

**ROOF REPLACEMENT PROJECT  
CITY OF WORTHINGTON  
FIRE STATION AND MUNICIPAL BUILDING  
WORTHINGTON, OHIO**

**ISSUED FOR:  
BID DOCUMENTS  
06-01-2018**

**PREPARED BY:  
MAYS CONSULTING & EVALUATION SERVICES, INC.  
201 PENNSYLVANIA AVENUE  
P.O. BOX 1020  
DELAWARE, OHIO 43015  
PHONE: (740) 363-9511**

**MAYS PROJECT NO. WOH29-003**

Review  
Not For Bidding

**FIRE STATION AND MUNICIPAL  
BUILDING ROOF REPLACEMENT**

**OWNER:**

**CITY OF WORTHINGTON  
6550 N. HIGH STREET  
WORTHINGTON, OHIO 43085**

**CONTACT:  
ROB CHANDLER  
ASSISTANT TO THE DIRECTOR OF  
SERVICE AND ENGINEERING  
PHONE: 614-431-2425  
EMAIL: RCHANDLER@CI.WORTHINGTON.OH.US**

**PROJECT LOCATION:**

**FIRE STATION  
6500 N. HIGH STREET  
WORTHINGTON, OHIO 43085**

**MUNICIPAL BUILDING  
6550 N. HIGH STREET  
WORTHINGTON, OHIO 43085**

**DESIGN PROFESSIONAL:**

**MAYS CONSULTING & EVALUATION SERVICES, INC.  
201 PENNSYLVANIA AVE., P.O. BOX 1020  
DELAWARE, OHIO 43015**

**CONTACT:  
DAN LAWRENCE, P.E., R.B.E.C.  
PROJECT ADMINISTRATOR  
PHONE: (740) 363-9511  
EMAIL: DLAWRENCE@MCES.COM**

**00 41 13  
BID FORM**

Bidding Contractor: \_\_\_\_\_

TO: CITY OF WORTHINGTON

The undersigned having examined the proposed Contract Documents titled:

FIRE STATION AND MUNICIPAL BUILDING ROOF REPLACEMENT

and having visited the site and examined the conditions affecting the Work, hereby proposes and agrees to furnish all labor, materials, equipment and appliances, to perform operations necessary to complete the Work as required by said proposed Contract Documents. The stipulated sum for the portion of the work identified as:

**1. BASE BID #1 – FIRE STATION AND MUNICIPAL BUILDING**

Removal of the existing shingle roof system and install a new shingle roof system as described in the project specifications and drawings.

Include the following divisions in the base bid amount:

02 41 19	Selective Demolition
06 10 53.01	Rough Carpentry for Roofing
07 31 13	Asphalt Shingles
07 53 23	Ethylene- Propylene-Diene-Monomer (EPDM) Roofing
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting
26 41 13	Lightning Protection for Structures

**BASE BID #1:**

All labor and materials for the sum of \$ \_\_\_\_\_

Sum in words: \_\_\_\_\_

**Note A:** Refer to Section 01 21 00 for allowances that are to be included in Base Bid #1.

**2. UNIT PRICES**

Where Work shall be added or deleted, the Contract Sum will be adjusted in accordance with the rates that follow. Unit prices shall include all labor, materials and services necessary for the timely and proper installation of the item for which the unit prices are requested.

A. Base Bid #1

1. Provide unit price for the installation of new cast iron roof drain bowl, flashing ring, strainer and all related flashing components.

\$ \_\_\_\_\_

2. Provide unit price per square foot for the removal and replacement of 5/8" thick, fire-retardant treated plywood decking.

\$ \_\_\_\_\_ per square foot

3. Provide unit price per square foot for membrane walkway system.

\$ \_\_\_\_\_ /square foot

4. Provide unit price to reflect hourly rate of the following trades to complete additional required work. These rates are to include the base rate, fringes, payroll burden, overhead, and profit.

Roofing Foreman	\$ _____	/hour
Roofing Mechanic	\$ _____	/hour
Sheet Metal Foreman	\$ _____	/hour
Sheet Metal Mechanic	\$ _____	/hour
Laborer	\$ _____	/hour

Note: If labor is required from other trades, labor rates must be approved and documented prior to additional required work.

### 3. CHANGE ORDERS

Change Orders reflecting work not covered by the base bid or unit prices therein shall be reimbursed to the Contractor as follows:

1. Where Change Order Work is accomplished by the Primary Contractor, allowable profit and overhead shall be limited to 15% above the sum of documented material and equipment costs. Labor required to accomplish Change Order work shall be limited to the hourly rate as indicated by Unit Prices.
2. Where Change Order Work is accomplished by the Primary Contractor, in conjunction with Subcontractors, profit and overhead shall be limited to the amounts as indicated in the Article 7 (Changes in the Work) of the General Conditions of the Contract for Construction (AIA Document 201-2007, as modified).

No Change Order work shall be undertaken without the prior written approval of the Owner.

### 4. ALTERNATE PRICES

Alternate prices are intended to explore the different methods of installation for various roof conditions. Alternate prices must be structured to be used as a deduction/increase to the Base Bid Price as supplied for in Item 1 of this Bid Form.

#### A. Base Bid #1

1. Alternate #1 – Municipal Building – Deduct Cupola Low-Slope Roof Replacement

Provide lump sum alternate price for removing the replacement of the low-slope roof

system on Roof Area B1 (cupola) from the scope of Alternate #1.

DEDUCT \$ \_\_\_\_\_

2. Alternate #2A – Fire-Station – Above Roof Wood Siding Replacement

Provide lump sum alternate price for the removal of the existing above roof wood siding and installation of a new wood siding system in accordance with the project specifications and drawing requirements.

ADD \$ \_\_\_\_\_

3. Alternate #2B – Fire-Station – Above Roof Fiber-Cement Siding Replacement

Provide lump sum alternate price for the removal of the existing above roof wood siding and installation of a new fiber-cement siding system in accordance with the project specifications and drawing requirements.

ADD \$ \_\_\_\_\_

4. Alternate #3A – Municipal Building – Above Roof Wood Siding Replacement

Provide lump sum alternate price for the removal of the existing above roof wood siding and installation of a new wood siding system in accordance with the project specifications and drawing requirements.

ADD \$ \_\_\_\_\_

5. Alternate #3B – Municipal Building – Above Roof Fiber-Cement Siding Replacement

Provide lump sum alternate price for the removal of the existing above roof wood siding and installation of a new fiber-cement siding system in accordance with the project specifications and drawing requirements.

ADD \$ \_\_\_\_\_

**5. PRE-BID MEETING MINUTES AND ADDENDUMS**

The undersigned understands and agrees to comply with and be bound by Instructions to Bidders and the other Contract Documents issued for the Project. The undersigned must be an officer of the company authorized to obligate the company in every way.

The undersigned acknowledges receipt of Pre-Bid Meeting Minutes dated \_\_\_\_\_

and Addendums as follows:

Addendum No. \_\_\_\_\_, dated \_\_\_\_\_.

Addendum No. \_\_\_\_\_, dated \_\_\_\_\_.

Addendum No. \_\_\_\_\_, dated \_\_\_\_\_.

## 6. BID GUARANTY

Enclosed with this bid is a Bid Guaranty in the form of (check one or state N/A):

\_\_\_\_\_ Bid Guaranty and Contract Bond, using the form included in the Contract Documents, in the amount of the highest aggregate amount of the base bid (including all add alternates) or left blank, or

\_\_\_\_\_ A Certified / Cashier's Check / Irrevocable Letter of Credit for not less than ten percent (10%) of the highest aggregate amount of the base bid (including all add alternates).

The Bid Guaranty must meet the requirements stated in the Instructions to Bidders. Included in the bid amount are all applicable city, county, state, federal sales taxes and/or applicable taxes.

### Bidder's Certifications

The Bidder hereby acknowledges that the following representations in this Bid are material and not mere recitals:

1. Bidder acknowledges that this is a public project involving public funds and that the Owner expects and requires the successful Bidder to adhere to the highest ethical and performance standards. Bidder by submitting its bid pledges and agrees that (a) it will act at all times with absolute integrity and truthfulness in its dealings with the Owner and the Design Professional, (b) it will use its best efforts to cooperate with the Owner and the Design Professional and all other Contractors on the Project and at all times will act with professionalism and dignity in its dealings with the Owner, Design Professional and other Contractors, (c) it will assign only competent supervisors and workers to the Project, each of whom is fully qualified to perform the tasks that are assigned to him/her, and (d) it has read, understands and will comply with the terms of the Contract Documents.
2. Bidder represents that a competent person has carefully and diligently reviewed each part of the Contract Documents, including the Divisions of the Specifications and parts of the Drawings that are not directly applicable to the Work on which the Bidder is submitting its bid. By submitting its bid, Bidder represents and agrees, based upon its careful and diligent review of the Contract Documents, that it is not aware of any conflicts, inconsistencies, errors or omissions in the Contract Documents for which it has not notified the Design Professional in writing at least 7 days prior to the bid opening. If there are any such conflicts, inconsistencies, errors or omissions in the Contract Documents, Bidder (i) will provide the labor, equipment or materials of the better quality or greater quantity of Work; and/or (ii) will comply with the more stringent requirements. Bidder will not be entitled to any additional compensation for any conflicts, inconsistencies, errors or omissions that would have been discovered by such careful and diligent review, unless it has given such prior written notice to Design Professional.
3. Bidder represents a competent person has carefully and diligently inspected and examined the entire site for the Project and the surrounding area, including all parts of the site applicable to the Work for which it is submitting its bid, including the location, condition and layout of the site and the location of utilities, and carefully correlate the results of the inspection with the requirements of the Contract Documents. Bidder agrees that its bid includes all costs attributable to site and surrounding area conditions that would have been discovered by such careful and diligent inspection and examination of the site and the surrounding area, and Bidder will not be entitled to any Change Order, additional compensation, or additional time on account of conditions that could have been discovered by such an investigation.

4. Bidder represents, understands and agrees that (a) the Claim procedures in the modified General Conditions are material terms of the Contract Documents, (b) if it has a Claim, it will have its personnel provide complete and accurate information to complete and submit the Statement of Claim form on a timely basis, (c) the proper completion and timely submission of a Statement of Claim form is a condition precedent to any change in the Contract Sum or the Contract Time(s), and (d) the proper and timely submission of the Statement of Claim form provides the Owner and the Design Professional with necessary information so that the Owner may investigate the Claim and mitigate its damages.
2. The Bidder represents that the Bid is based upon the materials and labor specified by the Contract Documents.
3. Bidder and each person signing on behalf of Bidder certifies, and in the case of a bid by joint venture, each member thereof certifies as to such member's entity, under penalty of perjury, that to the best of the undersigned's knowledge and belief: (a) the Base Bid, any Unit Prices and any Alternate bid in the bid have been arrived at independently without collusion, consultation, communication or agreement, or for the purpose of restricting competition as to any matter relating to such Base Bid, Unit Prices or Alternate bid with any other Bidder; (b) unless otherwise required by law, the Base Bid, any Unit Prices and any Alternate bid in the bid have not been knowingly disclosed by Bidder and will not knowingly be disclosed by Bidder prior to the bid opening, directly or indirectly, to any other Bidder who would have any interest in the Base Bid, Unit Prices or Alternate bid; (c) no attempt has been made or will be made by Bidder to induce any other Person to submit or not to submit a bid for the purpose of restricting competition; and (d) the statements made in this Bid Form are true and correct.
4. Bidder will execute the form of Owner-Contractor Agreement in the form included with the Contract Documents, if a Contract is awarded on the basis of this bid, and if Bidder does not execute the Owner-Contractor Agreement for any reason, other than as authorized by law, Bidder and Bidder's Surety are liable to the Owner.
5. Bidder certifies that upon the award of a Contract, it will ensure that all of its employees, while working on the Project site, will not purchase, transfer, use or possess illegal drugs or alcohol or abuse prescription drugs in any way.
6. Bidder agrees to furnish any information requested by the Design Professional or the Owner's authorized representative to evaluate that the Bidder is the lowest responsible bidder and that the bid is responsive to the specifications.
7. Bidder certifies that it has no unresolved findings for recovery issued by the Auditor of State.
8. Bidder certifies that it is aware of and in compliance with the applicable requirements of ORC Section 3517.13 regarding campaign contributions.
9. Bidder acknowledges that all Work shall be completed in the Contract Time, and that each applicable portion of the Work shall be completed upon the respective Milestones, unless an extension of time is granted in accordance with the Contract Documents.
10. Bidder acknowledges that, by signing the Bid Form, it is signing the actual Bid and when submitted as a part of its bid packages, shall serve as the Bidder's authorization for the further consideration and activity in the bidding and contract process.

Each Bid shall contain the name of every individual interested therein. If the Bidder is a corporation, partnership, sole proprietorship, or limited liability corporation, an officer, partner or principal of the Bidder, as applicable, shall print or type the legal name of the Bidder on the line provided and sign the Bid Form. If the Bidder is a joint venture, an officer, partner or principal, as applicable, of each member of the joint venture shall print or type the legal name of the applicable member on the line provided and sign the Bid Form. All signatures must be original.

BIDDER: \_\_\_\_\_  
(Company Name)

by: \_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Signature)

Address \_\_\_\_\_  
\_\_\_\_\_

CORPORATE SEAL \_\_\_\_\_  
\_\_\_\_\_

License number \_\_\_\_\_

License type \_\_\_\_\_

Type of business entity:  
\_\_\_\_\_  
(Corporation, Co-partnership, Individual, etc.)

Individual members of the firm:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

President of Corporation \_\_\_\_\_

Secretary of Corporation \_\_\_\_\_

Corporation is organized under laws of the State of \_\_\_\_\_

Bid dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

END OF SECTION 01 41 13 - BID FORM

**01 11 00  
SUMMARY OF WORK**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY OF WORK**

- A. The following is only a summary of the work that is to be completed and is not all-inclusive. The Contract Documents shall be reviewed as they specify the all of the requirements for the project.
- B. Base Bid #1 – Fire Station Roof Replacement

**Related Specifications**

Division 1	General Requirements
02 41 19	Selective Structure Demolition
06 10 53.01	Rough Carpentry for Roofing
07 31 13	Asphalt Shingles
07 53 23	Ethylene-Propylene-Diene- Monomer (EPDM) Roofing
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting
22 14 26.13	Roof Drains
26 41 13	Lightning Protection for Structures

**Shingle Roof System Replacement**

1. Remove existing shingle roof system down to the structural deck.
2. Inspection the structural fire-rated plywood deck for areas of deterioration.  
  
The base bid shall include an allowance for the replacement deteriorated 5/8" thick, fire-retardant treated plywood decking. See Section 01 21 00 Allowances.
3. Install new shingle roof system in accordance with the Contract Documents. The following is a summary of the new roof system composition:
  - Asphalt Shingles
  - Underlayment
  - Existing fire-retardant treated Plywood Deck
4. Install new metal flashings and accessories.

### **Low-Slope Roof System Replacement**

1. Remove existing EPDM roof system down to the structural deck.
2. Inspection the structural concrete deck for areas of deterioration. Any deck repairs will be completed on a change order basis.
3. Install new EPDM Roof System in accordance with the Contract Documents. The following is a summary of the new roof system composition:
  - 0.060" Unreinforced EPDM Roof Membrane – Adhered
  - Tapered Roof Insulation - Adhered
  - Existing Pre-Cast Concrete Roof Deck
4. Install new flashings and accessories.

### **Exterior Trim and Siding**

1. Remove wood trim as required to install the new roof system.
2. Inspect the existing wood siding and trim for damaged or deteriorated wood. Any damaged or deteriorated wood will be replaced on a time and material basis. There is an allowance for this work, see Section 01 21 00 Allowances.
3. Install new wood trim where the existing trim was required to be removed to install the new roof system. All new wood to be primed on both sides prior to installation.
4. Prepare the existing wood trim by scraping and or sanding areas of peeling paint down to bare wood or tightly bonded primer coat.
5. Patch holes and imperfections wood filler and/or sealant.
6. Spot prime areas of bare wood and new wood components.
7. Apply a minimum of two (2) coats of exterior paint to the existing trim.

### **1.03 CONSTRUCTION TIME**

- A. Base Bid Work: Time is of the essence in the performance of the Contract for the Project. The Agreement will include a stipulation that the Base Bid Work be substantially completed no later than 84 consecutive calendar days for Base Bid #1 after the execution of the Notice to Proceed.
- B. Alternate Work: The Alternate work shall be completed concurrently with the Base Bid work.
- C. Liquidated Damages: If the successful Bidder does not have its Work on the Project Substantially Complete by its Date for Substantial Completion, the successful Bidder shall pay the Owner (and the Owner may set off from sums coming due the successful Bidder) Liquidated Damages in accordance with the Contract Documents.

#### 1.04 PROJECT CONDITIONS AND WARNINGS

- A. The facility is an operational Fire Station and City Municipal facilities. The Contractor must coordinate the work areas closely with the building personnel in order to not interfere with the operations of the building. The Fire Station personnel will relocate equipment outside the work area as required.
- B. All activities shall be performed in a way to provide Owner with an immediate watertight roof system at all times during construction. It is the Contractor's responsibility to prevent construction-related leaks.
- C. The majority of the work is over occupied space. Every precaution must be taken to protect the building occupants, the general public, and the contents/products stored in the building.
- D. It is the Contractor's responsibility to prevent odors, dust, and hazardous materials from entering into the building. See Section 01 50 00 Temporary Facilities and Controls. If odors are detected, it is the Contractor's responsibility to provide exhaust equipment and remove the odors from the building immediately.
- E. All activities shall be so staged to prevent interference with the building occupant operations to the greatest extent possible. Safety of building occupants shall be of utmost priority in all stages of the project.
- F. In general, because of the nature of the project (high visibility and high profile), it is recommended that the Contractor instruct project-related personnel to not unduly alarm the general public and occupants. All issues regarding safety and security shall be communicated to all responsible parties, including occupants and the general public in the immediate vicinity of the work in progress - ALL SAFETY REGULATIONS SHALL APPLY. Communications shall be made through appropriate channels as approved through Owner's Design Professional.

#### 1.05 USE OF SITE

- A. Use of Site: Limit use of premises to areas within the limits indicated. Do not disturb portions of the site beyond areas in which the Work is indicated.
  - 1. Limits: Limit size of disturbance to 30 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, that require additional staging areas in order to limit compaction in the constructed area. See the project drawings for any areas where site access is limited.
  - 2. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
  - 3. Driveways and Entrances: Keep undesignated driveways, parking areas, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use undesignated areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

- B. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

#### **1.06 OWNER'S RIGHT TO MAINTAIN OPERATIONS**

- A. During the course of this Project, normal and customary facility functions and operations must be maintained. The Contract Documents are intended to define a strict separation between the facility activities and the construction project.
- B. The Owner will not tolerate any visible or audible actions initiated or responded to by employees of Contractors on this Project toward the building occupants or public at the facility. Violators shall be promptly removed from the Project site.
- C. Contractors shall expend their best effort toward protection of the health, safety, and welfare of occupants on the Owner's property during the course of Work on this Project.
- D. Contractors and subcontractors shall be subject to such rules and regulations for the conduct of the Work as the Owner may establish. Employees shall be properly and completely clothed while working. Bare torsos, legs, and feet will not be allowed. Possession or consumption of alcoholic beverages or drugs, tobacco, or other noxious behavior on the Project site is strictly prohibited. Violators shall be promptly removed from the Project site.
- E. No interruption to the Owner's operations will be permitted and Contractor shall schedule and perform his work accordingly.

#### **1.07 OWNER'S OCCUPANCY REQUIREMENTS**

- A. Full Owner Occupancy: Owner will occupy Project site and building during the construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide not less than 48 hours' notice to Owner of activities that will affect Owner's operations.

#### **1.08 CODES AND REGULATIONS**

- A. It is the intent of the Design Professional that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. Contractor shall notify Design Professional and Owner immediately if Contractor observes that the Contract Documents are at variance with this intent in any respect. Design Professional shall make any necessary changes.
- B. If the Contractor performs Work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the Design Professional and Owner, the Contractor shall assume full responsibility therefore and shall bear attributable costs.

### 1.09 PERMITS, FEES, AND NOTICES

- A. Plan review fees will be paid by the Owner.
- B. The Contractor shall secure and pay for all building permits, trade permits, bonds, and other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract.
- C. Shutdowns of existing systems shall be limited to minimum time required and scheduled with other involved parties. Provide 72 hours written notice of shutdown to Design Professional and Owner.
- D. Inspections of installed work shall be performed by governing authority (when required by governing authority) as arranged for by the Contractor. Work shall not be covered until approved.
- E. Contractor shall give notices and comply with laws, ordinances, rules, regulations, and orders of public authorities bearing on the performance of his Work.

### 1.10 WORK RESTRICTIONS

- A. General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Definitions:
  - 1. Ambient Noise Level: The total noise associated with a given environment, being usually a composite of normal or existing sounds from all sources near and far, excluding the noise source at issue.
  - 2. Daytime: The hours from 7:00 a.m. to 9:00 p.m. on weekdays and 9:00 a.m. to 9:00 p.m. on weekends and holidays.
  - 3. Nighttime: All non-daytime hours.
  - 4. Property Line: The real or imaginary line along the ground surface and its vertical extension, which separates real property owned or controlled by one person from contiguous real property owned or controlled by another person or from any public right-of-way or from any public space.
  - 5. Receiving Noise Area: Any real property where people live or work and where noise is heard, excluding the project or source area.
- C. Work Hours:
  - 1. The contractor will be permitted to work at the Project Site at the following times without prior written permission of the Owner or Design Professional:

Monday through Friday	8:00 a.m.	to	8:00 p.m.
Saturday	8:00 a.m.	to	8:00 p.m.
Sunday	No Work Permitted.		
Holidays	No Work Permitted.		

The Owner or Design Professional, at their sole discretion, may restrict working time or grant permission for additional working time.

Some municipalities and/or local authorities restrict work hours. The Contractor shall abide by all legal requirements regarding project work hours.

2. The following operations must also be completed during non-operating hours or completed in a manner that does not affect the operations of the building:
  - a. All operations which produce loud noises, and/or have the potential for injury related incidents from falling objects (i.e. tear off, decking replacement, curb removal, etc.), shall also be confined to non-operating hours. All project related interior debris, interior covering, equipment, etc. shall be removed and the interior shall be brought to like cleanliness condition prior to operating hours.
  - b. All operations (i.e. steel deck painting, adhesive application, etc.) which require HVAC equipment, ventilators, and air handling equipment to be shut off and/or sealed shall be completed in a time frame necessary to put such equipment back in service to achieve the desired interior operating temperature, and be odor free, at the time operations resume. It is the Contractor's responsibility to monitor and protect the interior and occupants of the building at all times during construction.
  - c. Any other special operations that interfere with the Owner/tenant daily operations.
- D. Noise Control: Perform construction operations to minimize noise. Coordinate operations that may result in high levels of noise or other disruption to Owner occupancy with Owner.
  1. Notify Owner not less than two (2) days in advance of proposed disruptive operations.

E. Repetitive and/or Intermittent, high-level noise:

1. Do not exceed the following dB limitations:

<u>Sound Level dB</u>	<u>Time Duration of Impact Noise</u>
70	More than 12 minutes in any hour
80	More than 3 minutes in any hour

2. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary for compliance.
3. Maximum permissible construction equipment noise levels at 50 feet (dB):

<u>Equipment</u>	<u>dB</u>
Trucks	75
Generators	75
Compressors	75
Cranes	75

Saws 75

- F. Ambient Noise:
1. Maximum noise levels (dB) for receiving noise area at property line shall be as follows:
    - a. Residential receiving area  
Daytime: 65 dB  
Nighttime: 60 dB
    - b. Commercial/Industrial receiving area  
Daytime: 67 dB  
Nighttime: 65 dB
- G. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Design Professional and Owner not less than 48 hours in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without written permission.
- H. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

#### 1.11 DRAWINGS AND SPECIFICATIONS

- A. The Owner shall furnish the Contractor an electronic copy of the plans and specifications for use during the project. The Contractor shall provide a minimum of one (1) hard copy for use on-site, in addition to the Record and Permit Drawings.

#### 1.12 MISCELLANEOUS PROVISIONS

- A. Contractor shall enforce strict discipline and good order among his employees or other persons carrying out Work of his Contract and shall not permit employment of unfit person or persons or anyone not skilled in the task assigned to them.
- B. The Contractor's employees shall be instructed to refrain from fraternization with the building occupants.
- C. When requested, the Contractor shall furnish Design Professional a list of personnel to be working at the site.
- D. When verification of existing dimensions is required, the Contractor requiring said verification for the construction or fabrication of his material shall be the Contractor responsible for the procurement of the field information.
- E. Do not scale documents. Obtain or verify all dimensions for the accommodation of equipment and/or materials to be installed by the Contractor. Dimensions on the drawings indicate nominal sizes under ideal conditions and shall not be construed to relieve the Contractor of the responsibility of taking measurements in the field and furnishing material of the correct dimensions.

- F. Advertising, References, and Pictures: Do not make reference to the project or use photographs of the work in any advertising without written permission of the Owner. These limitations also apply to subcontractors and vendors.
- G. Building Access: The Contractor's employees will not be allowed within the building without permission of the Owner and must follow directions of the Owner when in the building. The Owner shall retain the right to inspect all packages, material, equipment, and property of any nature, entering and/or leaving the facility, as circumstances warrant. The Owner shall hold any material which he deems irregular or about which he has any doubt until it is inspected.
- H. No gambling, drugs or alcoholic beverages will be permitted on the site at any time.
- I. Hazardous Materials: The Contractor in addition to products banned as part of the Clean Air Act (NESHAP Rule, Nov. 1990 Revision; 40 CFR 60, Subpart M) shall not use or bring on-site materials containing more than 1 percent asbestos by polarized-light microscopy (PLM) analysis. No materials marked as "MAY CONTAIN MINERAL FIBERS" shall be used in construction unless written results of microscopic examination by an AIHA or NVLAP-certified laboratory documenting the asbestos content at less than 1 percent are provided and approved before installation.
  - 1. If materials containing more than 1 percent asbestos are brought onto Project site by Contractor, materials shall be removed in accordance with all applicable laws and precautions so as not to make fibers friable. Removal of materials containing more than 1 percent asbestos and replacement of such materials shall be at contractor's expense.
  - 2. Before final payment, the contractor shall submit to the Owner, on contracting firm's letterhead, a signed, dated copy of the following statement: "I hereby certify to the best of my knowledge that no asbestos containing material (ACM) above 1 percent content was used as a building material for this Project."

### 1.13 TOBACCO POLICY

- A. Smoking Ban:
  - 1. Smoking (including E-cigarettes) is prohibited in any "public place" or "place of employment" as of December 7, 2006. For definitions of a "public place" and "place of employment", refer to ORC 3794.01 Definitions.
  - 2. All "public places" and "places of employment" must, by December 7, 2006, post conspicuous signs at each entrance. The signs must be clearly legible and shall contain a toll-free number for reporting violations. Refer to ORC 3794.06 (A) Posting of Signs.
- B. Tobacco Use:
  - 1. Smoking, E-cigarettes, and tobacco use is not permitted on the site, including vehicles.

## PART 2 – PRODUCTS – NOT USED

**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 11 00 - SUMMARY OF WORK

Review Set  
Not For Bidding

**01 21 00  
ALLOWANCES**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in order to address common work items that are required for this type of project, but the exact quantities are unknown until the existing components are removed.
- B. Types of allowances include the following:
  - 1. Lump-sum Allowances.
  - 2. Unit Price Allowances.

**1.03 LUMP SUM ALLOWANCES**

- A. Allowance shall include cost to Contractor of specific products and materials required to complete the scope of work required for the allowance and shall include taxes (if applicable), freight, and delivery to Project site.
- B. Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to the scope of work required for the allowance.
- C. Unused Materials: Return unused materials purchased under a Lump Sum Allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

**1.04 ADJUSTMENT OF ALLOWANCES**

- A. Lump Sum Allowance Adjustment: To adjust allowance amounts, prepare a Change Order based on the difference between the actual cost of the allowance scope of work and the Allowance amount.
  - 1. The Contractor shall substantiate all costs for a Lump Sum Allowance. This shall include daily reports indicating labor hours utilized to complete the allowance scope of work, invoices for rented equipment, and material invoices for materials.
- B. Unit Price Allowance Adjustment: To adjust allowance amounts, prepare a Change Order based on the additional unit price work that is anticipated and agreed on by all parties for each unit price.

1. The contractor shall not proceed with unit price work if the Unit Price Allowance has been completely utilized. The Contractor is responsible to monitor how much of the Unit Price Allowance has been utilized and notify the Design Professional and Owner prior to the Unit Price Allowance being fully utilized.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – SCHEDULE OF ALLOWANCES**

A. Base Bid #1

1. Lump Sum Allowances: Include the following lump sum allowance amounts in Base Bid #1 for inclusion in the Contract Sum:
  - a. Allowance #1: Include \$2,500 lump sum allowance for the remove and replacement of deteriorated wood siding and trim.
2. Unit Price Allowances: Include the following unit price allowances amounts in Base Bid #1 for inclusion in the Contract Sum:
  - a. Allowance #2: Include 1,280 square feet of the removal and replacement of deteriorated 5/8" thick, fire-retardant treated plywood decking.

END OF SECTION 01 21 00 – ALLOWANCES

**01 22 00  
UNIT PRICES**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY OF WORK**

- A. This Section includes administrative and procedural requirements for unit prices.

**1.03 DEFINITIONS**

- A. Unit price: A price per unit of measurement for materials and/or services that could be added or deducted from the Contract Sum.

**1.04 PROCEDURES**

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment:
  - 1. The Contractor must measure and document the amount of unit price work that is required to be completed on a daily basis. A daily written report, along with plan view or elevation drawings showing the approximate location of the work, must be completed.
  - 2. The documentation of the unit price work must include photographs prior to the work being completed to demonstrate that the work is required. In addition, photographs shall also be provided showing that the unit price work was completed. Unit price work will not be approved for payment unless the Contractor provides the specified documentation.
  - 3. The Contractor shall provide an update at every progress meeting outlining how much unit price work was completed and how much unit price work is remaining to be completed. The amount of remaining unit price work shall be evaluated at every progress meeting to determine if the remaining allowance for unit price work included in the contract is sufficient. If the amount of unit price work is determined to be insufficient, the parties shall agree on an allowance for future unit price work that may be needed and the Contract Sum increased by this amount.
  - 4. At the completion of the Work, any remaining allowance for unit price work shall be deducted from the Contract Sum.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and have this work measured, at Owner's expense, by the Design Professional.
- D. List of Unit Prices: A list of unit prices is included on the Bid Form. Specification Sections referenced in the schedule contain requirements for materials described under each unit

price.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION**

**3.01 UNIT PRICE SCHEDULE**

<b>Item No.</b>	<b>Section</b>	<b>Item or Material</b>	<b>Unit of Measure</b>
1	22 14 26.13	Removal and replacement of the existing cast-iron roof drain bowl, flashing ring, strainer, and all related flashing components.	Each
2	06 10 53.01	Removal and replacement of 5/8" thick, fire-retardant treated plywood decking.	Sq. Ft.
3	07 53 23	Installation of roof membrane walkway system.	Sq. Ft.

END OF SECTION 01 22 00 – UNIT PRICES

Review Set  
Not For Bidding

**01 23 00  
ALTERNATES**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. This Section includes administrative and procedural requirements for alternates.

**1.02 DEFINITION**

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept the corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. The cost or credit for each Alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

**1.03 SUMMARY OF WORK**

**A. Alternate #1 – Municipal Building – Deduct Cupola Low-Slope Roof Replacement**

**Related Specifications**

07 53 23 Ethylene-Propylene-Diene- Monomer (EPDM) Roofing

**Summary of Work**

- 1. Remove the replacement of Roof Area B1 (cupola) from the scope of work for Alternate #1.

**B. Alternate #2A – Fire Station – Above Roof Wood Siding Replacement**

**Related Specifications**

Division 1	General Requirements
02 41 19	Selective Structure Demolition
06 10 53.01	Rough Carpentry for Roofing
07 27 00	Air Barriers
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting

**Summary of Work**

### Exterior Trim and Siding

1. Remove wood siding, trim, and weather barrier from all above roof structures (i.e. dormers and cupola). This shall not include the fascia or soffit.
2. Inspect the existing exterior sheathing for damaged or deteriorated wood. Any damaged or deteriorated wood will be replaced on a time and material basis.
3. Install new mechanically-fastened sheet weather barrier and related flashings.
4. Install new wood siding and trim to match existing, inclusive of sheet metal flashings. All new siding and trim is to be prime-painted on all surfaces prior to installation.
5. Seal all butt joints between siding and trim.
6. Apply a minimum of one (1) primer coat and two (2) finish coats of exterior paint to the new trim and siding.

### C. Alternate #2B – Fire Station – Above Roof Fiber-Cement Siding Replacement

#### Related Specifications

Division 1	General Requirements
02 41 19	Selective Structure Demolition
06 10 53.01	Rough Carpentry for Roofing
07 27 00	Air Barriers
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting

#### Summary of Work

##### Exterior Trim and Siding

7. Remove wood siding, trim, and weather barrier from all above roof structures (i.e. dormers and cupola). This shall not include the fascia or soffit.
8. Inspect the existing exterior sheathing for damaged or deteriorated wood. Any damaged or deteriorated wood will be replaced on a time and material basis.
9. Install new mechanically-fastened sheet weather barrier and related flashings.
10. Install new fiber-cement siding and trim to match existing, inclusive of sheet metal flashings. All new siding and trim is to be prime-painted on all surfaces prior to installation.
11. Seal all butt joints between siding and trim.
12. Apply a minimum of one (1) primer coat and two (2) finish coats of exterior paint to the new trim and siding.

**D. Alternate #3A – Municipal Building – Above Roof Wood Siding Replacement**

**Related Specifications**

Division 1	General Requirements
02 41 19	Selective Structure Demolition
06 10 53.01	Rough Carpentry for Roofing
07 27 00	Air Barriers
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting

**Summary of Work**

**Exterior Trim and Siding**

1. Remove wood siding, trim, and weather barrier from all above roof structures (i.e. dormers and cupola). This shall not include the fascia or soffit.
2. Inspect the existing exterior sheathing for damaged or deteriorated wood. Any damaged or deteriorated wood will be replaced on a time and material basis.
3. Install new mechanically-fastened sheet weather barrier and related flashings.
4. Install new wood siding and trim to match existing, inclusive of sheet metal flashings. All new siding and trim is to be prime-painted on all surfaces prior to installation.
5. Seal all butt joints between siding and trim.
13. Apply a minimum of one (1) primer coat and two (2) finish coats of exterior paint to the new trim and siding.

**E. Alternate #3B – Municipal Building – Above Roof Fiber-Cement Siding Replacement**

**Related Specifications**

Division 1	General Requirements
02 41 19	Selective Structure Demolition
06 10 53.01	Rough Carpentry for Roofing
07 27 00	Air Barriers
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting

**Summary of Work**

**Exterior Trim and Siding**

6. Remove wood siding, trim, and weather barrier from all above roof structures (i.e. dormers and cupola). This shall not include the fascia or soffit.
7. Inspect the existing exterior sheathing for damaged or deteriorated wood. Any damaged or deteriorated wood will be replaced on a time and material basis.
8. Install new mechanically-fastened sheet weather barrier and related flashings.
9. Install new fiber-cement siding and trim to match existing, inclusive of sheet metal flashings. All new siding and trim is to be prime-painted on all surfaces prior to installation.
10. Seal all butt joints between siding and trim.
14. Apply a minimum of one (1) primer coat and two (2) finish coats of exterior paint to the new trim and siding.

#### **1.04 PROCEDURES**

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the Alternate into the Project.
  1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
  2. Contractor shall be responsible for any changes in the Work affected by the acceptance of Alternates. Claims for extras resulting from changes caused by the Alternates will not be allowed.
  3. Alternates will be exercised at the option of the Owner.
  4. Contractor shall coordinate related work and modify surrounding work as required to complete the Work, including changes under each Alternate, when acceptance is designated by the Owner.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.

#### **PART 2 – PRODUCTS – NOT USED**

#### **PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 23 00 - ALTERNATES

**01 29 00**  
**PAYMENT PROCEDURES**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
1. Coordinate the Schedule of Values with Applications for Payment, Project Schedule, Submittal Schedule, and List of Subcontracts.
  2. Progress payments will not be processed without an approved Schedule of Values.

**1.03 SCHEDULE OF VALUES**

- A. Coordination: Contractor shall coordinate preparation of their own Schedule of Values with the Construction Progress Schedule.
- B. Format and Content: The Schedule of Values shall include a thorough breakdown of the following work items as a minimum with the limitations indicated:
1. Mobilization
  2. Bonds, Insurance, and Permits
  3. Submittals: In the amount of 2 percent of the Contract; however, not less than \$1,000 or more than \$10,000.
  4. General Conditions (Lifts, dumpsters, safety, etc.)
  5. Project Supervision
  6. Sub-Contract A
    - Material
    - Labor
  7. Roof/Wall Area A
    - Demolition
    - Carpentry Material
    - Carpentry Labor
    - Insulation Material
    - Insulation Labor
    - Roofing Material
    - Roofing Labor
    - Sheet Metal Material
    - Sheet Metal Labor
  8. Allowances
    - Deck Replacement
    - Deck Painting
  9. Change Orders

10. Punch List: In an amount of 2 percent of the Contract; however, not less than \$1,000 minimum and \$50,000 maximum.
  11. Warranty: Actual warranty cost.
  12. Site Remediation
  13. Lawn Maintenance
  14. Close-Out Requirements: In an amount equal to 3 percent of the Contract amount; however, not less than \$500 or more than \$10,000.
  15. Demobilization
- C. Materials costs indicated in the Schedule of Values shall not exceed the actual material cost.

#### 1.04 APPLICATIONS FOR PAYMENT

- A. The Application and Certification for Payment, including progress payments shall be as indicated in the Contract. Payments will not be made until final approval by the Owner and Submittals that precede application have been received and accepted.
1. Refer to General Conditions.
  2. Each Application and Certification for Payment shall be submitted with one (1) original.
  3. Each Application for Payment to be accompanied by affidavits from principal subcontractors and suppliers to demonstrate that funds from the previous Application for Payment have been properly disbursed. Failure by the Contractor to submit affidavits will be considered cause for the Design Professional to decline to certify payment. In such event, payment will not be reconsidered until the following month.
- B. Payment Request shall be consistent with previous applications and payments as observed by Design Professional and paid for by the Owner. Payment Request shall include the following information and documentation:
1. Contractor's Payment Application Checklist.
  2. Application and Certificate for Payment (AIA Documents G702 and G703).
  3. Change Order (AIA Document G701)
  4. Owner required lien waivers as outlined in the General Conditions
  5. Original invoices for materials and equipment to verify the amount due the Contractor.
  6. Certified payroll on Prevailing Wage Projects.
  7. Back-up - Time Sheet for project labor.
  8. Current list of the Contractor's Subcontractors and material suppliers showing their respective contract sums, amount paid, and amount due.
  9. Subcontractor Affidavit and Waiver of Liens - Acknowledgment of Payment. (beginning with the second Application for Payment).
  10. Schedule of all materials stored on site.
  11. Schedule of all materials stored off site.
  12. Material Supplier Certificate and Waiver of Lien - Acknowledgment of Payment (beginning with the second Application for Payment).
  13. Copies of daily Construction Reports for the time period of the payment request, inclusive of documentation of work completed on Allowance work items.
  14. Copies of weekly toolbox safety meeting minutes for the time period of payment

request.

- C. Application Preparation: Complete every entry on the form. Include execution by a person authorized to sign legal documents. The Design Professional will return incomplete applications without action.
- D. Initial Payment Request: Administrative actions and submittals that must precede or coincide with submittal of the first Payment Request, in addition to the previously outlined items, include the following:
  - 1. Approved Schedule of Values.
  - 2. Approved Construction Progress Schedule.
  - 3. Permits.
  - 4. Certificates of Insurance and insurance policies.
- E. Progress Payment Requests: Administrative actions and submittals that must precede or coincide with submittal of the Progress Payment Request include the following:
  - 1. Updated and approved Construction Progress Schedule.
  - 2. Review of Project Record Documents to confirm they are being properly updated.
- F. Final Payment Request: Administrative actions and submittals that must precede or coincide with submittal of the final Contractor Payment Request include the following:
  - 1. Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706)
  - 2. Consent of Surety to Final Payment (AIA Document G707).
  - 3. Certificate of Substantial Completion (AIA Document G704).
  - 4. Manufacturer's Inspection Report(s).
  - 5. Specified Warranty(ies).
  - 6. Operating and Service Instructions.
  - 7. As-Built Drawings.
  - 8. Contractor's Certificate of Insurance - To be effective for a minimum of 1 year after substantial completion.
  - 9. Contractor's Worker's Compensation Certificate.
  - 10. Asbestos Free Certificate in the form contained in the Contract Documents
  - 11. Project Close-Out Submittals.

#### **1.05 RETAINAGE**

- A. Retainage. Retainage shall be withheld, as required by the Ohio Revised Code, at the percentages listed below for labor and materials and equipment (including stored materials if certified by the Contractor using AIA Document G702 and G703) until project completion.
  - 1. Payments for Labor: Payments for labor incorporated into the Work will be at the rate of 92% of the amount set forth in the Contractor's payment application and approved by the Design Professional until the Work is 50% complete. When the Work is 50% complete, the payment for labor incorporated into the Work will be at the rate of 100% of the amount set forth in the Contractor's payment application and approved by the Design Professional.
  - 2. Payments for Materials and Equipment: Payments for materials and equipment will be at the rate of 92% of the invoice cost (not to exceed the bid price of any unit

prices) of materials and equipment delivered to the Project Site or other storage site approved by the Design Professional. The balance of the invoice cost will be payable when the materials or equipment are incorporated into the Work.

- a. When the payment is made on account of materials or equipment not yet incorporated into the Project, such materials and equipment will become the property of the Owner; provided that if such materials or equipment are stolen, destroyed or damaged before being fully incorporated into the Project, the Contractor will be required to replace them at its own expense.
3. When the Work is 50% complete, the Owner will deposit the retained funds into an interest-bearing savings account or other fund regularly used by the Owner for its funds. The Contractor agrees that the Owner may select the bank or fund for deposit of the retained funds.
4. Upon Substantial Completion, retainage will be released and paid to the Contractor as provided in Article 9 of the General Conditions document.
5. The full retainage may be reinstated at any time after the Work is 50% complete if the progress and quality of the Work are not satisfactory to the Design Professional and the Design Professional determines that retaining additional funds is needed to protect the Owner's interests.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 29 00 – PROGRESS PAYMENTS

**01 31 00**  
**PROJECT MANAGEMENT AND COORDINATION**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative provisions for coordinating operations on Project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Subcontract list.
  - 3. Administrative and supervisory personnel.
  - 4. Requests for Information (RFI's).

**1.03 DEFINITIONS**

- A. Request for Information (RFI): A request from the Contractor seeking information or a clarification of some requirement of the Contract Documents. The Contractor shall clearly and concisely set forth the issue for which it seeks clarification or information and why a response is needed. The Contractor shall, in the written request, set forth its interpretation or understanding of the Contract's requirements along with reasons why it has reached such an understanding. Responses will not change any requirements of the Contract Documents.
- B. Superintendent: Contractor's personnel in charge of day-to-day operations on the project, perform quality control, coordinate subcontractors, update the construction schedule, and maintain Record Documents.
- C. Foreman: Contractor's personnel in charge of a group of workers under the direction of a Superintendent. Provides leadership and is responsible for the work being performed.

**1.04 COORDINATION**

- A. Coordination: Coordinate construction operations with those of subcontractors and entities to ensure efficient and orderly installation of each part of the Work. Coordinate its operations, with work included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components

to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of subcontractors to avoid conflicts and to ensure orderly progress of the Work.

#### **1.05 PROJECT SUPERVISION**

- A. The Contractor shall assign a Superintendent and necessary assistants, all satisfactory to the Design Professional. Superintendent shall represent Contractor and all instructions given to him shall be as binding as if given to Contractor. Contractor's Superintendent is not to be replaced during progress of work without consent of Design Professional.
- B. A superintendent shall visit the project site daily when work is being performed by the Contractor or any subcontractors, unless approved otherwise by the Design Professional. The superintendent shall not be continuously involved in the on-going work where it prevents him from performing the required responsibilities of the superintendent.
- C. A foreman shall be on-site at all times when work is being performed by the Contractor or any subcontractors, unless approved otherwise by the Design Professional. The foreman shall not be continuously involved in the on-going work where it prevents him from performing the required responsibilities of the foreman.
- D. Contractor shall be responsible for all personnel employed in work and shall have power to employ and discharge such personnel, or remove from project site, personnel who, in the judgement of the Design Professional, are detrimental to the best interest of Owner and the project.

#### **1.06 REQUESTS FOR INFORMATION (RFI)**

- A. Procedure: Immediately on discovery of the need for information regarding the Contract Documents, and if not possible to request information at Project meeting, prepare and submit an RFI in the form specified.
  - 1. RFI's shall originate with the Contractor. RFI's submitted by entities other than Contractor will be returned with no response.
  - 2. Coordinate and submit RFI's in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of RFI: Include a detailed, legible description of item needing information and why a response is needed along with the following:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Contractor.
  - 4. Name of Design Professional.

5. RFI number, numbered sequentially.
  6. Specification Section number and title and related paragraphs, as appropriate.
  7. Drawing number and detail references, as appropriate.
  8. Field dimensions and conditions, as appropriate.
  9. Contractor's suggested solution(s). Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached. If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  10. Contractor's signature.
  11. Attachments: Include drawings, descriptions, measurements, photos, product data, shop drawings, and other information necessary to fully describe items needing interpretation.
- C. Design Professional Action: Design Professional will review each RFI and determine action required. If it is determined that the document is not RFI, it will be returned to the Contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner. If the RFI is determined unnecessary or frivolous, by nature of the information clearly indicated in documents, the RFI will also be returned with no response. Allow three (3) working days for Design Professional's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day. If a longer time is determined necessary, the Design Professional will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time.
1. The following RFI's will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Request for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Design Professional's actions on submittals.
    - g. Incomplete RFI's or RFI's with numerous errors.
  2. Design Professional action may include a request for additional information, in which case Design Professional's time for response will start when Design Professional receives the requested additional information.
  3. Design Professional action on RFI's that might result in a change to the Contract Time or the Contract Sum may entitle Contractor to submit Change Proposal in accordance with the General Conditions.
  4. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Design Professional in writing within 10 days of receipt of the RFI response. Failure to give such written notice within 10 days shall waive the contractor's right to seek additional time or cost in accordance with the General Conditions.

## 1.07 DAILY CONSTRUCTION REPORTS

- A. Contractor shall keep a daily Construction Report. Daily Construction Report shall document weather conditions, number of personnel on site, hours worked, work accomplished, and conditions encountered. The Daily Construction Report shall be dated

- and signed by the Superintendent.
- B. The Contractor shall maintain a copy of all Daily Construction Reports at the project site and shall be available for review by the Owner or Design Professional, when on-site.
  - C. The Contractor shall submit to the Design Professional a copy of the daily Construction Reports with each Application for Payment and when requested by the Owner or Design Professional.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION

Review Set  
Not For Bidding

**01 31 19**  
**PROJECT MEETINGS**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the Contract, including General and Supplementary Conditions and the other Division 1 Specification Sections, apply to this Section.
- B. Attendance of all meetings by an Authorized Representative of the Contractor is mandatory.

**1.02 SUMMARY**

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
  - 1. Post Award Meeting.
  - 2. Pre-Construction Meeting.
  - 3. In-Progress Meetings.
  - 4. Safety.
  - 5. Coordination.

**1.03 DEFINITIONS**

- A. Authorized Representative: A person authorized by the contractor to make decisions for the Contractor regarding project staffing, schedule, and change order items.

**1.04 POST AWARD MEETING**

- A. The Design Professional will schedule a Post Award Meeting prior to the submittal process, within ten (10) business days of the contract award letter.
- B. Attendees: Authorized representatives of the Contractor, Owner, and Design Professional; the Contractor and the submittal coordinator; major subcontractors; primary material manufacturer, as requested by the Design Professional; and other concerned parties shall attend the conference.
- C. Agenda:
  - 1. Tentative submittal and construction schedule.
  - 2. Submittal requirements.
  - 3. Submittal submission requirements.

**1.05 PRE-CONSTRUCTION MEETING**

- A. The Design Professional will schedule a Pre-Construction Meeting at the project site prior to the start of on-site construction. The Contractor shall be responsible to notify the appropriate Contractor personnel, subcontractors, material manufacturers, etc. involved or affected by the Work of the date, time, and location of the meeting.

- B. Attendees: Authorized representatives of the Contractor, Owner, and Design Professional; the Contractor's Superintendent and foreman; major subcontractors; primary material manufacturer's technical representative, when requested by the Design Professional and other concerned parties shall attend the conference.
- C. Agenda:
1. Safety.
  2. Project schedule.
  3. Delays – Weather, owner, contractor.
  4. 2-Week look ahead.
  5. Submittals.
  6. Review mock-ups, if applicable.
  7. Deliveries.
  8. Weather limitations.
  9. Compatibility problems.
  10. Manufacturer's recommendations.
  11. Warranty requirements.
  12. Acceptability of substrates.
  13. Inspection and testing requirements.
  14. Daily coordination
  15. Daily documentation requirements.
  16. Change order work.
  17. Job cleanliness.
  18. Upcoming events.
  19. Project details.
  20. In-Progress Meeting Schedule
- D. Meeting Minutes: The Design Professional will record significant discussions and agreements and disagreements of the Pre-Construction Meeting. The Design Professional will promptly distribute the record of the Pre-Construction Meeting to all attendees.

#### 1.06 IN-PROGRESS MEETINGS

- A. The Design Professional will schedule In-Progress Meetings at the project site on a weekly or bi-weekly basis. The Contractor shall be responsible to notify the appropriate Contractor personnel, subcontractors, material manufacturers, etc. involved or affected by the Work of the date, time, and location of the meeting. All subsequent meetings shall be held on the same day of the week and at the same hour for the duration of the construction period and/or at such times as directed by the Design Professional. Additional meetings may also be required, depending on progress of the work, as instructed by the Design Professional.
- B. Attendees: Authorized representatives of the Contractor, Owner, and Design Professional; the Contractor's Superintendent and foreman; major subcontractors; and other concerned parties shall attend the conference.
- C. Construction Schedule Update: The Contractor shall provide an updated construction schedule at least 48 hours prior to each In-Progress Meeting.
- D. Agenda:

1. Safety.
2. Project schedule.
3. Delays – Weather, owner, contractor.
4. 2-Week look ahead.
5. Submittals.
6. Daily coordination
7. Project requirements.
8. Daily documentation requirements.
9. Job cleanliness.
10. Change order work.
11. Upcoming events.
12. Project details.

- E. Meeting Minutes: The Design Professional will record significant discussions and agreements and disagreements of each In-Progress Meeting. The Design Professional will promptly distribute the record of the Pre-Construction Meeting to all attendees.

#### **1.07 COORDINATION MEETINGS**

- A. The Contractor shall schedule and conduct subcontractor/coordination meetings as required for the project.

#### **1.08 SAFETY MEETINGS**

- A. The Contractor shall conduct a separate safety meeting after the safety plan is submitted. The Contractor shall take meeting minutes. The minutes shall be made available upon request. The Contractor shall notify the Design Professional of the times and dates of these meetings, who may elect to attend these meetings as an observer. A minimum of one (1) safety meeting shall be held per month.

#### **PART 2 – PRODUCTS – NOT USED**

#### **PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 31 19 - PROJECT MEETINGS

**01 32 16**  
**CONSTRUCTION SCHEDULE**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. This Section includes administrative and procedural requirements for construction schedules.

**1.02 SUMMARY**

- A. The purpose of the Construction Schedule is to allow the Contractor to prepare an orderly plan to aid in the timely completion of the Project.
- B. The approved Construction Schedule will be used to plan and execute the work, to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis for all progress payments.
- C. Contractors shall cooperate and coordinate with each other, and with the Design Professional and Owner, to provide all scheduling requirements in their respective schedules in accordance with the Contract Documents.
- D. Failure to maintain the Construction Schedule in an approved status may result in the Owner withholding progress payment until the Contractor provides an updated schedule that is approved.

**1.03 PROJECT SCHEDULING SEQUENCE REQUIREMENTS**

- A. The Contractor shall prepare a Construction Schedule for all work included under the scope of the Contract, in accordance with the General Conditions.
  - 1. The Contractor will prepare and furnish to all contractors a Master Activity Coding template, in hard copy and electronic, defining Responsibility Code, Work Area Code, Milestones, Phase Code, etc. for the Construction Schedule, as outlined in this section. Contractors shall submit subsequent schedule requirements in accordance with the Master Activity Code template to achieve continuity in merging scheduling input.
  - 2. The Contractor will prepare and distribute a schedule framework of proposed construction sequence to the Contractors.
- B. The Contractor shall submit the Construction Schedule to the Design Professional, with signature indicating approval.
  - 1. If acceptable, the Design Professional and Owner will accept the schedule.
  - 2. If not acceptable, the schedule will be returned to the Contractor for revision. The revised schedule, with approval signature, shall be resubmitted.

## **PART 2 – PRODUCTS**

### **2.01 SCHEDULE SOFTWARE**

- A. The computer software utilized by the Contractor to produce the project schedule shall be Primavera, Microsoft Project, or other software approved by the Design Professional and Owner.

## **PART 3 – EXECUTION**

### **3.01 CRITICAL PATH METHOD**

- A. The Critical Path Method (CPM) of network calculations will be used to generate the schedule. The Contractor shall provide the schedule in Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

### **3.02 LEVEL OF DETAIL REQUIRED**

- A. With the exception of the preliminary schedule submission, the Construction Schedule shall include an appropriate level of detail. Failure of the Contractor to develop or update the schedule or provide resource information will result in the disapproval of the schedule.
- B. Activity Durations:
  - 1. Submit the following data to support the schedule calendar as it relates to durations. Failure of the Contractor to include this data will delay the review of the submittal until the Design Professional receives the missing data.
    - a. The proposed number of working days per week.
    - b. The holidays to be observed during the life of the contract (by day, month, and year).
    - c. The planned number of shifts per day.
    - d. The number of hours per shift.
    - e. Break up the work into activities of a duration no longer than 20 work days each, except as to non-construction activities (e.g. procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities for which the Owner may approve a longer duration.
- C. Procurement Activities:
  - 1. Prepare the schedule in chronological order of submittals. Show specification section of the submittal, name of contractor and generic description or work covered. Include activities to cover the complete procurement process to include but not limited to: submittal, review, approval, resubmittal, procurement, fabrication, delivery, permits, and similar pre-construction work.
- D. Manpower:
  - 1. Activities shall have an estimate of the average number of workers per day that are expected to be used during the execution of the activity.
  - 2. Critical or near Critical Paths resulting from the use of manpower or equipment

restraints shall be kept to a minimum. Near Critical Paths are defined as paths having 10 workdays or less of total float.

E. Cost:

1. All activities shall be cost loaded in a logical manner tying to each Contractor's Schedule of Values.

F. Responsibility:

1. All activities shall be identified in the Construction Schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the Contractor, Subcontractor, Design Professional, or Owner.

G. Work Areas:

1. Arrange the schedule to show each major area of construction for each major category or unit of work.
2. All activities shall be identified in the Construction Schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

H. Change Order or Claim Number:

1. Any activity that is added or changed by a change order or used to justify any claimed time, shall be identified by change order code that changed the activity. Activities may not belong to more than one change order.

I. Milestones:

1. Milestone dates are defined in calendar days following the date set forth in the Notice to Proceed and are required to be met by all Contractors. Time is of the essence for the completion of Milestones and for the Contract Completion Date.
2. The following dates are defined in calendar days from the Notice to Proceed (unless noted otherwise) and shall be adhered to by each Contractor.

- a. Milestone 1 (M1) – N/A

J. Adverse Weather:

1. Definitions:

- a. Adverse Weather Day: A day when the magnitude of a weather parameter (precipitation or temperature) is such that it creates conditions that inhibit the ability of the contractor to work productively on a construction activity on the critical path.
- b. Expected Adverse Weather Days: The number of weather days expected to occur on a monthly basis.
- c. Unexpected Adverse Weather Days: The number of adverse days that exceed the expected number of adverse weather days determined on a

- monthly basis.
  - d. Actual Adverse Weather Days: The actual number of adverse weather days that occur during a single month.
  - e. Forecasted Weather Report: Weather forecast from a local weather forecasting source. Only forecasted weather reports for the next day are acceptable, long-range weather forecasts are not acceptable.
  - f. Precipitation: Rain, snow, or hail.
2. Tracking: The Contractor shall track weather forecasts and weather reports to document claims for additional time due to adverse weather conditions. Claims for additional time without documentation of actual or forecasted weather conditions, will be rejected.

### **3.03 SCHEDULED PROJECT COMPLETION**

- A. Project Start Date:
- 1. The Construction Schedule may start no earlier than the date that the Notice to Proceed (NTP) was issued. The Contractor shall include as the first activity in the Construction Schedule an activity named "Notice to Proceed." The "Notice to Proceed" activity shall have an early start constraint, a constraint date equal to the date that the NTP was issued, and a zero-day duration.
- B. Constraint of Last Activity:
- 1. Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the Critical Path. The Contractor shall include as the last activity in the Construction Schedule an activity named "Contract Complete". The "Contract Complete" activity shall have a late finish constraint, a constraint date equal to the completion date, equal to the date identified in the NTP for the project, and a zero-day duration.

### **3.04 INTERIM COMPLETION DATES (MILESTONES)**

- A. Contractually specified interim completion dates (Milestone dates) shall also be constrained to show negative float if early finish date of the last activity in that phase falls after the interim completion date.

### **3.05 HAMMOCK ACTIVITIES FOR CONTRACTS**

- A. The Contractor shall include hammock type activity for each Contractor. The Contractor shall be logically tied to the earliest and latest activities in the Contractor's Scope of Work. Hammock activities shall be identified within "HA" at the beginning of the Activity ID.

### **3.06 DEFAULT PROGRESS DATA DISALLOWED**

- A. Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in the CPM Scheduling Software Systems. Actual Start and Finish dates and Remaining Durations on the CPM Schedule shall match those dates provided from

Contractor Daily Reports for every in progress or completed activity and insure that the data contained on the Daily Reports is the sole basis for schedule updating. Failure to comply may result in the disapproval of schedule.

### **3.07 OUT OF SEQUENCE PROGRESS**

- A. Activities that have posted progress without predecessors being completed (Out of Sequence Progress) shall be allowed only by the case by case approval of the Design Professional. The Design Professional may direct that changes in schedule logic be made to correct any or all Out of Sequence Work.

### **3.08 NEGATIVE LAG(S)**

- A. Lag durations contained in the schedule shall not have a negative value.

### **3.09 DEFINITION OF, AND CONDITIONS RELATING TO FLOAT**

- A. Float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any activity in the schedule. Total float is defined as the amount of time any given activity or path of activities may be delayed before it will affect the project completion time.
- B. Float is not time for the exclusive use or benefit of the Contractor and shall be used in the best interest of completing the project on time.
- C. Extensions of time for performance required under the General Conditions pertaining to equitable time adjustment will be granted only to the extent that the equitable time adjustment exceed total float in the activity or path of activities affected at the time approval was issued for the change.
- D. Use of float suppression techniques such as preferential sequences, special lead/lag logic restraints, extended activity times, or imposed dates, other than as required by the Contract, shall be cause for rejection of the Construction Schedule and any revisions or updates.

### **3.10 CONSTRUCTION SCHEDULE**

- A. The Construction Schedule, defining the Contractor's planned operations for project shall be submitted for approval within 10 calendar days after Notice to Proceed is issued. The approved Construction Schedule shall be used for payment purposes and the basis for measuring Contractor progress.
  - 1. Paper copies shall be provided in color on minimum 11" x 17" paper and an electronic version in Adobe PDF format.
- B. The Construction Schedule shall show the sequence and interdependence of activities required for complete performance of the work, beginning with Contractor's receipt of the Notice to Proceed and concluding with the date of Final Completion of the Contract. The Construction Schedule shall show all activities in workdays, with allowance for holidays and the effects of normal weather conditions on outside work.
- C. The Construction Schedule shall comply with all limits imposed by the Scope of Work, with

all contractually specified intermediate milestones and completion dates, and with all constraints, restraints, or sequences included in the Contract.

- D. The Construction Schedule network (graphic presentations) and computer tabulations, the Resource Loading curve and the Contractor's signatures shall be submitted to the Design Professional for acceptance. Additionally, the Contractor shall submit one (1) copy of the data, containing the resource loaded Construction Schedule.
- E. The following computer-generated reports shall be required as part of the Construction Schedule submittals:
1. Activity ID Report
  2. Total Float/Early Start Report
  3. Logic Report
  4. Resource Report
  5. Coding Dictionary
- F. The schedule network (graphic presentation) shall include:
1. Activity ID
  2. Activity Description
  3. Original Durations
  4. Remaining Durations
  5. Early Start and Finish Dates
  6. Baseline Start and Finish Dates
  7. Total Float
  8. Percent Complete
- G. Schedule Review and Comments
1. Comments made by the Design Professional on the Construction Schedule during review shall not relieve the Contractors from compliance with the requirements of the Contract Documents.
  2. Following the Contractor's receipt of the Design Professional's review comments, the Contractors shall correct the schedule to identify missing activities and relationships relevant to the Scope of Work. No time extensions will be granted to complete activities not initially included in the Contractor's Construction Schedule.
  3. To the extent that there are any conflicts between the approved Construction Schedule and the requirements of the Contract Documents, the Contract Documents shall govern.
- H. Resubmittal of Construction Schedule
1. Should the Design Professional reject the Construction Schedule, the Contractor shall comply with the Design Professional's direction and resubmit the Construction Schedule and all associated submittals within five (5) calendar days.

### 3.11 PERIODIC CONSTRUCTION SCHEDULE UPDATES

- A. The following computer-generated reports in hard copy and electronic shall be required as a part of the monthly update thereof as a condition precedent to the receipt of progress

- payments under the Contract.
- B. The Contractor's monthly narrative report is to include:
1. Activities started in the month (with actual start dates).
  2. Activities completed during the month (with actual start and completion dates).
  3. Activities in progress (with estimated remaining durations).
  4. Activities scheduled to start in the next month (with estimated start dates).
  5. A list of approved logic changes.
  6. A list of proposed logic changes, new activities, and deleted activities.
  7. Recommendations for adjusting the Construction Schedule to meet milestone completion and Contract completion dates (include why the schedule needs adjusted, e.g., change order, weather, contractor resources, etc.).
    - a. Construction Contract Adjustment for Unexpected Adverse Weather
      - i. Contract adjustment is justified when the number of actual adverse weather work days exceeds the expected number of adverse weather work days over the life of the project.
      - ii. The number of actual adverse weather work days and related construction task(s) are to be reported on a monthly basis at the last Progress Meeting of the month as a condition of Payment Application approval.
      - iii. The Design Professional is to verify with documentation the actual adverse weather work days reported by the Contractor.
      - iv. The calculation of the difference between the actual adverse working weather days and expected adverse weather working days is to be reported at the first Progress Meeting of the month by the Design Professional.
  8. Attach copies of the Contractors' weekly schedule reports.
- C. The Contractors graphic presentation of the schedule is to include:
1. Activity ID.
  2. Activity Description.
  3. Original Durations.
  4. Remaining Durations.
  5. Early Start and Finish Dates.
  6. Baseline Start and Finish Dates.
  7. Total Float.
  8. Percent Complete.
  9. The schedule shall be sorted by Early Start and Total Float and should show both the early schedule and the target schedule.
- D. Computer generated reports are to include:
1. Activity ID Report.
  2. Total Float/Early Start Report.
  3. Logic Report.
  4. In Progress or Planned to Start Report.

5. In Progress or Planned to Finish Report.
6. Resource Report.

### **3.12 WEEKLY PROGRESS REPORT**

- A. The Contractor shall provide a Weekly Progress Report to the Design Professional. The Weekly Progress Report shall be based on the most recent Construction Schedule update and shall summarize only those activities scheduled to begin or are in progress during the week before and for next two (2) weeks.

### **3.13 STANDARD ACTIVITY CODING DICTIONARY**

- A. The Contractor shall submit, with the Construction Schedule, a coding scheme that shall be used throughout the project for all activity codes contained in the schedule. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. For example, A Responsibility Code Value, "ELE", may be identified as "Electrical Subcontractor". Activity code values shall represent the same information throughout the duration of the contract. Once approved with the Preliminary Project Schedule Submission, changes to the activity coding scheme shall be approved by the Design Professional.

### **3.14 DATA**

- A. The preliminary, approved, and update Construction Schedules shall be provided in the form of electronic files.
- B. File Medium:
  1. Submit data on media acceptable to the Design Professional.
- C. File Name:
  1. The Contractor shall insure that each file submitted has a name related to the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will insure that the names of all the files submitted are unique. The Contractor shall submit the file naming convention to the Design Professional.

### **3.15 APPROVED CHANGES VERIFICATION**

- A. Only Construction Schedule changes that have been previously approved by the Design Professional shall be included in the schedule submission. The narrative report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.
- B. The Contractor shall prosecute the work in accordance with the approved Construction Schedule. Out of sequence construction, defined as a change from the Construction Schedule in the Contractor's actual operation requires prior approval from the Design Professional.
- C. Upon the approval of a change order or the issuance of a unilateral change order by the

Owner the agreed upon change order activities, activity durations, logic and impacts shall be reflected in the next schedule submittal by the Contractor.

- D. No change to the approved activities, original activity durations, logic, interdependencies, milestones, planned sequence of operations, or resource loading of the Construction Schedule shall be made without prior approval from the Design Professional. If the Contractor desires to make a change to the approved Construction Schedule, the Contractor shall request permission from the Design Professional in writing, stating the reasons for the change as well as the specifics, such as the proposed changes in activities, original activity durations, logic, interdependencies, milestones, planned sequence of operations, or resource loading of the baseline Construction Schedule. The Design Professional shall respond within 14 calendar days after the receipt of the Contractor's request.
- E. If the Design Professional considers the Construction Schedule change requested by the Contractor to be a major change, it may require the Contractor to revise and submit for approval, without additional cost to the Owner, all of the affected portions of the network diagrams, and any schedule reports, or construction equipment reports deemed necessary to show the probable effect on the entire project. The proposed network revision and required reports shall be submitted to the Design Professional within five (5) calendar days after the Design Professional notifies the Contractor that the requested revision is a major change. Only upon the approval of the requested change by the Design Professional may it be reflected in the next Construction Schedule update submitted by the Contractor.
- F. A change will be considered of a major nature if the time estimated for an activity or sequence of activities is varied from the original plan to the degree that there is reasonable doubt that the Contract Completion date or milestones will be met, or if the change impacts the work of other Contractors at the job site. Changes to activities having adequate float may be considered as minor changes, except that an accumulation of minor changes may be considered a major change when such changes affect the Contract Completion date or milestones.

### 3.16 SCHEDULE REPORTS

- A. The format of each activity for the schedule reports listed below shall contain:
  - 1. Activity ID Number(s).
  - 2. Activity Description.
  - 3. Original Duration.
  - 4. Remaining Duration.
  - 5. Early Start Date.
  - 6. Early Finish Date.
  - 7. Baseline Start Date.
  - 8. Baseline Finish Date.
  - 9. Total Float.
  - 10. Actual Start and Actual Finish dates shall be printed for those activities in progress or completed.
- B. Activity ID Report: A list of all activities sorted according to Activity ID number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

- C. Logic Report: A list of preceding and succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.
- D. Total Float Report: A list of all activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates.

### **3.17 NETWORK DIAGRAM (GRAPHIC PRESENTATION)**

- A. The network diagram is required on the preliminary, baseline and monthly schedule submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Design Professional will use, but is not limited to, the following conditions to review compliance with this paragraph:
  - 1. Continuous Flow: Diagrams shall show a continuous flow from left to right. The Activity ID, description, original duration, remaining duration, early start and finish dates, target start and finish dates, total float and percent completed shall be shown on the diagram.
  - 2. Project Milestone Dates: Dates shall be shown on the diagram from start of any project, any contract required interim completion dates, and contract completion dates.
  - 3. Critical Path(s): The Critical Path(s) shall be clearly shown.
  - 4. Banding: Activities shall be grouped to assist in the clear understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

END OF SECTION 01 32 16 – CONSTRUCTION SCHEDULE

**01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. This section includes administrative and procedural requirements for submittals required for performance of the Work.

**1.02 GENERAL REQUIREMENTS**

- A. Electronically submit to Design Professional submittals as required by the project specifications.
- B. Submittals shall be submitted within ten (10) calendar days after the Notice to Proceed. The Contractor shall submit a list of any submittals that cannot be submitted within ten (10) calendar days after the Notice to Proceed for Design Professional review and approval. The list shall include the reason the submittal cannot be submitted and a schedule indicating when the submittal will be submitted.
- C. The time required for the submittal process has been allotted for in the Construction Time. Additional time will not be considered in the event the Contractor does not complete the submittals in a timely manner.
- D. Review of shop drawings and product data by Design Professional will be general in nature and does not relieve Contractor in any way of responsibility for proper detailing of designs furnished by Owner, satisfactory construction, compliance with Contract Documents and applicable codes, or for errors or omissions of any kind in final Work.
- E. Contractor to maintain one (1) hard copy of all submittals at the project site within the field office that is to be available for use by the Design Professional.

**1.03 DEFINITIONS**

- A. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display-independent fixed-layout document format.
- B. File Sharing Program (FSP): An internet based electronic file storage service to enable sharing and collaboration of project documents.
- C. Non-Technical Submittals: submittals that do not pertain to technical aspects of the project but are to be submitted to the Design Professional for review.
- D. Informational Submittals: submittals that are provided to the Design Professional for information purposes only and do not require action by the Design Professional.
- E. Technical Submittals: submittals that pertain to technical aspects of the project and are to be submitted to the Design Professional for review.

F. Review Notations

1. "Approved": Fabrication, manufacture, or construction may proceed on the basis that the submitted item is in conformance with the design concept and the contract documents.
2. "Approved as Noted": Fabrication, manufacture, or construction may proceed after making the noted corrections to satisfy compliance with the design concept and/or contract documents. If additional submittals are required to be submitted, no fabrication, manufacture, or construction may proceed without the additional submittals required. Submit additional submittals promptly.
3. "Rejected": No fabrication, manufacture, or construction may proceed. Make revisions and/or submit new documents as indicated.

**1.04 NON-TECHNICAL SUBMITTALS**

- A. Worker's Compensation Certificate: Submit a current Worker's Compensation Certificate for the Contractor and all subcontractors.
- B. General Liability Insurance: Submit proof of general liability insurance in the limits required in the Contract Documents. The Owner and Design Professional shall be listed as additional insureds.
- C. Installation Floater: Submit proof of Installation Floater Insurance in the limits required in the Contract Documents.
- D. Subcontractor Insurance Certificates: Submit proof of general liability insurance in the limits required in the Contract Documents.
- E. List of Subcontractors: Submit AIA Document G705 – List of Subcontractors.
- F. Schedule of Values: Submit a schedule of values that includes a thorough breakdown of the work. Each work item shall include a line item for the material and labor portion of the work.
- G. Project Schedule: Submit a detailed critical path method (CPM) construction schedule broken down per unit area indicating the durations, critical path, and overall project duration.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Contractor Site Safety Plan: Submit the Contractor's Site Safety Plan.
- B. Drug-Free Workplace Program: Submit written evidence that the Contractor and subcontractors are enrolled and are in good standing in the OBWC Drug-Free Workplace Program or similar approved program.
- C. Permit: Submit a copy of the permit, if required by the local jurisdiction.
- D. Contractor Emergency Contact Information: The Contractor shall submit contact numbers for the lead on-site personnel, project manager, and subcontractor(s) that can be utilized in

case of an after-hours emergency.

#### **1.06 TECHNICAL SUBMITTALS**

- A. Shop Drawings: Submit each shop drawing as required by the technical specifications.
- B. Product Data: Submit copies of the manufacturer's product data, bulletins, specifications, installation instructions, product test reports, etc. as required by the technical specifications.
- C. Qualification Data: Prepare and submit written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Design Professionals and Owners, and other information specified.
- D. Material/Product Certificates: Prepare and submit written statements on manufacturer's letterhead certifying that material complies with requirements.
- E. Manufacturer Certificates: Prepare and submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- F. Material Test Reports: Prepare and submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- G. Field Test Reports: Prepare and submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- H. Maintenance Data: Prepare and submit written and graphic instructions and procedures for operation and normal maintenance of products and equipment.
- I. Delegated Design: Where required by the specifications, the Contractor shall engage a Professional Engineer to perform the design of the specified system. The sealed drawings and calculations shall be submitted for review. All delegated design submittals shall also include a Certificate of Professional Liability Insurance with a minimum limit of \$1,000,000 included with the submittal.

#### **1.07 SAMPLES**

- A. Where Specifications require samples to be submitted, submit three (3) samples of materials.
- B. One (1) sample will be returned to Contractor when approved.
- C. Install materials matching approved samples.

#### **1.08 MOCK-UP MODELS**

- A. Where Specifications require mock-up models, submit and/or construct one (1) mock-up

model. If the mock-up is constructed on-site and not permitted to be incorporated into the work, it shall be placed in an area designated by the Design Professional and shall not be removed until completion of the work and instructed to do so by the Design Professional.

- B. Make changes to mock-ups until accepted by Design Professional.

## 1.09 SUBMITTAL PROCEDURE

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Submit electronic submittals via the Design Professional's FSP.
- B. Electronic submittals will only be accepted in an unchangeable electronic format such as pdf. File formats such as MS Word (.doc or .docx), MS Excel (.xls or .xlsx), AutoDesk, AutoCAD (.dwg or .dwt), are considered unacceptable as the original file submitted could be accidentally altered from the originators intended document. These file types will be rejected by the Design Professional.
- C. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp prior to submitting.
- D. Each submittal to bear Contractor's stamp. This shall indicate that the Contractor has reviewed the submittals and they are in compliance with the Contract Documents. Any submittals that are not in compliance with the Contract Documents shall be clearly indicated on the submittal cover page along with an explanation of why it is being submitted.
  - 1. Stamp shall be made electronically on the Submittal Transmittal Form in the assigned location. Stamp shall include name of reviewer, time, and date stamp was applied.
  - 2. Submittal Transmittal Form shall not be printed out to allow for a physical stamp to be applied and then scanned back into electronic format.
- E. All submittals shall include the Submittal Transmittal Form included in the specification (Section 00 62 11). The Contractor shall include all project and submittal information as outlined on the Submittal Transmittal Form. All submittals shall be named utilizing the file format outlined in Section 00 62 11 – Submittal Transmittal Form. The Submittal Transmittal Form will be provided to the Contractor in electronic format by the Design Professional.
- F. Electronic submittals shall be compiled, to the greatest extent, from original electronic formats. Scanning of physical or paper copies shall be kept to a minimum to maintain smaller file sizes and clarity of documents.
- G. Each submittal shall be submitted as one combined file inclusive of the Submittal Transmittal Form and all documents required by the contract documents for that submittal. A PDF binder format shall be used and not a portfolio format.
- H. Electronic submittals shall not have document restrictions applied by the Contractor that would prevent the Design Professional from reviewing or annotating the Submittal Transmittal Form or other submittal documents.

- I. File Sharing Program (FSP)
1. Contractor shall, at the Design Professional's direction, log-in and create an account on the FSP.
  2. Contractor will be given access to submittal folders on the FSP. The Contractor will have permission to view and download files from folders at the Design Professionals discretion. The Contractor will have permission to one folder to upload submittals.
  3. The project will have multiple folders used for the management of project documents. The primary folder to be used for Submittals is labeled 10 Submittals. This folder contains the following sub-folders:
    - a. 10.01 Sample Forms: Forms provided by Design Professional for use by the Contractor to prepare the electronic submittals. Folder will contain documents such as the Submittal Transmittal Form, Sample Submittal Transmittal Form, Sample Manufacturer Letters, and other forms or sample letters.
    - b. 10.02 Submittals Checklist: Will contain a submittal checklist prepared and maintained by the Design Professional. Checklist will be used to track the progress of submission by the Contractor and Review by the Design Professional. Checklist will be used for file naming of the submittals per the direction given by the Design Professional on the Sample Submittals Transmittal Form.
    - c. 10.03 Submitted: Folder will be used by the Contractor to upload submittals for the Design Professional's review. Submittals shall only be submitted by this method.
    - d. 10.04 Reviewed: This folder will contain submittals reviewed by the Design Professional. Contractor will have access to this folder to view or download the Design Professionals Reviewed Submittals.
    - e. 10.05 Miscellaneous: Folder will be used by Design Professional to place miscellaneous files such as Informational Submittals.
- J. Incomplete submittals may be returned without review with a request to resubmit when complete.
- K. The Contractor shall allow 14 calendar days for the initial and each subsequent review that may be necessary. No extension of Contract Time will be authorized because of failure to transmit submittals enough in advance of the work to permit processing.

#### **1.10 SUBMITTAL REVIEW PROCEDURE**

- A. General: The Design Professional will not review submittals that do not bear the Contractor's approval stamp and will return them without action.
- B. Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it.
- C. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- D. Submittals not required by the Contract Documents will not be reviewed and may be

discarded.

**1.11 PROJECT CLOSE-OUT SUBMITTALS**

See Section 01 78 39 Project Record Documents for Close-Out Submittal requirements.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 33 00 – SUBMITTAL PROCEDURES

Review Set  
Not For Bidding

**01 40 00**  
**QUALITY REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for Contractor quality control on the project.
- B. Specific quality control requirements for individual construction activities are specified in the Sections that govern those activities. Requirements in those Sections may also cover production of manufactured products.
- C. Specified tests, inspections, and related actions do not limit Contractor's quality control obligations to comply fully with the Contract Document requirements in all regards.
- D. Provisions of this Section do not limit the requirements for the Contractor to provide quality control services required by the Contract Documents or the authority having jurisdiction.
- E. The following quality issues are addressed in detail in this Section:
  - 1. Quality Control.
  - 2. Quality Assurance.
  - 3. Testing Agency.
  - 4. Testing.
  - 5. Inspections.
  - 6. Pre-Installation Meetings.
  - 7. Mock-ups.

**1.03 DEFINITIONS**

- A. **Quality Control:** Quality Control shall be the sole responsibility of the Contractor, unless specifically noted otherwise. The Contractor shall be responsible for all testing, coordination, start-up, operational checkout and commissioning of all items of work included in the project, unless specifically noted otherwise. All costs for these services shall be included in the Contractor's cost of work and general conditions.
- B. **Quality Assurance:**
  - 1. Quality Assurance is performed by the Owner or their delegated representatives. These procedures may include observations, inspections, testing, verification, monitoring, and any other procedures deemed necessary to ensure compliance with the Contract Documents.
  - 2. The Contractor shall cooperate with and provide assistance to the Owner for all

aspects of this endeavor. This shall include providing ladders, lifts, scaffolds, lighting, protection, safety equipment, and any other devices and/or equipment (including operators if required) deemed necessary by the Owner to access the work for observation or inspection.

#### **1.04 TESTING AGENCY**

- A. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated and specializes in types of tests and inspections to be performed.
- B. Owner may employ services of independent testing agencies to perform certain specified testing, as it deems necessary.
- C. The Contractor shall employ and pay for services of an independent testing agency to perform all specified testing requiring an independent agency, unless noted otherwise.
- D. Employment of agency in no way relieves the Contractor of the obligation to perform work in accordance with requirements of Contract Documents.

#### **1.05 TESTING**

- A. Where specific testing is specified in a technical section of the specifications or indicated in the Contract Documents, the Contractor shall bear all costs of such tests unless they are specifically stated to be paid by the Owner.
- B. Testing specifically identified to be conducted by Owner will be performed by an independent entity and will be arranged and paid for by the Owner unless otherwise indicated in the Contract Documents. Should the test return unacceptable results, the Contractor shall bear all costs of retesting and re-inspection as well as the cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
- C. The Owner's Designated Representative (ODR) will schedule the Owner's testing services unless otherwise directed in writing by the Owner. The Contractor is required to coordinate with the ODR to facilitate timeliness of such testing services.

#### **1.06 INSPECTIONS**

- A. It is the intent of the Contract Documents that all work be subjected to inspection and verification of correct operation prior to 100% payment of the line item(s) pertaining to that aspect of the Work.
- B. The Contractor shall incorporate adequate time for performance of all inspections and correction of noted deficiencies into the Work Progress Schedule for the project.
- C. During the course of construction, the Owner, Design Professional, and/or other Owner representatives may visit the site for observation of the work in place. The Contractor shall provide all necessary equipment for safe access to the work to be inspected or observed. This requirement shall extend to all Owner personnel and their representatives. Some of these inspections will be informal and some will require formal notification by the Contractor.

The following are typical project inspections:

1. Informal daily review of project conditions by the Design Professional's Project Representative, Owner, and/or Design Professional. When considered appropriate, results of these reviews will be documented via Observation Report. In addition to cooperating with, and providing safe access for these parties, the Contractor shall provide a system of tracking all Observation Reports, describing items noted and resolution of each item. This report shall be reviewed as necessary, at least on a monthly basis.
  2. Where specified, concealed space inspections are to be formally scheduled in advance through the Design Professional by submitting written notification at least five (5) working days in advance.
- D. On systems/equipment requiring a manufacturer's representative to verify installation/operation, the Contractor is required to perform a thorough check-out of operations with the manufacturer's representatives prior to requesting formal inspection by the Owner. Notify the ODR, in advance, as to when the manufacturer's representative is scheduled to arrive.
- E. Inspection of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by that equipment and/or system.
- F. For any requested inspection, the Contractor shall make prior inspection to ensure that items are ready for inspection and acceptance by the Owner and/or Design Professional. The Contractor will be responsible for any and all costs incurred by Owner and/or Design Professional resulting from a review or inspection that was scheduled prematurely.
- G. The Contractor shall coordinate the work and schedule the inspections in advance so as not to delay the work. All major inspections should be indicated on the Work Progress Schedule for advance planning and the Contractor should allow a minimum of five (5) working days to confirm schedule of requested inspections with Owner and Design Professional.
- H. The Contractor shall list and track all punch list items. The punch list shall be kept up-to-date reflecting status of work in place and inspections on the project. Copies of this populated and updated matrix shall be supplied to Design Professional and ODR for use during the course of the project.

#### **1.07 PRE-INSTALLATION/CONSTRUCTION MEETINGS**

- A. The Design Professional will schedule and conduct meetings to review the installation of major systems/equipment on the project.
- B. The Contractor shall ensure attendance of the installing subcontractor, manufacturer and/or supplier (if appropriate), supporting subcontractors involved in the installation and any other parties involved in the work being reviewed.
- C. Each party shall be prepared to discuss in detail the staging, installation procedure, quality control, testing/inspection, safety and any other pertinent items relating to the work being reviewed. Submittal approval shall be a prerequisite for the meeting.

**1.08 MOCK-UPS**

- A. Before installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required, using materials indicated for the completed work.
- B. Build mock-ups in location and of size indicated or, if not indicated, as directed by Design Professional. The mock-up may be work in place that is intended to remain, unless otherwise directed by the Design Professional.
- C. Notify Design Professional and Owner five (5) working days in advance of dates and times when mock-ups will be constructed.
- D. Demonstrate the proposed range of aesthetic effects and workmanship. Include anticipated repairs in mock-up, such as stone veneer.
- E. Obtain Design Professional's and Owner's approval of mock-ups before starting work, fabrication, or construction.
- F. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
- G. Demolish and remove mock-ups when directed by Design Professional.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 40 00 – QUALITY REQUIREMENTS

01 42 13  
**ABBREVIATIONS AND ACRONYMS**

**PART 1 – GENERAL**

**1.01 ABBREVIATIONS:** References to technical societies, institutes, associations, organizations or governmental authorities referred to in Project Manual are in accordance with the following abbreviations:

ACI	American Concrete Institute
AIA	American Institute of Architects
ARMA	Asphalt Roofing Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APA	American Plywood Association
ASLA	American Society of Landscape Architects
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservative Association
EPA	Environmental Protection Agency
FM	Factory Mutual
FS	Federal Specifications
ICRI	International Concrete Repair Institute
MBMA	Metal Building Manufacturer's Association
NFOPA	National Forest Products Association
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
OSHA	Occupational Safety and Health

PCA	Portland Cement Association
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
SPRI	Single-Ply Roofing Institute
SWRI	Sealant, Waterproofing and Restoration Institute
UL	Underwriter's Laboratories, Inc.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 42 13 – ABBREVIATIONS AND ACRONYMS

Review Set  
Not For Bidding

**01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications Sections, apply to this Section.
- B. Temporary installations shall comply with federal, state and local codes and regulations and with utility company requirements.
- C. Materials may be new or used, but adequate in capacity and safe for conditions.

**1.02 SUMMARY**

- A. This Section includes requirements for temporary utilities.
  - 1. Contractor is responsible for installing and maintaining such temporary facilities.
  - 2. At the completion of the Work, or when requested to, the Contractor shall remove all temporary utilities and related temporary work.
- B. Temporary facilities include, but are not limited to, the following:
  - 1. Temporary utilities include, but are not limited to, the following:
    - a. Rooftop Electric: Furnished by Contractor.
    - b. Water: Furnished by Owner, within limited quantities (i.e. existing hose connections). Large quantities of water usage must be approved by Design Professional and Owner and may require payment for such usage.
    - c. Sanitary Facilities, including drinking water.
  - 2. Support facilities include, but are not limited to, the following:
    - a. Storage containers.
    - b. Parking for construction personnel.
    - c. Waste disposal services.
    - d. Scaffolding, ladders, and other access equipment.
  - 3. Security and protection facilities include, but are not limited to, the following:
    - a. Temporary project signs.
    - b. Temporary fire protection.
    - c. Safety and health regulations for construction.
    - d. Storm drainage protection.
    - e. Security enclosure.
    - f. Tree and plant protection.
    - g. Fume and odor control.
    - h. Dust and dirt control.
    - i. Interior protection and cleaning.

**1.03 SUBMITTALS**

- A. Use of Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

#### 1.04 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
- B. Comply with codes and regulations regarding potable drinking water, sanitation, dust control, fire protection, and other temporary controls.

#### 1.05 PROJECT CONDITIONS

- A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
  - 1. Keep temporary services and facilities clean and neat.
  - 2. Relocate temporary services and facilities as required by progress of the work.

### PART 2 – PRODUCTS

#### 2.01 EQUIPMENT, FACILITIES AND CONTROLS

- A. General:
  - 1. Provide incombustible construction for offices, shops, and sheds located within 30 feet of building lines. Comply with NFPA 241.
  - 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion and when authorized by Design Professional.
- B. Site Enclosure Fence:
  - 1. Chain Link Fencing: Minimum 2 inch, 0.148 inch thick, Galvanized steel, chain link fabric fencing; minimum 6 feet high with Galvanized steel pipe posts at approximately 6' on-center. The fencing shall have ballasted, moveable stands at asphalt pavement areas. Non-pavement areas shall have posts embedded in the ground.
  - 2. Construction Site Fencing: Plastic fencing; 4 feet high with support posts spaced at approximately 6' on-center to prevent displacement. At grass areas, the posts shall be embedded in the ground.
  - 3. Locate where indicated on the project drawings. Install in a manner that will prevent people, dogs, and other animals from easily entering the site except by gate entrances.
  - 4. Provide gates in sizes and at locations necessary to accommodate the construction operations. Close and lock after construction hours.
- C. Sanitary Facilities: Provide temporary toilet, wash facilities, and drinking water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
  - 1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar

- disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
2. Toilets: Provide self-contained single occupant units of chemical type; vented; fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Provide separate facilities for male and female personnel.
  3. Wash Facilities: Install wash facilities supplied with potable water at locations as required for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
- D. Drinking Water Fixtures: Provide potable water, including paper cup supply.
- E. Project Identification and Temporary Signs: Do not permit installation of unauthorized signs except as required by law.
1. Prepare temporary signs to provide directional information to construction personnel and visitors.
  2. Install signs where indicated on project drawings.
  3. Post construction permit at the field office, as required by building department.
- F. Storage Containers: Provide non-combustible storage containers, as necessary, to store moisture and/or temperature sensitive materials.
- G. Temporary Stairs: Provide temporary stair towers where ladders are not adequate. The bottom 6' of the stair tower shall be enclosed with a lockable door in order to prevent unauthorized access. During non-construction times, the stair tower access door shall be locked.
- H. Storm Drainage Protection: Where the existing soil is disturbed by construction or construction traffic, provide temporary filters and silt fences around storm drain inlets in order to filter out excessive soil, construction debris, and other contaminants that might clog or pollute the waterways.
- I. Contractor Parking: Parking for the Contractor's employees will be assigned by the Design Professional and only this area may be used.
- J. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas as indicated on Drawings.
1. Provide and maintain access to fire hydrants, free of obstructions.
  2. Provide means of removing mud from vehicle wheels before entering streets.
  3. Designated existing on-site roads may be used for construction traffic.

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

- A. General:
1. Locate facilities where they will serve Project adequately or as directed by Owner or

Design Professional.

2. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed.
  3. The Owner will make all reasonable effort to provide a suitable and undisturbed space to the Contractor; however, if it becomes necessary at any time during progress of work to move temporary storage facilities, field offices, equipment or materials, the Contractor shall relocate them at no cost to the Owner.
- B. Motor Vehicles: All motor vehicles shall be driven slowly with extreme caution, obeying all posted traffic signs.
- C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- E. Material Storage Areas: Material only storage areas shall be enclosed with construction site fencing.
- F. Work Areas and Traffic Paths: All work areas and equipment traffic paths that are not located on existing roadways shall be fenced off with construction site fencing to prevent pedestrian traffic from unknowingly entering the construction area. The fencing shall be maintained until construction work (inclusive of any lawn remediation) in that area is complete and there are no hazards.

### **3.02 TRAFFIC CONTROLS**

- A. Comply with requirements of authorities having jurisdiction.
- B. Protect existing site improvements to remain including curbs, pavement, and utilities.
- C. Maintain access for firefighting equipment and access to fire hydrants.

### **3.03 FIRE PROTECTION**

- A. Comply with fire insurance and governing regulations.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent for exposures.
  1. Provide adequate number of fire extinguishers to protect the Work.
- C. Temporary Fire Protection: Provide and maintain temporary fire-protection of quantity and type needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

### **3.04 EXISTING UTILITY PROTECTION**

- A. Existing utility lines and structures indicated or known, and utility lines constructed for this Project shall be protected from damage during construction operations.
- B. Damage to existing utility lines or structures not indicated or known shall be reported immediately to the Design Professional and affected utility.

### **3.05 FUME AND ODOR CONTROLS**

- A. Prior to using any construction material containing solvents or other material causing objectionable odors, the Contractor must contact Owner to coordinate the protection of the air intakes in order to prevent fume or odor entry into the building. This protection could involve the following:
  - 1. Shut down air intake dampers.
  - 2. Shut down HVAC unit and cover intake vents with plastic sheeting.
  - 3. Installing activated carbon filter material over the HVAC intake vents.
  - 4. Re-locate equipment producing odors downwind from the air intake vents.
- B. If fumes or odors enter the building, the Contractor must work with the Owner to provide necessary ventilation to remove the fumes and odors from the building.

### **3.06 DUST AND DIRT CONTROLS**

- A. The Contractor shall control blowing dust, dirt, and refuse.
- B. The Contractor shall remove accumulations of dust, dirt, litter, and debris.
- C. The Contractor shall provide protection of equipment and personnel during operations creating dust from drilling, chipping, etc.
- D. The Contractor shall prevent debris, dust, or dirt from entering the building or the buildings HVAC system. The Contractor must contact Owner to coordinate the protection of the air intakes in order to prevent fume or odor entry into the building. This protection could involve the following:
  - 1. Shut down air intake dampers.
  - 2. Shut down HVAC unit and cover intake vents with plastic sheeting.
  - 3. Installing filter material over the HVAC intake vents.
  - 4. Re-locate equipment producing dust, dirt, or debris downwind from the air intake vents.
- E. The Contractor shall be responsible for any damage related to debris, dust, or dirt entry into the building or building HVAC system.

### **3.07 PROTECTION OF WORK AND BUILDING**

- A. The Contractor shall be responsible for the protection of the building interior and its contents from rain at holes or penetrations through the building envelope during work.
- B. The Contractor shall be responsible for the protection of the building exterior and grounds

from Contractor operations. When hoisting materials and/or removing materials, cover exterior walls including all items in work area with tarps or other required protection. An enclosed chute is required for the removal of the existing materials, from second story and higher locations, whenever building height is in excess of one (1) story.

- C. The Contractor shall provide protection to the grounds, walks, etc. from construction related materials and material handling equipment by placing plywood sheeting, tarps, or other required protection in and adjacent to the work area.

### **3.08 INTERIOR PROTECTION AND CLEANING**

- A. Interior Protection: The Contractor shall provide interior protection in area where there are no drop ceilings and fine dust and dirt can fall onto and damage the Owner's furnishings.
  - 1. The installation of interior protection shall be coordinated with the Owner's personnel.
  - 2. The interior protection shall consist of drop clothes or plastic sheeting draped over the furnishings.
  - 3. The Contractor shall coordinate with the Owner's Representative when sensitive/heat producing electronic equipment must be protected so that the interior protection is installed in a manner to not cause overheating of the equipment or the equipment is shutdown.
- B. Interior Cleaning: The Contractor shall sweep all areas where there is no drop ceiling to remove any construction related dirt and debris.
  - 1. At areas of deck replacement, the Contractor shall vacuum the top of the drop ceiling tile to remove large accumulations of dirt and debris that enters the building.
- C. All interior protection and cleaning operations shall be completed in a manner to minimize interference to the Owner's operations.
- D. Interior protection shall be removed, and interior cleaning completed as soon as possible.

### **3.09 SCAFFOLDING, LADDERS, AND OTHER ACCESS EQUIPMENT**

- A. The Contractor shall provide all necessary scaffolding, ladders, runways, and manlift equipment. All of this equipment shall be assembled and maintained in accordance with all applicable safety codes and standards. The Contractor shall provide the Owner and Design Professional with access to all work and storage areas.

### **3.10 EXISTING ROADWAYS AND SIDEWALKS**

- A. The Contractor shall not utilize paved areas that are indicated to be light-duty pavement. This includes areas only designed for passenger vehicle parking and playgrounds. Any traffic that is required over these areas must be minimized and any damage shall be repaired by the Contractor at no cost to the Owner.
- B. When the Contractor is utilizing normal or heavy-duty pavement areas, the Contractor shall verify the equipment does not exceed the weight capacity of this pavement. In addition, the Contractor shall install protection for the pavement in areas where damage could occur (i.e.

dumpster locations, excessive equipment traffic, etc.). Any damage to the pavement due to excessive traffic or overweight equipment shall be the responsibility of the Contractor to repair. Normal wear and tear will not be required to be repaired.

- C. The Contractor shall not traverse existing sidewalks as they are not typically designed for vehicular traffic. Any traffic that is required over these areas must be minimized and any damage shall be repaired by the Contractor at no cost to the Owner.

### **3.11 EXISTING BUILDING LOAD LIMITS**

- A. During warm weather conditions, materials shall not be loaded or placed on the structure in a manner that the loads exceed the live load capacity of the building, as determined by the local building code or ASCE 7.
- B. During winter-time conditions (when snow can occur), materials shall not be stored on the roof surface. During heavy snow events, rooftop storage could overload the structure causing the potential for damage or collapse.

### **3.12 OPERATION, TERMINATION, AND REMOVAL**

- A. Maintenance: Maintain temporary facilities in good operating condition until removal. Protect from damage caused by weather.

END OF SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

Review Set  
Not For Bidding

**01 74 00**  
**CLEANING AND WASTE MANAGEMENT**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes cleaning requirements during construction operations.

**1.03 SAFETY REQUIREMENTS**

- A. Hazards Control
1. Store volatile wastes in covered metal containers, and remove from premises daily.
  2. Prevent accumulation of wastes that create hazardous conditions.
  3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
1. Do not burn or bury rubbish or waste materials on Project site.
  2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
  3. Do not dispose of wastes into streams or waterways.

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

- A. Cleaning Agents: Use only cleaning materials recommended by manufacturer of surface to be cleaned.
1. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finish surface.
  2. Use cleaning products that comply with the allowable VOC level as permitted by the authority having jurisdiction.

**PART 3 – EXECUTION**

**3.01 DAILY/PROGRESS CLEANING**

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements of NFPA 241 for removal of combustible waste materials

- and debris.
2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer of fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Contract Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Contract Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted or finished surfaces.

END OF SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT

01 78 39  
**PROJECT RECORD DOCUMENTS**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for Project Record Documents.

**1.03 CLOSEOUT SUBMITTALS**

- A. Record Drawings (As-Built Drawings): Complying with the following:
  - 1. Number of Copies: Submit one (1) set of marked-up Record Prints and a PDF electronic file of the scanned printed to the Design Professional, unless otherwise noted.
- B. Warranties: As required by each technical section.
- C. Operating and Maintenance Instructions: Provide written maintenance instructions for each system specified.
- D. Manufacturer's Inspection Reports: Provide manufacturer's final inspection report for each system specified that requires a manufacturer's inspection.
- E. Asbestos-Free Certificate
- F. Certificate of Substantial Completion
- G. Contractor's Certificate of Insurance
- H. Performance and Payment Bond Form

**PART 2 – PRODUCTS**

**2.01 PROJECT RECORD DOCUMENTS**

- A. General: Refer to the requirements of the General Conditions.
- B. Record Documents, General
  - 1. The Contractor shall maintain at the jobsite one (1) copy of Drawings, Project Manual, addenda, final shop drawings, approved submittals, change orders, field orders, other contract modifications, and other documents submitted by the Contractor, in compliance with various Sections of the Project Manual.

C. Record Drawings

1. The Contractor shall update "As-Built Drawings" on separate set of Drawings set-aside especially for this purpose on the job. Drawings shall incorporate changes made in the Work during the construction period. Such changes shall be indicated at the time they occur.
  - a. Accurately record information in an understandable drawing technique.
  - b. Record data as soon as possible after obtaining it. Record and check markup prior to enclosing concealed installations.
2. Each of these drawings shall be clearly marked "As-Built Drawings"; maintained in good condition; available for observation by Design Professional; and shall not be used for construction purposes. Mark these drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
  - a. Dimensional changes to the Drawings.
  - b. Significant detail not shown in the original Contract Documents including Change Orders or Field Work Orders.
  - c. The location of underground utilities dimensionally referenced to permanent surface improvements.
  - d. The location of internal utilities concealed in building structures, referenced to visible and accessible features of the structures.
  - e. When elements are placed exactly as shown on Drawings, so indicate; otherwise show changed location.
  - f. Revisions to details shown on the Drawings.
  - g. Depths of foundations below the first floor.
  - h. Revisions to routing of piping and conduits.
  - i. Actual equipment locations.
3. Keep drawings current. Do not permanently conceal work until the required information has been recorded. Mark record prints of Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where shop drawings are marked, show cross-reference on Drawings location.
  - a. Mark record sets with red, or color that may be photo copied, erasable colored pencil. Use other colors (no blue) to distinguish between changes for different categories of the work at the same location.
  - b. Note Field Work Orders, alternate numbers, change order numbers, and similar identification.
4. Prior to request for Final Payment, the Contractor shall organize the "As-Built Drawings" into manageable sets, bind the sets with durable paper cover sheets, certify to the accuracy of the "As-Built Drawings" by signature thereon, and deliver the "As-Built Drawings" to the Design Professional.

- D. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Drawings with Design Professional and Owner. When authorized, prepare a full set of corrected digital data files of the Record Drawings, as follows:
1. Format: Adobe PDF

## PART 3 – EXECUTION

### 3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents: Store Record Documents in the field office apart from Contract Documents used for construction. Do not use Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Record Documents to Design Professional's reference during normal working hours. The Design Professional may review the Record Document to assure they are being properly updated prior to each payment request.

### 3.02 CLOSE-OUT SUBMITTALS

- A. The contractor shall prepare and submit one (1) 3-ring binder with the following binder tabs:
1. **Title Page:** Include project name.
  2. **Contractor Information:** Include Contractor and subcontractor name, project manager/superintendent, address, phone number and email address.
  3. **Performance and Payment Bond:** Include a copy of the Performance and Payment Bond.
  4. **Insurance Certificates:** Include a copy of the Contractor's insurance certificate.
  5. **Material Information:** Include product data sheets for the primary material utilized in the project.
  6. **Color Selection Information:** Include a summary of the colors selected for each material that required a color selection.
  7. **Warranties:** Include a copy of each warranty required for the project.
  8. **Operating and Maintenance Instructions:** Include a copy of the operating and maintenance instructions for each system installed as part of the project.
  9. **Manufacturer's Inspection Reports:** Include a copy of all manufacturer's inspection reports.
  10. **Final Lien Waivers:** Include a copy of the AIA Document G706 and G706A forms.
  11. **Project Forms:** Include a copy of the Asbestos Free Certificate and Certificate of Substantial Completion.
  12. **Change Orders:** Include a copy of each change order that was authorized for the project.
  13. **As-Built Drawings:** The Contractor shall include the As-Built Drawings.
  14. Based on the project, additional tabs may be required by the project administrator for additional project that may be required for specific projects.

- B. Electronic Copy: In addition to the one (1) hard copy of Project Record Documents, the contractor shall also provide an electronic copy. The electronic copy shall be in Adobe PDF format. The files shall be organized into folders with each tab name. The electronic copy shall be submitted by CD or USB drive.

END OF SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

Review Set  
Not For Bidding

**01 78 46  
EXTRA STOCK MATERIALS**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes attic stock, spare parts, equipment, and components for this Project.

**PART 2 – PRODUCTS**

**2.01 ATTIC STOCK SCHEDULE**

- A. Shingles
  - 1. Quantity: 100 square feet.
- B. Hip/Ridge Shingles
  - 1. Quantity: 1 Unopened Bundle.
- C. Paint
  - 1. Quantity: 1 gallon of each material and color applied.

**PART 3 – EXECUTION**

**3.01 General**

- A. The Contractor shall deliver and place the attic stock material to the Owner designated storage facility within 25 miles of the project site when the project is substantially complete.
- B. The extra stock materials shall be in new condition and in their original unopened containers.

END OF SECTION 01 78 46 – EXTRA STOCK MATERIALS

**02 41 19**  
**SELECTIVE DEMOLITION**

**PART 1 –GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Work of this section includes the removal and disposal of demoed components of the project.
- B. Items covered by this specification section (Removal and Disposal):
1. Existing Roof Systems
  2. Deteriorated Wood Roof Decking
  3. Gutters
  4. Downspouts
  5. Abandoned Piping
  6. Existing Wood Siding and Trim

**1.03 RELATED SECTIONS**

Division 1	General Requirements
06 10 53.01	Rough Carpentry for Roofing
07 31 13	Asphalt Shingles
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
09 91 13	Exterior Painting
22 14 26.13	Roof Drains
26 41 13	Lightning Protection for Structures

**1.04 REUTILIZED MATERIALS**

- A. The following items shall be assumed to be fully salvageable and reusable:
1. Existing lightning protection system.

**1.05 SUBMITTALS**

- A. Shop Drawings:
1. Indicate demolition and removal sequence, equipment to be used, location and construction of barricades, fences and temporary work structures.
- B. Proposed Dust Control and Noise Control Measures:

1. Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed timeframe for their operation. Identify options if proposed measures are later determined to be inadequate.

C. Schedule of activities

**1.06 REGULATORY REQUIREMENTS**

- A. Conform to all applicable codes for demolition of structures, safety of adjacent structures, dust control and disposal of materials.
- B. Obtain required permits from authorities with jurisdiction.
- C. Notify affected utility companies, if any, before starting work, and comply with their requirements.
- D. Do not close or obstruct any roadways, sidewalks or hydrants without permits.
- E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

**1.07 MATERIALS OWNERSHIP**

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from the site and legally disposed of.
- B. Historic items, relics, and similar objects of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver to Owner.

**PART 2 – PRODUCTS - N/A**

**PART 3 - EXECUTION**

**3.01 INSPECTION**

- A. Contractor shall survey the site prior to any demolition work and examine drawings and specifications to determine the extent of the work.
- B. Contractor shall examine the existing structure for any conditions that would affect the integrity of the remaining structure. Notify the Design Professional in writing of conditions detrimental to the Work.

**3.02 PREPARATION**

- A. Provide, erect, and maintain temporary barriers and safety devices to protect workers and public as needed.
- B. Protect the existing building and roof to prevent damage to any part of the building that is

not to be demolished.

- C. Mark location of utilities.

### **3.03 DEMOLITION REQUIREMENTS**

- A. Conduct demolition to minimize interference with adjacent structures or building occupants.
- B. Cease operations immediately if any structure not to be demolished appears to be in danger. Notify the Design Professional immediately.
- C. Conduct operations with minimum interference to public or private accesses. Maintain sufficient egress and access at all times.
- D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.
- E. Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose. The use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions, such as ice, flooding, or pollution.
- F. Protect building and contents from weather damage during and after demolition, until roof is replaced per the project specifications and drawings.
- G. Contractor assumes full responsibility for providing a watertight building envelope.
- H. A five (5)-day notice to building occupants and Design Professional is required before any demolition may proceed.
- I. No explosive devices may be used for demolition.

### **3.04 DEMOLITION**

- A. Remove demolished materials from the site daily. Materials that cannot be removed daily shall be stored in areas specified by the Design Professional.
- B. Do not burn or bury materials on site. Leave site in clean condition.
- C. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads.
- D. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- E. Remove any temporary fences or barricades.

### **3.04 REMOVAL OF EXISTING ROOF SYSTEM**

- A. GENERAL

1. Remove existing roof in areas designated on project drawings.
2. Remove all materials specified for removal, inclusive all wet and/or damaged roofing and flashing, including cants, wood blocking, underlayment materials, and currently concealed, damaged flashing materials. All existing roof system removal shall be in accordance with Regulatory Requirements.
3. The Contractor shall be responsible for the protection of the building interior and its contents from rain at holes or penetrations through the roof system during work. When roof deck is being replaced, he shall also be responsible for the normal protection of Owner's furnishing and equipment by covering all items in the work area with drop cloths or other required protection.
4. The Contractor shall provide protection of equipment and personnel during operations creating dust and debris from removal process.
5. The Contractor shall be responsible for the protection of the building exterior and grounds from the Contractor's operations. When hoisting materials and/or removing materials, cover exterior walls, including all items in the work area, with tarps or other required protection.
6. Removed portions of the existing roof system shall be replaced with materials in accordance with this specification. At the discretion of the roofing Contractor, the Contractor can either remove existing roof in its entirety and provide, at no additional charge to the Owner, a temporary roof system inclusive of appropriate flashings or remove/replace existing roof in sections to assure continued watertightness.
7. Remove all rubbish from the Owner's premises each day in compliance with all applicable local regulations. Dumpsters shall be placed at locations per Owner Representative's instructions. Rubbish placed in approved roof spot locations for future removal shall be placed out of view of the general public and shall be confined within tarps and/or plastic bags stored in a secure manner to prevent wind-blown debris.

B. REMOVAL SCHEDULE

1. Contractor shall outline to Design Professional prior to commencement of work the removal and replacement schedule for each roof section. Removal/replacement of the roof system shall be closely coordinated with Design Professional and building occupants.
2. It is critical that the removal and replacement process takes into consideration factors such as weather conditions, conditions of the existing roofing system(s), installation method of the new roofing system, productivity of the crew, material availability, etc.
3. Removed portions of the old roof system must be replaced in its entirety prior to commencing with additional roofing removal.
4. Upon commencement of roofing work, tie-in and/or cut-offs shall be removed.

Where incompatible substances were used for construction of a tie-in, care shall be taken to prevent any contact of the incompatible component and the roof membrane. Any contaminated sections shall be removed and replaced.

5. Roofing Contractor shall coordinate removal/re-roofing to minimize construction traffic over completed areas of the roof. Where traffic over completed roof areas is necessary, Contractor shall construct traffic path consisting of plywood boards anchored and/or weighted to prevent movement by winds.
6. In cases where loading/unloading has to be done on completed roof, Contractor shall designate one (1) area for this work. The area shall be adequately protected by use of plywood upon completion of the work and removal of the loading platform, Contractor together with the Design Professional shall inspect the roof area. At the discretion of the Design Professional, damaged or contaminated portions of the roof system shall be replaced.

### **3.05 REMOVAL OF EXISTING ROOF SYSTEM**

#### **A. GENERAL**

1. Remove existing siding and trim in areas designated on project drawings.
2. Remove all materials specified for removal, inclusive of weather barrier and related flashings. All existing siding and trim removal shall be in accordance with Regulatory Requirements.
3. The Contractor shall be responsible for the protection of the building interior and its contents from rain at holes or penetrations through the wall system during work.
4. The Contractor shall provide protection of equipment and personnel during operations creating dust and debris from removal process.
5. The Contractor shall be responsible for the protection of the building exterior and grounds from the Contractor's operations.
6. Remove all rubbish from the Owner's premises each day in compliance with all applicable local regulations. Dumpsters shall be placed at locations per Owner Representative's instructions.

#### **B. REMOVAL SCHEDULE**

1. Contractor shall outline to Design Professional prior to commencement of work the removal and replacement schedule for each wall section. Removal/replacement of the roof system shall be closely coordinated with Design Professional and building occupants.
2. It is critical that the removal and replacement process takes into consideration factors such as weather conditions, new roof system installation schedule, productivity of the crew, material availability, etc.

3. Contractor shall coordinate removal and re-installation to minimize construction traffic over completed areas of the roof.

END OF SECTION 02 41 19 – SELECTIVE DEMOLITION

Review Set  
Not For Bidding

**06 10 53.01**  
**ROUGH CARPENTRY FOR ROOFING**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1 - General Requirements, are included as part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Work of this section shall provide Owner with sound wood blocking to allow for the attachment of roofing components.
- B. Items covered by this specification section:
1. Fire-retardant treated wood
  2. Cedar Siding
  3. Fiber-Cement Siding
  4. Fasteners
  5. Accessories

**1.03 UNIT PRICE WORK**

The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and Contractor.

1. Provide unit price for wood member replacement, in sizes as indicated on Bid Form.

**1.04 RELATED SPECIFICATIONS**

Division 1	General Requirements
02 41 19	Selective Demolition
07 31 13	Asphalt Shingles
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
07 62 00	Sheet Metal Flashing and Trim
26 41 13	Lightning Protection for Structures

**1.05 REFERENCES**

- A. American Plywood Association (APA)
1. PRP-108 – Performance Standards and Policies for Structural-Use Panels
- B. American Society of Testing and Materials (ASTM)
1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. American Wood Preservers Association (AWPA)

1. C20 – Structural Lumber, Fire-Retardent Treatment by Pressure Processes
  2. C27 – Plywood, Fire-Retardent Treatment by Pressure Processes
  3. U1 – User Specification for Treated Wood
- D. Federal Specifications
1. MIL-L-19140 – Lumber and Plywood, Fire-Retardent Treated
- E. FM Global
1. Data Sheet 1-28 – Design Wind Loads
  2. Data Sheet 1-49 – Perimeter Flashing
- F. Underwriter’s Laboratories (UL)
1. UL 723 – Test for Surface Burning Characteristics of Building Materials and Flammability Ratings.
- G. U.S. Product Standards
1. PS 1 – Construction and Industrial Plywood
  2. PS 20 – American Softwood Lumber Standard
- H. American Wood Council (AWC)
1. National Design Specification for Wood Construction
- I. National Fire Protection Association (NFPA)
1. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.

#### **1.06 DEFINITIONS**

- A. Dimensional Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Board or Strips: Lumber of less than 2 inches nominal size in least dimension.

#### **1.07 PERFORMANCE REQUIREMENTS**

- A. **General:** Installed wood blocking and sheathing shall be secured to the building structure to provide an attachment point for the specified products and assemblies.
- B. **Material Compatibility:** Provide wood materials that are compatible with the building structure, fasteners, and other materials that will be in contact with the wood materials. Provide separator materials where required to prevent compatibility issues.

#### **1.08 REUTILIZED MATERIALS**

- A. The following items shall be assumed to be fully salvageable and reusable:
1. Existing fire-retardant treated plywood roof deck.

#### **1.09 SUBMITTALS**

Submit in accordance with Section 01 33 00:

- A. Product Data:
  - 1. Wood – include species and grade.
  - 2. Fasteners – including load capacity and pull-out resistance.
  - 3. Preservative treatment.
  - 4. Fire retardant treatment.
- B. Product Samples:
  - 1. Fasteners – each type.
- C. Material Safety Data Sheets (MSDS):
  - 1. Submit a MSDS sheet for each material that will be utilized on-site.

#### **1.10 QUALITY ASSURANCE**

- A. Source Limitations: Obtain wood materials, fasteners, sheathing, and accessories from a single manufacturer for each product required, unless approved by the Design Professional.
- B. Wood Standard: National Design Specification for Wood Construction; American Plywood Association.
- C. Installer Qualifications: A firm that has been engaged in carpentry work for a minimum of five (5) years.
- D. Environmental Standard: Manufacturer and contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where the project is located. Notify Design Professional in writing if variations to the Contract Documents are required to comply with these regulations.

#### **1.11 DELIVERY, STORAGE, AND HANDLING**

- A. Materials delivered to site in a wet condition shall be rejected and removed off Owner's property.
- B. Stack lumber to insure proper ventilation and drainage. Protect lumber from the elements.
- C. Store in a manner that will prevent warpage.

#### **1.12 JOB CONDITIONS (CAUTIONS AND WARNINGS)**

- A. All methods employed in performing the work, and all equipment, tools, and machinery used for handling materials and executing any part of the work, shall be subject to the approval of the Design Professional before the work is started, and whenever found unsatisfactory, shall be changed and improved as required.
- B. Time delivery and installation of carpentry to avoid delaying other operations whose work is dependent on or affected by the carpentry work, and to comply with protection and storage requirements.

- C. Protect installed carpentry from damage due to other work activities and weather.
- D. Select anchors for attachment of carpentry suitable for structural roof substrate.

## **PART 2 - PRODUCTS**

### **2.01 LUMBER**

- A. Grading Rules: PS 20
- B. Dimensions: Lumber dimensions are nominal; actual dimensions conform to industry standards established by American Lumber Standards Committee and rules writing agencies.
- C. Moisture Content: Shall be kiln-dried to 15%, maximum
- D. Species: No. 2 grade (or better) Southern Yellow Pine

### **2.02 SHEATHING**

- A. Comply with PS-1 for plywood construction panels and, for products not manufactured under PS-1 provisions, with APA PRP-108.
- B. Moisture Content: 15% maximum.
- C. Exposure: 1
- D. Treatment: Fire Retardant Treatment
- E. Grade Designation: CDX

### **2.03 FIRE RETARDANT TREATMENT**

- A. Lumber: AWPA C20
- B. Plywood: AWPA C27
- C. Flame Spread: Less than 25 per ASTM E84, NFPA 255, or UL 723.
- D. Moisture Content: Lumber - 19% maximum; Plywood 15% maximum
- E. Fire-retardant chemicals used to treat the lumber must be free of halogens, sulfates and ammonium phosphate.
- F. Testing on the fire performance, strength and corrosive properties of the fire-retardant treated wood shall be recognized by issuance of a National Evaluation Services Report.
- G. Carbon steel, galvanized steel, aluminum, copper and red brass in contact with the fire-retardant treated wood must exhibit corrosion rates of less than one mil per year when tested in accordance with Federal Specification MIL-L-19140 Paragraph 4.6.5.2.

## 2.01 FIBER-CEMENT SIDING AND TRIM

- A. General: ASTM C1186, Type A, Grade II, fiber cement board, noncombustible when tested according to ASTM E136; with a flame-spread index of 25 or less when tested according to ASTM E84.
- B. Nominal Thickness:
  - 1. Lap Siding: 0.312"
  - 2. Trim Boards: 5/4
- C. Exposure: 5"
- D. Panel Texture: Wood grain.
- E. Finish: Pre-Primed
- F. Manufacturers:
  - 1. James Hardie Building Products, Inc. (Select Cedarmill – Basis of Design)
  - 2. Nichiha Fiber Cement
  - 3. Plycem USA, Inc., a subsidiary of Elementia of Mexico

## 2.02 CEDAR SIDING AND TRIM

- A. General: Cedar bevel siding manufactured for use as exterior siding.
- B. Species: Western Red Cedar
- C. Size:
  - 1. Siding: 1/2" x 6"
  - 2. Trim: 5/4
- D. Grade: Clear V.G. Heart
- E. Moisture Content: Kiln-dried to 12% to 15%
- F. Fasteners: Hot-dipped Galvanized or stainless steel, ring-shanked
- G. Exposure: 5"
- H. Panel Texture: Rough sawn

## 2.04 FASTENERS

- A. General: All fasteners shall be corrosion-resistant stainless steel or heavy-duty fluorocarbon-coated steel threaded screw fasteners unless otherwise noted, to meet/exceed Factory Mutual Standard 4470 (current edition). Fasteners in contact with preservative treated or fire-retardant treated materials shall be stainless steel (300 series).
- B. Sheet Metal Screw Fasteners: 0.160" (#12) diameter shank and 0.435" head diameter with

self-drilling point. Self-drilling point shall be sized for the thickness of steel that wood blocking is being attached.

- C. Nails: 8d or 10d smooth shank nails, length as required to provide a minimum 1-1/4" penetration into framing.
- D. Wood Screw Fasteners: #10 diameter shank, bugle head, and Type 17 point.
- E. Concrete Screw Fasteners: 0.190" (#14) diameter shank and 0.435" head diameter.
- F. Washers: Galvalume steel or 300 series stainless steel.
- G. Manufacturers:
  - Triangle Fastener Corp., Pittsburgh, PA
  - Trufast (Altenloh, Brinck & Co. US, Inc.), Bryan, OH
  - OMG Roofing Products, Agawam, MA
  - Power Fasteners, Brewster, NY
  - ITW Buildex, Itasca, IL

## 2.05 REJECTED MATERIALS

- A. The Design Professional shall have the right to inspect all materials brought to or stored at the job site. Those materials that do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on site supervisor. The verbal notification will be by the Design Professional, which will be followed by written confirmation.

## PART 3 - EXECUTION

### 3.01 PREPARATION

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed. Notify the Design Professional in writing of conditions detrimental to the Work.
- B. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate the Work with a minimum of joints or the optimum jointing arrangement.
- C. Verify the existing wood blocking is securely attached and in good condition. The Design Professional shall be notified in writing, if the attachment, condition, location, or size of the wood blocking does not meet the specification requirements.

### 3.02 INSTALLATION

- A. General:
  - 1. Fit carpentry work to other work. Scribe and cope as required for accurate fit.
  - 2. Set carpentry work accurately to required levels and lines with members plumb and

true.

3. Securely attach carpentry work to substrates by anchoring and fastening as specified and as required by applicable building codes. Wood blocking shall be fastened to resist a force of 200 lbs. per linear foot applied in any direction.
  - a. Provide washers under bolt heads and nuts in contact with wood.
  - b. Countersink fastener heads where detailed on drawings, or where required by subsequent application of flashing materials.
4. Fasteners: Make tight connections between members. Install fasteners without splitting of wood. If structural deck is thicker than 20-gauge or where wood rides up threading prior to penetrating the structural deck, pre-drill the blocking. Where required, use washers and countersink into wood member.
5. Tighten bolts and lag screws at installation and re-tighten as required for tight connections prior to closing in or at completion of work.
6. A minimum of two (2) fasteners shall be utilized per section of wood, regardless of length. Pull out resistance must be a minimum of 360 lbs. per fastener.
7. All wood blocking indicated on the project drawings is to be new wood blocking, unless the drawings indicate that the blocking is existing and is to remain in place.
8. Use of power-actuated fastener use is not permitted.
9. Fasteners shall be installed in accordance with the manufacturer's installation recommendations.

### **3.03 WOOD BLOCKING INSTALLATION – WOOD, STEEL, OR CONCRETE SUBSTRATES**

- A. Wood blocking shall be installed at appropriate roof perimeters, curbs, and similar penetrations. All wood blocking shall be of sufficient thickness so as to be flush with the roof insulation. Wood blocking shall not be lower than the insulation surface.
- B. The wood blocking shall be fastened to the substrate at 12" on-center, staggered. The fastener spaced shall be enhanced eight feet (8') from each corner to two (2) rows of fasteners 12" on-center. At each end of the blocking there shall be two (2) fasteners installed.
- C. For wood blocking wider than 6 inches, bolts should be staggered to avoid splitting the wood. Each wood blocking member should have at least two fasteners. A fastener should be located approximately 4 inches but not less than 3 inches from each end of the wood. Additional wood members, such as cant strips and stacked wood blocking, should be fastened with corrosion-resistant fasteners having sufficient pullout resistance. Fasteners should be staggered, spaced at a maximum 12 inches on centers and should penetrate the wood sufficiently to achieve design pullout resistance.
- D. At areas of tapered insulation, solid wood blocking shall be installed by shaping the wood blocking to the same profile as the tapered insulation. Wood blocking shall not be lower

- than the insulation surface.
- E. Install wood blocking with one-eighth inch (1/8") gap between each length or as required based on climatic conditions at the time of installation.
  - F. Wood blocking, cants, etc. shall be chamfered, beveled, shaved, planed, or shimmed as necessary to provide smooth transition to adjacent materials.
  - G. Wood shims, where used for providing transition to insulation. Shims are only acceptable in conditions where shim thickness does not exceed one-half inch (1/2"). All shim material to be in compliance with this Section. All shims must be continuous and shall be placed at deck level.
  - H. Pre-drilling of fastener holes will be required for installation of wood blocking over any concrete surface.

### **3.04 WOOD BLOCKING INSTALLATION – WOOD DECKS**

- A. Wood blocking shall be installed at appropriate roof perimeters, curbs, and similar penetrations. All wood blocking shall be of sufficient thickness so as to be flush with the roof insulation. Wood blocking shall not be lower than the insulation surface.
- B. The wood blocking shall be fastened to the substrate at 12" on-center, staggered. The fastener spaced shall be enhanced eight feet (8') from each corner to two (2) rows of fasteners 12" on-center. At each end of the blocking there shall be two (2) fasteners installed.
- C. For wood blocking wider than 6 inches, bolts should be staggered to avoid splitting the wood. Each wood blocking member should have at least two fasteners. A fastener should be located approximately 4 inches but not less than 3 inches from each end of the wood. Additional wood members, such as cant strips and stacked wood blocking, should be fastened with corrosion-resistant fasteners having sufficient pullout resistance. Fasteners should be staggered, spaced at a maximum 12 inches on centers and should penetrate the wood sufficiently to achieve design pullout resistance.
- D. At areas of tapered insulation, solid wood blocking shall be installed by shaping the wood blocking to the same profile as the tapered insulation. Wood blocking shall not be lower than the insulation surface.
- E. Install wood blocking with one-eighth inch (1/8") gap between each length or as required based on climatic conditions at the time of installation.
- F. Wood blocking, cants, etc. shall be chamfered, beveled, shaved, planed, or shimmed as necessary to provide smooth transition to adjacent materials.
- G. Wood shims, where used for providing transition to insulation. Shims are only acceptable in conditions where shim thickness does not exceed one-half inch (1/2"). All shim material to be in compliance with this Section. All shims must be continuous and shall be placed at deck level.

### **3.05 SHEATHING INSTALLATION**

- A. General:
  - 1. Fastener heads shall be set flush with the sheathing surface.
  - 2. Sheathing sheets shall be spaced with a one-eighth inch (1/8") gap between sheets at all edges and ends.
  - 3. Stagger panel end joints.
- B. Installation Over Rafters:
  - 1. Where sheathing is installed as sheathing over open-framing, the sheathing shall be fastened 6" on-center at each end of the plywood and 12" o.c. at each intermediate support location.
  - 2. One (1) panel clip per span shall be installed for spans up to 24" o.c.
- C. Installation Over Solid Substrates:
  - 1. Where sheathing is installed over a solid substrate, the sheathing shall be secured at a rate of 20 fasteners per 4'x8' sheet of sheathing, unless otherwise specified.

### **3.06 FIBER-CEMENT SIDING AND TRIM INSTALLATION**

- A. General: Comply with manufacturer's installation instructions applicable to products and applications indicated unless more stringent requirements are specified.
- B. Cut edges of the fiber-cement siding shall be primed or treated as recommended by the siding manufacturer.
- C. Clearances between the fiber-cement siding and horizontal flashings shall be maintained at ¼ inch.
- D. Clearance between the fiber-cement siding and finished grade shall be maintained at 6".
- E. Clearance between the fiber-cement siding and roof surfaces shall be maintained at 2" minimum.
- F. Install sealant at all joints between the siding and trim boards.

### **3.07 CEDAR BEVEL SIDING AND TRIM INSTALLATION**

- A. General: Comply with manufacturer's installation instructions applicable to products and applications indicated unless more stringent requirements are specified.
- B. Cut edges of the siding shall be primed.
- C. Clearances between the siding and horizontal flashings shall be maintained at ¼ inch.
- D. Clearance between the siding and finished grade shall be maintained at 6".
- E. Clearance between the siding and roof surfaces shall be maintained at 2" minimum.

- F. Install sealant at all joints between the siding and trim boards.

**3.08 COMPLETION**

- A. Work that does not conform to specified requirements including tolerances and finishes, shall be corrected and/or replaced, as directed by Design Professional, at Contractor's expense, without extension of time. Therefore, Contractor shall also be responsible for cost of corrections to any Work affected by or resulting from correction to work of this Section.

END OF SECTION 06 10 53.01 - ROUGH CARPENTRY FOR ROOFING

Review Set  
Not For Bidding

**07 22 16**  
**ROOF BOARD INSULATION**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1 - General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Items covered by this specification section:
1. Rigid Insulation
  2. Cover Board
  3. Accessories
- B. It is the intent of this specification to provide a layer of roof insulation to form a smooth, uninterrupted and stable base for a membrane roof system, inclusive of tapered insulation as required.

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and the Contractor.
1. N/A

**1.04 RELATED SECTIONS**

Division 1	General Requirements
02 41 19	Selective Demolition
06 01 53.01	Rough Carpentry for Roofing
07 31 13	Asphalt Shingles
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
22 14 26.13	Roof Drains
26 41 13	Lightning Protection for Structures

**1.05 REFERENCES**

- A. American Society of Testing and Materials (ASTM)
1. C168 - Standard Terminology Relating to Thermal Insulation
  2. C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
  3. C209 - Methods of Testing Insulating Board, Structural and Decorative

4. C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
  5. C1289 - Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
  6. C 1303 - Standard Test Method for Estimating the Long Term Change in the Thermal Resistance of Unfaced Closed Cell Plastic Foams by Slicing and Scaling Under Controlled Laboratory Conditions.
  7. D1079 - Standard Terminology Relating to Roofing and Waterproofing
  8. D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics
  9. D 2126 - Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
  10. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
  11. E96 - Standard Test Methods for Water Vapor Transmission of Materials
- B. Environmental Protection Agency (EPA)
1. EPA Method 9045
- C. Factory Mutual Research (FM)
1. Approval Standard 4450 – Approval Standard for Class 1 Insulated Steel Roof Decks
  2. Approval Standard 4470 – Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies, for use in Class 1 and Noncombustible Roof Deck Construction
  3. Data Sheet 1-29 – Roof Deck Securement and Above Deck Components
- D. National Roofing Contractors Association (NRCA)
1. The NRCA Roofing Manual: Membrane Roof Systems.

## 1.06 DEFINITIONS

- A. Terminology: See ASTM D1079, C168, and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this section.

## 1.07 PERFORMANCE REQUIREMENTS

- A. Polyisocyanurate Insulation
1. General: Installed roof insulation, underlayment boards, and cover boards shall serve as a stable base for the roof system installation; and resist specified uplift pressures, thermal and moisture induced movement, and exposure to weather without excessive movement that causes failure of the roof membrane. The roof insulation system and system components shall comply with requirements in FM Approvals of 4450 and 4470, current editions.
  2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by component manufacturer based on testing and field experience.
  3. Wind Up-Lift Characteristics: Provide a roofing system that is identical to

systems that have been successfully tested in accordance with FM 4474 by a qualified testing and inspecting agency to resist uplift pressures and hail as listed below. The perimeter and corner areas shall be prescriptively enhanced in accordance with the current edition of FM Global Loss Prevention Data Sheet 1-29.

- a. Field Wind Up-Lift Rating: 60 psf
- 4. 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 another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - a. Interior Fire-Test Exposure: Class 1
  - b. Flame Spread and Smoke Development: ASTM E-84; <75/<450

#### 1.08 REUTILIZED MATERIALS

- A. The following items shall be assumed to be fully salvageable and reusable:
  - 1. N/A

#### 1.09 SUBMITTALS

Submit in accordance with Section 01 33 00:

- A. Product Data:
  - 1. Submit product data sheets for each material specified or required for installation of the insulation system. Include data substantiating that materials comply with requirements of this specification.
  - 2. Submit specifications, installation instructions, and general recommendations from roof insulation materials manufacturers for type of roof insulation specified.
  - 3. Submit manufacturer's suggested material handling and material protection requirements.
- B. Shop Drawings:
  - 1. Drawings illustrating tapered insulation layout, method of attachment, intersections with adjacent materials, and other installation details.
- C. Product Samples:
  - 1. Roof Insulation: Sample size 6-inches by 6-inches.
  - 2. Cover Board: Sample size 6 inches by 6 inches.
- D. Material Safety Data Sheets (MSDS):

1. Submit a MSDS sheet for each material that will be utilized on-site.
- E. Manufacturer's Certification:
1. Submit written approval from roof system manufacturer for use, performance, and compatibility of the roof insulation and products in the proposed system.
- F. Field Testing:
1. Perform adhesive pull tests in accordance with ANSI/SPRI IA-1 – 2010 for each substrate. A minimum of two (2) pull tests shall be completed on each substrate. Submit written evidence of the adhesive pull tests of deck substrate(s) to show compliance with this specification.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. All products delivered to the site shall be in the original unopened containers, wrappings, or crating. Storage areas will be defined by Owner or Design Professional.
- B. Average live loads on the roof during the work shall not exceed twenty (20) pounds per square foot at any time.
- C. Handle all materials to prevent damage.
- D. The Contractor shall store the materials to prevent exposure to UV light, precipitation, condensation (i.e. night-time dew or internal condensation within the packaging), and other moisture entry or formation. The following are the minimum storage requirements:
1. Elevate the insulation bundles a minimum of 3" above the ground or finished surface. Storage on paved surfaces is preferred over grass or dirt.
  2. Cover the insulation material with a waterproof, breathable cover. The cover must be secured to prevent displacement by wind forces.
  3. If recommended by the manufacturer, slit the factory wrappings to allow the product to breathe. The integrity of the bundles must be maintained so that the material can still be handled in full bundles.
  4. Long-term storage must be indoors in a dry, well-ventilated building.
  5. Regardless of the storage method selected by the Contractor, if the insulation is wet or is water-stained, it shall be replaced at the Contractor's expense.
- E. Store temperature susceptible materials in a dry and heated area between 60 degrees F and 80 degrees F. If exposed to lower temperatures, restore to proper temperature prior to use. Provide certification from the manufacturer indicating that freezing temperatures will not adversely affect the materials use and performance, and that roof system application will not be restricted by low ambient temperatures.
- F. Materials determined by the Design Professional to be damaged or to have been subjected to adverse conditions shall be removed and replaced at Contractor's expense.
- G. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier (MSDS sheets).

- H. Protect insulation against concentrated loads, and standing loads exerting a force in excess of 50% of the materials compressive strength.
- I. Do not expose foam core to excessive heat, sparks, or open flame.
- J. Any traffic shall be limited to the workmen installing the material.
  - 1. The Contractor shall plan installation progress to prevent or minimize traffic across completed or partially completed sections. Where traffic across completed or partially completed sections is necessary, Contractor shall provide protection adequate in nature and duration, consistent with requirements of the material manufacturer.

#### **1.11 WEATHER LIMITATIONS ON WORK**

- A. Proceed with installation only when existing and forecasted weather conditions permit insulation board system to be installed according to manufacturer's written instructions and warranty requirements. Roofing work shall not be done during precipitation and shall not be started in the event there is a high probability of precipitation during the ongoing work.
- B. At ambient temperatures of 40 degrees F and below, including wind chill, precautions must be taken to insure that temperature-susceptible materials maintain their minimum acceptable temperature at the point of application as recommended by the roofing materials manufacturer.

#### **1.12 WORK SEQUENCE**

- A. Work shall begin at the furthest point from the designated spot where materials are shipped to the roof. Work shall be so scheduled to minimize traffic over newly completed or previously renovated roof area.
- B. All insulation installed in any one day shall be covered with complete roof system underlayment or roof membrane to prevent any water infiltration.

#### **1.13 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)**

- A. All methods employed in performing the work, and all equipment, tools, and machinery used for handling materials and executing any part of the work, shall be subject to the approval of the Design Professional before the work is started, and whenever found unsatisfactory, shall be changed and improved as required.
- B. Contractor shall implement all necessary precautions to prevent debris or materials/equipment from becoming airborne due to wind conditions anticipated at the site. Contractor shall conform to all regulations and precautions as required by applicable safety organizations.

#### **1.14 MANUFACTURER'S REPRESENTATIVE**

- A. Contractor shall require the presence of a Technical Representative of the material

manufacturer to provide field instructions and supervision during the duration of the work, as required by the manufacturer for a guaranteed job.

- B. Design Professional may require the presence of the Technical Representative of the roofing material manufacturer, as necessitated by the work progress.
- C. The Technical Representative shall be employed by the roofing material manufacturer. The roofing material manufacturer shall designate one (1) Technical Representative for the duration of the project.

### 1.15 GUARANTEES AND MAINTENANCE

- A. A full system warranty is required for the low-sloped roof areas. The roof system manufacturer shall warrant the entire roof system, inclusive of the roof insulation for the periods as indicated in Section 07 53 23.

### 1.16 QUALITY ASSURANCE

- A. Contractor Qualifications:
  - 1. Contractor must be trained by the manufacturer in application of insulation system specified, and must be approved for this work by manufacturer.
- B. Manufacturer Qualifications:
  - 1. Manufacturer shall be a company that regularly manufactures polyisocyanurate and fully assembled nailbase insulation panels in-house with no outside fabrication operations.

## PART 2 – MATERIALS

### 2.01 GENERAL

- A. If materials from other manufacturers are proposed, supporting technical literature, drawings, performance data and manufacturers written endorsement of this specific product for use under job conditions must be submitted in accordance with the Instructions to Bidders.
- B. Preformed roof insulation boards manufactured or approved by roof system manufacturer. Selected from manufacturer's standard sizes suitable for application of thicknesses indicated and that produce FM Approvals for approved roof insulation.

### 2.02 POLYISOCYANURATE BOARD INSULATION

- A. Flat polyisocyanurate rigid roof insulation with reinforced non-organic biological growth-resistant coated-glass facers shall conform to ASTM C 1289 Type II, Class 2, Grade 3 (25 psi).
  - 1. Minimum Total Thickness: As noted on roof plan
  - 2. Maximum Thickness Per Layer: 2"

- B. Tapered polyisocyanurate rigid roof insulation with reinforced non-organic biological growth-resistant coated-glass facers shall conform to ASTM C 1289 Type II, Class 2, Grade 3 (25 psi).

1. Minimum Total Thickness: As noted on roof plan
2. Minimum Slope: 1/4" and 1/2" per 12"

- C. Tapered Edge Strip: Polyisocyanurate rigid roof insulation with reinforced non-organic biological growth-resistant coated-glass facers shall conform to ASTM C 1289 Type II, Class 2, Grade 3 (25 psi).

1. Edge thickness: 0"
2. Slope: 1:12 or 1.5:12
3. Width: 12"

- D. Material Properties

1. Compressive Strength: 25 psi
2. Dimensional Stability – maximum dimensional change after installation (inches):
  - a. Length +/- 1/8
  - b. Width +/- 1/8
  - c. Thickness +/- 1/16
  - d. Squareness 1/16
  - e. Flatness 1/16
3. Moisture Vapor Transmission: ASTM E96, <1 Perm
4. Water Absorption: ASTM C209, < 1 percent by volume
5. Flame Spread: ASTM E84, <75
6. Service Temperature: Minus 100 degrees to 250 degrees F
7. Smoke Developed: ASTM E84, <450
8. Acidity: EPA Method 9045, 6 pH Minimum, 8 pH Maximum
9. Aged R-Value Per Inch: ASTM C177 and C518, 5.6 R

- E. Manufacturers

1. H-Shield CG; Hunter Panels, Portland, ME
2. Atlas AC Foam III, Gemini Tapered Edge; Atlas Roofing Corporation, Atlanta, GA
3. ENRGY 3 CGF; Johns Manville, Denver, CO
4. Roof System Manufacturer

## 2.03 COVER BOARD

- A. Fiberglass-Mat Faced, water-resistant gypsum panel with a non-asphaltic coating to meet ASTM 1177. Silicone containing gypsum core board is not permitted.

1. Thickness: 1/2"

- B. Manufacturers

1. DensDeck Prime; Georgia-Pacific Gypsum, Atlanta, Georgia
2. Roof System Manufacturer

## 2.04 ACCESSORIES

- A. Insulation, Substrate, and Cover Board Fasteners
1. General:
    - a. Fasteners, inclusive of plates/adhesive system, must conform to the roof or product manufacturer's requirements.
    - b. Adhesive to have Factory Mutual approval for application.
    - c. Load distribution plates shall conform to FM 4470 for corrosion resistance. Roof systems utilizing mechanically fastened insulation require metal plates, unless an alternate method is specifically approved by the roof system or product manufacturer and the Design Professional.
    - d. Fastener pullout resistance must be a minimum of 360 lbs. per fastener.
    - e. Adhesive pull test resistance must be a minimum of 90 lbs. per square foot.
    - f. All steel fasteners shall be carbon steel with a corrosion-resistant coating that meets or exceeds Factory Mutual Standard 4470 unless noted otherwise.
  2. Manufacturers:
    - a. SFS/Stadler Inc., Valley City, Ohio
    - b. Tru-Fast, Bryan, Ohio
    - c. ITW Buildex, Elmhurst, Illinois
    - d. OMG Roofing Products, Agawam, Massachusetts
    - e. Roof System Manufacturer
  3. Concrete Deck:
    - a. Provide, install and secure insulation to structural roof deck using a two-part polyurethane foam adhesive in a ribbon pattern. The ribbons shall be 3/4" wide and spaced as indicated on the project drawings, in strict accordance with requirements of material manufacturer and this specification. The insulation board size is limited to four-foot by four-foot (4' x 4').
    - b. The insulation board size is limited to four-foot by four-foot (4' x 4').
    - c. Manufacturers
      - OMG Roofing Products, Agawam, Massachusetts
      - Royal Adhesives and Sealants, South Bend, Indiana
      - Roof System Manufacturer

## 2.05 REJECTED MATERIALS

- A. The Design Professional shall have the right to inspect all materials brought to or stored at the job site. Those materials that do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on site supervisor. The verbal notification will be by the Design Professional, which will be followed by written confirmation.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. A Pre-Job conference including the Design Professional, Owner's Representative, the Contractor, the manufacturer's representative and all involved trades shall be conducted prior to commencement of the roofing work.
- B. Examine the substrate and the conditions under which the work is to be performed. Do not proceed until unsatisfactory conditions have been corrected as required for the material application and in accordance with the material manufacturer's specifications and requirements. Surfaces to receive roofing material components are to be clean, even, smooth, dry and free from defects and projections which might adversely affect the application. Verify slope prior to installation.
- C. Contractor shall verify that work penetrating the roof deck or which may otherwise affect the roofing has been properly completed.
- D. Start of roof insulation installation shall constitute acceptance of substrates by Contractor.

### 3.02 PREPARATION

- A. General: All surfaces shall be swept or vacuumed prior to commencement of roofing work.
- B. Drainage: Contractor, together with Design Professional, shall verify that all drain lines are unblocked before starting work. Any blocked drains shall be cleared by the Owner before starting work. Cover all drains and other openings intended for roof drainage with screens to prevent clogging of the drainage system. During construction, allow for sufficient drainage to prevent ponding with possible structural overloading.
- C. Fasteners: Contractor is required to run pullout tests to verify conditions of deck or wall substrate(s) and to confirm pullout values.

### 3.03 COVER BOARD

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
  - 1. Adhere substrate board to the top layer of roof insulation to resist uplift pressure at corners, perimeter, and field of roof according to roof system manufacturer's written instructions and as required to meet "Performance Requirements".

### 3.04 ROOF BOARD INSULATION INSTALLATION

- A. No more insulation should be installed than can be covered by the roofing system that day, or before inclement weather occurs.
- B. Application shall be in accordance with the insulation and roof system manufacturer's instructions, and additional requirements of the project specifications and drawings.

- C. All insulation to be in full sheets, carefully fitted against adjoining sheets to form tight joints.
- D. Edges of the insulation boards shall be mitered at ridges, hips, valleys, and elsewhere to prevent open joints or irregular surfaces. Edges shall be butted to produce moderate contact but not deformed. Ridge and open joints require full thickness polyisocyanurate spray foam closure.
- E. Long joints will be laid continuous and short joints staggered. The joints in each layer shall be offset 12" in order to avoid a vertically continuous joint through the total insulation thickness.
- F. The roof insulation shall be adhered and/or mechanically secured to the substrate as indicated on the project drawings, the roof system manufacturer's requirements, and the submittals as required to comply with the Performance Requirements of the specifications.
- G. Adhered insulation assemblies shall utilize a two-part adhesive applied to the substrate using a ribbon pattern. The roof insulation, substrate board, and cover boards shall be a maximum of 4' x 4'. The ribbons shall be a minimum of  $\frac{3}{4}$ " wide, and spaced as indicated on the project drawings. Apply deck primer as required by the material manufacturer. As adhesive is applied, allow the adhesive to rise prior to placing the insulation board into wet adhesive, unless otherwise recommended by the adhesive manufacturer. Do not allow the adhesive to "skin over". Do not use when the substrate or ambient temperature is below 45 degrees Fahrenheit. The insulation board shall be weighted down, as necessary, and walked-in. Walking-in the boards alone is not acceptable. Apply deck primer as required by the adhesive manufacturer.
- H. Tapered Insulation Requirements:
1. It is the intent of this section to provide positive roof drainage by way of saddles and crickets, roof sumps, fully tapered insulation system, and other specified areas of tapered insulation as shown on the roof plan. Where fully tapered insulation systems are shown, they shall drain the roof completely within 48 hours after the latest rainfall. The maximum depth of allowable ponding shall be one-fourth inch ( $\frac{1}{4}$ " ) at any time, prior to the 48-hour period for complete drainage.
  2. Installation of tapered insulation shall meet the minimum design intent as indicated on the project drawings relating to tapered insulation requirements.
  3. Roof saddles and crickets shall have a maximum one-eighth-inch ( $\frac{1}{8}$ " ) step from toe of tapered insulation to substrate insulation. A tapered starter strip of polyisocyanurate tapered insulation is acceptable to complete the transition between flat and tapered insulation.
  4. Roof saddles and crickets shall be installed up-slope of rooftop units with a dimension of four feet (4') or larger, perpendicular to the roof slope.
  5. All tapered insulation components shall be compatible with existing roof membrane substrate and new roof membrane system. Where required by the

manufacturer, provide slip or separation layers.

6. The tapered insulation system shall provide a smooth, continuous, minimum 1/8" per linear foot slope (high point to drain) in all valley lines, inclusive of saddles and crickets.
- I. Cover Board Requirements: Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together.
  1. Secure cover boards to the top layer of roof insulation as indicated on the project drawings and outlined in this section.

### 3.05 COMPLETION

#### A. Correction of Work

Work which does not conform to specified requirements including tolerances, slopes and finishes shall be corrected and/or replaced as directed by Design Professional at Contractor's expense without extension of time. Therefore, Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.

#### B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.

All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre-construction condition.

#### C. All manufacturers' on-site inspection reports shall be submitted prior to final payment.

#### D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 07 22 16 – ROOF BOARD INSULATION

**07 27 00**  
**AIR BARRIERS**

**PART 1 – GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Items covered by this specification section:
1. Sheet applied air and moisture barrier.
  2. Flexible flashings.
  3. Accessories

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Owner's Representative and the Contractor.
1. N/A

**1.04 RELATED SPECIFICATIONS**

Division 1      General Requirements

**1.05 REFERENCES**

- A. American Association of Textile Chemists and Colorists (AATCC)
1. AATCC TM127 – Water Resistance: Hydrostatic Pressure Test
- B. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)
1. 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings
- C. American Society of Testing and Materials (ASTM)
1. D882: Standard Test Method for Tensile Properties of Thin Plastic Sheeting
  2. D1117: Standard Guide for Evaluating Nonwoven Fabrics
  1. E84: Standard Test Method for Surface Burning Characteristics of Building Materials
  3. E96: Test Methods for Water Vapor Transmission of Materials.
  2. E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
  4. E2178: Standard Test Method for Air Permeance of Building Materials.
  5. E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

- D. National Fire Protection Association (NFPA)
  - 1. NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

#### 1.06 DEFINITIONS

- A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.
- B. Weather Barrier: A combination of materials and accessories that do the following:
  - 1. Prevents accumulations of water as a water-resistive barrier.
  - 2. Minimizes air leakage into or out of the building envelope as a continuous air barrier.
  - 3. Provides sufficient water vapor transmission to enable drying as a vapor-permeable membrane.
- C. Water-Resistive Barrier: A combination of materials and accessories that prevent the accumulation of water within the wall assembly per the building code.
- D. Continuous Air Barrier: The combination of interconnected materials, assemblies, and sealed joints and components of the building envelope that minimize air leakage into or out of the building envelope per ASHRAE 90.1.
- E. Vapor Permeable Membrane: The property of having a water-vapor permeance rating of 10 perms or greater, when tested in accordance with the desiccant method using Procedure A of ASTM E 96.

#### 1.07 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Assembly Performance: Provide a continuous air barrier in the form of an assembly that has an air leakage not to exceed 0.04 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (0.04 cfm/ft<sup>2</sup> @ 1.57 psf) when tested in accordance with ASTM E2357.
- C. Water Penetration Resistance: Provide water penetration resistance when tested in accordance with ASTM E 331. The test pressure shall be a minimum of 2.86 lbs./sq. ft. for minimum time period of 15 minutes.
- D. The building envelope shall be designed and constructed with a continuous air barrier assembly to control air leakage into, or out of the conditioned space.

The air barrier shall have the following characteristics:

1. It must be continuous, with all joints made airtight.
2. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
4. It shall be durable or maintainable.
5. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
  - a. Foundation and walls, including penetrations, ties and anchors
  - b. Walls, windows, curtain walls, storefronts, louvers or doors
  - c. Different wall assemblies and fixed openings within those assemblies
  - d. Wall and roof connections
  - e. Wall and roof over unconditioned space
  - f. Walls, floor and roof across construction, control and expansion joints
  - g. Walls, floors and roof to utility, pipe and duct penetrations
  - h. Seismic and expansion joints
  - i. Other leakage pathways in the building envelope
6. Flame Propagation Test: Materials and construction shall be as tested in accordance with NFPA 285.

#### **1.08 REUTILIZED MATERIALS**

A. The following items shall be assumed to be fully salvageable and reusable:

1. N/A

#### **1.09 SUBMITTALS**

Submit in accordance with Section 01 33 00:

A. Product Data:

1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.
2. Include manufacturer's specifications for materials, construction details, and installation instructions.
3. Include data on air and water-vapor permeance based on testing according to referenced standards.
4. Submit manufacturer's list and description of wall assemblies, incorporating product, approved per NFPA 285.

B. Shop Drawings:

1. Flashing Conditions: Submit shop drawings showing locations and extent of air barrier and all flashing conditions.
- C. Product Samples:
1. Air barrier: Minimum 8 1/2" by 11"
  2. Accessory Materials: Sample of each item.
- D. Material Safety Data Sheets (MSDS):
1. Submit a MSDS sheet for each material that will be utilized on-site.
- E. Manufacturer Certification:
1. Submit certification of compatibility from air barrier manufacturer, listing all materials in the wall assembly with which the air barrier could come into contact.
- F. Contractor Certification:
1. Submit written statement from Contractor indicating five (5) years of successful experience with installation of fluid-applied air barrier assembly, including project name and location, type of air barrier, and scopes of work which are equivalent to work of this section.
- G. Sample Warranty:
1. Submit copy of warranty from the air barrier system manufacturer.
- H. Mock-Up:
1. Build mockups to verify the various flashing conditions. Apply product and accessories on mock-up to verify shop drawing details and to become familiar with the products. The mock-up can be included as part of the project. Do not proceed with base of wall installation, until mock-up is acceptable to the Design Professional.

#### 1.10 QUALITY ASSURANCE

- A. Source Limitations: Obtain air barrier system materials from a single manufacturer for each product required, unless approved by the Design Professional.
- B. Contractor Qualifications: A firm that has been engaged in placing and finishing cast-in-place concrete for a minimum of five (5) years.
- C. Manufacturer Qualifications: A firm experienced in manufacturing the specified air barrier systems for a minimum period of five (5) years.
- D. Environmental Standard: Manufacturer and contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where the project is located. Notify Design Professional in writing if variations to the Contract Documents are required to comply with these regulations.

### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. All products delivered to the site shall be in the original unopened containers, wrappings, or crating. Storage areas will be defined by Design Professional.
- B. Handle all materials to prevent damage. Store materials elevated sufficiently off the ground and fully protected from moisture. Materials shall be secured in a safe manner to prevent damage. Material shall be covered with opaque tarps, secured to prevent displacement by wind forces.
- C. Store temperature susceptible materials in a dry and heated area between 60° F and 80° F. If exposed to lower or higher temperatures, the material shall be discarded and new material provided at no cost to the Owner.
- D. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier (MSDS sheets).

### 1.12 WEATHER LIMITATIONS ON WORK

- A. Air barrier work shall not be done during precipitation and shall not be started in the event there is a high probability of precipitation during the ongoing work.
- B. At ambient temperatures of 40 degrees F and below, including wind-chill, precautions must be taken to insure that temperature-susceptible materials maintain their minimum acceptable temperature at the point of application and during curing as recommended by the air barrier system manufacturer.
- C. Protect substrates from environmental conditions that affect performance of air barrier.

### 1.13 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)

- A. Do not apply air barrier material over incompatible materials.

### 1.14 GUARANTEES AND MAINTENANCE

- A. Manufacturer's Product Warranty: To repair or replace weather barrier product that fails in materials within specified warranty period.
  - 1. Warranty Period: 10 years from date of purchase.

## PART 2 – MATERIALS

### 2.01 WEATHER BARRIER

- A. High-performance, spunbonded polyolefin, non-woven, non-perforated, weather barrier.
- B. Material Properties:
  - 1. Air Penetration (ASTM E2178): 0.001 cfm/ft<sup>2</sup> at 75 Pa

2. Water Vapor Transmission (ASTM E96 – Method B): 28 perms
3. Water Penetration Resistance (AATCC Test Method 127): 280 cm
4. Basis Weight: 2.7 oz./yd<sup>2</sup>
5. Tensile Strength (ASTM D882): 38/35 lbs./in.
6. Tear Resistance (ASTM D1117): 12/10 lbs.
7. Surface Burning Characteristics (ASTM E84): Class A; Flame Spread 10, Smoke Developed 10

C. Manufacturers:

1. DuPont Building Innovations, Wilmington, DE (Tyvek – Commercial Wrap)
2. Or Approved Equal

## 2.02 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by weather barrier and fiber-cement siding manufacturer for intended use and compatible with weather barrier and fiber-cement siding material.

B. Weather Barrier:

1. Primer: Provide manufacturer recommended primer at all self-adhering flashing locations.
2. Self-Adhering Flashing: Provide manufacturer's standard self-adhering flashing material. Width as required by flashing condition. (StraightFlash)
3. Flexible Self-Adhering Flashing: Provide manufacturer's standard flexible self-adhering flashing material. (FlexWrap NF)
4. Seam Tape: Provide manufacturer's standard seam tape for adhered adjacent weather barrier sheets together (not for flashings). (Tyvek Tape)

## 2.01 REJECTED MATERIALS

A. The Owner's Representative shall have the right to inspect all materials brought to or stored at the job site. Those materials which do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on-site supervisor. The verbal notification will be by the Owner's Representative, which will be followed by written confirmation.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. A pre-job conference including the Design Professional, Owner's Representative, Contractor, the manufacturer's representative and all involved trades shall be conducted prior to commencement of the weather barrier work.
- B. Examine the substrate and the conditions under which the work is to be performed. Do not proceed until unsatisfactory conditions have been corrected as required for the material application and in accordance with the material manufacturer's specifications and requirements. Surfaces to receive weather barrier material components are to be clean, even, smooth, dry and free from defects and projections which might adversely affect the application.

- C. Notify the Design Professional in writing to all conditions which may adversely affect the installation and/or performance of the weather barrier system prior to commencing with the work. Proceed with installation only after unsatisfactory conditions have been corrected. Application of any part of the weather barrier system shall indicate acceptance of the wall conditions and acknowledgment of full responsibility for the quality and durability of the weather barrier and fiber-cement siding.

### 3.02 PREPARATION

- A. General: Clean substrates of projections or other adjoining construction to ensure proper sequencing.
- B. Remove and dispose of the existing siding materials as required to install the new window flashings.

### 3.03 FLASHING INSTALLATION

- A. The window flashing installation shall comply with the weather barrier manufacturer's installation instructions to the greatest extent possible. Since, repairs are being installed, all aspects of the manufacturer's installation instructions may not be able to be followed.
- B. Cut the existing weather barrier as indicated in the project drawings as required to obtain water-shedding laps in the weather barrier system.
- C. Prime all surfaces that are to receive self-adhering flashings.
- D. Install self-adhering flashings as indicated on the project drawings and verified during the mock-up installation. All flashings shall be firmly pressed into place with a silicone roller.
- E. Lap the existing weather barrier membrane back into place and seal all cuts with self-adhering flashing.
- F. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The building and its contents shall be protected against all risks.
- G. If any unusual or concealed condition is discovered, stop the work and notify the Design Professional immediately in writing.

### 3.04 COMPLETION

- A. Correction of Work
  - 1. Work which does not conform to specified requirements including tolerances, slopes and finishes shall be corrected and/or replaced as directed by Owner's Representative at Contractor's expense without extension of time. Therefore, Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.
- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.

- C. All manufacturer's on-site inspection reports shall be submitted prior to final payment.
- D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 07 27 00 – AIR BARRIERS

Review Set  
Not For Bidding

**07 31 13**  
**ASPHALT SHINGLES**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1 - General Requirements, are included as part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Work of this section shall provide Owner with (1) functional weathering surface by applying a asphalt shingles over the properly prepared substrate; (2) appropriate flashings at roof perimeter and roof penetration conditions.
- B. This Section includes the following:
1. Asphalt shingles.
  2. Self-Adhering Underlayments
  3. Underlayments
  4. Ridge Vents
  5. Hat Vents
  6. Miscellaneous shingle accessories

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and Contractor.
1. Provide unit price to reflect hourly rate of roofing foreman, roofing mechanic, sheet metal foreman, sheet metal mechanic, and laborer to complete additional required work.

**1.04 RELATED SPECIFICATIONS**

Division 1	General Requirements
02 41 19	Selective Demolition
06 10 53.01	Rough Carpentry for Roofing
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
26 41 13	Lightning Protection for Structures

**1.05 REFERENCES**

- A. American Society of Testing and Materials (ASTM)
1. A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel

- Hardware
  - 2. D225 – Standard Specification for Asphalt Shingles (Organic Felt) Surfaced With Mineral Granules
  - 3. D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
  - 4. D1079 – Standard Terminology Relating to Roofing and Waterproofing
  - 5. D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
  - 6. D3161 – Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method)
  - 7. D3462 – Standard Specification for Asphalt Shingles Made from Glass and Surfaced with Mineral Granules
  - 8. D4586 – Standard Specification for Asphalt Roof Cement, Asbestos-Free
  - 9. D4869 – Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing
  - 10. D6757 – Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing
  - 11. D7158 – Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)
  - 12. E108 – Standard Test Methods for Fire Tests of Roof Coverages
  - 13. F1667 – Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- B. Asphalt Roof Manufacturers Association (ARMA)
- 1. Residential Asphalt Roofing Manual
- C. National Roofing Contractors Association (NRCA)
- 1. The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing
  - 2. The NRCA Roofing Manual: Steep-Slope Roof Systems
- D. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
- 1. Architectural Sheet Metal Manual.
- E. Underwriters Laboratories (UL)
- 1. UL790 – Standard Test Methods for Fire Tests of Roof Coverings
  - 2. UL2218 – Standard for Impact Resistance of Prepared Roof Covering Materials

## 1.06 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "*The NRCA Roofing and Waterproofing Manual*" for definitions of terms related to roofing work in this Section.

## 1.07 PERFORMANCE REQUIREMENTS

- A. General: Provide installed asphalt shingle roofing system and flashings that remain watertight; do not permit the passage of water; and resist specified wind speed requirements, 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 shingle manufacturer based on testing and field experience.
- C. Wind Up-Lift and Hail Characteristics: Provide a shingle roof system that has been tested in accordance with ASTM D7158 – Classification H OR ASTM D3161 - Classification F.
- D. Fire-Test Response Characteristics: Provide roofing materials with the fire-test response characteristics indicated as determined by testing identical products per ASTM E108 or UL790 for the roof slopes on this project. Identify materials with appropriate markings of applicable testing and inspecting agency.

Exterior Fire-Test Exposure: Class A – For the slopes required for this project.

### 1.08 REUTILIZED MATERIALS

The following items shall be assumed to be fully salvageable and reusable:

- 1. N/A

### 1.09 SUBMITTALS

Submit in accordance with Section 01 33 00:

A. Product Data:

- 1. Submit specifications, installation instructions, and general recommendations from roofing materials manufacturers for type of roofing required. Include data substantiating that materials comply with requirements of this specification, inclusive of accelerated weathering data.

B. Shop Drawings:

- 1. Flashing Conditions: Submit shop drawings showing all roof flashing conditions, including but not limited to gutters, perimeter conditions, roof penetration conditions, expansion joints, etc.

C. Product Samples:

- 1. Asphalt Shingle: Full size asphalt shingle strip.
- 2. Underlayment: 12-inch square sample.
- 3. Ice and watershield membrane: 12-inch square sample.
- 4. Ridge and Hip Caps: Full size ridge and hip cap.
- 5. Ridge Vent: 12-inch long section.
- 6. Nails: 10
- 7. Valley: 12-inch long section.
- 8. Drip Edge: 12-inch long section
- 9. Step Flashing: 1

D. Material Safety Data Sheets (MSDS):

1. Submit a MSDS sheet for each material that will be utilized on-site.

E. Manufacturer Certification:

1. Submit certification signed by asphalt shingle manufacturer stating that contractor is approved, authorized, or licensed to install roofing system indicated.
2. Manufacturer shall provide written evidence that he has reviewed the project specifications and drawings and will abide and uphold the Guarantee and Maintenance provision as outlined in this Specification. In addition, the manufacturer shall state that the warranty shall be issued regardless of any issues between the Contractor and supplier or Contractor and Owner at said time that the manufacturer has been paid in full for materials installed in accordance with the manufacturer's current technical specifications, and the project specifications and drawings. Statement shall be on manufacturer's letterhead and shall be signed by an officer of the corporation.

F. Contractor Certification:

1. Submit written statement from Contractor indicating three (3) years of successful experience with installation of asphalt shingle roofing, including project name and location, type of shingle roofing, and scopes of work which are equivalent to work of this section.

G. Sample Warranty:

1. Submit copy of warranty from the roof system manufacturer.

**1.10 QUALITY ASSURANCE**

A. Contractor Qualifications:

1. The contractor must be approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product that is eligible to receive the specified warranty.
2. The contractor shall have installed a minimum of three (3) projects within the last five (5) years similar in scope to this project.

B. Manufacturer Qualifications:

1. The roof system manufacturer shall have manufactured the specified roofing materials for a minimum of 10-years.

C. Source Limitations: Obtain each roofing shingles, flashing materials, underlayments, ridge caps, hip caps, and accessories from a single manufacturer for each product required, unless approved by the Design Professional.

D. Roofing Standard: Comply with The NRCA Roofing Manual: Steep-slope Roof Systems and the ARMA – Residential Asphalt Roofing Manual, unless more stringent requirements are

required by the Contract Documents.

- E. Sheet Metal Standard: Comply with the requirements of the SMACNA Architectural Sheet Metal Manual, unless more stringent requirements are required by the Contract Documents.

#### **1.11 DELIVERY, STORAGE, AND HANDLING**

- A. All products delivered to the site shall be in the original unopened containers, wrappings, or crating. Storage areas will be defined by Design Professional.
- B. Average live loads on the roof during the work shall not exceed twenty (20) pounds per square foot at any time.
- C. Handle all materials to prevent damage. Store materials elevated sufficiently off the ground and fully protected from moisture. Materials shall be secured in a safe manner to prevent damage. Roll goods shall be stored on end. Material shall be covered with opaque tarps, secured to prevent displacement by wind forces.
- D. Store temperature susceptible materials in a dry and heated area between 60° F and 80° F. If exposed to lower or higher temperatures, the material shall be discarded and new material provided at no cost to the Owner.
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier (MSDS sheets).

#### **1.12 WEATHER LIMITATIONS ON WORK**

- A. Roofing work shall not be done during precipitation and shall not be started in the event there is a high probability of precipitation during the ongoing work.
- B. At ambient temperatures of 40 degrees F and below, including wind-chill, precautions must be taken to insure that temperature-susceptible materials maintain their minimum acceptable temperature at the point of application as recommended by the roofing materials manufacturer.
- C. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingles and underlayments to be performed according to manufacturer's written instructions and warranty requirements.

#### **1.13 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)**

- A. Contractor shall implement all necessary precautions to prevent debris or materials/equipment from becoming airborne due to wind conditions anticipated at the site. All roof removal materials shall be removed from the roof by an enclosed chute to the ground level. Contractor shall conform to all regulations and precautions as required by applicable safety organizations.

#### **1.14 MANUFACTURER'S REPRESENTATIVE**

- A. Roofing Contractor shall require the presence of a Technical Representative of the roofing

- membrane manufacturer to provide field instructions and supervision during the duration of the work, as required by the manufacturer for a guaranteed job.
- B. In addition, Design Professional may require the presence of the Technical Representative of the roofing material manufacturer, as necessitated by the work progress.
  - C. The Technical Representative shall be employed by the roofing material manufacturer. We recommend the roofing material manufacturer designate one (1) Technical Representative for the duration of the project.

### 1.15 GUARANTEES AND MAINTENANCE

- A. Asphalt Shingle Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period. Material failures include manufacturing defects and failure of asphalt shingles to self-seal after a reasonable time.
  - 1. Material Warranty Period: 50 years from date of Contract Completion.
  - 2. Labor and Material Warranty: First 10 years, Non-prorated.
  - 3. Wind Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 130 mph for 15 years from date of Substantial Completion.
  - 4. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor for 15 years from date of Contract Completion.

**NOTE: The Effective Date of the Warranties shall not be prior to the date of Substantial Completion.**

## PART 2 - MATERIALS

### 2.01 GLASS FIBER REINFORCED ASPHALT SHINGLES

- A. Laminated Shingles: Laminated glass fiber reinforce asphalt shingle meeting ASTM D3462 or ASTM D225. The shingles shall be algae resistant granules and the shingles shall be self-sealing.
  - 1. Wind Resistance: ASTM D7158 – Class H or ASTM D3161 – Class F
  - 2. Weight/Square: 250 lbs./Sq.
  - 3. Color: To be selected by Owner from manufacturer's full color range
  - 4. Accessories: Starter and hip shingles
  - 5. Manufacturers:
    - a. Basis of Design: CertainTeed Corporation, Valley Forge, PA – Landmark Pro
    - b. GAF Materials Corporation, Parsippany, NJ – Timberline Ultra HD
    - c. Malarkey Roofing Products, Portland, OR – 273 Legacy

### 2.02 UNDERLAYMENT MATERIALS

- A. Synthetic Underlayment: A synthetic polymer-based scrim-reinforced underlayment designed for use on roof decks as a water-resistant layer beneath asphalt shingles. Must have been tested (or have ICC ES Approval showing that it meets or exceeds) per ASTM D226 - Type I, ASTM D4869 - Type I, or ASTM D6757.
1. Manufacturers:
    - a. CertainTeed Coporation, Valley Forge, PA – Diamond Deck
    - b. GAF Materials Corporation, Parsippany, NJ – Deck Armor
    - c. Malarkey Roofing Products, Portland, OR – Secure Start Plus
- B. Self-Adhering Sheet Underlayment: Self-adhering rubberized asphalt with a film laminated to the top surface. The material shall meet ASTM D1970.
1. Thickness: 40 mils
  2. Exposure: 30 days, Minimum
  3. Surface Color: Manufacturer's standard
  4. Manufacturers:
    - a. CertainTeed Corporation, Valley Forge, PA – WinterGuard HT
    - b. GAF Materials Corporation, Parsippany, NJ - StormGuard
    - c. Malarkey Roofing Products, Portland, OR – Artic Seal

### 2.03 RIDGE VENTS [REVIEW THIS SECTION]

- A. Rigid Ridge Vent: Manufacturer's standard rigid section high-density polypropylene or other UV-stabilized plastic vent with non-woven geotextile filter strips; for use under ridge shingles.
1. Manufacturers:
    - a. Air Vent Inc., a CertainTeed Company; ShingleVent II.
    - b. GAF Materials Corporation; Snow Country
    - c. Owens Corning; VentSure Ridge Vent..
    - d. Quarrix; Aviator Ridge Vent.
- B. Roof-to-Wall High Side Vents: Corrugated plastic vent assembly designed to be used at a roof-to-wall vent location in a shingle roof system.
1. Manufacturers:
    - a. Core-A-Vent, Inc.; Roof-2-Wall
    - b. DCi Products; Smart Vent

### 2.04 ROOF LOUVERS

- A. Heavy-duty aluminum static roof vents designed to be installed in a shingle roof system as an exhaust vent. The vent shall provide 50 square inches of net free area.
- B. Manufacturers:
1. Air Vent, Inc., a Certainteed Company (Airhawk SLA Slant Aluminum)
  2. GAF Materials Corporation (SSB960A)

3. Owens Corning (VentSure Metal Slant Back Roof Vent)

## 2.05 AUXILIARY MATERIALS

- C. Shingle Nails: 11 or 12-gauge shank diameter roofing nail with 3/8" diameter head with barbed/ring shank. The material shall meet ASTM F1667.
  1. Length: Sufficient to penetrate wood sheathing a minimum of 1/4" or into solid wood a minimum of 3/4"
  2. Corrosion Protection: Hot-dipped Galvanized meeting ASTM A153 or Series 300 stainless steel
  3. Manufacturers:
    - a. Maze Nails, Peru, IL; Storm Guard.
    - b. Paslode - Roofers Choice.
    - c. Senco Brands, Inc., Cincinnati, OH - Weatherex II
- D. Underlayment Nails: Aluminum, stainless steel, or hot-dip galvanized steel wire with low profile capped heads or disc caps, 1-inch minimum diameter.
- E. Asphalt Roofing Cement: ASTM D4586, Type I or II; asbestos-free.
- F. Lead Pipe Flashing: 4-pound lead sleeve sized to slip over and turn down into pipe, soldered to skirt at roof slope and extended 6" onto roof surface.
- G. Hot Pipe Flashing: Galvanized steel flashing designed for use at hot-pipe locations and shall be sized for the size of the hot pipe.
- H. Metal Lap Sealant; Polyisobutylene; extrudable sealant, non-migratory, nondrying, and non-skinning synthetic elastomer sealant. Comply with ASTM C919, ASTM E90, AAMA 809.2, or Federal Specification TTC-598-b Type 1.
  1. Manufacturers
    - a. Sika Corporation, Madison Heights, MI; Sikalastomer - 511
    - b. Schnee-Morehead, Irving, TX; Acryl-R SM 5430
    - c. Pecora Corp., Harleysville, PA – BA-98
- I. Sealant: One or two component polyurethane-based, non-sag elastomeric sealant. Comply with ASTM C920, Type S, Grade NS, Class 25.
  1. Use Locations: Exposed and concealed exterior sealant joints.
  2. Color: To be selected by Owner from manufacturer's standard colors.
  3. Manufacturers:
    - a. BASF, Shakopee, MN – MasterSeal NP1 or NP2
    - b. Sika Corp., Madison Heights, MI – Sikaflex 1a or 2c
    - c. Schnee-Morehead, Irving, TX – Permthane SM 7108
    - d. Pecora Corp., Harleysville, PA - DynaTrol I-XL

## 2.06 REJECTED MATERIALS

The Design Professional shall have the right to inspect all materials brought to or stored at the job site. Those materials which do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on-site supervisor. The verbal notification will be by the Design Professional, which will be followed by written confirmation.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. A pre-job conference including the Design Professional, Owner's Representative, the Contractor, the manufacturer's representative and all involved trades shall be conducted prior to commencement of the roofing work.
- B. Examine substrates and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected as required for the material application in accordance with the material manufacturer's specifications and requirements. Surfaces to receive roofing material components are to be clean, even, smooth, dry, and free from defects and projections which might adversely affect the application.
- C. Notify the Design Professional in writing to all conditions which may adversely affect the installation and/or performance of the roof system prior to commencing with the work. Proceed with installation only after unsatisfactory conditions have been corrected. Application of any part of the roof system shall indicate acceptance of the roof surface and acknowledgement of full responsibility for the quality and durability of the roofing.

#### **3.02 PREPARATION**

- A. All surfaces shall be swept clean prior to commencement of roof installation.
- B. Roof Deck: All surfaces to receive new roofing materials shall be smooth and even without any protrusions.
- C. Existing Flashing Components: Remove all existing flashing components of the roof's perimeter and penetrations, unless otherwise specified.

#### **3.03 GENERAL**

- A. Application of the roofing products for installation shall be in accordance with the roofing material manufacturer's recommendations and additional requirements of the project specifications and drawings. Material manufacturer's recommendations related to weather (temperature, moisture, humidity), surface preparation, and shelf life must be observed. The effect on the performance of materials, as well as installation costs and production, must be considered.
- B. Only install as much of the new roofing as can be made weather tight each day, including all flashing work.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The building and its contents shall be protected against all risks.

- D. All surfaces to receive new membrane or flashings shall be thoroughly dry. Should surface moisture occur, the Contractor shall provide the necessary equipment to dry the surface prior to application.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow-off or wind damage.
- F. All insulation installed in any one day shall be covered the same day.
- G. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement.
- H. If any unusual or concealed condition is discovered, stop the work and provide written notification to the Design Professional immediately.

### 3.04 SELF-ADHERING UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer, if applicable. Install at locations indicated below lapped in direction to shed water. Lap sides not less than 4 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within 30 days.
  - 1. Eaves: Extend from edges of eaves to a point a minimum of 24" inside of the exterior wall line of the building, unless a greater dimension is indicated on the project drawings.
  - 2. Valleys: Extend from lowest to highest point, 48 inches on each side of valley (3' width down center, 6" lap seams, total 8' wide valley). Note: Below dead valleys, extend 8' wide self-adhered underlayment down slope to eave. Extend minimum 4' out from end of valley.
  - 3. Ridges and Hips: Extend 36 inches on each side without obstructing continuous ridge vent slot. Over lap down slope underlayment a minimum of 6 inches to attain a water-shedding condition.
  - 4. Walls and Roof-Penetrating Elements (pipe vents, hat vents, curbs, etc.): Extend beyond roof penetrating element 30 inches and return vertically against flat penetrating element not less than 6 inches. Overlap downslope underlayment a minimum of 6 inches to attain a water-shedding condition.
  - 5. Rake edges – Extend 36" width at rake edge locations.
- B. The manufacturer's recommended primer shall be utilized where recommended by the manufacturer or if the self-adhering underlayment is not achieving proper adhesion on the unprimed surface.

### 3.05 UNDERLAYMENT INSTALLATION

- A. Single-Layer Underlayment (Roof Slopes Greater than 4:12): Install one (1) layer of underlayment perpendicular to slope of roof in parallel courses. Install to provide 2" head lap. Lap the ends a minimum of 6 inches. Stagger end laps a minimum of 24".
  - 1. Install underlayment over the entire roof surface. At areas with self-adhering flashing upslope, the self-adhering flashing shall be lapped onto the underlayment a

minimum of 6". At areas of self-adhering flashing downslope, cover the entire area with underlayment.

2. Install fasteners at no more than 8 inches on center at the laps. Provide sufficient fasteners to hold the underlayment in place until the asphalt shingles are installed.
  3. Terminate felt underlayment extended up not less than 4 inches against any sidewalls.
- B. Double-Layer (half lap) Underlayment (Roof Slope 3:12 to 4:12): Install two (2) layers of underlayment perpendicular to slope of roof in parallel courses. Install to provide 2" head lap. Lap the ends a minimum of 6 inches. Stagger the end laps 72 inches between courses.
1. Install underlayment over the entire roof surface. At areas with self-adhering flashing upslope, the self-adhering flashing shall be lapped onto the underlayment a minimum of 6". At areas of self-adhering flashing downslope, cover the entire area with underlayment.
  2. Install fasteners at no more than 8 inches on center at the laps. Provide sufficient fasteners to hold the underlayment in place until the asphalt shingles are installed.
  3. Terminate felt underlayment extended up not less than 4 inches against any sidewalls.

### 3.06 FLASHING INSTALLATION

- A. General: Install flashings per the asphalt shingle manufacturer's requirements and recommendations and the Contract Documents.
- B. Vent Pipe Flashing: Install pre-formed lead sleeve sized to slip over and turn down into pipe, soldered to flange at roof slope and extended at least 6" onto roof deck.

### 3.07 ASPHALT SHINGLE INSTALLATION

- A. Install asphalt shingles according to manufacturer's installation instructions and the Contract Documents. If there are discrepancies between these requirements, the more stringent required (as determined by the Design Professional) shall govern.
- B. Install starter strip along lowest roof edge, rakes and valleys with self-sealing strip face up and as recommended by the shingle manufacturer.
- C. Extend asphalt shingles 1/2 inch over fascia at eaves and rakes.
- D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure. Use the step-back dimensions and method per the shingle manufacturer recommendations. No vertical racking is permitted.
- E. Fasten asphalt shingle strips with a minimum of six (6) roofing nails located according to manufacturer's written instructions. Fasteners shall be driven so the nail head is flush with

surface of shingle.

1. Where slope is greater than 20:12, seal asphalt shingles with asphalt roofing cement spots.
2. When ambient temperature during installation is below 50° F, seal asphalt shingles with asphalt roofing cement spots at the rate recommended by the asphalt shingle manufacturer.

### **3.08 RIDGE VENTS [REVIEW THIS SECTION]**

- A. Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Seal between bottom surface of ridge/hip vents and top surface of asphalt shingles to prevent wind-driven rain from entering vent cavity. Apply asphalt cap shingles over top of vent. Fasten with roofing nails of sufficient length to penetrate shingle, vent, and sheathing.
  1. Extend ridge vents a uniform distance from all gable ends; 12 to 16 inches unless greater distance is recommended by vent or shingle manufacturer.
  2. Install roof-to-wall vents in accordance with vent and shingle manufacturer recommendations. Seal between bottom surface of vent and shingles.
- B. Ridge Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with four (4) roofing nails per cap (at outside corners of seal strip) of sufficient length to penetrate sheathing.
  1. Fasten cap asphalt shingles to cover ridge vent without obstructing airflow where applicable.

### **3.09 FIELD QUALITY CONTROL**

- A. Field inspection will be performed to verify compliance.

### **3.10 PROTECTION OF FINISHED WORK**

- A. Protect finished work.
- B. Do not permit traffic over finished roof surface.

### **3.11 COMPLETION**

- A. Correction of Work
  1. Work that does not conform to specified requirement including tolerances and finishes, shall be corrected and/or replaced as directed by the Design Professional, at Contractor's expense, without extension of time. Therefore, Contractor shall also be responsible for cost of corrections to any Work affected by or resulting from correction to work of this Section.

2. Rejection of Damaged Work
  - a. Roofing Contractor, jointly with Design Professional and roofing material manufacturer's representatives, shall investigate completed sections of work.
  - b. Damaged roofing components and work will be rejected.
  - c. Replace damaged roofing components or work with new brand materials. Replacement will be at Contractor's expense.
  
- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.

All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre-construction condition.
  
- C. All manufacturers' on-site inspection reports shall be submitted prior to final payment.
  
- D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 07 31 13 - ASPHALT SHINGLES

Review Set  
Not For Bidding

**07 53 23**  
**ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Work of this section shall provide Owner with (1) a functional weathering surface by applying a fully adhered roof membrane system over specified insulation system; (2) appropriate flashings at roof perimeter and roof penetration conditions.
- B. Items covered by this specification section:
1. Thermoset Single-Ply Membrane (EPDM)
  2. Flashings
  3. Fasteners
  4. Accessories

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Owner's Representative and the Contractor.
1. Provide unit price to reflect hourly rate of roofing foreman, roofing mechanic, and laborer to complete additional required work.

**1.04 RELATED SPECIFICATIONS**

The work of this part shall be in accordance with the applicable requirements of the following:

Division 1	General Requirements
02 41 19	Selective Structure Demolition
06 10 53.01	Rough Carpentry for Roofing
07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants
22 14 26.13	Roof Drains
26 41 13	Lightning Protection for Structures

**1.05 REFERENCES**

- A. American Society of Civil Engineers (ASCE)
1. Document ASCE 7-05, Minimum Design Loads for Buildings and Other Structures.

- B. American Society of Testing and Materials (ASTM)
  - 1. E108 – Standard Test Methods for Fire Tests of Roof Coverings.
  - 2. C920 – Standard Specification for Elastomeric Joint Sealants
  - 3. D1079 – Standard Terminology Relating to Roofing and Waterproofing
  - 4. D4637 –
  - 5. E108 – Standard Test Methods for Fire Tests of Roof Coverings.
  - 6. F1667 – Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- C. FM Global
  - 1. Data Sheet 1-29 – Roof Deck Securement and Above Deck Components
  - 2. Approval Standard 4450 – Approval Standard for Class 1 Insulated Steel Roof Decks
  - 3. Approval Standard 4470 – Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction
  - 4. Approval Standard 4474 – Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures
  - 5. RoofNAV – FM Approvals On-Line Listing of Approved Roofing Products and Assemblies
- D. National Roofing Contractors Association (NRCA)
  - 1. The NRCA Roofing Manual: Membrane Roof Systems.
- E. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
  - 1. Architectural Sheet Metal Manual.

## 1.06 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Waterproofing Manual" for definition of terms related to roofing work in this section.

## 1.07 PERFORMANCE REQUIREMENTS

- A. General: Installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure. The roof system and system components shall comply with requirements in FM Approvals of 4450 and 4474, current editions.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Wind Up-Lift and Hail Characteristics: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressures and hail as listed below. The perimeter and corner areas shall be prescriptively enhanced in accordance with the current edition of FM Global Loss Prevention

Data Sheet 1-29.

1. Field Wind Up-Lift Rating: 60 psf
  2. Hail Resistance: SH
- D. 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 another testing and inspecting agency acceptable to authorities having jurisdiction. 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.
  2. Interior Fire-Test Exposure: Class 1

### 1.08 REUTILIZED MATERIALS

The following items shall be assumed to be fully salvageable and reusable:

1. N/A

### 1.09 SUBMITTALS

Submit in accordance with Section 01 33 00:

- A. Product Data:
1. Submit specifications, installation instructions, and general recommendations from roofing materials manufacturers for type of roofing required. Include data substantiating that materials comply with requirements of this specification, inclusive of accelerated weathering data.
  2. Submit the RoofNAV number that shows the roof system complies with the performance requirements listed in the specification.
- B. Shop Drawings:
1. Flashing Conditions: Submit shop drawings showing membrane sheet layout, all roof flashing conditions, including but not limited to drains, perimeter conditions, roof penetration conditions, expansion joints, etc. The shop drawings must be reviewed and approved by the roof system manufacturer to assure the completed installation will meet the manufacturer's warranty requirements.
  2. Wind Uplift Securement: Provide roof plan(s) marked-up to indicate extent of roof corner and roof perimeter areas, inclusive of fastener spacing/density. This drawing must be reviewed and approved by the roof system manufacturer to assure the completed installation will meet the manufacturer's warranty requirements and the Performance Requirements listed in this specification.
- C. Product Samples:

1. Roof Membrane - Sample size 6" x 6".
  2. Mechanical Anchors and accessories.
  3. Slip or separation layers.
  4. Vapor Barriers/Retarders.
  5. Prefabricated items.
- D. Material Safety Data Sheets (MSDS):
1. Submit a MSDS sheet for each material that will be utilized on-site.
- E. Manufacturer Certification:
1. Manufacturer shall provide written evidence that he has reviewed the project specifications and drawings and will abide and uphold the Guarantee and Maintenance provision as outlined in this Section of this specification, and agrees to issue an addendum to the manufacturer's warranty regarding said provisions. In addition, the manufacturer shall state that the warranty shall be issued regardless of any issues between the Contractor and supplier or Contractor and Owner at said time that the manufacturer has been paid in full for materials and the roof system is installed in accordance with the manufacturer's current technical specifications, and the project specifications and drawings. Statement shall be on manufacturer's letterhead and shall be signed by an officer of the corporation.
  2. Submit written approval from roof membrane manufacturer for use, performance, and compatibility of the roof insulation and products in the proposed system.
  3. Submit written statement of roof membrane manufacturer that Contractor has experience in the application of specified roof system, and the Contractor is approved by membrane manufacturer to install the roof system and receive the specified warranty. Statement shall be on the roofing material manufacturer's letterhead and shall be signed by an officer of the corporation.
  4. The roof system manufacturer shall submit written certification that the proposed fastener will provide suitable pull-out resistance to meet the specified wind uplift rating.
  5. The roof system manufacturer shall certify that the Project Superintendent and at least two (2) assistants have attended and passed the manufacturer's installation course. In addition, the roof system manufacturer shall provide a list of individuals that are certified to perform hot-air welding on this project.
- F. Contractor Certification:
1. Contractor shall submit to the Design Builder a copy of the manufacturer's "Pre-installation Notice" (PIN) for review and acceptance prior to ordering materials for the project.
  2. Submit a list of three (3) projects of similar size and complexity that the roofing contractor has installed the specified system within the last five (5) years.
- G. Sample Warranty:

1. Submit copy of warranty from the roof system manufacturer.

H. Field Testing:

1. Submit written evidence of the fastener pull-out or adhesive pull-off tests of deck and/or wall substrates(s), including the location of each test, shall be submitted prior to material shipments.

### 1.10 QUALITY ASSURANCE

A. Contractor Qualifications:

1. The contractor must be approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product that is eligible to receive a manufacturer's 20 year no-dollar-limit warranty.
2. The contractor shall have installed a minimum of three (3) projects within the last five (5) years.
3. The project foreman and at least two (2) assistants must have attended and passed the manufacturer's installation course. Evidence of completion of the manufacturer's training must be presented prior to the start of the project.

B. Manufacturer Qualifications:

1. The roof system manufacturer shall have manufactured the specified membrane material for a minimum of 10-years without a change in the basic material formulation.
2. The roof system manufacturer shall have a training program that all contractors must attend prior to installing the specified roof system.
3. The manufacturer must demonstrate that they have an adequate warranty fund to cover possible future warranty claims.

### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. All products delivered to the site shall be in the original unopened containers or wrappings.
- B. Average live loads on the roof during the work shall not exceed twenty (20) pounds per square foot at any time.
- C. Handle all materials to prevent damage. Store materials elevated sufficiently off the ground and fully protected from moisture. Materials shall be secured in a safe manner to prevent damage. Material shall be covered with opaque tarps, secured to prevent displacement by wind forces.
- D. Store temperature susceptible materials in a dry and heated area between 60 degrees F and 80 degrees F. If exposed to lower or higher temperatures, the material shall be discarded and new material provided at no cost to the Owner.

- E. Materials determined by the Owner's Representative to be damaged or to have been subjected to adverse conditions shall be removed and replaced at Contractor's expense.
- F. Membrane rolls shall be stored in a way to prevent roll deformation by excessive stacking.
- G. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier (MSDS sheets).

#### 1.12 WEATHER LIMITATIONS ON WORK

- A. Roofing work shall not be done during precipitation and shall not be started in the event there is a high probability of precipitation during the ongoing work.
- B. At ambient temperatures of 40 degrees F and below, including wind-chill, precautions must be taken to insure that temperature-susceptible materials maintain their minimum acceptable temperature at the point of application as recommended by the roofing materials manufacturer.

#### 1.13 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)

- A. Contractor shall implement all necessary precautions to prevent debris or materials/equipment from becoming airborne due to wind conditions anticipated at the site. All roof removal materials shall be removed from the roof by an enclosed chute to the ground level. Roofing Contractor shall conform to all regulations and precautions as required by applicable safety organizations.
- B. All methods employed in performing the work, and all equipment, tools, and machinery used for handling materials and executing any part of the work, shall be subject to the approval of the Design Professional before the work is started, and whenever found unsatisfactory, shall be changed and improved as required.
- C. Roofing System:
  - 1. Solvents, adhesives, and primers used in the application of single-ply roofing systems are extremely flammable and/ or toxic. Provide any and all crewmembers with appropriate safety data information and training as provided by the roofing materials manufacturer. Provide each crew member with appropriate training as it relates to the specific chemical compound he/she may be expected to deal with. Each crewmember shall be fully aware of first-aid measures to be undertaken in case of accidents, etc.
  - 2. Various single-ply roofing membranes tend to change their material properties when exposed to sunlight and/or heat. Change in the physical properties can result in elimination or at least reduction of the apparent weld ability of a particular roof membrane material. It is critical to closely follow the roofing material manufacturer's recommendations and requirements as to material seaming.
- D. Protection:

1. General: Protection against staining and mechanical damage shall be provided for adjacent roof and other surfaces during the application of the roofing. Provide working platforms and traffic walkways where necessary.
2. Against Loads:
  - a. Do not store material/equipment on completed work of this section. Where due to work sequence storage of material/equipment on completed sections is required, protect work of this section against damage. Protection shall consist of plywood boards or similar material, and shall take into consideration the material characteristics of both the roof membrane and the roof insulation.
3. Against Traffic:
  - a. Traffic is not permitted across completed sections of the roof, except for workmen performing the work.
  - b. Where, due to work sequencing, traffic is required, traffic paths shall be clearly defined, and completed roofing shall be protected with plywood boards or similar material. Protection shall take into consideration the material characteristics of both the roof membrane and the roof insulation.
  - c. At locations where the existing roof system will be heavily trafficked, such as pathways for material removal and /or material distribution, the existing roof system shall be protected. Protection shall consist of foam insulation of sufficient thickness to prevent roof membrane punctures. The insulation shall be overlaid with plywood boards. The pathway shall be constructed in a fashion to prevent displacement by wind. Any deviation from this requirement shall be at the Owner/Owner's Representative's absolute discretion.
- E. All activities shall be performed in a way to provide Owner with an immediate watertight roof system at all times during construction. It is the Contractor's responsibility to prevent construction-related leaks.
- F. The majority of the work is over occupied space. Every precaution must be taken to protect the building occupants, the general public, and the contents/products stored in the building. The removal and replacement of the roof system shall be completed on specific roof sections and/or areas at such times as authorized by the Owner's Representative. All other operations which produce loud noises, and/or have the potential for injury incidents from falling objects, shall also be confined to non-operating hours. All project-related interior debris, interior covering, equipment, etc. shall be removed and the interior shall be brought to like cleanliness condition prior to operating hours, inclusive of cleaning debris from above ceiling tile grids unless other arrangements are made for final cleaning operations. It is the Contractor's responsibility to monitor and protect the interior and occupants of the building at all times during construction.
- G. Coordinate all roofing work closely with Design Professional as it relates to work going through the roof deck and/or affecting the roof deck and/or the roof system. Roofing work will be performed where identified in the project specifications and drawings, in strict

accordance with the various roofing material manufacturer's installation instruction requirements and recommendations.

- H. Closely inspect any uncovered condition and alert Owner or his Representative to any condition which may interfere with the performance of the new roof membrane system, inclusive of flashings. All work and activities shall be completed in such a manner to provide Owner with a watertight roof system.

#### 1.14 MANUFACTURER'S REPRESENTATIVE

- A. Roofing Contractor shall require the presence of a Technical Representative of the roofing membrane manufacturer to provide field instructions and supervision during the duration of the work, as required by the manufacturer for a guaranteed job.
- B. In addition, Owner's Representative may require the presence of the Technical Representative of the roofing material manufacturer, as necessitated by the work progress.
- C. The Technical Representative shall be employed by the roofing material manufacturer. We recommend the roofing material manufacturer designate one (1) Technical Representative for the duration of the project.

#### 1.15 GUARANTEES AND MAINTENANCE

- A. MATERIAL MANUFACTURER'S RESPONSIBILITY:
  - 1. The following warranty shall be in addition to and not in derogation of any other guarantees, warranties, or rights of the Owner against the contractor contained elsewhere in the agreement.
  - 2. The Contractor shall furnish to the Owner, the Manufacturer's FULL SYSTEM 20-Year Warranty/Guaranty (the "Warranty") for watertightness and against leaks and defects in materials and/or workmanship. The Warranty shall obligate Manufacturer, without cost to the Owner, to repair all leaks and defects in materials and/or workmanship in the Roof System (hereafter defined), including the replacement or repair of any materials and the repairing or restoration of any other part of the Roof System that may be damaged as a result of any such leaks and defects in materials and/or workmanship including, without limitation, wet insulation(\*\*) and corroded fasteners. In addition to requirements set forth elsewhere in the Contract Documents, the Warranty shall:
    - a. include and cover all materials manufactured, sold, provided, recommended and/or approved by the Manufacturer for use in connection with the roof membrane and system (e.g. insulation and fasteners), but shall specifically exclude the roof decking, unless such decking is manufactured or provided by Manufacturer (collectively, the "Roof System").
    - b. not be pro-rated; shall be without financial limit; shall not be limited due to the Contractor's failure to install all or any portion of the Roof System in strict compliance with the Manufacturer's and/or the Project installation requirements; and shall not be voided or limited as a result of repairs made or work performed by any Manufacturer-authorized Contractor during or

subsequent to the initial installation of the Roof System.

- b. not be limited to wind forces of less than the maximum expected wind speed indicated by the isotach map and building location condition factors stated in Factory Mutual Systems - Loss Prevention Data 1-28 (Current edition). The project location requires a 90 m.p.h. wind speed warranty. The wind speed shall be the Basic Wind Speed as defined by ASCE 7 – current edition.
  - c. include Factory Mutual Research Corporation (FMRC) approval rating of Class 1-SH, Severe Hail Damage Resistant and cover roof system damage as a result of hailstones up to 3/4 inch diameter.
  - d. cover all Manufacturer requirements identified in Sections 07 22 16 when Full System Warranty is specified.
  - e. run to the benefit of and be enforceable and transferable by and among Owner and all Affiliates without restriction or fee. For purposes of the Warranty, the term “Affiliate” shall mean and include any corporation, partnership, limited liability company, trust, real estate investment trust or other entity, whether heretofore, now, or hereafter existing, created, formed or organized, that directly or indirectly through one or more intermediaries controls, is controlled by or under common control with the current Owner of record at said time of Warranty issuance. Should the Owner of record sell the facility or otherwise transfer the Ownership to a non-affiliate, the Warranty shall be transferable for the Manufacturer’s (at that time) published Warranty transfer charge (not to exceed \$1,000.00).
  - f. commence not prior to the Date of Substantial Completion {the “Effective Date”(\*)}.
  - g. provide that any dispute relating to the interpretation, application, scope or enforceability of the Warranty shall be resolved and settled in accordance with applicable law in any court having jurisdiction thereof.
  - h. for the duration of the Warranty, investigate and repair all leaks within 24 hours of notification thereof (initial notification by telephone, with follow-up by written notification) and, promptly thereafter, complete other such repairs, restoration and/or replacement to the roof system.
  - i. upon completion of any investigation and repair, the manufacturer shall submit to the Owner adequate documentation (e.g. samples, photographs, etc.) depicting and describing the problem encountered and the probable cause of the leak(s) upon such investigation and repair.
1. The Manufacturer shall inspect the Roof System not later than six (6) months prior to the second, fifth, and tenth anniversary of the Effective Date of the Warranty. The Manufacturer shall correct all leaks and defects in materials and/or workmanship in the Roof System observed during any such inspection. The Manufacturer shall correct, before the expiration date of said Warranty, all obvious deficiencies encountered during the above inspections that may affect roof performance before the Warranty expires. The methods of repair shall be at the discretion of the Manufacturer,

providing the following guidelines are adhered to: The method of repair shall be compatible with the building components and must not affect the aesthetic nature of the roof, as visible from within the building or as viewed from the ground level surrounding the facility.

**(\*) NOTE: The Effective Date of the Warranty(ies) shall not be prior to the date of Substantial Completion.**

## **PART 2 - MATERIALS**

### **2.01 MEMBRANE**

- A. Thermoset (EPDM) Sheet: Cured non-reinforced EPDM compounded elastomer. Membrane shall conform to ASTM D4637, Type I.
1. Manufacturers:
    - a. Carlisle-Syntec, Carlisle, Pennsylvania
    - b. Johns-Manville, Denver, Colorado
  2. Thickness:
    - a. 60 mils, minimum
  3. Color: Black

### **2.02 AUXILIARY MATERIALS**

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing material.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, thickness, and color as sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard solvent-based or low VOC adhesive.
- D. Metal Termination Bars: Manufacturer's standard aluminum bars, approximately 1/8" thick and 1" wide with pre-punched holes 6" o.c.
- E. Water Cut-Off/Metal Lap Sealant: Butyl-based, non-curing, non-hardening sealant.
- Manufacturers
- Sika Corporation, Madison Heights, MI (or approved equal) - Sikalastomer – 511
  - Schnee-Morehead, Irving, TX - SM 5430 (SSR Sealant)
- F. Sealant: 1 or 2 component polyurethane-based sealant meeting ASTM C 920, Type S, Grade NS, Class 35, Use NT, M, A, G and I. Manufacturer-approved primers are required. Color to be selected by Owner.
1. Manufacturers:
    - a. Master Builders Solutions by BASF, Shakopee, MN; MasterSeal NP 1
    - b. Schnee – Morehead, Irving, TX; Permthane
    - c. Sika Corporation, Madison Heights, MI; Sikaflex-1a

- G. Tape Sealant: 3/4" wide butyl-based tape sealant.
- H. Sealant Primers: Sealant primer is a quick-drying solvent-based primer for priming joints and substrates before the application of sealants.
1. Manufacturers:
    - a. BASF, Shakopee, MN; Sonolastic Primer 733
    - b. Sika Corporation, Madison Heights, MI; Sikaflex Sealant/Adhesive Primer
- I. High Temperature Sealant
1. High Temperature Fire-stopping Sealant: one component, fire-rated elastomeric neutral, moisture cure silicone sealant for use in through-penetrations firestops.
- J. Expansion Joint Support (Foam Expansion Material): Formed EPDM product for use at expansion joint intersections between the roof deck and wall.
1. Manufacturers:
    - a. Carlisle Syntec, Inc., Carlisle, PA; Carlisle Sure-seal Expansion Joint Support
- K. Nails: ASTM F1667; hot-dipped galvanized steel wire shingle nails, barded or ring shank, minimum 3/8" head diameter; minimum 11 or 12 gauge shank diameter; shank to be of sufficient length to penetrate at least 3/4" into solid wood, plywood, or non-veneer wood decking.
- L. Masonry Anchors: Screw type fastener that requires pilot holes to be pre-drilled. Minimum diameter is 1/4".
- Manufacturers:
- ITW Buildex, Itasca, IL – Tapcon
  - Powers Fasteners, Brewster, WY – Tapper
  - Olympic Fasteners, Agawam, MA – Ruff-Nex Concrete Screw
- M. Pre-Fabricated Corners: 60 mil thick inside and outside corners fabricated from the roof manufacturers standard membrane material.
- N. Membrane Stripping: 60 mil thick reinforced thermoplastic membrane consisting of the same material as the roof system.
- O. Membrane Securement Plates: Manufacturer's standard 2" round steel membrane plate that has been tested with their roof system assembly to achieve the specified wind-uplift ratings. All products must meet Factory Mutual 4470 criteria for corrosion resistance.
- P. Fasteners: All fasteners shall be factory-coated steel fasteners to meet Factory Mutual 4470 criteria for corrosion resistance. Pull out resistance shall be a minimum of 360 lbs.
1. Structural Concrete Deck:
    - a. Fasteners shall be threaded masonry fasteners (Tapcons or approved

equal) or "hammer-in" hard carbon steel. Tapcons (or approved equal) shall be installed per the fastener manufacturer's requirements. Fasteners with "hammer-in" hard carbon steel shall have undersized holes pre-drilled one-half inch (1/2") deeper than depth of the fastener tips. Shank size of fastener shall be a minimum of 0.215 inches with a split diameter equal to 0.265/0.275 inches. Head size shall be a minimum of 0.435 inches in diameter.

- a. Fastener shall be treated with coating to meet or exceed Factory Mutual 4470 criteria for corrosion resistance.
  - b. Where spalling of the deck occurs, spalled area shall be repaired to match sound area of underside of deck.
  - c. Pull-out resistance shall be determined based on the mean value of ten (10) pull-outs. Pull-out resistance must be a minimum of 360 lbs. per fastener.
2. All products shall also be approved by membrane manufacturer.

### 2.03 REJECTED MATERIALS

The Design Professional shall have the right to inspect all materials brought to or stored at the job-site. Those materials that do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on-site supervisor. The verbal notification will be by the Design Professional, which will be followed by written confirmation.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. A pre-job conference including the Design Professional, Owner's Representative, Contractor, manufacturer's representative and all involved trades shall be conducted prior to commencement of the roofing work.
- B. Examine the substrate and the conditions under which the work is to be performed. Do not proceed until unsatisfactory conditions have been corrected as required for the material application and in accordance with the material manufacturer's specifications and requirements. Surfaces to receive roofing material components are to be clean, even, smooth, dry and free from defects and projections that might adversely affect the application.
- C. Notify the Design Professional in writing to all conditions which may adversely affect the installation and/or performance of the roof system prior to commencing with the work. Proceed with installation only after unsatisfactory conditions have been corrected. Application of any part of the roofing system shall indicate acceptance of the roof surface and acknowledgment of full responsibility for the quality and durability of the roofing.
- D. Verify slope prior to installation.
- E. Contractor shall verify that work penetrating the roof deck or which may otherwise affect the

roofing has been properly completed.

### 3.02 PREPARATION

- A. General: All surfaces shall be vacuumed prior to commencement of roofing installation.
- B. Drainage: Contractor together with Design Professional shall verify that all drain lines are unblocked before starting work. Any blocked drains shall be cleared by the Owner before starting work. Cover all drains and other openings intended for roof drainage with screens to prevent clogging of the drainage system. During construction, allow for sufficient drainage to prevent ponding with possible structural overloading.
- C. Roof Deck: All surfaces to receive new roofing materials shall be smooth and even without any protrusions.
- D. Fasteners: Contractor is required to run pullout tests to verify conditions of deck or wall substrate(s) and to confirm pullout values.
- E. Existing Flashing Components: Remove all existing flashing components of the roof's perimeter and penetrations. Clean existing surfaces of asphalt or other contaminants where contact with roof membrane surfaces is expected.
- F. Work shall begin at the furthest point from the designated spot where materials are shipped to the roof. Work shall be so scheduled to minimize traffic over newly completed or previously renovated roof areas.

### 3.03 GENERAL

- A. Application of the roofing products for installation shall be in accordance with the roofing material manufacturer's recommendations and additional requirements of the project specifications and drawings. Material manufacturer's recommendations related to weather (temperature, moisture, humidity), surface preparations, and shelf life must be observed. The effect on the performance of materials, as well as installation costs and production, must be considered.
- B. Only install as much of the new roofing as can be made weathertight each day, including all flashing work.
- C. Where possible, roof membrane panels shall be installed in such a fashion to create water-shedding seams.
- D. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The building and its contents shall be protected against all risks.
- E. All surfaces to receive new insulation, membrane, or flashings shall be thoroughly dry. Should surface moisture occur, the Contractor shall provide the necessary equipment to dry the surface prior to application.
- F. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow-off or wind damage.

- G. Temporary water stops shall be installed at the end of each day's work and shall be removed before proceeding with the next day's work. Temporary water stops shall be constructed to withstand protracted periods of inclement weather. Water stops shall be compatible with all materials and shall not emit dangerous or incompatible fumes.
- H. The Contractor is cautioned that the roof membrane may be incompatible with certain substances. Such materials shall not come into contact with the roof membrane at any time. If such contacts occur, the material shall be cut out and discarded. The Contractor shall consult material manufacturer with respect to material compatibility precautions and recommendations.
- I. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Where such access is absolutely required, the Contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Plywood protection shall be provided for all new and existing roof areas that receive traffic during construction.
- J. Liquid materials, such as solvents and adhesives, shall be stored in accordance with requirements of the Safety Data Sheets provided by the respective manufacturer.
- K. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to come into contact with the roofing membrane.
- L. If any unusual or concealed condition is discovered, stop the work and notify the Owner's Representative immediately in writing.

### 3.04 Criteria for Establishing When Insulation is Wet

The definition of "wet" as it pertains to insulation shall be the moisture determined to be in excess of the "Equilibrium Moisture Content" (EMC) as defined by the National Roofing Contractors Association, as "the moisture content of a material stabilized at a given temperature and relative humidity expressed as a percent moisture by weight." When material contains more water than it EMC, it shall be defined as wet. The values of EMC shall be based upon research by Carl G. Cash of Simpson Gumperts & Heger, Inc., of Arlington, Massachusetts (which was presented at the Second International Symposium of Roofing Technology in September 1985, pages 416 through 427 inclusive). The EMC values shall not exceed 100% over Cash's printed values for 90% relative humidity at 68F. Moisture contents of materials above these adjusted values will be considered to be excessive and to have developed from sources other than ambient humidity equilibrium conditions and they shall be classified as wet. These adjusted values (reflecting up to 100% increase over the printed values at 90% relative humidity at 68%) shall be as follows:

	<u>Material</u>	<u>Printed Value</u>	<u>Adjusted Value</u>
1.	Cellular Glass	0.2	0.4
2.	Extruded Polystyrene (XPS)	0.8	1.6
3.	Expanded Polystyrene (EPS)	2.0	4.0
4.	Fiberboard	15.0	20.0(*)
5.	Fiberglass	1.1	2.2
6.	Isocyanurate	3.0	6.0
7.	Perlite	5.0	10.0
8.	Gypsum Fill with Wood	1.7	3.4

9.	Gypsum Fill without Wood	1.6	1.2
10.	Thermo-setting asphalt	0.4	0.8
11.	Vermiculite	6.6	12.0(*)

(\*) Less than 100% increase

### 3.05 ROOF MEMBRANE INSTALLATION

- A. Fully adhered roofing systems shall be adhered with membrane manufacturer's approved adhesives, inclusive of manufacturer's required fasteners and additional fastener requirements as indicated on project drawings.
- B. Install roof membrane over prepared substrate inclusive of any and all required slip and/or separation layers as required by the roof membrane manufacturer, in compliance with local and national building codes and loss prevention control by the Owner.
- C. Position and unroll roof membrane. Extend membrane approximately three inches (3") up on all vertical surfaces, perimeter walls, etc.
- D. Determine the direction of water drainage and the low point of the deck. The orientation of both end and side laps shall be such that the direction of water flow is over the laps. The direction of the laps shall change as the direction of the water flow (slope) changes to avoid backwater laps.
- E. Cut field membrane around any and all roof projections prior to attaching adjacent roofing membrane sheet.
- F. Overlap adjacent roof membrane sheets a minimum of six inches (6") past fastening elements and under seam membrane edges when using liquid seam adhesive. Overlap adjacent roof membrane sheets a minimum of three inches (3") past fastening elements and under seam membrane edges when using preformed cured seam tape adhesive. Liquid splice adhesive shall be one part butyl adhesive. Seam tape splice adhesive shall be preformed and cured with a minimum width of three inches (3").
- G. The roof membrane shall be secured to nailers which are secured to the structural roof deck with mechanical anchors suitable for the deck type at all building perimeters and all curbed penetrations (see Detail drawings).
- H. Attach roof membrane to all flashing components. Installation of the roof membrane system shall be inclusive of all accessory and incidental items to obtain membrane manufacturer's roof warranty to cover both labor and material as specified.

### 3.06 FLASHING INSTALLATION

- A. General:
  - 1. Install flashings for all roof penetrations as shown on accompanying drawings and as required by materials manufacturer, to obtain manufacturer's warranty. Install new flashing as indicated on the accompanying drawings.
  - 2. Raise roof curb heights and/or parapet/perimeter walls as required to meet the minimum base flashing height. All wood nailer exposed to the interior of the building

shall be enclosed with 24-gauge Galvalume metal.

3. Secured flashing shall be installed at all intersections of vertical and/or horizontal planes, i.e. roof perimeter and roof penetrations or at locations where the net slope difference exceeds 1:12 inch. Flashing height to be not less than eight inches (8"), unless indicated otherwise on project detail drawings.
4. Flashing shall be the same membrane as the field of the roof, as approved by the manufacturer.
5. Regardless of the type of flashing utilized, the flashing components shall be anchored to the substrate to resist forces a minimum of 150 lbs/ft in any direction. Anchors shall be staggered and appropriate for the encountered substrate condition or as outlined in project drawings.
6. In cases where openings exist between perimeter conditions and roof deck, prior to flashing application, Contractor shall install spray foam insulation material to act as a thermal, air, and vapor barrier.
7. Complete new base flashing and penetration flashing work in conjunction with the installation of the new roof membrane as required to ensure the roof system is left in a watertight condition on a daily basis, and before inclement weather occurs.
8. Where membrane flashing is used, adhere membrane flashing to vertical substrate(s) with approved adhesives. Substrate shall be clean, smooth, non-porous and free of contamination. Vertically adhered membrane flashings shall also require mechanically attached termination and intermediate mechanical attachment at eight inches (8") minimum or 36" maximum intervals. Protect flashing membrane with separation layers as required by manufacturer.
9. Top of flashing shall be mechanically anchored to substrate utilizing a termination bar and approved anchor.

### 3.07 DRAIN FLASHINGS

- A. Roof drain flashing shall be fully adhered, without seams located in drain sump, and installed in strict accordance with the membrane manufacturer's requirement and the enclosed drawings.
- B. During the flashing operation, drain openings shall be protected against debris, etc. Prior to roofing activities, Design Professional and Roofing Contractor shall jointly inspect the drainage system to ensure proper drainage. Any defects in drainage shall be corrected immediately and shall be the responsibility of the Owner. During construction, install drain plugs. Plugs must be removed at the end of each workday or during work stoppage.
- C. Drain sumps shall be tapered to the drain for a distance of four feet (4'). In cases where a tapered insulation system is utilized, incorporate drain and drain flashing into tapered design, to ensure continuity of water flow.
- D. Check whether the drain bowl and the drainpipe are attached solidly without cause for leakage.

- E. Clamp rings/bolts where distorted, damaged, or corroded, shall be replaced. Where appropriate, cut new threads to secure clamp ring.
- F. Drain flashing shall be set in a bed of manufacturer recommended sealant.
- G. Upon completion of roofing activities, check drainpipe, to ensure that drain line is free of obstruction. Any obstructions will be the responsibility of the Contractor.

### **3.08 PRE-FORMED VENT STACK FLASHINGS, VENT STACK & EXHAUST DUCT FLASHING**

- A. In cases where the roofing systems manufacturer supplied pre-formed vent stack flashings, their use is allowable contingent upon the Design Professional's approval.
- B. Ensure that the penetration is clean and free of contaminants and protrusions. The penetration material must be compatible with the flashing material.
- C. In the event that a vent stack or exhaust duct is too small or too large to use a pre-formed cover, a wrap around detail shall be used. Install per membrane manufacturer's requirements.
- D. Install membrane flashing collar over vent stack and adhere to membrane roof sheet per roof system manufacturer's requirements. Using an approved adhesive by the membrane manufacturer, apply membrane wrap around the penetration. The wrap shall project upward from the finished elevation of the roof a minimum of eight inches (8"). The wrap shall completely cover the upturned portion of the membrane collar and extend a minimum of two inches (2") on the membrane collar. The end lap of the membrane wrap shall be a minimum of six inches (6"). Seal the top of the wrap with a sealant acceptable to the membrane manufacturer. Provide stainless steel hose clamp at top of sleeve and caulk. Uncured flashing shall be protected with a minimum two-inch (2")-wide, reinforced, cured membrane collar prior to installing stainless steel hose clamps. Hose clamps are not permissible when flashing a vent/stack consisting of a glass material.

CAUTION: NEVER USE A WRAP AROUND DETAIL OR A PRE-FORMED VENT STACK ON A HOT OR WARM PENETRATION.

- E. In the event of a hot or warm penetration through the roof, the Design Professional shall be alerted to the condition.
- F. Hot pipe penetrations shall utilized a sheet metal sleeve on the exterior of the hot pipe with high temperature insulation between the hot pipe and sleeve of sufficient thickness to prevent the sleeve from exceeding the manufacturer's recommended temperature limitation. High temperature sealant shall be installed between the top of the sleeve and the hot pipe.

### **3.09 WALKWAY INSTALLATION**

- A. Walkway pads shall be supplied by the membrane roof system manufacturer. The walkway pads shall be installed in a fully adhered condition and covered under the project warranty requirement. Walkway material shall have a surface structuring to impart non-slip qualities with a width of 30 inches.
- B. The area of the roof membrane which will receive the walkway membrane shall be free of

any defects, i.e., contamination, debris, foreign particles, etc. Where the walkway material shall not be installed over membrane or flashing seams. A 6" wide space shall be provided at all membrane seams to allow for the inspection and repair of seams.

CAUTION: WALKWAYS SHOULD NEVER BE INSTALLED OVER MEMBRANE FASTENERS. IN CASES WHERE THIS IS NECESSARY, ADDITIONAL PROTECTION MUST BE PLACED BETWEEN THE ROOFING FASTENER AND THE ROOFING MEMBRANE. IN AREAS CRITICAL FOR WIND UPLIFT, FASTENERS SHALL NEVER BE MOVED OR REMOVED DUE TO PLACEMENT OF WALKWAYS.

### 3.10 COMPLETION

- A. Correction of Work:
1. Work which does not conform to specified requirements including tolerances, slopes and finishes shall be corrected and/or replaced as directed by Design Professional at Contractor's expense without extension of time. Therefore, Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.
  2. Rejection of Damaged Work
    - a. Contractor, jointly with Design Professional and roofing material manufacturer's representatives, shall investigate completed sections of work.
    - b. Damaged roofing components and work will be rejected.
    - c. Replace damaged roofing components or work with new brand materials. Replacement will be at Contractor's expense.
- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.
- All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre-construction condition.
- C. All manufacturers' on-site inspection reports shall be submitted prior to final payment.
- D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 07 53 23 – ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

**07 62 00**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 –GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. It is the intent of this specification to provide sheet metal flashing and trim that is integrated with the roof and wall system, to provide a weather-resistant building envelope system. The sheet metal flashing and trim must be able to withstand the applicable live (i.e. wind) and dead loads.
- B. Items covered by this specification section:
1. Counterflashings and Receivers
  2. Roof Edge Metal Systems
  3. Gutters and Downspouts
  4. Splash Blocks
  5. Miscellaneous Sheet Metal Flashing

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and the Contractor.
1. Provide unit price to reflect hourly rate of roofing foreman, roofing mechanic, and laborer to complete additional required work.

**1.04 RELATED SECTIONS**

Division 1	General Requirements
02 41 19	Selective Demolition
06 10 53.01	Rough Carpentry for Roofing
07 22 16	Roof Board Insulation
07 31 13	Asphalt Shingles
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing

**1.05 REFERENCES**

- A. American Society of Civil Engineers (ASCE)
1. Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- B. American Society of Testing and Materials (ASTM)

1. ASTM A755 – Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  2. ASTM A792 – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- C. American National Standards Institute/Single-Ply Roofing Industry (ANSI/SPRI)
1. ANSI/SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roof Systems
- D. FM Global
1. Data Sheet 1-49 – Perimeter Flashing
- E. National Roofing Contractors Association (NRCA)
1. NRCA Guidelines for Architectural Metal Flashings
- F. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
1. Architectural Sheet Metal Manual.

#### 1.06 DEFINITIONS

- A. Shop or Field-Formed Sheet Metal: Include components that will be formed or fabricated in the field or at the contractor's shop. Fabrication of sheet metal flashing and trim is predominantly by press brake-forming.
- B. Prefabricated or Manufactured Sheet Metal: Items that are plant manufactured and ready for installation upon receipt.

#### 1.07 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Wind Resistance: Fabricate and install flashings to comply with recommendations of FM Global Loss Prevention Data Sheet 1-49 and ASCE 7 for the following zones:
1. Zone 1 (Field Areas) – Wind Uplift Pressure = 29 psf.
  2. Zone 2 (Perimeter Areas) – Wind Uplift Pressure = 33 psf.
  3. Zone 3 (Corner Areas) – Wind Uplift Pressure = 33 psf.
  4. Zone 4 (Wall Field Areas) – Wind Outward Pressure = 31 psf.
  5. Zone 5 (Wall Corner Areas) – Wind Outward Pressure = 38 psf.
- C. Thermal Movement: Provide sheet metal flashing and trim that allows for thermal movements resulting from the following maximum change in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 degrees F., ambient and 200 degrees F., material surfaces
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration into the building in driving rain conditions.

### 1.08 REUTILIZED MATERIALS

The following items shall be assumed to be fully salvageable and reusable:

1. N/A

### 1.09 SUBMITTALS

Submit in accordance with Section 01 33 00:

- A. Product Data:
  1. Submit manufacturer's product data, installation instructions, color chart, and general recommendations for each type of material, accessory, and product specified.
- B. Shop Drawings:
  1. Identify material, thickness, and finish for each item and location in project.
  2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions. Note: These are reviewed only for conformance with the specification requirement. The contractor is responsible to verify the field conditions.
  3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
- C. Product Samples:
  1. Sheet Metal Color Samples: Provide physical samples of the material with painted finish for color selection.
  2. Shop-Formed Material: Provide 6" square material sample for each material that is to be an exposed finish.
  3. Manufactured Sheet Metal: Provide a 12" long assembly sample for each item.
- D. Sample Warranty:
  1. Provide sample warranty per the project specification.

### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials from weather, deformation, and other damage during delivery, storage, and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

- C. Stack materials on platforms or pallets, covered with opaque tarps to prevent condensation. Do not store sheet metal flashings and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation. Remove strippable protective covering after installation is complete.

### 1.11 WARRANTY

- A. Material Manufacturer Responsibility:
  - 1. Finish Warranty: The material manufacturer shall agree to repair or replace manufactured roof accessories that show evidence of deterioration of factory-applied finishes within the specified warranty period.
    - 1. Kynar 500 Finish: Deterioration includes, but is not limited to, the following:
      - i. Color fading more than 5 Hunter units when tested according to ASTM D-2244.
      - ii. Chalking in excess of a No. 8 rating when tested according to ASTM D-4214.
      - iii. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
    - 2. Warranty Period: 20-years

### 1.12 QUALITY ASSURANCE

- A. Source Limitations: Obtain sheet metal materials, edge metals, and accessories from a single manufacturer for each product required, unless approved by the Design Professional.
- B. Sheet Metal Standard: SMACNA – Architectural Sheet Metal Manual and NRCA Guidelines for Architectural Metal Flashings.
- C. Contractor Qualifications: A firm that has been engaged in sheet metal for a minimum of five (5) years.
- D. Manufacturer Qualifications: A firm that has been engaged in sheet metal fabrication for a minimum of ten (10) years.
- E. Environmental Standard: Manufacturer and contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where the project is located. Notify Design Professional in writing if variations to the Contract Documents are required to comply with these regulations.

## PART 2 – PRODUCTS

## 2.01 SHEET METALS

- A. Pre-Painted Steel Sheets and Finishes for Manufactured Systems: Steel sheets coated by the hot-dip process and prepainted by the coil coating process to comply with ASTM A-755.
1. Aluminum Zinc Alloy-Coated Steel Sheet (Galvalume): ASTM A-792, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
  2. Material Thickness: 24-Gauge Minimum, unless noted otherwise.
  3. Exposed Finish:
    - a. High Performance Organic Finish: Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
    - b. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2605, except as modified below:
      - i. Humidity Resistance: 2,000 hours
      - ii. Salt Spray Resistance: 2,000 hours
    - c. Color: Selected by Owner from Manufacturer's Standard Colors

## 2.02 SHINGLE ROOF FLASHINGS

- A. Apron Flashings: Fabricate in lengths not exceeding 10 feet with a lower flange of 4 inches and vertical flange of 6 inches.
- B. Drip Edges: T-Type Drip Edge fabricated in lengths not exceeding 10 feet with minimum 4-inch flange over roof deck, a 1" T, and a 1-1/2 inch fascia flange with minimum 3/8-inch drip at lower edge.
- C. Valley Flashing: W-shaped valley fabricated in lengths not exceeding 10 feet. Width of sheet shall be a minimum of 24". Inverted vee or center rib shall be a minimum of 1" high. Edges of valley flashing shall be hemmed.
1. Accessories: 2" wide metal cleats.
- D. Step Flashing: 4" wide x 4" height x 8" length
1. Length shall be a minimum of exposure + 2"
- E. Curb Flashing: Shop formed sheet metal flashing with a drip edge and continuous cleat at the base.

- F. Backer Flashing: 0.080" Aluminum with fully-welded joints. Field-applied Kynar finish after fabrication.

### 2.03 ROOF EDGE FLASHING

#### A. Shop-Formed Edge Metal System

- 1. The roof edge metal shall be shop-formed edge metal for the membrane roof system.
- 2. Material: 24-gauge Galvalume.
- 3. Size: Per project details.

### 2.04 GUTTERS

#### A. Manufactured Gutter System:

- 1. Gutter:
  - a. Material: 24-gauge Galvalume or 0.032" Aluminum
  - b. Length: 40 feet minimum, continuous between expansion joints.
  - c. Size: 6"
  - d. Profile: Back of gutter to be a minimum of 1" higher than front.
- 2. Gutter Straps:
  - a. Material: 16-gauge galvanized
- 3. Expansion Joints: To be provided where indicated and not more than 50 feet on-center.
- 4. Accessories: Gutter baffles.
- 5. Manufacturers:
  - a. Metal Panel Systems, Inc.; Cincinnati, Ohio (Mig6)
  - b. Or Approved Equal

### 2.05 DOWNSPOUTS

#### A. Manufactured Downspout:

- 2. Downspout
  - a. Material: 24-gauge Galvalume, corrugated
  - b. Length: 10 feet minimum
  - c. Size: To match existing
- 3. Support Brackets
  - a. Material: 24-gauge Galvalume
  - b. Finish: Kynar 500 finish
  - c. Profile: U-shaped
  - d. Spacing: 5 feet on-center maximum
- 4. Accessories: Provide elbows, outlet tubes, and other accessories as required to complete the installation. Fasteners attaching the downspout to the downspout bracket shall be series 300 stainless steel.
- 5. Manufacturers:
  - a. Dimensional Metals Incorporated (DMI); Reynoldsburg, Ohio

- b. Metal Panel Systems, Inc.; Cincinnati, Ohio

## 2.06 COUNTERFLASHING

- A. Shop-Formed Counterflashing:
1. Material: 24-gauge Galvalume with Kynar 500 finish
  2. Length: 10 feet
- B. Receivers:
1. Material: 24-gauge Galvalume
  2. Finish: Kynar 500
  3. Length: 10 feet

## 2.07 STORM COLLAR

- A. 26-gauge stainless steel flashing with soldered seams. Flashing shall provide a perimeter skirt to provide a minimum 3" overlap of a curb cover of roof flashing.
1. Material: 26-gauge stainless steel
  2. Finish: Mill
  3. Manufacturer:
    - a. SBC Industries; Opa Locka, FL (Umbrella Bell Cap)

## 2.08 ACCESSORIES

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Same metal as flashing or sheet metal, or other non-corrosive metal. Match finish of exposed heads with material being fastened. Provide wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
- a. Masonry Fasteners: 1/4" screw-type masonry anchor.
  - b. Sheet Metal Fasteners: #14 Self-drilling, self-tapping, stainless steel screws.
  - c. Locking Fasteners with Sealing Washers: 5/16" bolt and sleeve fastener with a sealing washer. Fab-Lok or equal.
  - d. Blind Fasteners: 1/8" stainless steel pop-rivet.
  - e. Wood Fasteners: #10 pancake head screw or 1-1/2" ring-shanked galvanized roofing nails for areas where membrane is installed over the fasteners.
  - f. Gutter Straps
    - i. Into Fascia: Stainless steel #10 metal-to-wood screw with sealing washers.
    - ii. Strap to Gutter: Stainless steel 1/4" bolt.
  - g. Where fasteners will be in contact with treated wood with preservative chemicals, provide fasteners and anchorage that are stainless steel or with a coating recommended by the manufacturer for use with treated woods and pass FM 4470 for corrosion resistance.
  - h. Expanding type anchors are not permitted.

- C. Sealing Washers: Composite stainless-steel washer with 0.060" EPDM bonded to the washer. These shall be utilized at all exposed fastener locations.
- D. Metal Lap Sealant: Polyisobutylene; extrudable sealant, non-migratory, nondrying, and non-skinning synthetic elastomer sealant. Comply with ASTM C919, ASTM E90, AAMA 809.2, or Federal Specification TTC-598-b Type 1.
1. Use Locations: Concealed metal overlap joints.
  2. Primer:
  3. Manufacturers:
    - a. Sika Corp., Madison Heights, MI – Sikalastomer 511
    - b. Schnee-Morehead, Irving, TX – SM 5430 (SSR Sealant)
    - c. Pecora Corp., Harleysville, PA – BA-98
- E. Sealant: A one or two component polyurethane-based, non-sag elastomeric sealant. Comply with ASTM C920, Type S, Grade NS, Class 25.
1. Use Locations: Exposed and concealed exterior sealant joints.
  2. Color: To be selected by Owner from manufacturer's standard colors.
  3. Primer: Manufacturer's primer to be utilized on all joints submerged in water and on substrate materials recommended by the sealant manufacturer.
  4. Manufacturers:
    - a. BASF, Shakopee, MN – MasterSeal NP1 or NP2
    - b. Sika Corp., Madison Heights, MI – Sikaflex 1a or 2c
    - c. Schnee-Morehead, Irving, TX – Permthane SM 7108
    - d. Pecora Corp., Harleysville, PA - DynaTrol I-XL
- F. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required to resist the specified loads.
- G. Tape Sealant: A 100% solids, asbestos-free butyl tape sealant that is highly rubbery, tacky, reinforced compound designed for sealing metal lap joints. Complying with AAMA 804.3, AAMA 807.3, or Federal Specification TT-C-1796A, Type II, Class B.
1. Use Locations: Concealed metal overlap joints.
  2. Size:  $\frac{3}{4}$ " wide x  $\frac{3}{16}$ " thick min.
  3. Primer: Manufacturer's primer to be utilized on all joints submerged in water and on substrate materials recommended by the sealant manufacturer.
  4. Manufacturers:
    - a. Schnee-Morehead, Irving, TX – Tacky Tape
    - b. GSSI Sealants, Harleysville, PA – MB-10A Sealant Tape
    - c. Tremco Commercial Sealants & Waterproofing, Beachwood, OH - ET 675 Tape
- H. High Temperature Sealant: One component, fire-rated elastomeric neutral, moisture cure silicone sealant for use in through-penetrations firestops. Complying with ASTM C920, Type S, Grade NS, Class 25.

1. Use Locations: Exposed exterior joints exposed to high temperatures.
2. Color: To be selected by Owner from manufacturer's standard colors.
3. Primer: Manufacturer's primer to be utilized on all joints submerged in water and on substrate materials recommended by the sealant manufacturer.
4. Manufacturers:
  - a. Sika Corp., Madison Heights, MI – Sikasil WS-295
  - b. Pecora Corp., Harleysville, PA – 864 NST
  - c. Rectorseal, Houston, TX – Metacaulk 835+

### **PART 3 – EXECUTION**

#### **3.01 INSPECTION**

- A. Examine all substrates to receive sheet metal flashings and trim. If any unsatisfactory conditions exist, the Design Professional shall be notified and no work shall proceed until unsatisfactory conditions are corrected.

#### **3.02 PREPARATION**

- A. Coordinate all work closely with Design Professional as it relates to the installation of the sheet metal flashing and trim. Sheet metal flashing and trim will be installed as identified in the project specifications and drawings.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by providing a permanent separation layer as recommended by the material manufacturers.

#### **3.03 INSTALLATION**

- A. General:
  1. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, with SMACNA – "Architectural Sheet Metal Manual", and NRCA Guidelines for Architectural Metal Flashings.
  2. Install work with provisions for thermal expansion of gutters, flashings, gravel stops, coping, fascia, and other items exposed for more than 10 feet continuous length. Maintain a watertight installation at expansion joint seams. Locate gutter expansion joints where indicated, or if not indicated, at a maximum of 50' on-center.
  3. Torch cutting or abrasive grinding of sheet metal flashing and trim is not permitted.
  4. Sheet metal work shall be watertight and weathertight; lines, breaks, and angles sharp and true, plain surfaces free from waves and buckles. Workmen shall be experienced in the trade and thoroughly capable of performing the work in accordance with these requirements.
  5. Seal joints with metal lap sealant as required for watertight construction.

#### **B. Shingle Roof Flashings:**

1. Valley Flashing: Valley shall be installed over underlayment. Secure top edge of the valley with fasteners 3" O.C. The edges of the valley are to be secured with

cleats installed 24 inches O.C. Overlap joints shall be minimum 12 inches and bedded in 2 rows of metal lap sealant. Metal valley installation shall also follow the requirements of the shingle manufacturer and the project drawings.

2. Apron Flashing: Extend lower flange a minimum of 4" beyond each side of down slope asphalt shingles. Apron flashing shall hook onto a cleat secured over the shingle roof surface. Cleat shall be set in sealant. Apron flashing shall be secured to vertical wall surfaces 12" O.C.
  3. Drip Edges: Install eave drip edge under underlayment and rake drip edge over underlayment and fasten to roof deck 8" O.C. slightly staggered. Overlap joints shall be a minimum of 4".
  4. Step Flashing: Install step flashing between shingle courses at all rake-to-wall and curb penetration details. Step flashing shall overlap underlying step flashing a minimum of 2". Top edge of step flashing shall be secured to the roof deck with a minimum of 2 fasteners.
- C. Roof Edge Flashing:
1. Install as recommended by the manufacturer.
  2. The top of all walls shall be covered with waterproofing membrane prior to the installation of the edge metal system.
  3. If fasteners penetrate the horizontal portion of the membrane, tape sealant shall be installed on the membrane at each fastener location.
  4. The base clip shall be set in a bead of sealant in order to prevent water from penetrating under the roof edge flashing.
  5. Provide splice plates and other accessories required for complete installation.
- D. Coping Caps:
1. Install as recommended by the manufacturer.
  2. The top of all walls shall be covered with waterproofing membrane prior to the installation of the edge metal system.
  3. If fasteners penetrate the horizontal portion of the membrane, tape sealant shall be installed on the membrane at each fastener location.
  4. Provide splice plates and other accessories required for complete installation.
- E. Gutters:
1. For non-moving seams, seal overlaps with metal lap sealant and rivet 2" on-center. The interior of the gutter shall be sealed with a sealant joint (bridge type joint) at the joints. Provide expansion joints between downspouts, but not exceeding 50 feet apart.
  2. Install gutter support straps at 24" on-center.
  3. Provide pre-manufactured outlet tube sections extending 3" into downspouts.
  4. Provide each outlet with a removable basket-type, stainless steel wire strainer.
  5. Gutter laps 4" minimum and set in sealant as required.
  6. Gutter Baffles: Shall be same material and color as the gutter. Shall be fabricated per SMACNA Figure 1-24A. Extend 6 inches above the front edge of the gutter. Install at all locations where there is a concentrated flow of water (i.e. ends of valleys, downspouts from upper roofs, etc.). The baffle shall extend a minimum of 24" from the center line of the concentrated flow of water in each direction.

Secure to the gutter bead and provide support brackets at each gutter support strap.

F. Downspouts:

1. Provide downspout support brackets at 1' from the top and bottom of the downspout. Additional support brackets shall be located at 5' on-center.
2. Elbows and splash blocks shall be located at the end of each downspout.
3. The downspouts shall be terminated at 6" above the surface of the lower roof or elevation, connected into underground receiver pipe.

G. Counterflashing:

1. Counterflashings shall be installed as a removable, slip-type, surface mounted or reglet type counterflashing. Surface-mounted counterflashings are only to be used with permission of Design Professional.
2. Counterflashing shall be fabricated and installed to prevent horizontal surfaces that can pond water.
3. Counterflashing shall extend a minimum of 4" below top of base flashing and overlap 4" at the vertical joints.
4. Slip-type counterflashings shall extend vertically behind the existing flashing components a minimum of 3" to prevent wind-driven rain. Slip-type counterflashings shall be secured 16" on-center with the appropriate fastener with sealing washer.
5. Reglet-type counterflashing shall extend into the reglet a minimum of 1-1/2". The counterflashing shall be secured with the appropriate type fastener with sealing washers at 16" on-center.
6. Surface mounted counterflashings shall be installed into tape sealant and secured 12" on-center with the appropriate fastener with sealing washer.
7. Removable counterflashings shall be installed into a receiver and shall be secured 16" on-center.
8. The bottom edge of the counterflashing shall be formed tight against the roofing material but shall not cut into the roof material.
9. The counterflashing shall have end caps installed at all terminations.

H. Miscellaneous Metal Flashing:

1. Overlap joints a minimum of 4 inches and bed laps in metal lap sealant.
2. Seal work projecting through or mounted on roofing with roof system manufacturer-approved sealant materials and make weathertight.

### 3.04 COMPLETION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including

removal of unused fasteners, metal filings or cuttings, pop rivet stems, and pieces of metal flashing. Maintain a clean condition during construction.

- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- E. Work that does not conform to specified requirement including tolerances and finishes, shall be corrected and/or replaced as directed by the Design Professional, at Contractor's expense, without extension of time. Contractor shall also be responsible for cost of corrections to any Work affected by or resulting from correction to work of this Section.

END OF SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

Review Set  
Not For Bidding

**07 92 00**  
**JOINT SEALANTS**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS:**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1 - General Requirements, are included as part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Work of this section shall provide Owner with a functional weathering surface by applying Joint Sealants within properly prepared joints.
- B. Items covered by this specification section:
1. Wood siding and trim joints
  2. Accessories

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Owner's Representative and Contractor.
1. Unit price to reflect hourly rate of trades to complete additional required work.

**1.04 RELATED SPECIFICATIONS**

Division 1 General Requirements  
09 91 13 Exterior Painting

**1.05 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA)
1. AAMA 800 (804.3 and 807.3) – Voluntary Specifications and Test Methods for Sealants
- B. American Society of Testing and Materials (ASTM)
1. C920 – Standard Specification for Elastomeric Joint Sealants
  2. C1193 – Standard Guide for Use of Joint Sealants
  3. C1248 – Standard Test Method for Staining of Porous Substrate by Joint Sealants
- C. Federal Specifications

1. TT-C-1796A – Caulking Compounds, Metal Seam and Wood Seam

**1.06 DEFINITIONS**

- A. Adhesive Failure: Failure of the bond between the sealant and the substrate.
- B. Cohesive Failure: Failure characterized by the rupture within the sealant.
- C. Initial Cure: The time period recommended by the sealant manufacturer before the sealant can be exposed to precipitation.
- D. Concealed Locations: Locations where the sealant joint will to be exposed to UV light, but may be exposed to moisture.
- E. Exposed Locations: Locations where the sealant joint will be exposed to UV light and moisture.
- F. High Temperatures: Temperatures over 160° F.

**1.07 PERFORMANCE REQUIREMENTS**

- A. General: Installed sealant shall remain watertight, do not permit the passage of water, and remain flexible in order to withstand thermally induced movement without failure.
- B. Material Compatibility: Provide sealant materials that are compatible with one another under conditions of service and application required, as demonstrated by sealant manufacturer, based on testing and field experience.
- C. Movement Capability: Provide sealant material with the following minimum joint movement capabilities:  
  
Exterior Sealant Joints: +/- 50% Hybrid.
- D. Staining: Provide sealant materials that do not bleed into or stain the substrate.

**1.08 REUTILIZED MATERIALS**

The following items shall be assumed to be fully salvageable and reusable:

- 1. N/A

**1.09 SUBMITTALS**

Submit in accordance with Section 01 33 00:

- A. Product Data:
  - 1. Submit specifications, installation instructions, and general recommendations from sealant material manufacturers for each type of sealant specified. Include data substantiating that materials comply with requirements of this specification,

inclusive of accelerated weathering data.

- B. Shop Drawings:
  - 1. Submit shop drawings showing all sealant joint configurations.
- C. Product Samples:
  - 1. Sealant – Full range of manufacturer’s standard colors.
- D. Material Safety Data Sheets (MSDS):
  - 1. Submit a MSDS sheet for each material that will be utilized on-site.
- E. Manufacturer Certification:
  - 1. Submit written statement from sealant manufacturer that Contractor has experience in the application of specified sealant system, and the Contractor is approved by sealant manufacturer to install the system and receive the specified warranty.
  - 2. Submit written statement from the sealant manufacturer indicating that the joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. This statement shall also include recommendations for priming (including type of primer) of the joint substrates based on the field testing and experience.
- F. Contractor Certification:
  - 1. Submit a list of three (3) projects that the contractor has installed the specified system within the last five (5) years.
- G. Sample Warranty:
  - 1. Submit copy of warranty from the sealant manufacturer.
- H. Field Testing:
  - 1. Submit test reports summarizing the results of the preconstruction field adhesion testing as outlined in the Quality Assurance section of this specification.
- I. Mock-Up: Install a 5’ section of sealant for each type of sealant joint for review by the Design Professional prior to proceeding with the work.

#### **1.10 QUALITY ASSURANCE**

- A. Source Limitations: Obtain sealant materials and accessories from a single manufacturer for each product required, unless a different material is approved by the Design Professional.
- B. Sealant Standard: Comply with Sealant, Waterproofing & Restoration Institute –

Sealants: The Professionals' Guide. ASTM C1193 – Standard Guide for Use of Joint Sealants.

- C. Contractor Qualifications: Contractor shall be experienced with projects similar in material, design, and extent to those indicated for this project and shall be approved by the sealant manufacturer.
- D. Manufacturer Qualifications: Manufacturer shall be experienced with the manufacturer of the specified sealant system for a minimum of 10 years.
- E. Preconstruction Field-Adhesion Testing: Before installing sealants, perform adhesion field tests for each type of sealant and joint substrate.
  - 1. Locate test joints as directed by Design Professional.
  - 2. Notify Design Professional seven (7) days in advance of dates and times when test joints will be installed.
  - 3. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
  - 4. Test Method: Test joint sealants by hand-pull method described below:
    - a. Install joint sealants in 60 inch long joints using same materials and methods for joint preparation and joint sealant installation required for completed work. Allow sealants to cure fully before testing.
    - b. Make knife cuts from one (1) side of joint to the other, followed by two (2) cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2 inch piece.
    - c. Use fingers to grasp 2 inch piece of sealant between cross-cut and 1 inch mark; pull firmly at a 90 degree angle or more in direction of side cuts while holding a ruler alongside of sealant. Pull sealant out of joint to a distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    - d. For joints with dissimilar substrates, check adhesion to each substrate separately by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
    - e. After the adhesion has been check for the maximum movement capability, the sealant shall be pulled to failure.
  - 5. After the initial preconstruction adhesion tests, conduct number of field adhesion tests for each type of sealant and each type of substrate as follows:
    - a. Not less than 10 tests for the first 1,000 feet of installed sealant and 1 test for each additional 1,000 feet of sealant installed. Additional tests may also be required by the Design Professional and shall be performed at no additional costs to the Owner.
    - b. The test locations shall be determined by the Design Professional.
  - 6. Document results of field adhesion tests and record results in field adhesion test log.
  - 7. Include in log data on pull distance used to test each joint sealant.
  - 8. Include data on joints where material connected with pull portion of sealant failed

- to adhere to joint substrate or tore cohesively.
9. Inspect joints and record data for the following:
    - a. Joint width
    - b. Sealant thickness at the center of the joint
    - c. Sealant thickness at substrate
  10. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
  11. Evaluation of Preconstruction Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
  12. Repair sealant test areas by removing damaged materials and applying sealant to test area using same procedure used to originally install the sealant.
- F. Field Color and Workmanship Samples: Install a section of sealant joint (in the work) a minimum of 5' in length for each joint configuration at least seven (7) days prior to the start of work for review by the Design Professional. When approved, the sample shall be used as a standard of comparison for the remainder of the work.

#### **1.11 DELIVERY, STORAGE, AND HANDLING**

1. Deliver all materials in unopened containers and/or packages bearing the manufacturer's name and brand identification.
2. Handle all materials to prevent damage. Store temperature susceptible materials in a dry heated area between 60° F and 80° F. If exposed to temperatures above or below the manufacturer's recommended storage temperature, the contractor shall properly dispose of the improperly stored material and provide new materials at Contractor's expense. Prior to use the sealant shall be conditioned to approximately 70° F and maintained until just prior to use.
3. Materials determined by the Design Professional to be damaged or to have been subjected to adverse conditions shall be removed and replaced at Contractor's expense.
4. All flammable materials shall be stored in a cool, dry area away from sparks and open flames.

#### **1.12 WEATHER LIMITATIONS ON WORK**

- A. Do not install sealant system during precipitation and shall not be started in the event there is a high probability of precipitation during the on-going work or prior to initial cure.
- B. Install sealants when ambient temperatures are between 40° F and 100° F.

#### **1.13 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)**

- A. Do not apply over damp surfaces.

- B. Protect sealant joints from precipitation prior to initial cure.
- C. Do not apply when a moisture vapor transmission condition exists from the substrate as this can cause bubbling within the sealant.

#### 1.14 MANUFACTURER'S REPRESENTATIVE

- A. Contractor shall require the presence of a Technical Representative of the material manufacturer to provide field instructions and recommendations as required by the project.

#### 1.15 GUARANTEES AND MAINTENANCE

- A. The Contractor shall provide a written certification stating that the Contractor has prepared and applied the materials per the requirements of this specification and in conformance with the manufacturer's installation instructions.
- B. The Effective Date of the Warranty/Guarantee shall not be prior to the date of Substantial Completion.
- C. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two (2) years from date of Substantial Completion.

### PART 2 - MATERIALS

#### 2.01 JOINT SEALANT – HYBRID

- A. A one component silicone/polyurethane hybrid, non-sag elastomeric sealant. Comply with ASTM C920, Type S, Grade NS, Class 50.
- B. Use Locations: Exposed and concealed exterior sealant joints.
- C. Color: To be selected by Owner from manufacturer's standard colors (min. 10 colors to choose from).
- D. Manufacturers:
  1. BASF, Shakopee, MN – MasterSeal NP100
  2. Sika Corp., Madison Heights, MI – SikaHyflex-150 LM
  3. ITW Polymers Sealants North America, Inc., Irving, TX – Permthane SM 2100
  4. Pecora Corp., Harleysville, PA - DynaTrol I-XL Tru-White

#### 2.02 METAL LAP SEALANT

- A. Polyisobutylene; extrudable sealant, non-migratory, nondrying, and non-skinning synthetic elastomer sealant. Comply with AAMA 809.2, or Federal Specification TT-C-598-b Type 1.

- B. Use Locations: Concealed metal overlap joints.
- C. Manufacturers:
  - 1. Sika Corp., Madison Heights, MI – Sikalastomer 511
  - 2. Schnee-Morehead, Irving, TX – SM 5430 (SSR Sealant)
  - 3. Pecora Corp., Harleysville, PA – BA-98

### 2.03 TAPE SEALANT

- A. A 100% solids, asbestos-free butyl tape sealant that is highly rubbery, tacky, reinforced compound designed for sealing metal lap joints. Complying with AAMA 804.3, AAMA 807.3, or Federal Specification TT-C-1796A, Type II, Class B.
- B. Use Locations: Concealed metal overlap joints.
- C. Size: 3/4" wide x 3/16" thick min.
- D. Manufacturers:
  - 1. Schnee-Morehead, Irving, TX – Tacky Tape
  - 2. GSSI Sealants, Harleysville, PA – MB-10A Sealant Tape

### 2.04 AUXILARY MATERIALS

- A. Primer: Primer to be high-solid, low-VOC, solvent-based primer for priming joints and substrates before application of sealant.
- B. Backer Rod: Closed cell foam backer rod sized to the opening. At fillet joint locations provide a triangular or one-quarter round backer rod.
- C. Bond Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials, or joint surfaces at the back of the joint.

### 2.05 REJECTED MATERIALS

The Design Professional shall have the right to inspect all materials brought to or stored at the job site. Those materials that do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on site supervisor. The verbal notification will be by the Design Professional, which will be followed by written confirmation.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. A pre-job conference, including the Design Professional, Owner, and Contractor, shall be conducted prior to commencement of the Caulking or sealing Work.

- B. Examine substrates and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected as required for the material application in accordance with the material manufacturer's specifications and requirements.
- C. Notify the Design Professional in writing to all conditions which may adversely affect the installation and/or performance of the sealant system prior to commencing with the work. Proceed with installation only after unsatisfactory conditions have been corrected. Application of any part of the sealant system shall indicate acceptance of the existing conditions and acknowledgement of full responsibility for the quality and durability of the sealant.
- D. Contractor shall verify that investigation of all Work that may affect the General Public, Owner, and Owner's tenants has been completed and adequate precautions have been implemented.

### 3.02 PREPARATION

- A. Contractor shall investigate all air intake ventilators, HVAC, open windows, and related equipment in the immediate and downwind area of the Work. Equipment or openings which may allow debris, dust, dirt, and fumes into the interior of the building shall be shut down and/or sealed. Contractor shall coordinate the closing of HVAC equipment with the Owner.
- B. Removal of existing caulking and sealing materials shall be performed in a way to provide Owner with a watertight system at all times during construction.
- C. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust paints (except permanent, protective coatings tested and approved for adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- D. Porous Substrates: Clean surfaces by brushing, grinding blast cleaning, mechanical abrading, or a combination of these methods to produce clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining by vacuuming or blowing out joints with oil-free compressed air.
- E. Nonporous Substrates: Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- F. Concrete: Remove laitance and form-release agents from concrete.
- G. Joint Priming: Prime joints where recommended by the sealant manufacturer or where the Preconstruction Field-Adhesion Testing shows that a primer is needed. Prime all joints (i.e. gutter laps, below grade joints, horizontal surfaces, etc.) to be immersed under water.

Primer shall be confined to areas where joint sealant will be applied. Do not allow primer to migrate to surfaces that will remain exposed after sealant joint installation.

- H. Joint Backing:
1. Install backer rod or bond breaker tape in joints to prevent 3-sided bonding, which will cause the joint to fail prematurely.
  2. Backer rods shall be sized to 25% to 50% larger than the joint.
  3. Install backing to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  4. Do not leave gaps between ends of sealant backings.
  5. Do not stretch, twist, braid, puncture, or tear sealant backings.
  6. Remove absorbent sealant backings that have become wet before sealant installation and replace them with dry materials.
- I. Protection of Adjacent Surfaces: Use masking tape, where required, to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal. Where adequate grooves for caulking have not been provided, grooves shall be prepared by cutting and cleaning out the mortar to the minimum depth and by grinding to the minimum width, taking care that adjoining metal work is not reduced in section.
- J. Where a suitable mortar backstop has not been provided, the back of joint grooves shall be packed tightly with backer rod.

### 3.03 GENERAL

- A. Application of the sealant systems shall be in accordance with the sealant manufacturer's recommendations and additional requirements of the project specifications and drawings. Material manufacturer's recommendations related to weather (temperature, moisture, and humidity), surface preparation, and shelf life must be observed.
- B. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The building and its contents shall be protected against all risks.

### 3.04 INSTALLATION OF JOINT SEALANTS

- A. Install sealants so they directly contact and fully wet joint substrates.
- B. Completely fill recesses provided for each joint configuration.
- C. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- D. Sealant Tooling:

1. Immediately after sealant application and before skinning or curing begins, tool sealants to form a smooth, uniform joints; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  2. Remove excess sealants from surfaces adjacent to joint.
  3. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  4. Provide concave joint configuration unless otherwise specified.
- E. Install joint sealants in accordance with ASTM C 1193 as applicable to materials, applications, conditions indicated, and with the following profile configurations:
1. Fillet: Figure 5.
  2. Bridge: Figure 6.
  3. Butt: Figure 8A (concave tooling), generally hour-glass shape with 2:1 width-to-depth ratio.
- F. Protection: Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

### **3.05 INSTALLATION OF METAL LAP SEALANTS**

- A. Prime surfaces with primer specified by material manufacturer and allow to dry before applying sealing material. Priming and sealing must be done on the same workday.
- B. Apply sealant materials necessary for complete filling of voids as well as to provide maximum contact with the surface to which sealing materials are to be applied.
- C. Metal lap sealant shall not be exposed outside of the metal lap and shall be completely separated from any and all surface sealants used for exposed joints. If excess sealant extrudes from the lap, the excess sealant shall be removed.

### **3.06 CLEANING**

- A. The surfaces of all materials adjoining caulked joints shall be cleaned of smears of compound or other soiling resulting from caulking application.
- B. On non-porous surfaces, excess uncured sealing material shall be removed with a solvent moistened cloth immediately.
- C. On porous surfaces, excess sealing material shall be allowed to cure overnight, then removed by lightly wire brushing or sanding.
- D. Clean adjacent surfaces free of sealing material or soiling resulting from this work as

work progresses. Use solvent or cleaning agent as recommended by sealing material manufacturer. All finish work shall be left in a neat, clean condition.

- E. Remove all covers and masking from equipment, etc., only after danger of fumes entering the building has passed.

### 3.07 COMPLETION

- A. Correction of Work

Work which does not conform to specified requirements including tolerances, slopes and finishes shall be corrected and/or replaced as directed by Design Professional at Contractor's expense without extension of time. Therefore, Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.

- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.

All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre- construction condition.

- C. All manufacturers' on-site inspection reports shall be submitted prior to final payment.
- D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 07 92 00 – JOINT SEALANTS

**09 91 13**  
**EXTERIOR PAINTING**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
1. Wood siding
  2. Wood trim
  3. Wood Fascia
  4. Wood Soffit

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of 00 41 13 Bid Form. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and Contractor.
1. N/A

**1.04 RELATED SPECIFICATIONS**

Division 1      General Requirements  
07 92 00      Joint Sealants

**1.05 REFERENCES**

- A. Steel Structures Painting Council (SSPC)
1. SP 1 – Solvent Cleaning
  2. SP 2 – Hand Tool Cleaning
  3. SP 3 – Power Tool Cleaning
  4. SP 13 – Surface Preparation for Concrete
- B. Master Painters Institute (MPI)
1. MPI Architectural Painting Specification Manual
  2. MPI Maintenance Repainting Manual
  3. MPI Glossary

**1.06 DEFINITIONS**

- A. Painting Terminology: See MPI Glossary for definition of terms related to painting work in this section.

#### 1.07 PERFORMANCE REQUIREMENTS

- A. General: The applied paint shall be uniform coverage and color appearance without runs or other imperfections. The paint shall have a durable surface.
- B. Material Compatibility: Provide surface preparation, primers, and paint materials that are compatible with one another under conditions of service and application required. The pH level of the surface shall be considered in the material compatibility.

#### 1.08 REUTILIZED MATERIALS

The following items shall be assumed to be fully salvageable and reusable:

- 1. N/A

#### 1.09 SUBMITTALS

Submit in accordance with Section 01 33 00:

- A. Product Data:
  - 1. Manufacturer's technical literature for each product and system and should include:
    - a. Product characteristics.
    - b. Surface preparation instructions and recommendations.
    - c. Primer requirements and finish specification.
    - d. Storage and handling requirements and recommendations.
    - e. Application methods.
    - f. Cleanup information.
- B. Initial Selection Samples:
  - 1. Submit a set of color chips that represent that range of manufacturer's colors applicable to the area being painted for initial color selection.
- C. Material Safety Data Sheets (MSDS):
  - 1. Submit a MSDS sheet for each material that will be utilized on-site.'
- D. Contractor Certification:
  - 1. Submit written statement from Contractor indicating five (5) years of successful experience with installation of the specified paint system, including project name and location and scopes of work which are equivalent to work of this section.
- E. Mock-Up:
  - 1. Install a 2'x2' mock-up for each of the color selected for the initial color selection.
  - 2. Install the mock-up where designated by the Design Professional.

3. Do not proceed with work until the Owner approves the mock-up sample for final color selection.
- F. Closeout Submittals:
1. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

#### **1.10 QUALITY ASSURANCE**

- A. Source Limitations: Obtain primer and paint from a single manufacturer for each product required, unless approved by the Design Professional.
- B. Contractor Qualifications: A firm that has been engaged in painting for a minimum of five (5) years.
- C. Manufacturer Qualifications: A firm experienced in manufacturing paints for a minimum of ten (10) years.
- D. Environmental Standard: Manufacturer and contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where the project is located. Notify Design Professional in writing if variations to the Contract Documents are required to comply with these regulations.

#### **1.11 DELIVERY, STORAGE, AND HANDLING**

- A. All products delivered to the site shall be in the original unopened containers with manufacturer's identification intact.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range of the manufacturers recommendations for material storage.
- C. Materials determined by the Owner's Representative to be damaged or to have been subjected to adverse conditions shall be removed and replaced at Contractor's expense.
- D. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier.
- E. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

#### **1.12 PROJECT CONDITIONS**

- A. Apply paints only when environmental conditions (temperature, humidity, and wind) are within limits recommended by manufacturer for optimum results. Do not apply coatings

under environmental conditions outside manufacturer's recommended limits.

- B. Provide clean drop cloths, and other protection as necessary to protect floors, doors, windows, and other areas from damage.
- C. No plumbing fixtures, open waste or vent pipe, or other pipe of any kind, shall be used to dispose of paint materials, used rags, waste or other material.
- D. No interior fixtures or furniture shall be used as supports for planking or as a work platform. All fixtures and furniture shall be protected from damage during painting operations.
- E. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

## **PART 2 – PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other available manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Design Professional.
- B. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- C. Material Compatibility: Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- D. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- E. Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's recommendations.

### **2.02 TYPES OF PAINT**

- A. Manufacturers:
  - The Sherwin-Williams Company, Cleveland, OH – Basis of Design
  - Benjamin Moore & Co., Montvale, NJ
  - PPG Architectural Coatings North America, Cranberry Township, PA
- B. The kinds of paint and number of coats required on the various surfaces shall be as follows:
  - 1. Type 1 – Exterior – Wood Siding and Trim

- a. Gloss Finish
    - Primer: Exterior Latex Wood Primer
    - 1st Coat: A-100 Exterior Latex Gloss
    - 2nd Coat: A-100 Exterior Latex Gloss
  - b. Satin
    - Primer: Exterior Latex Wood Primer
    - 1st Coat: A-100 Exterior Latex Satin
    - 2nd Coat: A-100 Exterior Latex Satin
- C. Previously Painted Surfaces: On previously painted surfaces where the existing paint is intact and in good condition, the primer application is not required.

### 2.03 REJECTED MATERIALS

- A. The Owner's Representative shall have the right to inspect all materials brought to or stored at the job site. Those materials which do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on-site supervisor. The verbal notification will be by the Owner's Representative, which will be followed by written confirmation.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates and conditions for compliance with maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
- 1. Report, in writing, conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:
- 1. Maximum moisture content of substrates, when measured with an electronic moisture meter as follows:
    - a. Concrete: 12 percent
    - b. Fiber-cement board: 12 percent
    - c. Masonry (clay): 12 percent
    - d. Wood: 15 percent
    - e. Portland Cement Plaster: 12 percent
    - f. Gypsum Board: 12 percent
  - 2. Portland Cement Plaster: Verify that plaster is fully cured.
  - 3. Exterior Gypsum Board Substrates: Verify finishing compound is sanded smooth.

- C. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work will be construed as acceptance of surface conditions.

### 3.02 SURFACE PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in the "MPI Manual" applicable to substrates and paint systems specified.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Removal of any areas of loose or peeling paint by sanding, scraping or other means may generate dust or fumes. Removal must be done in accordance with applicable regulatory agencies that have jurisdiction.
- D. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint, incompatible paints, and other contamination to ensure good adhesion.
- E. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry a minimum of 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
- F. Methods:
  - 1. Wood: Must be clean and dry. Scrape and/or sand to remove all loose paint. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

### 3.03 APPLICATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for mixing and application. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Do not apply to wet or damp surfaces.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

- E. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
- F. Regardless of the number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. After completing paint applications, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

### **3.04 PROTECTION**

- A. Protect finished coatings from damage until completion of the project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendations for touch up repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

### **3.05 COMPLETION**

- A. Correction of Work
  - 1. Work which does not conform to specified requirements shall be corrected and/or replaced as directed by Owner's Representative at Contractor's expense without extension of time. Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.
- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.  
  
All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre-construction condition.
- C. All manufacturers' on-site inspection reports shall be submitted prior to final payment.
- D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 09 91 13 – EXTERIOR PAINTING

**22 14 26.13  
ROOF DRAINS**

**PART 1 –GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. Work of this section shall provide Owner with new roof drain bowls at existing overflow drain locations and to provide roof drain extensions. The roof drains shall be connected into the existing interior storm drainage system.
- B. Items covered by this specification section:
1. Overflow Roof Drains
  2. Drain Extensions
  3. Accessories

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and the Contractor.
1. Provide unit price to replace a roof drain.

**1.04 RELATED SECTIONS**

Division 1	General Requirements
02 41 19	Selective Structure Demolition
07 22 16	Roof Board Insulation
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing

**1.05 REFERENCES**

- A. American Society of Mechanical Engineers (ASME)
1. A112.6.4 – Roof, Deck, and Balcony Drains
  2. A112.36.2M – Cleanouts
- B. American Society for Testing and Materials (ASTM)
1. A48 – Standard Specification for Gray Iron Castings
  2. A74 – Standard Specification for Cast Iron Soil Pipe and Fittings
  3. A653 – Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-

- 4. Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process
  - 5. C564 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
  - 6. D2665 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
- C. Cast Iron Soil Pipe Institute (CISPI)
- 1. CISPI 310 – Specification for Coupling For Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- D. National Fire Protection Association (NFPA)
- 1. NFPA 255 – Standard Test Method of Test of Surface Burning Characteristics of Building Materials

#### **1.06 REUTILIZED MATERIALS**

- A. The following items shall be assumed to be fully salvageable and reusable:
- 1. The existing storm drainage piping system.

#### **1.07 SUBMITTALS**

- A. Product Data:
- 1. Submit manufacturer's product data for each type of drain, piping, accessory, and product specified.
  - 2. Submit manufacturer's installation instructions for each type of drain, piping, accessory, and product specified.

#### **1.08 DELIVERY, STORAGE AND HANDLING**

- A. Protect flanges and fittings from moisture and dirt by inside storage and enclosure or by packaging with durable, waterproof wrapping.
- B. All materials susceptible to moisture damage shall be stored to prevent water infiltration.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

#### **1.09 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)**

- A. Interruption of Existing Storm-Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
- 1. Notify Design Professional no fewer than two (2) days in advance of proposed interruption of storm-drainage service.
  - 2. Do not proceed with interruption of storm-drainage service without Design

Professional's written permission.

## 1.10 QUALITY ASSURANCE

- A. Source Limitations: Obtain each plumbing components from a single manufacturer for each product required, unless approved by the Design Professional.
- B. Plumbing Standard: Ohio Building Code.
- C. Contractor Qualifications: A firm that has been engaged in plumbing work for a minimum of five (5) years. The contractor performing the plumbing work shall be licensed by the authority having jurisdiction (if required).
- D. Environmental Standard: Manufacturer and contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where the project is located. Notify Design Professional in writing if variations to the Contract Documents are required to comply with these regulations.

## PART 2 – PRODUCTS

### 2.01 MANUFACTURERS

- A. Materials distributed by the following manufacturers and otherwise conforming with these specifications are acceptable:
  - 1. Zurn Industries, LLC; Erie, PA
  - 2. Jay R. Smith Mfg. Co.; Montgomery, AL
  - 3. Tyler Pipe, Wade Div.; Tyler, TX

### 2.02 OVERFLOW ROOF DRAINS

- A. General-Purpose Roof Drains
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Zurn Plumbing Products Group; Specification Drainage Operation; Z100 or comparable product by one of the listed manufacturers.
  - 2. Standard: ASME A112.6.4, for general-purpose roof drains.
  - 3. Body Material: Cast iron
  - 4. Dimension of Body: Nominal 14-inch diameter.
  - 5. Drain Pipe Connection: No hub connection.
  - 6. Combination Flashing Ring and Gravel Stop: Not required.
  - 7. Flow-Control Weirs: Not required.
  - 8. Outlet: Bottom.
  - 9. Static Extension Collars: Not Required.
  - 10. Adjustable Extension Assembly: Required
  - 11. Underdeck Clamp: Required.
  - 12. Expansion Joint: Not required.
  - 13. Sump Receiver Plate: Not required.
  - 14. Dome Material: Cast iron.
  - 15. Perforated Gravel Guard: Not required.
  - 16. Vandal-Proof Dome: Not required.

17. Water Dam: 2" required for overflow or secondary drains.

### **2.03 ROOF DRAIN EXTENSIONS**

- A. Two-piece, cast-iron, adjustable roof drain extension that is attached to the existing drain bowl utilizing a gasketed connection.

### **2.04 ROOF DRAIN CLAMPING RINGS**

- A. Cast-iron with corrosion resistant coating and sized to fit the existing roof drain.

### **2.05 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES**

- A. Downspout Adaptors:
1. Description: Manufactured, PVC, for attaching downspout to underground storm drainage piping.
  2. Size: To match existing downspout and underground piping sizes.

### **2.04 REJECTED MATERIALS**

- A. The Design Professional shall have the right to inspect all materials brought to or stored at the job-site. Those materials that do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on-site supervisor. The verbal notification will be by the Design Professional, which will be followed by written confirmation.

## **PART 3 – EXECUTION**

### **3.01 INSPECTION**

- A. The contractor shall determine the exact drain installation location based on the lowest point on the roof surface and below deck obstructions.
- B. Closely inspect any uncovered condition and alert Design Professional to any condition that may interfere with the performance of the new roof drainage system.

### **3.02 PREPARATION**

- A. Coordinate all work closely with Design Professional as it relates to the installation of the roof drain(s). Roof drains shall be installed where identified in the project specifications and drawings. Roof drainage system shall be completed according to local and state building code requirements by licensed contractors.

### **3.03 OVERFLOW ROOF DRAIN INSTALLATION**

- A. Install overflow roof drains at the existing location over the overflow drain pipes. Overflow roof drains and adjustable extensions shall be adjusted to be flush with the roof membrane surface and shall not be sumped.

1. Install flashing collar or flange of roof drain to prevent leakage between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
2. Drains shall be securely fastened to the structural roof decking by means of an under deck clamp supplied by the drain manufacturer.
3. Install expansion joints, if indicated, in roof drain outlets.
4. Position roof drains for easy access and maintenance.

### **3.04 ROOF DRAIN EXTENSION INSTALLATION**

- A. Install adjustable drain extensions, with required sealing gaskets, on the drains in order to allow for a smooth transition into the drain bowl from the roof insulation. Field tapering the roof insulation is not permitted. Coordinate total height of adjustable and/or static drain extension with the roof insulation thickness at the drain.

### **3.05 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

### **3.06 COMPLETION**

- A. Correction of Work
  1. Work which does not conform to specified requirements including tolerances, slopes and finishes shall be corrected and/or replaced as directed by Design Professional at Contractor's expense without extension of time. Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.
  2. Damage resulting from tests or installation shall be repaired or damaged materials replaced, to satisfaction of Design Professional, and at no cost to Owner.
- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.

All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre-construction condition.
- C. All testing reports shall be submitted to the Design Professional.

END OF 22 14 26.13 – ROOF DRAINS

**26 41 13**  
**LIGHTNING PROTECTION FOR STRUCTURES**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1 - General Requirements, are included as part of this Section as though bound herein.

**1.02 SCOPE OF WORK**

- A. The intent of this specification is to modify the existing lightning protection system. The existing down conductor shall be re-utilized for this project, but the location of the down conductor through roof penetrations shall be relocated.
- B. Items covered by this specification section:
1. Air terminals and bases
  2. Fastener plates
  3. Roof penetrations
  4. Accessories

**1.03 UNIT PRICE WORK**

- A. The following work shall be added or deleted on a unit price basis in accordance with the requirements of Section 00 41 13. Where required, the scope of work per unit price shall be jointly assessed and agreed upon between the Design Professional and Contractor.
1. N/A

**1.04 RELATED SPECIFICATIONS**

Division 1	General Requirements
02 41 19	Selective Demolition
07 31 13	Asphalt Shingles
07 53 23	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing

**1.05 REFERENCES**

- A. Lightning Protection Institute (LPI)
1. 175 – Lightning Protection Installation Code
- B. National Fire Protection Association (NFPA)
1. 780 – Standard for Installation of Lightning Protection Systems
- C. Underwriters Laboratories Inc. (UL)

1. UL96 – Lightning Protection Systems Standards for Components
2. UL96A – Installation Requirements for Lightning Protection Systems

#### 1.06 PERFORMANCE REQUIREMENTS

- A. General: Installed lightning protection system shall be installed per UL96A and NFPA 780. If a complete system is not specified, the components that are installed are installed in accordance with these standards.
- B. Material Compatibility: Provide lightning protection materials (i.e. adhesive, protection mats, lightning protection material, etc.) that are compatible with one another (and the roof system) under conditions of service and application required.

#### 1.07 REUTILIZED MATERIALS

The following items shall be assumed to be fully salvageable and reusable:

2. Existing ground electrodes.
3. Existing down conductors.
4. Existing air terminals.

#### 1.08 SUBMITTALS

Submit in accordance with Section 01 33 00:

- A. Product Data:
  1. Submit specifications, installation instructions, and general recommendations from lightning protection materials manufacturers for each lightning protection component required.
- B. Shop Drawings:
  1. Submit shop drawings showing the location of the lightning protection system aerials, conductor cables, through roof penetrations, and attachment methods.
- C. Material Safety Data Sheets (MSDS):
  1. Submit a MSDS sheet for each material that will be utilized on-site.
- D. Manufacturer Certification:
  1. Submit manufacturer certification stating that contractor is approved, authorized, or licensed to install the lightning protection system specified.
- E. Contractor Certification:
  1. Submit written statement from Contractor indicating three (3) years of successful experience with installation of lightning protection systems, including project name and location, type of shingle roofing, and scopes of work which are equivalent to work of this section.

- F. Close-Out Submittal:
  - 1. Submit written photographic documentation of the concealed lightning protection system components that were installed as part of this project.

#### **1.09 QUALITY ASSURANCE**

- A. Source Limitations: Obtain masonry units, flashing materials, and accessories from a single manufacturer for each product required, unless approved by the Design Professional.
- B. Contractor Qualifications: A firm that has been engaged in the design and installation of lightning protection systems for a minimum of five (5) years.
- C. Manufacturer Qualifications: A manufacturer regularly engaged in the production of lightning protection equipment. The manufacturer shall be listed by UL as a manufacturer of lightning protection components.
- D. Lightning Protection System Inspection: The Contractor shall apply for inspection of the completed system by UL field representatives. The system is to be inspected by Underwriters Laboratories Inc., or other ANSI certified testing agency for compliance with NFPA 780. The system shall be without deviation and the UL field representative will issue a "UL Master Label Certificate of Inspection for Lightning Protection Systems" or "Letter of Findings" at completion of the installation.
- E. Environmental Standard: Manufacturer and contractor shall conform to Federal, State, and Local V.O.C. (Volatile Organic Compound) Regulations in area where the project is located. Notify Design Professional in writing if variations to the Contract Documents are required to comply with these regulations.

#### **1.10 DELIVERY, STORAGE, AND HANDLING**

- A. All products delivered to the site shall be in the original unopened containers, wrappings, or crating. Storage areas will be defined by Design Professional.
- B. Handle all materials to prevent damage. Materials shall be secured in a safe manner to prevent damage.
- C. Store temperature susceptible materials in a dry and heated area between 60° F and 80° F. If exposed to lower or higher temperatures, the material shall be discarded and new material provided at no cost to the Owner.
- D. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier (MSDS sheets).

#### **1.11 WEATHER LIMITATIONS ON WORK**

- A. At ambient temperatures of 40 degrees F and below, including wind-chill, precautions must be taken to insure that temperature-susceptible materials maintain their minimum acceptable temperature at the point of application as recommended by the roofing materials

manufacturer.

## 1.12 PROJECT CONDITIONS (CAUTIONS AND WARNINGS)

- A. Contractor shall implement all necessary precautions to prevent debris or materials/equipment from becoming airborne due to wind conditions anticipated at the site. Contractor shall conform to all regulations and precautions as required by applicable safety organizations.

## PART 2 - MATERIALS

### 2.01 MATERIALS

- A. All materials used in the installation shall be new and shall comply with weight, size, and composition as required by UL 96A and NFPA 780 and shall be labeled or listed by Underwriters Laboratories Inc. for use in lightning protection systems. The system furnished under this specification shall be the standard product of a manufacturer.
- B. Material Requirements:
1. Class I materials shall be used on structures or portions of structures that do not exceed 75 feet in height above grade level. Class II materials shall be used on structures that exceed 75 feet in height above grade level.
  2. Copper materials shall not be mounted on aluminum, Galvalume, Galvanized steel, or zinc surfaces. This includes those materials that have been painted.
  3. Aluminum materials shall not come in contact with earth or where rapid deterioration is possible. Aluminum materials shall not come into contact with copper surfaces or where exposed to runoff from copper surfaces. Aluminum materials shall not be attached to surfaces covered with alkaline-based paint, embedded in concrete or masonry, or installed in a location subject to excessive moisture.

### 2.02 AIR TERMINALS

- A. Air terminals shall extend a minimum of ten inches above the object or area they are to protect. Air terminals shall be located at intervals not exceeding 20'-0" along ridges of pitched roofs and along the perimeter of flat or gently sloping roofs (flat or gently sloping roofs include roofs that have a pitch less than 3:12). Flat or gently sloping roofs exceeding 50'-0" in width shall be provided with additional air terminals located at intervals not exceeding 50'. Air terminals shall be located within two feet (2') of the ends of ridges, roof edges and outside corners of protected areas.
- B. Air terminals shall be installed on stacks, flues, mechanical units and other objects not located within a zone of protection. Permanent metal objects on the structure having an exposed metal thickness 3/16" or greater may be substituted for air terminals and shall be connected to the lightning protection system as required by the specified standards using main size conductor and bonding plates having a minimum of 3 square inches of surface contact area.
- C. Air terminal bases shall be securely fastened to the structure in accordance with the specified standards. Fasteners may include stainless steel screws, bolts, anchors or adhesive. Adhesive shall be compatible with the surface on which it is used. Any protective sheets or pads that may be required shall be supplied and installed by the roofing

contractor.

- D. Main conductors shall be sized as Class I or Class II materials in accordance with the specified standards. Conductors shall provide two way, horizontal or downward path from each strike or air terminal to connections to the lightning protection ground electrode system. Conductors shall be free of excessive splices and no bend of a conductor shall form an included angle of less than 90 degrees nor have a radius of less than 8 inches.
- E. Conductors shall be securely fastened to the structure on which they are placed at intervals not exceeding 3'. Fasteners shall be of the same material or of a material equally resistant to corrosion as that of the conductor. Any protective sheets or pads that are required shall be installed by the roofing contractor.
- F. Connector fittings shall be listed for the purpose and of the same material as the conductor or of electrolytically compatible materials.
- G. Down conductors shall be sized as Class I or Class II materials in accordance with the specified standards. Class II conductors from a higher portion of the structure shall continue to connections to the lightning protection ground electrode system. Down conductors shall be spaced at intervals averaging not more than 100 feet around the perimeter of the structure. In no case shall a structure have fewer than two down conductors. Where down conductors are installed exposed on the exterior of a structure and are subject to physical damage or displacement, guards shall be used to protect the conductor a minimum of 6' above grade. Metallic guards shall be bonded at each end.
- H. In case of structural steel frame construction, down conductors may be omitted and roof conductors shall be connected to the structural steel frame at intervals not exceeding 100 feet along the perimeter of the structure.

### **2.03 ROOF PENETRATIONS**

- A. Roof penetrations required for down conductors or for connection to structural steel framework shall be made using thru-roof assemblies with solid riser bars or conduits and appropriate roof flashing. Conductors shall not pass directly through the roof.
- B. The required roof flashing must be completed by the roofing contractor.

### **2.04 REJECTED MATERIALS**

- A. The Design Professional shall have the right to inspect all materials brought to or stored at the job site. Those materials which do not comply with the above requirements shall be removed from the Owner's premises within two (2) hours of verbal notification to the person designated by the Contractor to be the lead on-site supervisor. The verbal notification to be by the Design Professional, which will be followed by written confirmation.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. A pre-job conference including the Design Professional, Owner's Representative, Contractor, the manufacturer's representative and all involved trades shall be conducted prior to commencement of the lightning protection work.

- B. Examine the substrate and the conditions under which the work is to be performed. Do not proceed until unsatisfactory conditions have been corrected as required for the installation and in accordance with the material manufacturer's specifications and specified standards.
- C. Notify the Design Professional in writing to all conditions which may adversely affect the installation and/or performance of the lightning protection system prior to commencing with the work. Proceed with installation only after unsatisfactory conditions have been corrected. Application of any part of the lightning protection system shall indicate acceptance of the roof surface and acknowledgment of full responsibility for the quality and durability of the roofing.

### **3.02 PREPARATION**

- A. General: The roof installation shall be complete in the area where the lightning protection system is to be installed.
- B. Through roof penetrations shall be installed during the roof replacement and all flashing work shall be completed by the roofing contractor.

### **3.03 INSTALLATION**

- A. The installation of the lightning protection system shall be done in a neat and workmanlike manner.
- B. The lightning protection system shall be installed by or under the supervision of a UL listed lightning protection installer.
- C. The installers shall have completed factory training and be so certified by the manufacturer.
- D. Install the lightning protection system in accordance with the approved shop drawings and the referenced lightning protection installation standards. Any deviations shall be brought to the immediate attention of the manufacturer so as to not delay certification.
- E. Coordinate the installation of the lightning protection system with other trades.

### **3.04 PROJECT DOCUMENTATION**

- A. Photo document all concealed portions of the lightning protection system as they are being installed. This includes lightning protection system grounding electrodes, connections to structural metal, connections to underground metal piping entering the structure, connections to electrical and electronic service grounds, ground rings, etc. This documentation shall be provided as a Close-Out submittal.
- B. Maintain accurate "As-Built" drawings throughout the entire installation of the lightning protection system.

### **3.05 INSPECTION, CERTIFICATION, AND MAINTENANCE**

- A. At completion of the installation of the lightning protection system, the contractor shall apply for inspection of the system by UL field representative. The system is to be inspected for compliance with NFPA 780.

- B. The Contractor shall provide the Letter of Findings of the UL inspection for the portion of the project where the lightning protection system was installed and/or modified.
- C. Any issues, that part of this project, identified during the UL inspection shall be corrected by the Contractor at no cost to the Owner. Written notice shall be provided to the Owner's Representative and Design Professional for any issues that are identified during the UL inspection and are beyond the scope of this project.

### 3.06 COMPLETION

- A. Correction of Work
  - 1. Work which does not conform to specified requirements or standards shall be corrected and/or replaced at Contractor's expense without extension of time. Therefore, Contractor shall also be responsible for cost of correction to any work affected by or resulting from corrections to work of this section.
- B. Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.  
  
All landscaped areas affected by construction activities shall be raked clean, seeded, or restored to pre- construction condition.
- C. All manufacturer's on-site inspection reports shall be submitted prior to final payment.
- D. All guaranties, as required in Part 1 of this specification, shall be submitted for approval prior to final payment.

END OF SECTION 26 41 13 – LIGHTNING PROTECTION FOR STRUCTURES