAC Equipment.
- B. Under VTA's direction , Contractor shall supply 100% molded recycled plastic pipe curbs.
- C. Under VTA's direction , Contractor shall supply a composite recycled 17" round multi-purpose plastic base, with molded insert for square tubing and two threaded rod couplings molded within.
- D. Under VTA's direction , Contractor shall supply Vibration Isolation and Cushion system with a minimum of shock transmission to the substrate, where there is to be free movement and no pipe tension nor binding.

1.02 RELATED SECTIONS:

- A. DIVISION 7 - Roofing
- B. DIVISION 16 - Electrical

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM):
 - 1. A 123-89a Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
 - 2. A 153-82 Zinc Coating (Hot-Dip) Steel and Iron Hardware.
 - 3. A 167-92b Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Plate.
 - 4. A 570-92 Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
 - 5. D 256-91 Determining Properties Impact Resistance of Notched Specimens of Plastic.
 - 6. D 638-91 Tensile Properties of Plastic.
 - 7. D 695-91 Compressive Properties of Rigid Plastics.
 - 8. D 785-91 Rockwell Hardness of Plastics and Electrical Insulating Materials.
- B. Manufacturer's Standardization Society of the Valve and Fittings Industry, Inc. (MSS)
 - 1. SP-58 Pipe Hangers and Supports, Materials, Design and Manufacture.
 - 2. SP-69 Pipe Hangers and Supports, Selection and Application.

- C. National Roofing Contractor's Association (NRCA): NRCA Roofing and Waterproofing Manual, current edition.
- D. Sheet Metal and Air Conditioning Contractor's Association, Inc. (SMACNA): Architectural Sheet Metal Manual, current edition.

1.04 WARRANTY:

The Product Manufacturer shall provide a full system material warranty necessary to cover all cost of repairs and/or replacement of all components of the system against defects in manufacturing for the same period and duration as specified in Division 7 roofing warranty. Warranty will not include Acts of God, vandalism, neglect, metal finish or improper spacing of equipment.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Curb: Molded Recycled Plastic Tires.
 - 1. Dimensions: 4" high x 6" wide in lengths of, 6", 9" or 13".
- B. Base: Injection molded and pressed recycled plastic.
 - 1. Dimensions: 17" round Multi-Purpose Base with molded insert for square tubing and two threaded rod couplings molded within.
- C. Frame: Pre-Galvanized Zinc coated 14 Gage channel (ASTM. A653).
- D. Hangers: Clevis and/or Band type as per pipe requirements.
- E. Accessories: Cadmium plated threaded rods, clamps, nuts, bolts and washers.
- F. Rollers: None or non-binding Binding Heavy Duty SBR Rubber.

2.02 RELATED PRODUCTS:

- A. Isolation Pads are not required with molded recycled plastic curb.
- B. Pad or slip-sheet shall conform to the existing roof manufacturers system if required.

2.03 PIPE SUPPORTS:

- A. Curb: Molded Recycled Plastic Tires.
 - 1. Type: KeyCurb, Model (KC) Molded Recycled Plastic pipe curb. Curb dimensions are 4" high x 6" wide and 6", 9" or 13" long. Curb is to be used in the place of wood blocking for conduit supports.

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2. Type: KeyCurb Strut Support, Model (KS) Designed to support piping up to 8", curb is to be used with strut clamps. Curb is a Model KC with a framing channel adjustable with threaded rods.
 3. Type: KeyCurb Roller Support, Model (KR) Designed to support piping up to 8". Curb is a Model KC with SBR heavy duty rubber roller, adjustable with threaded rods. Roller support will be used with water or gas piping.
 4. Type: KeyCurb Cross Brace Bridge, Model (CCB) Designed to support all type of piping, curb is to be used with strut clamps or roller accessories. Curb is a Model CCB with two KeyCurbs and framing channel.
 5. Type: KeyCurb Adjustable Support Bridge, Model (ASB) Designed to support piping up to 12". Four (4) KeyCurbModel KC with steel clevis hanger, adjustable with threaded rods. Hanger support will be used with water or gas piping where piping is low to the roof surface.
- B. Base: Injection molded and pressed recycled plastic.
1. Type: ASP Strut Support, Model (SS-1000) Base dimensions 17" round, with two threaded rods and adjustable framing channel. Designed to support piping up to 6", with pipe clamps.
 2. Type: ASP Roller Support, Model (SS-1000-R) Designed to support piping up to 6", with two threaded rods and SBR heavy duty rubber roller, adjustable with threaded rods. Roller support will be used with water or gas piping.
 3. Type: ASP Bar Support, Model (SS-1000-B) Base dimensions 17" round, with two sided framing channels. Designed to support piping from 1/2" to 2 1/2", with pipe clamps.
 4. Type: ASP Tee Support, Model (SS-1000-T) Base dimensions 17" round, with framing channel. Designed to hang two pipes from 1/2" to 4", with two clevis or swivel hangers.
 5. Type: ASP Hanger Support, Model (SS-1000-H) One 17" round base, with two threaded rods, adjustable framing channel and one clevis or swivel hanger. Designed to hang one pipe up to 4".
 6. Type: ASP Equipment Support, Model (SS-1000-E or EC) Designed to support A/C units or roof top equipment.
 7. Type: ASP Cross Bar Support, Model (SS-2000-CR) Designed to support several conduit lines that can be secured when rollers or clamps are added. Steel grating is bolted to pairs of cross bars forming walkways and equipment platforms.
 8. Type: ASP Duct Support, Model (SS-2000-D) Designed to support A/C unit metal duct, adjustable cross bar or threaded rod.
 9. Type: ASP Pipe Hanging Support, Model (SS-4000-P) Designed to support piping up to 12". Four (4) 17" multi-purpose bases, adjustable framing channel with steel clevis hanger, adjustable with threaded rods. Hanger support will be used with water or gas piping where piping is low to the roof surface.
 10. Type: ASP Pipe Hanging Support, Model (SS-6000-P) Designed to support piping up to 12". Six (6) 17" multi-purpose bases, adjustable framing channel with steel clevis hanger, adjustable with threaded rods. Hanger support will be used with water or gas piping where piping is low to the roof surface.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Verify that substrate is smooth and clean to the extent needed to receive work.
- B. Review approved shop drawing for locations of support system.
- C. Clean surfaces to receive support system.
- D. Supports can be placed on completed gravel roof systems, as per roofing manufacturer's requirements.

3.02 INSTALLATION:

- A. Field customize to fit existing conditions or as specified herein.
- B. Set bases and support framing in locations specified or required herein as per drawings and site conditions but not to exceed 10' spacing. No Isolation pads are required under the support curbs. Sweep any loose gravel before setting supports, apply slip-sheet or pad if required by roofing manufacturer.
- C. Adjust all frame structures to required height and weight, assemble framing, supports, and hangers to configuration indicated.
- D. Adjust each required hanger or roller to its desired height, check each support for equal weight disbursement.

END OF SECTION 07 72 00

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