



# WOLF TRAIL™

ENGINEERING

NC P-1817 | SC 5872



## GREENVILLE COUNTY SCHOOLS

### BETHEL ELEMENTARY SCHOOL

### WALL REPAIR SPECIFICATIONS

**August, 2023**

*Prepared by:*  
Greenville County Schools  
and  
Wolf Trail Engineering PLLC  
1001 Lancaster Avenue, Monroe, NC 28112



- I. THE SCHOOL DISTRICT OF GREENVILLE COUNTY, SC  
INVITATION FOR BID
- II. NOT USED
- III. SEE GREENVILLE COUNTY’S GENERAL CONDITIONS
- IV. SUPPLEMENTARY CONDITIONS OF THE CONTRACT FOR  
CONSTRUCTION
- V. NOT USED
- VI. TECHNICAL SPECIFICATIONS

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09 24 23 – CEMENT STUCCO

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**ARTICLE 1 – GENERAL PROVISIONS****1.0 General Conditions:**

- a) In the event there is a conflict between the general conditions, instruction to bidders in the documents provided by Greenville School and AIA A201, the Greenville School documents shall take presentence over the AIA A201 document.
- b) In the event there is a conflict between the documents provided by Greenville School and Division 1 documents, Greenville School shall take presentence over the Division 1 documents.
- c) The Owner shall maintain Builder’s Risk Insurance for the material to be used on the project. The contractor shall provide insurance on his equipment and validation that may occur.
- d) All strainers, clamping rings shall be replaced with cast iron and stainless-steel fasteners for the roof drains as part of the base bid.

**2.0 GENERAL:**

NOTE: The base bid is to include a (\$20,000) twenty-thousand-dollar contingency allowance.

**3.0 SUBSTITUTION OF MATERIALS:**

Substitutions of the listed herein are prohibited unless approved IN WRITING by the Owner and/or the Owners Representative. Requests for substitution shall clearly describe the material, product or equipment for which approval is requested and shall be accompanied by the manufacturer’s literature, specifications, drawings, performance criteria and/or other information necessary to completely describe the items to establish their acceptability.

The approval of the Owner is required prior to inclusion of any substitute material(s) in the Bid or the Work. If the Bidder includes unapproved materials in the Bid, it will be assumed that the specified materials were included and must be installed. If a less expensive material is approved and used for the Work after a bid has been submitted, the Bidder shall issue an appropriate credit to the Owner. The Owner’s approval will be required even though “or equal” or synonymous terms are used in the Bid Documents.

**SUBSTITUTIONS AND COST DIFFERENCE MUST BE SUBMITTED WITH THE PROPOSAL ON A SEPARATE SHEET WITH JUSTIFICATION FOR THE SUBSTITUTION.**

The approval or rejection of a proposed substitution is vested in the Owner whose decision shall be final and binding. The determination may or may not explain the reason for the decision. Substitutions will be approved by Addendum to the Project Documents.

END OF SUPPLEMENTARY CONDITIONS

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SECTION 01 10 00  
SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS and REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Project Name: Greenville County Schools  
Bethel Elementary Wall Repair.  
111 Bethel School Rd.  
Simpsonville, SC 29681
- B. Consultant Identification: The Contract Documents, dated August 2023, were prepared for the Project by Wolf Trail Engineering, PLLCC. The work consists of:
1. Existing Conditions:
    - a. The building was constructed approximately 20 years ago.
    - b. The building will be occupied during this project.
  2. Renovation/New Construction:
    - a. The contractor shall include in his bid the cost of demolition and replacement of concrete patio and block walls on either side of the patio.
    - b. Install stamped and stain concrete as indicated on the drawings. The contractor shall provide mockup panel of stamped and stained concrete.
    - c. Removal of shrubs and installing a French drain.
    - d. Installing an ADA curb cut
    - e. Provide temporary signage to redirect everyone from the front of the building to another entrance.
    - f. Provide orange safety fencing around the work site.
    - g. Install stucco on the block wall and the brick below grade.
    - h. Installing a drainage mat and metal wall panels
    - i. Provide and install new letters as indicated on the drawings.
    - j. Provide and install new planting and wood mulch.
    - k. Provide and install new coping cap and flashing on the roof side of the wall.

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- l. All other work indicated on the drawings.
        - m. General clean up and reseed any areas disturbed.
    - 3. Addition work occurring on site:
      - a. None at this time.
  - D. Contractor shall furnish all material, labor, tools, supplies, equipment, transportation, superintendence, temporary construction of every nature, insurance, taxes, contributions and all services and facilities, unless specifically excepted, and install all materials, items and equipment required to complete the construction of the Project, as set forth in the Contract Documents and as required to provide complete and operational systems.
  - E. The consultant nor the owner shall direct the contractor as to means and methods to execute the work. If a condition or process occurs that will create damage or danger to someone, the contractor shall stop and re-evaluate his means and methods to eliminate the damage or danger.
  - F. The Contractor shall act as the Project Expediter and be responsible for coordinating the work and schedules of others hired by him.
- 1.3 CONTRACT
- A. Project will be constructed as a Single Prime Contractor
- 1.4 WORK SEQUENCE
- A. The General Contractor shall be the project expeditor
  - B. Work may commence on Notice to Proceed and be pursued continuously until complete.
    - 1. School will be in session when the work is in progress. Care shall be taken to maintain a safe site. Work will be able to occur while school is in session.
    - 2. Elementary Schools 7:30am- 3:00pm  
Middle Schools 8:00am- 4:00pm  
High Schools 9:00am- 4:00pm
    - 3. Anticipated start date is **October 2, 2023**
    - 4. All work must be completed by **December 2, 2023**. If the Contractor does not complete the work in time to arrange for the final inspection and submit the

final invoice by this date, liquated damages of \$1,000.00 per calendar day will be deducted from the Contract amount.

5. All punch list items are to be completed by two weeks after the final inspection or liquated damages of \$1,000.00 per calendar day will be deducted from the Contract amount.

#### 1.5 WORK UNDER OTHER CONTRACTS

- A. Separate Contract: Owner reserves the right to award a separate contract for performance of certain construction operations at Project site. Those operations may be conducted simultaneously with Work under this Contract.
- B. Contractor shall cooperate fully with separate contractors so work on other contracts may be carried out smoothly, without interfering with or delaying Work under this Contract.
- C. The Owner has hired a roofing contractor to replace the gutters and down spouts in the courtyard. The downspouts will be re-installed by the roofing contractor after this contractor has pressure washed the wall and caulked the joints.

#### 1.6 SPECIFICATION FORMATS AND CONVENTIONS

- A. Technical Specifications Format: The Specifications are organized into Divisions and Sections using the 50-division format and Construction Specifications Institute / Construction Specifications Canada (CSI/CSC's) 2018 "Master Format" numbering system.
  1. Section Identification: The Technical Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
- B. Technical Specifications Content: The Technical Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  1. Abbreviated Language: Language used in the Technical Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as

appropriate. Words implied, but not stated, shall be inferred as the sense requires.

Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Technical Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

## PART 2 - PRODUCTS

### 2.1 PRODUCTS ORDERED IN ADVANCE

- A. Unless otherwise stated in the Contract Documents, Costs for receiving, handling, storage if required, and installation of material and equipment shall be included in the Contract Sum.

### 2.2 OWNER-FURNISHED PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

END OF SECTION 01 11 00

SECTION 01 21 00  
PROJECT CONTINGENCY AND ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
  - 1. Contingency Allowance
- C. Related Sections include the following:
  - 1. Division 1, Technical Specifications Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Consultant of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Consultant's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Consultant from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, on the "Proposal Request" and "Proposal Request Log" forms.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

## 1.5 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Consultant for Owner's purposes and amount an amount of Twenty Thousand Dollars (**\$20,000**) to be charged to the contingency allowance. The contingency allowance shall be included in the Roofing Contractor's bid.
- B. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

## 1.6 UNIT PRICES

- A. The unit prices shall be used to either increase or decrease the contract based on the quantity of work that is either increased or decreased.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

## 3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

END OF SECTION 01 21 00

SECTION 01 25 00  
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications whereas all parties agree to the following:
  - 1. A modification in the Work or Contract Documents.
  - 2. The amount of the adjustment in the Contract Sum, if any.
  - 3. The extent of the adjustment in the Contract Time, if any.

1.3 NOTIFICATION TO SURETY

- A. The Contractor shall notify the Surety of any modifications to the Work or provisions of the Contract Documents, including, but not limited to, the Contract Price or Contract Time.

1.4 MINOR CHANGES IN THE WORK

- A. The Consultant shall have authority to order Minor Changes in the Work not involving adjustment to the Contract Sum or extension of the Contract Time, and consistent with the intent of the Contract Documents. Such changes shall be in the form of a written order and shall be binding for both the Owner and Contractor when fully executed.

1.5 CLAIMS FOR ADDITIONAL COST:

- A. No claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with the following:
  - 1. Notice: Written notice stating the general nature of each claim shall be delivered by the claimant to the other party to the Contract promptly, but in no event later than thirty (30) days after the start of the event giving rise to the claim.

2. The responsibility to substantiate a claim shall rest with the party making the claim. The amount or extent of the claim, with supporting data, shall be delivered to the other party to the Contract within fifteen (15) days after the initial Notice of the Claim. Each claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to the claimant within thirty (30) days after receipt of the claimant's last submittal. Prior notice is not required for Claims relating to an emergency endangering life or property.
- B. The Contractor shall submit a claim if he believes additional cost is involved for reasons including but not limited to the following:
1. A written interpretation from the Consultant,
  2. An order by the Owner to stop the Work where the Contractor was not at fault,
  3. A written order for a minor change in the Work issued by the Consultant,
  4. A change in the Scope of the Work by the Consultant.

## 1.6 PROPOSAL REQUESTS

- A. The Owner initiated Proposal Requests is generated by the Owner to modify the Work or Contract Documents. The Consultant will issue a detailed description of proposed modifications in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. The description is for information and shall be considered as a directive to automatically stop work or execute the proposed change.
1. Within ten 10-calendar days after receipt of the Proposal Request, the Contractor shall submit a Proposal Request Form with an estimate to adjust the Contract Sum and the Contract Time if necessary to execute the change. Proposal shall include support documents from Subcontractor, if applicable.
    - a. Include a list of quantities of (plus or minus) the materials and/or products required with unit prices, total amount of purchases, and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

- c. Include costs of labor and supervision directly attributable to the change for the hours anticipated for the additional work, including social security, old age and unemployment insurance, fringe benefits, and workmen’s compensation insurance. (example of what will not be accepted is the labor cost of supervision for 5 days when the additional work only is for one day.)
  - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start, and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
2. The Contractor may initiate proposals if latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Consultant.
- a. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - b. Include a list of quantities of (plus or minus) the materials and/or products required with unit prices, total amount of purchases, and credits to be made. If requested, furnish survey data to substantiate quantities.
  - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - d. Include costs of labor and supervision directly attributable to the change, including social security, old age and unemployment insurance, fringe benefits, and workmen’s compensation insurance.
  - e. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - f. Comply with requirements in Division 1 Section, of the Technical Specifications "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- B. An alternative method to price the changes in the work is to utilize current “Mean’s Cost Data”.

- C. Profit and Overhead shall not exceed ten percent (10%) of the cost of the changes to the Work.
- D. Use Proposal Request Form in the specifications. The Contractor shall prepare three copies, one for the Consultant, one for the Owner and one for himself and for all parties to sign. Each shall keep a copy.
- E. Each Proposal shall include detail information from the sub-contractor(s) and supplier concerning the cost(s) for the Proposal.
- F. The Contractor shall be responsible for keeping and updating a "Proposal Request Log", listing all Proposal Requests and Minor Changes. The log shall also indicate the date of the Proposal Request, approval date, action taken, running balances, and a complete description of the change.
- G. After all parties have signed "The Proposal Request Form", it shall be the Contractor's authorization to proceed with the changes to the Work. Work shall not start until all parties agree to the change order.
- H. If the Owner and Contractor do not agree with the requested adjustment in the Contract Sum, the Contract Time or the method of determining each, the provisions for Mediation shall be utilized.

1.8 CHANGE ORDER PROCEDURES

- A. The Consultant shall issue a Change Order for signatures once all of the Proposal Request(s) amounts exceeds the contingency amount of \$30,000 or at the end of the project.
- B. The Contractor shall not invoice for the Change Order until it has been executed by all parties.

1.9 CONSTRUCTION CHANGE DIRECTIVE

- A. The Consultant may issue a Construction Change Directive that has been signed by the Owner to the Contractor directing a change in the Work. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved. And the Contractor shall advise the Consultant of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.
- C. The Contractor shall maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 PROCESSING CHANGE ORDERS

- A. The Change Order will be issued describing the change or changes to the Work and/or Contract Documents and will refer to the Proposal Requests.
- B. The Consultant shall issue one copy of the Change Order to the Contractor. The Contractor shall promptly sign the copy and return the copy to the Consultant who will sign the Change Order and forward the Change Order to the Owner to execute.
- C. Once the Change Order has been full executed, a copy shall be forwarded to the Consultant and to the Contractor for their files.

END OF SECTION 01 25 00

SECTION 01 29 00  
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
1. Division 1, of the Technical Specifications Section "Allowances" for procedural requirements governing handling and processing of allowances.
  2. Division 1, of the Technical Specifications Section "Unit Prices" for administrative requirements governing use of unit prices.
  3. Division 1, of the Technical Specifications Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  4. Division 1, of the Technical Specifications Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - a. Application for Payment form AIA G702.
    - b. Continuation Sheet form AIA G703.
    - c. Conditional Waiver and Leans

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- d. Invoices or statements that are not AIA documents will not be considered for payment request.
  - 2. The Owner shall retain 10% retainage on material and labor until the completion of the project and all close out documents have been submitted and accepted. This includes all shop drawings and As Built. The retainage shall be calculated based on the total accumulative amount being billed.
  - 3. Submit the Schedule of Values to the Consultant at earliest possible date but no later than fourteen days before the date scheduled for submittal of initial Applications for Payment.
  - 4. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each of the Technical Specifications Section and line item for potential billing against the Construction Contingency Allowance.
- 1. Identification: Include the following Project information on the Schedule of Values:
    - a. Project name and location.
    - b. Name of Consultant.
    - c. Contract number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Technical Specifications Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractors.
    - d. Name of manufacturer or fabricator.
    - e. Name of suppliers.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value.
  - 3. Group items that are “Non-Tangible & Non-Taxable and Tangible & Taxable Items” on the Schedule of Values (see VII. Forms, Continuation Sheet).

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include labor and materials and/or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Closeout documentation: Provide a separate line item in the Schedule of Values for close out documentation as set forth in the Supplementary Conditions.
9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Consultant and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involves additional requirements.
  2. Contractor Coordination Drawings or Construction schedule are required within 60 calendar days of the issued Notice-to-Proceed. Failure to provide requirements shall result in delays of Application for Payment.

- B. Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.
- C. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for material and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such material and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such material and equipment stored off the site.

The Contractor warrants that title to all Work covered by an Application and Certificate for payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application and Certificate for payment all work for which Certificates for payment have been previously issued and payment received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of claims of liens, claims, security, interests, or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work.

- D. Payment Application Times: Each Month, the County can make a partial payment to the Contractor on the basis of a duly notarized Application and Certification for Payment approved and certified by the Consultant.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. The Consultant will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
    - a. Nothing in this section shall prevent the prime Contractor at the time of application and certification to the Owner from withholding application and certification to the Owner for payment to the subcontractor for

- unsatisfactory job progress; defective construction not remedied; disputed work; third party claims filed or reasonable evidence that claim will be filed; failure of subcontractor to make timely payments for labor, equipment, and materials; damage to prime Contractor or another subcontractor; reasonable evidence that subcontract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by the Owner.
- b. Nothing in this section shall prevent the Owner from withholding payment to the Contractor in addition to the amounts authorized by this section for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the Owner or reasonable evidence that a third-party claim will be filed.
  - c. Provide a separate line item for the allowance item uses the allowance for payment.
4. Provide a separate line item in the Schedule of values for close out documentation as set forth in the Supplementary Conditions.
- F. Transmittal: Submit one (1) signed and notarized electronic (pdf format) copy of each Application for Payment with required Conditional Partial Release of Lien to the Consultant.
  - G. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
  - H. With each Application and Certification for payment, the Contractor must furnish for themselves, as well as for all Subcontractors, certified statements stating the cost of the property purchased from each vendor and the amount of sales and/or use taxes paid. See General Conditions, Sales and Use Tax for additional information.
  - I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - J. Neither Final payment nor any remaining retained percentage shall become due until the Contractor submits the following to the Consultant for approval:
    1. An affidavit that payrolls, bills for material and other indebtedness connected with the Work has been paid or otherwise satisfied will be required with each payment request,

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2. A certificate evidencing that insurance required by the Contract Document to remain in force after Final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,
  3. Consent of surety to Final payment and
  4. If required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of claim of liens, claims security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If the Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such claim of lien. If such claim of lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such claim, including all costs and reasonable attorneys' fees.
  5. A list of all suppliers and subcontractors that were involved with the project. As part of the list, the Contractor shall include the address, phone number, what they supplied or Work performed, and a contact name.
  6. "As-Builts" Drawings and all other specified closeout documents.
  7. Sales Tax information.
  8. Maintenance and Operation instructions and guarantees.
- J. Final Payment Application: Submit one electronic copy (pdf format) of the final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Warranties and Test results required by the Contract Documents.
  2. Updated final statement, accounting for final changes to the Contract Sum.
  3. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  5. AIA Document G707, "Consent of Surety to Final Payment."
  6. AIA Document G702.
  7. AIA Document G703.

8. Additional Evidence that claims have been settled if required by the Owner. An example of the evidence could be a letter from a subcontractor indicating that he has been paid in full for the work that he has performed.
9. Certificates from all local and State Governing Agencies as required by Law.
10. Final liquidated damages settlement statement.
11. List of Subcontractors and Suppliers that has contributed to the completion of the Work. The list shall include:
  - a. Material they supplied or type of construction they performed.
  - b. Address
  - c. Contact person
  - d. Phone number

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00  
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Consultant will chair and conduct project meetings and compile an agenda for each meeting throughout the construction period.
- B. This Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:
1. General project coordination procedures.
  2. Conservation.
  3. Coordination Drawings/Construction Schedule.
  4. Administrative and supervisory personnel.
  5. Project meetings.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 1, of the Technical Specifications Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
  2. Division 1, of the Technical Specifications Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  3. Division 1, of the Technical Specifications Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Technical Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components.
  2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, the Consultant shall prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
  2. Preparation of the Schedule of Values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Pre-installation conferences.
  7. Project closeout activities.

#### 1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Indicate relationship of components shown on separate Shop Drawings.
  2. Indicate required installation sequences.
- B. Staff Names: Fourteen days prior to the Pre-Construction conference, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

#### 1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

#### 1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
  1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
  2. Agenda: The Consultant shall prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes:
    - a. The Consultant will compile minutes of each project meeting and will distribute copies to the Contractor and required copies to the Owner.
    - b. Recipients of copies may make and distribute such other copies as they wish.
  4. Attendance:
    - a. To the maximum extent practical, assign the same person or persons to represent the Contractor at the project meetings throughout progress of the Work.
    - b. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.
  5. Minimum agenda:
    - a. Review, revise as necessary, and approve minutes of previous meetings.
    - b. Review progress of the Work since last meeting, including status of submittals for approval.
    - c. Identify problems which impede planned progress.
    - d. Develop corrective measures and procedures to regain planned schedule.
    - e. Complete other current business.
- B. Pre-construction Conference: Schedule a pre-construction conference before starting construction, at a time convenient to Owner and Consultant, but no later than 14 days after execution of the Construction Contract. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Consultant, and their consultants; Contractor and its superintendent; major subcontractors and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing.
    - d. Designation of responsible personnel.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for processing Applications for Payment.
    - g. Distribution of the Contract Documents.
    - h. Submittal procedures.
    - i. Preparation of Record Documents.
    - j. Use of the premises.
    - k. Responsibility for temporary facilities and controls.
    - l. Parking availability.
    - m. Office, work, and storage areas.
    - n. Equipment deliveries and priorities.
    - o. Security.
    - p. Working hours.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Consultant of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related Change Orders.
    - d. Purchases.
    - e. Deliveries.
    - f. Submittals.
    - g. Review of mockups.

- h. Possible conflicts.
- i. Time schedules.
- j. Weather limitations.
- k. Manufacturer's written recommendations.
- l. Temporary facilities and controls.
- m. Space and access limitations.
- n. Regulations of authorities having jurisdiction.
- o. Testing and inspecting requirements.
- p. Required performance results.
- q. Protection of construction and personnel.

Record significant conference discussions, agreements, and disagreements.

Do not proceed with installation if the conference cannot be successfully concluded.

Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

- E. Progress Meetings: Conduct progress meetings at a minimum of once every two weeks. Coordinate dates of meetings with preparation of payment requests.
  - 1. Attendees: Representatives at the meeting shall be the Owner, Consultant, Subcontractors, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Access.
      - 6) Work hours.

- 7) Hazards and risks.
  - 8) Review of Record Drawings
  - 9) Review of construction defects that has been identified by the Consultant
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

#### 1.7 REQUESTS FOR INTERPRETATION (RFI's)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI.
1. RFI's shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
1. Project Name
  2. Date
  3. Name of Contractor
  4. Name of Consultant.
  5. RFI number, numbered sequentially.
  6. Specification Section number and title and related paragraphs, as appropriate.
  7. Drawing number and detail references, as appropriate.
  8. Field dimensions and conditions, as appropriate.
  9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  10. Contractor's signature.
  11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Format: Contractor's standard form, submitted as PDF electronic submittal.

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- D. Standard Form
1. Identify each page of attachments with the RFI number and sequential page number.
- E. Consultant's Action: Consultant will review each RFI, determine action required, and return it. Allow seven (7) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of substitutions.
    - b. Requests for coordination information already indicated in the Contract Documents.
    - c. Requests for adjustments in the Contract Time or the Contract Sum.
    - d. Requests for interpretation of Consultant's actions on submittals.
    - e. Incomplete RFIs or RFIs with numerous errors.
  2. Consultant's action may include a request for additional information, in which case Architect's time for response will start again.
  3. Consultant's action on RFI's that may result in a change to the Contract Time or the Contract Sum does not constitute an approval to proceed with the additional Work. Contractor must submit a Change Proposal and receive written approval to proceed according to Division 1 Section "Contract Modification Procedures".
    - a. If Contractor believes the RFI response warrants a change in the Contract Time or the Contract Sum, notify Consultant in writing within five (5) days of receipt of the RFI response.
- F. On receipt of Consultant's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log biweekly. Include the following:
1. Project Name
  2. Name and address of Contractor.
  3. Name and address of Consultant.
  4. RFI number including RFI's that were dropped and not submitted.
  5. RFI description
  6. Date the RFI was submitted.
  7. Date Consultant's response was received.
  8. Identification of the related Minor Change in the Work, Construction Change Directive and Proposal Request as appropriate.

9. Identification of related Field Order, Work Change Directive and Proposal Request as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00  
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Preliminary Construction Schedule.
  2. Contractor's Construction Schedule.
  3. Submittals Schedule.
  4. Daily construction reports.
  5. Construction photographs.
- B. Related Sections include the following:
1. Division 1, of the Technical Specifications Section "Payment Procedures" for submitting the Schedule of Values.
  2. Division 1, of the Technical Specifications Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
  3. Division 1, of the Technical Specifications Section "Submittal Procedures" for submitting schedules and reports.
  4. Division 1, of the Technical Specifications Section "Quality Requirements" for submitting a schedule of tests and inspections.
  5. Division 1, of the Technical Specifications Section "Closeout Procedures" for Project Record Documents at Project closeout.

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### 1.3 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Consultants and owners, and other information specified. The date shall be submitted for any change of construction personal.
- B. Preliminary Construction Schedule: Submit three printed copies; one a single sheet, of the Preliminary Construction Schedule.
- C. Contractor's Construction Schedule: Submit three printed copies of initial schedule, large enough to show entire schedule for entire construction period.
  - 1. Submit an electronic copy of schedule, excel grant chart. Include type of schedule (Initial or Updated) and date on label.
- D. Daily Construction Reports: Submit two copies at monthly intervals.
- E. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
  - 1. Revise list below to suit Project. Add information, such as scheduled dates for purchasing and installation and the activity or event number, if a CPM construction schedule is used.
  - 2. Scheduled date for first submittal.
  - 3. Of the Technical Specifications Section number and title.
  - 4. Submittal category (action or informational).
  - 5. Name of subcontractor.
  - 6. Description of the Work covered.
  - 7. Scheduled date for Consultant's final release or approval.
- F. Construction Photographs: Submit of each photographic view within seven (7) days of taking photographs.
  - 1. Identification: In the title of the picture, indicate the area taken.

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## 1.4 COORDINATION

- A. Coordinate requirements in this Article with "Submittals Schedule" Article in Part 2. If a submittal review sequence policy governs, revise this Article to comply with requirements. See Evaluations for discussion on submittal review sequence policies.
- B. Coordinate preparation and processing of schedules and daily construction reports with performance of construction activities and with scheduling and reporting of separate contractors.
- C. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from parties involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## PART 2 - PRODUCTS

### 2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  - 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
    - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

### 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- 
- A. Time Frame: Extend schedule from date established for the Notice to Proceed, through the date of Substantial Completion and Final Completion.
    - 1. Contract completion date shall not be changed, unless specifically authorized by Change Order.
  
  - B. Activities: Treat each area or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
    - 1. Activity Duration: Define activities of each activity per area.
    - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
    - 3. Submittal Review Time: Include review and re-submittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
    - 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Consultant's administrative procedures necessary for certification of Substantial Completion.
  
  - C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in the schedule and show how the sequence of the Work is affected.
    - 1. Phasing: Arrange list of activities on schedule by phase.
    - 2. Work Restrictions: Show the effect of the following items on the schedule:
      - a. Coordination with existing construction.
      - b. Limitations of continued occupancies.
      - c. Uninterruptible services.
      - d. Partial occupancy before Substantial Completion.
      - e. Use of premises restrictions.
      - f. Environmental control.
    - 3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
      - a. Submittals.
      - b. Purchases.
      - c. Mockups.
      - d. Fabrication.
      - e. Sample testing.

- f. Deliveries.
  - g. Installation.
  - h. Tests and inspections.
  - i. Startup and placement into final use and operation.
- D. List critical work and subcontracts here if requirement to indicate stages of the Work is limited only to those elements.
- E. Milestones: If not included in the Construction Documents, milestones shall be indicated in the Construction Schedule for the Consultant's and Owner's approval and shall be reference points of the construction progress.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragments to demonstrate the effect of the proposed change on the overall project schedule.
- G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.
- 1. Excel Gant Chart.

### 2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven (7) days of date established for the Notice to Proceed. Excel has a Gant Chart Template (Bar-Chart Schedule).
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work.
- C. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
- 1. Identification of activities that have changed.
  - 2. Changes in early and late start dates.
  - 3. Changes in early and late finish dates.
  - 4. Changes in activity durations in workdays.
  - 5. Changes in total float or slack time.

6. Changes in the Contract Time.

## 2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  1. List of Subcontractors at Project site.
  2. List of separate Contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. High and low temperatures and general weather conditions.
  5. Accidents.
  6. Meetings and significant decisions.
  7. Unusual events (refer to special reports).
  8. Stoppages, delays, shortages, and losses.
  9. Services connected and disconnected.
  10. Equipment or system tests and startups.
  11. Visitors to the site
  12. Activities accomplished that day

## 25. Submittal Log

- A. Stucco
- B. Hat channels
- C. Metal Wall Panels
- D. Pipe for French drain
- E. Drainage mat
- F. Letters fabrication shop drawing
- G. Stamp color sample book for the owner to choose from

- H. Mockup of stamp pattern that has been stained.
- I. Concrete mix design
- J. Roof material to be used
- K. Parapet cap/metal flasing

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Consultant, Owner, separate Contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

#### 3.2 CONSTRUCTION PHOTOGRAPHS

- A. Provide per 01 32 20.

END OF SECTION 01 32 00

SECTION 01 32 20  
PHOTOGRAPHIC DOCUMENTATION (DIGITAL)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.
  - 3. Final Completion construction photographs.
- B. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for submitting construction photographs.

1.3 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Consultants and owners, and other information specified.
- B. Construction Photographs: Submit 1 digital of each photographic view within 7 days of taking photographs.
  - 1. Format: Digital "JPEG".
  - 2. Digital Images: Submit a complete set of digital image electronic files as a Project Record Document. Identify electronic media with date photographs were taken. Submit images that have the same aspect ratio as the sensor, uncropped.

#### 1.4 COORDINATION

- A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting.

### PART 2 - EXECUTION

#### 2.1 PHOTOGRAPHS, GENERAL

- A. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.

#### 2.2 CONSTRUCTION PHOTOGRAPHS

- A. Preconstruction Photographs: Before starting construction, take color photographs of Project site and surrounding properties from different vantage points.
  - 1. Take minimum 4 photographs to show existing conditions of each side of building adjacent to the property before starting the Work.
  - 2. Take minimum 4 photographs of existing buildings either on or adjoining the property to accurately record the physical conditions at the start of construction.
- B. Periodic Construction Photographs: Take color digital photographs to document progress. Photographer shall select vantage points to best show status of construction and progress since the last photographs were taken. Submit the photographs with each payment request.
- C. Final Completion Construction Photographs: Take minimum 10 digital color photographs of each project after date of Substantial Completion for submission as Project Record Documents. Consultant will direct photographer for desired vantage points.
  - 1. Do not include date stamp.

END OF SECTION 01 32 20

SECTION 01 33 00  
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. Related Sections include the following:
  - 1. Division 1, of the Technical Specifications Section "Payment Procedures" for submitting Applications for Payment.
  - 2. Division 1, of the Technical Specifications Section "Project Management and Coordination" for submitting Coordination Drawings.
  - 3. Division 1, of the Technical Specifications Section "Photographic Documentation" for submitting periodic construction photographs.
  - 4. Division 1, of the Technical Specifications Section "Quality Requirements" for test and inspection reports and Delegated-Design Submittals and for erecting mockups.
  - 5. Division 1, of the Technical Specifications Section "Closeout Procedures" for submitting warranties.
  - 6. Division 1, of the Technical Specifications Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 7. Division 1, of the Technical Specifications Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Consultant's responsive action.
- B. Informational Submittals: Written information that does not require Consultant's approval. Submittals may be rejected for not complying with requirements.

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#### 1.4 SUBMITTAL PROCEDURES

- A. The Contractor shall provide the submittals as required by the Consultant's Submittal Log and the Contract Documents.
- B. General: Electronic copies of PDF Drawings of the Contract Drawings will be provided by Consultant for Contractor's use in preparing submittals. The contractor shall initial each drawing as submittal for the details to be used for the project.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Consultant reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Submittals Schedule: Comply with requirements in Division 1, of the Technical Specifications Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities. (Submittal Log)
- E. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Consultant's receipt of submittal.
  - 1. Initial Review: Allow seven (7) days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Consultant will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Concurrent Review: Where concurrent review of submittals by Consultant's consultants, Owner, or other parties is required, allow twenty one (21) days for initial review of each submittal.
  - 3. If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 4. Allow seven (7) days for processing each re-submittal.
  - 5. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- F. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Consultant.
  3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Consultant.
    - d. Name and address of Contractor.
    - e. Name and address of subcontractor.
    - f. Name and address of supplier.
    - g. Name of manufacturer.
    - h. Unique identifier, including related specification section/number and revision number.
    - i. Number and title of appropriate Technical Specifications Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Other necessary identification.
- G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Additional Copies: Unless additional copies are required for final submittal, and unless Consultant observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Consultant.
  2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.
- I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Consultant will return submittals, without review, received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Consultant on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
  2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
  3. Transmittal Form: Use on form to be defined by the Consultant.

- J. Distribution: Furnish copies of final submittals to manufacturers, Subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals with mark indicating action taken by Consultant in connection with construction.

## PART 2 - PRODUCTS

### 2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
  - 1. Number of Copies: Submit one electric copy of shop drawings and data to the consultant.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operating and maintenance manuals.
    - k. Compliance with recognized trade association standards.
    - l. Compliance with recognized testing agency standards.
    - m. Application of testing agency labels and seals.
    - n. Notation of coordination requirements.
    - o. Manufacturer's location.

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- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams and existing conditions.
    - e. Schedules.
    - f. Compliance with specified standards.
    - g. Notation of coordination requirements.
    - h. Notation of dimensions established by field measurement.
  2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."
- E. Samples: Prepare physical units of materials or products, including the following:
1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups. Verify the samples are true presentation of the materials to be used.
  2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Consultant's sample where so indicated. Attach label on unexposed side that includes the following:
    - a. Generic description of Sample.
    - b. Product name or name of manufacturer.
    - c. Sample source.
  4. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
    - a. Size limitations.
    - b. Compliance with recognized standards.
    - c. Availability.
    - d. Delivery time.

5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
  - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations. The consultant will return submittal with the option selected.
  - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
  
6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
  - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
  - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  
- F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  1. Type of product. Include unique identifier for each product.
  
- G. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
  
- H. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."
  
- I. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."
  
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  1. Name, address, and telephone number of entity performing subcontract or supplying products.

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## 2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
  - 1. Number of Copies: Submit one copy of each submittal, unless otherwise indicated. Consultant will not return copies.
- B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: If requested, prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Consultants and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that the contractor is certified to install their product and the product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Safety Data Sheets: Submit two copies for the Consultant and the Owner and keep a copy at the job site. Post warning signs when appropriate.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Consultant.

- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

### 3.2 CONSULTANT'S ACTION

- A. General: Consultant will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Consultant will review each submittal, make marks to indicate corrections or modifications required, and return it. Consultant will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- C. Informational Submittals: Consultant will review each submittal and will not return it or will reject and return it if it does not comply with requirements. Consultant will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded unless a justification is also submitted.

END OF SECTION 01 33 00

SECTION 01 40 00  
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
  3. The Owner shall provide testing/observation by a testing agency of the welding of the structural steel. If the inspection does not pass, the contractor shall for all additional inspections by the material testing firm.
- C. Related Sections include the following:
1. Division 1, of the Technical Specifications Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
  2. Division 1, of the Technical Specifications Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
  3. Divisions 2 through 48, of the Technical Specifications Sections for specific test and inspection requirements.

### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction comply with requirements. Services do not include contract enforcement activities performed by Consultant.
- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

### 1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent for a second option.

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## 1.5 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
  2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
1. Testing agency will notify Consultant and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Consultant with copy to Contractor and to authorities having jurisdiction.
  3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

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4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  5. Testing agency will retest and re-inspect corrected work.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services as requested by the Consultant at the Contractor's expense, including retesting and re-inspecting, for construction that revised or replaced Work, at the Contractor's expense, that failed to comply with requirements established by the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Consultant and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Consultant and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
  5. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field-curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
  1. Distribution: Distribute schedule to Owner, Consultant, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS: (NOT USED)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
  2. Comply with the Contract Document requirements for Division 1, of the Technical Specifications Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 50 00  
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- C. Temporary utilities include, but are not limited to, the following:
1. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
  2. Electric power service.
  3. Lighting.
- D. Support facilities include, but are not limited to, the following:
1. Temporary roads and paving.
  2. Dewatering facilities and drains.
  3. Waste disposal facilities.
  4. Storage and fabrication sheds.
  5. Lifts and hoists.
  6. Temporary stairs/Ladders.
  7. Construction aids and miscellaneous services and facilities.
  8. Material shall not be stored in the facility.
- E. Security and protection facilities include, but are not limited to, the following:
1. Environmental protection.
  2. Tree and plant protection.
  3. Barricades, warning signs, and lights.
  4. Temporary enclosures.

- F. Related Sections include the following:
  - 1. Division 1, of the Technical Specifications Section "Execution Requirements" for progress cleaning requirements.

### 1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Consultant, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary enclosures.

### 1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Consultant and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
  - 1. Owner's construction forces.
  - 2. Occupants of Project.
  - 3. Consultant.
  - 4. Testing agencies.
  - 5. Security.
  - 6. Personnel of authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.
- C. Water Service: The Owner will provide a source of water for the contractor's use. The contractor shall provide all material and labor to provide potable water.
- D. Electric Power Service: The Owner will provide a source of power for the contractor's use. The Contractor shall provide extension cords, outlets, and distribution panels as needed and according to National Electrical Code.

### 1.5 SUBMITTALS

- A. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

## 1.6 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
  - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

## 1.7 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
  - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
  - 1. Keep temporary services and facilities clean and neat.
  - 2. Relocate temporary services and facilities as required by progress of the Work.

## PART 2 - PRODUCTS:

### 2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if indicated on the plans and/or specifications. Provide materials suitable for use intended.
- B. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- C. Water: Potable.

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## 2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
  - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure and the requirements of the local Governing agency.
- C. Self-Contained Toilet Units: Single-occupant units of chemical or aerated recirculation or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water, drinking-water units, including paper cup supply.
- E. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- F. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

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### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
- B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Subparagraph below may be excessive for small- and medium-size projects.
  3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations as required. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
  4. Drinking-Water Facilities: Provide drinking-water.
- C. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.
- D. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
  2. Provide warning signs at power outlets other than 110 to 120 V.
  3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
  4. Provide metal conduit enclosures or boxes for wiring devices.
  5. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.

- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions for the duration of the construction.
- F. PROGRESS CLEANING: This Article refers to regular cleaning operations conducted while construction is in progress. Requirements for final cleaning before Substantial Completion are included in Division 1 Section "Closeout Procedures."
  - 1. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly.
  - 2. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations. Dispose of material in accordance with Division 1, Section "Construction Waste Management".
  - 4. Site: Maintain Project site free of waste materials and debris. Remove debris around the facility daily.
  - 5. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 6. Remove liquid spills promptly.
  - 7. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: If required, Comply with the following:
  - 1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
  - 2. Maintain support facilities until approved by the Consultant to be removed.
- B. Temporary Roads and Paved Areas: If applicable/as needed, construct and maintain temporary roads and paved areas to avoid damage to the site. Locate temporary roads and paved areas in same location as permanent roads and paved areas. If applicable, extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
- C. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous,

dangerous, or unsanitary waste materials separately from other waste. Comply with "Construction and Demolition Waste Management Recycling.

- E. Storage and Fabrication Sheds: If required, provide sheds sized, furnished, and equipped to accommodate materials and equipment involved.
- F. Existing Elevator Usage: Use of Owner's existing elevators will not be permitted.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Storm water Control: Comply as indicated on the erosion control plan/measures before any earth disturbing activities start.
- C. Tree and Plant Protection: Comply with the plans and specifications for protection.
- D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- E. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
- G. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- H. Temporary Fire Protection:
  - 1. Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
  - 2. The Contractor shall maintain existing fire-protection facilities that are already in service for the duration of the project.

- a. The Contractor shall protect all fire-detection devices to avoid damage and prevent false alarms.
  - 1) The Contractor shall be responsible for locating and protecting both visible and hidden devices.
  - 2) The Contractor shall be responsible for all work associated with cleaning and/or replacing any fire protection devices that trigger false alarms as a result of the construction process.
- b. If the Contractor disables (zone-out) any fire detection devices over the course of the work, the Contractor shall be responsible for returning those devices to full service at the completion of the project.
- c. If required, it shall be the responsibility of the Contractor to place an existing fire alarm into test mode. The Contractor shall return the fire alarm system to full service as soon as possible.
  - 1) If a functioning fire alarm system in an occupied building is put into test mode for any period of time, the Contractor shall be responsible for paying the Owner's chosen security personnel to perform code required Fire Watches every hour for the entire building over the course of time that the fire alarm system is not fully functioning.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Termination and Removal: Remove each temporary facility when the need for its service has ended, when it has been 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 temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1, of the Technical Specifications Section "Closeout Procedures."

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in Work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.

2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.
6. At the end of each day, secure the work from any water intrusion into the building. The contractor shall be responsible for any water damage in the building.

END OF SECTION 01 50 00

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SECTION 01 50 50  
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Owner has established that this Project shall include proactive measures for waste management participation by all parties to the contract.
1. The purpose of this program is to ensure that during the Project all diligent means are employed to pursue practical and economically feasible waste management and recycling options.
  2. Upon award, each subcontractor shall be required to furnish documentation from suppliers or manufacturers regarding waste management and recycling options for those products and procedures furnished.
  3. Waste disposal to landfills shall be minimized.
  4. Remove all waste from the grounds daily and place it in the dumpsters.
- B. Definitions:
1. Waste: Any material that has reached the end of its intended use. Waste includes salvageable, returnable, recyclable and reusable material.
  2. Construction waste: Solid wastes including, but not limited to, building materials, packaging materials, debris, and trash resulting from construction operations.
  3. Salvage: To remove waste material from the Project site to another site for resale or reuse by others.
  4. Hazardous waste: Any material or byproduct of construction that is regulated by the Environmental Protection Agency and that may not be disposed in any landfill or other waste end-source without adherence to applicable laws.
  5. Trash: Any product or material unable to be returned, reused, recycled, or salvaged.
  6. Landfill: Any public or private business involved in the practice of trash disposal.
  7. Waste Management Plan: A Project-related plan for the collection, transportation, and disposal of the waste generated at the construction site.

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## 1.2 SUBMITTALS:

### A. Project Information:

1. Contractor's Construction Waste Management Plan.

## 1.3 CONSTRUCTION WASTE MANAGEMENT PLAN

### A. Waste Management Plan shall include the following:

1. Solid Waste Disposal and Diversion document.
  - a. Identification of materials recycled.
  - b. Identification of materials landfill.
  - c. Identification of hazardous waste and disposal.
2. Locations of sorting and waste storage facilities on Site Plan of project.
3. Final documentation of subcontractor/supplier waste management/recycling data.
4. Final documentation of hazardous waste disposal plan. Burning on site is NOT allowed.

### B. Construction Waste Management Plan Implementation:

1. The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting the Waste Management Plan.
2. The "Summary of Construction Waste/Recycling" shall be completed each month and submitted as part of Application for Payment.
  - a. All materials identified in the Summary shall be reported by weight.
  - b. Where weight is not applicable, Contractor shall report materials by units applicable to material recipient.
  - c. Contractor shall procure receipts or other validation of waste management procedures and include them as part of the submittal.
3. The Contractor shall distribute copies of the "Summary of Construction Waste/Recycling" to the Consultant, Owner and each subcontractor involved in the plan.
4. The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse and return methods to be used by all parties at appropriate stages of the Work.

5. Separation facilities:
    - a. Contractor shall define specific areas to facilitate separation of materials for recycling, salvage, re-use or return.
    - b. Recycle and waste bin areas are to be maintained in an orderly manner and clearly marked to avoid contamination of materials.
    - c. Do not mix recyclable materials.
    - d. Store hazardous wastes in secure areas.
  
  6. Hazardous wastes:
    - a. Hazardous wastes shall be separated, stored, and disposed of in accordance with local and EPA regulations and additional criteria listed below:
      - 1) Building products manufactured with PVC or containing chlorinated compounds shall not be incinerated.
      - 2) Disposal of fluorescent tubes to open containers is not permitted.
      - 3) Unused fertilizers shall not be co-mingled with construction waste.
- C. Program profits:
1. All profits from recycling of construction waste shall be granted to the Contractor.

PART 2 - PRODUCTS: (NOT USED)

PART 3 - EXECUTION: (NOT USED)

END OF SECTION 01 50 50

SECTION 01 73 10  
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
  - 1. Primary operational systems and equipment.
  - 2. Air or smoke barriers.
  - 3. Fire-protection systems.
  - 4. Control systems.
  - 5. Communication systems.
  - 6. Conveying systems.
  - 7. Electrical wiring systems.
  - 8. Operating systems of special construction in Division 13 Sections.

- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or those results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
  2. Membranes and flashings.
  3. Exterior curtain-wall construction.
  4. Equipment supports.
  5. Piping, ductwork, vessels, and equipment.
  6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Consultant's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
    - a. Processed concrete finishes.
    - b. Stonework and stone masonry.
    - c. Ornamental metal.
    - d. Matched-veneer woodwork.
    - e. Preformed metal panels.
    - f. Roofing.
    - g. Firestopping.
    - h. Window wall system.
    - i. Stucco and ornamental plaster.
    - j. Terrazzo.
    - k. Finished wood flooring.
    - l. Fluid-applied flooring.
    - m. Aggregate wall coating.
    - n. Wall covering.
    - o. Swimming pool finishes.
    - p. HVAC enclosures, cabinets, or covers.

## 1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of the Technical Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

## PART 3 - EXECUTION:

### 3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

### 3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of the Technical Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

END OF SECTION 01 73 10

SECTION 01 77 00  
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
  2. Project As-Built Documents.
  3. Operation and maintenance manuals.
  4. Warranties.
  5. Instruction of Owner's personnel.
  6. Final cleaning.
- B. Related Sections include the following:
1. Division 1, of the Technical Specifications Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
  2. Division 1, of the Technical Specifications Section "Construction Progress Documentation" for submitting Final Completion construction photographs and negatives.
  3. Division 1, of the Technical Specifications Section "Photographic Documentation" for submitting Final Completion.
  4. Division 1, of the Technical Specifications Section "Construction Waste Management" method of disposal of construction waste.
  5. Division 1, of the Technical Specifications Section "Execution Requirements" for progress cleaning of Project site.
  6. Division 1, of the Technical Specifications Section "Project Record Documents".
  7. Division 1, of the Technical Specifications Section "Operation and Maintenance Data".
  8. Divisions 2 through 48, of the Technical Specifications Sections for specific closeout and special cleaning requirements for products of those Sections.

### 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: The Contractor shall, before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  2. Advise Owner of pending insurance changeover requirements.
  3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  5. Prepare and submit Project Record Documents, "As-Builts" drawings, operation and maintenance manuals, Final Completion construction photographs and photographic negatives if required, damage or settlement surveys, property surveys, and similar final record information.
  6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  8. Complete startup testing of systems.
  9. Submit test/adjust/balance records.
  10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  12. Complete final cleaning requirements, including touchup painting.
  13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Consultant will either proceed with inspection or notify Contractor of unfulfilled requirements. Consultant will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Consultant, that must be completed or corrected before certificate will be issued. The Consultant's Substantial Completion list is composed by verification of the punch list submitted by the Contractor and any additional defects in the work observed by the Consultant.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
  1. Submit a final Application for Payment according to Division 1, of the Technical Specifications Section "Payment Procedures."
  2. Submit certified copy of Consultant's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Consultant. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report and warranty.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes if required.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Consultant will either proceed with inspection or notify Contractor of unfulfilled requirements. Consultant will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. The Contractor shall take immediate steps to correct the stated deficiencies, and send a written notice to the Consultant, certifying the Project is complete, at which time the Consultant will re-inspect the Work. This review and additional reviews by the Consultant where the Work is not considered Substantial Completion or Final Completion will be considered an additional service from the Consultant. The Contractor will be charged for these additional services incurred by such failure including travel time, observation time, and administrative time at the Consultant's hourly rate, as well as all expenses associated with the distribution of a written notice stating the reasons for failure to reach final completion.
  3. In the event the Contractor is granted Substantial Completion by the Consultant and the Contractor fails to complete and/or correct all of the items listed in the Substantial Completion within 15 calendar days of the date of Substantial Completion, the liquidated damages shall start to accrue until all of the items on the Substantial Completion list are completed and/or corrected and have been approved by the Consultant.

4. If the Consultant is required to make more than two inspections for the project to achieve Substantial Completion, the Contractor shall pay for the Consultant's time and expensive.

#### 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  1. Organize list of spaces in sequential order, use the room number as indicated on the drawings and on the exterior areas include a location diagram indicating the defects.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Consultant.
    - d. Name of Contractor.
    - e. Page number.

#### 1.6 PROJECT RECORD DOCUMENTS

- A. The Contractor shall provide Project Record Documents, O&M, "As-Builts" Drawings, and Warrantees as indicated in Division 1, of the Technical Specifications Section Project Record Documents. Use Division 1, of the Technical Specifications Section "Project Record Documents".

#### 1.7 OPERATION AND MAINTENANCE MANUALS

- A. See Section "Operation and Maintenance Manuals" for additional Information.

#### 1.8 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Consultant for designated portions of the Work where commencement of warranties other than date of acceptances by the owner.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

- C. Provide original copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION:

### 3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

- j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - k. Remove labels that are not permanent.
  - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  - m. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - n. Replace parts subject to unusual operating conditions.
  - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
  - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  - s. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully. Provide load tickets from landfill.

END OF SECTION 01 77 00

SECTION 01 78 10  
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
1. As-Built Drawings.
  2. Record Specifications.
  3. Record Product Data.
- B. Related Sections include the following:
1. Division 1, of the Technical Specifications, Section "Closeout Procedures" for general closeout procedures.
  2. Division 1, of the Technical Specifications, Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  3. Divisions 2 through 16, of the Technical Specifications, Sections for specific requirements for Project Record Documents of products in those Sections.

1.3 SUBMITTALS

- A. As-Built Drawings: Comply with the following:
1. Number of Copies: Submit two sets of marked-up As-Built Drawings to the Consultant for the Consultant to prepare the Record Drawings.
- B. Record Specifications: Submit two copies of Project's marked up Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit two copies of each Product Data submittal.
1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

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## 2.1 AS-BUILT DRAWINGS

- A. As-Built Drawings: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings.
1. Preparation: Mark As-Built Drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up As-Built Drawings.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Consultant's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
    - o. Clarification Drawings.
  3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Update the record drawings when the changes occur.
  7. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
  8. Identify and date each As-Built Drawing; include the designation "PROJECT AS-BUILTS DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

- B. Newly Prepared As-Built Drawings: Prepare new Drawings instead of preparing As-Built Drawings where Consultant determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
  1. New Drawings may be required when a Change Order is issued as a result of accepting a substitution or other modification.
  2. Consult with Consultant for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared As-Built Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of the manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
  5. Note related Change Orders, As-Built Drawings, and Product Data where applicable.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, As-Built Drawings, and Product Data where applicable.

**2.4 MISCELLANEOUS RECORD SUBMITTALS**

- A. Assemble miscellaneous records required by other sections of the Technical Specifications for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

**PART 3 - EXECUTION:****3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document (As Built) purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Consultant's reference during normal working hours.

END OF SECTION 01 78 10

**SECTION 07 01 91**  
**JOINT SEALANT REHABILITATION AND REPLACEMENT**

**PART 1 – GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Rehabilitation and replacement of exterior weatherproofing sealants
  
- B. Locations for sealant:
  - 1. Expansion joints.
  - 2. Around doors and window frames.
  - 3. Wet sealing between glass panels and window frames.
  - 4. Wet sealing between glass panels and door frames.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM C 1135 - Test Method for Determining Tensile Adhesion Properties of Structural Sealants
  - 2. ASTM C 1184 - Standard Specification for Structural Silicone Sealants.
  - 3. ASTM C 1193 - Standard Guide for Use of Joint Sealants.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of joint sealant product specified, including:
  - 1. Preparation instructions and recommendations.
  - 2. Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
  
- B. Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and color, for each application. Utilize joint sealant designations included in this Section.

- 
- C. Samples for Color Selection: For each joint sealant type.
  - D. Samples for Verification: For each exterior joint sealant product, for each color selected.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified applicator.
- B. Warranty: Sample of unexecuted manufacturer and installer special warranties.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced Installer equipped and trained for application of joint sealants required for this Project with record of successful completion of projects of similar scope.
- B. Single Source Responsibility: Provide glazing sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- C. Mockups: Provide glazing sealant [and weather barrier transition] application within mockups required in other sections identical to specified sealants and installation methods.

#### 1.7 FIELD CONDITIONS

- A. Hazardous Materials: Hazardous material is not anticipated.
  - 1. If suspected hazardous materials are encountered, do not disturb materials, and immediately notify Engineer.

#### 1.8 WARRANTY

- A. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
  - 1. Warranty Period for Silicone Sealants: 20 years date of Substantial Completion.

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- C. Warranty Conditions: Special warranties exclude deterioration or failure of joint sealants in normal use due to structural movement resulting in stresses on joint sealants exceeding sealant manufacturer's written specifications, joint substrate deterioration, mechanical damage, or normal accumulation of dirt or other contaminants.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURER

- A. Basis-of-Design Product: The Dow Chemical Company, 799 , silicone caulking.

### 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, with joint substrates, and with materials in close proximity under use conditions, as demonstrated by sealant manufacturer by testing and related experience.
- B. Joint Sealant Standard: Comply with ASTM C 920 and other specified requirements for each liquid-applied joint sealant.
- C. Stain Test Characteristics: Where sealants are required to be non-staining, provide sealants tested per ASTM C 1248 as non-staining on porous joint substrates indicated for Project.

### 2.3 WEATHERPROOFING LIQUID SILICONE JOINT SEALANTS

- A. Single-Component, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT; SWRI validation.
  - 1. Basis of Design Product: DOWSIL™ 795 Silicone Building Sealant.
  - 2. Hardness, ASTM D 2240: 35 - 45 durometer Shore A, minimum.
  - 3. Volatile Organic Compound (VOC) Content: 32 g/L maximum or less.
  - 4. Staining, ASTM C 1248: None on concrete, marble, granite, limestone, and brick.
  - 5. Color: As selected by Engineer/Owner from manufacturer's full line.
  - 6. Ozone Resistance, Thermal Resistance, UV Resistance, Water Resistance.
  - 7. 1-Part Cure.
  - 8. Working time: 20-30 minutes.
  - 9. Primeless adhesion.

### 2.5 ACCESSORIES

- A. Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.

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- B. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
  - C. Bond Breaker Tape: Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer.

### PART 3 – EXECUTION

#### 3.1 EXAMINATION

- A. Examination of Existing Joint Sealants: Examine existing joint sealants indicated to be replaced or rehabilitated. Examine joints for compliance with requirements for joint configuration, installation tolerances, condition of joint substrate, and other conditions affecting joint-sealant performance

#### 3.2 PREPARATION

- A. Removal of Failed Joint Sealant Materials: Cut out and remove joint materials and associated backing materials as indicated on drawings and specifications.
- B. Surface Cleaning of Joint Substrates: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

#### 3.3 APPLICATION

- A. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- B. Cut window gaskets to make an “L” shape to receive sealant.
  - 1. Install bond breaker tape over substrates when sealant backings are not used.
- D. Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths between  $\frac{1}{4}$  between concrete panels and window frames and  $\frac{1}{2}$  inch in control joints. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.

- 
1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
  2. Using tooling agents approved by sealant manufacturer for application.

### 3.5 CLEANING

A. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.

1. Remove masking tape immediately after tooling joint without disturbing seal.
2. Remove excess sealant from nonporous surfaces while still uncured.

### 3.6 FIELD QUALITY CONTROL

A. Owner may retain testing agency to perform the following tests:

1. Verification that substrate preparation meets requirements.
2. Testing and certification that joint sealant materials comply with requirements.
3. Testing of application for compliance with adhesion requirements.

B. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C 1193, Method A.

1. Perform 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet of joint length thereafter or 1 test per each floor per building elevation, minimum.
2. For sealant applied between dissimilar materials, test both sides of joint.

C. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.

D. Remedial actions taken of any areas that fail the test.

E. Remove all debris daily from the site.

END OF SECTION

SECTION 07 42 13.13  
METAL ROOF AND WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and all Divisions of the Technical Specifications, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Factory-formed metal roof and wall panels, including fascia, soffit and liner panels and includes:
  - 1. Factory-formed panels in vertical installation.
  - 2. Factory-formed panels in horizontal installation.
  - 3. Metal flashings and trim.
- B. Related Sections include the following:
  - 1. Cold Formed Metal Framing: Division Metal Framing Section.
  - 2. Building Insulation: Division 7 Building Insulation Section.
  - 3. Sealants: Division 7 Joint Sealers Sections.
  - 4. Flashing & Sheet Metal: Division 7 Flashing & Sheet Metal

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM A653/A653M Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
  - 3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 4. ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

5. ASTM E1680 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Metal Systems Under Specified Pressure Differences Across the Specimen.
6. ASTM E1646 Standard Test Method for Water Penetration of Metal Systems by Uniform Static Air Pressure Difference.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meetings:
  1. Schedule meeting to discuss project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements before start of work onsite. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
  2. Required attendees: Contractor, metal deck & metal installer, and any other subcontractors who have equipment penetrating the metal or work that requires access or traffic to metal roof and wall areas.

#### 1.5 SYSTEM DESCRIPTION

- A. Panel Performance Requirements: Provide panels, which have been manufactured, fabricated and installed to withstand structural and thermal movement, wind loading and weather exposure to maintain manufacturer's performance criteria without defects, damage, failure or infiltration of water.

##### Finish Performance Requirements:

1. Two coat coil applied, baked on full strength (70% resin, PVF2) fluorocarbon coating:
  - a. Consisting of a nominal 0.25 mil dry film thickness primer, and a nominal dry film thickness of 0.7 -0.8 mil color coat for a total 0.9 to 1.1 mil total system dry film thickness.
  - b. Color change and fade resistance: No cracking, peeling, blistering or loss of adhesion when tested in accordance with ASTM G23; color change, after removal of surface deposits such as dirt or chalk, maximum 5 NBS units.
  - c. Humidity resistance: No blistering, peeling or loss of adhesion after 1000 hours testing, in accordance with ASTM D2247.

#### 1.6 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

- B. Product Data: Submit manufacturer's product data for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.
  - 1. Indicate layout of metal panels and metal panel sizes, including custom-fabricated metal panels if indicated; indicate each item of trim and accessories.
  - 2. Indicate in detailed drawings profile and gauge of interior and exterior sheets, and locations and types of fasteners; indicate locations, gauges, shapes and methods of attachment of metal panels, trim and accessory items.
  - 3. Include sealant location and denote those that are factory and field applied.
  - 4. Indicate products/materials required for construction activities and field worked conditions of this section not supplied by manufacturer of products of this section.
- D. Samples: Submit selection and verification samples for finishes, colors and textures.
  - 1. Verification Samples: For each color and finish selected, 2 chips indicating match to selected color and finish.
- E. Quality Assurance Submittals: Submit the following:
  - 1. Contractor Certificates: Contractor's certification that:
    - a. Manufacturer of products of this section meets specified qualifications.
    - b. Installer of products of this section meets specified qualifications.
  - 2. Manufacturer's Instructions: Manufacturer's installation instructions.
  - 3. Manufacturer's Field Reports: Manufacturer's field reports if required.
- F. Closeout Submittals: Submit the following:
  - 1. Warranty: Warranty documents specified herein.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. Provider of "hands on" installer training programs at manufacturer facility.
  - 2. Minimum of ten years' experience in manufacturing metal roof and wall systems.
  - 3. Provider of product produced in a permanent factory environment with fixed roll-forming equipment.

- B. Installer Qualifications:
  - 1. Experience on at least five projects of similar size, type and complexity as this project that have been in service for a minimum of two years with satisfactory performance of the metal panel system.
  - 2. Employer of workers for this project who are competent in techniques required by manufacturer for installation indicated and who shall be supervised at all times when material is being installed.
- C. Mock-Up Size: 12"x12
- D. Maintenance: Maintain Mock-up during construction for workmanship comparison: remove and legally dispose of mock-up when no longer required.

#### 1.8 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirements Sections.
  - 1. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Identify fabricated components with UL 90 label where appropriate.
- C. Delivery and Acceptance Requirements: Ensure all panels are received in good condition. In cases where damage is visible, note all paperwork; inform Engineer and project superintendent.
- D. Packing, Shipping, Handling and Unloading:
  - 1. Bundle panels in waterproof wrapping paper when nested, or wooden crates when panels cannot be nested.
  - 2. Package trim and accessories in waterproof wrapping paper.
- E. Storage and Protection: Store materials protected from exposure to harmful conditions. Store material in dry, above-ground location.
  - 1. Stack prefinished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture runoff.
  - 2. Store products of this section in manufacturer's unopened packaging until installation of products

3. Maintain dry, heated storage area for products of this section until installation of products.
4. Remove strippable plastic film before storage under high-heat conditions.

#### 1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

#### 1.10 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
  1. Panel Material: Furnish manufacturers 25-year warranty covering the panel against rupture, structural failure, or perforation.
  2. Panel Coating:
    - a. Polyvinylidene Fluoride: Furnish manufacturer's 40-year warranty covering cracking, checking, and peeling, and 30-year warranty covering fade and chalk on the two-coat coil applied, baked on full strength (70% resin, PVF2) fluorocarbon coating.
- B. Special Warranty: Installer's standard form in which installer agrees to repair or replace panels that fail due to poor workmanship or faulty installation within the specified warranty period.
  1. Contractor's Warranty Period: 2 years from date of Substantial Completion.
  2. For a period of 40 years from the date of shipment, the coating system will not crack, check or peel (lose adhesion).
  3. For a period of 30 years from the date of shipment, the coating system will not chalk in excess of numerical rating nine (9) for sidewall applications and numerical rating eight (8) for roof applications when measured in accordance with ASTM D-4214 method A procedures.

4. For a period of 30 years from the date of shipment, the coating system will not change color (fade) more than four (4)  $\Delta E$  Hunter units for sidewall applications and five (5)  $\Delta E$  Hunter units for roof applications when tested in accordance with ASTM D-2244 method A procedures. Color change shall be measured on an exposed painted surface that has been cleaned of surface soils and chalk, and the corresponding values measured on the original or unexposed surface. It is understood that fading or color changes may not be uniform, if the surfaces are not equally exposed to the sun and elements.

## PART 2 - PRODUCTS

### 2.1 METAL PANELS

#### A. MANUFACTURER - **BASES OF DESIGN**

1. Dimensional Metals, Inc.
2. McElroy Metal FW Panel System
3. Construction Metal Product Panel System
4. Metal Roofing Systems Panel System
5. Mini-Rib Panel, 3/8" thick, 9/16" Strip Width, Ribs on 3" O.C., 24 gage 50ksi Steel.

- B. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:

- A.
  1. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.  
Concealed Joint Sealant: Non-curing butyl, AAMA 809.2

#### C. SUBSTITUTIONS

1. Requests for approval must be submitted in writing at least ten (10) days prior to bid date and are accompanied by all related test reports and design calculations listed in section 1.4 and Design and Performance criteria Section 2.2.
2. Substitute manufactures will be approved by written addendum to all bidders. Voluntary alternatives will not be considered. Substitutions will not be permitted after the bid date of this project.

- D. Forming: Use continuous end rolling method. No end laps are permitted on panels without Engineer approval. No portable roll forming machines will be permitted on this project, no installer—owner or installer-rented machines will be permitted. It is the intent of the Engineer to provide factory-manufactured panel systems only for this project.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide metal wall panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
- C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
  - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated by ASCE 7-16.
  - 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of L/120 of the span with no evidence of failure.
  - 3. Seismic Performance: Comply with ASCE 7, Section 9, "Earthquake Loads."
- D. Water Penetration: ASTM E 331: No uncontrolled water penetration at a static pressure of 13.24 lbf/sq. ft.

## 2.3 METAL PANEL MATERIALS

- A. Material: Galvalume steel sheet conforming to ASTM A792, AZ55 coating for bare; AZ50 coating for painted; 24 gauge sheet thickness.

## 2.4 METAL WALL PANELS

- A. Metal Panels: Structural metal panel consisting of formed metal sheet, installed by fastening edge and locking into next panel.
  - 1. Coverage Width: 36 inches
  - 2. Spacing: attach 16 inches on center.
  - 3. Depth: 3/8 inch.
  - 4. Nominal Coated Thickness: 24 gage.
  - 5. Exterior Finish: Fluoropolymer two-coat system.
  - 6. Screws shall be painted the same color as the metal panel.
  - 7. Color: As selected by Owner from manufacturer's standard colors.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
  - 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
  - 2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
    - a. 1/4 inch in 20 foot in any direction.
- B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal panel system installation.

### 3.2 METAL PANEL INSTALLATION

- A. Fastener Metal Wall Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Panel Sealants: Install manufacturer's recommended tape sealant at panel side laps and end laps.
- C. Panel Fastening: Attach panels to hat channel supports using screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.
  - 1. Fasten metal panels to hat channel supports at each location indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
  - 2. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

### 3.3 ACCESSORY INSTALLATION

- A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
  2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
  3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.
- B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.

#### 3.4 CLEANING AND PROTECTION

- A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION 07 42 13

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SECTION 07 52 16.11  
COLD APPLIED MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes thermoplastic membranes for the following applications:
1. Roof Membranes: SBS modified bituminous membrane roofing.
    - a. Flashing Membrane
- B. Related Sections:
1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking, and for wood-based, structural-use roof deck panels.
  2. Section 07 62 00 "Sheet Metal Flashing and Trim" for premanufactured metal copings, roof edge fascia, gravel stops, reglets, roof edge flashings, and counter flashings.

1.3 REFERENCES

- A. References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout this specification section.

1. ASTM: American Society for Testing and Materials
2. FM: Factory Mutual Engineering and Research
3. NRCA: National Roofing Contractors Association
4. OSHA: Occupational Safety and Health Administration
5. SMACNA: Sheet Metal and Air Conditioning Contractors National Association
6. UL: Underwriters Laboratories

1.4 PREINSTALLATION MEETINGS

- A. Pre-installation Roofing Conference at Jobsite: Hold a meeting with the Owner, Construction Manager, Architect, Roofing Contractor, Roofing Manufacturer's Representative, and other applicable trades to discuss the means and methods related to roofing installation. The Roofing Contractor shall examine the substrate that will receive the specified roofing materials and confirm its suitability for attachment of the specified roofing system.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each thermoplastic product indicated.
- B. Product Certificates: For each type of modified bitumen membrane and accessory.
- C. Modified Bitumen Membrane Schedule: Include the following information:
  - 1. Membrane application.
  - 2. Membrane manufacturer and product name.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Manufacturers Contractor Certification Certificate, manufacturer's literature, and materials list for proposed roof assembly.
- B. MSDS sheets are required for all materials and products to be used during the performance of the work. MSDS sheets are to be submitted with the submittals.
- C. The Contractor shall submit in writing on the form provided, that all materials to be used on the project do not contain asbestos.
- D. System shall be designed to meet a minimum wind uplift rating of 90# per square foot as tested and listed by FM Global or Underwriters Laboratories with corner and perimeter enhancements.
- E. System shall have a class A fire resistance rating per UL.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit the manufacturer's care and maintenance guide.
- B. Executed Guarantee: Provide the Owner with an executed version of the specified guarantee.

#### 1.8 QUALITY ASSURANCE

- A. The roofing system shall be applied only by a Roofing Applicator authorized by one or more of the membrane manufacturers listed in the product section of the specifications.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Storage: Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer.
  - 1. Protect stored liquid material from direct sunlight, heat, open fire, ignition sources, oxidizing agents, strong acids, and strong alkalis.
  - 2. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protection: Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with the insulation manufacturer's written instructions for handling, storing, and protecting materials during installation.
- D. Handling: Handle and place roofing materials and equipment in a manner to avoid permanent deflection of deck.

## 1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed in accordance with manufacturer's written instructions and warranty requirements.
- B. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.
- C. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.
- D. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.
- E. Torch Safety: Crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractors Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas

during roof construction activity, and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.

### 1.11 GUARANTEE

- A. Manufacturer's Guarantee: Provides that the Manufacturer will repair leaks through the covered roofing materials due to material or workmanship defects, subject to certain exclusions, during the specified time period. Refer to guarantee for complete coverage and restrictions.
  - 1. The Guarantee shall provide coverage for the roofing membrane and base flashings. The Guarantee shall be non-prorated and contain no deductibles or limitations on coverage amount.
  - 2. Guarantee Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing contractor's warranty signed by the Installer, including all components of the roofing and insulation system for the following warranty period:
  - 1. Warranty Period: 2 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: A roof system by the following manufacturer is approved for application.
  - 1. Siplast, Inc.
  - 2. Tremco
  - 3. Derbigum

### 2.2 ROOFING MEMBRANE SHEET MATERIALS

- A. Base Ply: An ASTM D6163, Type I, Grade S homogenous membrane with a glass-fiber reinforcing mat impregnated/saturated and coated each side with SBS modified bitumen blend and dusted with a fine silica parting agent on both sides. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen. The base ply shall possess waterproofing capability, such that a phased roof application can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system and possess the following physical/mechanical properties.
  - 1. Thickness (avg): 91 mils (2.3 mm) (ASTM D5147)
  - 2. Thickness (min): 87 mils (2.2 mm) (ASTM D5147)

3. Weight (min per 100 ft<sup>2</sup> of coverage): 62 lb (3.0 kg/m<sup>2</sup>)
  4. Peak filler content in elastomeric blend - 35% by weight
  5. Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D5147)
  6. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D5147)
  7. Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D5147)
  8. Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D5147)
  9. Compound Stability (max): 0.1% (ASTM D5147)
  10. High Temperature Stability (min): 250°F (121°C) (ASTM D5147)
    - a. Siplast, Inc. : Paradiene 20
    - b. Tremco: POWERply Heavy Duty Base Sheet
    - c. Derbigum: Deribase Ultra
- B. Finish Ply: An ASTM D6163, Type I, Grade G homogenous membrane with a glass-fiber reinforcing mat impregnated/saturated and coated each side with SBS modified bitumen blend and dusted with a fine silica parting agent on bottom surface and a coarse mineral-granule top surfacing. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen.
1. Thickness (avg): 130 mils (3.3 mm) (ASTM D5147)
  2. Thickness at selvage (coating thickness) (avg): 98 mils (2.5 mm) (ASTM D5147)
  3. Thickness at selvage (coating thickness) (min): 94 mils (2.4 mm) (ASTM D5147)
  4. Weight (min per 100 ft<sup>2</sup> of coverage): 90 lb (4.4 kg/m<sup>2</sup>)
  5. Peak filler content in elastomeric blend: 35% by weight
  6. Low temperature flexibility @ -15° F (-26° C): PASS (ASTM D5147)
  7. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D5147)
  8. Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D5147)
  9. Ultimate Elongation (avg.) @ 73°F (23°C): 55% (ASTM D5147)
  10. Compound Stability (max): 0.1% (ASTM D5147)
  11. High Temperature Stability (min): 250°F (121° C) (ASTM D5147)
  12. Granule Embedment (max loss): 2.0 grams per sample (ASTM D5147)
  13. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
  14. Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria
  15. Surfacing: ceramic granules
    - a. Siplast, Inc. : Paradiene 30 FR
    - b. Tremco: POWERply Standard FR
    - c. Derbigum: Derbicolor GPFR

## 2.3 BASE FLASHING SHEET MATERIALS

- A. Flashing Reinforcing Ply and Cant Backer: An ASTM D6163, Type I, Grade S homogenous membrane with a glass-fiber reinforcing mat impregnated/saturated and coated each side with SBS modified bitumen blend with a factory applied polymer modified asphalt self-adhesive on the back surface of the sheet to provide full adhesion to the total surface area of the substrate. The back side of the base ply shall be surfaced with a removable film.
  - a. Siplast, Inc. : Paradiene 20
  - b. Tremco: POWERply Heavy Duty Base Sheet
  - c. Derbigum: Deribase Ultra
  
- B. Granule-Surfaced Flashing Sheet: An ASTM D6162, Type II Grade G homogenous membrane with a fiberglass scrim/polyester reinforcing mat composite impregnated/saturated and coated each side with the SBS modified bitumen blend and dusted with a fine silica parting agent on bottom surface and a coarse mineral-granule top surfacing. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen.
  - a. Siplast, Inc. : Paradiene 30 FR / Parafor 30
  - b. Tremco: POWERply Standard FR
  - c. Derbigum: Derbicolor GPFR

## 2.4 PRIMERS

- A. Asphalt Primer: Primer shall meet ASTM D41 criteria.
  - 1. Coordinate primers with selected manufacturer's recommendation
- B. Low VOC Asphalt Primer: Primer shall meet ASTM D41 criteria and South Coast Air Quality District and Ozone Transport Commission requirements.
- C. Primer for Self-Adhesive Membranes: Primer for self-adhesive membranes shall be a single component, water-based resinous primer formulated to condition masonry, wood, plywood, concrete, asphaltic, and gypsum surfaces to facilitate adhesion of self-adhesive membranes.

## 2.5 AUXILIARY ROOFING MATERIALS

- A. Roofing Asphalt: ASTM D312, Type [III or IV].
  - 1. Siplast, PA-1021, PA-828
  - 2. Tremco, ELS
  - 3. Derbigum, Derbimastic S

- B. Cold-Applied Asphalt Adhesive: An asphalt, solvent blend conforming to ASTM D4479, Type II requirements.
- C. Membrane Adhesive: A single-component, moisture curing, low-odor adhesive designed for application of the specified roof membrane system.
- D. Asphalt Roofing Cement: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D4586 Type II requirements.
- E. Flashing Cement: A slump resistant, asphalt cutback flashing adhesive, reinforced with non-asbestos fibers, conforming to ASTM D4586 Type II requirements.
- F. Flashing Cement: A single-component, moisture curing, low-odor adhesive formulated in a grade for application of flashing materials.
- G. Sealant: A moisture-curing, self-leveling elastomeric sealant designed for roofing applications.
- H. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.

## 2.6 INSULATION ACCESSORIES

- A. Membrane Adhesive: All membrane adhesives must be coordinated with membrane manufacturer to meet requirements for specified NDL warranty.
- B. Insulation Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders, meeting ASTM C728 criteria. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.
- C. Tapered Edge Strips: A tapered panel composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The panels shall have a dimension sufficient to provide for a smooth transition and provide proper support for the membrane layer or subsequent layer of insulation when there are transitions of 1/4 inch or greater.

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## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Substrate Qualification: The installing contractor shall examine all substrates where the specified roofing and flashing system will be applied and confirm their suitability to receive the specified roofing materials.

### 3.2 PREPARATION

- A. Chip aggregate from existing built-up roof system a minimum of two feet from existing parapet wall.
- B. Sweep or vacuum affected surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.
- C. Remove all of the following existing conditions:
  - 1. Surface gravel
  - 2. Base flashings
  - 3. Flanged metal flashings
  - 4. Cants
  - 5. Metal trim, counter flashing
- D. Primer for Self-Adhesive Flashing Reinforcing Ply: Apply the specified tacky primer by roller or spray in an even film. Refer to the manufacturer's literature for the approved rate of application over various substrate types. Allow the primer to dry until it leaves a slightly sticky surface without transfer when touched. Cutting or alteration of the primer is not permitted.
- E. Asphaltic Primer: Prime metal and concrete and masonry surfaces with a uniform coating of the specified asphalt primer according to the manufacturer's published application rate. Cutting or alteration of the primer is not permitted.

### 3.3 INSTALLATION OF ROOFING, GENERAL GUIDELINES

- A. Adhesive Application: Apply membrane cold adhesive by roller, squeegee or spray unit in a smooth, even, continuous layer without breaks or voids. Utilize an application rate for each ply as published by the roof membrane manufacturer. Double the adhesive application rate at the end laps of granule surfaced sheets. Where solvent-based adhesive is applied, refer to the manufacturer's inter-ply flashing detail at the locations that are to receive the specified catalyzed acrylic resin primer/flashing system. Cutting or alteration of the adhesive is not permitted.
- B. General Appearance: Ensure that the finished roofing application has an aesthetically pleasing overall appearance and is acceptable to the Owner.

### 3.4 APPLICATION OF BITUMINOUS ROOFING MEMBRANE

- A. Apply all layers of roofing with side laps running perpendicular to the direction of the slope. Exert sufficient pressure on the roll during application to ensure prevention of air pockets, wrinkles, creases or fish mouths. Refer to the manufacturer's guidelines for maximum sheet lengths and special fastening of the head laps where the roof deck slope exceeds 1/2 inch per foot.
- B. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.
- C. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.

### 3.5 APPLICATION OF FLASHING AND STRIPPING

- A. Modified Bitumen Flashing System: Apply the specified base flashing materials in accordance with the manufacturer's standard details. For torch applied base flashings, apply a 12-inch self-adhesive cant backing sheet extending 6 inches onto the field of the roof area and a minimum of 6 inches up the vertical surface utilizing minimum 3-inch laps. Set the non-combustible cant into place dry prior to installation of the roof membrane base ply and subsequent flashing system. Flash walls and curbs using the reinforcing sheet and flashing membrane. Exert pressure on the flashing sheet during application to ensure complete contact with the vertical/horizontal surfaces, preventing air pockets. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9-inch centers. (See the manufacturer's schematic for visual interpretation). Install counterflashing in accordance with detail drawings for vertical surfaces.
- B. Liquid Flashing System: Install the specified liquid-applied flashing system in accordance with the membrane system manufacturer's printed installer's guidelines and other applicable written recommendations as provided by the manufacturer.

### 3.6 APPLICATION OF SEALANT

- A. Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

3.7 FIELD QUALITY CONTROL

- A. Notify the manufacturer of job completion to schedule a final inspection date. Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the manufacturer's representative. Complete, sign, and send the punch list form to the manufacturer's headquarters.
- B. Leave all areas around job site free of debris, roofing materials, equipment, and related items after completion of job.
- C. Complete all post installation procedures and meet the manufacturer's requirements for issuance of the specified guarantee.

END OF SECTION 07 52 16

## **SECTION 07 62 00 SHEET METAL FLASHING & TRIM**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions, apply to this Section.

#### **1.2 SUMMARY**

- B. Section Includes:
  - 1. Fabrication and installation of flashings, counter flashings.
  - 2. Fabrication of coping.

#### **1.3 REFERENCES**

- A. Refer to the following references for specification compliance:
  - 1. 2018 North Carolina Building Code
  - 2. American Society for Testing and Materials (ASTM)
  - 3. National Roofing Contractors Association (NRCA)
  - 4. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

#### **1.4 DEFINITIONS**

- A. Flashing: In shop fabrication of metal flashing, followed by installation.

#### **1.5 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include material descriptions, product data sheets, material safety data sheets and literature verifying physical properties and available colors of materials.
- B. Pre-finished sheet metal and sealant color chart
- C. Shop drawings for any transitions and/or terminations not depicted in Contract Drawings.
- D. Warranties: Sample of any special warranties.

#### **1.6 QUALITY ASSURANCE**

- A. Obtain metal from a single source manufacturer to the greatest extent possible.
- B. Installation shall comply with the contract drawings and SMACNA Architectural Sheet Metal Manual.
- C. Contractor to check the availability of the selected color in both 24 and 22 gage.
- D. Ensure work is free of leaks in all weather conditions.

- E. Workmanship shall be first-class in every respect. The sheet metal work shall be assembled and secured in accordance with these specifications, the manufacturer's requirements and referenced standards.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver to site the fabricated items in timely manner.
- B. Storage: Store materials within areas designated or approved by the Owner. Ensure materials remain dry, covered and not in contact with the ground.
- C. Handling: Handle materials in such manner as to preclude damage and contamination.

#### 1.8 PROJECT CONDITIONS

- A. Install all items in strict accordance with all published safety, weather, or applicable regulations of the manufacturer and local, state, and federal agencies which have jurisdiction.
- B. Always protect the building and its components from the elements.
- C. Coordinate all phases of work.

#### 1.9 WARRANTY

- A. 2 Year Contractors Warranty for sealant application in which contractor agrees to repair work sections that fail due to workmanship within specified warranty period.
- B. Pre-finished sheet metal manufacturer's thirty (30) year finish warranty from the date of substantial completion.

### **PART 2 – PRODUCTS**

#### 2.1 PRE-FINISHED STEEL

- A. ASTM A 653, AISI G90 zinc coated sheets, commercial steel, extra smooth, primed and finished on one side with Kynar/Hylar based fluoropolymer coating of 1.0 mil total dry film thickness, and on the reverse side, with a wash coat of 0.3 to 0.4 mil dry film thickness. A strippable plastic film should protect the finish during fabrication and installation. Manufacturer's standard color to be selected by owner.
  - 1. 24 gauge
    - a. Flashing
    - b. Counter flashing
    - c. PVC coated scupper

#### 2.2 GALVANIZED STEEL

- A. ASTM, A 653, AISI G90 galvanized steel, mill finish.

#### 2.3 STAINLESS STEEL

- A. 18-gauge, Type 304 as tested in accordance with ATSM A 167.
  - 1. ZEE

- B. 26-gauge, Type 304 as tested in accordance with ATSM A 167.
  - 1. Curb flashing and counter flashing
  - 2. Sleeper Cap
  - 3. Pitch Pocket weather cap

## 2.4 ALUMINUM

- A. .040 thickness: coping, flashing. Match existing finish
- B. .050 thickness: cleat, scupper plate. Match existing finish

## 2.5 FASTENERS

- A. Roofing Nails: 11- or 12-gauge stainless steel ring shank roofing nails with diamond point, minimum 3/8" diameter head and 1- 1/4" length.
- B. Screws: #12 stainless steel hex or pan head screws with length to penetrate substrate a minimum of 1- 1/2".
- C. Concrete and Masonry Anchors: 1/4" diameter metal-based expansion anchor with stainless steel pin of length to penetrate substrate a minimum of 1- 1/2".
- D. Washers: Shall be stainless steel with neoprene gasket backing. Shall be 9/16" diameter for use with #12 screws and 5/8" diameter for use with 1/4" diameter concrete and masonry anchors.
- E. Rivets: #44 stainless steel rivets with stainless steel mandrel. Length of rivet to properly fasten sheet metal components. Rivets shall be factory painted to match adjacent sheet metal.

## 2.6 RELATED MATERIALS

- A. Self-adhering Membrane: 40-mil minimum thickness sheet; slip-resistant surfacing, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; suitable for high temperature applications up to 250 degrees. Acceptable products include:
  - 1. Mid-States Asphalt Quik-Stick HT Pro
  - 2. Grace Ice and Water Shield HT
  - 3. TAMKO: Moisture guard plus
- B. Polyurethane Sealant: One-component elastomeric gun grade polyurethane sealant conforming to ASTM C 920, Type S, Grade NS, Class 25, and use NT, M, A, G or O As required by substrate conditions. Color to match adjacent materials.
- C. Silicon Sealant: Shall be a one-component, non-sag, neutral cure, low-modulus, UV resistant, high performance silicone sealant. Shall meet ASTM C 920, Type S, Grade NS, Class 100, Use M, G, A or O. Color to match adjacent materials.
- D. Sealant Tape: Minimum 1/2" wide non-skinning butyl sealant tape.
- E. Solder: 20-80 tin-lead alloy conforming to ASTM B32.

- F. Flux: Muriatic acid killed with zinc or an accepted brand of commercial soldering flux designed for use with 20-80 solder.

## PART 3 – EXECUTION

### 3.1 GENERAL:

All metal flashings and accessories are to be installed as noted in the drawings or specifications.

Metal flashings and accessories shall not be face fastened unless specified and/or approved in writing prior to installation of fasteners through metal faces. If face fastening is stipulated, only screw or expansion type fasteners will be acceptable.

Any deviation from these specifications and drawings must be approved prior to installation. Shop drawings of alternate details shall be submitted to the Owner and approved, or the materials installed shall be removed and replaced in accordance with the drawings/specifications at the discretion of the Owner.

Metal counterflashing, gravel stop and closures extending over or across expansion joints in the roof or walls shall be interrupted and metal closures installed to accommodate anticipated movement of structural sections.

Use fasteners of the same base metal as the accessory metal to be secured or when this is not possible, cover the exposed portion of the fastener with caulking material to eliminate galvanic response between the metals. Fasteners fabricated from compatible metals will be acceptable (stainless steel screws/bolts with aluminum, brass fasteners with copper).

All exposed edges of metal flashings and accessories shall be hemmed a minimum of 3/8". Exposed ends of metal flashings and accessories shall be closed by fabricating a watertight metal closure to cover the exposed end of metal components and mechanically attached to adjacent metal components.

Prior to installation of the metal flashing seal the area around the penetration with plastic roofing cement, one-part urethane foam or cement mortar. If the hole around the penetration is excessively large, cut and fit No. 15 asphalt saturated organic felt around the penetration prior to the application of sealant material.

#### A. COUNTERFLASHING:

The tops of all membrane base flashings not protected by waterproofing membranes or other closures shall be closed with metal counterflashing in accordance with the specifications and drawings. Metal counterflashing shall lap over tops of membrane base flashing a minimum of three (3") inches at all locations.

New metal counterflashing to be installed into existing or new reglets and shall be fabricated with a 1/2" wide hemmed metal flange to fit into the receiver, a 1 1/2" wide vertical securement flange and a spring-lock metal section to overlap tops of membrane flashings a minimum of three (3") inches. Counterflashing shall be secured by screw or expansion type fasteners installed through the securement flange spaced nine (9") inches on center. The reglet opening shall be caulked using caulking material specified herein.

Inside and outside corners of counterflashing's shall be field fabricated with metal lapped a minimum of one (1") inch at the corner juncture secured by sealant and pop rivets installed one (1") inch on center with horizontal legs extending away from the corner a maximum of eighteen (18") inches.

Metal sections shall be lapped and interlocked three (3") inches with a bead of caulk applied at the center of the lap between metal sections at joints.

Configuration of metal counterflashing shall be "spring-lock" unless existing conditions prevent installation of metal of such configuration.

Surface mounted counterflashing shall be installed ONLY at locations indicated on drawings or as approved in writing prior to installation. Surface mounted counterflashing shall be installed only to flush, smooth surfaces at areas where the roof surface varies in elevation along perimeter walls.

Surface mounted counterflashing shall be fabricated in a spring lock configuration with a caulk receiver along the top edge a minimum of ½" wide, hemmed to eliminate raw metal edges and formed to allow a minimum ¼" bead of caulk between the outer edge of the metal receiver and the wall surface. The vertical securement flange shall be 1-1/2" wide with holes pre-punched nine (9") inches on center. Width shall be sufficient to allow installation/securement of the securement flange over the top of membrane flashings and to overlap tops of membrane flashings a minimum of three (3") inches.

Surface mounted counterflashing shall be installed with the vertical securement flange set over a solid ¼" diameter bead of polysulfide base caulk, secured with screw or expansion type fasteners installed through pre-punched holes. The top caulk receiver shall be immediately caulked so that the caulk provides a positive slope to the exterior face of the counterflashing.

#### B. METAL FLANGE FLASHING:

All metal flanges to be stripped to the roofing membrane shall be primed with asphalt primer and allowed to dry prior to application of stripping plies. Metal flanges shall be set on top of the roofing membrane in a continuous 1/8" thick application of asphalt flashing cement (ASTM D-2822 type II). Strip the flanges to the roof membrane using modified bituminous flashing materials. Stripping plies shall be set in one piece as much as possible. When stripping plies must be installed in two pieces, lap the modified bituminous membrane at a center overlap a minimum of three (3") inches. Stripping material shall extend onto the roof surface a minimum of four (4") inches.

Modified bituminous stripping shall be set in the manufacturer's approved adhesive. Fuse bonding of modified bituminous stripping will be permissible only when approved in writing by the Owner.

#### C. METAL EDGE ASSEMBLIES:

Install metal edge assemblies in ten (10') feet lengths with a minimum number of pieces in each run. Inside and outside corners shall be field, or shop fabricated with horizontal legs extending from corner junctures a maximum eighteen (18") inches. The horizontal flange on inside corners shall be filled with a fill section of metal to form a continuous three (3") inch

wide stripping flange at the corner juncture area. Metal sections shall be “broken” at expansion joints and building control joints to allow for structural expansion/contraction without displacement of accessory metal. Perimeter metal edging shall be secured on the face side with a continuous metal cleat (hook strip) fabricated from metal at least one gage heavier than the accessory metal and in general compliance with recommendations for hook strips listed in Factory Mutual Loss Prevention Data Bulletin 1-49. Intermittent cleats will be acceptable if existing conditions do not permit the use of continuous cleats. The decision will be made by the Owner’s representative on the site.

Gravel Stops/Eave Strips shall be fabricated in the configuration depicted on the drawings. Horizontal metal flanges shall be a minimum of three (3”) inches wide or ½” narrower than the width of the wood nailer to which it is to be attached.

Metal section ends shall be butted with a ¼” wide gap between sections and the joints closed using six (6”) inch wide joint covers set into a solid bed of plastic roofing cement (excepting at gutters and rake edges where sections shall be lapped three (3”) inches and sealed between lapped metal sections with plastic roofing cement). At gutters, metal sections shall be lapped three (3”) inches with a liberal application of plastic roofing cement between metal contact surfaces at the overlap.

#### D. PITCH PANS:

Install pitch pans in the areas indicated on the drawings. Vertical flanges shall be a minimum of four (4”) inches high with top edges hemmed a minimum of ½”. Corners of flanges shall be filled with metal sections soldered to adjacent metal to form a continuous flange around the pitch pan base. The vertical open joint shall be secured with a minimum of two (2) No. 8 X ½” pan head sheet metal screws and where possible the joint shall be soldered after installation. All pitch pans installed around singular penetrations shall be covered with weather caps attached and sealed to the penetration a maximum of three (3”) inches above the pitch pan top edge or closed with metal form closures.

Fill the pitch pan approximately ½ full of non-shrink cementitious grout. Fill the balance of the pitch pan with pourable sealer. Install weather caps or top closures over pitch pans.

#### E. WEATHERCAPS:

Weather caps shall be installed over all penetration flashings except at plumbing vents or other like conditions where flashing metal is turned into the tops of pipes, or the penetration is otherwise integrally secure against water entry. Weather caps/storm collars shall be mechanically secured to penetrations as shown in the drawings. Securement of the weather cap to the penetration by sealant or caulk alone will not be acceptable. Weather caps shall be fabricated from the same base metal as the penetration to which it is to be attached.

Where installation of weather caps is impractical or impossible, the Contractor shall fabricate and install a two-part metal closure over the pitch pan or penetration flashing. The juncture of the closure sections shall be caulked and secured with screws or pop rivets. The closure shall be fabricated from the same type of metal as the pitch pan/penetration flashing and shall be mechanically secured to the vertical sides of the flashing.

#### F. METAL BASE FLASHING AT STACKS:

Metal base flashing for stacks/chimneys shall be fabricated from stainless steel with a conical shape closure for the penetration. The top of the metal base flashing shall extend a minimum of eight (8") inches above the roof surface. The horizontal metal flange shall be round, minimum three (3") inches wide and be soldered and sealed to the conical vertical section to form a watertight closure.

#### G. SOIL STACK/VENT PIPE FLASHING:

Soil stacks/vent pipes shall be sealed and flashed using pre-formed 16 oz. copper flashings of the appropriate size for the pipe extension. The roofing membrane shall be run tightly around the pipe penetration and the penetration juncture sealed with plastic roofing cement prior to installation of the flashing.

Set the copper flashing over the pipe extending through the roofing membrane with the horizontal flashing flange set into a solid 1/8" thick layer of plastic roofing cement. Apply a thin continuous layer of plastic roofing cement over the top surface of the copper flange. Strip the flange to the roofing membrane using modified bituminous flashing materials fuse bonded to the metal and to the top surface of the adjacent roofing membrane. The stripping ply shall extend a minimum of six (6") inches beyond the metal onto the roof surface. Trim the top of the copper flashing so that it extends approximately one (1") inch above the top of the pipe and bend the copper into the pipe opening to form a complete watershed into the pipe.

If soil stacks/vent pipes are too long to close with standard flashing, cut the pipe to allow proper installation of the pre-formed copper flashing or shop fabricate top closures for the copper flashing to extend into the pipe opening one (1") inch and extend down over the outer surface of the flashing a minimum of three (3") inches. If local ordinances or job conditions prohibit shortening of the soil stack/vent pipes, the pipes shall be flashed using shop fabricated 16 oz copper metal flashings formed in two pieces—a soldered and sealed base sized to fit each individual pipe size twelve (12") inches high with a minimum twelve (12") inch diameter round stripping flange and a watertight sleeve top closure extending into the pipe opening two (2") inches and down over the metal base flashing a minimum of three (3") inches. Horizontal metal flanges shall be stripped to the roofing membrane in accordance with the requirements of this section of the specifications.

#### H. METAL COPING:

Metal coping shall be installed in the areas indicated on the roof plan. A continuous waterproofing membrane shall be installed under all metal coping to waterproof tops of walls prior to installation of coping sections. Metal coping shall be fabricated from the specified metal of a configuration in general compliance with the drawings. Provision shall be made to insure positive slope of the metal coping section top surfaces toward the roof side.

Vertical faces (front and rear) of the coping metal shall extend below the top of the wall a minimum of two inches. Metal coping sections shall be maximum ten feet in length unless otherwise agreed upon in writing.

Joint ends shall be formed with a backer plate, butt joint with manufacturer's recommended gap for expansion and a cover plate assembly. The overlap shall be sealed with caulk or butyl tape. Corner sections shall not extend more than 24" from the corner in either direction.

Metal coping sections shall be secured on the face side by a continuous metal cleat secured to the wood nailer. Cleat (Hook Strip) requirements shall be as established in Factory Mutual Loss Prevention Data Bulletin 1-49, allowing for face dimension of the cleat, or as indicated on the drawings.

Inside vertical surfaces of coping sections shall be secured to the wood nailers installed on the wall top using #8 stainless steel screws of appropriate length with inherent steel and neoprene washers installed through elongated, pre-punched holes spaced twelve inches on center.

#### I. CAULKING/SEALANTS:

Counterflashing receivers, metal junctures, closures and masonry shall be caulked with the material specified in the material section herein. Caulk for wall expansion joints, between masonry or tilt-up wall panels shall be two-part urethane. Caulking and/or sealants shall be of a color to most closely match the surface to which they are to be applied.

All joints and surfaces to receive caulking/sealant shall be completely clean and free of foreign material and debris prior to application of caulk/sealant. Rake existing caulking from joints so that no weathered caulk remains on any surface to which new caulk is to come in contact. Surfaces with protective coatings with which new caulking/sealant will come in contact shall be cleaned with Xylol or an appropriate solvent cleaner to remove protective films and/or oils. Where joints are deeper than ½", polyethylene joint backing shall be installed in the joint to within ½" of the joint surface. Joint backing shall be of a size to allow for minimum 30% compression of the backing when installed in the joint. Joints ½" to ¾" wide shall receive backing so that the depth of the joint to receive caulking does not exceed ½". Sealant shall be applied with an appropriate caulking gun through a nozzle opening of such diameter to allow complete filling of the joint with a uniform bead of sealant. All beads shall be tooled immediately after application to insure firm contact with the inner surfaces of the joint. Excess material is to be "struck-off" with a tooling stick or knife. Finished sealant bead is to be flush with adjacent surfaces.

Joint openings more than one (1") inch in width shall be sealed by closure. Do not attempt to caulk joints where backer rod is not wide enough to be properly compressed in the joint opening.

### 3.07 FIELD QUALITY CONTROL AND INSPECTIONS

- A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment, and related items after completion of job.
- B. Notification of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion to schedule a final inspection date.
- C. Final Inspection/Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list

of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

- D. Issuance of the Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

### 3.3 CLEANING AND PROTECTION

#### A. General:

- 1. Contractor to remove protective film from metal surfaces after installation.

**END OF SECTION 07 62 00**

## SECTION 09 24 23 – CEMENT STUCCO

## PART 1 - GENERAL 1.1 SECTION INCLUDES

- A. Supply and installation of a rapid hardening, hydraulic cement, exterior one-coat stucco assembly.

## 1.3 REFERENCES

- A. ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- B. ASTM C144 Standard Specification for Aggregate for Masonry Mortar
- C. ASTM C578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
- D. ASTM C847 Standard Specification for Metal Lath
- E. ASTM C897 Standard Specification for Aggregate for Job-Mixed Portland Cement Based Plaster
- F. ASTM C920 Standard Specification for Elastomeric Joint Sealants
- G. ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster
- H. ASTM C933 Standard Specification for Welded Wire Lath
- I. ASTM C1032 Standard Specification for Woven Wire Plaster Base
- J. ASTM C1063 Standard Specification for Installation of Lathing and Furring for Portland Cement Based Plaster
- K. ASTM C1177 Specification for Glass Mat Gypsum for Use as Sheathing
- L. ASTM C1278 Specification for Fiber-Reinforced Gypsum Panel
- M. ASTM C1396 Standard Specification for Gypsum Board
- N. ASTM C1600 Standard Specification for Rapid Hardening Hydraulic Cement
- O. ASTM D226 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
- P. IBC International Building Code 2012, 2009 and 2006
- Q. IRC International Residential Code 2012, 2009 and 2006
- R. ADIBC Abu Dhabi International Building Code 2013
- S. ICC-ES Acceptance Criteria for Water-Resistive Barriers AC38
- T. ICC-ES Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive AC212 Barriers over Exterior Sheathing
- U. ICC-ES Rapid Set One Coat Stucco System ESR-2671

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V. TSIB Technical Services Information Bureau, Drywall and Plaster Systems Manual

1.4 ASSEMBLY DESCRIPTION

- A. One-Coat Stucco assembly consisting of a code compliant water-resistive barrier, wire or metal lath, [pre-blended rapid hardening, high early strength stucco basecoat] [rapid hardening, high early strength cement pre-mixed with high quality graded plaster sand], and finish. The stucco assembly is installed on exterior walls over wood, steel, masonry or concrete construction.

1.5 SUBMITTALS

- A. General: Submit samples, Evaluation Reports and manufacturer's product data sheets in accordance with Division 01 General Requirements Submittal Section. B. Samples:

1. Submit samples for approval. Samples must be of materials specified and of suitable size as required to accurately represent each color and texture used on project. Prepare each sample using the same tools and techniques for actual project application.
2. Maintain and make approved samples available at the job site throughout the construction process and until final acceptance.

1.6 QUALITY ASSURANCE

- A. Qualifications:

1. Manufacturer:
    - a. Must have marketed stucco assemblies in the United States for at least five (5) years and have completed projects of the same general scope and complexity.
    - b. System components must be manufactured by or approved for use by CTS Cement Manufacturing Corp. (800-929-3030, [www.CTScement.com](http://www.CTScement.com)) and distributed by the same or an authorized CTS dealer.
  2. Applicator:
    - a. Must be experienced and competent in installation of rapid hardening stucco and plaster-like materials and provide evidence of a minimum of five (5) years experience in work similar in size and scope to that required by this section.
    - b. Must provide proof of current Approved Applicator status from the stucco materials manufacturer. Temporary approvals must be approved in writing by an authorized CTS Cement Manufacturing Technical Representative at least 15 days prior to installation and are required to have an authorized CTS Representative on site for initial application.
- B. Functional Criteria:

1. General:

- a. Stucco application must be to code compliant vertical substrates or to substrates sloped for positive drainage.
  - b. Uses and installation must comply with ICC ESR-2671 and all applicable building codes.
- C. Substrate Conditions:
1. Substrate materials and construction must conform to the building code having jurisdiction.
  2. Substrates must be sound, dry and free of dust, dirt, laitance, efflorescence and other harmful contaminants.
  3. Substrate Dimensional Tolerances: Flat with 1/4 in (6.4 mm) within any 10 ft (3 m) radius.
  4. Maximum deflection of substrate system under positive or negative design loads must not exceed L/360 of span.
- D. Expansion and Control Joints: Continuous expansion and control joints must be installed at locations in accordance with ASTM C1063 and ASTM C926.
1. Substrate movement, and expansion and contraction of the stucco assembly and adjacent materials must be taken into account in design of expansion joints, with proper consideration given to sealant properties, installation conditions, temperature range, coefficients of expansion of materials, joint width to depth ratios, and other material factors. Minimum width of expansion joints must be as specified by the designer or shown on the project drawings.
  2. In accordance with ASTM C1063, expansion or control joints must be installed in walls not more than 144 ft<sup>2</sup> (13.4 m<sup>2</sup>) in area, and not more than 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) in area for all non-vertical applications. The distance between joints must not exceed 18 ft (5.5 m) in either direction or a length-to-width ratio of 2-1/2 to 1.
  3. For direct application to concrete or masonry, stucco joints are required only at control/expansion joints in the underlaying concrete or masonry.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver products in original, unopened, undamaged packaging with manufacturer's identification (i.e., brand logo, product name, weight of packaged unit, lot number).
- B. Storage: Store products in a dry location, covered, out of direct sunlight, off the ground, and protected from moisture. Maintain storage temperature required by the manufacturer. Keep materials dry until used. Store bulk sand in a well-drained area on a clean, solid surface. Cover sand to prevent contamination.
- C. Handling: Handle products in accordance with manufacturer's published recommendations.

1.8 SITE / ENVIRONMENTAL CONDITIONS

- A. Temperature: Maintain ambient and surface temperatures between 32F to 110F. Do not apply stucco materials if ambient temperature falls below 32F within 24 hours of application. Protect stucco from uneven and excessive evaporation during dry weather, windy conditions and strong blasts of dry air.
- B. Inclement Weather: Do not apply stucco base during inclement weather unless appropriate protection is employed.
- C. Sunlight Exposure: Avoid, whenever possible, installation of stucco materials in direct sunlight which could adversely affect aesthetics.
- D. Substrate: Prior to installation, the wall surfaces must be inspected for surface contamination or other conditions that may adversely affect the performance of the stucco materials and be free of residual moisture.
- E. Protect adjacent and surrounding surfaces not specified to receive finishing with drop cloths, waterproof paper, or other means to ensure protection against overspray, water or other harmful debris.

1.9 COORDINATION AND SCHEDULING

- A. Coordinate installation of stucco materials with all other trades to avoid damage of installed stucco materials and to avoid impeding other construction.
- B. Sufficient manpower must be provided to ensure continuous application and timely finishing, and to prevent cold joints, scaffolding lines, variations in texture, etc.

1.10 WARRANTY

- A. Warranty: Upon request, at completion of installation, provide manufacturer’s Standard Limited Warranty for stucco one-coat materials.

PART 2 - PRODUCTS 2.1 MANUFACTURERS

- A. Components: Obtain stucco materials components manufactured from one source.

2.2 MATERIALS

- A. Stucco Basecoat

1. Rapid Set® Stucco Mix: a rapid-setting, high early strength, low shrinkage plastic cement, pre-blended with quality plaster sand and high-performance additives, mixed with clean, cool, potable water in the field with water stop.

- a. Cement Performance Criteria

1,500 psi

6 hours

Compressive Strength,	2,500 psi	24 hours
Minimum (ASTM C109)	3,500 psi	28 days

- B. Water: Clean, potable water free of deleterious amounts of silt and dissolved salts.
- C. Primer: As specified in [Section 09 90 00 – Painting and Coating] [Section 04 21 13 – Brick Veneer Masonry] [Section 04 22 00 – Concrete Unit Veneer Masonry] [Section 04 26 14 – Masonry Veneer] [Section 04 43 13 – Stone Masonry Veneer].
- D. Finish: As specified in [Section 09 90 00 – Painting and Coating] [Section 04 21 13 – Brick Veneer Masonry] [Section 04 22 00 – Concrete Unit Veneer Masonry] [Section 04 26 14 – Masonry Veneer] [Section 04 43 13 – Stone Masonry Veneer].

2.3 RELATED MATERIALS AND ACCESSORIES

A. General: Stucco assembly and its related materials must conform to the requirements of ICCES Evaluation Report No. 2671 and this specification. B. Substrate Materials:

- 1. Gypsum Sheathing: Minimum 1/2 in) thick, core-treated, weather-resistant, exterior gypsum sheathing complying with ASTM C79 or ASTM C1177.
- 2. Fiberboard: Minimum 1/2 in thick exterior grade, structural fiberboard complying with ANSI/AHA A194.1 as a regular density sheathing complying with ASTM C208.
- 3. Plywood: Minimum 5/16 in thick exterior grade or Exposure I plywood, compliant with U.S. Department of Commerce Product Standard PS-1, for studs spaced 16 in o.c. and 3/8 in thick exterior type plywood minimum for studs spaced 24 in o.c.
- 4. Concrete Masonry Construction: Non-painted (uncoated), must conform to current IBC and IRC building codes.

C. Water-Resistive Barrier Sheet:

- 1. For Non-Wood Based Sheathing: Minimum one layer of No. 15 asphalt-saturated felt compliant with ASTM D226, Type I, or a water-resistive barrier recognized as equivalent to ASTM D226, Type I or better, holding a current ICC-ES Evaluation Report compliant with UBC Standard 14-1 or ICC-ES Acceptance Criteria AC38 incorporating in itself a means of drainage.
- 2. For Plywood Sheathing: Minimum two layers of Grade D kraft building paper per IBC Section 2510.6 and IRC Section R703.6.3, or an equivalent recognized in a current ICCES Evaluation Report compliant with ICC-ES Acceptance Criteria AC38 incorporating in itself a means of drainage.
- 3. Other Code Approved Water-Resistive Barrier and a means of drainage. D.

Water-Resistive Barrier Coating:

- 1. For Non-Wood Based Sheathing: A Code compliant water-resistive barrier coating holding a current ICC-ES Evaluation Report compliant with ICC-ES Acceptance

- Criteria AC212 covered by a water vapor permeable intervening material such as building wrap incorporating in itself a means of drainage.
2. For Plywood Sheathing: Minimum two (2) coats of a code compliant water-resistant barrier coating holding a current ICC-ES Evaluation Report compliant with ICC-ES Acceptance Criteria AC212 covered by a water vapor permeable intervening material such as building wrap incorporating in itself a means of drainage.
- E. Lath and Accessories: Conform to ASTM C847, ASTM C933, ASTM C1032, ASTM C1063 and Appendix.
1. Accessories: Manufacturer's standard steel products with minimum G60 galvanizing unless otherwise indicated as rigid polyvinyl chloride (PVC plastic) or zinc alloy.
  2. Metal Plaster Bases: Minimum 2.5 lb/yd<sup>2</sup> expanded metal diamond lath; minimum 1.14 lb/yd<sup>2</sup> self-furred welded wire lath; or minimum 1.40 lb/yd<sup>2</sup>, 17 gauge, 1-1/2" opening woven wire plaster base in accordance with applicable codes and standards.
  3. Weep Screeds: Foundation weep screed with minimum 3-1/2 inch vertical attachment flange.
- F. Seals, Sealants and Bond Breakers: Sealants must conform to ASTM C920, Grade NS, Class 25, Use NT. Backer rod must be closed-cell polyethylene foam.

### PART 3 - EXECUTION 3.1 EXAMINATION

- A. Verify project site conditions under provisions of Section 01 00 00.
- B. Compliance: Comply with manufacturer's instructions for installation of the stucco materials.
- C. Substrate Examination: Examine prior to stucco base installation as follows:
  1. Substrate must be of a type approved by stucco manufacturer. Plywood and OSB substrates must be gapped 1/8 in (3.2 mm) at all edges.
  2. Substrate must be examined for soundness, and other harmful conditions.
  3. Substrate must be free of dust, dirt, laitance, efflorescence, and other harmful contaminants.
  4. Substrate must be installed to ensure all stucco surfaces will be true, level, and plumb without requiring additional or uneven thickness of stucco materials or finishes.
  5. Substrate construction in accordance with substrate material manufacturer's specifications and applicable building codes.

- D. Advise Contractor of discrepancies preventing proper installation of stucco materials. Do not proceed with stucco work until unsatisfactory conditions are corrected.

### 3.2 PREPARATION

- A. Wire Fabric Lath and Metal Lath: Install according to ICC Evaluation Report ESR 2671, ASTM C1063 and Appendix and current Building Code.
- B. Concrete (Cast-in-Place): Provide a surface that is slightly scarified, water absorbent, straight and true to line and plane. Remove form ties and trim projecting concrete so it is even with the plane of the wall. Remove form release agents. Pre-moisten the surface with water just prior to placement of stucco, or apply one uniform coat of acrylic emulsion additive according to application instructions.
- C. Concrete Masonry Units: Remove projecting joint mortar so it is flush with the plane of the wall. Remove surface contaminants such as efflorescence, existing paint or any other bond inhibiting material by wire brushing, chipping or other appropriate means. Pre-moisten the surface with water just prior to placement of stucco, or apply one uniform coat of acrylic emulsion additive according to application instructions.

### 3.3 MIXING

- A. Mix proprietary products in accordance with manufacturer's instructions and applicable Product Data Sheets.
- B. Admixtures must be approved for use in writing by an authorized CTS Cement Manufacturing Technical Representative prior to use.
- C. General: Stucco assembly and its related materials must conform to the requirements of ICCES Evaluation Report No. 2671 and this specification.
- B. Comply with stucco manufacturer's instructions for cold and warm weather installation.
- C. Water-Resistive Barrier: Install in accordance with all applicable building codes, Evaluation Reports and manufacturer's instructions. Application must comply with IBC Section 1402.1.
  - 1. Flash all rough openings and treat all sheathing joints to ensure protection from moisture intrusion.
- D. Metal Lath and Accessories: Install in accordance with all applicable building codes, Evaluation Reports and manufacturer's instructions. E. Stucco Basecoat:
  - 1. Over Sheathing: Apply stucco basecoat by hand trowel or pneumatic gun in one coat to a minimum 3/4" thickness. Use sufficient pressure and mechanical force to fully embed lath, filling all spaces and ensuring consistent thickness of the basecoat.

- a. Stucco basecoat can be applied in two coats, minimum 3/8" thickness each, with the second coat applied as soon as the first coat has attained sufficient rigidity to accept the mechanical force of application without damage.
  2. Over Concrete and Masonry: Apply stucco basecoat by hand trowel or pneumatic gun in one coat to a minimum 3/4" thickness. Basecoat must be brought to grounds, straightened to a true surface, and finished with sufficient texture to ensure adequate bond with the finish coat.
  3. Rod the surface to true plane and float to densify.
  4. Trowel to smooth and uniform surface to receive specified finish.
- F. Curing:
1. Stucco Basecoat:
    - [a. Rapid Set® Stucco Mix: Immediately begin moist curing for at least 90 minutes by lightly fogging stucco surfaces with clean, potable water as needed to maintain a wet sheen after material has hardened.
  2. Complete all work in the same plane and panel each day. Do NOT stop work short at control joints, expansion joints, etc. Avoid cold joints.
  3. Apply primer and finish to a minimum 1/8" thickness.
  4. Comply with stucco manufacturer's instructions for cold and warm weather installation.

### 3.4 CLEAN-UP

- A. Remove and legally dispose of stucco material and debris from the jobsite.
- B. Remove all tools, equipment and unused materials.
- C. Clean up all overspray/splatters from surrounding surfaces.
- D. Clean all residual materials from joints.

### 3.5 PROTECTION

- A. Protect installed materials from water infiltration into or behind them.
- B. Protect installed stucco materials from dust, dirt, precipitation and freezing during installation. C. Protect installed finish from dust, dirt, precipitation, freezing and continuous high humidity until fully cured and dry.
- D. Clean exposed surfaces using materials and methods recommended by the manufacturer of the material or product being cleaned. Remove and replace work that cannot be cleaned to the satisfaction of the Project Designer/Owner.

END OF SECTION 09 24 23