

ANAMOSA COMMUNITY SCHOOL DISTRICT

ELECTRICAL DISTRIBUTION - METERING

SPECIFICATIONS

April 29, 2026

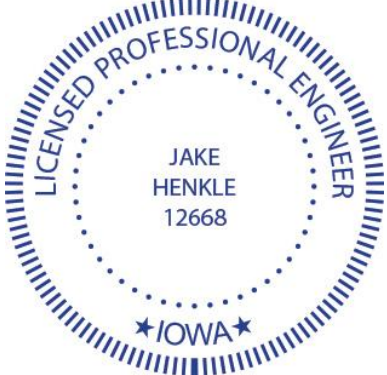

Prepared by:



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**SECTION 00 0105
CERTIFICATIONS PAGE**

STATE OF IOWA

 <p>The seal is circular with a double-line border. The outer line contains the text "LICENSED PROFESSIONAL ENGINEER" at the top and "★ IOWA ★" at the bottom. The inner line contains the text "JAKE HENKLE" and "12668" in the center.</p>	<p>I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p> <p> _____ 04/29/2026</p> <p>Signature Date</p> <p>Printed or typed name: Jake J. Henkle, P.E. License Number: 12668 My license renewal date is: December 31,2026 Pages, Sheets, or Divisions covered by this Seal: All</p>
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**SECTION 00 1113
ADVERTISEMENT FOR BIDS**

PROJECT: ANAMOSA COMMUNITY SCHOOL DISTRICT ELECTRICAL DISTRIBUTION - METERING

BIDS DUE: May 21, 2026, 2:00 PM

Project Location:

Anamosa Community School District – High School
209 Sadie Street
Anamosa, Iowa 52205

THE Owner (HEREINAFTER REFERRED TO AS Owner):

Anamosa Community School District
200 South Garnavillo Street
Anamosa, Iowa 52205

Architect (hereinafter referred to as Architect/Engineer):

Shive-Hattery, Inc.
2839 Northgate Drive
Iowa City, IA 52245
319-354-3040

TO: POTENTIAL BIDDERS

Sealed bids will be received by the Owner at 200 South Garnavillo Street until 2:00 PM, Central Time, on May 21, 2026 at which time the Bids received will be opened.

The general nature of the work is as follows:

The Project will involve the installation of new metering packages at designated electrical equipment and other related work as follows: General electrical work and miscellaneous work as shown on the drawings.

The project will start in April with actual building construction work being scheduled to start on or after May 21, 2026 and shall be substantially completed by August 14, 2026.

Bids will be received for a single Prime Contract. Bids shall be on a Lump Sum basis, as indicated in the Bid Form.

Bidding documents may be examined at the Architect/Engineer's office, at the Owner's office, online at, and at the following location(s):

Master Builders of Iowa mbionline.com, 221 Park Street, Des Moines, IA 50309
mbiplanroof-dsm@mbionline.com
Rapids Reproductions, DFS Plan Room, Shive-Hattery Custom Portal, rapidsrepro.com
6015 Huntington Ct. NE, Cedar Rapids, IA 52402

**Anamosa CSD Electrical Distribution –
Metering Project # 2250014290**

Each Bidder shall accompany the Bid with a Bid security, in a separate envelope, as security that the successful bidder will enter into a contract for the work bid upon and will furnish after the award of the contract corporate surety bond or bonds, acceptable to the Owner, for the faithful performance of the contract, in an amount equivalent to one hundred percent of the amount of the contract. The bidder's security shall be in an amount equivalent to 5% of the bid amount, and shall be in the form of a cashier's or certified check drawn on a bank in Iowa or a bank chartered under the laws of the United States of America, or a certified bank share draft drawn on a credit union in Iowa or chartered under the laws of the United States of America or a bid bond with corporate surety satisfactory to the Owner. The bid security will be held by the Owner until a contract is fully executed and bonds are approved by the Owner.

No bid may be withdrawn for a period of 30 days after the date of the scheduled closing time for the receipt of bids.

It is the intent of the Owner to award a contract to the lowest responsible, responsive bidder provided the bid has been submitted in accordance with the bidding requirements. The Owner reserves the right to waive informalities or irregularities. The Owner reserves the right to reject any or all bids.

Bid security shall be furnished in accordance with the Instructions to Bidders.

Contractors using "materials, supplies, and equipment" on projects in designated "exempt entities" may purchase these items without liability for the sales tax. The contractor must have a purchasing agent authorization letter and an exemption certificate from the public entity to present to the retailer, which specifies the construction project and will be available for that project only.

Anamosa Community School District will issue an authorization letter and an exemption certificate to the contractor and/or subcontractors for the purchase or use of building materials, supplies, and equipment to be used on this project only. **DO NOT INCLUDE SALES TAX ON YOUR BID FORM**

Bidders shall be prepared to submit a performance and payment bond conditioned on the faithful performance of the contract. Out-of-state bidders shall be prepared to submit an Out-of-State Contractor Bond to the Iowa Division of Labor in accordance with Chapter 91C of the Code of Iowa.

END OF SECTION

**SECTION 00 2113
INSTRUCTIONS TO BIDDERS**

AIA Document AIA A701 Instructions to Bidders, is the Instructions to Bidders and is hereby made a part of these Documents to the same extent as if bound herein. This form can be purchased from the American Institute of Architects State Office as follows:

AIA Iowa

400 Locust Street, Suite 100

Des Moines, IA 50309

Phone: 515-244-7502

Fax: 515-244-5347

www.aiaiowa.org

OR

AIA Chicago

35 East Wacker Drive, Suite 250

Chicago, IL 60601

Phone: 312-670-7770

Fax: 312-670-2422

www.aiachicago.org

Refer to Document 00 2115 Supplementary Instructions to Bidders for additions and amendments to these Instructions to Bidders.

END OF SECTION

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**SECTION 00 4100
BID FORM**

PROJECT: ANAMOSA COMMUNITY SCHOOL DISTRICT ELECTRICAL DISTRIBUTION - METERING

BID TO:	ANAMOSA COMMUNITY SCHOOL DISTRICT
	200 SOUTH GARNAVILLO STREET
	ANAMOSA, IOWA 52205
DELIVER BID TO:	200 SOUTH GARNAVILLO STREET
	ANAMOSA, IOWA 52205

SUBMITTED BY: _____

(BIDDER TO ENTER NAME AND ADDRESS).

BIDDER'S FULL NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

NOTE: Submit one original of this Bid Form. All blanks shall be completed. Only bids on this form will be accepted. Submit Bid Security, if required, in separate envelope. Bidder shall carefully review the Instructions to Bidders and Supplementary Instructions to Bidders prior to completing this form.

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the schedule indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents. Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 30 days after the day of Bid opening.
2. The undersigned Bidder submits, herewith, bid security in accordance with the terms set forth in the Advertisement for Bids and Supplementary Instructions to Bidders.
3. The Bidder has examined and carefully studied the Bidding Documents and the following Addenda, receipt of all which is hereby acknowledged:

<u>DATE</u>	<u>NUMBER</u>

4. BIDDER has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance and furnishing of the Work.
5. BIDDER is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.
6. BIDDER will complete the Work in accordance with the Contract Documents for the following Bid Price(s).

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BASE BID (Lump Sum)	_____	\$	_____
	(use words)		

ALTERNATE NO. 1 - Add Metering Package to panelboards PG & PT and switchboard MSB-A:

_____ \$_____ Amount shall be indicated in both words and figures. In case of discrepancy, the amount indicated in words will govern.

7. BIDDER agrees that the Work will be completed in accordance with the project schedule in the Advertisement for Bids.
8. Bidder certifies that this proposal is made in good faith, without collusion or in connection with any other person, organization, or corporation bidding on the work.
9. The following documents are attached to and made a condition of this Bid:
 - a. Required Bid Security in the amount of _____ and in the form of _____.
SUBMITTED IN A SEPARATE ENVELOPE.
10. This Bid submitted on _____, 20_____.
11. State Contractor License No. _____.
15. The bidder shall not make any revisions to the bid forms or the Schedule of Bid Prices and shall not devise any alternates other than those provided. Any such notes, revisions, or comments shall be grounds for rejection of the bid as not being responsive.
16. Complete the applicable item(s) listed below. If this Bid is submitted by an agent of BIDDER, attach a current Power-of-Attorney certifying the agent's authority to bind the BIDDER.

IF BIDDER IS:

An Individual

By: _____

(signature of individual)

(typed or printed name)

doing business as: _____

Business Address: _____

Phone No. _____

A Partnership

By: _____

(signature of general partner)

(typed or printed name)

Business Address: _____

Phone No. _____

A Corporation

By: _____

(Corporation Name)

State of Incorporation: _____

By: _____

(signature of person authorized to sign)

(typed or printed name and title)

Attest: _____

(Secretary)

Business Address: _____

Phone No. _____

END OF SECTION

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**SECTION 01 1000
SUMMARY**

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Anamosa CSD Electrical Distribution - Metering
- B. Owner's Name: Anamosa Community School District.
- C. Owner's Representative:

Dallas Camp –
Director of Operations
200 South Garnavillo Street
Anamosa, Iowa 52205
Phone: (319) 480 - 9250
Email: dcamp@anamosa.k12.ia.us
- D. Architect's Name: Shive-Hattery, Inc.
- E. The Project consists of the construction of new metering packages at designated existing electrical equipment.

1.2 PROJECT SCHEDULE

- A. The onsite work is scheduled to start on or around May 21, 2026 and shall be substantially completed by August 14, 2026.

1.3 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing site during the entire construction period. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.
 - 1. Provide not less than one week notice to Owner of activities that will affect Owner's operations.
 - 2. The Owner has a strict year-round no tobacco policy for all persons on School property including E-cigarettes.
 - 3. Firearms are prohibited on owner property.
- B. Owner intends to occupy the Project during work performance.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period.

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2. Do not obstruct roadways, sidewalks, or other public ways without permit.
 3. Driveways and Entrances: Keep driveways, parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, or emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - C. Work by Public Utilities
 1. If work is required by public utilities, the work shall be coordinated by the Contractor and paid directly to the utility by the Owner.
 2. Electrical contractors shall locate and mark all utilities, public and private, prior to any/all public utility work onsite. This effort shall be coordinated with utilities' own locating service, those specifically working at the direction of the utility (i.e., independent locator to utility).
 - D. Utility Outages and Shutdown:
 1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 2. Prevent accidental disruption of utility services to other facilities.
 - E. Maintain egress requirements as indicated on the Contract Documents and as required by authorities having jurisdiction Existing exits may not be obstructed without written approval from the Architect.
- 1.5 SPECIAL CONSIDERATIONS
- A. Prior to returning site to the Owner, The Contractor(s) shall clean site and Owner will accept using a sign-off sheet. The space will only be considered complete when the Owner accepts the space.
 - B. Project site and all work areas shall be kept clean. Provide daily cleanup and as otherwise necessary to maintain clean site. In the event progress cleanliness is not satisfactory to the Owner, the Owner is prepared to conduct this work at the contractor's cost.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.

1.2 RELATED REQUIREMENTS

- A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

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.
- B. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - 1. Application for Payment forms with Continuation Sheets.
 - 2. Submittals Schedule.
 - 3. Contractor's Construction Schedule.
- C. 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 Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
- D. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect/Engineer for approval.
- E. Forms filled out by hand will not be accepted.
- F. Submit Schedule of Values to Engineer at earliest possible date but no later than 7 days after date on the Owner/Contractor Agreement OR Owner/Contractor Agreement.
- G. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization. Provide at least one line item for each Specification Section. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - 1. Related Specification Section or Division.
 - 2. Description of the Work.

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3. Name of subcontractor.
4. Name of manufacturer or fabricator.
5. Name of supplier.
6. Change Orders (numbers) that affect value.
7. Dollar value.
 - a. Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
- H. 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. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
- I. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- J. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
- K. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
- L. 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.
- M. 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.
 1. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

1.5 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Form to be used: AIA Document G702 and AIA Document G703 Continuation Sheets.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect/Engineer for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 1. Item Number.
 2. Description of work.
 3. Scheduled Values.
 4. Previous Applications.
 5. Work in Place and Stored Materials under this Application.
 6. Authorized Change Orders.
 7. Total Completed and Stored to Date of Application.
 8. Percentage of Completion.

9. Balance to Finish.
10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit one electronic copy of each Application for Payment.
- I. Include the following with the application:
 1. Transmittal letter as specified for Submittals in Section 01 3000. Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 2. Current construction photographs specified in Section 01 3000.
 3. Partial release of liens or other claims from major subcontractors and vendors.
 - a. Conditional Waivers and Releases on progress payments: With each Application for Payment, submit waivers and releases from every entity who is lawfully entitled to file a mechanic's lien, claim payment against payment bond, or any other claim for payment arising out of the Contract and related to the Work covered by the current payment.
 - 1) The Conditional Waiver and Release is effective on the Contractor's receipt of payment in accordance with the terms stated in form with exceptions noted.
 - 2) Submit partial waiver and release on each item for amount requested in current application, after deduction for retainage, on each item.
 - 3) When an application shows completion of an item, submit final or full waivers and releases.
 - 4) Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 5) Waiver Forms: Submit waivers and releases on form AIA G901, executed in a manner acceptable to Owner.
 4. Project record documents as specified in Section 01 7800, for review by Owner which will be returned to the Contractor.
- J. When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- K. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final). See Section 01 3216 Construction Progress Schedule for critical path schedule requirements.
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.

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9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Certificates of insurance and insurance policies.
 13. Performance and payment bonds.
 14. Data needed to acquire Owner's insurance.
- L. 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.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- M. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Waiver Forms: Submit waivers and releases on form AIA G903, executed in a manner acceptable to Owner.
 2. Evidence of completion of Project closeout requirements.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final, liquidated damages settlement statement.
 10. Change of door locks to Owner's access.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2300
ALTERNATES**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Description of Alternates.
- B. Procedures for pricing Alternates.
- C. Documentation of changes to Contract Price and Contract Time.

1.2 RELATED REQUIREMENTS

- A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

1.3 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.4 DEFINITIONS

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

1.5 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

1.6 SCHEDULE OF ALTERNATE

ALTERNATE NO. 1: ADD Metering Package on panelboards PG & PT and switchboard MSB-A

**PART 2 - PRODUCTS - NOT USED
PART 3 - EXECUTION - NOT USED
END OF SECTION**

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**SECTION 01 2600
CONTRACT MODIFICATION PROCEDURES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Minor Changes in the Work
- B. Proposal Requests
- C. Change Order Procedures
- D. Construction Change Directive

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, as a Software Generated "Architect's Supplemental Instruction".

1.4 PROPOSAL REQUESTS

- A. Proposal Requests: Architect will issue a detailed description of proposed changes 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.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with 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.
 - 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.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
 - 1. 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.

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2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. 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.
 6. Comply with requirements in Division 01 Section 01 6000 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use Software-Generated Proposal Request.
- C. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Architect/Engineer.
- D. Unit Price Change Order: For predetermined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not predetermined, execute Work under a Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- E. Construction Change Directive: Architect/Engineer may issue a directive, on AIA Form G714 Construction Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.
- F. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect/Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.
- G. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- H. Change Order Forms: Software-Generated Change Order form provided by Architect. A sample form is available upon request.
- I. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- 1.5 CHANGE ORDER PROCEDURES
- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
- 1.6 CONSTRUCTION CHANGE DIRECTIVE
- A. Construction Change Directive: Architect may issue a Construction Change Directive on EJCDC Document C-940. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction 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. Documentation: Maintain detailed records on a time and material basis of work required by the Work 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 (NOT USED)

END OF SECTION 01 2600

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**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Construction progress schedule.

- F. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Requests for Interpretation (RFI) procedures.
- I. Submittal procedures.
- J. Administrative and supervisory personnel
- K. Requests for information (RFI).
- L. Engineer's Digital Data Files

1.2 RELATED REQUIREMENTS

- A. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- B. Section 01 6000 - Product Requirements: General product requirements.
- C. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 REFERENCE STANDARDS

- A. AIA G810 - Transmittal Letter; 2001.

1.4 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect/Engineer:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.

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5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

1.5 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation, information, or clarification of the Contract Documents.
- B. Action Submittals: Written and graphic information that does require Architect's responsive action.
- C. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.6 PROJECT COORDINATION

- A. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- B. Coordination (Single-Prime): Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Coordinate operations with 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, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
 5. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- C. 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.
- D. 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. Preinstallation conferences.
 7. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to the conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.
- 1.7 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.
 - B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including the superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, email addresses, and telephone numbers, including home, mobile, and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to the Project.
- 1.8 PROJECT MEETINGS
- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - B. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - C. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - D. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- 1.9 REQUESTS FOR INFORMATION (RFI)
- A. Procedure: Immediately on discovery of the need for information or interpretation of the Contract Documents, prepare and submit a Request for Information (RFI) in the form specified, with a necessary question regarding ambiguities or conflicts in the documents or field conditions, concealed conditions at the site, clarification of a contract requirement, dimensions, or other information for which clarification is required.
 1. RFI's shall originate with Contractor, Architect, or Owner. RFIs submitted by entities other than Contractor, Architect, or Owner 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.
 3. The Contractor is required to review all RFI's submitted by subcontractor's and suppliers for completeness, accuracy, validity, and justification prior to submission to the Architect. The Contractor can commonly answer subcontractor /supplier RFI's without delegation to the Architect.

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4. Promptly submit any RFI's that could result in a delay of the activities on the critical path if the resolution is not obtained promptly. Provide a date on each RFI that the response is required by, in order to not have an impact on the critical path of construction activities.
5. In the case of a condition that requires a change in the work to resolve a conflict or other condition, the Contractor shall include a recommendation for resolution of the condition and submit a separate Change Order Request (COR).
6. The Architect's response to an RFI is not an authorization to proceed with work involving additional cost, time or both. If the response involves additional work the Contractor shall provide the Architect with a complete description of work added and work deleted by the response within seven (7) days of the issued date of the RFI response. If the response involves additional work for which the Contractor will seek an adjustment to the contract sum, time or both, the Contractor shall submit a cost proposal in the form of a Change Order Request (COR) to the Architect. The Contractor shall not proceed with incorporating the response into the work until a Change Order or, Construction Change Directive has been fully executed.
7. Unless notified otherwise by the Contractor, the Architect's RFI response shall have the same effect as the Architect's order for minor changes in the Work. The Contractor will proceed with the Work, and the response will be incorporated into the contract that same as the Architect's written order for minor changes in the Work. Notify the Architect in writing if noted modifications cannot be made due to conflicting circumstances in the field, in other contract documents, or for other reasons.
8. The Contractor shall not incorporate any language into RFI's or Change Proposals that imply future additional costs or delays beyond those fully explained within the document. The Contractor may stipulate conditions or constraints under which the pricing or time may change; however, such conditions or constraints shall not infringe on the Architect's or Owner's right to adequate time for review of the issue.
9. The Contractor shall not submit Confirming RFI's, i.e., RFI's requesting confirmation of information already in the contract documents or previously provided, or requesting confirmation to questions previously answered or clarification previously given. Similarly the Contractor shall not submit Repetitive RFI's, i.e., RFI's, wherein the same information is requested more than once, even if phrased in another format or asked in a different manner. Confirming & Repetitive RFI's are considered frivolous.
10. The Contractor shall not retain or suppress RFI's for group submissions. Each individual RFI is to be submitted expeditiously upon occurrence. Numerous RFI's submitted in a short time period will not be considered reasonable, and will result in review times being extended accordingly.
11. The Contractor shall not install any components in locations other than as indicated on the contract documents unless 1) all other affected work has been reviewed and coordinated with the relocation; and 2) the relocation is the resolution for an RFI, including a statement by the Contractor that the relocation has been coordinated with other affected work.
12. The Contractor shall not use an RFI as a means of proposing a deviation, an alternative product, arrangement, or installation for the Contractor's convenience; these proposals shall be submitted as Substitution Requests, and the RFI voided. A contractor-proposed alternative arrangement or installation submitted as an RFI will not become the subsequent basis for a claim by the contractor.
13. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to:

- a. Incomplete, illegitimate, or frivolous Contractor's requests for information and requests for information that are not prepared in accordance with the Contract Documents.
 - b. Contractor requests for information where the requested information is available to the Contractor from a careful study and comparison of the contract documents, field conditions, contractor-prepared coordination drawings, other Owner/Architect-provided information or prior project correspondence or documentation.
 - c. Contractor-proposed alternative arrangements or installations for the convenience of the contractor which, upon acceptance, requires the Architect to revise the contract documents.
- 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 Architect.
 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 or review stamp.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing information or interpretation. Each RFI shall include sufficient detail for evaluation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Software-Generated RFI's: Software-generated form with substantially the same content as indicated above.
- D. Engineer Action: Engineer will review each RFI, determine action required, and return it. Allow an average of ten working days for Architect's response for each RFI. RFI's received after 1:00 p.m. will be considered as received the following working day. Some issues may take longer for review, the recipient of the RFI shall notify the sender of the RFI if additional time is required.
1. The following RFI's will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions or deviations.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.

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- f. Incomplete, inaccurate, invalid, and unjustified RFI's or RFI's with numerous errors.
- g. Confirming or Repetitive RFI's.
- 2. Engineer's action may include a request for additional information, in which case Engineer's time for response will start again.
- 3. Engineer's action on RFI's that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit a Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If the Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within seven days of receipt of the RFI response.

1.10 ENGINEER'S DIGITAL DATA FILES

- A. General: The Engineer will provide digital data files of the contract drawings to the Contractor for use in preparing submittals.
 - 1. The Architect makes no representations as to the accuracy or completeness of digital data files as they relate to the Contract Drawings.
 - 2. The digital data files are available in Newforma Info Exchange Server, (www.shive-hattery.net/UserWeb/Login/Login).
 - 3. Contractor shall execute a digital data licensing agreement in the form of AIA Document C106.
 - 4. The digital data files will be transmitted to the Contractor via Newforma Info Exchange Server. By downloading these documents, the Contractor agrees to also accept the following terms and conditions:
 - a. Definitions: "S-H" shall mean Shive-Hattery, Inc., Shive-Hattery A/E Services, P.C., Helix Design Group, a Division of Shive-Hattery, Inc. or KdG, a Division of Shive-Hattery, Inc. "Contractor" shall mean the person or entity that has executed an Agreement with S-H for services resulting in this electronic file. "Other Party" shall mean any person or entity other than S-H or Contractor.
 - b. Where these electronic files are provided under the terms and conditions of a contract and such contract terms and conditions conflict with these terms and conditions, then the contract terms and conditions shall prevail.
 - c. In the event these electronic files are provided as a project deliverable to a Contractor of S-H:
 - 1) The electronic files are submitted to the Contractor for a 30-day Acceptance Period. During this period, the Contractor may review and examine these files; any errors detected during this time will be corrected by S-H as part of the basic agreement. Any changes requested after the Acceptance Period will be considered additional services to be performed on a time and material basis at S-H's current standard fee schedule.
 - 2) Because data stored on electronic media can deteriorate undetected or can be modified without S-H's knowledge, the Contractor agrees that S-H will not be held liable for the completeness or correctness of the electronic media after an acceptance period of 30 days after delivery of the electronic files.

- d. Any use or reuse of original or altered electronic files by the Contractor or Other Party without written verification, or CAD adaptation for the specific purpose intended by S-H, will be at the Contractor's or Other Party's risk and full legal responsibility. Furthermore, the Contractor or Other Party will, to the fullest extent permitted by the law, indemnify and hold S-H harmless from any and all claims, suits, liability, demands, or costs arising out of or resulting there from. Any verification of such adaptation by the Contractor will entitle S-H to additional compensation at S-H's current standard fee schedule.
- e. S-H makes no warranty as to the compatibility of these files with other hardware or software.
- f. These electronic files were prepared by S-H and are instruments of S-H's service for use solely with respect to this project and S-H shall be deemed the author of these documents and shall retain all common law, statutory, and other reserved rights, including the copyright.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect/Engineer are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect/Engineer's consultants are to be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
 - 1. Procure www.procure.com If Procure is used by the Contractor the Architect will connect Newforma using a Connector API.

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- C. Training: A minimum one, one-hour, web-based training session will be arranged for all participants, with representatives of Architect/Engineer and Contractor participating; further training is the responsibility of the user of the service.
- D. Project Closeout: Architect/Engineer will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 PRECONSTRUCTION MEETING

- A. Architect/Engineer will schedule a meeting after Notice of Award.
- B. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- C. Attendance Required Authorized Representatives of:
 - 1. Owner.
 - 2. Architect/Engineer.
 - 3. Contractor and its superintendent; major subcontractors; suppliers, and other concerned parties.
- D. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Procedure for maintaining Record Documents.
 - 5. Use of premises and existing building.
 - 6. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 7. Submission of initial Submittal schedule.
 - 8. Designation of personnel representing the parties to Contract and their duties.
 - 9. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 10. Scheduling (tentative construction schedule and phasing).
 - 11. Procedures for RFIs.
 - a. Incomplete, illegitimate, or frivolous Contractor's requests for information and requests for information that are not prepared in accordance with the Contract Documents.
 - b. Contractor requests for information where the requested information is available to the Contractor from a careful study and comparison of the contract documents, field conditions, contractor-prepared coordination drawings, other owner/architect-provided information or prior project correspondence or documentation.
- E. Engineer will record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, Contractor participants, and those affected by decisions made.

3.3 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals. Coordinate dates of meetings with preparation of payment requests.

- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Owner, Contractor Project Manager and Job Superintendent as appropriate to agenda topics for each meeting. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, and those affected by decisions made.

3.4 CONSTRUCTION PROGRESS SCHEDULE- SEE SECTION 01 3216

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Submit updated schedule with each Application for Payment.

3.5 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

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- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Prepare in a format and with content acceptable to Owner.
 - 3. Prepare using software provided by the Electronic Document Submittal Service.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.

3.6 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect/Engineer for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.7 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.

7. Other types indicated.
- B. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

3.8 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List according to the 007300 - Advertisement for Bids.
- B. Submit Final Correction Punch List according to the 00 7300 - Supplementary Conditions.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.9 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in Adobe Portable Document Format PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected. Submit separate PDF files for each specification section. Multiple sections combined into one PDF file will be returned to the Contractor.
 1. Name Files according to the following format: <Section Number> <Item Description>. For example: 08 1113 Hollow Metal Doors Shop Drawings.
 2. For shop drawings, the size of the electronic image must be equal with the standard paper size of the sheet, for example:
 3. A 30" x 42" drawing should not be placed on an 11" x 17" sheet size.
 4. An 11" x 17" drawing should not be placed on a 30" x 42" sheet size.
 5. For electronic shop drawings larger than 11" x 17", one hard copy of the drawing(s) is required to be submitted with the electronic copy. The hard copy will NOT be returned to the Contractor.
 6. If the Engineer deems the electronic submittal illegible, corrupted, and unusable, or if the file size is unreasonably large, then a new electronic copy or hard copy will be required.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect/Engineer.
 1. After review, produce duplicates of the Architect's review information.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

- A. General Requirements:
 1. Transmit using approved form.
 2. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 3. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

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- b. For sequential reviews involving Architect/Engineer's consultants, Owner, or another affected party, allow an additional 7 days.
- B. Product Data Procedures:
 - 1. Submit only information required by individual specification sections.
 - 2. Collect required information into a single submittal.
 - 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Submittal System: The contractor will provide electronic submittals using Newforma Konekt provided by the Architect/Engineer
- E. Submittal Schedule:
 - 1. In preparing the schedule, the Contractor should consider time required for review, ordering, manufacturing, fabrication, and delivery plus include additional time required for making corrections or revision to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - a. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - b. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - c. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - d. Format: Arrange the following information in a tabular format:
 - 1) Schedule date for first submittal.
 - 2) Specification Section number and title.
 - 3) Submittal category: Action or Informational.
 - 4) Name of subcontractor.
 - 5) Description of the Work covered.
 - 6) Scheduled date for Architect's final release or approval.
 - 7) Scheduled date of fabrication.
 - 8) Scheduled dates for purchasing.
 - 9) Scheduled dates for installation.
 - 10) Activity or event number.
- F. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. 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. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received. This includes the right to withhold action on a submittal requiring color selection until all related color samples or submittals are received.
 2. The Contractor is responsible for assuring that each submittal is in full compliance with the submittal requirements prior to forwarding to the Architect for review. Submittals which are incomplete will be considered as not submitted until all submittal requirements are fulfilled. The architect has sole discretion to return incomplete submittals without review, to hold submittals until all requirements are fulfilled, to review partial submittals, or to waive partial requirements. In exercising this discretion, the Architect will incur no obligation to apply the same action to any other submittal.
 3. The Contractor is responsible for timely submission of submittals to allow for review and any subsequent corrections necessary prior to undertaking any work covered by the submittal.
- G. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals or consultants is required. Architect will advise Contractor when a submittal being processed requires extended review time for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Should the Contractor request an expedited review in order to maintain schedule, the requests will be approved at the sole discretion of Architect. Rejection will not be cause for any claims for delay or additional cost by the Contractor. The Contractor shall be solely responsible should such rejection result in the completion of construction to occur after the contract deadlines.
- H. Transmittal Form: Use Newforma Info Exchange Transmittal as approved by the Architect. When using the Architect's electronic submittal procedure, the transmittal form is part of the submittal file.
- I. Transmit each submittal with a copy of approved submittal form.
- J. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will reject and return received from sources other than Contractor.
1. Transmittal Form Content: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.

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- f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Transmittal number (numbered consecutively).
 - j. Remarks.
 - k. Signature of transmitter.
- K. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- L. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- M. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- N. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
- O. Include the following information on label for processing and recording action taken:
- 1. Project name.
 - 2. Date.
 - 3. Name and address of Engineer.
 - 4. Name and address of Contractor.
 - 5. Name and address of subcontractor.
 - 6. Name and address of supplier.
 - 7. Submittal number or other unique identifier, including revision identifier.
 - a. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06-1000.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 06-1000.01.A).
- P. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- Q. When revised for resubmission, identify all changes made since previous submission.
- R. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- S. Submittals not requested will not be recognized or processed.

3.11 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. Submit Product Data before or concurrent with Samples.

Administrative Requirements

3.12 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
- B. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- C. Material Safety Data Sheets (SDS): Submit information directly to Owner; do not submit to Architect except as required in "Action Submittals" Article.

3.13 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Review each submittal for accuracy and completeness of dimensions and quantities, and for performance of equipment or systems. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect. Submittals deemed by the Architect to not have been reviewed by the Contractor prior to submission may be returned and considered as "Not Submitted".
- 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 and coordinated with other Work of the contract.

3.14 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Furnish as Submitted: Denotes that the submittal meets the criteria of the drawings and specifications and no revisions are required. The Contractor may proceed with fabrication or procurement of the item reviewed and may proceed with the work shown on the drawings and specifications for this item.
 - 2. Furnish as Corrected: Denotes that there are deficiencies, but the Contractor may proceed with fabrication or procurement of the item reviewed and may proceed with the work shown on the drawings and specifications for the item if the deficiencies are first corrected.
 - 3. Revise and Resubmit: Denotes that the submittal does apply to the drawings and specifications, but insufficient detail has been shown or the submittal contains too many errors or omissions. The Contractor may NOT proceed with fabrication or procurement of the item reviewed and may NOT proceed with the work shown on the drawings and specifications for the item. The Contractor must revise the submittal and resubmit for review.
 - 4. Incomplete - Resubmit: Denotes that some portion of the submittal is incomplete and the Architect cannot, therefore, review the submittal. The Architect will describe the incompleteness by comment on the submittal. The Contractor may NOT proceed with fabrication or procurement of the item reviewed and may NOT proceed with the work shown on the drawings and specifications for the item. The Contractor must revise the submittal and resubmit for review.
 - 5. Rejected: Denotes that the submittal does not apply to the item specified or was not specified. The Contractor may NOT proceed with fabrication or procurement of the item reviewed and may NOT proceed with the work shown on the drawings and specifications for the item, and the Contractor must prepare a new submittal. The Architect will describe

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the reason for rejection by comment on the submittal.

- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- F. Architects review is only for limited purpose of checking for general conformance with the information given and design concept expressed in the Contract Documents.
- G. Unless notified otherwise by the Contractor, the Architect's notations, comments, and mark-ups on approved submittals shall have the same effect as the Architect's order for minor changes in the Work not involving adjustment in the contract sum or extension in the contract time. The Contractor will proceed with the work, and the response will be incorporated into the contract the same as the Architect's written order for minor changes in the Work. Notify Architect in writing if noted modifications cannot be made due to conflicting circumstances in the field, in other contract documents, or for other reasons.
- H. If the Contractor believes that the Architect's notations, comments, or mark-ups constitute a change that results in added cost or time, the Contractor is to notify the Architect in writing within seven (7) days of receipt of the reviewed submittal. Do not proceed with changes that result in added cost or time until the matter is resolved in accordance with other provisions of the contract.

END OF SECTION

**SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, with network analysis diagrams and reports.

1.2 RELATED SECTIONS

- A. Section 01 1000 - Summary: Work sequence.

1.3 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016, with Addendum (2021).

1.4 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. Submit updated schedule, identifying critical path, with each Application for Payment. Applications for Payment may be rejected if an updated schedule is not received with such documentation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

3.3 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

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- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect/Engineer at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.6 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect/Engineer, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

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**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.1 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.2 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- D. Comparable Product Requests: Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

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- a. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - b. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - c. Evidence that proposed product provides specified warranty.
 - d. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - e. Samples, if requested.
2. Engineer's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request.
 - a. Form of Approval: Comply with requirements specified in Division 01 "Administrative Requirements."

1.3 COMPATIBILITY OF OPTIONS

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.4 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

- a. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
- b. Refer to Divisions 02 through 48 for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 "Execution and Closeout Requirements" and " Closeout Submittals."

PART 2 PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.2 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specified time restrictions for submitting requests for substitutions during the bidding period and the documents required.
- B. Engineer will consider requests for substitutions only within 15 days after date of Agreement. Requests received after that time may be considered or rejected at discretion of Engineer.
- C. Substitutions may be considered when a project becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- E. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified project.

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2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 5. Agrees to reimburse Owner and Engineer for review or redesign services associated with re-approval by authorities
- F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- G. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except for record noncompliance with these requirements.
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - a. Requested substitution does not require extensive revisions to the Contract Documents.
 - b. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

3.3 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft.
- D. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

- E. Deliver products to project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- F. Coordinate schedule of product delivery to designated prepared areas at project site in order to minimize long-term site storage time, overcrowding of construction spaces, and potential damage to stored materials.
- G. Transport and handle products in accordance with manufacturer's instructions.
- H. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- I. Promptly inspect shipments on delivery to ensure that products comply with requirements of the Contract Documents, quantities are correct, and products are properly protected and undamaged.
- J. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- K. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration by the elements, above ground, with impervious sheet covering. Provide adequate ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection and measurement of quantity or counting of units. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- L. Store materials in a manner that will not endanger Project structure.
- M. Store cementitious products and materials on elevated platforms.
- N. Store items subject to sun damage such as foam and, plastics away from exposure to sunlight, except to extent necessary for period of installation and concealment.
- O. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage
- P. Protect stored products and liquids from damage from freezing

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- Q. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

END OF SECTION

**SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Cutting and patching.
- C. Surveying for laying out the work.
- D. Cleaning and protection.
- E. Substantial Completion.
- F. Final Completion.
- G. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- H. General requirements for maintenance service.

1.2 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect/Engineer. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.3 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.4 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

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1.5 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare and submit 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. Additionally, attach a copy of work required for each room to the door entering the room. Subcontractor and Superintendent to initial as each Work item is completed. Attach supplemental lists as required.
 2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 3. 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 by applicable authorities having jurisdiction.
 4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance (including Operation & Maintenance Manuals).
 6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection Procedures: Submit a written request for inspection for Substantial Completion a minimum of seven (7) days in advance of the requested Substantial Completion inspection date. On receipt of request, Architect may notify Contractor of unfulfilled requirements. On date of inspection, Architect will conduct a review and either proceed with inspection or notify Contractor that the project is not Substantially Complete due to unfulfilled requirements.
1. Upon inspection the Architect and the Owner's representative will accompany the Contractor on a walk-through review of the Contractor's punch list. Should the Architect and/or the Owner's representative observe work which is incomplete or defective which is not included on the contractor's punch list, the Architect will prepare a supplemental punch list of items to be completed or corrected.
 2. Architect 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 Architect, that must be completed or corrected before certificate will be issued.
 3. Results of the completed inspection will form the basis of requirements for establishing Final Completion.

1.6 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 01 Section "Price and Payment Procedures".
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Contractor. The certified copy of the list shall state that the Work, including each item on the list has been completed or otherwise resolved for acceptance. Provide explanations for each proposed resolution to incomplete items.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

- B. Inspection Procedures: Submit a written request for inspection for Final Completion, a minimum of (7) days in advance of the requested Final Completion Inspection Date. On receipt of request, Architect may notify Contractor of unfulfilled requirements. On date of inspection, Architect will conduct a review and either proceed with inspection or notify Contractor that the project is not Finally Complete due to unfulfilled requirements.
1. Upon Inspection the Architect and the Owner's representative will accompany the Contractor's superintendent on a walk-through review of the Substantial Completion punch list.
 2. Engineer will process the final Application for Payment after inspection providing all closeout documentation has been received and is acceptable, or the Architect will notify Contractor of construction and/or documentation that must be completed or corrected before final Application for Payment will be processed.

1.7 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 starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Indicate the subcontractor responsible for each item; provide spaces for subcontractor and superintendent to initial each item as Work is completed.
 4. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name of Contractor.
 - e. Page number.

1.8 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

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3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- C. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- D. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

2.2 CLEANING PRODUCTS

- 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 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.
- G. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
- H. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.

- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.
- D. Temporary Support: Provide temporary support of Work to be cut.
- E. Protection: Protect in-place 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.
- F. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- G. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect/Engineer of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect/Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

3.4 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.5 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- B. Perform whatever cutting and patching is necessary to:

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1. Complete the work.
 2. Fit products together to integrate with other work.
 3. Provide openings for penetration of mechanical, electrical, and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials such as concrete and masonry using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- I. Patching: Patch construction by filling, repairing, refinishing, closing up, 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.
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.6 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.7 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.

Execution and Closeout Requirements

- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.8 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.9 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. Use cleaning materials that are nonhazardous.
 - 2. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces. vacuum carpeted and soft surfaces.
 - 3. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
 - 4. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
 - 5. Clean filters of operating equipment.
 - 6. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
 - 7. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 8. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
 - 9. Leave Project clean and ready for occupancy.

3.10 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Owner and Shive-Hattery on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect/Engineer when work is considered ready for Architect/Engineer's Substantial Completion inspection.

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- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect/Engineer's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect/Engineer's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect/Engineer.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect/Engineer when work is considered finally complete and ready for Architect/Engineer's Substantial Completion final inspection.
- H. Complete items of work determined by Architect/Engineer listed in executed Certificate of Substantial Completion.

3.11 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

**SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor Reporting Responsibilities: Submit periodic Waste Disposal Reports; report landfill disposal, incineration, recycling, salvage, and reuse regardless of to whom the cost or savings accrues; use the same units of measure on required reports.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures.
- B. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- C. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- D. Section 01 6000 - Product Requirements: Waste prevention requirements related to product substitutions.
- E. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- F. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

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- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.

- b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards (cubic meters).
 - c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS - NOT USE

2.1 PRODUCT SUBSTITUTIONS

- A. See Section 01 6000 and Section 01 2500.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 6000:
 1. Relative amount of waste produced, compared to specified product.
 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
 3. Proposed disposal method for waste product.
 4. Markets for recycled waste product.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect/Engineer.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

**SECTION 01 7500
STARTING AND ADJUSTING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Starting Systems.
- B. Demonstration and Instructions.
- C. Testing, Adjusting, and Balancing.

1.2 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

1.3 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- E. The amount of time required for instructions on each item of equipment and system is that specified in individual sections.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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**SECTION 01 7800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect/Engineer with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit a preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

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- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect/Engineer, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.
- F. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.
- G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

- I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

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**SECTION 26 0100
BASIC MATERIALS AND METHODS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Basic materials and methods.

1.2 REFERENCE STANDARDS

- A. Work shall comply with applicable standards of the:
1. American Insurance Association
 2. American Society for Testing and Materials (ASTM)
 3. Edison Electric Institute
 4. Factory Mutual (FM)
 5. Institute of Electrical and Electronics Engineers
 6. Insulated Power Cable Engineers Association
 7. National Board of Fire Underwriters
 8. National Bureau of Standards
 9. National Electrical Code (NEC)
 10. National Electrical Manufacturer's Association
 11. National Electrical Safety Code
 12. National Fire Protection Association
 13. National Safety Council
 14. Underwriters' Laboratories, Inc. (UL)
 15. Uniform Fire Code (UFC)
 16. William-Steiger Occupational Safety and Health Act of 1970 (OSHA)

1.3 SYSTEM DESCRIPTION

- A. Basic materials and methods are described.

1.4 SUBMITTALS

- A. Submit to the Design Professional for review, prior to the placing of orders for any equipment, a complete schedule of electrical fixtures, materials and panels to be installed. Schedule shall consist of catalog cuts, diagrams, shop drawings, performance curves, or any other descriptive material necessary to fully describe the equipment proposed and its operating characteristics.
- B. Review of the materials, including alternate or substitute items, shall be obtained in writing from the Design Professional; verbal review will not be considered binding.
- C. Submittals shall have been reviewed and signed by the Contractor, prior to submittal to the Design Professional. Faxes or copies of faxes are not acceptable. The Design Professional will review submittals to aid in interpreting the drawings and specifications, and in so doing will assume that the submittals conform to the specified requirements set forth in this specification. Review of submittals by the Design Professional does not relieve the Contractor of the responsibility of complying with the elements of the specifications.

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- D. Furnish copies of parts lists and operating and maintenance instructions and manuals, and furnish the services of a competent, trained individual thoroughly familiar with the operation of each special system. Special systems shall include electrical and communications equipment requiring operating instructions, inspection or periodic maintenance. The person instructing the Owner shall see that the Owner is conversant with the operation of the system and its various controls; the company from whom maintenance service and repairs may be obtained; and the location and function of switches, devices and accessories, contained in the system.
- E. Operations and Maintenance Manuals shall be supplied containing the following:
 - 1. Operation, maintenance, recommended spare parts, and renewal parts information for equipment furnished.
 - 2. Set of complete, final, as-reviewed and accepted information required to be submitted for review.
 - 3. As-constructed electrical, equipment, and installation drawings.
 - 4. Index of equipment suppliers listing current names, addresses and telephone numbers of those who should be contacted for service.
 - 5. As-constructed contract drawings permanently marked in red to show departures from original drawings.
 - 6. Submit one (1) copy for review. This copy will be returned. Submit three (3) final revised copies.

1.5 PERMITS AND INSPECTIONS

- A. Obtain, furnish and include the costs of necessary permits, fees and inspection certificates for material and labor furnished. Include costs of permits, certificates and inspection fees required in connection with the installation, unless otherwise noted in the detailed contractual description preceding these Electrical Specifications.
- B. Obtain, furnish and include the costs of necessary permits, fees and inspections required by the local Fire Marshall and the UFC, for installation of the emergency generator.
- C. Where applications are required for the procuring of utility services, see that such application is properly filed with the utility.
- D. On completion of work, furnish satisfactory evidence that work is acceptable to regulatory authorities having jurisdiction.
- E. Be responsible to see that the proper inspection authorities are notified when inspections are required by Code, and provide necessary assistance to the inspector during inspection.

1.6 REGULATIONS

- A. Installation shall conform to or exceed the minimum requirements of the NEC, and federal, state, local and municipal ordinances.
- B. Work shall be performed in accordance with applicable recommendations of the ADA and OSHA.
- C. Installations shown on drawings or required in the specifications that exceed the minimum requirements of the NEC or other regulations shall be installed as shown or specified.

1.7 CONTRACT DOCUMENTS

- A. Intent of the drawings and specifications is to describe the complete installation. At the conclusion of construction, the electrical system shall be turned over to the Owner complete and ready for safe, efficient operation.

- B. Drawings and the specifications are intended to be cooperative and supplementary. Closely check the drawings and specifications for any obvious errors or omissions, and bring any such condition to the attention of the Owner's Representative prior to the receipt of bids, in order to permit clarification by means of an Addendum.
- C. Drawings for electrical work are in part diagrammatic, intended to convey the scope of work, general arrangement, approximate sizes, and locations of equipment and materials. Exact locations shall be determined to best fit the layout of the job. Scaling of the drawings will not be sufficient or accurate for determining these locations. Where job conditions require reasonable changes in indicated locations and arrangement, make such changes as directed by the Owner's Representative, without additional cost to the Owner.
- D. A complete set of contract documents shall be on the site at all times. Prior to installing the work, check drawings for dimensions and conflicts.
- E. Rules
 - 1. Where the context requires, the singular includes the plural and the plural includes the singular.
 - 2. The use of "and" in a combined provision means that all elements in the provision must be complied with, or must exist to make the provision applicable. Where compliance with one or more elements suffices, or where existence of one or more elements makes the provision applicable, "or" (rather than "and/or") is used.
 - 3. "Shall" is mandatory and "may" is permissive.

1.8 RESPONSIBILITY

- A. Examine the project site and become familiar with existing conditions that will affect the work. Review the drawings and specifications of other trades and take note of conditions to be created which will also affect the work.
- B. Provide sensors, equipment and supervision required for work in "confined spaces".
- C. No energized conductors shall be exposed at any time except when the immediate area is under the direct supervision of a qualified electrician.
- D. Provide temporary insulated magnetic covers for open panelboards. Use SP Products (1-800-233-8595) Type TPC xx-xx or approved equivalent.
- E. Locate equipment, which must be serviced, operated or maintained, in fully accessible positions.
- F. Verify location and size of each motor, and properly connect motors.
- G. Responsibility shall not end with installation and connecting of various apparatus. Include services of an experienced superintendent who shall be constantly in charge of the work. Provide qualified journeymen, helpers and laborers required to properly unload, install, connect, adjust, start, operate and test the work involved, including equipment and materials furnished by other trades or by the Owner.

1.9 DAMAGE

- A. Be responsible for damage to the work of other trades or to the building and its contents caused by the electrical installation.

1.10 GUARANTEE AND MAINTENANCE

- A. Material and equipment shall be fully guaranteed to be free from defects and to be new equipment. No secondhand, used or salvaged equipment will be allowed.

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- B. Keep entire portion of the work in repair, so far as defects in workmanship, apparatus, material or construction are concerned, without additional cost to the Owner, for one (1) year from the date of Substantial Completion, except as otherwise specified.
- C. Equipment installed which fails to meet performance ratings specified or shown on drawings shall be removed and replaced by new equipment which meets specified requirements, without additional cost to the Owner.
- D. Material and workmanship shall be subject to the review of the Owner's Representative, in whose presence various tests shall be made as required by these specifications.

PART 2 PRODUCTS

2.1 STANDARDS OF MATERIALS AND WORKMANSHIP

- A. Material shall be new, complete with manufacturer's guarantee or warranty, and shall be as listed by UL, if a standard has been established by UL for the type of material. Approved manufacturers shall be firms regularly engaged in the manufacture of equipment of types and capacities required and whose products have been in satisfactory use in similar service for not less than three years.
- B. Methods and techniques of installation shall be subject to review by the Owner's Representative.
- C. Material shall be the standard product of a reputable manufacturer regularly engaged in the manufacture of the specific product. Materials of the same type or class shall be the products of one manufacturer. For example, panelboards shall be from the same manufacturer and lighting switches from the same manufacturer.
- D. Material shall be protected from damage and stored indoors at all times, unless other storage arrangements are reviewed by the Owner's Representative.
- E. Material and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- F. The equipment manufacturer and installing contractor shall carefully check that the installed, operating equipment can be properly serviced. If the manufacturer or the contractor has any reservations in this regard, they shall state their reservations and suggested changes in a separate letter addressed to the Owner's Representative, and shall include this letter as part of their shop drawing submission. Owner's Representative will work out required changes and adjustments in contract prices where such adjustments are warranted. No adjustment in contract price will be allowed for additions required by applicable code, ordinance, statute, utility regulation or labor regulation. It is the obligation of the contractor to include such items in his original bid. Changes in equipment shall be incorporated in shop drawings.

If the contractor fails to call such reservations or suggestions to the Owner's Representative's attention, in writing, before any work is done or equipment is purchased, it shall be assumed that the contractor accepts the responsibility for providing a safe, coordinated and complete installation. If at a later date, changes become necessary to assure a safe, coordinated and complete installation, the changes shall be made without increase in contract price.

- G. Equipment, devices, apparatus, systems and installations shall be entirely suitable and safe for each intended application in every respect, and must not create conditions which would be harmful to occupants of the building, to operating personnel, to installation personnel, to testing personnel, to workmen or to the public. The contractor shall be solely responsible for providing installations that will meet these conditions. If the contractor believes that the installation will not be safe for all parties, he shall so report to the Owner's Representative, in writing, before any equipment is purchased or work is installed, giving his exact recommendations.

- H. Where the specifications or drawings state that equipment shall be "furnished," "installed" or "provided," it shall be understood to mean that the contractor shall furnish and install that equipment completely, unless it is specifically stated that the equipment is to be furnished or installed by other trades, public utility companies or the Owner.

2.2 MATERIAL SUBSTITUTIONS

- A. Proposals as submitted shall be based on the products specifically named in the specification or the equivalent. Furnishing material or equipment by manufacturers other than those specified shall only be by permission of the Owner's Representative. Such permission for substitution must be requested, by the Bidder/Vendor, in writing, at least eleven (11) calendar days prior to bid opening time. The request shall identify the differences in the alternate material or equipment as compared to that specified, and shall indicate the benefits to the project as a result of selecting the alternative.
- B. Furnish to the Owner's Representative, when requested, samples of proposed material or equipment substitutions. These samples shall remain with the Owner's Representative as long as they desire.
- C. Changes required by alternate equipment shall be made at no additional cost to the Owner. Re-design costs incurred by the Design Professional and costs incurred by other trades, public utilities, or the Owner as a result of the use of such equipment shall be the responsibility of the Contractor.
- D. The Owner's Representative reserves the sole right for the approval of proposed material or equipment, and the phrase "or an approved equivalent" used in these specifications or on the drawings shall be interpreted to mean an equivalent approved by the Design Professional.
- E. The Owner's Representative reserves the right to refuse approval of equipment which does not meet the specification, in their opinion, or of equipment for which no local experience of satisfactory service is available. The Owner's Representative further reserves the right to reject equipment for which maintenance service and the availability of replacement parts is questionable.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

- A. Examine the existing building and grounds and become familiar with conditions as they exist, or that will, in any manner, affect the work under this contract. No allowance will be made subsequently, on the behalf of the contractors, for error or negligence on their part in connection with this.
- B. Existing equipment, devices and conduits in or on the existing building or grounds which are to be replaced, or which interferes with the remodeling of the existing facilities or installation of new equipment, shall be removed from the premises or relocated as directed by the Owner's Representative. Do not remove from premises any equipment that may have maintenance value to the Owner without permission of the Owner. Items not to be reused shall be removed from the premises, unless otherwise noted herein or on the drawings.
- C. Locate and protect existing utilities and other underground work in a manner that will ensure that no damage or service interruption will result from excavating or other site or building work.

3.2 TEMPORARY UTILITIES

- A. Provide temporary electrical utilities as described in the detailed contractual description preceding the Electrical Specifications.

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- B. Provide temporary lighting, as required, to light all construction areas, ramps, runways, corridors, shops and storage areas to a minimum of 10 foot-candles while any work is in progress. First aid stations, infirmaries and offices shall be lit to a minimum of 30 foot-candles.
- C. Temporary services shall meet OSHA requirements.
- D. Pay costs necessary to remove or relocate any existing private, public or municipally owned electrical service or telephone service, which are on or adjacent to the Owner's property, and which will interfere with or would be disturbed by the work of this trade or any other trade on this project.

3.3 ELECTRICAL EQUIPMENT CONCRETE PADS

- A. Floor mounted electrical equipment shall be mounted on a four (4) inch high concrete pad. Size bases to extend a minimum of 4" inches beyond equipment base in any direction and 4" above finished floor. Such required pads not shown on the structural or architectural drawings shall be furnished and installed by this Contractor, by experienced cement finishers and not by electricians. This shall include pads for equipment such as freestanding switchboards, transformers, and motor control centers. Construct of reinforced concrete, roughen floor slab beneath based for bond, and provide steel rod anchors between floor and base. Locate anchor bolts using equipment manufacturer's templates. Chamfer top and edge corners.

3.4 IDENTIFICATION

- A. Each device shall be identified according to the following system:
 - 1. Panels and switchboard shall be identified as to panel designation, voltage and feeder, e.g., "Panel L1, 120/208 volts, Feeder FDP-1." Markings shall be inside the door.
 - 2. Service disconnecting means shall be permanently identified on the exterior, e.g. "Main Service Disconnect".
 - 3. Panel circuit number shall be identified on the convenience outlet and light switch box, or the backside of the plate with embossed lettering plastic tape or indelible marking pen.
 - 4. Junction and pull box covers shall be labeled with circuits contained within. Mark on outside with permanent marker in concealed or mechanical spaces, or inside the cover in public areas.
 - 5. Three phase outlet cover plates shall have special 1/8" engraved lettering "208 volt, 3 phase".
- B. Identification shall be engraved, laminated plastic using white letters on black background, unless otherwise specified.
- C. Feeders located in tunnels, pipe chases, or other accessible locations shall be identified as to feeder number and voltage at least once, and then at 50 feet intervals. Means of identification shall be white stenciled letters, 1-1/2 inches high, on a black background.
- D. Accessible junction boxes and conduit for the emergency power system shall be identified in a manner as described in paragraph C above. In addition, receptacles connected to the emergency power system shall be identified by a special engraved cover plate with the word "EMERGENCY" and the circuit number, in 1/4-inch high letters.
- E. Color-coding of branch circuit wiring shall be as stated in the NEC. Color-coding of neutral conductors in conduit with multi-circuits shall be as stated in the NEC. Wires of sizes larger than No. 8 AWG shall be color coded by a strip around the conductor at junctions, pull boxes and terminating points.
 - 1. Color-coding of wiring shall match existing.

2. Color-coding of wiring shall be black (A phase), red (B phase), blue (C phase) for 120/208-volt three-phase system with white neutral.
3. Color-coding of grounding wires shall be green.

3.5 INTERRUPTIONS

- A. Changes in electrical services shall be made so as to provide a minimum of interference with the operation of services in the building. When changes require shutdown of building services, notify the proper building authorities not less than 24 hours in advance and obtain approval from these authorities before making changes. Such notices shall give duration and nature of shutdown. Temporary arrangements shall be approved by the Design Professional or Owner.
- B. Include costs for temporary wiring and overtime work required, in the Contract price. Remove temporary wiring at the completion of work.

3.6 DEMOLITION

- A. Provide labor necessary to demolish the existing electrical system described in the contract documents.

3.7 CUTTING AND PATCHING

- A. Provide cutting and fitting necessary to properly install work, unless specifically noted otherwise in these specifications or shown on the drawings. Coordinate with other trades as required to minimize the damage and the amount of patching required.
- B. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval. Carefully carry out any cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings, paving or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment.
- C. Patch around holes cut for new work or holes where existing devices are removed.

3.8 EXCAVATION AND BACKFILL

- A. Provide excavation and backfilling necessary in the construction of the work as shown on the drawings or as specified. Provide sheeting and bracing using proper materials that may be necessary for the protection of the foundations and walls of the building. Replace roads, curbs, walks, topsoil and dispose of surplus earth and debris as directed.
- B. Review procedures with Owner for testing, covering, and containment of surplus earth and debris prior to disposal. Include any costs not covered by the Owner.
- C. No materials except clean sand shall be placed within six (6) inches of any pipe, sewer, conduit or cable. Backfill under sidewalks, drives, parking lots, building or any other finished areas shall be 100% clean sand.
- D. Backfill shall be placed and tamped pneumatically in six (6) inch lifts until pipe or conduit is covered with a minimum of twelve (12) inches of cover. Additional backfill to finished grade shall be placed and tamped pneumatically in ten (10) inch lifts. The Design Professional's and Owner's representatives shall be notified prior to backfilling so that backfilling may be observed.
- E. Where conduit passes below footings or through foundation walls, the cavity around the conduit shall be well filled and tamped, with rich concrete composed of one part Portland cement to six parts of clean sand and gravel.
- F. Conduit and cable may be installed in advance of earth fills by the General Contractor. Such conduit shall be installed with backfill material adjacent to the conduit and with the compaction requirements as set forth for the General Contractor.

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- G. Protect property from damage which might result from excavating and backfilling and protect persons from injury at excavations, by barricades, warnings and illumination.
- H. Coordinate excavations with weather conditions to minimize possibility of washouts, settlements, and other damages and hazards. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install electrical work on frozen excavation bases or subbases.

3.9 PAINTING

- A. No painting or finishing is to be included under this contract except as noted. The finish of any item that has been marred, scratched, or damaged in any way, shall be repainted to the satisfaction of the Design Professional and the Owner.

3.10 CLEANING OF PREMISES

- A. Keep the premises clean of debris caused by the work at all times. Keep material stored, in areas designated by the Owner, in such a manner so as not to interfere with the progress of the work of other trades or with the operation of existing facilities.
- B. Interiors and exteriors of electrical panels shall be thoroughly cleaned.
- C. At the conclusion of the construction, the site shall be thoroughly cleaned of rubble, debris and unused material and shall be left in good order. Closed off spaces shall be cleaned of waste material, cartons, and wood frame members used in the construction.

3.11 RECORD OF CHANGES MADE TO THE WORK

- A. Maintain at the job site a separate and complete set of electrical plans and specifications upon which it is clearly and permanently marked in red and noted, in complete detail, any changes made. Include changes to location and arrangement of electrical apparatus or changes made in the electrical system and wiring as a result of building construction conditions or as a result of written instructions from the Design Professional. Such record of changes shall be made daily and the marked plans and specifications shall be available for the Design Professional's examination at any normal work time.
- B. Upon completion of the job, and before final payment is made, transmit the marked-up plans and specifications to the Design Professional.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Oxide inhibiting compound.
- E. Wire pulling lubricant.
- F. Cable ties.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

1.3 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- H. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- N. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

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- O. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
3. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Field Quality Control Test Reports.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect/Engineer and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 26 0526.
- H. Conductor Material:
 - 1. Provide copper only.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 - 3. Color Code:
 - a. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.

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- b. Equipment Ground, All Systems: Green.

2.3 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:

- a. Encore Wire Corporation: www.encorewire.com/#sle.
- b. General Cable Technologies Corporation: www.generalcable.com/#sle.
- c. Nexans Energy USA
- d. The Okonite Company
- e. Prysmian Power Cables and Systems[<>]: www.us.prysmian.com
- f. Southwire Company: www.southwire.com/#sle.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:

- a. Size 10 AWG and Smaller: Solid.
- b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

- 1. Copper Building Wire: Type THHN/THWN-2, except as indicated below.

2.4 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 26 0526.

C. Wiring Connectors for Splices and Taps:

- 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
- 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:

- 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
- 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
- 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
- 4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- F. Mechanical Connectors: Provide bolted type or set-screw type.
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.5 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
- B. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- C. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location indicated.

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4. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
5. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
7. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- E. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
- F. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- G. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- H. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- I. Make wiring connections using specified wiring connectors.
 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 5. Connections for Aluminum Conductors: Fill connectors with oxide inhibiting compound where not pre-filled by manufacturer.
 6. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

- 7. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- J. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- K. Insulate ends of spare conductors using vinyl insulating electrical tape.
- L. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- N. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
- D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

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**SECTION 26 0520
WIRE CONNECTIONS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wire connections and devices.

1.2 REFERENCES

- A. American Wire Gage (AWG)
- B. Federal Specifications (FS).
- C. General Services Administration (GSA).
- D. National Electrical Manufacturers Association (NEMA).
- E. Underwriters' Laboratories, Inc. (UL).

1.3 QUALIFICATIONS

- A. Connectors shall be as manufactured by AMP Inc., Blackburn/Thomas and Betts Company, Burndy Corp., General Electric Co., Ideal Industries, Inc., Minnesota Mining and Mfg. Co., O.Z./Gedney Co., or Thomas and Betts Co.
- B. Connectors shall be UL listed.

PART 2 PRODUCTS

2.1 REQUIREMENTS

- A. Lugs for termination of conductors in distribution panels and motors, shall be Thomas & Betts compression type or approved equivalent, series 53100 for conductors 8 AWG through 4/0 AWG and Series 53200 for conductors 250 kcmil and larger. Lugs and contact surfaces where lugs are installed shall be plated. Terminals for control wire shall be tinned ring tongue type: Buchanan "Termend", Thomas & Betts "Stakon", or approved equivalent.
- B. Splices and connections to conductors larger than 8 AWG shall be by means of compression type Thomas & Betts Series 53500 for 2-way and Series 54700 for 3-way connections, or equivalent Burndy connectors.
- C. See Section 26 0526, 3.08 for grounding clamp connection, of the electrical system grounding electrode conductor, to the building water service piping.
- D. Connectors and lugs provided by the contractor or by the manufacturer of electrical equipment shall be approved for use with the conductor material supplied.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Conductors 8 AWG and smaller that are to be pigtail spliced shall be joined with wire nuts. Splices of and connections to conductors larger than 8 AWG shall be by means of compression or hoyden type connectors.
- B. Splices shall be made only in accessible junction boxes.

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- C. Wiring connections to lugs in switchgear, motor control centers, switchboards and panelboards shall be coated with an antioxidizing compound. Ensure that exposed wire ends are coated.
- D. Inaccessible or buried grounding connections may be Burndy compression, exothermic weld or brazed connections.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground access wells.

1.2 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

1.3 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2012.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
 - 3. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.5 SUBMITTALS

- A. None required.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Separately Derived System Grounding:
 - 1. Separately derived systems include, but are not limited to:
 - a. Transformers (except autotransformers such as buck-boost transformers).
 - 2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
 - 3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
 - 4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
 - 5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- E. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
 - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:

1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections or compression connectors for underground, concealed and other inaccessible connections.
 - a. Exceptions:
 - 1) Use mechanical connectors for connections to electrodes at ground access wells.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
 - a. Exceptions:
 - 1) Use exothermic welded connections for connections to metal building frame.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 26 0553.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.
- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.
- F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

**SECTION 26 0533
CONDUIT AND RACEWAY**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Conduit and raceway.

1.2 REFERENCES

- A. National Electrical Code (NEC).
- B. Conduit shall carry the Underwriters' Laboratories (UL) label.
- C. Conduit shall meet the following American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA) and Federal Specifications (FS) standards:
 - 1. Rigid Steel Conduit (RGS): FS WW-C-581 and ANSI C80.1.
 - 2. Electrical Metallic Tubing (EMT): FS WW-C-563, UL797, and ANSI C80.3.
 - 3. Liquid-Tight Flexible Metal Conduit: CSA, UL.
 - 4. Rigid Nonmetallic Conduit (PVC): NEMA Standards Pub. No. TC3.

1.3 QUALIFICATIONS

- A. Rigid nonmetallic conduit shall be Carlon Type 40 PV-DUIT (heavy wall) or approved equivalent.
- B. Liquid-tight flexible metal conduit shall be Electri-Flex, Type LA or approved equivalent.

PART 2 PRODUCTS

2.1 REQUIREMENTS

- A. Conduit smaller than 1/2-inch diameter shall not be used on this project.
- B. Only threaded type connectors and couplings shall be used with RGS.
- C. Connections between EMT or rigid conduit and PVC shall be made with threaded PVC adapters or fittings.
- D. RGS flexible conduit or flexible liquid tight conduit including fittings and hangers used throughout this project shall be galvanized steel.
- E. Connectors for EMT shall be steel set screw type. Connectors for RGS shall be compression type
- F. Connectors for EMT shall be steel or malleable iron. Fittings shall be capable of carrying ground fault currents of 10,000 amps rms for 1½ inch and smaller, and 20,000 amps rms for 2-inch and larger for a minimum of 3 cycles. Fittings shall be Thomas & Betts 5030, 5031, 5120, 5123, or 530 series. Die cast metal fittings will not be permitted on this project.
- G. Type LA Liqueflex flexible conduit, with appropriate fittings which are UL listed as an assembly, shall be used in an exterior location or any moist location.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Wiring shall be in conduit or approved raceways, unless shown otherwise.
- B. Conduit and outlet installation shall be concealed throughout this project, as follows unless otherwise indicated.
 - 1. Unless otherwise noted, conduits concealed under floor shall not be routed in concrete slabs-on-grade but shall be routed in at least six (6) inches of drainage fill beneath the bottom of the slab. Conduit shall not contact the slab unless protected by a vapor barrier such as Vis Queen.
 - 2. Steel conduit installed in concrete or underground, or in duct banks, shall be protected with an enamel and tape (applied hot), or with PVC coating. All damage and voids in the protective coating shall be repaired after installation and prior to installing concrete or backfill.
 - 3. Conduit, under floors, shall be PVC, unless shown otherwise. Risers and elbows shall be metallic, conduit, fiberglass, or conduit.
 - 4. PVC may be embedded in concrete where shown on drawings.
- C. Conduit throughout this project shall be RGS installed with compression fittings.
- D. Conduit shall not be used as the sole grounding means.
- E. Nonmetallic conduit located underground, outside the building area, shall be installed a minimum of 36 inches (914.4 mm) below grade, unless otherwise indicated. Conduit shall be installed in a sand backfilled and compacted trench with a 2" wide yellow poly marker tape placed in the trench approximately 6" below finished grade.
- F. Metallic conduit, cut with a power saw or hacksaw, shall be reamed to remove burrs.
- G. Conduit bends shall be held to as large a radius as possible for ease in pulling of conductors and to provide a neatly installed appearance. The maximum length of straight conduit runs shall be 200 feet (6096 cm) between pull boxes, with 50 feet (1524 cm) deducted for each 90-degree bend and 25 feet (762 cm) deducted for each 45-degree bend; reduction of length for all other angle bends shall be calculated on a similar basis.
- H. Conduit risers below grade, inside and outside the building, shall have the bend weighted with concrete to prevent the conduit from lifting when cables are pulled.
- I. PVC conduit shall be installed away from high temperature piping. PVC conduit shall be cut with a fine-tooth blade or knife, and burrs removed from the cut edge. Connections between EMT or rigid conduit and PVC shall be made with threaded PVC adapters or fittings.
- J. Insulated Bushings
 - 1. Conduits shall have insulated bushings installed at entrances to panelboards, starters, pull boxes and shall be secured to the enclosure by the bushing (and lock nut, if necessary) on the inside, and by lock nut on the outside.
 - 2. Conduits entering distribution type panelboards and the main switchgear shall have insulated grounding bushings similar to T & B 3800 series, with bushings connected together by means of a continuous copper grounding conductor, sized to meet the requirements of the NEC.
- K. Connectors, couplings, and lock nuts shall be tightened securely by use of the proper tools to assure an effective and continuous path to ground through the conduit system.
- L. Where wire is run for a motor connection, to be connected under a separate contract, the conduit shall be terminated in the proper fitting at the correct location.

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- M. A short piece of flexible metal conduit shall be used in the feeder conduit near the motor.
- N. Surface mounted conduit shall be mounted flush to wall and secured by one-hole or two-hole clamps.

END OF SECTION

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**SECTION 26 0535
PULL AND JUNCTION BOXES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pull, junction, and outlet boxes.

1.2 REFERENCES

- A. National Electrical Code (NEC).
- B. National Electrical Manufacturers Association (NEMA).
- C. Underwriters' Laboratories, Inc. (UL).

1.3 QUALIFICATIONS

- A. Junction and pull boxes shall be as manufactured by Appleton Electric, Arrow-Hart, Bell Electric / Square D, General Electric, O.Z. / Gedney Co., Slater Electric Inc., or approved equivalent.
- B. Conduit bodies shall be as manufactured by Appleton Electric Co., Crouse-Hinds Co., Harvey Hubbell Inc., Killark Electric Mfg. Co., O.Z. / Gedney Co., Pyle-National Co., Spring City Electrical Mfg. Co., or approved equivalent.
- C. Bushings, knockout closures and lock nuts shall be as manufactured by Appleton Electric Co., Burndy Corp., Crouse-Hinds Co., Gould, Inc., O.Z. / Gedney Co., RACO, Inc., Steel City, Thomas and Betts Co., or approved equivalent.
- D. Interior outlet boxes shall be as manufactured by Appleton Electrical Co., Arrow Conduit and Fittings Corp., RACO, Inc., Steel City / Thomas and Betts Co. or approved equivalent.
- E. Weatherproof outlet boxes shall be as manufactured by Appleton, Bell Electric / Square D Co., Crouse-Hinds Co., Harvey Hubbell, Pyle-National, or approved equivalent.
- F. Weatherproof outlet boxes for "unattended wet locations while in use" per NEC 406.8(B) (latest edition), Tay Mac Series 20xxx or approved equivalent.

PART 2 PRODUCTS

2.1 REQUIREMENTS

- A. Provide galvanized, UL-code gauge sheet steel junction and pull boxes, with screw-held covers. Type, shape, and size shall be as required to suit each respective location and installation. Boxes shall have welded seams with stainless steel nuts, bolts, screws, and washers.
- B. Provide galvanized cast-metal conduit bodies of type, shape, and size to suit each respective location and installation. Bodies shall have threaded conduit entrances, removable covers, and corrosion resistant screws.
- C. Provide corrosion resistant, punched-steel box knockout closures, conduit locknuts and malleable iron conduit bushings, and offset connectors of type and size to suit respective uses and installation.
- D. Outlet Boxes

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1. Weatherproof outlet boxes shall be corrosion-resistant cast-metal wiring boxes of the type, shape, and size, including box depth to suit each respective location and installation. Boxes shall have threaded conduit ends and threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.
2. Weatherproof switch and receptacle cover plates shall be case aluminum or zinc die cast with spring hinged waterproof caps, faceplate gaskets, and corrosion-resistant fasteners.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide pull and junction boxes where required unless specifically shown on the drawings to be larger than required by the NEC, size pull and junction boxes in accordance with the minimum volumes set forth in the NEC.
- B. Fasten boxes rigidly to structural surfaces to which they are to be mounted or, solidly embed in concrete or masonry.
- C. Provide electrical grounding connections for installed boxes.
- D. Outlet Boxes
 1. Provide 4" x 4" galvanized pressed steel outlet box at each receptacle, wall mounted light fixture, task light, wall switch, or any other device shown.
 2. Outlet boxes exposed to weather or located in damp locations shall be galvanized cast iron, or malleable iron, or cast aluminum. Weatherproof switches and receptacles shall be mounted in "FS" (4-point mounting) boxes.
 3. Outlet boxes shall be plumb and level and shall be firmly secured in position, with the face of the box flush with the finished wall or ceiling.
 4. Remove only knockouts which are required for connection of conduit or insertion of conductors. Provide plugs for unused openings.
 5. Conduit shall enter box squarely and shall be secured by means of lockout on outside and insulated bushing inside.
 6. Provide electrical grounding connections for installed boxes.
 7. Outlet boxes shall be mounted 18" above finished floor to center of box for receptacles and 48" for switched unless shown otherwise on the drawings.

END OF SECTION

**SECTION 26 2713
ELECTRICITY METERING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Equipment for Owner electricity metering:
 - 1. Single circuit electricity meters.

1.2 REFERENCE STANDARDS

- A. ANSI C12.1 - Electric Meters - Code for Electricity Metering; 2024.
- B. ANSI C12.20 - American National Standard for Electricity Meters - 0.1, 0.2, and 0.5 Accuracy Classes; 2022.
- C. IEC 62053-21 - Electricity Metering Equipment - Particular Requirements - Part 21: Static Meters for AC Active Energy (Classes 0,5, 1 and 2); 2020.
- D. IEC 62053-22 - Electricity Metering Equipment - Particular Requirements - Part 22: Static Meters for AC Active Energy (Classes 0,1S,0,2S and 0,5S); 2020.
- E. IEC 62053-23 - Electricity Metering Equipment - Particular Requirements - Part 23: Static Meters for Reactive Energy (Classes 2 and 3); 2020.
- F. IEEE 1459 - IEEE Standard Definitions for the Measurement of Electric Power Quantities Under Sinusoidal, Nonsinusoidal, Balanced, or Unbalanced Conditions; 2010.
- G. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; 2016.
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- I. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work to provide equipment suitable for interface with electricity metering systems to be provided.
 - 2. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Preinstallation Meeting: Conduct meeting with facility representative and other related equipment manufacturers to discuss electricity metering system interface requirements.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for electricity metering systems and associated components and accessories. Include ratings, configurations, standard wiring diagrams, dimensions, service condition requirements, and installed features.
- C. Shop Drawings: Include system interconnection schematic diagrams showing all factory and field connections. Include requirements for interface with other systems.

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- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual installed locations of meters and final equipment settings.
- F. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.5 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
- B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.7 FIELD CONDITIONS

- A. Maintain field conditions within required service conditions during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Electricity Meters:
 - 1. Honeywell E-Mon
 - 2. AccuEnergy
 - 3. ABB: www.electrification.us.abb.com/#sle.
 - 4. Eaton Corporation: www.eaton.com/#sle.
 - 5. Schneider Electric: www.se.com/#sle.
 - 6. Siemens Industry, Inc: www.new.siemens.com/#sle.
 - 7. Source Limitations: Provide electricity meters produced by single manufacturer and obtained from single supplier.

2.2 GENERAL METER REQUIREMENTS

- A. Meter shall be fully electronic with 4-line by 20-character backlit LCD display showing kWh, kW demand (with peak date and time), power factor per phase, real-time load in kW, Amps per phase and Volts per phase.
- B. Meter shall use 0-2 volt output split-core current sensors to allow paralleling and/or mounting up to 500 feet from the meter. Sensors shall be of split-core configuration to allow installation without powering down. Sensors shall be available from 100 amp to 3200 amp. Sensors shall be optionally available in solid-core configuration (100 & 200 amp.)
- C. Meter shall be field programmable for meter date/time.
- D. Meter shall provide installation diagnostics on display.
- E. Meter shall be enclosed in a NEMA 4X polycarbonate enclosure (standard) with padlocking

hasp & mounting flanges for indoor/outdoor installation (standalone) with one 1 1/16" KO on bottom of enclosure. Optional MMU enclosure or heavy duty JIC steel enclosure, see drawings for enclosure type.

- F. Meter shall be UL Listed/CUL Listed to latest applicable standards for safety.

2.3 EQUIPMENT FOR OWNER ELECTRICITY METERING

- A. Provide microprocessor-based digital electricity metering systems including all instrument transformers, wiring, and connections necessary for measurements specified.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Provide electricity metering systems and associated components compatible with the equipment and associated circuits to be metered.
- D. Service Conditions: Provide electricity meters suitable for operation under the service conditions at the installed location.
- E. Enclosures:
 - 1. Where not furnished by manufacturer, provide required cabinets and enclosures.
 - 2. Each meter unit shall be a multifunction power & energy meter with digital display and provided with a protective display cover.
 - 3. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R or Type 4.
 - 4. Provide lockable door(s) for outdoor locations.
 - 5. Finish: Manufacturer's standard unless otherwise indicated.
- F. Instrument Transformers:
 - 1. Comply with IEEE C57.13, where applicable.
 - 2. Select suitable ratio, burden, and accuracy as required for connected devices.
 - 3. Current Transformers: Compatible with connected meters; replace meters damaged by connection of incompatible current transformers. Provide shorting terminal blocks for connection of secondaries where applicable.
 - 4. Potential Transformers: Include primary and secondary fuses with disconnecting means.

2.4 SINGLE CIRCUIT ELECTRICITY METERS

- A. Single Circuit Electricity Meter - Basis of Design: Honeywell E-Mon Series Meter with LCD screen interface; 5-year warranty; utilizes voltage mode CTs that do not require terminal shorting blocks; compatible with solid-core, split-core, and rope CTs.
 - 1. Measured Parameters:
 - a. Real/active energy (kWh); per phase and total of all phases.
 - b. Maximum (peak) demand intervals; real/active power (kW), reactive power (kVAR), and apparent power (kVA).
 - c. Current; per phase and average of all phases.
 - d. Voltage; line-to-line and line-to-neutral; per phase and average of all phases.

- e. Power factor; per phase and average of all phases.
- f. Frequency.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of metering systems and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive meters.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Provide required support and attachment components.
- D. Provide grounding and bonding.

3.3 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.4 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.
 - 3. Instructor: Manufacturer's authorized representative.
 - 4. Location: At project site.

END OF SECTION 26 2713

**SECTION 26 2813
FUSES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fuses.

1.2 RELATED REQUIREMENTS

- A. Section 26 2816.16 - Enclosed Switches: Fusible switches.

1.3 REFERENCE STANDARDS

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.
- D. UL 248-4 - Low-Voltage Fuses - Part 4: Class CC Fuses; Current Edition, Including All Revisions.
- E. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
 - 2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
 - 3. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. None required.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com.
- B. Littelfuse, Inc: www.littelfuse.com.
- C. Mersen: ep-us.mersen.com.

2.2 APPLICATIONS

- A. Individual Motor Branch Circuits: Class RK5, time-delay.
- B. Primary Protection for Control Transformers: Class CC, time-delay.

2.3 FUSES

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
- C. Provide fuses of the same type, rating, and manufacturer within the same switch.
- D. Comply with UL 248-1.
- E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
- F. Voltage Rating: Suitable for circuit voltage.
- G. Class R Fuses: Comply with UL 248-12.
 - 1. Class RK5, Time-Delay Fuses:
- H. Class CC Fuses: Comply with UL 248-4.
 - 1. Class CC, Time-Delay Fuses:
- I. Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.
- J. Provide the following accessories where indicated or where required to complete installation:
 - 1. Fuseholders: Compatible with indicated fuses.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Do not install fuses until circuits are ready to be energized.
- B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

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**SECTION 26 2816
DISCONNECT SWITCHES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Safety disconnect switches.

1.2 REFERENCES

- A. National Electrical Manufacturers Association (NEMA).
- B. Underwriters' Laboratories, Inc. (UL).

1.3 SYSTEM DESCRIPTION

- A. Disconnect switches provide safe disconnecting of electrical power to equipment.

1.4 SUBMITTALS

- A. Submit the following information:
 - 1. Outline drawing with dimensions.
 - 2. Equipment Ratings.
 - a. Voltage.
 - b. Capacity.
 - c. Horsepower.
 - d. Short circuit withstand rating.

1.5 QUALIFICATIONS

- A. Safety switches shall be NEMA heavy-duty type and shall carry the UL label. Fusible switches shall incorporate Class "R" fuse rejection feature and shall be braced to withstand 50,000 ampere RMS symmetrical fault current.
- B. Switches shall be of the manufacturer Square D, ABB, Eaton, Siemens.
- C. Safety switches used for service entrance equipment shall be UL listed as suitable for service entrance.

PART 2 PRODUCTS

2.1 PRODUCTS

- A. Provide heavy-duty type, sheet steel enclosed, safety switches. Type, size, and rating shall be as shown on the drawings or as required by the motor or equipment served.
- B. Switches shall incorporate quick-make, quick-break operating handles. Mechanism shall be an integral part of the box, not the cover, and switches shall have a cover interlock to prevent unauthorized opening of the switch door in the on position or closing of the switch mechanism with the door open. Current carrying parts shall be constructed of high-conductivity copper with silver-tungsten type switch contact.
- C. Fuse clips shall be positive pressure type reinforced rejection type fuse clips.

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- D. Indoor enclosures shall be NEMA 1. Enclosures for wet locations and for outdoor use shall be NEMA 3R. Disconnect switch shall be lockable in the "On" and "Off" positions.
- E. Equip each motor disconnect with auxiliary contacts (1-NO, 1-NC). Disconnect switches utilized with variable speed motor controllers shall be interlocked with the drive control circuit.

PART 3 EXECUTION

3.1 EXECUTION

- A. Furnish and install safety disconnect switches (fused and non-fused) shown on the drawings. In addition, furnish a safety disconnect switch for motors and equipment which do not have combination starters or integral disconnecting means.
- B. For mechanical equipment rated for use only with fuses (such as condensing units, compressors, chillers), provide fusible disconnect switches. Such switches shall be one, two or three pole type, with solid neutral for 4- wire service, and shall have the proper current and voltage rating as required.
- C. Terminals of the proper size for wire as shown on the drawings for line, load and ground shall be supplied by the disconnect switch manufacturer.
- D. Each motor shall be individually protected. Furnish a safety disconnect for each motor as required by the NEC.
- E. Disconnect switches shall not be directly mounted to equipment, which is mounted on vibration isolation pads or springs, unless a piece of flexible conduit is used between the disconnect switch and the fixed conduit.
- F. Safety switches shall be mounted securely to walls, columns, or machine frames, and provided with brackets, mounting devices, structural pieces and expansion type anchor inserts necessary for this purpose. Switches shall not be mounted directly to metal surfaces or to concrete or masonry walls. Structural channels such as Kindorf or 3/4" plywood shall be used to mount switches at least 3/4 inch (19.05 mm) away from the mounting surface.
- G. Switches shall be mounted at a height of 60 inches (1524 mm) above the finished floor to the top of the back box.
- H. Coordinate fuseable switches and fuse sizes, with mechanical trades, where required by UL listing for mechanical equipment installation.

END OF SECTION