

PROJECT MANUAL

Heritage High School Main Distribution Switchboards Replacement

Newport News Public Schools Newport News, Virginia

IFB #018-0-2025/SB



THOMPSON
Consulting Engineers

*Mechanical and Electrical Engineering
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MJT Project No. 21-163

March 26, 2025

Final Submittal

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SECTION 000002 - PROJECT DIRECTORY

Owner: Newport News Public Schools
12580 Patrick Henry Drive
Newport News, Virginia 23602

Owner's
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END OF SECTION 000002

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END OF SECTION 000005

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SECTION 000820 - SPECIAL CONDITIONS

1. SAFETY:

State Occupational Safety and Health Standards apply to this project. The Owner and Engineer shall not be held responsible for enforcement of safety conditions. Particular attention to the following subparts must be observed:

- a. Ladders and Scaffolds: All ladders, scaffolds, or temporary work platforms to be kept in locked storage or removed from the job site when not in use or when unattended.
- b. Cranes, Hoists, Elevators, and Conveyors: Cranes are to be guarded and/or secured at all times when on the job site so as to avoid becoming a hazard to the public and employees.

Material hoists, lifts, or conveyors are to be secured so as to avoid becoming a hazard when unattended.
- c. Motor Vehicles and Mechanized Equipment: Keys must be removed and secured from vehicles and other mobile equipment when not in use or unattended.

Vehicles and mobile equipment with door locking capability will be locked when not in use.
- d. Demolition: Pay particular attention to safe procedures for demolition and removal of debris so as not to create a hazard to the public and employees. The disposal of solid waste in open dumps is prohibited.
- e. Additional Safety Requirements: No firearms, alcohol, or drugs may be brought onto the project at any time.
- f. All poisonous or otherwise hazardous material will be kept in locked containers when not in use or left unattended.
- g. Contractor's personnel will strictly adhere to all traffic regulations, traffic patterns, and speed limits.
- h. If any hot work, including but not necessarily limited to welding, burning, or torch cutting, is required, the Contractor will station a watchman inside the building with proper fire extinguisher equipment.

2. APPLICABLE STANDARDS AND CODES:

Wherever reference is made to any published standards, codes, or standard specification, it shall mean the latest standard code, specification, or tentative specification of the technical society, organization, or body referred to, which is in effect at the date of Invitation for Bids. The following is a partial list of typical abbreviations which may be used in the specifications and the organizations to which they refer:

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ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
UL	Underwriters Laboratory
NEC	National Electrical Code
USBC	Uniform Statewide Building Code (Virginia)

3. FIRE PROTECTION:

The Contractor shall not use flammable liquids or gases, stoves, salamanders, tar pots, etc., in and on the building unless approved by the Engineer. Where welding, cutting, or burning are necessary, incombustible shields shall be used, and suitable fire extinguishing equipment shall be maintained nearby. Paints, oils, turpentine, and similar materials shall be stored in well-ventilated spaces, and no other materials shall be stored therein. The arrangement for storage must have written approval of the Owner. The Contractor shall provide and maintain an adequate number of fire extinguishers throughout the construction period. Free and unobstructed access shall be maintained at all times to fire extinguishing equipment and fire hydrants.

The Contractor shall designate a regular supervisory employee as a Fire Warden, and he shall be responsible for all fire prevention, fire protective matters, and posting of fire protection procedures at the work site.

4. PREVENTION OF NUISANCE FROM NOISE, ETC.:

The Contractor shall be responsible for curtailing noise, smoke, fumes, or other nuisances resulting from his operations within the limitations set by law and as directed by the Owner or Engineer.

5. PERMITS:

Attention is called to license charges and fees pertaining to construction work, as levied by local governments. Such charges and fees, based on the amount of contracted work, are the responsibility of the Contractor. Such permits include but are not limited to hauling materials, dumping materials, and crossing roads with utilities. The Contractor is also responsible for paying all taxes applicable to the project.

6. TEMPORARY FACILITIES:

The Contractor shall coordinate with Owner Representative for location of trailers, storage, and portable toilet at the pre-construction meeting.

The Contractor shall control workers at all times. Workers are not to use school lounges or telephones.

When possible, parking areas for construction employees in the vicinity of the project site will be allocated. The Contractor is responsible for informing his employees that they cannot park in any location other than the allocated areas. All existing parking regulations will be enforced. Control of vehicles on the site is the responsibility of the Contractor.

Construction fencing, where required, must be adequate to protect persons and property.

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7. UNDERGROUND SERVICES:

At all locations, all underground utilities or service lines uncovered or exposed by operations performed under the Contract shall be adequately protected by the Contractor. In the event of damage to underground utilities or service interruptions resulting from failure to follow all applicable procedures, the Contractor will be held responsible for resulting costs.

8. UTILITY OUTAGES:

The Contractor shall not disrupt traffic, utilities, or the normal daily operation of the school nor produce excessive dust, noise, or fumes without prior Owner Representative coordination and permission.

Authority for power outages must be obtained from the Owner, who will coordinate the interruption of service with the Contractor and the City parties affected. In general, a request for interruption to service will require at least 21 working days for approval.

If telephone, power, cable television, gas, or water lines are to be affected by proposed digging operations, the Contractor shall notify the applicable utility company(s) and request that they locate their utilities in the field.

END OF SECTION 000820

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SECTION 000821 - OWNER'S SPECIAL RULES AND CONDITIONS

The following Rules and Conditions apply to this project. These Rules and Conditions take precedent if in conflict with other similar Rules and Conditions that appear elsewhere in this Specification.

- Contractor shall provide an on-site supervisor for the duration of the contract. Name and local telephone number will be provided to the Owner Representative.
- Contractor shall obtain and post all necessary permits. City Codes Compliance Department will inspect all aspects of the project for compliance with codes and regulations. Contractor's supervisor shall be present during all inspections.
- Contractor shall coordinate with Owner Representative for location of trailers, storage and portable toilet.
- Contractor shall not disrupt traffic, utilities, or the normal daily operation of the school nor produce excessive dust, noise, or fumes without prior Owner Representative permission.
- Contractor will be responsible for removal and proper disposal of all debris and materials generated by the project.
- Contractor shall provide safety barriers or tape around project areas. Contractor shall secure equipment and materials at all times.
- Contractor shall control workers at all times. Workers are not to use school lounges or telephones.
- Smoking is not permitted.
- Any damages sustained through the fault of the contractor shall be repaired or paid for by the contractor.

END OF SECTION 000821

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SECTION 000851 - DRAWING INDEX

T1 TITLE SHEET

ELECTRICAL

E0.1 ELECTRICAL LEGEND, ABBREVIATIONS, NOTES, AND SCHEDULES
E1.2 ELECTRICAL FLOOR PLANS, DETAILS, AND NOTES
E1.2 SWITCHBOARDS SECTIONS PHOTOGRAPHS AND NOTES

END OF SECTION 000851

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SECTION 010010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DRAWINGS ACCOMPANYING PROJECT MANUAL

- A. The Drawings accompanying this Project Manual are listed under Section 00851 Drawing Index in this Project Manual.

1.3 PROJECT DESCRIPTION

- A. The "Work" generally includes but is not limited to the following:

Remove two existing 4000 amp, 480Y/277-volt, 3-Phase, 4-Wire, Main Distribution Switchboards and install two new 4000 amp, 480Y/277-volt, 3-Phase, 4-Wire, Distribution Switchboards. Disconnect all existing feeder conductors from the existing main distribution switchboards, extend and reconnect to the new branch circuit breakers in the new main distribution switchboards.

1.4 PERMITS, FEES AND CHARGES

- A. General: The Contractor shall obtain and pay for all applicable permits, fees and charges, not specifically excluded from the Contract and not specifically indicated to be obtained and paid for by the Owner.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010010

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SECTION 010015 - CONTRACTOR'S USE OF THE PREMISES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: This Section applies to situations in which the Contractor or his representatives, including but not necessarily limited to suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property.

1.2 QUALITY ASSURANCE

- A. Promptly, upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.
- B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.

1.3 SUBMITTALS

- A. Staff Names: Within 5 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

1.4 GENERAL

- A. Construction areas of the building will be vacated during the construction period of the summer of 2022. During the occupied portions of the project, including the Owner's occupancy of the building immediately after Substantial Completion, the Contractor shall maintain a low profile and adhere to the Contract Documents as well as Owner requirements so as not to interfere with the staff operations. The Contractor shall take all precautionary measures required by the Contract documents, or as deemed necessary by the Owner or Engineer during the occupied portions of the contraction project, to maintain the site in a safe condition for occupants.
- B. Permission to interrupt utility service or gain access to the building shall be requested from the Owner 14 calendar days in advance.
- C. Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public. Confine operations to areas within limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

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- D. The Contractor shall protect all improvements which are to remain from damage. All improvement and ground areas damaged during construction shall be restored to like new work. All sidewalks, parking lot surfaces, and curbs shall be protected from the work. Any damaged surfaces shall be restored to new condition.
- E. The Contractor shall limit staging areas to prevent scattering of construction materials and equipment throughout site. The Contractor shall indicate at the Pre- Construction meeting the location and limits of staging areas that he anticipates utilizing for approval by Owner.
- F. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials.
- G. During the occupied portions of the project, park in designated pre-approved areas only.
- H. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
- I. Maintain the building in a weather-tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
- J. The Contractor shall strictly prohibit weapons, drugs, and tobacco products in all buildings and property. The Contractor shall restrict and instruct all personnel at the project site that talking to students and/or teachers as well as using telephones is prohibited. A dress code which requires all construction personnel to wear shirts at all times (without slogans) will be strictly enforced.

1.5 CONTRACTOR'S VEHICLES

- A. Parking for Contractor's vehicles, vehicles belonging to employees of the Contractor, and all other vehicles entering upon the Owner's property in performance of the Work of the Contract shall only use the parking and access route as authorized by the Owner.

1.6 SECURITY

- A. Restrict the access of all persons entering upon the Owner's property in connection with the work to the access route and to the actual site of the work. Employees of all Contractors shall be required to display a photo identification badge at all times while on Newport News School Board property.

1.7 OWNER OCCUPANCY

- A. The Owner may occupy portions of the site and facilities located at the site during the period of

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construction. The Contractor shall cooperate fully with the Owner and any of his representatives during construction operations to minimize conflicts and to facilitate the Owner's usage of the facilities. The Contractor shall perform the work so as not to interfere with the Owner's usage and other facility operations.

1.8 CONTRACTOR'S USE OF EXISTING BUILDINGS

- A. Use of the building will not be permitted, except in the actual area of the work. The Contractor shall not allow the use of the Owner's telephone by the Contractor's personnel, subcontractor personnel, or other persons entering upon the Owner's buildings in connection with the work unless otherwise specified.

1.9 PROJECT SCHEDULE AND PHASING

- A. Refer to Section 01020, "Project Schedule".

1.10 RECORD OF EXISTING DAMAGE

- A. Prior to beginning work, the Contractor shall photograph or video tape all existing damage to building surfaces, finishes, furniture, equipment, and any other property left in the area of work. A copy of the record video, documentation, and photographs shall be provided to the Owner prior to beginning work. The Contractor shall be responsible for repair or replacement of all property damaged as a result of the Contractor's work. Should a dispute occur, the video tape, documentation, or photographs shall be used to settle the dispute. Any damage not documented shall be considered the Contractor's responsibility. Contractor shall verify the operation of all devices removed to facilitate the construction, including but not limited to speakers, clocks, motion detectors, smoke detectors, light fixtures, etc.

1.11 TIME OF WORK

- A. Construction work may be done between the hours of 6:00 A.M. and 8:00 P.M. Monday through Thursday and between the hours of 6:00 A.M. and 4:00 P.M. Friday and Saturday. With a minimum of one week's notice to the Owner, and the Owner's approval, work may be done between the hours of 6:00 A.M. and 4:00 P.M. on Sunday.

1.12 SYSTEM SHUTDOWNS

- A. The Contractor shall schedule the work in such a manner as to complete the work so that system downtime will be at a minimum. Under no circumstances shall the Contractor shut down any systems without Owner's approval.
- B. The Contractor shall not interfere with the operation of equipment and services in those areas of the facility where work is not scheduled and where the Owner, employees, and others

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occupy the facility, facilities, and/or site.

- C. The Owner's representative shall be informed at least 14 calendar days in advance of each scheduled shutdown. The Owner shall approve the shutdown schedule in writing.

1.13 CONTRACTOR'S DUMPSTER

- A. Contractor shall provide and dump regularly a minimum 10 cubic yard dumpster on site during the construction period for construction debris disposal.

1.14 MANNER OF CONDUCTING THE WORK

- A. Daily Cleanup: The Contractor shall regularly clean-up work in a manner consistent with this Specification. The Contractor shall provide daily cleanup of dust and debris to preclude the potential of contamination of new materials and equipment or existing equipment. All building entrances, corridors, sidewalks, and exterior pavement shall be cleaned of debris and materials daily to provide clean and unobstructed vehicular and walk paths. The work shall be so executed, and such temporary facilities furnished, as to preclude interference with access within and between the existing building areas and structures and to cause no possible interference with the operation of any essential service thereof. If daily cleanup is not performed to the satisfaction of the Owner, the Owner reserves the right to perform cleanup after 24 hours' notice and backcharge Contractor at rate of \$30.00 per hour.
- B. Existing Utilities and Equipment: Do not operate or disturb the setting of valves, switches, or electrical equipment on the service lines to the building, and service within the building, except by proper previous arrangement with the Owner and in the presence of the Owner or his authorized representative.
- C. Coordination: Coordinate demolition and installation of temporary and permanent utilities with the Owner. Schedule this work so as to cause no disruption of existing building operation and minimum delay of the work. Notify the Owner a minimum of 14 calendar days in advance of anticipated utility outages, and schedule such work so as not to interrupt normal operations. Coordinate with the City of Newport News to ensure that all underground utilities are marked prior to start of work by Dominion Energy. Coordinate with the City of Newport News Fire Marshal all fire system work and adhere to all requirements of the Fire Marshal for protection of the building.
- D. Damage to Existing Facilities: Restore existing work, including concealed work not indicated or specified to be modified, and which is damaged or otherwise affected by the Contractor's operations, to a condition equal to that which existed before the work was commenced. Use workmanlike manner where new construction adjoins, connects to, or abuts existing work. Join new work to existing work in such a manner as to make the joining as inconspicuous as possible. Obvious patching of damaged work will not be acceptable. At the completion, ensure that the buildings and grounds are in first-class condition within the intent of these Specifications, with all new parts well joined to the old as required, all connections completed, and all facilities in full working condition.

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- E. Prior to beginning work, the Contractor shall photograph or video tape all existing damage to building surfaces and finishes in the area of work. A copy of the record video and photographs shall be provided to the Owner prior to beginning work. The Contractor shall be responsible for repair or replacement of all property damaged as a result of the Contractor's work. Should a dispute occur, the video tape or photographs shall be used to settle the dispute. Any damage not documented shall be considered the Contractor's responsibility.
- F. Final Cleaning: Provide professional cleaners using commercial quality building maintenance equipment and materials to clean the building in accordance with Section 01710, "Final Cleaning," prior to the date of Substantial Completion.
- G. Containment: Maintain containment barriers of the project areas as indicated and as required to preclude construction-generated dust and dirt from entering non- construction areas.
- H. In the event the Contractor does not comply with the construction documents, the Owner may procure the services of another qualified Contractor and deduct his costs from the Contract amount.

END OF SECTION 010015

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SECTION 010020 - PROJECT SCHEDULE

PART 1 - GENERAL

1.1 PURPOSE

- A. The project schedule calls for the work to be done during the 2026 summer months.

1.2 PROJECT SCHEDULE

- | | | |
|----|----------------------------------|------------|
| A. | Project Construction Start Date: | 06-15-2026 |
| B. | Substantial Completion: | 07-15-2026 |
| C. | Final Completion: | 08-01-2026 |

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 010020

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SECTION 010027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.
- C. The Contractor's Construction Schedule and Submittal Schedule are included in Section 01300, "Submittals".

1.3 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
- B. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - 1. Contractor's construction schedule.
 - 2. Application for Payment form.
 - 3. List of subcontractors.
 - 4. List of products.
 - 5. List of principal suppliers and fabricators.
 - 6. Schedule of submittals.
- C. Submit the Schedule of Values to the Engineer within ten (10) days after receipt of the Notice to Proceed, unless otherwise directed by the Owner.
- D. Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
- E. Include the following Project identification on the Schedule of Values:

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1. Project name and location.
 2. Name of the Engineer.
 3. Project number.
 4. Contractor's name and address.
 5. Date of submittal.
- F. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
1. Generic name.
 2. Related Specification Section.
 3. Name of subcontractor.
 4. Name of manufacturer or fabricator.
 5. Name of supplier.
 6. Change Orders (numbers) that have affected value.
 7. Dollar value.
 8. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.
- G. Provide a breakdown of the Contract Sum in accordance with requirements of the General Conditions and in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
- H. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
- I. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- J. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
- K. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense.
- L. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- 1.4 APPLICATIONS FOR PAYMENT
- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Engineer and paid for by the Owner.

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- B. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- C. Payment Application Times: Each progress payment date is as indicated in the General Conditions. The period of construction Work covered by each Application or Payment is the period indicated in the General Conditions.
- D. Payment Application Forms: Use AIA Document G 702 and Continuation Sheets G 703 as the form for Application for Payment.
- E. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- F. Transmittal: Submit 3 executed copies of each Application for Payment to the Engineer by means ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien, invoices for stored on site material, and similar attachments, when required.
- G. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
- H. Waivers of Mechanics Lien: With each Application for Payment submit waivers of mechanics liens from subcontractors or sub-subcontractors and suppliers for the construction period covered by the previous application.
 - 1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit final or full waivers.
 - 3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
- I. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.
- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of Values.
 - 3. Contractor's Construction Schedule (preliminary if not final).

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4. Submittal Schedule (preliminary if not final).
 5. Copies of building permits
 6. Copies of authorizations and licenses from governing authorities for performance of the Work.
 7. Initial progress report.
 8. Report of pre-construction meeting.
 9. Certificates of insurance and insurance policies.
 10. Performance and payment bonds (if required).
 11. Data needed to acquire Owner's insurance.
- K. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
1. Administrative actions and submittals that shall proceed or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Test/adjust/balance records.
 - c. Maintenance instructions.
 - d. Start-up performance reports.
 - e. Change-over information related to Owner's use, operation and maintenance.
 - f. Final cleaning.
 - g. Application for reduction of retainage, and consent of surety.
 - h. Advice on shifting insurance coverages.
 - i. List of Incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
 - j. Waivers of Mechanics Liens.
 - k. Items required by the General Conditions.
- L. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Assurance that unsettled claims will be settled.
 4. Assurance that Work not complete and accepted will be completed without undue delay.
 5. Transmittal of required Project construction records to Owner.
 6. Proof that tax, fees and similar obligations have been paid.
 7. Removal of temporary facilities and services.
 8. Removal of surplus materials, rubbish and similar elements.
 9. Final waiver of Mechanics Liens.
 10. Items required by the General Conditions.

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PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010027

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SECTION 010035 - MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

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. The Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

1.4 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: The Engineer will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
- B. Proposal requests issued by the Engineer are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
- C. Within 5 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Engineer for the Owner's review.
 - 1. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - 2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 3. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- D. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Engineer.

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1. Include a statement outlining the 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 Contract Time.
 2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Comply with requirements in Section 01631, "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.
- E. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. When the Owner and the Contractor disagree on the terms of a Proposal Request, the Engineer may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
- C. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
- D. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.6 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Proposal Request, the Engineer will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G701.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010035

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SECTION 010040 - PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Coordination.
 - 2. Administrative and supervisory personnel.
 - 3. General installation provisions.
 - 4. Cleaning and protection.
- B. Progress meetings, coordination meetings and pre-installation conferences are included in Section 01200 "Project Meetings".
- C. Requirements for the Contractor's Construction Schedule are included in Section 01300, "Submittals".

1.3 COORDINATION

- A. Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to ensure maximum accessibility for required maintenance, service and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

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- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project Close-out activities.

1.4 SUBMITTALS

- A. Staff Names: Within 5 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
- B. Post copies of the list in the temporary field office.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.
- F. Recheck measurements and dimensions, before starting each installation.

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- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.2 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. Electrical current.
 - 20. High speed operation.

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21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 010040

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SECTION 010095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the General Conditions.
- B. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Engineer," "requested by the Engineer," and similar phrases.
- D. Approve: The term "approved," where used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in General and Supplementary Conditions.
- E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use".
- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor, for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

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- J. The term "experienced" when used with the term "Installer" means having a minimum of 5 previous Projects similar in size and scope to this Project, being familiar with the precautions required, and having complied with requirements of the authority having jurisdiction.
- K. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- L. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 - 1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- M. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.
- N. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERFORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
- C. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the full context of the Contract Documents so indicates.
- D. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be

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fulfilled indirectly by the Contractor, or by others when so noted.

1. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Where the date of issue of a referenced standard is not specified, comply with the standard in effect as of date of Contract Documents.
- C. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Engineer for a decision before proceeding.
 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

1.5 GOVERNING REGULATIONS/AUTHORITIES

- A. The Engineer has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents; that information may or may not be of significance to the Contractor. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.

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1.6 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010095

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SECTION 010200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Construction Conference.
 - 2. Progress Meetings.
- B. Construction schedules are specified in another Division-1 Section.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 5 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Engineer, the Contractor and its Superintendent, and major subcontractors, and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including such topics as:
 - 1. Tentative construction schedule.
 - 2. Critical Work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of Shop Drawings, Product Data and Samples.
 - 8. Preparation of record documents.
 - 9. Use of the premises.
 - 10. Office, Work and storage areas.
 - 11. Equipment deliveries and priorities.
 - 12. Safety procedures.

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13. First aid.
14. Security.
15. Housekeeping.
16. Working hours.

- D. Reporting: No later than 7 days after the pre-construction conference date, the Contractor will distribute copies of minutes of the conference to each party present and to other parties concerned who were not present. Included will be summaries, in narrative form, of all discussions, agreements, decisions and matters concluded.

1.4 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project site at regular Owner agreed upon intervals. Coordinate dates of alternate meetings with preparation of the payment request. The Engineer or the Owner's Representative will chair the meeting.
- B. Attendees: In addition to representatives of Owner and Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project, and topics required by the General Conditions.
- D. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
- E. Review the present and future needs of each entity present, including such items as:
1. Interface requirements.
 2. Time.
 3. Sequences.
 4. Deliveries.
 5. Off-site fabrication problems.
 6. Access.
 7. Site utilization.
 8. Temporary facilities and services.
 9. Hours of Work.
 10. Hazards and risks.
 11. Housekeeping.
 12. Quality and Work standards.

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- 13. Change Orders.
- 14. Documentation of information for payment requests.

- F. Reporting: No later than 3 days after each progress meeting date the Contractor will distribute copies of minutes of the meeting to each party present and to other parties who should have been present. The Contractor shall provide a brief summary, in narrative form, of progress since the previous meeting and report, to be attached to the minutes.

- G. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PRECONSTRUCTION CONFERENCE FORMAT

- A. The format of the Agenda for the Preconstruction Conference shall generally be as follows:

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PRE-CONSTRUCTION CONFERENCE FORMAT

PRE-CONSTRUCTION CONFERENCE FOR:

OWNER: _____
PROJECT: _____
LOCATION: _____
COMM. NO.: _____ TIME: _____ DATE: _____

AGENDA AND MINUTES

1. GENERAL

- a. Introductions and Registrations of Attendees (sign attached sheet)
- b. Conference Format and Agenda
- c. Agreement, Performance and Payment Bonds and Insurance
- d. Notice to Proceed
- e. Responsibilities of Owner, Contractor, Engineer, and Inspector

2. PROJECT COMMUNICATION AND CORRESPONDENCE

a. With Contractor:

Field Superintendent will be: _____
Company: _____
Street: _____
P.O. Box: (if any) _____
City & Zip: _____
Attention: _____
Telephone: Office _____
 Field _____
 Cell _____

b. With Engineer:

Project Engineer will be: _____
Company: _____
Street: _____
P.O. Box: (if any) _____
City & Zip: _____
Attention: _____
Telephone: Office _____
 Field _____
 Cell _____

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- (1) For questions, information, etc., Attention: _____
In the absence of Mr. _____, if necessary, contact
first _____,
and second _____.
 - (2) For shop drawings and other submittals, use:

 - (3) Discuss submittals and other points on shop drawings, samples, test data,
brochures and other submittals.
- c. With Owner – Inspector will be _____.
Project Manager: _____.
- (1) Copies of correspondence
 - (2) Through Inspector and Engineer
 - (3) Project Identification
- d. With material suppliers and subcontractors
- e. Other
3. SCHEDULE, ESTIMATES, CHANGE ORDERS, AND TIME EXTENSIONS
- a. Project Schedule: CPM, bar chart, other
 - b. Schedule of Values (Lump Sum Breakdown)
 - c. Monthly requests for payment
 - (1) Closing date
 - (2) Format
 - (3) Preliminary approval by Inspector and Engineer copy to Owner
 - (4) Work done and materials on hand
 - (5) Place and projection of materials on hand
 - (6) Conformance to schedule
 - d. List of subcontractors and major suppliers
 - e. Change Orders
 - (1) Request for Proposal and Response
 - (2) Acceptance by Engineer and Owner
 - (3) Change Order execution by Contractor, Engineer, and Owner
 - (4) Time extension, if any
 - (5) Not official until approved by Contractor and Owner
 - f. Time extensions (other than Change Orders) all are to be on change order request.

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4. CONSTRUCTION

- a. Manner of conducting the work
- b. Construction plant area
 - (1) On-site
 - (2) Off-site
 - (3) Disposal of wastes
- c. Project sign(s)
- d. Temporary facilities
- e. Traffic maintenance
- f. Safety – Public, on-site, personnel
- g. Contractor's Quality Plan and Owner's Quality Assurance Plan
 - (1) Certificates – mfg.
 - (2) Construction quality

5. PROJECT CLOSEOUT

- a. Final cleanup
- b. Guarantees
- c. Punch lists and final inspections
 - (1) Testing and Adjusting
 - (2) O & M instructions and manuals
- d. Final payment, Affidavits for Payments of Debts and Claims, Consent of Surety, Release or Waiver of Liens
- e. Record drawings
- f. Assessment of Roles in Construction Project
- g. Other

6. ADDED COMMENTS BY OWNER

7. ADDED COMMENTS BY ENGINEER

8. ADDED COMMENTS BY PRINCIPAL SUBCONTRACTORS

END OF SECTION 010200

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SECTION 010300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;
 - 1. Contractor's Construction Schedule.
 - 2. Submittal Schedule.
 - 3. Daily Construction Reports.
 - 4. Shop Drawings.
 - 5. Product Data.
 - 6. Samples.
 - 7. Quality Assurance Submittals.
- B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - 1. Permits.
 - 2. Applications for Payment.
 - 3. Performance and Payment Bonds.
 - 4. Insurance Certificates.
 - 5. List of Subcontractors.

1.3 SUBMITTAL PROCEDURES

- A. 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.
- B. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
- C. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

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1. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 2. All samples, shop drawings, and product data for finish materials requiring color selection or verification by the Engineer shall be submitted as follows: All exterior finish materials shall be submitted at one time, and the Engineer will take no action on any one submittal until all items have been submitted. All interior finish materials shall also be submitted at one time, and the Engineer will take no action on any one submittal until all items have been submitted.
- D. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re- submittals.
1. Allow 10 days for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 2. If an intermediate submittal is necessary, process the same as the initial submittal.
 3. Allow 5 days for reprocessing each submittal.
 4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.
- E. General Contractor's Review: All submittals shall be reviewed and approved by the General Contractor for conformance to the Contract Requirements and coordination with the work of other trades prior to submission to the Engineer. Submittals submitted without the General Contractor's stamp of approval will not be considered or reviewed by the Engineer and will be returned to the General Contractor.
- F. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block
1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Transmittal Number.
 - d. Transmittal Item Number.
 - e. Name and address of Engineer.
 - f. Name and address of Contractor.
 - g. Name and address of subcontractor.
 - h. Name and address of supplier.
 - i. Name of manufacturer.
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.

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- G. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.
1. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
- H. Completion of transmittal form by the Contractor shall be as follows:
1. Transmittal Number: Number each form consecutively as submitted. Re- submittals shall bear the number of the original submission with a letter suffix (A) added to identify it as the first resubmission. The suffix letters (B), (C), etc. shall be used if additional resubmissions are necessary.
 2. Date all transmittals.
 3. Restrict use of each transmittal form to submittals for one section of Specifications per form.
 4. Restrict each transmittal form to a submission in only one of the following categories:
 - a. For approval.
 - b. Resubmission for approval.
 - c. Substitution for approval.
 5. Item Number: Number consecutively each item submitted with each transmittal form.
 6. Specification section and/or drawing number which describes or requires the item(s) shall be included for each item submitted.
 7. Subcontractor: Indicate the Subcontractor for items submitted on each transmittal form.
 8. Contractor; or his authorized representative; shall sign each transmittal form.
- I. Transmittal Form: Use the sample form at the end of this Section for transmittal of submittals.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Critical Path Method (CPM) Bar Chart Type Schedule: Prepare a fully developed, critical path method horizontal bar-chart type Contractor's Construction Schedule. Submit within 15 days of the date established for "Commencement of the Work".
1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".
 2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.

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3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
 4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
 5. Coordinate the Contractor's construction schedule with the Schedule of Values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
 6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Engineer's procedures necessary for certification of Substantial Completion.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project temporary field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule.
- B. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
- C. Prepare the schedule in chronological order; include submittals required during the first 10 days of construction. Provide the following information:
1. Scheduled date for the first submittal.
 2. Related Section number.
 3. Submittal category.
 4. Name of subcontractor.
 5. Description of the part of the Work covered.
 6. Scheduled date for re-submittal
 7. Scheduled date the Engineer's final release or approval.
- D. Distribution: Following response to initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with submittal dates

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indicated. Post copies in the Project and field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- E. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report, recording the following information concerning events at the site; and submit copies to the Engineer and Owner at weekly intervals:
1. List of subcontractors at the site.
 2. Approximate count of personnel at the site.
 3. High and low temperatures, general weather conditions.
 4. Accidents and unusual events.
 5. Include measured amount of precipitation at project site, occurring daily during period since previous report.
 6. Meetings and significant decisions.
 7. Stoppages, delays, shortages, losses.
 8. Meter readings and similar recordings.
 9. Emergency procedures.
 10. Orders and requests of governing authorities.
 11. Change Orders received, implemented.
 12. Services connected, disconnected.
 13. Equipment or system tests and start-ups.
 14. Partial Completions, occupancies.
 15. Substantial Completions authorized.

1.7 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
1. Dimensions.
 2. Identification of products and materials included.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.

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- 5. Notation of dimensions established by field measurement.
- C. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 30" x 40".
- D. Submittals: Submit one correctable translucent reproducible print and four blue- or black-line prints for the Engineer's review; the reproducible print will be returned.
- E. Distribution: Furnish copies of final submittal to the installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
- F. Do not proceed with installation until a copy of applicable Shop Drawings is in the installer's possession.
- G. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
- H. Engineer will make distribution to the Owner

1.8 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
- B. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - 1. Manufacturer's printed recommendations.
 - 2. Compliance with recognized trade association standards.
 - 3. Compliance with recognized testing agency standards.
 - 4. Application of testing agency labels and seals.
 - 5. Notation of dimensions verified by field measurement.
 - 6. Notation of coordination requirements.
 - 7. Material Safety Data Sheets (MSDS).
- C. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- D. Submittals: Submit nine copies of each required submittal. The Engineer will retain four and will return the other marked with action taken and corrections or modifications required.
 - 1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal. Suppliers, manufacturers, fabricators, and

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others required for performance of construction activities. Show distribution on transmittal forms.

- E. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
- F. Do not permit use of unmarked copies of Product Data in connection with construction.
- G. Engineer will make distribution to the Owner.

1.9 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
 - 1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Engineer's Sample. Include the following:
 - a. Generic description of the Sample.
 - b. Sample source.
 - c. Product name or name of manufacturer.
 - d. Compliance with recognized standards.
 - e. Availability and delivery time.
 - 2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - 3. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.
 - 4. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
 - 5. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
- B. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
 - 1. Preliminary submittals will be reviewed and returned with the Engineer's mark indicating selection and other action.
- C. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication

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techniques, connections, operation and similar characteristics, submit four sets; one will be returned marked with the action taken.

- D. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
 - 1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - 2. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- E. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
- F. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.
- G. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.
- H. Engineer will make distribution to the Owner.

1.10 QUALITY ASSURANCE SUBMITTALS

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 - 1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

1.11 ENGINEER'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.
- B. Compliance with specified characteristics is the Contractor's responsibility.

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- C. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
- D. Final Unrestricted Release: Where submittals are "FURNISH AS SUBMITTED," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
- E. Final-But-Restricted Release: When submittals are marked "FURNISH AS CORRECTED," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
- F. Final-But-Restricted Release Requiring Resubmission: When submittals are marked "REVISE AND RESUBMIT," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance. Revise or prepare new submittal in accordance with the notations; resubmit without delay.
- G. Returned for Re-submittal: When submittal is marked "REJECTED," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - 1. Do not permit submittals marked "REJECTED" to be used at the Project site, or elsewhere where Work is in progress.
- H. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "RECEIPT ACKNOWLEDGED".
- I. Unsolicited Submittals: The Engineer will return unsolicited submittals to the sender without action.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010300

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SECTION 010500 - TEMPORARY FACILITIES AND PROTECTION OF PROPERTY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection of property.
- B. Temporary utilities required include but are not limited to:
 - 1. Use of electric power and water.
 - 2. Provision of telephone.
 - 3. Sanitary facilities, including drinking water.
- C. Temporary construction and support facilities required include but are not limited to:
 - 1. Waste disposal services.
 - 2. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities required include but are not limited to:
 - 1. Staging and storage areas.
 - 2. Temporary fire protection.
 - 3. Barricades, warning signs, lights.
 - 4. Protection of installed work.
 - 5. Security against theft and vandalism.

1.3 SUBMITTALS

- A. Drawings: Submit partial site plans that indicate the following:
 - 1. Proposed locations of fenced temporary storage areas for material and equipment.
 - 2. Dimensions of fenced storage locations indicating gates.
 - 3. Contractor parking area.
 - 4. Proposed crane access for lifting and setting of equipment.

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1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, Fire Department and Rescue Squad rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition".

1.5 PROJECT CONDITIONS

- A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.
- B. Maintain security against theft and vandalism for the site and the building at all times until the date of Substantial Completion.

1.6 DESCRIPTION OF REQUIREMENTS

- A. Definitions: Specific administrative and procedure minimum actions are specified in this section, as extensions of provisions in General Conditions and other contract documents. These requirements have been included for special purposes as indicated. Nothing in this section is intended to limit types and amount of temporary work required, and no omission from this section will be recognized as an indication by the Engineer that such temporary activity is not required for successful completion of the work and compliance with requirements of contract documents. Provisions of this section are applicable to, but not limited to utility services, construction facilities, security/protection provisions and support facilities.
- B. It shall be the responsibility of the Contractor to determine the applicable requirements to initiate and maintain all required safety and health programs, and to follow the recommendations of Federal, State and Local officials.

1.7 TEMPORARY ELECTRIC POWER AND WATER

- A. The contractor may utilize existing permanent electric power and water within the facility

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during the construction phase of the work. Coordinate connection requirements with Owner's representative. All connection costs shall be borne by the Contractor. Usage costs shall be borne by the Owner. Contractor's use of Owner's existing permanent power and water shall in no way limit availability of these utilities to the Owner's facilities. Contractor shall restore Owner's permanent utilities to pre-construction conditions after removal of temporary utility connections.

- B. The contractor shall provide temporary power to the building fire alarm system to maintain fire alarm monitoring throughout the duration of project.
- C. The contractor shall provide temporary power to the building Intrusion Detection System throughout the duration of project.
- D. The contractor shall provide temporary power to the Cox service modem, servers in the data room throughout the duration the during of power outage.

1.8 TEMPORARY TELEPHONE

- A. Provide a job telephone through the completion of all punch list items until Substantial Completion and Owner occupancy. A single cell phone which is on site at all times during construction meets this requirement.

1.9 SANITARY FACILITIES

- A. Provide and maintain temporary toilets as necessary for use of all construction personnel. Place toilets in convenient locations and maintain in sanitary condition. Provide portable container or sanitary bubbler drinking fountains.
- B. Provide adequate washing facilities for all construction personnel. Place in convenient locations.
- C. Existing toilet facilities shall not be used by construction personnel.
- D. Sanitary facilities shall be located as directed by Owner. Provide sanitary facilities for the duration of the project including the punch list period.

1.10 FIRE PROTECTION

- A. Provide temporary fire protection as required by authorities having jurisdiction throughout the entire construction period. Maintain access to the site and to the building at all times for Fire Department apparatus and personnel. Maintain access to fire protection devices at all times.

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1.11 STAGING AND STORAGE AREAS

- A. Locate staging and storage areas within areas designated or approved by the Owner. Provide gates, double gates, fencing and locks as required to secure all construction materials and protect from vandalism. Remove any potentially hazardous or flammable materials, including all welding materials, from the site at the end of each workday. Materials which will be installed in the project area shall not be stored in uncontrolled exterior locations where they may be susceptible to temperature, humidity, rain, dirt, and dust.
- B. Provide and maintain weather tight storage as required.

1.12 PROTECTION OF INSTALLED WORK

- A. Protect installed work from elevated temperature and humidity, dust, and dirt. Provide special protection where specified in individual Specification Sections.
- B. Provide protective coverings at openings in air-handling units, ductwork, chases, walls, and other items of construction to prevent damage, contamination by dust, and transmission of dust to other spaces.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
- D. 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.
- E. Use all means necessary to protect the site, the building, and all materials stored or installed at all times, including the employment of a watchman or guard when required.
- F. Provide weather protection as described in this specification for any penetrations made in the existing building.

1.13 REMOVAL

- A. Remove all temporary facilities from the site and leave the site and affected off- site areas in a clean and finished condition prior to final acceptance.

1.14 OSHA (Occupational Safety and Health Act)

- A. Comply with all requirements of the Occupational Safety and Health Act for job safety and health standards.

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1.15 CONSTRUCTION AIDS

- A. Provide all temporary stairs, ladders, ramps, runways, hoists, chutes, and other facilities necessary for the proper execution of the work. Provide guard rails and warning lights as required for job safety.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials suitable for the use intended.

2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Temporary Lighting: Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching.
- D. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.
- E. Telephones: Provide cellular telephone service for all personnel engaged in construction activities, throughout the construction period, until final completion.
- F. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

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- G. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.
- H. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
- I. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
- J. Drinking Water Facilities: Provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.

3.2 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion, unless otherwise indicated. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
- C. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
- D. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
- E. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- F. Project Identification and Temporary Signs: Signs are not permitted.
- G. Collection and Disposal of Debris and Waste: Collect debris and waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
- H. Burying of waste materials on the site will not be permitted. Washing waste materials

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down sewers or into waterways will not be permitted.

- I. Provide rodent proof containers located convenient to areas of construction.
- J. Provide a dumpster for use by all subcontractors.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Owner.
- B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
 - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - 2. Store combustible materials in containers in fire-safe locations.
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
- C. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
- F. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- G. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

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3.4 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Engineer requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
- D. Materials and facilities that constitute temporary facilities are property of the Contractor.
- E. Repair or replace street paving, curbs and sidewalks damaged by construction activities to match surrounding conditions.
- F. Seed the staging and storage areas within construction fences and any other areas on the school property where damage has occurred due to trucks, cranes, excavations, or other construction activities. A satisfactory stand of turf from the seeding operation is defined as a minimum of 15 grass plants per square foot. Bare spots can be no larger than 6" square. Total bare spots must be less than 2% of the total seeded area.
- G. Contractor is responsible for maintenance of seeded area until acceptance by Owner.

END OF SECTION 010500

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SECTION 010600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
- D. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
- E. Equipment Nameplates: Provide a permanent nameplate on each item of service- connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - 1. Name of product and manufacturer.
 - 2. Model and serial number.
 - 3. Capacity.
 - 4. Ratings.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.
- B. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- C. Coordinate delivery with installation time to ensure minimum holding time for items that

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are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

- D. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
- E. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
- F. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
- G. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- H. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
- B. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- C. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- D. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
- E. Semi-proprietary Specification Requirements: Where three or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
- F. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
- G. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to

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use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

- H. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- I. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
 - 1. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
- J. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
- K. Visual Matching: Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily.
 - 1. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
- L. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, pattern and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
- B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 010600

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SECTION 010631 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 01300, "Submittals."
- C. Standards: Refer to Section 01095, "Reference Standards and Definitions" for applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under Section 01600, "Materials and Equipment."

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:
 - 1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to Contract Documents requested by the Owner.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

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1.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 30 days after commencement of the Work. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the Engineer.
- B. Submit 6 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
- C. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - 1. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - 2. Samples, where applicable or requested.
 - 3. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - 4. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
 - 5. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - 6. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - 7. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
- D. Engineer's Action: Within 5 days of receipt of the request for substitution, the Engineer will request additional information or documentation necessary for evaluation of the request. Within 10 days of receipt of the request, or 10 days of receipt of the additional information or documentation, whichever is later, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

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PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Contractor's substitution request will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer; otherwise, requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010631

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SECTION 010700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operating and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-1 through -16.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100% completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - a. If 100% completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise Owner of pending insurance change-over requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 - 5. Submit record drawings, operations and maintenance manuals, and similar final record

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information. Operations and maintenance manuals shall be furnished to Owner 14 days before date operation and maintenance instructions and demonstrations are to occur.

6. Deliver tools, spare parts, extra stock, and similar items.
 7. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
 8. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel.
 9. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
 10. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Contractor's Inspection Report: Prepare a complete list of all work remaining to be completed, deficiencies to be corrected, and any other items or requirements not yet fulfilled.
- C. Inspection Procedures: On receipt of a request for inspection and the Contractor's Inspection Report, the Engineer will either proceed with inspection or advise the Contractor of unfulfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
- D. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
- E. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.
 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
 5. Submit Consent of Surety to Final Payment.
 6. Submit a final liquidated damages settlement statement.

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7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 8. See Project Closeout Checklist at the end of this Section for additional requirements.
- B. Re-inspection Procedure: The Engineer will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.
1. Upon completion of re-inspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. Only if absolutely necessary, will the re-inspection procedure be repeated. It is the Contractor's responsibility to inspect the Work and have all items completed prior to requesting a re-inspection. All Engineer's cost incurred beyond the initial re-inspection shall be borne by the Contractor.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Two weeks prior to all demonstrations, such as the mechanical and electrical controls and equipment, the Owner shall have in his possession all related manuals of operation and maintenance for the system. The Owner shall be notified one week in advance of intended time and date of all above demonstrations. Include a detailed review of the following items:
1. Maintenance manuals.
 2. Record documents.
 3. Spare parts and materials.
 4. Tools.
 5. Lubricants.
 6. Fuels.
 7. Identification systems.
 8. Control sequences.
 9. Hazards.
 10. Cleaning.
 11. Warranties and bonds.
 12. Maintenance agreements and similar continuing commitments.

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- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up.
 2. Shutdown.
 3. Emergency operations.
 4. Noise and vibration adjustments.
 5. Safety procedures.
 6. Economy and efficiency adjustments.
 7. Effective energy utilization.
 8. Troubleshooting procedures and corrections (explain most frequent causes of failure).

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P R O J E C T C L O S E O U T C H E C K L I S T

The following items must be submitted prior to processing Final Application and Certificate for Payment and Closeout of Project.

ITEM	STATUS
Certificate of Substantial Completion	Engineer will provide
Letter from Contractor indicating that items on the Punch List have been completed, corrected and accepted by the Engineer	
Consent of the Surety Company to final payment General Release from Contractor Release of Liens from Major Subcontractors	
Written certification from the Contractor to the Engineer and Owner that no asbestos containing materials or products were included in the Project	
Record Drawings	
Record Specifications	
Operations and Maintenance Manuals Standard	
Warranty from Contractor	
Special Warranties from Materials & Equipment Suppliers	
Cost proposals for all outstanding changes in the Contract.	
Final Application and Certificate for Payment	

END OF SECTION 010700

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SECTION 010710 - FINAL CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for final cleaning at Substantial Completion.
- B. Special cleaning requirements for specific elements of the Work area included in appropriate Sections of Divisions-1 through -16.
- C. General Project closeout requirements are included in Section 01700, "Project Closeout."
- D. General cleanup and waste removal requirements are included in Section 01500, "Temporary Facilities."
- E. Environmental Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
 - 1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
 - 2. Burying of debris, rubbish or other waste material on the premises will not be permitted.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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- A. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion for the entire Project or a portion of the Project.
- C. Clean the Project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petro-chemical spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.
- D. Remove tools, construction equipment, machinery and surplus material from the site.
- E. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- F. Remove debris and surface dust from limited access spaces, including roofs, plenums, and similar spaces.
- G. Remove labels that are not permanent labels.
- H. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or that show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical name plates.
- I. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
- J. Leave the Project clean and ready for occupancy.
- K. Removal of Temporary Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- L. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner.
- M. Where extra materials of value remain after completion of associated construction have become the Owner's property, dispose of these materials as directed.

END OF SECTION 010710

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SECTION 010720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

- A. Work Included:
 - 1. Throughout progress of the work, maintain an accurate record of changes in the Contract Documents, as described in this Section.
 - 2. Upon completion of the work, transfer the recorded changes to a set of Record Documents, as described in this Section. Cross reference all changes to addenda, change orders, etc.

1.3 QUALITY ASSURANCE

- A. Assign the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.
- B. Accuracy of Records:
 - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of the Specifications and each sheet of drawings and other documents where such entry is required to show the change properly.
 - 2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.
- C. Make entries within 24 hours after receipt of information that the change has occurred.

1.4 SUBMITTALS

- A. The Engineer's approval of the current status of Project Record Documents is a prerequisite to the Engineer's approval of requests for progress payment and request for final payment under the Contract.
- B. Prior to submitting each request for progress payment, secure the Engineer's approval of the current status of the Project Record Documents.

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- C. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer and secure his approval.

1.5 PRODUCT HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the work and transfer of all recorded data to the final Project Record Documents.
- B. In the event of loss of the recorded data, use means necessary to again secure the data to the Engineer's approval.
 - 1. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealed materials.
 - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

1.6 MAINTENANCE OF JOB SET

- A. Identify each of the job set documents with the title, "RECORD DOCUMENTS - JOB SET."
- B. Preservation of Documents:
 - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set suitable to the Engineer.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Engineer, until start of transfer of data to the final Project Record Documents.
 - 3. Maintain the job set at the site of work as that site is designated by the Engineer.
- C. Making Entries on Drawings:
 - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required. Colors that are not reproducible using standard printing procedures shall not be used.
 - 2. Date all entries.
 - 3. Call attention to the entry by drawing a box or other shape in a manner that avoids confusion with the original shapes and elements on the drawing around the area or areas affected.
 - 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other documents as approved by the Engineer.

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E. Conversion of Schematic Layouts:

1. In some cases on the drawings, arrangements of conduits, circuits, piping, ducts, and similar items, are shown schematically and are not intended to portray precise physical layout.
 - a. Final physical arrangement is determined by the Contractor, subject to the Engineer's approval.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the drawings.
2. The Engineer may waive the requirements for conversion of schematic layouts where, in the Engineer's judgment, conversion served no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Engineer.

1.7 FINAL PROJECT RECORD DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation, and examination.
- B. Review and Submittal:
 1. Submit the completed set of Project Record Documents to the Engineer for approval.
 2. Make required changes and promptly deliver the final Project Record Documents to the Engineer.

1.8 CHANGES SUBSEQUENT TO ACCEPTANCE

- A. The Contractor has no responsibility for recording changes in the work subsequent to final completion, except for changes resulting from work performed under warranty.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 010720

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SECTION 010730 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

- A. Work Included: To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding the products incorporated into the work, furnish and deliver the data described in this section and in pertinent other sections of these Specifications.
- B. Related Work: Required contents of submittals also may be amplified in pertinent other sections of these Specifications.

1.3 QUALITY ASSURANCE

- A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in the operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in communicating the essential data.

1.4 SUBMITTALS

- A. Unless otherwise directed in other sections, or in writing by the Engineer, submit three copies of the final manual to the Engineer for approval prior to indoctrination of operation and maintenance personnel.

PART 2 - PRODUCTS

2.1 INSTRUCTION MANUALS

- A. Where instruction manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Format:
 - 1. Size: 8-1/2" x11"
 - 2. Paper: White bond, at least 20 lb. weight.

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3. Text: Typed (Hand printed or written is not acceptable)
 4. Drawings: 11" x 8" preferable; bind in with text; foldouts are acceptable; larger drawings are acceptable if folded to fit within the manual and provide a drawing pocket inside rear cover or bind in with text.
 5. Fly Sheets: Separate each portion of the manual with neatly prepared Fly Sheets or tabbed index sheets briefly describing the contents of the ensuing portion. Fly Sheets or index tabs may be in color.
 6. Binding: Use heavy-duty plastic covers with binding mechanism concealed inside the manual; 3-ring binders or GBC binding is acceptable. All binding is subject to the Engineer's approval.
- C. Provide front and back covers for each manual, using durable plastic material approved by the Engineer, and clearly identified on the front cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS
FOR
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(Name, addresses, and telephone numbers of Contractor and subcontractors)
(name and address of Engineer)
(Engineer's approval and date approved)

D. Contents:

1. Neatly prepared and typewritten detailed table of contents.
2. Complete instructions regarding operation and maintenance of all equipment involved, including lubrication, disassembly, and re-assembly.
3. Complete nomenclature of all parts of all equipment.
4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
5. Copy of all guarantees and warranties issued.
6. Manufacturer's bulletin, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
7. Such other data as required in pertinent Sections of these Specifications.

PART 3 - EXECUTION

3.1 INSTRUCTION MANUALS

- A. Final Manuals: Complete the Manuals in strict accordance with the Specifications and the Engineer's review comments.
- B. Submit one copy of the manual to Engineer for review.

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- C. Revisions: Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Engineer.
- D. Submit three copies of manual and a CD containing an electronic version of the Manual in PDF format to Engineer after completion of reviews.

END OF SECTION 010730

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SECTION 010740 - WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.
- B. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
- C. General closeout requirements are included in Section 01700, "Project Closeout."
- D. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the individual Sections of Divisions 1 through 16.
- E. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- F. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

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1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- A. Submit written warranties directly to the Owner, with copies to the Engineer prior to the date of final payment.
- B. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within fifteen days of completion of that designated portion of the Work.
- C. Form of Submittal: At Final Completion compile three copies of each required warranty and bond properly executed by the Contractor, or by the Contractor's subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

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- D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, one for each set, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the installer.
 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.
- E. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 010740

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SECTION 010800 - CODE OF CONDUCT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for the prescribed Code of Conduct while working on school premises.

1.3 CONDUCT

- A. The following rules shall apply at all times that students, faculty and staff are on the premises:
 - 1. Owner's Representatives are on site to assist the Contractor (and his subcontractors) in coordination of the Work at the school, and with any required interaction between school personnel. They shall be the only means of communication between the Contractor (and his subcontractors) and persons at the school, except in life threatening emergencies.
 - 2. Minor first time violation of this relationship will result in a warning, or removal from the project. Repeated violations will result in removal from the project.
 - 3. Construction workers shall under no circumstances consult with the school principal and / or teachers regarding any issue of a construction nature, except as noted above.
 - 4. All Contractors (subcontractors) shall wear a colored identification badge while on school premises. Failure to do so is reason for removal from the Job Site.
 - 5. The General Contractor will distribute and maintain badges in accordance with County guidelines.
 - 6. Fraternization between construction workers and teachers or students is strictly prohibited. Any contact deviating from normal courteous behavior will be considered reason for removal from the project.
 - 7. If any student or teacher persist in disrupting the activities of construction work, the Owner's representative shall be notified immediately. Any work proceeding at the direction of a teacher, administrator or staff may result in the work being undone, corrected in accordance with the Contract Documents, or no compensation to the contractor.
 - 8. Use of vulgar, suggestive or abusive language is strictly prohibited in the presence of or within earshot of teachers, students, school administrators or staff.
 - 9. Consumption of alcohol or alcohol containing beverages is strictly prohibited on school grounds.
 - 10. Use and / or possession of any controlled substance or substances considered to be illegal are strictly prohibited on school grounds. Any violation will result in removal from the

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- project, and violator shall be turned over to the proper authorities.
11. Use and / or possession of any firearms or weapons considered to be illegal are strictly prohibited on school grounds. Any violation will result in removal from the project, and violator shall be turned over to the proper authorities.
 12. Cigarette smoking is prohibited on school grounds.
 13. The use of personal radios / stereos is not permitted.
 14. Construction workers shall not use the restrooms throughout the school facility.
 15. Contractors shall park in designated areas only.
 16. All construction materials and equipment shall be safely secured and stored when not in use.
 17. Any demolition work shall not cause any disruption of communication or fire alarm system in occupied areas.
 18. All construction work shall be performed to minimize disruption to any school activity. This may require the contractor to schedule work during off peak hours and shall be accounted for by the contractor during scheduling and included within the bid. Any conflicts shall be brought to the attention of the Architect and Owner's representative prior to proceeding with the work.
 19. Construction workers are not permitted free access to the school: Access shall be limited to specific task of construction in designated areas only. The school shall not be used as a shortcut from one portion of construction Work to another, unless specifically designated as a construction route by the Contract Documents or the Owner's representative. This shall apply at all times during the Work without exception.
 20. Adequate temporary lighting shall be provided in all demolished / construction areas, including provisions for parking areas which remain in use subsequent to removal of fixtures.
 21. Fire exits may not be blocked. (except as indicated in the documents, and as directed by the local authority having jurisdiction)
 22. School dumpsters are not for construction debris. The contractor shall provide suitable equipment for prompt and safe removal of all construction debris.
 23. Adequate ventilation must be maintained during welding or torch cutting procedures. In addition, spark screens shall be used and adequate fire extinguishing equipment shall be present. All standard safety procedures shall be observed.
 24. Appropriate barricading, fencing and signage shall be used to clearly indicate areas of on-going construction, material storage, or any other condition that may create an unsafe environment for non-construction workers.
 25. The Contractor is responsible for the safety, security, and cleanliness of all school property which may remain in the assigned areas of construction.
 26. For the Contractor's protection, he may solicit the confirmation of the quantity, quality, etc. of the items of concern with the Owner's representative prior to occupancy. Any shortages or damages noted upon returning to the area of the school shall be considered the Contractor's responsibility. This is of special concern in areas where items (such as athletic equipment) are stored. This shall also include, but not be limited to, damage to carpet, vinyl floor, painted walls, blackboards, bulletin boards, clocks, speakers and furniture.
 27. Eating from the school cafeteria is not permitted.
 28. Fumes from work that occurs adjacent to HVAC intake or exhaust areas shall be blocked so that they do not enter into the HVAC system.

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1.4 RESPONSIBILITIES

- A. Contractor's responsibilities shall include but not be limited to the following:
1. Owner's Representatives shall be informed and kept advised of all construction activities at the school. They will assist the Contractor in coordination of the Work effecting school systems, such as electrical, mechanical, plumbing, telephone, etc.
 2. A minimum 48-hour notice is required prior to disruption of utilities or services to the school.
 3. Owner's Representatives shall be informed and kept advised of the schedule for classroom turnover, and the need to have spaces vacated for construction.
 4. Owner's Representatives shall be kept advised of any disruptions or concerns that develop at the school, or with any persons at the school not related to the construction.
 5. The General Contractor shall have an authorized and qualified representative, project manager or superintendent *on the site at all times* during which Work is proceeding. *No exceptions.*

1.5 SPECIAL COORDINATION AND COOPERATION

- A. Owner Occupancy of Existing School Facility: The Owner may occupy all or portions of the existing school facility outside of the construction contract limits for each phase of the construction during some of the construction period. The Contractor shall cooperate with the Owner during the construction period to minimize conflicts and facilitate Owner's usage of the building / premises.
- B. The Contractor shall be responsible for scheduling Work so as not to interfere with the Owner's normal operations.
- C. To best facilitate the continued operation of the school (while in session), determine with the Owner a general sequence of construction. The additions can generally be constructed with minimal disturbance of the existing school operation. There will be the need to provide construction tunnels for Life Safety issues. See Plans.
- D. Generally, renovations shall be accomplished when areas are vacant or when school is not in session, with full access to the building unless noted otherwise.
- E. Where isolating work areas requires closing off existing exit-ways, work shall be coordinated with the Owner and the Fire Marshall, providing and maintaining safe egress from the building.
- F. Certain items / materials indicated for removal shall be salvaged and turned over to the Owner.
- G. The Contractor shall be advised of the schedule required for the installation of loose furniture, equipment, appliances, etc. as provided by the Owner under separate contract(s) in order to allow time for installation by the owner's forces.

END OF SECTION 010800

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SECTION 260100 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE OF WORK

- A. This Section of the Specifications describes the material and installation procedures to be followed for furnishing and installing the electrical equipment and material as outlined and described on the contract drawings and as stated in this Division of the Specifications.
- B. Where the word "Contractor" appears in this Division of the Specifications, it applies to the Contractor performing the electrical portion of the work, unless specifically indicated otherwise.
- C. The Contractor shall install the systems as specified herein and indicated on the contract drawings and shall furnish all labor, material, tools, scaffolds, erection equipment, services and other items of expense as necessary as a part of this Contract. This Contract further includes placing the systems into operation and properly testing, adjusting, balancing and training the owner's personnel on the use of all items of equipment as specified and as approved by the Engineer.

1.3 SUPERVISION

- A. The Electrical Contractor shall have a competent and English speaking designated Supervisor who is a Certified Master Electrician on the job site at all times that any electrical work is being performed. This shall include any and all electrical work being accomplished by contractors who are subcontractors to the prime Electrical Contractor.

1.4 DRAWINGS

- A. General arrangements of the necessary conduits, feeders, light fixtures, devices, panels, and equipment are indicated on the drawings in diagrammatic form only. Due to the scale of the drawings, offsets, fittings, and accessories may not be shown. Work indicated but having details omitted shall be provided complete to an operating condition with all fittings, wiring, and ancillary equipment and material as required. Where rearrangement is necessary, submit drawings of proposed changes for approval and coordinate and arrange work with consideration to the existing building conditions. Equipment provided under this Division of the

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Specifications shall be installed in accordance with the recommendations of the equipment or material manufacturer.

1.5 COORDINATION

- A. Coordinate the electrical work in order to avoid omissions and to eliminate any interference. Report any discrepancies found, as soon as possible, after discovery, to the Engineer.
- B. The contractor shall be responsible for coordinating with the Division 23 Contractor for providing properly sized circuit breakers to serve mechanical equipment and motors furnished which differ from that specified or indicated. This shall be further understood to include branch circuit wiring, conduit, disconnect switches, etc., in accordance with the appropriate codes and specifications. The cost of providing this increased electrical service and related work shall be included under the applicable section under which the equipment and motors are being furnished, at no additional cost to Owner.

1.6 CODES AND STANDARDS

- A. Various recognized codes and standards form a part of these Specifications the same as if written fully herein and shall be followed as minimum requirements. The codes and standards will be referred to by their abbreviated names and are listed below. Reference to these standards shall be understood to mean the latest edition and accumulative supplements which have been adopted by the "Authority Having Jurisdiction," unless noted otherwise.

ASAD	ADA Standards for Accessible Design
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IECC	International Energy Conservation Code
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
NEC 2020	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Prevention Association
NFPA 70E	Standard for Electrical Safety in the workplace
OSHA	The Occupational Safety and Health Act
UL	Underwriters Laboratories, Inc.
VUSBC	Virginia Uniform Statewide Building Code, 2021 Edition

- B. All equipment, material, apparatus, and work shall conform to the requirements of the NEC. If the Contractor observes that the drawings and specifications are at variance therewith, the contractor shall notify the Engineer in writing. If the Contractor performs such work contrary to

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the above referenced rules and regulations and without written acknowledgment or notice thereto, they shall correct this work and bear all cost arising therefrom.

1.7 NOTICES AND FEES

- A. Give all required notices, obtain all necessary permits, and pay all required fees, including any fees associated with temporary electrical power services during construction. Utility company fees, which are for the permanent installation of electrical power services, shall be paid for by the Owner.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

- A. Refer to Specification 013300 "Submittals" for shop drawing submittal procedures. Submit shop drawings for materials required for this project as indicated herein. Obtain approval from the Engineer before manufacture is started on any of same. The shop drawings shall show complete details of the various items, wiring diagrams, etc., and shall be submitted in a sufficient number of copies to allow the Engineer to retain one copy. Approved copies of all shop drawings shall be kept on the job site accessible to the Architect at all times. All new power distribution equipment shall all be by the same manufacturer.

2.2 ACCEPTABLE MANUFACTURERS

- A. The following list states specific names of acceptable manufacturers of particular equipment and indicates the types of material on which submittals shall be made:

Submittal
Information
Required:

Power Distribution Equipment (Switchboards) Shop Drawings
General Electric / ABB Company
Square D Company
Eaton/Cutler-Hammer
Siemens

Surge Protective Devices Product Data
Liebert
Square D
Eaton

- B. The following list states other materials for which product data submittals shall be made:

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Conductors (each type)
Conduit (each type)
Infrared scans of the switchboard

- C. Catalog numbers and manufacturers are listed as a guide for minimum requirements to be met. Material and equipment of manufacturers other than those listed will be given consideration by the Engineer providing the material meets the minimum requirements set forth in these Specifications and providing the material or equipment will provide satisfactory performance for the intended installation, does not exceed the dimensions and weight of the specified item and meets the aesthetic performance desired of the specified item. Submittals of other than specified equipment shall have indicated on the specification sheets in the shop drawing submittals each item called for in these Specifications by paragraph and subparagraph numbers and/or letters.
- D. Refer to Specification Section 012500 for substitution requirements.
- E. Any deviation from the manufacturers listed in the preceding list and /or of those stated in the Contract Documents shall be submitted to the Engineer for approval in accordance with Specification Section 260500, "Materials and Methods." Facsimile transmission of data for review will not be accepted.
- F. The Engineer will review for approval, only one substitute for each type of material specified in the Division 26 Contract Documents. If the substitute material is not approved, the Contractor shall provide the material by one of the specified manufacturers. Approval of substitute material is at the sole discretion of the Engineer and Owner, and the Contractor shall bear all costs arising therefrom, including any design fees if additional design effort is deemed prudent or necessary by the Engineer.
- G. Only the types of materials specified herein are approved for use on this project. No other material types will be considered.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. "Provide," as used on the drawings and in these Specifications, shall mean furnish, install, connect, adjust, test, and place into operation, except where otherwise specifically stated in the contract documents.
- B. Provide coordinated electrical systems, equipment, and material complete with auxiliaries and accessories as required for a complete and operable finished project.
- C. Run all conduits concealed except where specifically indicated otherwise. Exposed conduit installation other than where indicated shall be approved by the Engineer and Owner prior to installation.

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3.2 CLEANING AND PAINTING

- A. Remove all dirt, trash, and oil from all raceways, boxes, fittings, cabinets, and panelboards.
- B. Protect, to the satisfaction of the Engineer, all equipment provided against damage during construction. If damage does occur to any materials, refinish, repair, or replace the equipment or material as directed by the Engineer.

3.3 REPAIR OF EXISTING WORK

- A. Repair of existing work, demolition, and modification of existing electrical distribution systems shall be performed as follows:
 - 1. Workmanship: Lay out work in advance.
 - a. Exercise care when cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces as necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to buildings and materials or equipment damaged using skilled craftsmen of the appropriate trades.
 - 2. Existing Concealed Wiring to be Removed:
 - a. Existing concealed wiring to be removed shall be disconnected from its source. Remove conductors and cut conduits flush with concrete floors, and top openings with non-shrink grout. Where wood floors are encountered, remove conduit to below wood floor. Where conduit that passes through walls is removed, seal opening in wall with a material that is equal to the fire rating of the material the wall is constructed from.
 - 3. Removal of Existing Electrical Distribution System:
 - a. Removal of existing electrical distribution system equipment shall include equipment's associated wiring including conductors, cables, exposed conduit, surface metal raceways, boxes, fittings, etc., back to equipment's source or as indicated on the electrical drawings.
 - b. Verify phase rotation of existing system with the power company and existing equipment to be reconnected prior to removal.
 - 4. Continuation of Service:
 - a. Maintain continuity of existing circuits to remain. Existing circuits shall remain energized unless otherwise indicated. Circuits which are to remain but were disturbed during demolition shall have circuit wiring and power restored back to original condition as approved by the Engineer. Only materials specified for this project may be used to affect repairs.

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3.4 RECORD DRAWINGS

- A. Refer to Specification Section 017839 “Project Record Documents”.

3.5 OPERATION AND MAINTENANCE MANUALS

- A. Refer to Specification Section 017823 “Operation and Maintenance Data”.

The following list states materials for which Operation and Maintenance Data submittals shall be made:

- Power Distribution Equipment (Switchboards)
- Infrared scans of the switchboards
- Surge Protective Devices

3.6 EQUIPMENT INVENTORY

- A. Provide a complete equipment inventory for all Electrical Equipment listed below. Refer to Appendix A in this section for the required template. A separate form shall be provided for each new piece of equipment provided.
- B. Prior to substantial completion, submit the equipment inventory forms for review. Once approved, include the forms in the operation and maintenance manual.

The following list states materials for which equipment inventory shall be made:

- Power Distribution Equipment (Switchboards)
- Surge Protective Devices

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APPENDIX A

New Equipment Inventory

Project Name: (Add Project Name)

Project Address: (Add Project Address)

Description of Item: _____
(ex. Switchboard, Panelboards, Generator, Lighting, etc.)

Classification:

- ☐ Lighting
- ☐ Power Distribution
- ☐ Auxiliary Systems

Building: _____

Equipment Location (Room Number): _____

Date Purchased: _____

Date Placed in Service: _____

Original Cost: _____

Life Expectancy (years): _____

Estimated Replacement Date: _____

Estimated Replacement Cost: _____

Manufacturer: _____

Model/Serial #: _____

END OF SECTION 260100

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SECTION 260500 - MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Provide all labor, material, tools, erection equipment, services and supplies to fabricate, install, connect, adjust, test, and place in operation the electrical and other systems as called for in these Specifications and as indicated on the Contract Drawings.
- B. Properly store and protect all material and equipment until installed.
- C. All material and equipment shall be new and of the quality noted or specified. Material, equipment, and work of inferior quality will be rejected and shall be removed from the job site immediately upon rejection and replaced. Unacceptable work shall be removed and replaced. All replacement material and work shall be done at the Contractor expense. The Engineer will decide upon the quality of material and equipment furnished and of the work performed.

1.3 WARRANTIES

- A. The Contractor shall provide the Owner with a one-year, unlimited material and labor warranty on all work accomplished and materials provided under Division 26, including all components thereof except as otherwise noted herein. The warranty start date is the date of project "Substantial Completion" as determined by the Engineer.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Electrical material furnished under these Specifications shall be new and listed by UL and shall bear the UL label where labeling service is available for the type of material provided for this project.

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2.2 RACEWAYS

- A. Raceways shall be of the size indicated or as required by the NEC; whichever is the larger; except where larger conduits are specified on the Contract Drawings. Raceways shall be 1/2" minimum.
- B. Raceways shall be provided for all electrical systems indicated on the drawings unless specifically indicated otherwise. Raceways shall be hot-dip galvanized rigid steel conduit (GRS), electrical metallic tubing (EMT), flexible steel conduit, or intermediate metallic conduit (IMC). Flexible steel conduit in outdoors shall be liquid tight. Schedule 40 PVC conduit may be used only below grade, under concrete slabs-on-grade and other locations where specifically indicated.

2.3 CONDUCTORS

- A. Conductors shall be of the American Wire Gauge size indicated on the contract drawings or specified herein.
- B. All conductors shall be copper.

2.4 LABELING

- A. Label all panelboards provided under Division 26 of these Specifications.
- B. Labels shall be machine engraved, laminated, Bakelite, nameplate type. Labels shall have black faces with white letters.
- C. Size of labels shall be based on the required lettering and lettering size. The following are the minimum requirements for each type of label:
 - 1. Panelboards and Transformers: First line of label shall state name of panel as shown on the drawings. Second line shall state from where the panel is fed. Lettering shall be 3/8" high.

Example:	Panel L-100	Transformer TC-1
	Fed from MDS	Fed from Panel #1
	Circuit # _____	Circuit # _____
	Voltage _____	Voltage _____
- D. Circuit breakers serving Fire Alarm Control Panels shall be provided with a red, Bakelite nameplate with white letters attached to the panel adjacent to the circuit breaker.
- E. Attach labels with a minimum of two rivets or sheet metal screws. Adhesive-backed labeling will not be accepted.

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2.5 PULL BOXES

- A. Install pull boxes at all necessary points, whether indicated on the drawings or not, to prevent injury to conductor insulation or other damage that might result from pulling resistance or for other reasons necessary for proper installation. Minimum dimensions shall not be less than the NEC requirements and shall be increased if necessary for practical reasons or where required to fit the job condition.
- B. Above grade pull boxes shall be constructed of galvanized sheet steel, code gauge, except that not less than 12-gauge shall be used for any box. Where boxes are used in connection with exposed conduit, plain covers attached to the box with a suitable number of countersunk flathead machine screws may be used.
- C. All junction and pull box covers shall be labeled indicating the circuits contained therein in a manner that will prevent unintentional interference with circuits during testing and servicing. For example: "HE1-13." See Specification Section 260534 for additional labeling requirements.

2.6 BRANCH CIRCUITS

- A. The branch circuit wiring has been designed to utilize the advantages of multi-wire distribution and shall be installed substantially as indicated on the drawings. Major changes in the grouping or general routing of the branch circuits require prior approval in writing from the Architect/Engineer.
- B. The number of conductors in each run of conduit is indicated on the drawings, but where there is a conflict between the number of wires indicated and the actual number required as determined by the functional requirements of the connected load, or where the number of wires was inadvertently omitted from the drawings, the correct number and size of wires as determined by the functional requirements of the connected load shall govern and be provided at no additional cost.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install material in a first-class and workmanlike manner to the satisfaction of the Engineer.

END OF SECTION 260500

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SECTION 260519 - CONDUCTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Feeder and branch circuit wiring shall conform to the requirements of the NEC, and shall meet all relevant ASTM specifications.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Provide electrical wires, cables, and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer for a complete installation and for the application indicated. Provide copper conductors with a conductivity of not less than 98% at a temperature of 20°C (68°F).
- B. Provide factory-fabricated wires of sizes, ampacity ratings, and materials for applications and services indicated. Where not indicated, provide proper wire selection as determined by installer to comply with project's installation requirements, the NEC, and NEMA standards. Select from the following UL types those wires with construction features which fulfill project requirements:
 - 1. Type RHH: For dry locations; max operating temperature 90°C (194°F). Insulation, heat-resistant rubber; outer covering, moisture-resistant, flame-retardant, nonmetallic covering; conductor, annealed copper, compressed stranded.
 - 2. Type RHW: For dry and wet locations; max operating temperature 75°C (167°F). Insulation, heat-resistant rubber; outer covering, moisture-resistant, flame-retardant, nonmetallic covering; conductor, annealed copper, compressed stranded.
 - 3. Type THWN or THHN: Max operating temperature not to exceed 90°C (194°F) (THHN) in dry locations, or 75°C (167°F) (THWN) in wet or dry locations. Insulation, flame-retardant, moisture- and heat-resistant, thermoplastic; outer covering, nylon jacket; conductor, annealed copper.
 - 4. Type XHHW: For dry and wet locations; max operating temperature 90°C (194°F) for dry locations, and 75°C (167°F) for wet locations. Insulation, flame-retardant, cross-linked synthetic polymer; conductor, annealed copper.

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- C. Service entrance conductors shall be Type XHHW, RHW, or THWN.
- D. Unless specified otherwise, power and lighting conductors shall be 600 volt, Type THWN/THHN, or XHHW.
- E. Conductors shall be continuous from outlet to outlet with splices made only in pull boxes, junction boxes, and outlet boxes.
- F. Do not use wire smaller than #12 AWG for power or lighting wiring.
- G. Wiring sizes #12 and #10 AWG shall be solid. Larger sizes may be stranded.
- H. Where the standard lug sizes on circuit breakers and the main lugs on a main lug only panelboard will not accept the conductor size specified, provide Burndy Compression Type "AYP" or "AYPO" HYPLUGS or approved equal.

PART 3 - EXECUTION

3.1 SPLICES

- A. Splicing connectors must have a metal spring that is free to expand. The spring must be suitably coated to resist corrosion. Each connector size must be listed by UL for the intended purpose. The connectors must be suitably color coded to assure that the proper size is used on the wire combinations to be spliced. Each connector must be capable of withstanding 105°C ambient temperatures. The connectors must be compatible with all common rubber and thermoplastic wire insulations. They must also be capable of making copper-to-copper, copper-to-aluminum, and aluminum-to-aluminum splices. At the Contractor's option, self-strapping electrical tap connectors may be used in wire size and voltage range of the connector. When tape is required for splices, SCOTCHBRAND No. 33, or approved equal, shall be used. Use the plastic tape on PVC and its copolymers and rubber-based pressure-sensitive adhesive. The tape must be applicable at temperatures ranging from 0°F through 100°F without loss of physical or electrical properties. The tape must not crack, slip, or flag when exposed to various environments indoor or outdoor. The tape must also be compatible with all synthetic cable insulations as well as cable splicing compounds.
- B. Make splices in conductors #8 AWG and larger with solderless connectors, with molded composition covers.
- C. Connect conductor sizes #12 and #10 AWG with pre-insulated spring connectors rated at not less than 105°C. Connectors shall be UL approved for fixture and pressure work. Connectors shall be 3M CO. SCOTCHLOK, Type Y, R, and B, or approved equal.
- D. Join or terminate conductors #8 AWG and larger with pressure-type copper connectors and properly tape.

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- E. All branch circuit, feeder, and control wiring shall be color coded. The color shall be integral with sheath for sizes #12, #10, and #8 AWG. Larger size wire and cable shall be color coded with a minimum 1/2" wide, colored, plastic tape strip. Place strips a minimum of 6" on center anywhere the conductors are accessible and visible. Wire and cable shall be color coded to match the existing color coding if an existing color code is present. If there is no existing color code, provide the following:

<u>120/208-Volt System</u>	<u>277/480-Volt System</u>
Phase A - black	Phase A - brown
Phase B - red	Phase B - orange
Phase C - blue	Phase C - yellow
Neutral - white	Neutral - gray
Ground - green	Ground - green

- F. After all wiring is pulled and ready for operation but prior to placing systems in service, conduct insulation resistance tests in all feeder circuits. Measure the insulation resistance between conductors and between each conductor and ground. Make measurements with an instrument capable of making measurements at an applied potential of 500 Volts.
- G. Take readings after the voltage has been applied for a minimum of one minute. The minimum insulation resistance for circuits of #12 AWG conductors shall be 1,000,000 ohms. For circuits of #10 AWG or larger conductor, a resistance based on the allowable ampacity of the conductor shall be as follows:

25 through 50 Amperes	250,000 ohms
51 through 100 Amperes	100,000 ohms
101 through 200 Amperes	50,000 ohms
201 through 400 Amperes	25,000 ohms
401 through 800 Amperes	12,000 ohms
Over 800 Amperes	5,000 ohms

- H. Advise the Engineer if the color-coding provided by the utility company differs from that indicated above.

3.2 TEMPORARY WIRING

- A. Temporary wiring is not specified nor governed by this Division of the Specifications.

END OF SECTION 260519

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SECTION 260526 - GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Provide grounding for service, conduits, metal casings, and solid neutral, and as required by NEC Article 250. Resistance to ground at service shall not exceed 25 ohms.

PART 2 - PRODUCTS

2.1 GROUND WIRE

- A. Provide a green insulated ground wire, sized per the NEC, in all conduits, junction boxes, and pull boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Connect grounding conductors to the panelboard equipment ground bus and not to the panelboard neutral bus. Also connect grounding bushings to the ground bus. Connect the neutral bus only to the system neutral wire. Provide a bonding wire between the equipment ground bus and the neutral bus in the main distribution equipment only. The grounding system (conduit, cabinets, enclosures, and grounding conductors) and the grounded system (neutral conductors and service equipment ground) shall be separate and independent systems, except at the main distribution equipment.
- B. Test resistance to ground and submit readings to the Engineer for review. Include the date and time of the test and the name of the individual performing the test.

END OF SECTION 260526

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SECTION 260529 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Extent of supports, anchors, sleeves, and seals is indicated in other Division 26 Sections.
- B. Types of supports, anchors, sleeves, and seals specified in this Section include the following:
 - C-clamps
 - I-beam clamps
 - One-hole conduit straps
 - Two-hole conduit straps
 - Round steel rods
 - Expansion anchors
 - Toggle bolts
 - Wall and floor seals
- C. Supports, anchors, sleeves, and seals furnished as part of factory-fabricated equipment are specified as part of equipment assembly in other Division 26 Sections.

1.3 QUALITY ASSURANCE

- A. Furnish supporting devices manufactured by firms regularly engaged in manufacture of supporting devices of types, sizes, and ratings required.
- B. Comply with the requirements of the NEC, as applicable to construction and installation of electrical supporting devices.
- C. Comply with applicable requirements of ANSI/NEMA FB1, "Fittings and Supports for Conduit and Cable Assemblies."
- D. Comply with NECA "Standard of Installation" pertaining to anchors, fasteners, hangers, supports, and equipment mounting.
- E. Provide electrical components which are UL-Listed and labeled.

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PART 2 - PRODUCTS

2.1 MANUFACTURED SUPPORTING DEVICES

- A. Provide supporting devices complying with manufacturer's standard materials, design, and construction in accordance with published product information and as required for a complete installation, and as herein specified. Where more than one type of device meets indicated requirements, selection is installer's option.
- B. Provide supporting devices of types, sizes, and materials required, and having the following construction features:
1. Reducing Couplings: Steel rod reducing coupling, 1/2" by 5/8"; galvanized steel; approx. 16 pounds per 100 units.
 2. C-Clamps: Galvanized steel; 1/2" rod size; approx. 70 pounds per 100 units.
 3. I-Beam Clamps: Galvanized steel, 1-1/4" by 3/16" stock; 3/8" cross bolt; flange width 2"; approx. 52 pounds per 100 units.
 4. One-hole Conduit Straps: For supporting metal conduit through 3/4" galvanized steel; approx. 7 pounds per 100 units.
 5. Two-hole Conduit Straps: For supporting metal conduit above 3/4" galvanized steel; 3/4" strap width; and 2-1/8" between center of screw holes.
 6. Hexagon Nuts: For 1/2" rod size; galvanized steel; approx. 4 pounds per 100 units.
 7. Round Steel Rod: Galvanized steel; 1/2" dia.; approx. 67 pounds per 100 feet.
 8. Offset Conduit Clamps: For supporting 2" rigid metal conduit; galvanized steel; approx. 200 pounds per 100 units.
- C. Provide anchors of types, sizes, and materials required and having the following construction features:
1. Expansion Anchors: 1/2"; approx. 38 pounds per 100 units.
 2. Toggle Bolts: Springhead; 3/16" by 4"; approx. 5 pounds per 100 units.
- D. Provide sleeves and seals of types, sizes, and materials required, and having the following construction features:
1. Provide factory-assembled, watertight wall and floor seals suitable for sealing around conduit, pipe or tubing passing through concrete floors and concrete block walls. Construct with steel sleeves, malleable-iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps and cap screws.
- E. Provide U-channel strut system for supporting electrical equipment, 16-gauge hot-dip galvanized steel of sizes required; construct with 9/16" dia. holes, 8" o.c. on top surface, and with the following fittings which mate and match with U-channel:
- Channel hangers
End caps
Beam clamps

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Wiring stud
Rigid conduit clamps
Conduit hangers
U-bolts

PART 3 - EXECUTION

3.1 INSTALLATION OF SUPPORTING DEVICES

- A. Install hangers, anchors, sleeves, and seals as indicated in accordance with manufacturer's published instructions and with recognized industry practices to ensure supporting devices comply with the requirements of the NEC, NECA, and ANSI/NEMA for installation of supporting devices.
- B. Coordinate with other electrical work, including outlet box, raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- C. Install hangers, supports, clamps, and attachments to support conduit and outlet boxes properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze-type hangers where possible. Install supports with maximum spacings indicated.
- D. Tighten sleeve seal nuts until sealing grommets have expanded to form watertight seal.

END OF SECTION 260529

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SECTION 260533 - RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Run all conduit concealed, except conduit may be run exposed in mechanical rooms, locations where specifically indicated, and spaces with exposed construction as approved by the Engineer.
- B. Install conduit as a complete system without wiring and continuous from outlet to outlet and from fitting to fitting, mechanically and electrically connected to all boxes, fittings, and wireways, and grounded in accordance with the NEC.
- C. Cap ends of all conduit promptly upon installation with plastic pipe caps. Caps shall remain until wiring is ready to be installed. Taping the ends of conduits is not acceptable.
- D. Size conduit to equal or exceed the minimum requirements of the NEC (except where sizes are specifically indicated on the drawings and in these specifications).

PART 2 - PRODUCTS

2.1 CONDUIT

- A. Minimum size conduit shall be 1/2" unless noted or indicated otherwise on drawings. Use larger sizes as required by the NEC to accommodate the number and sizes of wires contained therein.
- B. Conduit concealed in walls or above ceilings shall be rigid steel (GRS), electrical metallic tubing (EMT), or intermediate metallic conduit (IMC). Flexible steel conduit may be used above accessible ceilings only.
- C. GRS, EMT and IMC shall be UL approved, hot-dip, high-strength, galvanized steel.
- D. Flexible conduit shall be galvanized, continuous spiral, single strip type. In areas subject to moisture, and where specifically indicated, flexible steel conduit shall have a plastic covering in accordance with NEC Article 350. Fittings shall be standard UL approved with ground

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connector. Watertight connectors shall be used with plastic-covered conduit. All flexible steel conduit installed in outdoors shall be plastic covered. The maximum length for flexible steel conduit is 72" unless as otherwise indicated.

2.2 FITTINGS

- A. All conduit entering or leaving panelboards, cabinets, outlet boxes, pull boxes, or junction boxes shall have lock nuts and bushings, except provide insulated throat connectors on EMT conduit 3/4" and 1". Rigid steel conduit shall have a lock nut both inside and outside of the enclosure entered. Install bushings on the ends of IMC conduit and EMT conduit larger than 1". Insulating bushings shall be OZ Type A for GRS and IMC, and Type B for EMT. Conduit entering enclosures through concentric knockouts shall have grounding-type bushings with copper bond wire to enclosure.
- B. Provide expansion fittings where conduits cross building expansion joints. Expansion fittings shall be OZ Type AX with OZ Type BJ bonding jumper. See Architectural drawings for location of expansion joints.
- C. Fittings for rigid conduit shall be threaded type, except where IMC changes to EMT above floor slab, fittings shall be threadless type.
- D. Fittings for EMT shall be UL-approved, steel set screw couplings.

2.3 JUNCTION BOXES

- A. Use junction boxes on exposed conduit work for changes in direction of conduit runs and breaking around beams and columns.
- B. Furnish covers and gaskets with the junction boxes where installed in damp or wet locations.
- C. Label all junction and pull box covers indicating the circuits contained therein in a manner that will prevent unintentional interference with circuits during testing and servicing. For example: "HE1-13." See Specification Section 260534 for labeling requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Conduit may be run exposed in mechanical and electrical equipment rooms. Maintain a minimum clear distance of 6" from parallel runs of flues, steam, or hot water pipes. Do not run conduit horizontally in concrete slabs.
- B. Group conduit so it is uniformly spaced, where straight and at turns. Make bends and offsets (where unavoidable) with a hickey or bending machine.

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- C. Securely fasten conduit to outlets, junction boxes, and pull boxes to affect firm electrical contact. Join conduit with approved couplings. Running threads are not allowed.
- D. Exercise care to avoid condensation pockets in the installations. Keep conduit, fittings, and boxes free from foreign matter of any kind, before, during, and after installation.
- E. Do not use EMT outdoors and in wet locations.
- F. Support exposed runs of conduit in accordance with N.E.C. 342, 344, 348, 350 and 358 and parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings with right angle turns consisting of fittings or symmetrical bends. Support conduit within one foot of all changes in direction and on each side of the change.
- G. Supports shall be wall brackets, trapeze, strap hanger, or pipe straps, secured to hollow masonry with toggle bolts; to brick and concrete with expansion bolts; to metal surfaces with machine screws; and to wood with wood screws.
- H. Use explosive drive equipment to make connections where the use of this equipment is beneficial and is subject to strict compliance with safety regulations and approved by the Owner.
- I. Prime conduit with a surface conditioner "GalvaGrip" or approved equal and paint to match the surface on which attached. Conduit installed in mechanical and electrical rooms need not be painted.
- J. Install and support conduit from the underside of the upper chord in bar joist construction.
- K. Do not support conduit from or attach outlet or junction boxes to metal roof decks.
- L. Do not run conduit in the cavity of exterior walls between brick and CMU.

END OF SECTION 260533

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SECTION 260534 - ELECTRICAL BOXES AND FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Furnish and install all junction boxes of a type and size applicable for use in the location indicated on the drawings and where required by the NEC.

PART 2 - PRODUCTS

2.1 PULL BOXES AND JUNCTION BOXES

- A. Install pull boxes and junction boxes where required for changes in direction, at junction points, and where needed to facilitate wire pulling.
- B. Size boxes in accordance with the requirements of the NEC.
- C. Boxes shall be constructed of 12-gauge minimum hot-rolled sheet steel and shall be hot-dip galvanized inside and outside to match the conduit. Boxes shall have removable covers.
- D. Label the front face of the cover on each box with indelible black marker indicating the number of each circuit contained in or running through the box. In areas where exposed construction is the final finished condition and conduit and junction boxes are called out to be painted, label the inside face of the covers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Conduit installation shall be rigid and secure, and, where necessary, angle iron (1" by 1" by 1/4" or larger) shall be provided to facilitate adequate mounting.

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- B. Install electrical boxes and fittings in accordance with manufacturer's published instructions, applicable requirements of the NEC and NECA "Standard of Installation," and in accordance with recognized industry practices to fulfill project requirements.
- C. Coordinate installation of electrical boxes and fittings with wire/cable, wiring devices, and raceway installation work.
- D. Install electrical boxes in those locations which ensure ready accessibility to enclosed electrical wiring.
- E. Fasten electrical boxes firmly and rigidly to substrates or structural surfaces to which attached or solidly embed electrical boxes in concrete or masonry.
- F. Upon completion of installation work, properly ground all electrical boxes.

END OF SECTION 260534

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SECTION 262413 - MAIN DISTRIBUTION SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Extent of switchboard work is indicated by drawings and schedules.
- B. Type of switchboard specified in this Section is as follows:
 - 1. Dead-front distribution; circuit breaker type, in NEMA 1 enclosure.

1.3 QUALITY ASSURANCE

- A. Comply with the requirements of the NEC, as applicable to wiring methods, construction, and installation of switchboards.
- B. Comply with applicable requirements of UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors," and UL 891, "Dead-front Electrical Switchboards," pertaining to installation of switchboards. Provide switchboards and components which are UL-Listed and labeled.
- C. Comply with applicable requirements of ANSI standards pertaining to switchboard assemblies.
- D. Comply with applicable portions of NEMA PB2, "Dead-front Distribution Switchboards" and NEMA PB2.1, "Instructions for Safe Handling, Installation, Operation, and Maintenance of Switchboards."

1.4 SUBMITTALS

- A. Submit manufacturer's data on switchboards, including but not limited to voltages, number of phases, frequencies, and short-circuit and continuous current ratings. Provide application data for main and branch circuit breakers, sections, main buses, and basic insulation levels.
- B. Submit 1/8" scale layout drawings of switchboards showing accurately scaled basic equipment sections, including auxiliary compartments, section components, and combination sections. Indicate on the layout drawings that the number and size of each conduit scheduled for bottom

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entry into the compartment has been verified as achievable and that the switchboard will fit in the space indicated with all code-required working clearances complied with.

- C. Submit wiring diagrams for switchboards showing connections to electrical power feeders and distribution branches. Clearly differentiate between portions of wiring that are manufacturer installed and portions to be field installed.
- D. Submit switchboard shop drawings to Dominion Virginia Power and gain approval on same prior to submitting to the Engineer. Provide evidence that Dominion Virginia Power has approved the equipment for installation.

PART 2 - PRODUCTS

2.1 EQUIPMENT SECTIONS AND COMPONENTS

- A. Except as otherwise indicated, provide switchboards and ancillary components of types, sizes, characteristics, and ratings indicated, which comply with manufacturer's standard design, materials, components, and construction, in accordance with published product information, and as required for complete installation.
- B. Provide factory-assembled, dead-front, metal-enclosed, self-supporting secondary power switchboards of types, sizes, and electrical ratings and characteristics indicated; consisting of panel (vertical) units, and containing circuit-breakers of quantities and ratings indicated. Provide copper main bus and connections to switching devices and circuit breaker branches of sufficient capacity to limit rated continuous current operating temperature rise of no greater than 65°C above average ambient temperature of 30°C with main bus and tap connections silver surfaced and bolted tightly according to manufacturer's torquing requirements for maximum conductivity. Brace bus for short-circuit stresses up to the interrupting capacity indicated. Prime and coat switchboard with manufacturer's standard finish and color. Equip units with built-in lifting eyes and yokes; and provide individual panel (vertical) units, suitable for bolting together at project site. Construct switchboard units for an indoor NEMA Type 1 environment.
- C. Construct dead-front switchboards, suitable for floor mounting, with front cabling/ wiring accessibility, and conduit accessibility as indicated. Provide welded steel channel framework, hinged wireway front covers to permit ready access to branch circuit-breaker load side terminals. Coat enclosures with manufacturer's standard corrosive-resistant finish.
- D. Provide switchboard bussing with sufficient cross-sectional area to fulfill UL 891 pertaining to temperature rise. Construct through bus of copper with ampacity and short-circuit current rating as indicated on the drawings.
- E. Provide with integral meter to allow viewing of current, current demand, voltage, real power (kW), reactive power (kVAR and kVA), power factor, real power demand, real energy (kWh), reactive power demand (present and peak), apparent power demand (present and peak), real energy in and out (kWh), reactive energy in and out (kVARh), and THD. Provide meter with

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outputs for connection to building Automatic Temperature Control System, coordinate requirements with the Automatic Temperature Controls Contractor. Mount meter recessed in front door and install meter wiring and lacing with sufficient flexibility at hinged edge of meter front mounting plates to prevent damage.

- F. Provide solid-state phase failure protection unit, equipped with static relays, sensors, pilot lights and push buttons for phase failure indication and reset. Include fuse blocks, fuses, and control power transformers. The unit shall be in a separate compartment with barriers from the main breaker. The use of under-voltage trip relays to accomplish this is not acceptable.
- G. The main breaker shall be a 100% duty rated, fixed mount, full function electronic circuit breaker with adjustable long-term, short-term, and instantaneous trips, and ground fault protection when of a size as to be required by the NEC.
- H. Provide main breaker/switch capacitor trip capability on switchboard.
- I. Provide HACR rated branch circuit breakers for all heating and air conditioning equipment.
- J. The circuit breaker(s) feeding the Automatic Transfer Switch shall be listed and approved by the Automatic Transfer Switch manufacturer for the Short Circuit Current Rating (SCCR).
- K. Provide switchboard with Energy Reduction Maintenance Switch with local status indicator in compliance with NEC article 240.87 for any circuit breaker that can be set at 1200A and above. Following is a list of approved methods to implement arc energy reduction.
 - 1. Zone-selective interlocking.
 - 2. Differential relaying.
 - 3. Energy-reducing maintenance switching with local status indicator.
 - 4. Energy-reducing active arc flash mitigation system.
 - 5. An instantaneous trip setting that is less than the available arcing current.
 - 6. An instantaneous override that is less than the available arcing current.
- L. Provide all circuit breakers rated 1000 amps or more with ground fault equipment protection in accordance with NEC article 210.13.
- M. Provide electronic trip circuit breakers with adjustable trip settings for all life-safety emergency power feeders.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which switchboard and components are to be installed, and notify the General Contractor, in writing, of conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions have been corrected.

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- B. Verify Phase Rotation of existing system with the power company and existing equipment to be reconnected prior to removal.

3.2 INSTALLATION

- A. Install switchboards as indicated, in accordance with manufacturer's published instructions, and with recognized industry practices; complying with applicable requirements of the NEC, NEMA PB2.1, and NECA "Standard of Installation."
- B. Coordinate with other work, including electrical cabling/wiring work, as necessary to interface installation of switchboards with other work.
- C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.
- D. Provide 4" thick concrete housekeeping pad under all switchboards. Exceed dimensions of transformer by 6" on all sides. Chamfer all exposed edges 1/2".

3.3 ADJUSTING AND CLEANING

- A. Adjust operating mechanisms for free mechanical movement.
- B. Repair scratched or marred surfaces to match original finishes.
- C. Keep switchboard clean and free from foreign matter of any kind, before, during, and after installation.

3.4 GROUNDING

- A. Provide equipment grounding connections for switchboards as required by the NEC and the "Local Authority Having Jurisdiction." Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounding.

3.5 FIELD QUALITY CONTROL

- A. Prior to energization of circuitry, verify all accessible connections meet manufacturer's tightening torque specifications.
- B. Prior to energization of switchboards, check with ground resistance tester phase-to-phase and phase-to-ground insulation resistance levels to ensure requirements are fulfilled.

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- C. Prior to energization, check switchboards for electrical continuity of circuits and for short circuits.
- D. Subsequent to wire and cable hook-ups, energize switchboards and demonstrate functioning in accordance with requirements. Where necessary, correct malfunctioning units and then retest to demonstrate compliance.
- E. Infrared Scanning: After Substantial Completion, but not more than 60 days from Final Acceptance, perform an infrared scan of the switchboard.
 - 1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 2. Record of Infrared Scanning: Prepare a certified report that identifies and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 GROUND FAULT EQUIPMENT TESTING

- A. Ground fault equipment provided with main distribution switchboards shall be tested when first installed on the site in accordance with the requirements of NEC Article 230.95.
- B. A written record of the test shall be made available to the authority having jurisdiction.

END OF SECTION 262413

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SECTION 262710 - SERVICE AND DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specifications Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 ELECTRICAL SERVICE

- A. The electrical service for the building shall be 480/277 Volts, 3-phase, 4-wire, grounded neutral.
- B. Install current transformer equipment and a meter base furnished by Dominion Energy or the local electrical utility company where indicated on the drawings except the final location of the meter base shall be as directed by Dominion Energy or the local electrical utility company. Provide a 1-1/4" empty conduit (with pull wire) between the current transformer equipment and the meter base. Make all provisions necessary for metering equipment and install as directed by Dominion Energy or the local electrical utility company.
- C. Consult with Dominion Energy or the local electrical utility company for color coding of cables when service lateral is provided by this Contract and color code cables as directed by Dominion Energy or the local electrical utility company. Advise the Engineer if the color coding provided by Dominion Energy or the local electrical utility company differs from that indicated in Specification Section 260519.

1.3 SERVICE CONDUIT AND CONDUCTORS

- A. The service lateral will originate from a pad-mounted transformer furnished by Dominion Energy or the local electric utility company. Provide conduit of the size and quantity indicated on the drawings. Consult with Dominion Energy or the local electrical utility company before commencement of electrical service work.

PART 2 - PRODUCTS

2.1 ELECTRICAL SERVICE EQUIPMENT

- A. Electrical service equipment shall comply with the requirements of the NEC.

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PART 3 - EXECUTION

3.1 SERVICE AND DISTRIBUTION

- A. Arrangement shall be as indicated on the drawings and as required by Dominion Energy or the local electrical utility company, including exact point of service and metering requirements.

END OF SECTION 262710

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SECTION 262713 - SERVICE ENTRANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

1.2 SCOPE OF WORK

- A. Extent of service entrance work is indicated by drawings and schedules.
- B. Switchboards used for service entrance equipment are specified in other Division 26 Sections and are work of this Section.
- C. Refer to other Division 26 sections for wires/cables, raceways, and electrical boxes and fittings work required in connection with service entrance equipment; not work of this Section.

1.3 QUALITY ASSURANCE

- A. Comply with the requirements of the NEC, as applicable to construction and installation of service entrance equipment and accessories.
- B. Comply with construction and installation requirements of the following NEMA standards for service entrance equipment and accessories where applicable:

Std Pub No. AB1	Molded Case Circuit Breakers
Std Pub No. PB1.2	Application Guide for Ground-fault Protective Devices for Equipment
Std Pub No. PB2	Dead-front Distribution Switchboards
Std Pub No. SG3	Low-voltage Power Circuit Breakers

- C. Comply with construction and installation requirements of the following UL standards for service entrance equipment and accessories:

UL 50 Electrical Cabinets and Boxes
UL 489 Molded Case Circuit Breakers and Circuit Breaker Enclosures
UL 854 Service Entrance Cables
UL 869 Electrical Service Equipment

- D. Provide service entrance rated equipment and accessories which are UL-Listed and labeled and marked, "SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT."

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- E. Comply with applicable requirements of IEEE 241 pertaining to service entrances.
- F. Comply with ANSI C2, "National Electrical Safety Code," installation requirements for above ground service entrance conductors.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE EQUIPMENT

- A. Provide service entrance equipment and accessories of types, sizes, ratings, and electrical characteristics indicated, which comply with manufacturer's standard materials, design, and construction in accordance with published product information, and as required for complete installation and as herein specified.
- B. All electrical service entrance equipment, dry-type transformers, panelboards, disconnect switches, lighting contactors, and magnetic contactors provided under Division 26 of these Specifications shall be by the same equipment manufacturer.

2.2 RACEWAYS

- A. Provide raceways complying with Specification Section 260533, "Raceways."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install service entrance equipment as indicated in accordance with equipment manufacturer's published instructions, and with recognized industry practices, to ensure that service entrance equipment fulfills requirements. Comply with applicable installation requirements of the NEC and NEMA standards.
- B. Coordinate with other electrical work, including utility company wiring, as necessary to interface installation of service entrance equipment work with other work.
- C. Set field-adjustable GFP devices and circuit breakers for pickup and time-current sensitivity ranges subsequent to installation of devices and circuit breakers in accordance with the recommendations of the Short Circuit Coordination Study/Arc Flash Hazard Analysis.

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3.2 GROUNDING

- A. Provide equipment bonding and grounding connectors, sufficiently tight to assure a permanent and effective grounding, for service entrance equipment and wiring/ cabling as required by the NEC.

3.3 ADJUST AND CLEAN

- A. Adjust operating mechanisms for free mechanical movement.
- B. Repair scratched or marred enclosure surfaces to match original finishes to the satisfaction of the Engineer.

3.4 FIELD QUALITY CONTROL

- A. Upon completion of installation of service entrance equipment and electrical circuitry, energize circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION 262713

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SECTION 264313 - SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SCOPE

- A. The Contractor shall furnish and install the Surge Protective Device (SPD) equipment having the electrical characteristics, ratings, and modifications as specified herein and as shown on the contract drawings.

1.2 RELATED SECTIONS

- A. Section 262413 – Switchboards – Low Voltage

1.3 REFERENCES

- A. SPD units and all components shall be designed, manufactured, and tested in accordance with the latest applicable UL standard (ANSI/UL 1449 3rd Edition).

1.4 SUBMITTALS – FOR REVIEW/APPROVAL

- A. The following information shall be submitted to the Engineer:
 - 1. Provide verification that the SPD complies with the required ANSI/UL 1449 3rd Edition listing by Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratory (NRTL). Compliance may be in the form of a file number that can be verified on UL's website or on any other NRTL's website, as long as the website contains the following information at a minimum: model number, SPD Type, system voltage, phases, modes of protection, Voltage Protection Rating (VPR), and Nominal Discharge Current (I_n).
 - 2. Electrical/mechanical drawings showing unit dimensions, weights, installation instruction details, and wiring configuration.
- B. Where applicable the following additional information shall be submitted to the engineer:
 - 1. Descriptive bulletins
 - 2. Product sheets

1.5 QUALIFICATIONS

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

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- B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- D. The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of manufacturer's instructions shall be included with the equipment at time of shipment.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided with each SPD shipped.

PART 2 - PRODUCTS

2.1 VOLTAGE SURGE SUPPRESSION – GENERAL

- A. Electrical Requirements:
 - 1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.
 - 2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall not be less than 115% of the nominal system operating voltage.
 - 3. The suppression system shall incorporate thermally protected metal-oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create any environmental hazards.
 - 4. Protection Modes – The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

	Protection Modes			
Configuration	L-N	L-G	L-L	N-G
Wye	●	●	●	●
Delta	N/A	●	●	N/A
Single Split Phase	●	●	●	●
High Leg Delta	●	●	●	●

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5. Nominal Discharge Current (I_n) – All SPDs applied to the distribution system shall have a 20kA I_n rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage. SPDs having an I_n less than 20kA shall be rejected.
6. ANSI/UL 1449 3rd Edition Voltage Protection Rating (VPR) – The maximum ANSI/UL 1449 3rd Edition VPR for the device shall not exceed the following:

Modes	208Y/120	480Y/277
L-G; N-G	800	1200
L-L	1200	2000
L-N	900	1500

B. SPD Design:

1. Maintenance Free Design – The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
2. Balanced Suppression Platform – The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating replaceable SPD modules shall not be accepted.
3. Electrical Noise Filter – Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up to 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method. Products unable able to meet this specification shall not be accepted.
4. Internal Connections – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be soldered, hardwired with connections utilizing low impedance conductors.
5. Monitoring Diagnostics – Each SPD shall provide the following integral monitoring options:
 - a. Protection Status Indicators - Each unit shall have a green / red solid-state indicator light that reports the status of the protection on each phase.
 - 1) For wye configured units, the indicator lights must report the status of all protection elements and circuitry in the L-N and L-G modes. Wye configured units shall also contain an additional green / red solid-state indicator light that reports the status of the protection elements and circuitry in the N-G mode. SPDs that indicate only the status of the L-N and L-G modes shall not be accepted.
 - 2) For delta configured units, the indicator lights must report the status of all protection elements and circuitry in the L-G and L-L modes.
 - 3) The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All

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protection status indicators must indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights must continue to indicate the status of the protection on all other phases and protection modes. Diagnostics packages that simply indicate whether power is present on a particular phase shall not be accepted.

- b. Remote Status Monitor – The SPD must include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.
- c. Audible Alarm and Silence Button – The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.
- d. Surge Counter – The SPD shall be equipped with an LCD display that indicates to the user how many surges have occurred at the location. The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of $50 \pm 20A$ occurs. A reset pushbutton shall also be standard, allowing the surge counter to be zeroed. The reset button shall contain a mechanism to prevent accidental resetting of the counter via a single, short-duration button press. In order to prevent accidental resetting, the surge counter reset button shall be depressed for a minimum of 2 seconds in order to clear the surge count total.
 - 1) The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter's display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter's memory shall not require a backup battery in order to achieve this functionality.

6. Overcurrent Protection:

The unit shall contain thermally protected MOVs. These thermally protected MOVs shall have a thermal protection element packaged together with the MOV in order to achieve overcurrent protection of the MOV. The thermal protection element shall disconnect the MOV(s) from the system in a fail-safe manner should a condition occur that would cause them to enter a thermal runaway condition.

7. Fully Integrated Component Design – All of the SPD's components and diagnostics shall be contained within one discrete assembly. SPDs or individual SPD modules that must be ganged together in order to achieve higher surge current ratings or other functionality shall not be accepted.

8. Safety Requirements:

The SPD shall minimize potential arc flash hazards by containing no user serviceable / replaceable parts and shall be maintenance free. SPDs containing items such as

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replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.

- a. SPDs designed to interface with the electrical assembly via conductors shall require no user contact with the inside of the unit. Such units shall have any required conductors be factory installed.
- b. SPDs shall be factory sealed in order to prevent access to the inside of the unit. SPDs shall have factory installed phase, neutral, ground and remote status contact conductors factory installed and shall have a pigtail of conductors protruding outside of the enclosure for field installation.

2.2 SYSTEM APPLICATION

- A. The SPD applications covered under this section include distribution and branch panel locations and switchboard assemblies. All SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C, B, and A environments.
- B. Surge Current Capacity – The minimum surge current capacity the device is capable of withstanding shall be as shown in the following table:

Minimum surge current capacity based on ANSI / IEEE C62.41 location category			
Category	Application	Per Phase	Per Mode
C	Service Entrance Locations (Switchboards, Main Service Entrance)	250 kA	125 kA
B	High Exposure Roof Top Locations (Distribution Panelboards)	160 kA	80 kA
A	Branch Locations (Panelboards)	120 kA	60 kA

- C. SPD Type – SPDs installed on the load side of the service entrance disconnect shall be Type 1 or Type 2 SPDs.

2.3 LIGHTING AND DISTRIBUTION PANELBOARD REQUIREMENTS

- A. The SPD application covered under this section includes lighting and distribution panelboards. The SPD units shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category B environments.
 1. The SPD shall not limit the use of through-feed lugs, sub-feed lugs, and sub-feed breaker options.

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2. SPDs shall be installed immediately following the load side of the main breaker. SPDs installed in main lug only panelboards shall be installed immediately following the incoming main lugs.
3. The panelboard shall be capable of re-energizing upon removal of the SPD.
4. The SPD connected to a 30A circuit breaker for disconnecting purposes may be installed using short lengths of conductors as long as the conductors originate integrally to the SPD. The SPD shall be located directly adjacent to the 30A circuit breaker.

B. Side mount Mounting Applications Installation (SPD mounted external to electrical assembly):

1. Lead length between the breaker and suppressor shall be kept as short as possible to ensure optimum performance. Any excess conductor length shall be trimmed in order to minimize let-through voltage. The installer shall comply with the manufacturer's recommended installation and wiring practices.

2.4 ENCLOSURES

A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:

1. NEMA 1 – Constructed of steel intended for indoor use to provide a degree of protection to personal access to hazardous parts and provide a degree of protection against the ingress of solid foreign objects.
2. NEMA 4 – Constructed of steel intended for either indoor or outdoor use to provide a degree of protection against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (dirt and windblown dust); to provide a degree of protection with respect to the harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and that will be undamaged by the external formation of ice on the enclosure.
3. NEMA 4X – Constructed of stainless steel providing the same level of protection as the NEMA 4 enclosure with the addition of corrosion protection.

PART 3 - EXECUTION

3.1 FACTORY TESTING

- A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

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3.2 INSTALLATION

- A. The Contractor shall install all equipment per the manufacturer's recommendations and the contract drawings.

3.3 WARRANTY

- A. The manufacturer shall provide a full ten (10) year warranty from the date of shipment against any SPD part failure when installed in compliance with manufacturer's written instructions and any applicable national or local code.

END OF SECTION 264313