8. Other Insurance Coverage:

Specific Liability Insurance for Asbestos Abatement:

(a) Bodily Injury:

$1,000,000.00 Each Occurrence

$1,000,000.00 Aggregate

(b) Property Damage:

$1,000,000.00 Each Occurrence

$1,000,000.00 Aggregate

9. The policies for the above required insurance coverage shall name the Town of East Haven, and the Architect as assureds and shall, in addition, indemnify and hold harmless the Town of East Haven, the Architect, the Architect's Consultants, and Agents and employees of any of them as required by paragraph 3.18 of the General Conditions.

10. Add the following sentence to Subparagraph 11.1.3:

If this insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a Commercial General Liability policy form, ACORD Form 25S will be acceptable.

11. Add the following sentence to Clause 11.3.1.1:

The form of policy for this coverage shall be Completed Value.

12. Delete Clause 11.3.1.4 and substitute the following:

11.3.1.4 The Contractor shall provide insurance coverage for portions of the work stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the work in transit.

13. Delete Subparagraph 11.4.1 and substitute the following:

11.4.1 The Contractor shall furnish bonds covering faithful performance of the contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100% percent of the Contract Sum.

11.4.1.1 The Contractor shall deliver the required bonds to the Owner no later than three days following the date the Agreement is entered into, or if the work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the work, submit evidence satisfactory to the Owner that such bonds will be furnished.

11.4.1.2 The Contractor shall require the attorney-in-fact who executed the required bonds on behalf of the surety to affix thereto a certified and current copy of he power of attorney.

10. <u>ARTICLE 13 - MISCELLANEOUS PROVISIONS</u>

A. Add the following Paragraph 13.8 to Article 13:

13.8 EQUAL OPPORTUNITY

13.8.1 The Contractor shall maintain policies of employment as follows:

13.8.1.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

11. **ARTICLE 14 – TERMINATION OR SUSPENSION OF THE CONTRACT**

A. Add the following paragraph 14.4 to Article 14:

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

14.4.2 Upon receipt of written notice from thew Owner of such termination for the Owner's convenience, the Contractor shall:

a. Cease operations directed by the Owner in the notice;

b. Take actions necessary, or that the Owner may direct, for the protection and preservation of the work;

c. Except for work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontractors and purchase orders and enter into no further subcontractors or purchase orders.

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment from the Owner on the same basis provided in Subparagraph 14.2.

END OF SUPPLEMENTRY CONDITIONS

LIST OF DRAWINGS

FOXON RECREATIONAL CENTER

1. Foxon Recreation Center Roof

Orig. 5/29/2015

Revision: 7/21/2015

SUMMARY OF WORK

PART 1- GENERAL

1. RELATED SECTIONS

General Conditions
Supplemental General Conditions
Other Sections of Division 1
Specific Project Requirements

2. SYSTEM DESCRIPTION

A. **The Project** consists of the entire removal of the existing roof system down to the wood decking and installation of a new roofing system at the Foxon Recreational Facility located at 1408 North High Street in East Haven, Connecticut.

B. **The Work** includes, but is not necessarily limited to the following:

1. The removal of existing roof system and any insulation and associated flashings. This work does not include the removal of any electrical system, i.e. floodlights or siren mounted on said flashing. These features will be removed by the Town of East Haven or designated agent prior to commencement of any work by the Contractor. Inspection of wood roof deck and repair as required will take place at the unit price quoted in this document. Include removal of old wood decking, supplying new wood material as required and installation of same. Provision of a new roofing system, rigid insulation and 4-ply built-up roof, including flashing and accessories are required. Provide tapered insulation for drainage where indicated.
2. The removal of the existing roof system and insulation and disposal thereof will conform to ALL Federal, State and Local Laws including Environmental Standards for handling. An Analysis of the existing roof decking and areas that need to be replaced will take place between the Owner and the Contractor A unit cost for wooden deck replacement is included in this bid and the total

square footage removed and replaced wil be multiplied by the per/square footage price for said work.

3. **CONTRACTOR USE OF PREMISES**

A. Limit use of premises to construction activities in work areas; allow for and coordinate with Owner occupancy to minimize disturbance.
B. Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees and the public at all times. Coordinate areas for parking, delivery and storage of materials with Owner. Schedule deliveries to maximize space and time requirements for storage of materials and equipment onsite.
C. Maintain the existing building in a weather-tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
D. The Contractor's use of premises is limited by the Owner's right to perform construction operations with its own forces, to employ separate contractors on portions of the project and to continue daily operations.
E. Private utilities, Contractors and other parties may be expected to be working within the Contract area during this Contract. It shall be the responsibility of the Contractor to coordinate his work under this Contract with the work being done by others in order that construction may proceed in an efficient and logical manner. The Contractor shall have no claim or claims whatever against the Owner, Architect or other parties due to delays or other reasons caused by the work of others or his failure to coordinate such work.

4. **OCCUPANCY REQUIREMENTS**

A. The Owner will occupy the site and adjacent buildings during the entire construction period. Cooperate and coordinate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operations.

PART 2 - PRODUCTS

1. **MATERIALS/SUPPLIES**

A. The drawings and specifications list a well-known industry supplier. If other materials or products are to be used by any Bidder, please provide information as required.
B. The town of East Haven will accept other manufacturers and suppliers if the products are found to be acceptable.

PART 3 – EXECUTION N/A

END OF SUMMARY OF WORK

SECTION 01026
UNIT PRICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for unit prices.

B. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of work required by the Contract Documents are increased or decreased.

C. Unit prices include all necessary material, overhead, profit and applicable taxes.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE

A. Item No. 1 - Removal of existing deteriorated perimeter wood nailers and replacement with new pressure treated wood nailers.

Unit of Measurement: Board foot of wood nailers.

B. Item No. 2 - Removal of existing metal roof deck and replacement with new primed steel roof deck (identical gage and configuration).

Unit of Measurement: Square foot of replaced deck.

END OF SECTION 01026

SECTION 01027
APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.03 SCHEDULE OF VALUES

A. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

B. Submit the Schedule of Values to the Architect at the earliest feasible date, but in no case later than 14 days before the date scheduled for submittal of the initial Application for Payment.

C. Format and Content: Use the Project Manual Section 01340 as a guide to establish the format for the Schedule of Values. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:

Generic name.
Related Specification Sections.
Name of subcontractor or fabricator.
Dollar value.
Percentage of Contract Sum to the nearest one percent, adjusted to total 100 permit.
Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items where required. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.

PART 1 - GENERAL

1.04 APPLICATIONS FOR PAYMENT

E. Transmittal: Submit 3 executed copies of each Application for Payment to the Architect by means ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.

F. Lien Waivers: Submit Final Application for Payment with or preceded by final waivers from every entity involved with performance of work covered by the application who could lawfully be entitled to a lien.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:

List of subcontractors and fabricators.
Schedule of Values.
Contractor's Construction Schedule (preliminary if not final).
Copies of building permits.
Certificates of insurance and insurance policies.
Performance and payment bonds.
Data needed to acquire Owner's insurance.

H. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

I. Administrative actions and submittals that shall precede or coincide with this application include:

Occupancy permits and similar approvals.
Warranties (guarantees) and maintenance agreements.
Test/adjust/balance records.
Maintenance instructions.
Meter readings.
Change-over information related to Owner's occupancy, use, operation and maintenance.
Final cleaning.
Advice on shifting insurance coverages.
List of incomplete work, recognized as exceptions to Architect's Certificate of Substantial Completion.

SECTION 01027
APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.04 APPLICATIONS FOR PAYMENT

J. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:

Completion of Project close-out requirements.
Completion of items specified for completion after Substantial Completion.
Assurance that unsettled claims will be settled.
Transmittal of required project construction records to Owner.
Proof that fees and similar obligations have been paid.
Removal of surplus materials, rubbish and similar elements.
Change of door locks to Owner's access.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01027

PRE-CONSTRUCTION PROJECT MEETINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 RELATED DOCUMENTS

A. This Section specifies administrative and procedural requirements for a pre-construction project meeting.

1.03 PRE-CONSTRUCTION CONFERENCE

A. **A pre-construction** conference and organizational meeting will be scheduled at the Project Site or other convenient location no later than fifteen days (15) after execution of the Agreement and prior to commencement of construction activities.

B. The Architect will administer pre-construction conference and exchange of preliminary submittals.

C. **Attendees:** The Owner, the Architect, the Contractor and its superintendent, major Subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

... of significance that could affect progress including such topics

Tentative construction schedule
Critical Work sequencing
Designation of responsible personnel
Procedures for processing field decisions and Change Orders
Distribution of Contract Documents
Submittal of Shop Drawings, Product Data and Samples
Use of the premises
Office, Work and Storage Areas
Equipment deliveries and Owners priorities

PART 1 – GENERAL

1.03 PRE-CONSTRUCTION CONFERENCE

C. **Mobilization:** The Owner will administer an on-site mobilization meeting at project site for clarification of Owner and Contractor responsibilities in use of site and for review of administrative procedures.

END OF PRE-CONSTRUCTION PROJECT MEETINGS

SECTION 01340
SHOP DRAWINGS, PRODUCT DATA
AND SAMPLES

PART 1 - GENERAL

1.01 RELATED SECTIONS

General Conditions
Supplemental General Conditions
Specific Project Requirements
Other Sections of Division One

1.02 SYSTEM DESCRIPTION

A. This Section specifies administrative and procedural requirements for submittals required for performance of the work including:

Contractor's Construction Schedule
Submittal Schedule
Shop Drawings
product Data
Samples

1.03 QUALITY ASSURANCE

A. Shop drawings, etc., or printed matter shall give all dimensions, sizes, etc., to enable the Architect to determine suitability of the construction, installation, material or layout for the purposes intended. The drawings shall include outline, sectional views and detailed working dimensions, designations of materials, machine work, methods of attachment, finish, etc., required. The drawings to be submitted shall be coordinated by the Contractor with any other drawings previously reviewed, with the design and function of any equipment or structure and the Contract Drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Contractor, shall submit manufacturer's literature as a supplement to, the shop drawings, etc.

B. Where contents of submittal literature from manufacturers includes data not pertinent to the submittal, clearly show which portion of the contents is being submitted for review.

PART 2 - PRODUCTS

2.02 SHOP DRAWINGS

A. Scale and measurements: Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection of the work.

B. The minimum size for any submission shall be 8-1/2" x 11" and the maximum size shall be the size of the Contract Drawings.

2.03 SAMPLES

A. Provide sample(s) identical to the precise article proposed to be provided. Identify as directed under "Identification of Submittals" below.

2.04 COLORS AND PATTERNS

A. Unless the precise color and pattern is specifically called out in the Contract Documents and wherever a choice of color or pattern is unavailable in the specified products, submit accurate color and pattern charts to the Architect for selection.

PART 3 - EXECUTION

3.01 SCHEDULE AND IDENTIFICATION OF SUBMITTALS

A. The Contractor shall submit a schedule of submittals within ten (10) working days after signing the Contract to the Architect for his approval. The schedule shall include the following:

1. Proposed dates for commencement and completion of each of the various items of work and tasks, by each trade and/or subcontractor, to be performed under this Contract. Coordination of trades/subcontractors shall be shown. The format shall be a bar chart.

2. Schedule of submission of shop drawings, submittals and including estimated time for material(s) product data, fabrication, and delivery to site.

PART 3 - EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

B. Consecutively number all submittals when material is resubmitted for any reasons, transmit under a new letter of transmittal and with a new transmittal number. Resubmittals shall cite the original number for reference. All shop drawings, etc., and/or printed matter submitted shall be properly identified by project and specific application with reference to Contract Drawings number and specification items.

C. When the Contractor proposes a revision to a previously submitted shop drawing, etc., six (6) copies shall be resubmitted for review. This resubmittal shall clearly indicate, in a revision block, the date, description and location of the revision. The letter of transmittal shall state the reasons for the revision.

D. The Contractor shall furnish as many copies of the submittals as is necessary for the proper coordination of the work, and shall maintain a complete set of the reviewed submissions at the site of the work at all times.

3.02 ARCHITECT'S ACTIONS

A. All required shop drawings layout drawings, working drawings, material and equipment descriptions, etc., shall be submitted to the Architect in four (4) copies for review sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. Two (2) weeks should be allowed for checking from the date of receipt by the Architect.

B. After review, the submittals will be stamped "No Exceptions Taken," "Make Corrections Noted," "Amend and Resubmit" or "Rejected - See Remarks." Three (3) prints of "No Exceptions Taken" or "Make Corrections Noted" drawings will be returned to the Contractor for his use and distribution to his suppliers and/or Subcontractors. In the case of those stamped "Amend and Resubmit" or "Rejected - See Remarks," two (2) prints will be returned to the Contractor who shall make all indicated corrections and resubmit six (6) prints.

PART 3 - EXECUTION

3.02 ARCHITECT'S ACTIONS

C. In any submission which is noted as "No Exceptions Taken" or "Make Corrections Noted," the review shall not extend to details or dimensions and shall not relieve the Contractor from his responsibility for compliance with the Contract Drawings and specifications.

D. Upon the final acceptance of the project, the Contractor shall, on request, furnish the Owner with a complete set of shop drawing tracings or reproducible cloth reproductions of the shop drawing tracings.

END OF SECTION 01340

SECTION 01500
TEMPORARY FACILITIES AND
CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

1. Temporary construction and support facilities required may include but are not limited to:

   Temporary enclosures.
   Waste disposal services.

2. Security and protection facilities required include but are not limited to:

   Temporary fire protection.
   Barricades, warning signs, lights.

1.03 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including, but not necessarily limited to:

   Building Code requirements.
   Health and Safety regulations.
   Police, Fire Department and Rescue Squad rules.
   NFPA 241.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

PART 2 - PRODUCTS

2.01 MATERIALS

B. EQUIPMENT

1. General: Provide new equipment.

2. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

3. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by the Owner.

3.02 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; periodically dispose of in on-site dumpster supplied and maintained by Contractor.

3.03 CLEANING DURING CONSTRUCTION

A. Removal: Remove temporary materials, equipment, services and construction prior to substantial completion inspection.

1. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to original condition.

SECTION 01500
TEMPORARY FACILITIES AND
CONTROLS

PART 3 - EXECUTION

3.03 CLEANING DURING CONSTRUCTION

B. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Comply with NFPA 10 "Standard for Portable Fire Extinguishers", and NFPA 241 "Standard for Safeguarding Construction, Alteration and Demolition Operations."

B. Locate fire extinguishers where convenient and effective for their intended purpose.

C. Store combustible materials in containers in fire-safe locations.

D. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, and access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.

E. Provide supervision of welding operations and similar sources of fire ignition.

F. Temporary Fire Protection: Unless protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses.

PART 3 - EXECUTION

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

G. Barricades, Warning Signs and Lights: The Contractor will comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

H. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

I. Protect materials, both before and after their incorporation in the work, as required to prevent damage from moisture, rain, dirt, cold, sunlight, and other harmful influences.

J. Do not deliver materials to the job until they can be properly protected.

K. If possible, store materials vulnerable to exposure damage in enclosed areas where weather-protected.

L. Follow recommendations of manufacturers and contractors for protection and storage. Minimum protection shall be as follows:

M. Materials requiring thorough protection, shall be stored inside enclosed areas under cover. Provide separators to keep materials off the floor and to ensure ventilation.

N. Replace work which becomes unfit for use or unsightly during construction. Replace broken products. Restore all finishes damaged, soiled or otherwise made unsightly during construction.

PART 3 - EXECUTION

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

O. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

P. Exits: Emergency exits from the building shall be maintained throughout the period of construction. Safe passage shall also be maintained at exterior site areas adjacent to emergency exits.

3.05 PROTECTION OF INSTALLED WORK

A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

B. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.

3.06 RECORD DOCUMENTS

A. Refer to Section 01700 - Project Closeout regarding record copies of drawings, specifications, addenda, change orders and other modifications, and approved submittals. In addition, the following requirements apply to record copies:

B. Do not use record documents for construction purposes.

C. Label each record document "PROJECT RECORD" in 2" high printed letters.

D. Keep record documents current.

E. Do not permanently conceal any work until required information has been recorded.

PART 3 - EXECUTION

3.06 RECORD DOCUMENTS

F. Contract Drawings: Legibly mark to record actual construction:

1. Field changes of dimension and detail.

2. Changes made by Change Order or Field Order.

3. Details not on original Contract Drawings.

G. Specifications and Addenda: Legibly mark-up each section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.

2. Changes made by Change Order or Field Order.

3. Other matters not originally specified.

H. Shop Drawings: Maintain as record documents: Legibly annotate to record changes made after review.

I. Submit record documents to Architect at completion of project.

3.07 MAINTENANCE AND PROTECTION OF OWNER'S PROPERTY

A. Maintain suitable fire protection equipment. Train workmen in use of fire protection equipment, and assign responsibility for reporting fires and performing first aid firefighting.

B. Maintain electric service at all times.

C. Arrange and maintain temporary facilities so as not to encumber walks, drives, roads, and ways of access and egress. Maintain safe access and egress for Owner to carry on full use of property. Clear ice and snow from access and egress ways, in construction areas actually being used by the Contractor, only. Provide security at all times consistent with the Owner's security program.

PART 3 - EXECUTION

3.08 OPERATION, TERMINATION AND REMOVAL

A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

B. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

C. Materials and facilities that constitute temporary facilities are property of the Contractor.

D. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period.

E. Replace significantly worn parts and parts that have been subject to unusual operating conditions.

END OF SECTION 01500

SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.03 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft:

B Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

C. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.

D. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

D. Store products subject to damage by the elements above ground, under cover in a watertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.05 GENERAL STANDARDS

A. These provisions, standards, and tolerances shall apply to all work under this contract. Where stricter standards and tolerances are specified, they shall take precedence over these standards and tolerances.

B. Build and install parts of the work level, plumb, square and in correct position unless specifically shown or specified otherwise.

C. No part shall be out of plumb, level, square, or correct position so much as to impair its function or that of the project, or so as to impair aesthetic effect.

D. All fasteners used by all trades on the exterior of the building and where dampness and corrosion can reasonably be anticipated shall be corrosion resistant.

E. Exposed fasteners used for exterior trim, whether set and puttied or not, shall be stainless steel or aluminum.

F. Fasteners for carpentry on the exterior or in potentially damp locations shall be stainless steel, aluminum, or hot dip galvanized steel.

G. Fasteners for stainless steel shall be stainless steel.

H. Fasteners for aluminum shall be stainless steel or aluminum.

I. Fasteners for ferrous metals shall be galvanized or stainless steel.

J. Fasteners for other materials on the exterior of the building, and where dampness and corrosion can reasonably be anticipated shall be one of the types specified above.

K. Follow manufacturer's instructions for assembling, installing, and adjusting products. Where manufacturers' instructions conflict with Contract Documents, request instructions from Architect.

L. All materials and equipment shall comply with the Occupational Safety and Health Act as amended.

SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.06 REFERENCE STANDARDS

A. Reference to standard specifications shall mean latest edition of such specifications published at date of Project Manual.

B. Reference to technical society or organization is made in the project manual according to the following abbreviations:

A.I.A.	-	American Institute of Architects
A.C.I.	-	American Concrete Institute
A.I.E.E.	-	American Institute of Electrical Engineers
A.I.S.C.	-	American Institute of Steel Construction
A.I.S.I.	-	American Iron and Steel Institute
A.N.S.I.	-	American National Standards Institute Obsolete designations are A.S.A. and U.S.A.S.I.
A.P.A.	-	American Plywood Association Obsolete designation is D.F.P.A.
A.S.M.E.	-	American Society of Mechanical Engineers
A.S.T.M	-	American Society of Testing and Materials
A.W.I.	-	Architectural Woodwork Institute
F.S.	-	Federal Specification
G.A.	-	Gypsum Association
N.A.A.M.M.	-	National Association of Architectural Metal Manufacturers
N.B.S.	-	National Bureau of Standards
N.E.C.	-	National Electrical Code
S.I.G.M.A.	-	Sealed Insulating Glass Manufacturers Association
S.S.P.S.	-	Steel Structures Painting Council
T.A.S.	-	Technical Aid Series
U.L.	-	Underwriters Laboratories, Inc.
N.F.P.A.	-	National Fire Protection Association

1.07 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a specification section shall be the same, and shall be interchangeable.

SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.08 LIST OF PRODUCTS

A. Within 15 days after date of Owner-Contractor Agreement, submit a complete list of major products proposed for use, with name of manufacturer, trade name and model number of each product.

1.09 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; delivery in undamaged condition in manufacturer's unopened containers or packaging, dry.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

B. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

C. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

D. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations. Procedures governing product selection include the following:

E. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

F. Semiproprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.

G. Where products or manufacturers are specified by name, accompanied by the term "or equal", or "or approved equal" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

H. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to sue of these products only, the Contractor may propose any available product that complies with Contract requirements.

I. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

J. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

K. Visual Matching: Where Specifications require matching an established Sample or existing material or finish, the Owner's decision will be final on whether a proposed product matches satisfactorily.

L. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

M. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Owner will select the color, pattern and texture from the product line selected.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS:

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

END OF SECTION 01600

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

Inspection procedures.
Project record document submittal.
Maintenance manual submittal.
Submittal of warranties.
Final cleaning.

1.03 SUBSTANTIAL COMPLETION:

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

B. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

C. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

D. Advise Owner of pending insurance change-over requirements.

E. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

PART 1 - GENERAL

1.03 SUBSTANTIAL COMPLETION:

F. Obtain and submit releases enabling the Owner unrestricted use of the Work. Include occupancy permits and similar releases.

G. Deliver tools, spare parts, extra stock, and similar items.

H. Complete instruction of the Owner's operating and maintenance personnel. Discontinue and remove temporary facilities from the site, along with construction tools and similar elements.

I. Complete final clean-up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

J. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor that incomplete or uncorrected work must be completed or corrected before the certificate will be issued.

K. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE:

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

B. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

PART 1 - GENERAL

1.04 FINAL ACCEPTANCE:

C. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Architect.

D. Submit consent of surety to final payment.

E. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

F. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Owner.

G. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.05 RECORD DOCUMENT SUBMITTALS:

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

PART 1 - GENERAL

1.05 RECORD DOCUMENT SUBMITTALS:

C. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

D. Mark new information that is important to the Owner, but was not shown on the Contract Drawings or Shop Drawings.

E. Note related Change Order Numbers where applicable.

F. Organize record drawing sheets into sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

G. Upon completion of the work, provide the Owner with a record set of the Contract Drawings, showing all changes marked on the record set of prints. Submit prints to the Architect for transmission to the Owner.

H. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observations.

I. Note related record drawing information and Project Data.

J. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 FINAL CLEANING

A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities."

B. Cleaning: Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

C. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

D. Clean the site of rubbish, litter and other foreign substances. Sweep paved areas, in vicinity of work, broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface. This cleaning applies only to items and surfaces in areas involved in the performance of the work.

E. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

F. Compliance: Comply with the regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

G. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01700

SECTION 02070
DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK:

A. Demolition Work: Demolition requires the selective removal and subsequent offsite disposal.

1. Removal of entire roofing system; all flashings, ~~insulation~~, ~~and~~ perimeter gravel stop.

2. Disposal and abatement of hazardous roofing material.

1.03 SUBMITTALS:

A. Schedule: Submit schedule indicating proposed methods and sequence of operations for demolition work to Owner's Representative for review prior to commencement of work. Include details for dust and noise control protection.

1. Provide detailed sequence of demolition and removal work to permit Owner's scheduling of this operations.

1.04 JOB CONDITIONS:

A. Occupancy: Owner will be occupying areas of the building immediately below roof areas of demolition during this Contract.

B. Condition of Structures: Owner assumes no responsibility for actual condition of items to be removed.

C. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to demolition work.

1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of adjacent buildings and site.

PART 1 - GENERAL

1.04 JOB CONDITIONS:

2. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

3. Protect surrounding drives, walks and landscaping with suitable coverings when necessary.

4. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.

5. Remove protections at completion of work.

D. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

E. Traffic: Conduct demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

F. Explosives: Use of explosives will not be permitted.

G. Utility Services: Maintain existing utilities, keep in service, and protect against damage during demolition operations. Do not interrupt existing utilities serving occupied or used facilities. Notify Owner 48 hours in advance of any anticipated utility interruptions.

SECTION 02070
DEMOLITION

PART 1 - GENERAL

1.04 JOB CONDITIONS:

H. Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

1.05 HAZARDOUS MATERIAL ABATEMENT

A. Exterior:

1. Abatement: Remove and dispose of existing roofing system materials in accordance with applicable codes and regulations. Retain the service of a Certified Abatement Specialist to test existing roofing material, specify abatement procedures, monitor removal work and perform required inspections.

B. Certification: Upon completion of abatement work, provide certification to the Owner that all work, including material disposal, has been completed in accordance with applicable codes and regulations.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.01 INSPECTION:

A. Prior to commencement of demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from demolition work; file with Owner's Representative prior to starting work.

PART 3 - EXECUTION

3.02 PREPARATION:

A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

3.03 DEMOLITION:

A. Perform demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange demolition schedule as necessary to continue overall job progress without delay.

3.04 DISPOSAL OF DEMOLISHED MATERIALS:

A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.

1. If unforseen hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.

2. Burning of removed materials is not permitted on project site.

PART 3 - EXECUTION

3.05 CLEAN-UP AND REPAIR:

A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of demolition work. Repair adjacent construction or surfaces soiled or damaged by demolition work.

END OF SECTION 02070

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SUMMARY:

A. Types of work in this section include rough carpentry for:

1. Wood nailers and blocking.

1.03 SUBMITTALS:

A. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.

1. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.

1.04 PRODUCT HANDLING:

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1.05 PROJECT CONDITIONS:

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of nailers, blocking, and similar supports to allow attachment of other work.

PART 2 - PRODUCTS

2.01 LUMBER, GENERAL:

A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

NLGA - National Lumber Grades Authority (Canadian).
SPIB - Southern Pine Inspection Bureau.
WCLIB - West Coast Lumber Inspection Bureau.
WWPA - Western Wood Products Association.

C. Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S.

2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness.

2.02 MISCELLANEOUS LUMBER:

A. Provide wood for support or attachment of other work including rooftop equipment curbs and support bases, nailers, blocking, and similar members. Provide lumber of sizes indicated or required, worked into shapes shown, and as follows:

1. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

PART 2 - PRODUCTS

2.02 MISCELLANEOUS LUMBER:

2. Grade: Standard Grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 3 boards per SPIB rules.

2.03 MISCELLANEOUS MATERIALS:

A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).

2.04 WOOD TREATMENT BY PRESSURE PROCESS:

A. Preservative Treatment: All lumber shall be treated, and comply with applicable requirements of AWPA Standards C2 (Lumber) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.

B. Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LP-2. After treatment, kiln-dry lumber to a maximum moisture content of 19 percent. Treat all items and the following:

Nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing and flashing.

C. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment and to comply with AWPA M4. Inspect each piece of lumber after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL:

A. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

B. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards.

D. Use common wire nails, except as otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.02 NAILERS AND BLOCKING:

A. Provide wherever shown and where required for attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION 06100

DIVISION 7
THERMAL AND MOISTURE PROTECTION

SECTIONS:

7.1 DAMPPROOFING
7.2 THERMAL INSULATION
7.3 ASPHALT SHINGLES
7.4 BUILT-UP ROOFING
7.5 MODIFIED BITUMEN ROOFING
7.6 FLASHING AND SHEET METAL
7.7 DRAINAGE PLANE
7.8 PREFORMED SIDING
7.9 ROOF ACCESSORIES
7.10 SEALANTS
7.11 AIR-SEALING
7.12 USE OF BLOWER DOOR – PROCEDURES AND TESTING

SECTION 7.1 DAMPPROOFING

7.1 A Products:

1. Asphaltic emulsion based – equal to Sonneborn "Hydrocide 700 Mastic" or Karnack "955-Heavy Trowel."
2. Interior Coating – "Thoroseal" by Standard Drywall Products Co.
3. Admixture – "Thoroguard" by Standard Drywall Products or approved equal anti-hydra admixture.
4. Grout – "Thoroplug" by Standard Drywall Products Co. or approved equal.
5. Exterior drainage membrane – "A-H Seamless Membranes" by AntiHydro International Inc. or approved equal.

7.1 B Reference:

Joseph Lstiburek, Builder's Guide – Moderate Climates, © 1998 Building Science Corp., EEBA and Shelter Source, Chapter 4 – Foundations.

7.1 C Execution: (see Builder's Guide, Figures 4.2, 4.8, 4.11 et al.)

1. New concrete footings – as a capillary break across top of footing, either apply one troweled-on coating of asphaltic emulsion dampproofing according to manufacturer's instructions or secure an impermeable membrane.

2. New foundation walls at exterior – Install one troweled-on coating of asphaltic emulsion dampproofing according to manufacturer's instructions. Apply only at temperatures above 40° F. in dry weather. Apply mastic from footing up parged foundation wall to point of grade or start of stucco. Backfill with care to prevent damage to dampproofing, providing membrane protection course when necessary to prevent such damage. Where existing

foundation walls are exposed, parge and apply dampproofing as above. Dampproofing may be omitted where draining rigid glass fiber insulation is used.

3. Basement drainage (new construction) – install perforated perimeter drain on outer side of footing and below the level of floor slab. Surround the perforated drain with coarse gravel (no fines); protect the gravel with filter fabric. Pipe to drainage system. Above it, face the below-ground portion of the basement wall with draining rigid glass fiber insulation (or drainage membrane with filter fabric).

SECTION 7.2 THERMAL INSULATION

7.2 A General:

1. Section includes –
   a. Batt and cellulose thermal insulation in exterior wall, roof and floor cavities
   b. Rigid insulation in exterior walls
   c. Crawlspace vapor retarder.
   d. *Exterior insulation and finish systems* (EIFS)

2. Related sections –
   a. Steel Framing 5.1
   b. Rough Carpentry 6.1
   c. Air Sealing 7.10
   d. Ductwork and Pipe Insulation 15.2

3. Definition of thermal boundary – Uninterrupted thermal insulating barrier enclosing entire heated space of building. Basements and connected crawlspaces are usually unintentionally heated and defined within the thermal envelope. Other crawlspaces may be excluded from the thermal envelope only with explicit written authorization of PHDC/RDA.

4. Storage and handling – All insulation shall be delivered to the site in manufacturer's original container, clearly marked and identified with brand, applicable standards, type and R-value. Protect materials from weather.

5. Quality assurance – Install all materials in accordance with manufacturer's specs.

7.2 B Products:

1. Cellulose – Shall conform to interim safety standard 16 CFR Part 1209.

   a. Approved low moisture wet-spray: R-Pro Wall System
   b. Loose fill cellulose: R-3.2 per inch.
   c. Dense-packed cellulose: Density not less than 3 and not more than 5 lb/cubic foot installed

2. Glass fiber – Preformed glass fiber batt, faced or unfaced as indicated, width conforming to construction application.

   R-11, 3-1/2 x 16 inch batt, kraft-faced
   R-13, 3-1/2 x 15 inch high-density batt, kraft-faced
   R-19, 6 x 15 inch batt, kraft-faced
   R-19, 6 x 16 inch batt, kraft-faced
   R-30, 10 x 16 inch batt, unfaced

3. Rigid insulation –

   a. Foil-faced polyisocyanurate (R-Max, Tough-R, Thermax)
   b. Foil-faced glass fiber board (Owens Corning et al.)
   c. Extruded polystyrene "XPS" ("blue board," "pink board" – Owens Corning et al.)
   d. Rigid glass fiber draining insulation board (Insul-Drain by Owens Corning)

4. Exterior insulation and finish systems – complete system including expanded- or extruded-polystyrene board insulation, mechanical fasteners, reinforcing mesh, synthetic stucco, and aperture details, all provided or certified for use by the same EIFS manufacturer: Dryvit Sytems, Parex, Senergy, Simplex, Sto Corp., US Gypsum.

   System shall be designed with a drainage plane behind the foam insulation: Dryvit MD System, Senergy CDsystem, US Gypsum InsulScreen or approved equivalent. EIFS dependent on a perfect face seal for moisture exclusion shall not be used.

5. Staples – galvanized or bronze flattened 1/2 inch shank wire staples.
6. Support wire – 12 gauge galvanized soft-annealed, mild steel wire.
7. Prefabricated batt hangers –
8. Vapor barrier – Polyethylene film 6 mil thick.
9. Vapor barrier tape: 3M #8086.
10. Adhesive – As recommended by insulation manufacturer. Shall not damage insulation or vapor barrier.

7.2 C Execution:

1. Insulate entire thermal boundary as specified.

2. Special requirement for exterior insulation and finish system – The system shall be installed by certified EIFS applicators trained by its manufacturer. Flashing, sealing and termination details shall be pre-approved by the architect and prime contractor. Joints shall be sealed with silicon or other low-modulus sealant.

3. Special requirement for steel framing – *De-rating due to thermal short*. Insulation installed between metal framing (that portion of insulation with thickness equal to framing member depth) shall be de-rated by 50%. Where insulation method is not prescribed below, provide additional insulation outside (on the cold side of) the framing to achieve required minimum total thermal resistance.

4. Special requirements for pipes and ductwork –

   a. General: Building insulation shall be installed such that all wet piping and ductwork remain within the building thermal envelope.

   b. Walls and chaseways: Install minimum R-13 of insulation uncompressed on cold side of heating pipes and ducts. Two-inch rigid glass fiber board, fit tight at studs and butt joints, may be substituted for R-13 glass fiber where mechanicals leave insufficient clearance for full thickness batts. Insulate remainder of cavity to either side of mechanicals.

5. Existing construction with intact interior finish –

   a. Roof cavity: Dense-packed cellulose in all portions that cannot be air-sealed. Insulate remainder with loose fill cellulose to R-30.

   b. Walls and floors: Dense-packed cellulose.

6. Walls –

   a. General:

      1) Insulation requirement – Achieve effective R-13 minimum with batts or cellulose unless stipulated otherwise.

      2) Exterior frame walls – Insulate full depth of stud cavity.

      3) Studded-out exterior masonry walls –

         a) Glass fiber batt: R-13 minimum if distance from masonry to interior stud face is less than 4-1/2 inch, R-19 if greater and whenever steel studs are used (see *Metal stud walls* below).

b) Cellulose: permitted only where masonry has new outer course of hard face brick or moisture-resistant stucco.

4) Fitting batts – Cut batts 1 inch longer than stud cavity. Staple top to underside of firestop or top plate and press-fit between studs with stapling tabs left folded. Install wrinkle free and flush with stud face to minimize convection within stud cavity. Cut batts 1/2-inch wider than non-standard width stud bays to provide snug fit. (For walls studded out with metal studs, see "Metal stud walls" below.)

5) Exterior corners fully insulated – Provide continuous insulation at outside corners and where partition walls abut outside walls. See Section 6.1 D 3 (c), Stud Framing.

6) Exterior walls between floors – When new ceilings, other than on the top-floor, are erected below the joists, insulate exterior walls to R-13 between the new ceiling and floor sheathing above. Install insulation without gaps.

b. Metal stud walls:

1) Comply with all other minimum insulation requirements.

2) Glass fiber batt – Width shall equal full center to center spacing of studs.

3) Wet-spray cellulose – Install to full depth of wall cavity without voids behind studs or inside stud channels. Flanges of studs and runners shall be scraped free of insulation prior to installation of drywall.

4) New frame walls – Insulate stud bays to full depth. Use R-11 batts with insulating exterior sheathing (polyisocyanurate or XPS), R-5 minimum.

5) Studded-out exterior masonry walls –

a) Glass fiber batt: Use R-19 batts the full width of the center-to-center stud spacing, slit to fit around the stud C-section so that approximately 40% of the batt thickness is in the space between the masonry and studs. The edges of adjacent batts shall meet in this space.

b) Cellulose: Install without voids to full depth of wall cavity.

c. Basement and crawlspace:

1) Basement walls (new construction) – In owner-occupied single-family dwellings where the floor-to-ceiling height is 6 feet or more, insulate to R-10 minimum.

a) Interior: in unfinished spaces, install a foil-faced glass fiber board (FSK), approved for exposed use, over the full height of the exterior (non-party) wall. In finished space, use any approved non-hygroscopic insulating material.

b) Exterior: Where insulation is placed on the exterior of the basement wall without foundation drainage, use either 2-inch draining rigid glass fiber or 2-inch extruded polystyrene extending from the top of the footing to the top of the foundation wall. Where insulation is part of an exterior foundation drainage system, comply with manufacturer's specifications. In either case, provide protective membrane above ground and appropriate termite barrier detail.

c) Integral: Where a concrete block wall is not insulated on either side, insulate all hollow cores in the block with expanded polystyrene foam inserts from a level 3 feet below grade to the top.

2) Basement walls (existing construction) – Insulate finished basement exterior walls with any approved non-hygroscopic insulating material.

3) Basement-under-porch partition – Construct partition, with hinged door, to separate excavated areas under porches or sidewalks from the main basement space. Insulate partition wall with R-13 foil-faced glass fiber board.

4) Crawlspace vapor barrier – Cover ground of all dirt crawlspaces with 6-mil polyethylene film and lap up wall one foot above grade.

5) Crawlspace perimeter – Insulate wall of crawlspaces under heated living areas with foil-faced glass fiber board, R-10 minimum. Completely air seal exterior crawlspace perimeter prior to insulating. Embed board 1-foot into crawlspace soil. On walls perpendicular to joists, wedge top tight against joist. On walls parallel to joists, affix with adhesive approved for use with glass fiber.

6) Slab-on-grade (new construction only) – a floating-slab design should be used unless structural considerations dictate an anchored slab.

a) Floating slab: Separate the edge of the floor slab from the perimeter wall with continuous 2-in. extruded polystyrene insulation, which then continues 2 ft. downward or 2 ft. inward horizontally. Insulation thickness at slab edge may be reduced to as little as 0.75 in. where necessary to avoid a gap between slab and wall-base trim.

b) Anchored slab: When the slab cannot be thermally isolated from the perimeter wall, insulate outside surface of perimeter wall to R-10 minimum.

7. Floors –

a. Insulation requirement: Use R-19 batt minimum or blow in cellulose to full depth of floor cavity.

b. Overhangs: Insulate portion directly above exterior wall to full depth of floor cavity.

c. Bay over existing porch: Install insulation against all exterior surfaces including retrofit air barrier, ends of joist bays and sides of outboard joists.

d. Support open batt: Where exterior sheathing or finish is not installed immediately below floor batt, support batt with approved wire or hangers spaced 10 inches on center. Attach wire to joist with staple or "J" nail.

8. Ceilings –

a. Insulation requirement: Achieve R-30 with glass fiber batt or loose fill cellulose. Batt should be unfaced if necessary to conform to ceiling finish where lower part of batt is compressed by width of stud.

b. Chimneys and vents: Maintain combustible materials at least 2 inches from hot surfaces, or as required by code.

c. Wood-framed ceilings:
   1) Glass fiber – Install batts, width equal to center-to-center joist spacing, compressed at the bottom to fit between joists, without gaps in space above joists.
   2) Cellulose – Blow loose fill to required depth.

d. Metal-framed ceilings: top flanges shall be covered with a continuous layer of loose-fill cellulose or glass fiber batts. That portion of insulation installed between metal framing members shall be derated by 50%.
   1) Glass fiber – batt insulation shall be applied in two perpendicular layers. The lower layer shall be kraft-faced, inserted between members and be the same width as C-C joist spacing, and have same thickness as members (exception: insulation shall be permitted to be 1/2 in. thinner than joist web). The upper layer shall be a minimum 23 in. wide R-19 unfaced glass fiber laid cross-wise over joists. Top layer shall laid flat without gaps between courses. All gaps between perimeter of framing and masonry walls, including party walls, shall be stuffed with glass fiber.
   exception: Suspended grid ceiling systems may be insulated with one layer of kraft-faced 23-inch wide glass fiber batts, R-30 minimum, installed without gaps.
   2) Cellulose – Blow loose fill to required depth to achieve R-30.

e. Low clearance: Where low rafters cause glass fiber batt to be compressed vertically, insulate between rafters as necessary to achieve R-30. Install batts in two layers or blow cellulose.

SECTION 7.3 ASPHALT SHINGLES

7.3 A General:

1. Colors – provide a minimum of 3 colors for selection on all projects, and get owner's approval on color choice prior to start of work.

2. Product Delivery, Storage and Handling – Deliver materials to jobsite packaged with manufacturer's labels intact and legible. Store materials on raised platforms and protect with coverings at outdoor locations. Do not stack bundles more than 3 ft. high.

7.3 B Products:

1. All roofing shingles shall be square tab butt strip shingles conforming to standards of ASTM D225-70 type I and Federal Specification SS-S-300B type II, UL 790, Class C, 3 tab, approx. 12 inches by 36 inches, minimum weight 235 lbs per square.

   Approved products: Bird & Son "Windseal"
   CertainTeed "Sealdon"
   GAF "Standard Self Sealing"

2. Asphalt saturated roofing felt – ASTM D226, 15 lb., organic, unperforated, 36 inches wide.

3. Hip and Ridge Shingles – same manufacturer, type, weight and color as roofing shingles.

4. Mineral Surfaced Roll Roofing – ASTM D249.

5. Nails – galvanized 10 ga. annular thread, 3/8 inch head, 1 inch minimum lengths or; staples may be employed conforming to the following: zinc coated, 16 gauge, semi-flattened to an elliptical cross section, and long enough to penetrate 1/2 inch through decking. The staple crown must bear tightly against shingle but must not cut shingle surface, and the crown of the staple must be parallel to the tab edge.

6. Bituminous Plastic Cement – FS-SS-C-153 type I.

7. Roof Edging – Painted aluminum.

7.3 C Execution:

1. Install asphalt shingle roofs only on roofs having a slope of 3-1/2 in 12 or greater.

2. Repair damage to neighboring roofs caused during demolition or new roofing work with materials of type and quality to match existing.

3. Assure that prerequisite metal flashings have been installed. Perform all work to standards and requirements established in Asphalt Roofing Manufacturers Association printed stan-

dards for this type work. Install aluminum step flashing at intersections between shingle roofing and vertical faces. Step flash and counterflash at masonry surfaces.

4. Install new asphalt shingles in strict accordance with manufacturer's instructions regarding underlayment, covering, nailing, weathering and installation of flashings, edges and roof accessories.

5. Shingle sides of dormers to match roof.

6. Install roof edging prior to beginning roofing work.

SECTION 7.4 BUILT-UP ROOFING

7.4 A General:

1. Submit manufacturers product data and installation instructions for approval.

2. Minimum temperature for application is 35° F. Do not install roofing on damp, wet, or frosty surfaces.

3. Guarantee - Contractor shall provide written 5 year guarantee against defective materials and workmanship on all roofing installations. Guarantee shall be in no way contingent upon manufacturers warranties or reservations concerning qualifications or certification of the roofing contractor. The guarantee shall be provided by the General Contractor, and not by the roofing subcontractor nor the manufacturer of the roofing materials. The guarantee shall cover all roofing and flashing, and shall not be contingent upon maintenance or re-coating of the roof within the 5 year period.

4. Standards - Installation shall conform to standards in National Roofing Contractors Association "A Manual of Roofing Practice," most recent edition.

5. Ensure roof deck is structurally sound to support the live and dead load requirements of the roofing system and sufficiently rigid to support construction traffic.

6. Decks shall be firm, clean, smooth, and dry.

7.4 B Products:

1. Provide a 10-year bondable built-up roofing system with asphalt bitumen and glass fiber felt from a national manufacturer of roofing products.

2. Asphalt bitumen - ASTM D312, Type III.

3. Ply Sheets - Asphalt saturated, 15 lb. glass fiber felt, ASTM D2178.

4. Base Ply – Asphalt saturated and coated 30 lb. glass fiber felt, ASTM D2178.
5. Aluminum coating – Type 3 cellulose fibered, ASTM A-2824.
6. Cant strips – Preformed fiberboard.
7. Asphalt plastic cement – Asphalt roof cement compatible with roofing products, ASTM D2822.
8. Nails – Large head non-ferrous or galvanized barbed roofing nails.
9. Cap flashing – Mineral surfaced, 90 lb. asphalt roll roofing, glass fiber felt, ASTM D3909.
10. Vents – Passive "mushroom" vents, 12- or 16-inch dia. Do not use turbine vents.
11. White acrylic elastomeric roof coating – Liquid-applied acrylic white coating, must conform to all aspects ASTM D6083 (not just "performance"). Must be warranted by manufacturer for at least 10 years.

7.4 C Execution:

1. Install all roofing systems in strict accordance with manufacturer's printed instructions.
2. Remove any trash, debris, grease, oil, water, moisture, and contaminates which may affect bond of roofing to surface.
3. Inspect exposed roof decks and repair any rotted or deteriorated roof boards. Cracks greater than 1/4 inch and all knotholes shall be covered with sheet metal nailed securely to the deck.
4. When existing roofing is removed completely, or roof is installed on new sheathing, roofing shall consist of a base sheet, three plies of felt hot mopped, and hot mopped top coating.
5. When existing roof is not removed, roofing shall consist of three plies of felt hot mopped, and hot mopped top coating; base ply is not required.
6. Application of base ply – Apply base ply with 2 inch side and end laps. Mechanically fasten at 9 inches o.c. max. at side laps, and 18 inches o.c. max. staggered in two rows 12 inches from each edge. Roofing nails or other fastening system approved by the roofing manufacturer may be used on wood or plywood decks. To minimize wrinkles and buckles allow time for base ply to relax unrolled prior to attachment. Cold temperatures will increase time required for base ply to relax.
7. Application of plies – Embed three plies of glass fiber felt in shingle fashion, starting from the low point of the roof. Each ply should lap 24-2/3 inches into uniform solid moppings of hot asphalt, using 25-45 lb. per 100 sf per ply. Starter plies of 12-inch and 24-inch widths are necessary at beginning and end of job to maintain roofing thickness.

8. When applying roofing, keep the mopping within 6 ft. of the roll. Keep the mop full, and flow asphalt in front of the roll. Do not scrub with mop.

9. Cant strips – Apply cant strips at intersections of roof deck with vertical surfaces. Secure fiberboard cant strips with plastic cement or hot steep asphalt.

10. Flashing – Extend the built-up roofing plies a minimum of 2 inches above the cants and adhere to the wall curb or parapet with hot asphalt. At all parapets, install 90 lb. mineral surface roll roofing as cap flashing, mopped in solid with hot asphalt over cant strip onto roof surface. At party walls extend cap flashing down onto both adjacent roofs.

11. Asphalt top coating – Coat entire roof surface with a uniform mopping of hot asphalt at a rate of 15 to 20 lb. per 100 sf.

12. Clean-up – Thoroughly remove all debris, including old roofing and slag. Under no circumstances leave slag or debris on adjacent properties. Clean all asphalt drips from adjacent surfaces and sidewalk.

13. Aluminum coating – mix well and apply coating to clean, dry roof surface. Use 2 coats if necessary for complete coverage.

14. White elastomeric acrylic coating - Inspect and repair all flashing, counterflashing and drains. Remove or alleviate all "ponding" areas. Pressure wash roof surface with surfactant cleaning agent, paying particular attention to "oily" areas. Apply in sunny weather at ambient temperatures greater than 50° F. Apply two coats, each 8 to 10 mils thick. First coat must dry before application of the second coat (2-10 hours depending on temperature, humidity and amount of sunlight). No rain may occur during drying period. All perimeter areas should be "backrolled" using 3/4" nap, exterior rough surface rolling pad. (Do not "sludge" coat.) All other surface areas should be sprayed or rolled with coating. All surfaces on roof should be covered, including all vertical surfaces, flashing and members. Drains should not be covered.

15. Vents – Comply with building code requirement for ventilation of each roof (net free vent area = roof area/300).

SECTION 7.5 MODIFIED BITUMEN ROOFING

7.5 A General:

1. Submittals – Submit product data for sheet membrane, flashings, and sealants with temperature range for application of membrane. Submit fastener certification and pull-out test results. Submit manufacturers installation instructions.

2. Quality Assurance –

   a. Membrane manufacturer: A company specializing in modified bitumen membranes with more than 5 years of experience.

b. Applicator: A company specializing in modified bitumen roofing installation, with more than 5 years of experience.

c. Underwriter's Laboratories, Inc. (UL): Class C fire Hazard Classification.

3. Environmental Requirements – Deliver products to site and store materials in a weather-protected environment clear of ground and dry.

4. Warranty –

a. Provide a 10 year manufacturer's warranty on roof.

b. Furnish a 5-year contractor's warranty.

7.5 B Products:

1. Provide a compatible assembly of products that are recommended by manufacturers to be fully compatible with substrates, flashings, and related materials.

2. Modified Bitumen Membrane – Provide 160 mil modified bitumen cap sheet.

Acceptable manufacturers: ARC, GAF, Garland, Rhoflex (Firestone), Tarmac

3. Base Sheets – Install heavy duty glass fiber base sheets manufactured by or approved by the same manufacturer as the cap sheet.

4. Vents – Passive "mushroom" vents, 12- or 16-inch dia. Do not use turbine vents.

5. Accessories –

a. Accessories shall be made by or approved by the roofing manufacturer.

b. Cant strips shall be rigid fiberboard.

c. Fasteners shall be screw or peel rivet type with plastic plates.

d. Where termination bars are required, they shall be aluminum 1/8 inch thick x 1 inch wide.

e. Stacks or pipes penetrating the roof shall be flashed with aluminum collars with rubber gaskets.

7.5 C Execution:

1. Inspection –

a. Verify the roof openings and penetrating elements through the roof are solidly set and all nailing and cant strips are in place. Verify that the deck is solid and secured.

b. Do not apply roofing to damp, frozen, or dirty surfaces, or to surfaces unacceptable to the manufacturer, installer, architect, or PHDC/RDA. Beginning installation means acceptance of the substrate by the contractor.

2. Fire Safety –

a. The contractor shall meet all the fire safety requirements of OSHA, the City, and the manufacturer of the roofing materials.

b. During application, the contractor shall require that a designated person on each crew be assigned to conduct a fire watch. This individual shall be trained in the use of fire extinguishing equipment and shall have a phone for calling the fire department in the event of a fire. He/she shall watch for smoldering materials or fires on all areas of the roof, try to extinguish them when the fire is within the limits of the fire extinguishing equipment available, and sound the alarm.

c. After application, a fire watch shall be continued on a daily basis after torch welding applications are completed. The job foreman or other designated person shall carefully walk the entire area of application at the end of the work day, checking for smoldering material. A fire watch shall be maintained during breaks in the work day and for two hours after the last torch is shut off for the day.

3. Surface Preparation –

a. Fully prepare the surface for each component of the roofing system. Remove all existing roofing and flashing materials unless otherwise directed. Remove all materials from the roof by means of an approved chute to a truck or dumpster. Provide legal disposal. Patch all holes and gaps in the roof sheathing. Maintain the watertight integrity of the roof at all times.

b. Install non-combustible, fire-resistant cant strips.

c. Install roof drains.

4. Application of base sheets –

a. Install a coated glass fiber base sheet over the roof deck according to manufacturer' instructions.

b. Mechanically fasten base sheet to roof deck at the rate of 1 fastener per 2 sq. ft.

5. Application of membrane –

a. Install modified bitumen membrane according to the roofing manufacturer's printed instructions.

b. Lay out the modified bitumen cap sheet roll in straight course to be followed, starting at the low end of the roof to insure that laps are toward surface of the coiled part of the roll and progressively unroll it, pressing down with the foot to insure bonding. After the major portion of the roll has been bonded, re-roll the first 6 feet and bond it in a similar fashion. Repeat this operation on subsequent rolls with overlaps of 4 inches on the sides and 8 inches on the ends. Give each lap a finishing touch by passing a trowel against the seam to insure a smooth, tight seal. If any gaps are found, they shall be reheated and re-sealed.

6. Base Flashing –

a. Install 2 plies of modified membrane cap sheet at all intersecting vertical walls, parapets, curbs, etc. Torch apply both plies. Terminate all base flashings at counterflashings or a metal termination bar.

b. Prime and strip all metal flanges with one ply of modified bitumen cap sheet, torch applied.

7. Vents – Comply with building code requirement for ventilation of each roof (net free vent area = roof area/300).

8. Protection of roofing – Upon completion of roofing, including associated work, take appropriate measures for surveillance and protection of roofing during remainder of construction period.

SECTION 7.6 FLASHING AND SHEET METAL

7.6 A Quality Assurance:

The work of this section shall conform to standards and guidelines for work of this type contained in the "Architectural Sheet Metal Manual" by the Sheet Metal and Air Conditioning Contractors' National Association, Inc., and "Copper and Common Sense" by Revere Copper and Brass Inc.

7.6 B Products:

1. Metal Flashing – All metal flashings shall be galvanized ASTM A526 commercial quality min. 28 ga. or aluminum ASTM B209, alloy 3003, temper H14, finish AS-C22A41, .020 inch min. thickness. Metal Flashings exposed to view such as at roof edges, gravel stops and eave flashing shall be prefinished aluminum. Concealed flashings may be galvanized or aluminum. Forming of exposed flashings shall be neatly done to consistent, tight fitting and self-lapping configuration. All flashings at roof edge, vents, curbs and other roof protrusions shall be preformed to appropriate shapes; vent and similar flashings shall

be cap and counter flashed. Flashings shall be asphalt coated if in contact with dissimilar metal. Fastener shall be of an alloy appropriate for use with the flashing material.

2. Through-wall flashing – Through-wall flashing shall be copper fabric laminate 3 oz. copper with asphalt impregnated cotton fabric both sides, or shall be 30 mil PVC modified flexible plastic sheets similar to Sandell "Copper-Fabric Flashing" or Nervastral "Nervastral 300".

3. Window and Door flashing – Integral with unit or .032 inch aluminum.

4. Gutters and Downspouts –

   a. Gutter: 5 inch style K (o.g.) aluminum .027 inch thick, prefinished color similar to Alcoa with all necessary brackets, outlet boxes, end caps, gutter guards, joining sections, mitered section, hangers, and straps as necessary for a completely finished job.

   b. Downspouts: 3 inch x 4 inch corrugated aluminum, .027 inch thick, prefinished color similar to Alcoa with all necessary elbows and fasteners, OR 2 inch x 3 inch corrugated PVC with metal-to-vinyl adapter below gutter outlet, Rain Master 2200 or equal.

   Provide removable leaf strainer at neck of downspout.

7.6 C Execution:

1. Install flashing where required to provide weatherproof enclosure in accordance with conventional and specified standards and in accordance with manufacturer's printed instructions.

2. Provide expansion joints in long lengths of exposed metal flashing. Seal all seams, corners, boxes and turnings at all joints in flashing material.

3. At roof penetrations, install preformed type of cap and counter flashing in accordance with manufacturer's recommendation.

4. Provide new eave boxes where required of size to suit drainage requirements, with apron and cap flashing to suit downspout size. All seams in eave box fabrication shall be soldered.

5. Downspouts shall be mechanically fastened to walls at no smaller interval than 8 ft. vertically and no less than one fastener per piece. Cement downspouts at boot fitting.

6. Repair flashing and sheet metal work at neighboring structures when damaged either in demolition or in the performance of the new work with materials matching the quality and type of the existing damaged elements.

7. Repair of sheet metal work at cornices and bays of existing structure: Repair shall match quality, material, type, workmanship and configuration of the existing sheet metal.

SECTION 7.7 DRAINAGE PLANE

7.7 A When required:

For all frame construction, a continuous drainage layer is required behind the exterior cladding. See Joseph Lstiburek, *Builder's Guide – Moderate Climates*, © 1998 Building Science Corp., EEBA and Shelter Source, Appendix I: Rain and Drainage Planes

7.7 B Products:

1. Flexible systems –
   a) 15-lb or heavier asphalt-impregnated sheathing paper
   b) vapor-permeable synthetic membrane: Tyvek (DuPont), Typar (Reemay), Amowrap (Tenneco), Barricade (Simplex), Pinkwrap (Owens Corning)

2. Rigid systems –

   Foil-faced polyisocyanurate foam insulation or a foil facing integral with sheathing, and approved tape

3. Sealing tapes –
   a) For use on synthetic membrane – as approved by membrane manufacturer
   b) For use on foil – 3M 8086 or Contractor Sheathing Tape; DuPont Contractor Tape; Benjamin Obdyke Inc. Gap Wrap or approved equal

4. Adhesive membrane strip – MiraDri 860/861 self-adhering membranes or approved equal

7.7 C Compatibility: Housewrap-type synthetic membranes are prohibited –

1. Unless there is an air gap between the membrane and the exterior cladding (e.g. with face brick, siding). They may be used behind stucco or wood siding only if an intermediate air space is provided by furring strips or channels.

2. Over oriented strand board (OSB).

7.7 D Execution:

1. Location: Fasten drainage layer to exterior surface of sheathing.

2. Installation of flexible drainage layers:

   a) Install according to manufacturer's instructions.

   b) Lap horizontal joints shingle fashion to drain water to exterior. *Synthetic membrane only:* tape joints to exclude air.

   c) Lower termination: To drain water to the exterior, provide aluminum flashing at bottom of drainage layer where it terminates above a projection (such as a roof or a step in the plane of the wall). Lap material over flashing to drain water to exterior.

   d) Openings: Wrap drainage material around all penetrations and openings for full depth of framing. Provide head flashing above all penetrations and openings. Lap material and flashing to drain water to exterior.

3. Installation of rigid drainage layers:

   a) Install according to manufacturer's instructions.

   b) Joints: Tape all joints with approved foil tape.

   c) Lower termination: To drain water to the exterior, provide aluminum flashing at bottom of drainage layer where it terminates above a projection. Tape flashing to exterior surface with approved adhesive membrane strip.

   d) Openings: Cover sill framing with adhesive membrane strip and lap over rigid drainage material. Provide head flashing above all penetrations and openings. Tape flashing to exterior surface with approved adhesive membrane strip.

SECTION 7.8 PREFORMED SIDING

7.8 A General:

1. Standards –

   a. Aluminum siding shall meet FHA Minimum Property Standards 4900.1 and 4910 and AAMA Specifications 1402.3.

   b. Vinyl siding shall comply with the regulations set forth in ASTM standard specification for Rigid Polyvinyl Chloride (PVC) Siding #D369 Class 2.

2. Color – Contractor shall provide a selection of a minimum of 7 standard manufacturer's colors for use on each project, and shall secure the owner's approval of color prior to each installation.

3. Installer shall have a minimum of 5 years established experience in the work of this trade.

7.8 B Product:

1. Aluminum – equal to Alcoa "single 8 inch Horizontal Siding, Smooth Texture – .024 inch thick 7N" with 38-inch styrofoam drop-in backing, tabs, nails, caulking, window flashings, drips, starter strips and matching metal for field forming. All exposed parts shall be prefinished to match the color of the selected siding.

2. Vinyl – equal to Wolverine Technologies "Vinalside Classic" solid vinyl siding, 0.44 inch nominal thickness, minimum weight 35 lb. per square, with all required accessories. All exposed parts shall be prefinished to match the color of the selected siding.

7.8 C Execution:

1. Install siding in strict accordance with manufacturer's instructions.

2. Match architectural configuration and detail of substrate to be covered to the greatest possible degree.

SECTION 7.9 ROOF ACCESSORIES

7.9 A Products:

1. Skylights –

   a. New: double-glazed, as called for in construction documents.

   b. Existing single-glazed: add permanent glazing panel at ceiling level. If skylight is operable, then the interior glazing panel shall also be operable and shall form a tight seal when closed.

2. Roof hatches shall be metal covered wood box type construction on raised curb with hook at interior. Design and construction shall match conventional industry standards.

7.9 B Execution:

1. Mount all skylights and roof hatches on flashed wooden curb. Height of curb shall be 8 inches minimum.

2. Repair of existing skylights and roof hatches: Repair shall match quality material and workmanship of the existing installation.

3. All work on skylights and hatches shall conform to latest building code requirements.

SECTION 7.10 SEALANTS

7.10 A Products:

1. For interior use –

   a. Foam sealant at air barrier penetrations: Non-expanding one-part polyurethane foam.

   b. Caulk for air-sealing, interior trim *(surfaces to be painted)*: White pigmented siliconized acrylic rated by the manufacturer to last 25 years or more. Shall meet ASTM standard C834-76.

   c. Caulk for air-sealing, interior trim *(already-painted or wallpapered surfaces)*: Clear siliconized acrylic rated by the manufacturer to last 25 years or more.

2. For exterior use –

   a. Colors: where sealant is visible on exterior, provide matching color at storm door, windows and siding. Provide gray or "mortar" color at brick and masonry openings and elsewhere.

   b. Sealant at doors and windows: One part Urethane Sealant II-S-00230C Type 2 class A, ASTM C920-79 Type S Grade NS Class 25.

      Approved products: Chem Caulk – 900
      Pecora Dynatrol – 1
      PRC – 6000
      Tremco Dymonic
      Sonneborn NP-1

   c. Sealant at aluminum siding: OSI Rubber, Butyl Rubber Caulk TT-S-001657 Type-1.

      Approved Products: Chem Caulk – 300
      Pecora BC – 158
      PRC – 2000
      Tremco – Butyl

d. Sealant at vinyl siding: to meet siding manufacturer's specification for compatibility.

3. General –
   a. Primer: As recommended by sealant manufacturer.
   b. Backer Rod: compressible polyethylene foam strip.

7.10 B Execution:

1. Install caulking using gun applied cartridge type sealant at all locations requiring sealing, and at least at the following locations:
   a. At doors, windows and other exterior openings.
   b. At backing at flashings, fascias, and thresholds.
   c. At aluminum siding work.

2. Joints which exceed 3/8 inch in depth shall be filled with backer rod or other effective caulk-backing material before caulk is applied. Caulk shall not be used to seal joints which exceed 3/8 inch in width.

3. Clean loose materials, install priming and backer rod where required, seal the joint to full depth, even with adjoining surfaces, and tool completed joint with thumb or spatula. Remove excess materials promptly.

SECTION 7.11 AIR-SEALING

7.11 A General:

1. Related sections –
   a. Steel Framing 5.1
   b. Rough Carpentry 6.1
   c. Thermal Insulation 7.2
   d. Sealants 7.9
   e. Use of Blower Door 7.11
   f. Plumbing and Drainage 15.2
   g. Venting of Water Heaters and House Heaters 15.6
   h. Ductwork 15.8
   i. Electrical 16.1

2. Definitions –
   a. Air barrier: Building elements which prevent the migration of air between zones.

b. Zone: An air space, within which air movement is permissible or desirable, but which is intentionally separated from other spaces. (See 7.11.C.3 for examples.)

c. Outer air seal: Exterior air barrier, including shell and air sealing measures, intended to prevent infiltration of outside air into framing cavities and spaces within the thermal boundary.

d. Inner air seal: Interior air barrier, including interior building finish and air sealing measures, intended to prevent transfer of air between building interior and framing cavities.

e. Intermediate air seal: Measures performed to subfloor, framing voids, shaftways, chaseways, and penetrations to isolate, or impede air flow between, zones as required.

f. Top floor ceiling air barrier: Continuous air barrier, terminating at exterior sheathing or masonry, intended to prevent the transfer of air between roof cavity and all zones below, including building interior and framing cavities.

g. Thermal boundary: See section 7.2.

h. Unconditioned space: Space enclosed by building shell but outside thermal boundary.

i. Conditioned space: All space within thermal boundary.

j. Sealing measure: Sealant, rigid or spray-applied blocking, or a combination of blocking and sealant as appropriate.

7.11 B Products:

1. Rigid blocking –
   a. Lumber, plywood
   b. Radiator reflector board: foil-faced foam
   c. Foam insulating board: polyioscyanurate, extruded polystyrene
   d. FSK-faced rigid glass fiber

2. Spray-applied blocking –
   a. Expanding foam
   b. Damp-spray cellulose

3. Sealants: As listed in section 7.9

4. Gaskets: Silicone, EPDM, or neoprene bulb

5. Fire-resistive materials –

   a. Sealant: RTV silicone firestop caulk
   b. Sheet metal: .032 inch pre-finished aluminum
   c. Concrete board: nominal 1/2-inch thick Durock, Eternaboard, Utilicrete

7.11 C Execution:

1. Firestops – Provisions of this section do not supersede firestopping or smoke barrier requirements of this or any other applicable code.

2. Blower door test – Sealing measures shall be judged adequate when structure passes all portions of blower door test. Note that there are minimum and maximum allowable airflows.

3. Zones requiring separation by air sealing (note that firestop requirements may apply to air-sealing materials) –

   a. Finished interior, basement, and ductwork.
   b. Framing voids and chaseways.
   c. Attic or roof cavity and the outdoors to which it is vented.
   d. Framing cavities in projecting construction (bays).
   e. Any part of basement or crawlspace specifically defined as outside the thermal boundary.

4. Outer air seal –

   a. Basement and crawlspace:

      1) Exterior walls – seal unintentional wall openings of basements and crawl-spaces within thermal boundary.

      2) Space outside thermal boundary – Seal all openings between conditioned and unconditioned spaces (see Definitions, part A).

      3) Basement-under-porch partition: weathersrip partition door.

   b. Roof cavities and attics:

      1) Unconditioned – For cavities outside thermal boundary, do not seal to outside unless otherwise required.

      2) Conditioned – For cavities enclosed within thermal boundary (i.e. un-vented with roof deck and exterior walls insulated), seal to outside.

c. Exterior walls (not covered in a. or b. above):

1) Masonry and sheathing – Seal all cracks, gaps and unintentional openings.

2) Fenestration – Frames and sills shall be sealed to rough openings.

3) Bay over porch – Seal underside of bay framing to separate bay from porch roof space.

5. Intermediate air seal (framing) –

a. Top floor ceilings: Seal cavities of perimeter stud walls and partitions at ceiling level. Note: failure to provide firestop or top plate at ceiling level may increase cost of air sealing.

b. Dropped ceiling between apartments: Seal cavities of perimeter stud walls and partitions at ceiling level.

c. Bays and projections:

1) Cantilevered joists – Block and seal joist bays where projecting through exterior wall.

2) Roof cavity – Seal opening into bay roof at exterior wall.

d. Bathtub at exterior wall: Seal exterior wall cavity from space under tub.

e. Subflooring: Above basement and crawlspace, seal subfloor to exterior sheathing or masonry.

f. Chaseways: Seal all openings into attics, roof cavities, basements and crawl-spaces.

g. Framing penetrations:

1) Piping subject to movement – All seals around soil stack, stack vent, and domestic water piping shall employ resilient materials. Rigid foam shall not be used.

2) Hot pipes and ducts – Seals around all hot water, hydronic, or steam piping, and uninsulated warm-air ducts shall employ resilient materials rated for the service temperature.

h. Chimneys and vents: Use approved noncombustible materials within 2 inches of chimney, B-vent, or flue carrying combustion products, or follow appliance manufacturer's directions.

i. Electrical devices: Seal cable knockouts from back of box unless box is provided with device and cover designed to prevent infiltration.

j. Abandoned flues, conduits and chases: Remove or seal to prevent air movement between zones.

6. Inner air seal –

a. Sealing drywall to framing:

1) Top-floor ceiling – Seal interior finish to wall framing at ceiling level to prevent air transfer between vented roof cavity and wall cavities below.

a) Ceiling method: Caulk edges of ceiling finish to all top plates, runners, and firestops prior to installing wall finish. For ceilings finished prior to framing walls, caulk to exterior masonry.

b) Wall method: Install approved drywall gasket, caulk, or panel adhesive to top plates, runners, and firestops before installing interior finish.

b. Openings for mechanicals: In top-floor ceilings and all exterior walls, caulk penetrations of interior finish for electrical devices, pipes, register boots, etc.

c. Prioritizing inner air sealing measures: Where necessary to comply with whole house infiltration (blower door) test limits, caulk trim to interior finish in the following order of priority:

1) All bathrooms

2) Exterior walls on top floor.

SECTION 7.12 USE OF BLOWER DOOR – PROCEDURES AND TESTING

7.12 A General:

1. Section includes –

a. Whole-house infiltration test.
b. Top-floor ceiling air barrier test.
c. Duct system exterior leakage test.

2. Applicability – Rehab and new construction, gross floor area 3500 square feet or less between firewalls.

3. Certification – Operator performing tests shall be certified by PHDC/RDA.

4. Test results shall be submitted to PHDC/RDA.

5. Related sections –

a. Air sealing 7.10
b. Space heating - general 15.5
c. Ductwork 15.7

6. Definitions -

a. Pascal: Unit of pressure. One inch water column = 249 Pascals (Pa).
b. cfm_{50}: Cubic feet per minute at a pressure difference of 50 Pa.

7.12 B Instrumentation:

1. Blower door kit - Variable speed fan rated 4000 cfm at 50 Pa min., expanding frame, calibrated flow sensor.

2. Micromanometer - Digital pressure gauge accurate to 0.5 Pa.

3. Pressure pan - Shallow box, one face open and gasketed, with pressure tap for testing registers.

7.12 C Execution:

1. Whole-house infiltration (blower door) test -

a. Multi-family with separate outside entryways: Where no one entryway gives access to all units, treat each portion of the building served by its own entryway as a separate building.

b. Procedure:

1) Set up - Erect blower door in common entry, place exterior windows and doors in winter position, open basement and apartment doors to common area, fill traps with water or seal, close basement vents. (See "Measuring Air Tightness with a Blower Door" and "#2 Air Sealing" in the OHCD/ PHDC/ RDA *ResourceEfficient Rehabilitation Implementation Guide*, and separate guideline "Testing Roof cavity Pressure to Verify Integrity of Top-Ceiling Air Barrier.")

2) Measurement - Depressurize building to 50 Pa, read cfm_{50} air flow. If fan cannot reach 50 Pa, calculate cfm_{50} = cfm * (50/pressure)^0.65, or use "can't reach 50" table.

c. Allowable limits:

1) Row house or other connected building - flow *shall not exceed* 2400 cfm, or 3 cfm per square foot of finished space, whichever is larger. Notify Inspector if flow *is less than* 1800 cfm, 1 cfm per square foot, or 900 cfm per unit, whichever is larger.

2) Single house or free-standing building – flow *shall not exceed* 2000 cfm, or 2.5 cfm per square foot, whichever is larger. Notify Inspector if flow *is less than* 1400 cfm, 0.75 cfm per square foot, or 700 cfm per unit, whichever is larger.

d. Correcting failure: If maximum flow limit is exceeded, continue air sealing according to requirements of Section 7.10.

2. Top-floor ceiling air barrier test – Conduct test on all roof cavities outside thermal boundary.

a. Procedure: Depressurize building to 50 Pa. Measure pressures between roof cavity, building interior, and outside. Sum of pressures from interior to roof cavity, and from roof cavity to outside shall be within 1 pascal of pressure from inside to outside.

b. Allowable limit: Cavity pressure with respect to outside shall be less than 10% of house pressure (5 Pa with building at 50 Pa).

c. Correcting failure: If cavity pressure limit is exceeded, identify and caulk openings in interior finish responsible for passage of air from building interior to attic or roof cavity.

3. Duct system exterior leakage test –

a. Procedure: Depressurize house to 50 Pa with basement and furnace room doors open. Place pressure pan over each register individually and measure pressure with micromanometer.

b. Allowable limit: Register pressure shall not exceed 1.5 Pa.

c. Correcting failure: if register pressure limit is exceeded, repair duct leakage. Restore any damaged interior finish to original condition.

TOWN OF EAST HAVEN
NOTICE OF AWARD

To:_____
_____
_____

Project
Description:_____
_____
_____

The Town has considered the Bid submitted by you for the above described work in response to its Advertisement for Bids dated _____, 20____, and Information for Bidders.

You are hereby notified that your Bid has been accepted for items in the amount of $_____.

You are required by the Information for Bidders to execute the Contract and furnish the required Contractor's Performance-Payment Bond and Certificates of Insurance within fifteen (15) days from the date of this Notice to you.

If you fail to execute said Contract and to furnish said Bonds within fifteen (15) days from the date of this Notice, said Town will be entitled to consider all your rights arising out of the Town's acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The Town will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Town.

Dated this_____day of _____, 20_____.

_____
City

_____
By

_____
Title

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged:
by_____
this the _____day of _____, 20_____.
Title_____