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SECTION 001000 - INSTRUCTIONS TO CONTRACTOR

PART 1 GENERAL

1.01 EXAMINATION

- A. In order to discover and resolve any conflicts or lack of definition which might create problems, Contractor must review Contract Documents, existing site conditions, and all existing equipment specified to be retained for compatibility with its product prior to submitting Bid. Site review shall include, but not be limited to: adequacy of access, retained equipment, equipment rooms, overhead clearances, electrical power characteristics, structural supports, etc. Investigation and calculations required to determine all components required to provide a fully operational system are responsibility of Contractor. Owner will not pay for any change to building, structure, mechanical, electrical, plumbing or any other systems required to accommodate Contractor's equipment.
- B. Orange County Government has standardized its Electronic Security Systems county-wide on the follow manufacturers and does not accept alternates.
1. Dell Computers and Servers
 2. Windows 10 Software or latest approved version
 3. Wonderware InTouch Industrial HMI Software
 4. Allen Bradley Programmable Logic Controllers
 5. APC Uninterruptible Power Supplies
- C. Submission of Bid is considered evidence that Contractor has visited and is conversant with the site facilities, site conditions, requirements of the Contract Documents, pertinent state and local codes, state of labor and material markets, and has made due allowance in his Bid for all contingencies. Should Contractor's investigation of site conditions or local codes or rules reveal requirements contrary to Contract Documents, or if Contractor finds any discrepancies or omissions from Contract Documents, or if Contractor is in doubt as to their meaning, they shall contact the Owner for clarification at least ten (10) working days prior to Bid due date.
- D. No oral explanation will be made and no oral instructions will be given before Bid due date. Contractor shall act promptly and allow sufficient time for a reply to reach it before submission of its Bid. Any required interpretation or supplemental instructions will be issued in the form of an addendum to the specifications and forwarded to all bidders.
- E. Provide everything necessary for and incidental to the satisfactory completion of work required by Contract Documents. All required preparations and movement of equipment, or removal of existing equipment shall be the responsibility of Contractor.

END OF SECTION

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SECTION 010100 – SUMMARY OF WORK

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 WORK COVERED BY CONTRACT DOCUMENTS

- A. Installation of New Touchscreen Door Control System
 - 1. New Touchscreen Operating Terminals
 - 2. New Computers with Windows and Wonder ware Software
 - 3. New Computer Server
 - 4. New Programmable Logic Controller (PLC) Processors
 - 5. New Programmable Logic Controller (PLC) Remote I/O Modules
 - 6. New Communication Cards / Modules
 - 7. New Relays with Status Indicator
 - 8. New PLC Rack Enclosures
 - 9. New Power Supply
 - 10. New Articulating Touchscreen Monitor Mounts
 - 11. New Cat 6 Cabling
- B. Provide all labor, engineering, tools, transportation, services, supervision, materials, and equipment necessary for and incidental to satisfactory completion of required work as indicated in Contract Documents.
- C. Provide all required staging and movement of new equipment, reused equipment, or removal of replaced equipment.
- D. Applicable conditions of Owner's General, Special, and Supplemental Conditions.
- E. Prime contracts are defined below and each is recognized to be a major part of required work to be performed concurrently in close coordination with work of other Contractors.
 - 1. This Contract: Electronic Touchscreen Door Control Sysytem.
- F. Scope of Contract includes, but is not limited to, the following:
 - 1. Coordination, scheduling, and management of work of component suppliers and subcontractors.
 - 2. Furnish and install equipment as specified utilizing existing control room consoles, equipment rooms, mechanical rooms, door control and relay cabinets, door and motor driven hardware and conduit.
 - 3. Specific item of required work which cannot be determined to be included in another

- contract is thereby determined to be included in prime contract.
4. Coordinating with and assisting any / all subcontractors. No additional fees will be accepted for coordination and assisting subcontractors

1.3 SECURITY CONTRACTOR'S DUTIES

- A. Security Contractor's duties include the following:
 1. Provide and pay for labor, materials and equipment, tools, construction equipment and machinery, and other facilities and services necessary for proper execution and completion of required work.
 2. Pay for legally required sales, consumer, and state taxes.
 3. Secure and pay for required permits, fees and licenses necessary for proper execution and completion of required work, as applicable at time of quotation due date.
 4. Provide required notices.
 5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of required work.
 6. Promptly submit written notice to Consultant of observed variance of Contract Documents from legal requirements.
 7. Enforce strict discipline and good order among employees.

1.4 WORK SEQUENCE

- A. Construct work in stages to maintain all existing controls until new controls are functional.

1.5 CONTRACTOR USE OF PREMISES

- A. Confine operations at site to areas permitted by law, ordinances, permits, Contract Documents, and Owner's specific instructions.
- B. Do not unreasonably encumber site with materials or equipment. Staging area will be located as directed by Owner.
- C. Clear all on-site personnel with Department of Corrections and maintain security procedures at all times.
- D. Assume full responsibility for protection, inventory and safekeeping of tools, materials and products stored on or off premises at all times.
- E. Only store products in pre-approved locations authorized by Corrections.
- F. Obtain and pay for use of additional storage or work areas needed for operations.

1.6 CONCURRENT MODERNIZATION WORK AND BUILDING OPERATION

- A. This project is a major Door Control upgrade in an existing Correctional building which is operational and will continue to operate throughout all phases of required work. It is essential that Contractor give special attention and priority to all matters concerning project security, safety, protection from dust and loose materials, reduction of noise levels,

protection from water and air infiltration into building and maintenance of neat, orderly conditions in and around all work areas inside and outside of building. Packaging, scrap materials, and demolition debris shall be promptly removed from building and site on a daily basis.

- B. At all times, Contractor shall provide clearly visible warning and directions signs, barricades, temporary lighting, and hazard-free walking surfaces throughout all areas. At all times, special attention must be given to security of entrances, exits, and proper safe exiting through work areas as required
- C. Contractor shall consult Owner and any other Contractors to establish and maintain safe temporary routes including, but not limited to, proper barricades, walking surfaces, lighting, fire protection, exiting, warning and directional signs, and general protection of persons from all hazards in accordance with OSHA Standards due wholly or partially to its operations

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

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SECTION 010270 - APPLICATION FOR PAYMENT

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 governing the Contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment forms, including Continuation Sheets.
 - c. List of subcontractors.
 - d. Schedule of allowances.
 - e. Schedule of alternates.
 - f. List of products.
 - g. List of principal suppliers and fabricators.
 - h. Schedule of submittals.
 - 2. Submit the Schedule of Values to the County's designated Representative and Architect at the Pre-Construction meeting.
- B. Format and Content: Use the County form
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project number.

- d. Contractor's name and address.
 - e. Date of submittal.
 - f. Change Orders shall be added as they are approved.
2. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
 4. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Materials shall be stored on-site only to be included in the Application for Payment.
 5. 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.
 6. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment-Application Times: Each progress-payment date is indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment-Application Forms: Use County form for Applications for Payment.

- D. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule.
 2. Change Orders amounts may only be shown on the Application for Payment when they are fully executed and approved by the County.
- E. A field review shall be made by the Owner, Architect and the General Contractor one week before Final copies are transmitted to the Architect for his recommendation to the Owner. The Application for Payment shall only include work completed and materials used or stored on site as of the time and date of the field review.
- F. Transmittal: Submit 5 signed and notarized original copies of each Application for Payment.
- G. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
1. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Test/adjust/balance records.
 - c. Equipment demonstrations.
 - d. Final cleaning.
 - e. Keys.
- H. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Ensure that unsettled claims will be settled.
 4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 5. Transmittal of required Project construction records to the Owner.
 6. Removal of temporary facilities and services.
 7. Removal of surplus materials, rubbish, and similar elements.
 8. Warranties (guarantees) and maintenance agreements.
 9. Maintenance instructions.
 10. Meter readings.
 11. Contractor's release of lien (on County form)
 12. Sub-Contractor's and supplier's release of lien
 13. Consent of Surety (dated and notarized)
 14. Power-of-Attorney (dated and notarized)

15. Asbestos-Free statement on Contractor's letterhead (dated and notarized)

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION - (Not Applicable)

END OF SECTION

SECTION 010350 - MODIFICATION PROCEDURES

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 handling and processing contract modifications.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 013000 "Submittals" for requirements for the Contractor's Construction Schedule.
 - 2. Section 010270 "Applications for Payment" for administrative procedures governing Applications for Payment.
 - 3. Section 016310 "Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 MINOR CHANGES IN THE WORK

- A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on Architect's standard Supplemental Instructions form.

1.4 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: The Architect 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.
 - 1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 - 2. Within 14 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.
 - a. 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.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

- c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. 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 Architect.
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 "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.
 5. Contractor-initiated proposals shall be submitted within 15 days of the event causing the change.
- C. Proposal Request Form: Use forms which will be provided by the Architect. Sample copies are included at the end of this Section.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. 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.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 CHANGE ORDER PROCEDURES

- A. On the County's standard form.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION - (Not Applicable)

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SECTION 010400 - COORDINATION

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 includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 012000 "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
 - 2. Section 013000 "Submittals" for preparing and submitting the Contractor's Construction Schedule.
 - 3. Section 016000 "Materials and Equipment" for coordinating general installation.
 - 4. Section 017000 "Contract Closeout" for coordinating contract closeout.

1.3 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Make 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.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure 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 closeout activities.
- D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 1. Show the relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Comply with requirements contained in Section "Submittals."

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION 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. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. 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.
 - 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

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SECTION 010450 – CUTTING AND PATCHING

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 includes administrative and procedural requirements for cutting and patching.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 010400 "Coordination" for procedures for coordinating cutting and patching with other construction activities.
 - 2. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements of this Section also apply to electrical installations.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - 6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 - 7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Timber and primary wood framing.
 - g. Structural decking.
 - h. Stair systems.
 - i. Miscellaneous structural metals.
 - j. Exterior curtain-wall construction.
 - k. Equipment supports.
 - l. Piping, ductwork, vessels, and equipment.
 - m. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Electrical wiring systems.
 - j. Operating systems of special construction in Division 13 Sections.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Processed concrete finishes.
 - b. Roofing.
 - c. Ornamental metal.
 - d. Preformed metal panels.
 - e. Firestopping.
 - f. Window wall system.
 - g. Stucco and ornamental plaster.
 - h. Acoustical ceilings.
 - i. Terrazzo.
 - j. Finished wood flooring.
 - k. Fluid-applied flooring.
 - l. Carpeting.
 - m. Aggregate wall coating.
 - n. Wall covering.
 - o. HVAC enclosures, cabinets, or covers.

1.5 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. The Architects approval is required for materials which are to be used that are not identical to existing. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

1. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
 2. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
 3. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Concrete shall be cut square. Tile, brick, cement masonry, etc. shall be cut at joints. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 4. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 5. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 6. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
 7. Remove full tile, brick, cement masonry units, etc., toothing if required, and replace with full uncut replacement materials.

- B. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 - 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- C. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats as indicated.
 - 1. Unless otherwise indicated, provide 3-coat work.
 - 2. Finish gypsum plaster to match existing adjacent surfaces. Sand lightly to remove trowel marks and arises.
 - 3. Cut, patch, point-up, and repair plaster to accommodate other construction.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

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SECTION 010950 - REFERNECE STANDARDS AND DEFINITIONS

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 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": 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 to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, 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 another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, who performs a particular construction activity including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of 5 previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 2. Trades: Using terms such as "carpentry" does not 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 tradespeople of the corresponding generic name.
 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing 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 on which the Project is to be built.
- K. "Testing Agencies": A testing agency 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: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless 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 to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the Architect 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. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Inc.'s "Encyclopedia of Associations," which is available in most libraries.

1.5 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, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION - (Not Applicable)

END OF SECTION

SECTION 012000 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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, the following:
 - 1. Preconstruction conferences.
 - 2. Preinstallation conferences.
 - 3. Progress meetings.
 - 4. Coordination meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 010400 "Coordination" for procedures for coordinating project meetings with other construction activities.
 - 2. Section 013000 "Submittals" for submitting the Contractor's Construction Schedule.
 - 3. Review each Section of the Specifications for requirements for Preinstallation Conferences.

1.3 PRECONSTRUCTION CONFERENCE

- A. A preconstruction conference shall be held before the starting of construction, at a time convenient to the Owner and the Architect, but no later than 20 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Attendance List.
 - 2. Introductions.
 - 3. Notice to Proceed issued.
 - 4. Access to site.
 - 5. Temporary Facilities.
 - 6. Schedules.

7. Coordination with Owner\Occupants\Sub-Contractors.
8. Responsibility to protect existing Property.
9. Contractor responsible for security of tools and equipment.
10. Contractor responsible for safety on the job.
11. Job Superintendent on site at all times work in progress.
12. Scope of work, base bid and accepted alternates.
13. Use of standard forms.
14. No change in Contract scope, time, or amount without change order.
15. Application for Payment.
16. Salvage Materials.

1.4 PREINSTALLATION CONFERENCES

- A. The General Contractor shall conduct a preinstallation conference at the Project Site before each construction activity is started to coordinate all trades without conflicts arising.
- B. Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.
 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Shop Drawings, Product Data, and quality-control samples.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities.
 - q. Space and access limitations.
 - r. Governing regulations.
 - s. Safety.
 - t. Inspecting and testing requirements.
 - u. Required performance results.
 - v. Recording requirements.
 - w. Protection.

2. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Distribute the record of the meeting to everyone concerned within 3 days of each meeting and include copies to the Owner and the Architect.
3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 PROGRESS MEETINGS

- A. Progress meetings shall be conducted by the County's Designated Representative at regular intervals. The date and time for these meetings shall be determined at the Pre-Construction meeting. Generally, Progress meetings are held weekly during the first third of construction bi-weekly during the middle third of construction and weekly during the last third of construction.
- B. Attendees: In addition to representatives of the Owner and the Architect, 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. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- 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 status of the Project.
 1. 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 insure that current and subsequent activities will be completed within the Contract Time.
 2. Review the present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Status of submittals.
 - e. Statue of "Request for Information"
 - f. Deliveries.
 - g. Off-site fabrication problems.
 - h. Access.
 - i. Site utilization.
 - j. Temporary facilities and services.
 - k. Hours of work.
 - l. Hazards and risks.
 - m. Housekeeping.
 - n. Quality and work standards.
 - o. Change Orders.

p. Documentation of information for payment requests.

D. Reporting: The County's Designated Representative will issue a report within 2 days of the Progress Meeting.

1.6 COORDINATION MEETINGS

- A. The General Contractor shall conduct project coordination meetings as may be required to avoid conflicts arising between trades. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies within 3 days after each meeting to everyone in attendance, the Owner and the Architect and to any others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION - (Not Applicable)

END OF SECTION

SECTION 013000 – SUBMITTALS

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 includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Submittal schedule.
 - 3. Warranty Schedule.
 - 4. Daily construction reports.
 - 5. Shop Drawings.
 - 6. Product Data.
 - 7. Samples.
 - 8. Quality assurance submittals.
 - 9. Warranties required for close-out.
- 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, the following:
 - 1. Permits.
 - 2. Applications for Payment.
 - 3. Performance and payment bonds.
 - 4. Insurance certificates.
 - 5. List of subcontractors.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 10270 "Application for Payment" specifies requirements for submittal of the Schedule of Values.
 - 2. Section 010400 "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
 - 3. Section 012000 "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
 - 4. Section 014000 "Quality Control" specifies requirements for submittal of inspection and test reports.
 - 5. Section 017000 "Contract Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.3 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
 - 1. Preparation of Coordination Drawings is specified in Section 01040 "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- C. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

1.4 SUBMITTAL PROCEDURES

- A. Submit equipment, installation, console, wiring and equipment room layout drawings for security consultant and architect approval prior to procurement and / or manufacturing. Submit additional drawings as specified and require.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow 2 weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow 2 weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

- e. The Contractor shall deliver Submittals to the Architects Office and when advised the review has been completed, the Contractor shall arrange to obtain them from the Architects Office.
- B. Submittal Preparation: Provide a standard submittal sheet with each submittal, a copy of which is included as part of this section. Provide sufficient number of copies of each submittal for review, one copy will be retained by the reviewing Engineering Consultant, one copy by the Architect for record and the remaining copies returned to the Contractor. Indicate the name of the entity that prepared each submittal on the space provided.
1. Include the following information on the submittal form.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Architect.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using the standard transmittal form, a copy of which is included as part of this section. The Architect will not accept submittals received from sources other than the Contractor.
1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information has been reviewed for compliance with the Contract Document requirements.
 2. For all submittals, the Contractor shall send a copy of each transmittal to the County's Designated Representative. For the response to each submittal, the Architect shall send a copy of each transmittal to the County's Designated Representative.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit the Construction Schedule at the Pre-Construction meeting.
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. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.

- B. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
- C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting. Any revised Schedule shall be submitted to the Architect for review. The completion date will not be changed, unless it has been revised by a Change Order.

1.6 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 submittal of the Contractor's Construction Schedule.
 - 1. The Submittal Schedule shall be submitted at the Pre-Construction meeting.
 - 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of the subcontractor.
 - e. Description of the part of the Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for the Architect's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room 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.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.7 SHOP DRAWINGS

- A. Submit equipment, installation, console, wiring and equipment room layout drawings for security consultant and architect approval prior to procurement and / or manufacturing. Submit additional drawings as specified and require.
 - a. Submit newly prepared information drawn accurately to 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 a Shop Drawing.

- 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 by sheet and detail number.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.
 5. Notation of dimensions established by field measurement.
 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
 7. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print for the Architect's review. The Architect will return the reproducible print only.
 8. Resubmittals, if required, will be done in the same fashion as the initial submittal.
 9. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

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.
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Submittals: Submit one copy of each required submittal for the Architects record, one copy for the Engineering Consultant and sufficient copies for the Contractor's use and copies for maintenance manuals. The returned copies will be marked with action taken and corrections or modifications required.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities.

- a. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
- b. Do not permit use of unmarked copies of Product Data in connection with construction.

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 or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
 - a. Specification Section number and reference.
 - b. Generic description of the Sample.
 - c. Sample source.
 - d. Product name or name of the manufacturer.
 - e. Compliance with recognized standards.
 - f. Availability and delivery time.
 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - c. 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.
 - d. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
 3. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.
 - a. The Architect will review and return preliminary submittals with the Architect's notation, indicating selection and other action.

4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. The Architect will return one set marked with the action taken.
 5. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work.
1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
 - a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

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 ARCHITECT'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Taken: The Architect and Engineering Consultant will indicate on the Submittal and Transmittal Forms the action taken, as follows:
 1. No Exception Taken: When the Architect marks a submittal "No Exception Taken" the Work covered by the submittal may proceed provided it complies with

- requirements of the Contract Documents. Final payment depends on that compliance.
2. Exceptions as Noted: When the Architect marks a submittal "Exceptions as Noted," 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 payment depends on that compliance.
 3. Revise and Resubmit: When the Architect marks a submittal "Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 4. Rejected; Submit specified item: When the Architect marks a submittal "Rejected; submit specified item" do not proceed with Work covered by the submittal in any manner. Prepare a new submittal complying with the specifications without delay.
 5. Do not use, or allow others to use, submittals marked "Revise and Resubmit" or "Rejected; submit specified item" at the Project Site or elsewhere where Work is in progress.
 6. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "No Action Taken."
- C. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.

1.12 WARRANTIES

- A. Provide a list of Warranties within 10 days of the submitting of the construction schedule. They shall be listed by each section of the specification. The warranties are to be provided with the close out items.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION - (Not Applicable)

END OF SECTION



ARCHITECTURAL GROUP, INC.

SUBMITTAL COVER SHEET

Date _____

Log # _____

Contractor _____

Owner _____

Project Name _____

Project No. _____

Spec. Section No. _____

Dwg. Reference _____

Item (s) Submitted _____

Manager's Name _____

Sub-Contractor/Name Address

Supplier Name & Address

Contractor's Approval

Architect's Action

- NO EXCEPTION TAKEN EXCEPTION
 REVISE AND RESUBMIT SUBMIT SPECIFIED ITEM

Reviewing is only for conformance with the design concept/drawing of the Project. Corrections or comments made on the Shop Drawings during this review do not relieve Contractor from compliance with requirements of the Drawings and Specifications. The Contractor is responsible for all dimensions which shall be confirmed and correlated at the site; for information that pertains solely to the fabrication processes, or to the means, methods, techniques, sequences and procedures of construction; for coordination of the Work of all trade; and for performing his work in a safe and satisfactory manner.

By _____ Date _____

Engineer's Action

Comments



ARCHITECTURAL GROUP, INC.

SUBMITTAL TRANSMITTAL FORM

Log # _____

Contractor _____

Project Name _____

Owner _____

Project No. _____

Spec. Section No. _____

<p>SUB-CONTRACTOR/SUPPLIER</p> <p>_____</p> <p>_____</p> <p>Date _____ Copies _____</p> <p>Substitution Or Yes _____ No _____ Deviations _____</p>	<p>RECEIVED DATE BY <i>MRI</i></p>
<p>MRI to <i>CONSULTANT</i></p> <p>ENGINEER _____</p> <p>_____</p> <p>Attn _____</p> <p>Date _____ Copies _____</p>	<p>DATE RECEIVED BY <i>CONSULTANT</i></p>
<p>CONSULTANT to <i>MRI</i></p> <p>Date _____</p> <p>Copies _____</p> <p>Reviewed By _____</p> <p>Comments _____</p> <p>_____</p>	<p>DATE RECEIVED BY <i>MRI</i></p>
<p>MRI to <i>CONTRACTOR</i></p> <p>Date _____</p> <p>Copies _____</p> <p>Contractor _____</p> <p>_____</p> <p>To Owner _____ To Field _____ To File _____</p>	<p>DATE RECEIVED BY <i>CONTRACTOR</i></p>

ACTION TAKEN:

_____ No Exception Taken

_____ Exceptions as Noted

_____ Revise and Resubmit

_____ Rejected; Submit specified item

_____ No Action Taken

SECTION 013220 – PHOTOGRAPHIC DOCUMENTATION

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 includes administrative and procedural requirements for the following:
 - 1. Preconstruction video.

1.3 SUBMITTALS

- A. Videos: Submit two copies of each video with protective sleeve or case within seven days of recording.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date video was recorded.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - g. Weather conditions at time of recording.
 - 2. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as corresponding video. Include name of Project and date of video on each page.

1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.5 COORDINATION

- A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.6 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Video Format: Provide high-quality, cd, color video.
 - 1. CD quality shall be adequate to create photographic prints to be made from individual frames.

PART 3 - EXECUTION

3.1 CONSTRUCTION VIDEOS

- A. Video Photographer: Engage a qualified commercial videographer to record construction videos.
- B. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video, record weather conditions from local newspaper or television and the actual temperature reading at Project site.
- C. Narration: Describe scenes on video by audio narration by microphone while video is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
 - 1. Confirm date and time at beginning and end of recording.
 - 2. Begin each video with name of Project, Contractor's name, videographer's name, and Project location.
- D. Preconstruction Video: Before starting demolition, record video of Project site, roof and surrounding properties from different vantage points, as directed by Architect.
 - 1. Flag construction limits before recording construction videos.
 - 2. Show existing conditions adjacent to Project site before starting the Work.
 - 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of demolition.
 - 4. Show protection efforts by Contractor.

END OF SECTION

SECTION 014000 - QUALITY CONTROL

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 includes administrative and procedural requirements for quality-control services.
- B. Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- E. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01045 "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
 - 2. Section 01300 "Submittals" specifies requirements for development of a schedule of required tests and inspections.

1.3 RESPONSIBILITIES

- A. Owner Responsibilities: Unless otherwise indicated, the Owner shall provide and pay for testing services required by authorities having jurisdiction.

- B. Retesting: The Contractor shall be responsible for the cost of all failed tests and the cost of retesting until satisfactory results are achieved.
- C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
 - 1. Provide access to the Work.
 - 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 - 3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 - 4. Provide facilities for storage and curing of test samples.
 - 5. Deliver samples to testing laboratories.
 - 6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - 7. Provide security and protection of samples and test equipment at the Project Site.
- D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
 - 1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 - 3. The agency shall not perform any duties of the Contractor.
- E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
 - 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 SUBMITTALS

- A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 - 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
 - a. Date of issue.

- b. Project title and number.
- c. Name, address, and telephone number of testing agency.
- d. Dates and locations of samples and tests or inspections.
- e. Names of individuals making the inspection or test.
- f. Designation of the Work and test method.
- g. Identification of product and Specification Section.
- h. Complete inspection or test data.
- i. Test results and an interpretation of test results.
- j. Ambient conditions at the time of sample taking and testing.
- k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
- l. Name and signature of laboratory inspector.
- m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.
 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

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SECTION 016000 - MATERIAL AND EQUIPMENT

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 includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 - 2. Section 013000 "Submittals" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Division 1 Section "Substitutions" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
 - b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
 - 2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
 1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the Contractor is given the option of selecting between 2 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. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:
 1. No available domestic product complies with the Contract Documents.
 2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.
- D. 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 that will be exposed to view in occupied spaces or on the exterior.
 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 - 6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
 - 7. Store products subject to damage by the elements above ground, under cover in a weathertight 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, new at the time of installation.
 - 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 - 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
 - 1. Specification Requirements: Where Specifications name only one or two products or manufacturers, others may be submitted for review by the Architect as being "acceptable equals" to though specified.
 - 2. 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.
 - 4. Performance Specifications Requirements: Where Specifications require compliance with performance

5. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
6. 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 Architect 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.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 016310 - SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 010950 "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 - 2. Section 013000 "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Section 016000 "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.
- C. Substitutions:
 - 1. After the Award of Contract:
 - a. The Procurement Division will consider a request by the contractor for substitution where the specified product cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 - b. The Procurement Division will consider a request by the Contractor for a substitution after the award of the Contract where substantial advantage is offered to the Owner in terms of:
 - 1) A credit is offered for substitution of a Product accepted as an approved equal to a specified item by the Architect.
 - 2) A Product has been accepted by the Architect as being of greater quality at no additional cost to the Owner.
 - 3) The Products specified, for no fault of the Contractor, cannot be obtained.
 - 4) The Architect will consider a request for substitution when the specified Product cannot be provided in a manner which is compatible with other materials of the work.
 - 5) The Architect will consider a request for substitution when the specified Product cannot be properly coordinated with other materials in the work

- 6) The Architect will consider a request for substitution when the specified Product cannot receive a warranty as required by the Contract Documents.
2. The Contractor, Subcontractor or Supplier who is recommending the Substitution shall compensate the Architect/Engineer for expenditures necessary in reviewing the proposed substitution. Prevailing hourly billing rates shall be used plus 20%.

1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
 1. Products, are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor's previously purchased stock. The term Product as used herein includes the terms "material," "equipment," "system" and other terms of similar intent.
 2. Named Products, are products identified by use of the manufacturer's name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the contract documents.
 3. Materials, are products that must be substantially cut, shaped, worked, mixed, motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.
 4. Equipment, is defined as a product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents. The following are not considered to be requests for substitutions:
 1. Revisions to the Contract Documents requested by the Owner, Architect or Engineers are considered as changes and not substitutions.
 2. Specified options of products and construction methods included in the Contract Documents.
 3. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal:
 1. Submit 6 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and or to construction necessary to accommodate the proposed substitution. The Contractor shall certify that the Substitution, if accepted, would be complete and no additional cost to the Owner would be required.
 - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. 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.
 - f. Cost information, including a proposal of the net change, if any to the Contract Sum.
 - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. 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.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation. Acceptance will be in the form of a change order.
 - a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 3. The request is timely, fully documented, and properly submitted.
 4. The Architect will not consider the request if the specified product or method cannot be provided as a result of the Contractor failure to pursue the Work promptly or coordinate activities properly
 5. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations.
 6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. 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.
 8. 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.
 9. 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 provides the required warranty.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION - (Not Applicable)

END OF SECTION

SECTION 017000 - CONTRACT CLOSEOUTS

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 includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation 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 2 through 48.

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 percent completion for the portion of the Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise the Owner of pending insurance changeover requirements.
 - 3. Identify specific warranties which have been requested pending the date of Substantial Completion, 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. Advise the Owner and supplier of Finish Hardware to have final changeover of permanent locks made and to provide the keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
 6. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 7. Complete final cleanup requirements, including touchup painting.
 8. Touch up and otherwise repair and restore marred, exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued. The Architects cost to reinspect, if required due to the Contractor not being prepared, shall be paid by the Contractor to the Architect prior to Final Inspection.
1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.
- C. Closeout Submit the following documents:
1. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 2. Deliver tools, spare parts, extra stock, and similar items.
 3. Dated and notarized Power-of Attorney (with consent of surety).
 4. Release of Lien from Contractor.
 5. Sub-Contractor/Supplier Release of Lien, if applicable.
 6. Notarized letter of Asbestos-Free Construction.

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 insurance certificates 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 Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 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 assumed responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 8. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 9. Deliver tools, spare parts, extra stock, and similar items.
- B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
1. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated by the Architect at the Contractors expense.

1.5 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
 3. Note related change-order numbers where applicable.
 4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 5. Obtain from the Architect one full set of CAD computer disk and record all revisions as indicated on the as-built drawings.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
 3. Note related record drawing information and Product Data.
 4. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.
- D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
 3. Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.
- E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.
- G. Maintenance Manuals: Provide three sets of organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions.
 2. Spare parts list.
 3. Copies of warranties.
 4. Wiring diagrams.
 5. Recommended "turn-around" cycles.
 6. Inspection procedures.
 7. Shop Drawings and Product Data.
 8. Fixture lamping schedule.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operation 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. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. 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.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."

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

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

- a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION

SECTION 017400 - WARRANTIES

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 includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 013000 "Submittals" specifies procedures for submitting warranties.
 - 2. Section 017000 "Contract Closeout" specifies contract closeout procedures.
 - 3. Divisions 26 and 28 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. 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. Manufacturer's disclaimers and limitations on product warranties do not 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.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- 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 the 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: Expressed 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. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- A. Submit written warranties to the Owner as part of the close-out documents. The Owner's Certificate of Substantial Completion designates the commencement date for warranties.
 - 1. 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 Owner within 15 days of completion of that designated portion of the Work.
- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the

required parties. Submit a draft to the Owner, through the Owner, for approval prior to final execution.

1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch 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 spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 LIST OF WARRANTIES

- A. Schedule: Provide a Warranties Schedule on products and installations of items which will require the Contractor to provide warranties with the close-out documents. This schedule shall be submitted with the Submittal Schedule.

END OF SECTION

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SECTION 260600 - MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition for installation of new electronic security systems.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify field measurements and circuiting arrangements.
- B. Verify and remove abandoned wiring and equipment that is no longer used.
- C. Demolition will be based on field observation and existing record documents.
- D. Report discrepancies to Owner Architect/Engineer before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Demolition will be based on field observation and existing record documents. Report discrepancies to Owner Architect/Engineer before disturbing existing installation.
- B. Disconnect electrical circuits and systems in cabinets, consoles, doors, walls and ceiling scheduled for removal.
- C. Provide temporary wiring and connections to maintain existing systems in service during transition. When work must be performed on energized equipment or circuits, use only personnel experienced in such operations.

- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchover and connections. Obtain permission from Owner/Architect/Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new door control system is accepted. Disable system only to make wiring changes and connections. Notify Owner Architect/Engineer and local fire service at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System: Maintain existing system in service until Door Control system is complete and ready for service or Door system is accepted. Disable system only to make switchovers and connections. Notify Owner, Architect/ Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing Intercom System: Maintain existing system in service until Door Control system is complete and ready for service and Door system is accepted. Disable system only to make switchovers and connections. Obtain permission from Notify the Owner and Architect/Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- H. Existing Television System: Maintain existing system in service until Door Control system is complete and ready for service and accepted. Disable system only to make switchovers and connections. Obtain permission from Notify the Owner and Architect/Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- I. Existing Data Systems: Maintain existing system in service until Door Control system is complete and ready for service and system is accepted. Disable system only to make switchovers and connections. Obtain permission from Notify the Owner and Architect/Engineer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new installation.
- B. Remove abandoned wiring from device to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces. Provide all required fire-blocking / proofing of empty conduits.

- D. Disconnect and remove abandoned equipment / devices. Remove abandoned equipment / devices if conduit servicing them is abandoned and removed. Provide blank cover for abandoned equipment which are not removed.
- E. Disconnect and remove abandoned panels / racks / cabinets and distribution equipment.
- F. Disconnect and remove electrical devices and equipment serving all equipment that has been removed.
- G. Disconnect and remove abandoned equipment. Remove brackets, stems, hangers, and other accessories. Patch all holes and paint surface.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to all existing electrical equipment which remains active. Modify installation or provide access panel as appropriate.
- J. Extend existing installations using materials and methods in compliance with NEC, or as specified.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Cabinets / Consoles: Clean exposed surfaces and check tightness of electrical connections. Replace damaged equipment and provide blank plates for vacant / open positions. Provide typed circuit directory showing revised circuiting arrangement.

3.05 INSTALLATION

- A. Install relocated any materials and equipment as may be required under the provisions found in other specification sections.

END OF SECTION

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SECTION 261100 - RACEWAYS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. This section is a Division 16 Electrical section, and is part of each Division 16 section making reference to electrical raceways as specified herein.

1.02 DESCRIPTION OF WORK

- A. Extend raceway work as required for installation of the Security Door Control system..
- B. Types of raceway specified in this section include the following:
 - 1. Rigid metal conduit.
 - 2. Intermediate metal conduit.
 - 3. PVC coated metal conduit.
 - 4. Flexible metal conduit.
 - 5. Liquid tight flexible metal conduit.
 - 6. Electrical metallic tubing (EMT).
 - 7. Rigid nonmetallic conduit (PVC).
 - 8. Surface Metal Raceway
- C. Electrical Nonmetallic Tubing (ENT) is not acceptable.

1.03 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of raceway systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Installer shall have at least 3 years of successful installation experience on projects with electrical raceway work similar to that required for this project.

1.04 CODES AND STANDARDS

- A. NEMA Compliance: Comply with applicable requirements of NEMA Standards Publications pertaining to raceways.
- B. UL Compliance and Labeling: Comply with applicable requirements of UL safety standards pertaining to electrical raceway systems. Provide raceway products and

components which have been UL listed and labeled.

- C. NEC Compliance: Comply with applicable requirements of NFPA-70 pertaining to construction and installation of raceway systems.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions for each type of raceway system required. Include data substantiating that materials comply with requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide raceways and fittings, of types, sizes, and weights (wall thickness) for each installation indicated. Where types are not indicated, provide proper selection determined by installer to fulfill installation requirements and comply with applicable portions of NFPA-70 for raceways.
- B. All conduits and fittings shall bear the U.L. label or seal.
- C. Minimum trade size raceway shall be 3/4".
- D. Where conduit size is not indicated on plan, size conduit in accordance with NFPA-70, except no conduit smaller than 1" shall be embedded in concrete or masonry or installed below grade.

2.02 RIGID METAL CONDUIT

- A. Provide zinc coated or hot-dipped galvanized type rigid steel conduit conforming to Federal Specification WW-C-581, ANSI C80 and U.L.6.
- B. Provide threaded type zinc plated or hot-dipped galvanized malleable iron or steel fittings conforming to Federal Specification W-F-408.
 - 1. Use Type 1 fittings for raintight connections.
 - 2. Use Type 2 fittings for concrete tight connections.
 - 3. Use Type 3 fittings for other miscellaneous conditions.
- C. Provide insulated bushings on all rigid steel conduits terminating in panels, boxes, wire gutters, or cabinets.
- D. Provide zinc plated or hot-dipped galvanized, malleable iron conduit bodies with removable cover, corrosion resistant screws, threaded hubs and complying with ANSI/NEMA FB1.

2.03 INTERMEDIATE METAL CONDUIT

- A. Provide zinc coated or hot-dipped galvanized type intermediate steel conduit conforming to Federal Specification WW-C-581 and U.L. 1242.
- B. Provide threaded type zinc plated or hot-dipped galvanized, malleable iron or steel fittings.
- C. Provide insulated bushings on all intermediate steel conduits terminating in panels, boxes, wire gutters, or cabinets.
- D. Provide zinc plated or hot-dipped galvanized malleable iron conduit bodies with removable cover, corrosion resistant screws, threaded hubs and complying with ANSI/NEMA FB1.

2.04 PVC COATED METAL CONDUIT

- A. Provide hot-dipped galvanized type rigid steel conduit with external PVC coating (20 mil. thick) conforming to Federal Specification WW-C-581, ANSI C80.1, U.L. 6, and NEMA RN1.
- B. Provide threaded type zinc plated or hot-dipped galvanized, malleable iron or steel fittings with external PVC coating (20 mil. thick).
- C. Provide insulated bushings on all PVC coated metal conduits terminating in panels, boxes, wire gutters, or cabinets.
- D. Provide zinc plated or hot-dipped galvanized, malleable iron conduit bodies with removable cover, corrosion resistant screws, threaded hubs and complying with ANSI/NEMA FB1.

2.05 FLEXIBLE METAL CONDUIT

- A. Provide flexible steel conduit formed from continuous length of spirally wound, interlocked zinc coated strip steel and conforming to Federal Specification WW-C-56 and U.L. 1.
- B. Provide threadless hinged clamp type fittings for use with flexible steel conduit.
 - 1. Straight Terminal Connectors: One piece body, female end with clamp and deep slotted machine screw for securing conduit, male threaded end provided with locknut, and insulated throat connections for terminations.
 - 2. 45 deg. Or 90 deg. Angle Terminal Connectors: Two piece body construction with removable upper section, female end with clamp and deep slotted machine screw for securing conduit, male threaded end provided with locknut, and insulated throat connections for terminations.

2.06 LIQUID TIGHT FLEXIBLE METAL CONDUIT

- A. Provide liquid tight flexible metal conduit constructed from a continuous, flexible, interlocked, single strip and double wrapped steel, galvanized inside and outside, coated with liquid tight jacket of flexible polyvinyl chloride (PVC), and conforming to U.L. 360.
- B. Provide compression type cadmium plated, malleable iron fittings with neoprene gasket sealing rings, and complying with ANSI/NEMA FB1 and U.L. 5148.
- C. Provide insulated throat connectors for terminations.

2.07 ELECTRICAL METALLIC TUBING

- A. Provide galvanized steel tubing conforming to Federal Specification WW-C-563, ANSI C80.3, and U.L. 797.
- B. Provide set screw or compression type zinc plated or hot-dipped galvanized, malleable iron or steel fittings conforming to Federal Specification W-F-408.
 - 1. Use Type 1 fittings for raintight connections.
 - 2. Use Type 2 fittings for concrete tight connections.
 - 3. Use Type 3 fittings for miscellaneous connections.
- C. Provide insulated throat connectors for terminations.
- D. Provide zinc plated or hot-dipped galvanized, malleable iron conduit bodies with removable cover, corrosion resistant screws, threaded hubs and complying with ANSI/NEMA FB1.

2.08 RIGID NONMETALLIC CONDUIT

- A. Provide rigid nonmetallic conduit conforming to Federal Specification WC1094A, NEMA TC-2 and U.L. 651.
 - 1. Heavy Wall Conduit: Schedule 40, 90C, U.L. rated, constructed of polyvinyl chloride, for direct burial or normal above ground use.
 - 2. Extra Heavy Wall Conduit: Schedule 80, U.L. rated, constructed of polyvinyl chloride, for direct burial or above ground use.
- B. Provide fittings which mate and match to conduit type and material and comply with NEMA TC-3 and U.L. 514.
- C. Provide threaded terminal adapters on all rigid nonmetallic conduits terminating in panels, boxes, wire gutters, or cabinets. Adapters to have male threads on one end, socket end on other.
- D. Provide zinc plated or hot-dipped galvanized, malleable iron conduit bodies with

removable cover, corrosion resistant screws, threaded hubs and complying with ANSI/NEMA FB1.

2.09 EXPANSION FITTINGS

A. Expansion fittings shall be:

1. U.L. Listed, hot-dipped galvanized inside and outside, providing a 4" expansion chamber, external braided grounding and bonding jumper with approved clamps and U.L. listed for the application.
2. U.L. Listed, polyvinyl chloride, providing a 6" expansion chamber, and meet requirements for rigid nonmetallic conduit.

2.10 Available Conduit Bodies Manufacturers: Subject to compliance with requirements, manufacturers offering conduit bodies which may be incorporated in the work include, but are not limited to the following:

- A. Appleton Electric; Div. of Emerson Electric Co.
- B. Arrow Hart Div.; Crouse Hinds Co.
- C. Bell Electric Div.; Square D Co.
- D. Killark Electric Mfg. Co.
- E. O-Z/Gedney Div.; General Signal Co.
- F. Spring City Electrical Mfg. Co.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install raceways as indicated; in accordance with manufacturer's written installation instructions, and in compliance with NFPA-70, and NECA's "Standards of Installation".
- B. Coordinate with other work including wires/cables, boxes and panel work, as necessary to interface installation of electrical raceways and components with other work.
- C. Install conduits concealed in either wall, slabs, or above hung ceilings. Where conduits cannot be concealed, route conduits exposed on wall or ceiling. No exposed conduit shall be installed in inmate / detainee accessible areas.
- D. Mechanically fasten together metal conduits, enclosures and raceways for conductors

to form continuous electrical conductor. Connect to electrical boxes, fittings and cabinets to provide electrical continuity and firm mechanical assembly.

- E. Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat surfaces with corrosion inhibiting compound before assembling.
- F. Install miscellaneous fittings such as reducers, chase nipples, 3 piece unions, split couplings, and plugs that have been specifically designed and manufactured for their particular application. Install expansion fittings in raceways every 200' linear run or wherever structural expansion joints are crossed.
- G. Use roughing-in dimensions of electrically operated equipment furnished by supplier. Set conduit and boxes for connection to equipment only after receiving review of dimensions and after checking location with other trades and facilities staff.
- H. Provide nylon pull cord in all empty conduits. Test conduits required to be installed, but left empty, test with ball mandrel. Clear any conduit which rejects ball mandrel. Pay costs involved for restoration of conduit and surrounding surfaces to original condition.

3.02 CONDUIT INSTALLATION

- A. Use electrical metal tubing conduit in mechanical equipment rooms, electrical equipment rooms and for communication circuits.
- B. Use flexible metal conduit in movable partitions and from outlet boxes to recessed lighting fixtures, and final 24" of connections to motors, or control items subject to movement or vibration and in cells of pre-cast concrete panels.
- C. Use liquid tight flexible metal conduit where subject to one or more of the following conditions:
 - 1. Exterior location.
 - 2. Moist or humid atmosphere where condensate can be expected to accumulate.
 - 3. Corrosive atmosphere.
 - 4. Subjected to water spray or dripping oil, water or grease.
- D. Cut conduits straight, properly ream, and cut threads for heavy wall conduit deep and clean.
- E. Field bend conduit with benders designed for purpose so as not to distort nor vary internal diameter.
- F. Size conduits to meet NFPA-70, except no conduit smaller than 1" shall be embedded in concrete or masonry or install below grade.
- G. Where penetrating grade or floor in an exposed location from underground or in slab, a

black mastic coated or PVC coated galvanized rigid steel conduit shall be used.

- H. Provide rigid 90 degree elbows when turning conduit up in slab or turning conduit up above grade.
- I. Fasten conduit terminations in sheet metal enclosures by 2 metal locknuts, and terminate with bushing. Install locknuts inside and outside enclosure.
- J. Conduits are not to cross pipe shafts, or ventilating duct openings.
- L. Keep conduits a minimum distance of 6" from parallel runs of flues, hot water pipes, or other sources of heat. Wherever possible, install horizontal raceway runs above water and steam piping.
- M Support riser conduit at each floor level with clamp hangers.
- N. Use of running threads at conduit joints and terminations is prohibited. Where required, use 3 piece union or split coupling.
- O. Complete installation of electrical raceways before starting installation of cables/wires within raceway.

3.03 CONCEALED CONDUITS

- A. Raceways installed in floors or outside shall be PVC Schedule 40.
- B. Where penetrating a floor in a location concealed in a block wall and acceptable by applicable codes, PVC Schedule 40 rigid non-metallic raceways may be used up to the any outlet box, provided outlet height above finished floor does not exceed 48".

3.04 EXPOSED CONDUITS

- A. No exposed conduit will be permitted in inmate / detainee accessible areas.
- B. Install exposed conduits and extensions from concealed conduit systems neatly, parallel with, or at right angles to walls of building.
- C. Install exposed conduit work as not to interfere with ceiling insets, lights, or ventilation ducts or outlets.
- D. Support exposed conduits by use of hangers or clamps. Support conduits on each side of bends and on spacing not to exceed following: up to 1": 6'-0"; 1-1/4" and over: 8'-0".
- E. Exposed conduits shall be painted to match the color of walls, ceilings, canopies, etc., as indicated on drawings, or as directed by the Architect.

3.05 NON-METALLIC CONDUITS

- A. Make solvent cemented joints in accordance with recommendations of manufacturer.
- B. Install PVC conduits in accordance with NFPA-70 and in compliance with local utility practices.

3.06 CONDUIT FITTINGS

- A. Construct locknuts for securing conduit to metal enclosure with sharp edge for digging into metal, and ridged outside circumference for proper fastening.
- B. Insulated bushing for terminating conduits smaller than 1-1/4" are to have flared bottom and ribbed sides, with smooth upper edges to prevent injury to cable insulation.
- C. Insulated bushings for terminating conduits 1-1/4" and larger are to have flared bottom and ribbed sides. Upper edge to have phenolic insulating ring molded into bushing.
- D. Bushing off or insulated type to have screw type grounding terminal.
- E. Miscellaneous fittings such as reducers, chase nipples, 3 piece unions, split couplings, and plugs to be specifically designed for their particular application.

END OF SECTION

SECTION 261200 WIRES AND CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work of this section.
- B. This section is a Division 26 Electrical section and is part of Division 26 section making reference to electrical wires and cables specified herein.

1.02 DESCRIPTION OF WORK

- A. Extent of electrical wires and cable work will encompass 5th and 6th floors of Building "E".
- B. Types of electrical wire, cable, and connectors specified in this section include the following:
 - 1. Copper conductors.
 - 2. Service cables.
 - 3. Split-bolt type connectors.
 - 4. Wirenut connectors.
 - 5. Crimp connections.
- C. Applications of electrical wire, cable, and connectors required for project are as follows:
 - 1. For power distribution circuits.
 - 2. For door and relay control circuits.
 - 3. For equipment circuits.
 - 4. For status monitoring circuits.

1.03 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in the manufacture of electrical wire and cable products of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firm with at least 3 years of successful installation experience with projects similar to that required for this project.
- C. NFPA-70 Compliance: Comply with NFPA-70 requirements as applicable to construction, installation and color-coding of electrical wires and cables.

- D. UL Compliance: Comply with applicable requirements of UL Std. 83, "Thermoplastic Insulated Wires and Cables" and Std. 486A, "Wire Connectors and Soldering for Use With Copper Conductors".
- E. UL Compliance: Provide wiring/cabling and connector products which are UL listed and labeled.
- F. NEMA/ICEA Compliance: Comply with NEMA/ICEA Std. Pub/No's WC5, Thermoplastic Insulated Wires and Cable for the "Transmission and Distribution of Electrical Energy", and WC30, "Color Coding of Wires and Cables", pertaining to electrical power type wires and cables.
- G. IEEE Compliance: Comply with applicable requirements of IEEE Stds. 82, "Test Procedures for Impulse Voltage Tests on Insulated Conductors", and Std. 241, "IEEE Recommended Practice for Electric Power Systems in Commercial Buildings" pertaining to wiring.
- H. ASTM Compliance: Comply with applicable requirements of ASTM B1, 2, 3, 8, and D-573. Provide copper conductors with conductivity of not less than 98% at 20 degrees C. (68 deg. F.).
- I. FOIST Compliance: Comply with Federal Specifications J-C-30, "Electrical Cable and Wire (Power, Fixed, Installation)", and W-S-610, "Splice Conductor".

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data on electrical wires, cables, and conductors.
- B. DELIVERY, STORAGE, AND HANDLING:
 - 1. Deliver wire and cable properly packaged in factory fabricated type containers, or wound on NEMA specified type wire and cable reels.
 - 2. Store wire and cable in clean dry space in original containers. Protect products from weather, damaging fumes, construction debris and traffic.
 - 3. Handle wire and cable carefully to avoid abrading, puncturing, and tearing wire and cable insulation and sheathing. Ensure that dielectric resistance integrity of wires/cables is maintained.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to the following:

1. Wire and Cable:
 - a. Apex Wire and Cable Corp.
 - b. American Insulated Wire Corp.
 - c. American Wire and Cable Co.
 - d. Anaconda-Ericson Inc., Wire and Cable Div.
 - e. Beldon Div.; Cooper Industries.
 - f. Brand-Rex Div.; Pyle National Co.
 - g. Cerro Wire and Cable Corp.
 - h. Cleveland Insulated Wire Co.
 - j. Phelps Dodge Cable and Wire Co.
 - k. Rome Cable Corp.
 - l. Southwire Corp.
 - m. Triangle PWC, Inc.

2. Connectors;
 - a. AMP, Inc.
 - b. Appleton Electric Co.; Emerson Electric Co.
 - c. Burndy Corporation.
 - d. Brand-Rex Div.; Pyle National Co.
 - e. Electrical Products Div.; Midland Ross Corp.
 - f. General Electric Co.
 - g. Ideal Industries, Inc.
 - h. Leviton Mfg. Company.
 - i. 3M Company.
 - j. O-Z/Gedney Co.
 - k. Southport Industries Inc.
 - l. Square D Company.
 - m. Thomas and Betts Corp.

2.02 WIRES, CABLES, AND CONNECTORS

- A. General: 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 application indicated. Except as otherwise indicated, provide copper conductors with conductivity of not less than 98% at 20 degrees C (68 degrees F.).

- B. Building Materials: 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, NFPA-70 and NEMA standards. Select from the following UL types, those wires with construction features which fulfill project requirements.
 1. Type THWN: For dry or wet locations; max. operating temperature 75 deg. C.(167 deg. F.). Insulation, flame retardant, moisture and heat resistant, thermoplastic; outer covering, nylon jacket; conductor, annealed copper.

2. Type THHN: For dry and damp locations; max. operating temperature 90 deg. C. (194 deg. F.). Insulation, flame retardant, heat resistant thermoplastic conductor, annealed copper.

2.03 CONNECTORS

- A. General: Provide UI type factory fabricated, metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Where not indicated, provide proper selection as determined by Installer to comply with project's installation requirements, NFPA-70 and NEMA standards. Select from the following, those types, classes, kinds and styles of connectors to fulfill project requirements:

PART 3 - EXECUTION

3.01 INSTALLATION OF WIRES AND CABLES

- A. General: Install electrical cables, wire and wiring connectors as necessary, in compliance with applicable requirements of NFPA-70, NEMA, UL, and NECA's "Standard of Installation" and in accordance with recognized industry practices.
- B. Coordinate wire/cable installation work including electrical raceway and equipment installation work, as necessary to properly interface installation of wires/cables with other work.
- C. Install UL type wiring in conduit, for feeders and branch circuits.
- D. Pull conductors simultaneously where more than one is being installed in same raceway.
- E. Use pulling compound or lubricant, where necessary; compound used must not deteriorate conductor or insulator.
- F. Use pulling means including, fish tape, cable, rope and basket weave wire/cable grips which will not damage cables or raceways.
- G. Keep conductor splices to a minimum.
- H. Install splices and tapes which possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
- I. Use splice and tap connectors which are compatible with conductor material.

- J. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A and B.

END OF SECTION

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PART 1 - GENERAL

1.01 STIPULATIONS

- A. Any specifications sections accompanying or attached along with procurement standards representing "General Conditions," "Special Requirements" and/or "General Requirements" form a part of this section and other related sections to this project by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.02 SUMMARY

A. Section Includes:

1. This section includes basic manufacturing, assembly, programming and installation requirement specifications for the Touchscreen Detention Door Control system and associated sub-systems. This section serves as an overview for all of the security component sections. This section contains requirements that pertain to all of the section 28 series security sections, and includes the design basis, as well as requirements for submittals, quality assurance, product handling, record documents, project conditions, installation, testing, demonstrations and acceptance and required training of owner selected personnel.

B. Related Sections:

1. Section 285202 - Touchscreen Security Door Control System
2. Section 285203 - Programmable Logic Controllers (PLC).

C. Definitions:

1. **BCMS** Building Control/Management System
2. **CCVE** Closed Circuit Video Equipment.
3. **CPU** Computer Processing Unit.
4. **BPS** Bolt Position Switch (Locking Hardware).
5. **DPS** Door Position Sensor (Magnetic Sensor)
6. **VDSI** Visual Door Status Indicator.
7. **PLC** Programmable Logic Controller.
8. **LCD** Liquid Crystal Display.
9. **ECE** Elevator Control Equipment.
10. **EMI** Electromagnetic Interference.
11. **GCP** Graphic Control Panel.
12. **HDD** Hard Disk Drive.
13. **ISMS** Integrated Security Management System.
14. **IDS** Intrusion Detection System and Sub-systems.
15. **LAN** Local Area Network.

- 16. **WAN** Wide Area Network.
- 17. **SCCN** Security Closed Communication Network.
- 18. **LED** Light Emitting Diode.
- 19. **RAM** Random Access Memory.
- 20. **SIC** System Interface Cabinet/Frame.
- 21. **SSI** Security System Integrator/ Installer.
- 22. **UPS** Uninterruptible Power Supply.

1.03 REFERENCES AND COMPLIANCES TO THE LATEST EDITIONS, AS RELATED:

- A. States National Electric Code (NEC).
- B. National Fire Protection Agency (NFPA).
- C. Underwriters Laboratories (UL).
- D. US Americans with Disabilities Act (ADA).
- E. Uniform Building Code (UBC).
- F. Federal Communications Commission (FCC).

1.04 SYSTEM DESCRIPTION

- A. The Security Door Control and Monitoring System shall perform all of its control and monitoring functions through the integrated programmable logic controller distributed network and remote input/output modules and provide real-time status indication of all security doors throughout the building "E" 5th & 6th floors and their associated housing units, isolation areas, stairwells and mechanical chase areas.
- B. This Touchscreen system will consist solely of Door Control and Monitoring and will not include any other systems such as CCVE, Intercommunications, intrusion detection, officer down, etc.
- C. Each of the Building "E" 5th and 6th floor control rooms will be equipped with two (2) fully redundant security touchscreen control systems capable of controlling and monitoring each of the doors indicated in the schedules and diagrams.
- D. Each Touchscreen shall consist of a completely independent Windows based computer operating system utilizing "Wonderware" software as the HMI / SCADA program and shall be located in its assigned control room to support each touchscreen display.
- E. The touchscreen computers shall communicate with the programmable logic controller over a dedicated CAT-6 network. The PLC shall also have redundant processors providing bump-less transfer of operational capabilities in the event of failure.

- F. Each touchscreen computer, display/monitor, PLC processor, Input/output module and associated power supply must be provided with uninterruptable power providing no less than thirty (30) minutes of standby power and connected to emergency power circuits providing facility generator emergency power.
- G. Touchscreen displays are to be provided with articulating mounts, which will be attached to blank 19" EIA plates installed where the existing door control switch panels are currently located on each end of the control room consoles. Mounts must be capable of being "Locked / Secured" into operator selected positions for ease of operation.
- H. Programmable logic controller processors are to be provided with a secured rack mount enclosure located in the 5th floor Electrical room number # E563 with remote I/O modules located in or adjacent to each of the existing emergency release cabinets in the mechanical rooms at the end of each housing unit. Housing unit doors were converted from 120VAC sliders to 24VDC half-cycle Southern Folger locks in 2017 and the wiring and cable chase along with the emergency release cabinet are still available for use.
- I. Newly installed swing doors are equipped with Green and RED LED status indicators in the top corner of the doorframes above each door lock. These signals are derived from monitoring of a magnetic door position switch and bolt position switch. All wiring is concealed in the detention grade slider chase that runs the complete length of each housing unit and connects to the mechanical room at the end of each unit, which can be utilized for all new cabling.
- J. Each individual door will be represented on the touchscreen display by an Icon to provide door status. The door status Icon shall provide both a change in color and visual state to represent its operational condition. An icon with a green background and a padlock symbol with a closed/latched hasp shall represent controlled doors that are in the "Secure" state. An Icon with a red background and a padlock with an open/unlatched hasp shall represent controlled doors that are in the "Unsecured" state.
- K. Each housing unit has a "Sally Port or Mantrap" which is referred to in the diagrams as Inner and Outer Trap doors. There are four (4) Traps located on each floor and one (1) set of control room doors that require electronic interlocking. This system prevents the two doors from being opened/unsecured simultaneously. A two-step override exist on the Touchscreen panels that will permit the doors to be overridden under special and highly controlled circumstances to permit both doors to be opened. As indicated on the Touchscreen diagrams if an attempt to open the associated "Trap" door prior to the other door being secured a sub- window will appear providing both a warning and requiring a separate step to override the door. Such events will be recorded and archived in the systems activity log.
- L. The attached diagrams indicate the Touchscreens and their respective Icon layouts. Additionally, the Pop-up Icons are also indicated on the attached diagrams. Pop-up

Icons can vary position on screen to provide clarity.

1. The "HOME" screen is designed to provide an overview of the four adjacent housing units and the East and West ISO and Stairwell areas and several roll down gates. The top bars on the screen represent housing unit "ALPHA, BRAVO, CHARLIE and DELTA" and the background color indicates the status of "RED" Unsecured or "GREEN" Secured. For purposes of clarity the "Padlock" Icon is not shown on this diagram but should be included on the Touchscreen version. This screen also includes an Icon for "CLEAN SCREEN" which will freeze the Touchscreen portion of the screen for 30 Seconds to permit the screen to be cleaned without activating any of the Icons. If the Icon is activated prior to the 30 seconds elapsing the operation will return to normal. During the "Clean Screen" operation all of the status indications will continue to operate in real-time.
 2. Upon activation of one of the housing unit bars at the top of the screen the selected unit will be enlarged with each of its controlled doors along with a "Group Release" function. Adjacent housing units will be displayed in a smaller top bar visual method along with the Catwalk Roll up doors and Balcony Doors to permit simultaneous status monitoring. By touching any of the other housing unit status bars or the Catwalk Bar the system will switch to the larger version of the selected housing unit. Should any door status change or a door be manually opened and audible tone will alert the operator along with a flashing indication of the specific door. The screen is also equipped with a "Acknowledge" Icon to extinguish audible alerts and record for archived storage the operators response to the incoming events. All doors will be programmed with a forty (40) second Door-Open-To-Long (DOTL) audible alert if not re-secured within that period of time. When a group release is utilized the audible alert will be automatically silenced not requiring the operator to Acknowledge or Silence.
 3. The Smaller Icon bar for the Catwalk Roll Up Doors and the Control Room Roll Up Doors are represented by an Icon at the bottom of the screen for the Control Room Gates, and on the smaller Icon bar representing the Catwalk / Balcony. On the lower Icon, Once touched, ALL Gates will Close into the Secure mode. To open any of the Gates it will require individual Icon use. The color bars are to indicate small GREEN Bar in the UP/ OPEN position and YELLOW extended Bar indicating the CLOSE /SECURE position. Touching the GREEN or YELLOW BAR will cause the Roll UP gate to STOP or OPERATE.
 4. This system will be expanded in the future but shall only require the expansion of the PLC I/O along with ladder logic and software programming enhancements.
- M. Each Control Room will be able to provide control and supervision on the all security activities and devices from either Touchscreen located within their Control Room. Additionally, These Touchscreens shall also be capable of controlling the alternate floor through proper password log-on to facilitate future area construction.
- N. The system will consist of the following fully integrated component
1. System Components
 - a. Computerized Touchscreen Security Door Control operating system.
 - b. Operating Computers.

- c. Microsoft Windows 10 operating software.
- d. Wonderware HMI/SCADA operating software.
- e. Networking Software.
- f. Microsoft Windows Server software.
- g. Allen Bradley Programmable Logic Controller with remote I/O.
- h. Allen Bradley PLC software.
- i. Associated Power Supplies.
- j. Associated Uninterruptable Power Supplies (UPS).
- k. Associated Cabling and Connectors.
- l. Associated EIA console hardware and articulating flat screen mounts

1.05 General and Existing Conditions

1. This project will serve as an interim control systems solution to be interfaced into a complex- wide security system at a later date utilizing all of these components with modifications consisting of connecting to the security system wide area network and modifications to the operating software.
2. The existing system being replaced consists of rack mounted toggle switches and bi-color status indicators mounted on EIA 19" standard panels. There are four (4) of these panels on the 5th floor and four (4) on the 6th floor. Each panel represents a housing unit. The panels utilize a 22 AWG. / 25 pair telephone type cable with Amphenol connector and are routed through 2.5" conduit to the emergency mechanical release cabinet located at the end of each line of cell doors in the mechanical room.
3. These specifications and diagrams are intended to convey the extent, general arrangement and locations of the work. Because of the scale of the diagrams, certain basic items such as conduit fittings, access panels, cabinet sizes, sleeves, pull boxes, back-boxes and junction boxes may not be indicated. Include all items where required by code and/or other sections and for proper installation of the work.
4. Provide and install all related devices, equipment and appurtenances necessary to complete the work as a complete and fully operational system.
5. Security conductors shall be a minimum #16 AWG unless otherwise noted. Communications and Network cabling shall be CAT-6a or CAT-7a. Size all conductors in accordance with NEC to ensure proper operation.
6. All security cabling shall be routed through existing dedicated concealed raceways unless otherwise required. All raceways shall be a minimum 3/4 inches. Size raceways and install conductors in accordance with the NEC, NFPA requirements.
 - a. No exposed conduit shall be permitted in inmate / detainee accessible areas.
 - b. EMT conduit with compression fittings may be utilized in all inaccessible areas unless otherwise prohibited by code or authority having jurisdiction.
7. Mounting heights and accessibility to equipment requiring access by individuals

with disabilities shall comply with ADA requirements.

8. The contractor shall provide an uninterruptible power supply (UPS) system, which shall supply 120 volts AC power for selected security equipment as indicated below. The UPS system shall have the capacity to furnish total power for at least 30 minutes in the event of failure of the normal and emergency power source. No signal, alarms or indications shall be lost during switch over from normal to emergency power. The UPS system shall have visual and audible trouble indicators.
 - a. Selected equipment shall include:
 - 1) Central Processing Units and Touchscreen Monitors.
 - 2) Programmable Logic Control processors, and remote I/O modules.
 - 3) Power supplies.
 - 4) Relays.
 - 5) Servers and Communications Equipment/Devices.

1.06 SUBMITTALS

- A. Submit Shop Drawings:
 1. Include dimensions, wiring and block diagrams, conduit routing and sizes, performance data, ratings, control sequences, and all other descriptive data necessary to describe the component proposed and its operating characteristics.
- B. Submit complete technical data necessary to evaluate the material and equipment. Include a complete technical specification for the submitted equipment, noting any and all differences and adherence to this section.
- C. Submit a list of at least 5 facilities of equal size and technical requirements utilizing the equipment submitted.
 1. For each facility, list:
 - a. Name and location of facility.
 - b. Date of system installation.
 - c. Owner's representative to contact and telephone number.
- D. Prior to substantial completion, provide 'project record' schematic drawings depicting location of equipment, interfaces with sub-systems, wiring and cable types, number of conductors, and types of connectors, circuit requirements, types and sizes of enclosures, security key codes.

1.07 QUALITY ASSURANCE

- A. Qualifications of Integrator/Installer: Documented successful work experience of at least 5 facilities of equivalent size and technical requirements utilizing the equipment proposed for this project.
 - 1. "Experience" is defined as the successful completion of an operational security management / control system, with the system being successfully operated by the Owner for its intended purpose for at least one year.
- B. The system and its components must be manufactured by a company engaged in the manufacturing of the specific equipment for a minimum of five years.
 - 1. Use the products of a single manufacturer for similar type equipment, i.e., Touchscreen Monitors, Computers, Relays, etc.
 - 2. Use products made by companies regularly engaged in the manufacture of the type equipment specified.
- C. Equipment specifications may not deal individually with every part, control, or device, which may be required to produce the equipment performance specified or as required to meet the equipment warranties. Include such items, as required, for a complete operational system, whether or not specifically indicated.
- D. Regulatory Requirements:
 - 1. National Electric Code (NEC)
 - 2. National Fire Protection Association (NFPA).
 - 3. Underwriters Laboratories (UL).
 - 4. Americans with Disabilities Act (ADA).
 - 5. Uniform building code (UBC)
 - 6. Regulations of the:
 - a. State of Florida
 - b. City of Orlando
 - c. County of Orange.
 - d. All other Authorities having Jurisdiction

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect materials stored on the job site. Protect materials during construction and after installation, provide protection of equipment until final inspection and acceptance by owner.
- B. Provide and apply protective material immediately upon receiving the products and maintain throughout the installation process.
- C. Keep products clean and dry, elevating equipment above ground and floor.

- D. Take all necessary precautions to protect apparatus and materials from damage.
- E. Failure to protect materials constitutes sufficient cause for rejection of the apparatus or material.
- F. Protect factory finish from damage during construction operations and until final acceptance. Restore finishes to the satisfaction of the owner that become stained, scratched, or damaged. Replace if restoration is not acceptable to owner.

1.09 RECORD DOCUMENTS

- A. Provide complete schematic drawings depicting location of all equipment/devices, equipment interface, and number of conductors, types of connectors, circuit requirements and type of enclosure.

1.10 PROJECT CONDITIONS

- A. Active Services: Protect existing active services, water, gas, sewer, and electric, when encountered, against damage. If active services are encountered which require relocation, notify Owner promptly in writing, with copy to Owner's designated representative.

PART 2 - PRODUCTS

2.1 APPROVED SECURITY EQUIPMENT INTEGRATORS

- A. Pre-Approved Systems Integrators:
 - 1. Esitech Inc. – 2506 Waco Street, Richmond, Va. 23294, Tel. 804-672-3223
 - 2. P2 Controls – 600 Swedesford Road, Frazer, Pa., Tel. 610-644-8300
 - 3. Secure Control Systems – 16103 University Oak, San Antonio, Texas., Tel. 210-530-5245
 - 4. Trentech – Cornerstone Electronics – 3224 Mobile Highway, Montgomery, Al. 36108, Tel. 334- 286-4280

2.2 MATERIALS

- A. Raceway: Comply with all requirements of the National Electric Code (NEC)..
- B. Identification:
 - 1. Provide identification for all equipment, components and wiring.
 - 2. Color code junction boxes and enclosures per NEC.
 - a. Color for security circuits: White.

3. Lettering for Identification: Sign painter's quality or stencil lettering, using fast drying sign enamel.
4. Identify control and sub-control, motor and equipment controls, remote relay cabinets, security equipment panels, system interface cabinets, and similar equipment with 1/2-inch red lettering. Letter flush panels inside the door or cover.
5. Letter all pull-boxes and junction boxes in service areas, above accessible ceilings, and in accessible chases with 1/2-inch red lettering identifying the circuit and system. Example: Security "SY," Circuit Number SY-126.
6. Engraved laminated plastic tags may be used for identification in lieu of painted lettering.
7. Provide typewritten circuit directories installed in 3-ring binders with transparent page protectors in each control and sub-control cabinet.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Shop drawings shall detail space conditions to the satisfaction of all concerned trades, subject to final review by the Owner. If installation of equipment, raceways, cable trays and/or conduit is performed prior to coordination with other trades, which interferes with work of other trades, make necessary changes to correct the condition at no additional cost to the Owner.
- B. Provide coordination with other Sections of this project for the installation of all necessary components to provide a completely operational system within the implementation schedule.
- C. Comply with all requirements of the Owner's General Conditions.
- D. Coordinate Touchscreen control system and graphic display room/area identification with signage and graphics provided by the Corrections Department.

3.2 INSTALLATION

- A. Provide tamper-resistant installation of all equipment utilizing "torx with peg" security fastening devices at all fastener locations. Provide Key locks on all security equipment cabinets.

3.3 SOURCE QUALITY CONTROL

- A. Tests
 1. Notify Owner's representative in writing, in advance of bench testing, to prevent delays in installation schedules.

2. Test all systems and place in proper and specified working order prior to demonstration of the systems.
3. Perform tests, as may be required, by authorities having jurisdiction over the site.
4. Testing shall be in the presence of the Owner's designated representatives, Contractor, Architect and representatives of the authorities having jurisdiction.

B. Verification of Performance:

1. Prior to acceptance of the work, the security system integrator/installer shall demonstrate to the Owner, designated representatives, Contractor, Architect and representatives of the authorities having jurisdiction, all subsystems, features and functions of the system, and shall instruct the Owner in the proper operation and event sequences of the system.
2. Demonstrate each system and sub-system. The demonstration is to consist of no less than the following:
 - a. Designate actual location of each component of a system or sub-system and demonstrate its function and its relationship to other components within the system.
 - b. Demonstrate the systems and sub-systems operations by actual "START/STOP-ON/OFF- OPEN/CLOSE" cycling showing how to work controls, how to reset devices, how to replace fuses and emergency operating/operations procedures.
 - c. Demonstrate communication, signaling and equipment/devices by actual operation of such devices.
3. Systems to be demonstrated are to include, but not be limited to the following:
 - a. UPS power and distribution system.
 - b. Security Touchscreen /control/monitoring operations.
 - c. Alarm detection and signaling equipment.
 - d. Door control / monitoring system.
4. Security system Integrator/Installer (SSI) shall furnish the necessary trained personnel to perform the demonstration and instructions and arrange to have any manufacturer's representatives present to assist with the demonstrations. Training time shall as a minimum include 8 hours of dedicated owner training.
5. SSI shall arrange with the Owner's designated representative the date and times for performing the demonstrations. The owner shall be given 14 days advance notice of impending testing/training. The Owner will have final selection of the date and time for the demonstration.

6. Comply with all requirements of Systems Demonstrations:
 - a. Provide DVD digital media recording of all training sessions and maintenance procedures. This disk shall be a detailed description of a fully functional system including all maintenance procedures and operator training instructions. Disk must have high quality / resolution video and clear audio and be labeled clearly for owner's future reference.
 - b. Provide two (2) copies of training/maintenance disk to Owner.

3.4 INSPECTIONS

- A. At the completion of the project and prior to final acceptance of the work, provide evidence of final inspections and approvals to the Owner, as required by the authorities having jurisdiction and also to the requirements of all other sections.

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SECTION 285202 – TOUCHSCREEN SECURITY DOOR CONTROL SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Supplemental Conditions and individual Specifications sections and their referenced related specification sections shall all apply to this scope of integrated work.
- B. Related Sections:
 - 1. Section 285201 -- Basic Electronic Security Requirements.
 - 2. Section 285203 – Programmable Logic Controller

1.02 SUMMARY

- A. This Section specifies the technical and operational parameters of the Touchscreen Security Door Control System. The control and monitoring of individual doors/gates is a function of the four (4) graphically operated Touchscreen control terminals networked through a server to a programmable logic controller (PLC) system with dual processors capable of providing fully redundant system processing with bump-less transfer in the event of processor error, fault and/or failure. The System shall facilitate simple user-friendly operations and program alterations for user changes in Icon creation, I/O point assignment, door groups and functions, monitor assignment, interlock groups and device status monitoring.
- B. The Central Processing Unit (CPU) at each Touchscreen terminal serves as the network HMI interface from the computer through a server to the PLC. All computers will operate on Windows 10 software utilizing Wonderware software, providing the HMI operator interface for the Touchscreen Terminals. The CPU shall drive the Touchscreen color graphic monitors in order to provide control and status monitoring of all door and slider components including magnetic door position switches, lock bolt position switches, slider door limit switches, slider door lock bar position switches, roll down door position switches, half-cycle 24VDC door locks, 120VAC solenoid locks, slider and overhead door motor control. The Touchscreen CPU shall provide monitoring and control of all security devices through the Programmable Logic Controller (PLC) remotely located I/O.
- C. All touchscreen Central Processing Units (CPU) shall be powered by dedicated UPS systems.

1.03 REFERENCES

- A. Refer to Specification Section 01 and all other applicable Sections, "References" paragraph.

1.04 SYSTEM DESCRIPTION

- A. The Touchscreen Security Door Control System is comprised of various security devices, sensors and technologies, integrated into a central processing management system to provide complete automated door control and monitoring.
- B. The Security Management System shall include but not limited to the control and event monitoring of the following security related systems:
 - 1. Control and annunciation of all electrified doors
 - 2. Annunciation and control of all doors, door interlocks and gates
 - 3. Security escape detection
 - 4. Manual Release of Door Groups
 - 5. Future expansion that will include integration of CCTV, intercoms, access control, lighting control, water control, officer down systems, elevator control, etc.
 - 6. The graphic display will annunciate and identify alarm origin, complete with flashing icons and audible alerts. The Touchscreen system shall provide the security operator the information needed to properly assess and respond to situations. Door control and monitoring will be managed through Two (2) Touchscreen terminals located on the 5th floor and Two (2) Touchscreen terminals located on the 6th floor.

1.05 SUBMITTALS

- A. Comply with all requirements of Division 01, "Submittals" paragraph.
 - 1. In addition to the above submit the following information for review with Owner's Representative and Architect.
 - 2. Provide a detail operational narrative of all security monitoring/control functions.
 - 3. Provide copies of preliminary graphic screens for the facility generated from printouts of actual Touchscreens configurations for this project. Graphics shall indicate all door control functions, alarm indications, door interlock functions, operational functions and ancillary controls.

1.06 QUALITY ASSURANCE

- A. Comply with all requirements of Division 01, "Quality Assurance" and each specification section.

- B. In addition to the above, provide the following for quality control and coordination requirements.
- C. Coordinate all operational provisions of the specification with software programming and Programmable Logic Controller ladder logic programming.
- D. Review with Owner and Architect all graphic control functions, alarm indications, door interlock controls, time-based alert functions, and operational sequences prior to finalization of programming. Failure to provide this review prior to programming shall be at risk to the Contractor.
- E. In addition to other stipulated pre-qualification requirements the security system programmer shall have no less than Five (5) years of documented experience on correctional projects of similar size and scope. Submit documented experience to Architect at the time of submissions.

1.07 RECORD DOCUMENTS

- A. Provide Owner with complete set of record drawings in accordance with the requirements of Division 01 "Record Documents" and requirement of all Specification sections.
- B. In addition to the above provide the following;
 - 1. Provide Owner with two backup copies of software programming upon completion of all user requested software revisions.
 - 2. Provide separately sealed instruction manual that provides a step-by-step process by which to make program changes.
 - 3. Provide written certification to Owner, the disposition of the following:
 - a. Date Facility Program was created.
 - b. Number of revisions to program.
 - c. Nature of each revision.
 - d. Total number of hour's program has been factory operated and tested.
 - e. Complete debugging of program

1.08 WARRANTY

- A. Comply with all requirements of Division 01, "Warranty".

1.09 MAINTENANCE SERVICE

- A. Test and service system on a quarterly basis during the warranty period.
- B. Provide written notification to the Owner of the systems condition before and after service, exact components that were tested and serviced, and overall status of the

system for each quarterly maintenance period.

1.10 EXTRA MATERIALS

A. Provide Owner with:

1. Provide two back-up programs in sealed packaging, completely identified, with booting/ installation instruction written in step-by-step procedures format.

PART 2 - PRODUCTS

2.01 DESCRIPTION

A. Touchscreen Door Control System Network Design Requirements:

1. System Central Processing Unit shall operate from any PLC that it may be connected to on the Local Area Network (LAN) independently.
2. Each Central Processing Unit/Remote Central Processing Unit must be capable of independent and simultaneous operations.
3. The Touchscreen Door Control System shall be based on Windows NT or Windows 10 operating system platforms and utilizing Wonderware software for the HMI interface, or approved equal based on 2.01A.3.a.
 - a. The Wonderware Graphic Touchscreen software is commercially available, off- the-shelf, non-proprietary, specifically designed and programmed to interface with the PLC systems. Any Software programs that are proprietary to single vender or commercially available software that has been rewritten to restrict modifications by other than the original provider is not be acceptable.
4. The system shall include custom Graphic screens configured in a tabular format as well as and indicate status and location of all devices, components and system interfaces. All graphic screens shall provide a graphical representation of all device locations in relationship to the Touchscreen terminal location as indicated on the Touchscreen diagram. All tabular icons shall provide a graphic lock indicator that provides both a change in color and physical change of state.
5. Interface/integrate all remote door/gate controls as required for complete annunciation and control of individual doors and gates as indicated on the Touchscreen diagram and/or herein specified. The Balcony inner and outer door indicated on the Touchscreen diagram only exist on the 5th floor and will not be displayed on the 6th floor Touchscreens.
6. Roll Gates outside the Control Room and on the East and West Catwalk's may require additional door position sensors for proper position indication on the Touchscreen, provide as required and make inaccessible to Inmate / Detainee tampering.

7. The system central processing equipment shall meet the minimum standards as outlined in this section and must meet the requirements of the software as specified by the software manufacturer.
8. The Touchscreen Door Control System Network shall be able to accommodate no less than 25 fully independent remote Touchscreen Central Processing Unit/Remote Central Processing Units operable throughout this facility to accommodate future expansion.
9. Programming Requirements shall require that the Touchscreen System programming and the Programmable Logic Controller programming facilitate simple - user-friendly operation of all doors, gates, door groups, interlock groups and alarm device interfaces. In addition, the system programming shall allow for the modification by owner's personnel of all system icons, graphics, functions and features.
10. The system shall allow for user-friendly operation and enhanced alarm-monitoring capabilities from any and all Touchscreen terminals.
11. Monitoring and control of the system shall occur primarily through the graphic icons and tabular screens for ease of operation.
12. The icons shall include a padlock type image that provides for open / unlatched and closed /latched physical appearance along with text to describe its location / assignment and the type of alarm, function or occurrence.
13. In addition to door and gate functions and security alarm indications the system shall provide for complete door open too long monitoring. ICONS shall be provided at all Touchscreen locations for the control and monitoring of each door as indicated on the Touchscreen diagram.
14. Additional alarms shall not override the current unacknowledged alarm and shall be stacked based on the sequence of occurrence.
15. Provide for manual call-up of any of the housing unit screens by touching the icon representing the particular area from any Touchscreen location.
16. All Touchscreen terminals shall have the capability of full time system control and annunciation of all equipment/ devices located on their specific floor. In the operational mode all Touchscreen terminals shall provide graphic control and annunciation of the Four (4) respective housing units associated with that floors control station only.
17. All activity will be time and date stamped and archived for historical data storage easily accessible for forensic purposes.

B. Zoning:

1. Each individual device and tamper shall be separately zoned and represented by a symbol on the graphic screen.
2. Represent status changes of devices utilizing changes in color on the graphic screen and physical change of state.
3. Archived and journal reporting of status changes are required for each individual device.
4. Configure each door with its individual operational requirements consisting of at the minimum:

- a. Adjustable unlock time.
 - b. Adjustable door open time.
 - c. Half-cycle motor operation.
 - d. Full-cycle motor operation.
 - e. Open/Stop/Close operation.
 - f. Individual and Group functioning.
 - g. Interlocking Groups
 - h. Door Open Too Long
5. Each door lock position and door position switch shall be interfaced to programmable logic controller inputs a supervised by end-of-line EOL sensing for supervision of wiring. The graphic screens shall indicate a flashing yellow alarm condition at the door location in the event the lock position switch is normal, but the door position switch is abnormal or any combination thereof.

C. Screen Creation:

1. All Tabular screens shall be configured to provide a simple icon style operation of all system functions and indications. The ICON shall indicate all alarm and control functions for each device, which is connected to the system.
2. The tabular operation screens shall be provided at all touchscreen locations and shall allow for the complete navigation through "Top Bar" tabular housing unit screens.
3. Each graphic screen shall depict the general floor layout in relationship to the position of the console operator and shall indicate by ICON all control and status functions of each associated door within the specific area and/or space.
4. The graphic screens at all touchscreen locations shall allow for the complete navigation through all common areas and housing units screens in a seamless user-friendly / operator-friendly method.
5. All graphic configurations shall conform to the layout of the Touchscreen diagram as indicated within this section.
6. The contractor shall be responsible for developing the required tabular screens to efficiently operate all security functions and shall size and configure the layout of each graphic ICON and/or screen to provide a consistent arrangement from map to map in order to promote user friendly operations.
7. The system shall be capable to generate by owner the creation of, floor plan maps, tabular screens, alarm symbols and user definable symbols, "tokens/icons" by use of mouse or keyboard while not interrupting on-line alarm reporting activities and other menu-driven functions.
8. The system shall allow for selective creating, editing and deletion of symbols, tokens/icons and text, in addition to selective or global color strobing of symbols, tokens/icons and text by owner.
9. The system shall permit the relocating of on-screen symbols, tokens/icons and text by owner. Changes in the programming of any individual door and/or device shall be accomplished in less than 15 minutes and shall not require any rewiring

- of components/devices.
10. The system shall permit the relocating of on-screen symbols, tokens/icons and text by owner.
 11. System components will be represented by the use of tokens/icons and a maximum of 100 tokens/icons is to be permitted on each graphic display.
 12. Tokens/Icons shall remain in a clipboard type file system to facilitate easy copying and assignment of tokens for placement on screens. System shall permit user creation of new tokens.
 13. All emergency control functions and operator pop-up menus on the Touchscreens shall be strategically located in the same location on each graphic map and tabular screen in order to facilitate user friendly operation. In locations where space allocation requires pop-up menus can vary in position to better associate with assigned ICON.
 14. Recall of Housing Unit enlarged plan will automatically occur when any "user designated" priority alarm event from that Housing Unit occurs. Manual recall of Housing Unit shall occur with selection of the respective Top Bar ICON of the Housing Unit by the operator.
 15. All security detection devices, door/gate ICONs shall display real-time information/status while either a Top Bar or enlarged Housing Unit screen is displayed. All alarm conditions shall display a flashing red token/icon with physical state change indicating exact location of device when alarm situation is activated.

D. Tokens/Symbols/Icons:

1. Each device monitor or control token/symbol/icon shall resemble the device it represents. A list of ICONS is provided with some of these only for future reference and not required by this scope of work. ICON's that are not used do not require programming. As a minimum the following devices should be represented:
 - a. Locks/Gate/Door Control – Padlock Symbol / Position Symbol - (Status by Color and Physical Appearance).
 - b. Intercom Stations – Speaker/Horn Symbol (Status by Color and Physical Appearance).
 - c. Cameras – Camera Symbol (Status by Color). All PTZ cameras shall provide an individualized ICON representing the camera type which offers additional camera features and functions.
 - d. Motion Detectors – Walking Pedestrian Symbol (Status by Color).
 - e. Glass Break Detectors – Symbol to be determined (Status by Color).
 - f. Lighting and Utility Controls – Symbol to be determined (Status by Color and physical attributes).
 - g. Duress Alarms – Symbol to be determined (Status by Color).
 - h. Fire Alarm Manual Activation – Symbol to be determined (Status by Color).
 - i. Fire Alarm Zone – Symbol to be determined (Status by Color).

- j. Smoke Barrier/Door Release – Symbol to be determined (Status by Color).
- 2. Use only solid colors for icons.

DI. Touchscreen Terminals

- 1. Each Control room terminals shall be capable of being simultaneous and fully independent operations of individual devices from operation by the operator.
- 2. Alarms and Event Processing.
 - a. Alarms Recognized by the System:
 - 1. A special type of event associated with an input point, device status change.
 - 2. Indication that an input point is not in the user defined normal condition.
 - b. Events Recognized by the System:
 - 1. Input points that return to normal from an alarm or trouble status.
 - 2. PLC communication failure returns from failure status.
 - 3. PLC uploading/downloading.
 - 4. User/administrator configuration of system to identify which type of events such as alarms, returns to normal, changes-of-state, and in/out of service activities are to be logged and require acknowledgment.
 - 5. All events must be logged.
 - c. Acknowledgeable Events:
 - 1. Alarms or events that have been user defined as requiring graphic ICON display with strobing color and require operator interaction and acknowledgment.

F. Performance Requirements:

- 1. Alarms shall display graphic Symbols/ICONS automatically, and shall not require the operator to search screens to obtain information.
- 2. The icons shall display dynamic changes in state information when alarms are displayed.
- 3. Each alarm or programmed occurrence shall display as a flashing icon and sound an audible alarm. Touching the "ACK/SILENCE" ICON shall acknowledge the alarm or occurrence, and extinguish audible alert.

G. Operations Specification:

1. Locking and unlocking of doors will require the operator to touch the assigned/associated lock symbol icon on the graphics screen. Status changes of all doors must directly be a result of the doors hardware/ position switch changes in state.
2. Unauthorized Entry is any entry caused by control room operation or by use of key unlocking within the housing unit of any single door.
3. Unauthorized, forced and/or key bypassed entry of an individual doors will cause the following events:
 - a. Graphic screen will display door where unauthorized entry has occurred.
 - b. Historical data logger will record to memory the time, date, location and event as "unauthorized access."
 - c. Audible alarm will sound.

H. Interlocking:

1. Structure system programming, permitting defined interlocking of Sallyport/Trap doors preventing one or more additional doors from being unsecured at the same time. Interlocked areas shall include all Housing Unit Traps, Multiple cell door within the same housing unit, balcony doors (5th Floor), gates adjacent to Control room and gates in mechanical corridor as determined by the Owner and Architect.
2. Upon activation/unlocking of a door, all other doors that are interlocked with that door are to display normally and if attempt is made to operate an interlocked door the pop-up screen will appear providing "Override" capability.
3. Include provisions to permit the "INTERLOCK OVERRIDE" This shall require that upon an attempt to open two interlocked doors that a pop-up screen will initiate a two-step process asking the operator "Are you Sure?". Initiating an interlock override shall cause the following to occur:
4. Historical data logger will record to memory: Time, date, location, operator that is signed on, and event as interlocked door override.

I. Group Release:

1. Structure system programming, permitting a defined operation of all doors within a Housing Unit upon an activation of a group release ICON. Group Release ICON shall start a two-step process asking operator "Are you Sure"? These functions shall release all doors within the Housing unit.
2. Upon activation of Group Release Function all doors associated within the selected group shall display an unlocked indication.
3. Operation of the Group Release function shall cause the following events:
 - a. Graphic screen Housing Unit will display group/area of activation.
 - b. Historical data logger will record to memory the time, date, location and event as "Group Release."

2.02 EQUIPMENT

- A. Approved Computer Equipment Manufacturers;
1. Dell Computers (Computer Systems)
 2. EIO Touch Solutions Inc. (Touchscreen & Flat-screen Monitors)
 3. Owner approved equal
- B. Provide products in conformance with the performance requirements of the Touchscreen Door Control System. The Touchscreen Computer System terminals shall be provided in accordance with all manufacturers' recommendations and operational requirements.
1. At the minimum the Touchscreen Central Processing Unit and Server shall meet the following requirements:
 - a. Dell OptiPlex 705) Small Form Factor (SFF)
 1. Processor: Intel i5 or i7 Processor SFF with Digital Versatile Disk/Rewritable.
 2. Windows 10 Professional 64 - bit.
 3. Memory: 8GB Random Access Memory (RAM).
 4. Hard Drive: 128GB Solid State (SSD) Hard Drive.
 5. Universal Serial Bus (USB) Keyboard and Mouse.
 6. 8X DVD + R/W.
 7. Optional Built-in Aircard.
 8. Display Port to Digital Visual Interface.
 9. DVI Adapter Cable 6'.
 10. 3 Year Warranty.
 - b. File Server / Computer.
 1. Dell Percision T3420 SFF.
 2. Intel Core i7 - 6700.
 3. Windows 10 Professional 64 bit.
 4. 512 GB SSD Hard Drive.
 5. 16 GB RAM
 6. NVIDIA Quadro K1200 4 GB, 4X Mini Display Port MDP
 7. Low Profile Video Graphics Card.
 8. USB Keyboard and Mouse.
 9. 17" Flat-screen LED Monitor.
 10. Display Port to DVI Adapter Cable 6'.
 11. Windows Server Requirements:
 - a. Boot Partition "C Drive" shall be 40 GB (Thin Provisioned).
 - b. Data Partition shall be 40GB to 100GB (Thin Provisioned).
 - c. Minimum 8 GB RAM.

- d. "C Drive" shall contain only the operating system.
 - e. Databases must reside on separate server from that of **Application or Web Server.**
 - f. Application, Service or Vendor shall not be Members of the Domain Administrator's group.
 - g. Application, Service or Vendor Accounts shall not be in the Local Administrator's group for any service.
 - h. 3 Year Warranty.
2. At the minimum Touchscreen Monitor shall meet the following requirements:
- a. Display Size: 20" Flat Panel Touch Monitor 19.6" Diagonal.
 - b. Type: Active matrix TFT LCD (LED)
 - c. Aspect ratio: 16:9
 - d. Active screen area: W/H: 17.20 (436.9mm) x 9.48" (240.7 mm)
 - e. Monitor dimensions Width: 19.22" (w) x 13.87" (h) (352.3mm) x (193.4mm)
 - f. Optimal (native) resolution 1920 x 11080
 - g. Colors 16.7 million
 - h. Brightness: 250 Nits
 - i. Response time 20 msec
 - j. Viewing angle (typical, from center) Left / Right: +-89 Degrees Up / Down: 189 Degrees total.
 - k. Contrast ratio 3000:1
 - l. Input video format Analog; Mini-VGA to DE-15 Male connector, HDMI and HDCP.
 - m. Mounting Options: VESA 4-hole 75mm and 100mm.
 - n. Warranty: 3 Years
 - o. Humidity: Operating - 20% to 80 %
 - p. Touch Interface: USB
 - q. Monitor input voltage: 12VDC +/- 5%, 100-240VAC, 50/60Hz
 - r. Speakers: Two (2), 2W internal
 - s. Mean time before failure greater than 50,000 hours with a touch life greater than 1 million touches at any one location.
 - t. Operating Temperature: 32 Degrees to 104 Degrees F.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Prior to the final programming and installation of graphic screens, provide to all Owners' representatives a functional demonstration of the finalized Touchscreen graphics and operational functions. The demonstration shall be performed at the owner's facility and shall include an operational demonstration of but not limited to, all graphic screens for the facility, all door control functions, alarm/alert indications and

door interlock functions.

- B. Prior to the final commissioning of Touchscreen Door Control System provide the owner the opportunity to acquaint personnel in the operation of the Touchscreen Graphic interface program. Install a minimum of one (1) fully programmed Touchscreen terminal.
- C. The functionality of the software shall at the minimum permit the staff to familiarize themselves with the basic system functions and operations such as but not limited to: ICON recognition and familiarization with system operations.

3.02 OPERATIONS, TRAINING AND MAINTENANCE

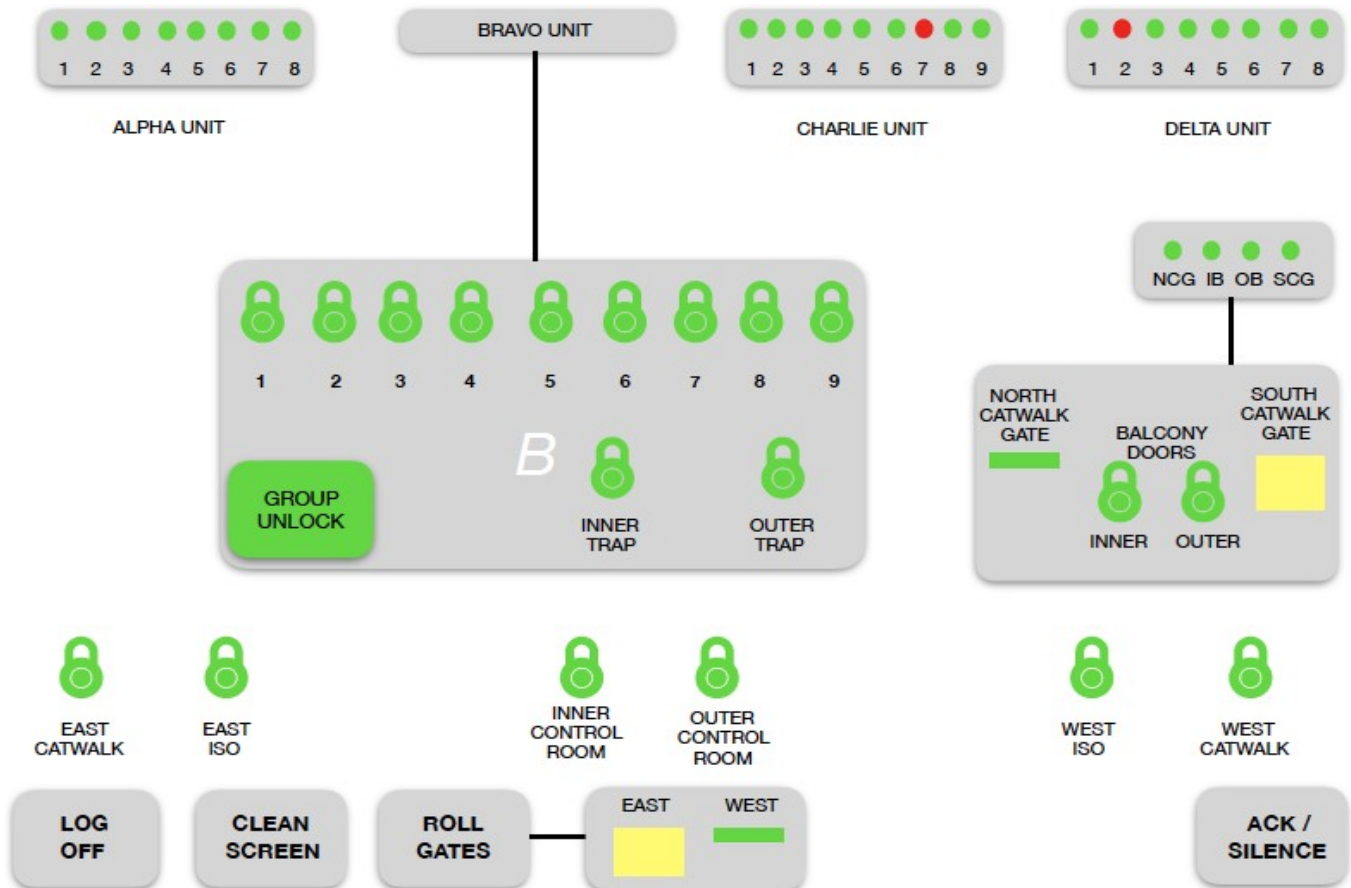
- A. Comply with all requirements of Division 01, and "Field Services" and all other specification sections.
- B. Prior to acceptance of the Work, demonstrate to the Owner's designated representatives, Contractor and representatives of the Authorities having jurisdiction, all features and functions of the system and subsystems. Instruct the Owner and designated representatives in the proper operation and maintenance of the system. Allow a minimum of 3 separate training sessions of 1 hour each for training purposes.
- C. Designated Orange County Integrated Systems Services (ISS) personnel shall be fully trained to perform modifications to the Wonderware and PLC software. Instruct representatives in the proper programming of the system. In addition to other specified training requirements provide a minimum of 16 hours' time for training selected owner's representatives in the proper programming of the Touchscreen database.

3.03 TESTING

- A. Comply with all requirements of Division 01, "Testing" and all other specification sections.
- B. Individually test and demonstrate all features, functions and operating parameters of each icon to the Owner's designated representative, Architect and Authorities having jurisdiction.

3.04 TOUCHSCREEN & POP-UP ICON LAYOUTS

A. Screen diagram with associated Icons.

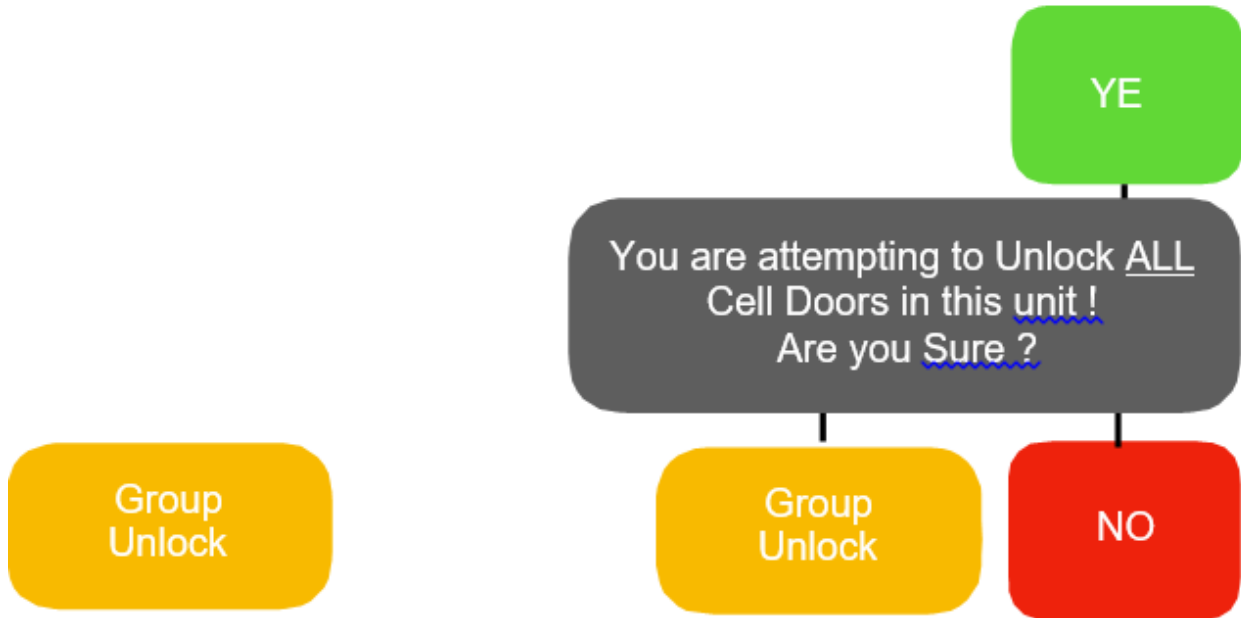


NOTES:

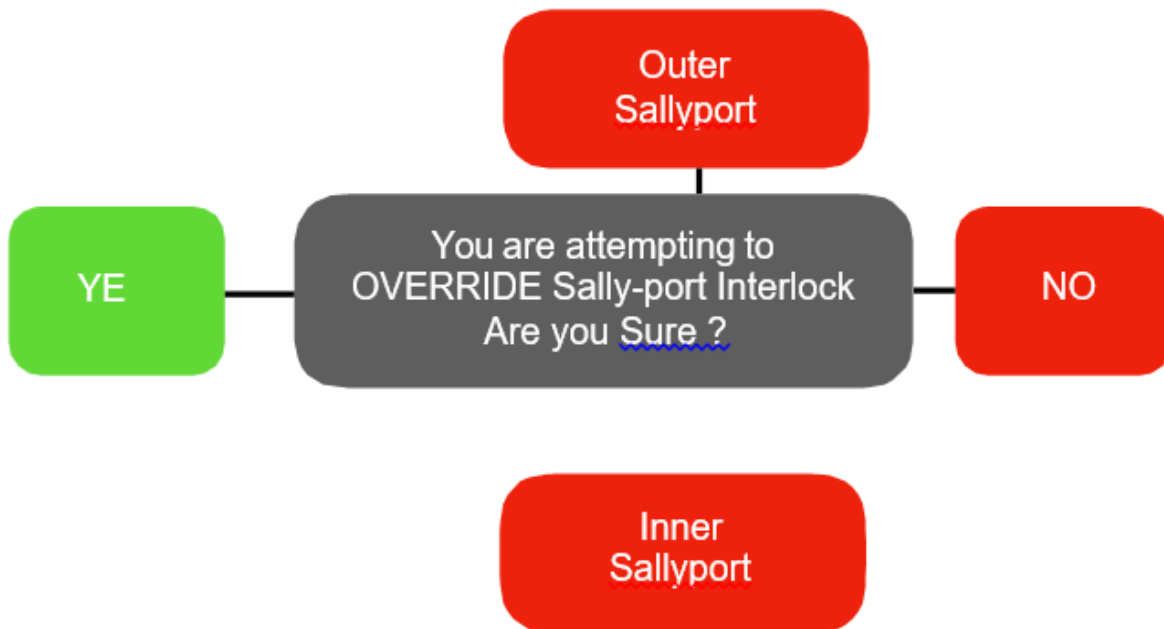
1. Icons are not to scale and are organized in relationship to operator’s position in the Control Room.
2. Doors B-9 and C-1 are slider doors and will require Pop-up Icon for Open/Stop/Close operation.
3. Icons can move based upon Housing Unit selection for operator friendliness.
4. Owner will select final screen layouts from Integrators scaled drawing and Sample Touchscreen.
5. Roll Gate and Catwalk Status Bar Screen are both shown with expanded Pop-up windows/Icons for clarity. Windows will only appear after initial Icon/Bar is touched.
6. Housing Unit Identification Letter shall appear as a Watermark and be easily identifiable against all other text and icons.

B. Operational "Pop-Up Icons" for two-step procedural verification.

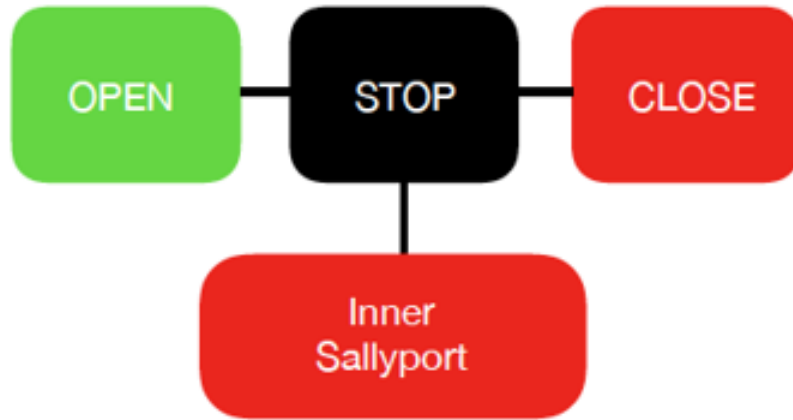
1. Group Door Unlocking Sequence



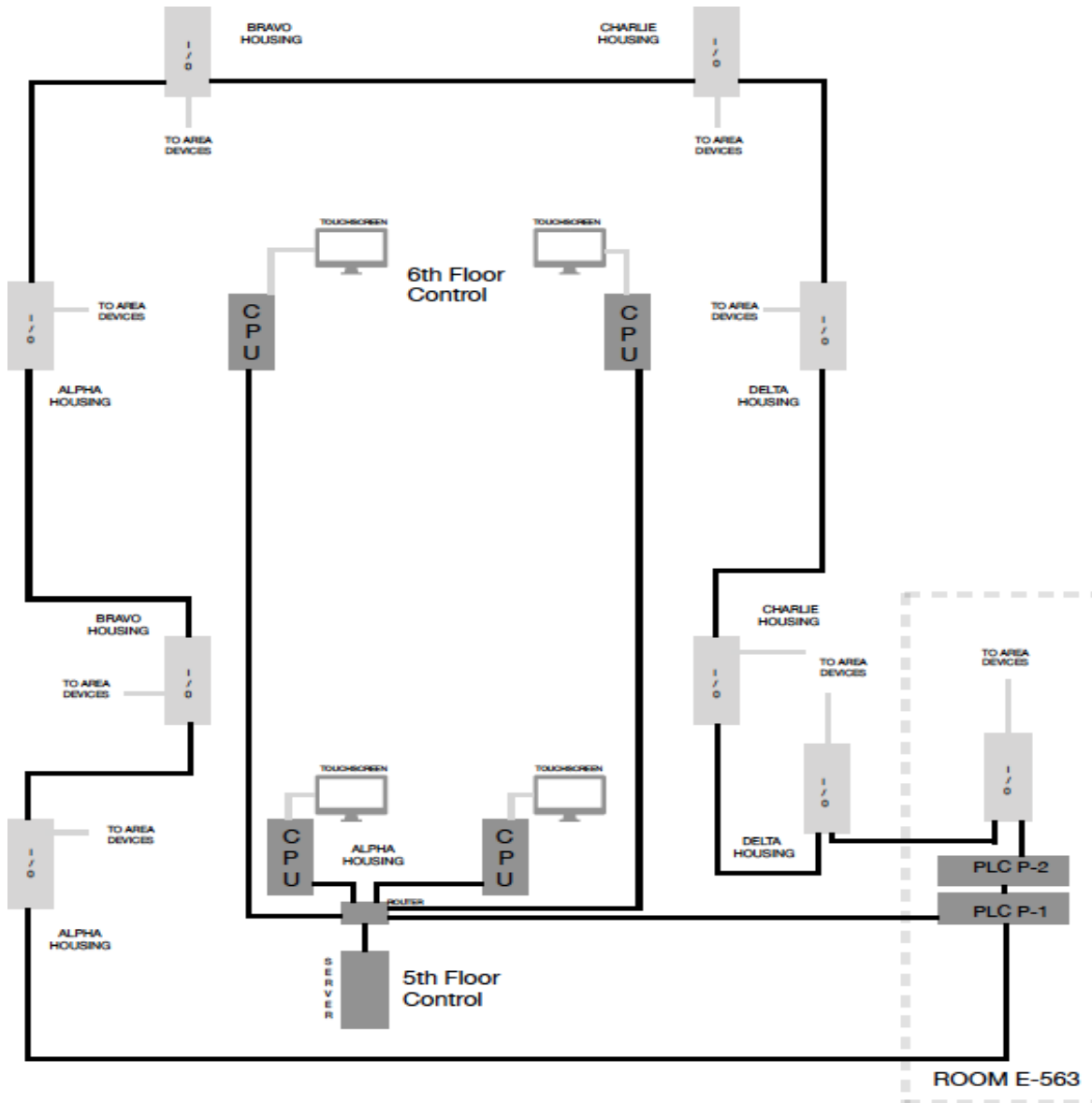
2. Sally-port / Trap Override Sequence



3. **Sally-Port / Trap / Slider Door - Open – Stop – Close Icons**



3.05 SYSTEM ARCHITECTURE / LAYOUT DIAGRAM



NOTES:

1. Not all ancillary computer devices such as keyboard, mouse, UPS and power cables are indicated.
2. Network is shown in block format for clarity and does not always indicate redundancy.
3. Local devices are relays, door locks, door position switches and lock bolt position switches.
4. Room E563 may require multiple cabinets due to available wall space along with multiple I/O modules.
5. All network and SCADA communications shall be via VAT-6a or CAT-7a cabling.

END OF SECTION

SECTION 285203 - PROGRAMMABLE LOGIC CONTROLLER (PLC)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS / SECTIONS

- A. This specifications section is one of the interrelated sections for the integration of a Touchscreen Control System along with the referenced related specification sections shall comprise the overall work. These sections have been separated to specifically address manufactures, series, performance, installation, and testing / warranty requirements.
- B. Related Sections:
 - 1. Section 285201 – Basic Security Requirements
 - 2. Section 285202 – Touchscreen Security Door Control System

1.02 SUMMARY

- A. Section Includes:
 - 1. The Programmable Logic Controller(s) (PLC) consists of a distributed intelligence, ladder logic controlled, switching network. The PLC receives information from devices (inputs) and annunciates or controls other devices (outputs) according to the ladder logic program. All input/output (I/O) data is transmitted across the PLC network to the Human Machine Interface (HMI) on Touchscreen operated Windows based computers utilizing Wonderware software to create operator displays for door control and monitoring.
 - 2. The PLC shall be integrated with four (4) separate Touchscreen CPU's located in the 5th and 6th floor control rooms through one (1) Windows based file server to provide manual control and status of all devices residing on the security network. All PLC processors and remote I/O modules shall be configured to have fully redundant processing and Local Area Network (LAN) communications.

1.03 SYSTEM DESCRIPTION

- A. The Programmable Logic Controller consists of a distributed intelligence, ladder logic controlled, switching network, interconnected by a supervised data communications network. The PLC shall provide the integration to all touchscreen Icon based display panels for input/output control of all associated and interconnected security doors and components

B. Design Requirements:

1. Programmable Logic Controller Inputs/Outputs shall interface and control security sub- systems functions to include the following as a minimum:
 - a. Locking and unlocking of an individual door.
 - b. Locking and unlocking of individual and groups of doors (group unlock).
 - c. Manual release of doors (smoke barrier doors and hold open devices)
 - d. Monitoring of all security sensors/devices.
 - e. Motorized/electric door control.
2. All PLC inputs shall be supervised to detect circuit loop opens/closes and shall be protected against any electrical surges.
3. All control and monitoring functions at each PLC location shall be operational in the event that the communications link to the PLC network is severed and shall have redundant means of communications. Each PLC shall retain all programming and archiving information.
4. System shall archive all input and output status. The storage may be internal to the PLC's CPU. Internal archived information is to be downloaded to the server for reporting purposes. Each change of input/output state shall be time and date stamped
5. All PLC processors and remote I/O shall be powered by dedicated connection to a UPS system.
6. Each PLC location shall be provided with a minimum of 8 spare on-board I/O points. All spare I/O points shall include all modules, components and relays necessary for the proper connection of any Owner selected systems and/or devices.

C. Performance Requirements:

1. Engineer data highway capable of converting status changes from the point of input to the Touchscreen door control system within 450 milliseconds.
2. Programmable Logic Controller equipment is to be general purpose "off-the-shelf" in nature and not custom built for this application.
3. Controller is to be generally non-location specific in its construction and made location specific and operationally customized by reprogramming firmware.

1.04 SUBMITTALS

- A. Comply with all requirements of each Specification Section 28, "Submittals" paragraph.
 - 1. In addition to the above submit the following information for review by Architect.
 - a. A complete technical specification for the submitted equipment, noting any and all differences and adherence to this section.

1.05 QUALITY ASSURANCE

- B. Manufacturer Qualifications: Company specialization in Programmable Logic Controller for a minimum of five years. Provide documentation of experience which shall include the following:
 - 1. A minimum of five facilities of equal size and technical requirements utilizing the equipment submitted.
 - 2. For each facility, list:
 - a. Name and location of facility.
 - b. Date that system was placed into operation.
 - c. Owner's representative to contact and telephone number.
 - d. Architect/Engineer.
- C. Security System Integrator: Comply shall with all requirements of Specification Section 28, "Quality Assurance" paragraph.

1.06 DELIVERY STORAGE AND HANDLING

- A. Protect materials during storage on the job, during and after installation.
- B. Permit no cardboard or paper containers to become wet. Remove immediately from site materials and containers, which have become wet and replace materials.
- C. Materials shall be secured in dry, locked storage areas at all times.

1.07 RECORD DOCUMENTS

- A. Comply with all requirements of Specification Section 28, "Record Documents" paragraph.
 - 1. In addition to the above, submit the following information for review by Owner representatives and Architect.
 - a. Provide compiled record documents in accordance with all specification

sections.

- b. Provide project record drawings identifying system organization and rack/component/cabinet distribution.
- c. Provide identification of each input/output card/module and its respective function (i.e., door, sensor, connection numbers).

1.08 OPERATION TRAINING AND MAINTENANCE DATA

- A. Demonstrate to the Owner's designated representatives, Architect, designer, the features, and functions of the system and subsystems. Instruct the Owner and designated representatives in the proper operation and maintenance of the system.

1.09 WARRANTY

- A. Comply with all requirements of Specification Section 28 "Warranty" paragraph

1.10 MAINTENANCE SERVICE

- A. System is to be fully tested and serviced on a quarterly basis during the warranty period.
- B. For each quarterly maintenance period, provide written notification to the Owner, the systems condition before and after service, exact components that were tested and serviced, and overall status of the system.

1.11 EXTRA MATERIALS

- A. Provide Owner with:
 - 1. One (1) each card cage for each type utilized on the project.
 - 2. One (1) each central processor modules utilized on the project.
 - 3. Two (2) each electronic input or output modules for each type utilized on the project.
 - 4. One (1) each communication/memory cards for each type utilized on the project.
 - 5. One (1) each power supply for each type utilized on the project.
 - 6. One factory box for each component, addressed to the manufacturer to facilitate factory return for repair.
 - 7. Written procedures for obtaining return authorizations. (If not required, state so in writing.)

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers listed as acceptable shall not negate the contractor's responsibility for

providing all systems in accordance with the functions and performance requirements of all 28 series specification sections.

- B. Acceptable Manufacturer of Programmable Logic Controllers:
 - 1. Allen Bradley
 - 2. Orange County Government has standardized its Electronic Security Systems county-wide and does not accept Alternates.

2.02 FUNCTIONS FOR A COMPLETE OPERATIONAL SYSTEM

- A. Logic functions
- B. Timing functions
- C. Memory capability
- D. Software and programming
- E. Input/output points with 10% on board spare capacity and full expandability at each location.
- F. Logic functions as a minimum are to include "and," "or" and "invert" functions with sufficient levels and operating features to meet overall system requirements.
- G. Counter functions (up/down).
- H. Data transfers and data comparisons (=, 2, ').
 - 1. Synchronous shift registers forward, reverse (1, 8 and 16 channel).
- I. BCD to Binary control.
- J. Input/Output forcing.
- K. RUN MODE Programming.
- L. BINARY to BCD conversion.
- M. Key operated switch to select at least the following modes of operation: (key switch to be locked/key removed in any position).
 - 1. HALT - Processor, not scanning memory program and outputs are turned off.
 - 2. RUN - Processor, executing memory program and outputs controlled accordingly.
 - 3. DISABLE OUTPUTS - Processor, executing memory program and the outputs held off.

4. RUN/PROGRAM - Processor, executing memory program, and changes in user memory are permitted.

2.03 COMMUNICATION

- A. Programmable Logic Controller and remote input/output equipment shall be capable of communicating over fiber optic cables without requiring separate fiber optic transmitters or receivers in addition to the Programmable Logic Controller communication card. (See paragraph on Fiber Optics in this Section).
- B. An RS-422/485 compatible differential communication port is required for programming and communication to additional compatible devices. Communication up to 10,000 ft. must be capable from this port.
- C. Data rates of the RS-422/485 compatible communication port shall be programmable. Minimum data (baud) rates of 50, 110, 300, 1200, 2400, 4800, 9600 and 19,200 must be available.

2.04 LADDER LOGIC

- A. In event of power loss, register and ladder information must be retained. Program storage medium to be battery-backed RAM available in 4K, 8K, 16K and 26K with memory housed in the same enclosure as the processor.
- B. Programmable Logic Controller power supply batteries required for RAM memory retention upon AC power failure must be readily available, standard sized, lithium type.
- C. Programmable Logic Controller power supply is to provide LED visual indication if battery charge is insufficient to maintain the RAM program for less than 300 hours, in addition; this information must be reported to the processor to initiate an audible and visual alarm.
- D. Whenever the words "CONTACTS AND ENTIRE RUNGS" are intentionally deleted from an existing logic program, the remaining program words are to be automatically repositioned to fill the void. NOPs to replace deleted words are not acceptable.
- E. Ladder logic memory is not to be used to store data (numbers). A unique register memory (general purpose storage registers) that is separate from the ladder logic (program) memory is required to store data.
- F. Typical scan time for 1K words is not to exceed 3.2 ms (.8ms BOOLEAN).
- G. Memory word length will be minimum 16 bits.
- H. Whenever the words "CONTACTS, ENTIRE RUNGS," or other verbiage are intentionally inserted into an existing logic program, the original program is to be

automatically repositioned, to open up a gap of sufficient size to accommodate the additional words if there is adequate memory to accommodate the program.

- I. For reduction of the effective scan time of select local I/O's (to detect both high frequency and short pulse duration inputs), immediate Input/Output update functions must be available.
- J. Minimum word utilization for program storage is:
 - 1. No more than one word for each contact or coil, including address.
 - 2. No more than one word for each opening branch.
 - 3. No more than one word for each closing branch.
 - 4. No words for spaces or connects.
 - 5. No words to begin a new rung.
- K. Each word of memory must incorporate a parity bit (odd parity is to indicate proper memory operation and even parity is to result in the halting of the processor), accompanied by visual annunciation of the memory error.
- L. Processor RAM memory is to retain its program indefinitely provided AC power or DC power is maintained.
- M. As a safety precaution the Programmable Logic Controller is to immediately switch to redundant processor and annunciate the occurrence of any of the abnormal conditions:
 - 1. Memory Parity Error.
 - 2. Loss of Communication between PLC Data Network and Inputs/Outputs.
 - 3. Loss of Logic power to any part of the network/system.
 - 4. Halt or interruption of memory scan.
 - 5. Detection of any "incomplete" relay ladder rungs in memory.
- N. Equip processor with a minimum of 64,000 internal relay equivalents.
- O. Total number of normally open (N.O.) and normally closed (N.C.) contacts and internal output are to be virtually unlimited, dependent only upon memory capacity to store the control logic.
- P. Make any internal coil transition sensitive using a single command.
- Q. Program any internal relay as a latch relay with both a latch and unlatch coil.

2.05 SYSTEM HARDWARE

- A. A single logic power supply is permitted for a system of up to 512 local Inputs/Outputs. Remote Input/Output system architecture will require logic power supplies at each remote location.

- B. Power supplies must be short circuit protected, overcurrent protected, over voltage protected, surge protection and upon loss of power provide a minimum of 16 ms ride through. Power supply breakers/fuses must be accessible from the front of the equipment.

2.06 SYSTEM SOFTWARE

- A. Each register must be 16 bit and capable of storing a five digit decimal value (+32767 to -32768).
- B. Entry of data into the storage register in either binary, decimal or hexadecimal.
- C. Programming techniques must allow each register to be programmed as a counter, timer and shift register or for data storage.
- D. To monitor and alter any register via the programming equipment without halting the processor, provided those registers have not been intentionally locked out.
- E. To monitor and alter the individual bits of a storage register using programming techniques or directly with the programming equipment.
- F. To reset the value of a storage register to zero with the use of a single programming instruction.
- G. To present any value into a storage register using a single programming instruction.
- H. Circuit design techniques must allow for decoding the "bit" information from any zone of any programmed shift register and from as many zones as desired. The decoding of a zone, regardless of channel width (number of bits), must be possible within a single circuit rung.
- I. The back-up battery in the event of a loss of AC power must retain register data.

2.07 COUNTERS AND TIMERS

- A. Programming techniques must allow for cascading timers and counters.
- B. Programming techniques must allow for programming ON delay and OFF delay timers.
- C. To program a reset contact(s) or data comparison(s) such that counter operation can be halted and counter value reset.
- D. Controller must have the capacity of no less than 96 counters or timers. Each counter and timer must be capable of storing a four digit decimal value (0-0009).
- E. To program a reset contact(s), or data comparison(s) such that timer operation can be

halted, and timer value reset to zero.

- F. Programming techniques are to provide for as many timer and counter decode (comparison) values as desired.
- G. There must be at least a 0.1-sec., 0.01-min., time base.
- H. To program an interrupt contact(s), or data comparison(s) such that timer operation can be halted, and restarted (start/stop time operation).

2.08 DATA FUNCTIONS, SHIFT REGISTERS

- A. Implement data transfer and comparison/condition instructions once every scan or for a single scan, the latter occurring upon the opened to closed transition of the combinational logic, or, false to true data comparison/condition function preceding the instruction.
- B. Programming techniques must allow for programming a single channel (bit) synchronous shift register with up to 1792 zones, or an eight channel (8 bit) shift register with up to 224 zones, or a sixteen channel (16 bit) shift register with up to 112 zones.
- C. To perform a Binary-to-BCD or BCD-to-Binary conversion with the use of a single instruction.
- D. Shift right and shift left commands must allow bit, byte, (8 bit) and, word (16 bit) shift synchronous registers to be programmed.
- E. To program the following compare condition functions between storage registers (-32, 768 to +32, 767) or between a storage register and a constant value (0 to 32,767).
- F. To program up to five comparison/condition functions on one line of logic.
- G. To transfer data from one storage register to another or, a constant to storage register using a single programming instruction.
- H. To perform a block data transfer of up to 9 registers (register to register or constant to register) per line of relay ladder logic.

2.09 DIGITAL INPUTS AND OUTPUTS

- A. Each input or output module must be a self-contained unit housed within an enclosure.
- B. Input and output modules must be UL listed and CSA approved.
- C. Pressure type screw terminals must accept as a minimum, one No. 12 or two No. 14 stranded or solid wires.

- D. Provide convenience marker strips and labeled adjacent to the input/output field wiring terminals.
- E. Permit replacement of any input/output module without disturbing or removing user field wiring.

2.10 REMOTE INPUTS AND OUTPUTS

- A. Serial data rate must be at least 31.25K baud for each independent channel.
- B. Maximum cable distance between the processor and the last drop on a channel is to be no less than 15,000-ft. (4572m).
- C. Remote input/output system must have a group of pre-assigned diagnostic registers, which are to be used to report system faults to the main processor.
- D. Any module comprising the system cannot consume more than one input/output rack assembly slot.
- E. No special power supply is to be required for system operation. Power shall be provided by the input/output rack assembly power supply.
- F. The system is to consist of a multichannel, multi-drop configuration having at least two independent channels with eight drops per channel minimum.
- G. The method of communication between the modules comprising the system is to be continuous, full duplex serial differential.
- H. Each channel must support at least 1024 digital input/output and provide 127 registers for register input/output.
- I. Each drop is to support at least 512 digital input/output.
- J. The input/output scan of the remote input/output system must be independent of the processor memory scan.
- K. Each module comprising the system must have a removable wiring terminal for ease of module replacement.
- L. System design must allow the user to have the option to continue system operation should a fault occur on a single drop of either channel.
- M. Should the user elect to continue system operation when a drop fault occurs, there must be a means to automatically restart processor communications to that drop, (if that drop fault clears) without halting the processor.

- N. System design must allow the user to have the option to select how the outputs of the system will fail (reset, off or freeze in last state) should any of the following occur:
 - 1. A user selected condition.
 - 2. A system communication failure.
 - 3. Loss of processor due to power outage or systems fault.
- O. Upon failure of a particular drop or upon a user-defined condition, it must be possible to shut down one or all of the other drops on the remote input/output system.

2.11 FIBER-OPTICS (PLC Network Connection)

- A. A fiber optic Local Area Network (LAN) network must be provided to operate as the primary communication link between any of the Programmable Logic Controller's differential (RS- 422/485) devices. This is to include processors and remote input/output programmers, processors to processors and processors to remote input/output links.
- B. System design must allow the use of a minimum of 7 repeaters (multiple transmitters/receivers).
- C. Maximum distance for a single (one transmitter and one receiver) fiber optic link is to be no less than 3,280 ft., 22960 ft. with seven repeaters.
- D. Fiber optic communication must be modular fully redundant, providing high EMI/RFI immunity and complete electrical isolation.
- E. Each module comprising the fiber optic communication system must consume no more than one rack assembly slot.
- F. No special power supply must be required for the fiber optic system. Power will be provided by the rack assembly power supply.
- G. All Fiber optic cabling shall be provided in accordance with all manufacturers' recommendations. At the minimum all fiber optic cable shall be 4 strand, 62.5 micron, multi-mode and/or single mode as required for the proper operation of the connected systems and/or devices. All fiber optic cabling shall be installed in existing raceways and conduit.

2.12 NETWORKING

- A. LAN design must allow communication between devices on individual Local Area Networks (Net- to-Net Communications).
- B. The base baud, timed floating master, high speed Local Area Network (LAN) must be supplied with the following capabilities:

1. Transmission type will comply with ANSI 3.28 and Cyclic Redundancy Code (CRC) error checking.
2. Communication data rate of the high-speed local area network shall be selectable up to 2 MB.
3. Maximum high speed LAN cable distance is to be at least 3,280 ft.
4. A single LAN as a minimum must allow communication of up to 200 devices (programmers, computers, and others).
5. A single Network Interface Module must manage the transmission of at least two devices (programmers, computers, and others) through two separate low speed RS-422/485 compatible communication ports.
6. Communication rate of the Network Interface Module low speed, RS-422/485 compatible ports, must be selectable up to 19.2K Baud.
7. Network Interface Module low speed ports will support RS-422/485 compatible as well as Fiber Optic Communication capabilities.
8. Minimum distance between the Network Interface Module and a device connected to either of its low speed communication ports must be at least 3,280 ft for RS-422/485 compatible communications.
9. All programming functions will be supported over the Local Area Network. These are to include programming, altering, monitoring, forcing input/output, and program upload/download via tape or computer.

2.13 PROGRAMMING/MONITORING/CONTROL EQUIPMENT

- A. System programming capability must be implemented through the Programmable Logic Controller network. It must be possible to program and monitor/control any device in the system from the Server or networked PC over the local area network.
- B. Data jacks shall be provided at each PLC location for localized troubleshooting.

2.14 PROGRAMMING

- A. Programming equipment must provide English language indication of the nature of programming errors or incorrect operating procedures.
- B. To program any given input/output address as often as desired.
- C. To program nested branches (branch circuits within branch circuits).
- D. To force any external input or output on or off via the programming equipment.
- E. To search the program for any contact address, coil address, storage register, rung number, master control relay, forced input/output address and any other special function the systems network supports.
- F. It must be possible to alter or delete all or any part of a rung without affecting the remainder of the program. In these cases, the program must be automatically recompiled to accept the new rung or remove the old rung thus leaving no gap.

- G. The programmer display must give readout of input/output address number, relay symbols, rung number, line and position reference, special function symbols, storage register address number and data, input/output status, and forcing indication.
- H. To program relay rungs comprised of a contact matrix 10 contacts across by seven contacts down (70 contacts per rung).
- I. To issue a two-part command in order to delete all relay ladder rungs from memory. The second part must provide a safeguard wherein the operator must verify his intentions to erase the entire control program.
- J. To simultaneously display the following information for any divider rung with a single key stroke:
 - 1. The ON or OFF state of any contact or coil.
 - 2. The contents of a given storage register.
 - 3. Whether a given input/output has been forced ON or OFF.
 - 4. Whether an output coil is standard, transition sensitive, or latching.

2.15 REDUNDANCY

- A. Redundant Transfer Interface System (TIS) shall provide bump less transfer of I/O control from the on line central processor to the backup central processor or from the on line to the backup LAN should a system fault occur. Components that require a manual operation to switch to the redundant system will not be accepted.
- B. TIS must be designed so that no single failure will halt the operation of the system.
- C. The system shall be capable of manual transfer.
- D. The system shall allow manual restart of the start-up processor, and synchronization with the master processor without shutting down the control system.
- E. Full redundancy must be provided for both the Programmable Logic Controller CPU and local area network CPU's.
- F. TIS must provide visual indication of "on line" and "back up" status.
- G. TIS must ensure PLC network data and scan synchronization.
- H. The number of inputs/outputs that single TIS must support will be no fewer than 1024.

2.16 DIAGNOSTICS

- A. Processor must incorporate self-diagnostic features which will halt the processor, in addition, a separate visual indication will enunciate at the following conditions:

1. RUN - Indicating, processor operating properly, executing memory program.
 2. HALT - Indicating, processor not operating/executing memory program properly, all outputs off, due to key position, fault in input/output or memory or through programming.
 3. MEMORY - Indicating, parity error or memory malfunction - also forces "HALT" indicator on.
 4. FORCE - Indicating that one or more inputs/outputs have been forced on/off.
 5. INPUT/OUTPUT - Indicating malfunction in input/output system.
 6. LOW BATT - Indicating low voltage in battery backup.
 7. WRITE PROTECTED - Indicating user memory is protected from intentional alteration.
- B. Processor must have a specifically designated block of no less than 95 internal diagnostic registers to provide detailed system status and fault diagnostic information accessible by programming equipment or intelligent peripherals.
- C. As a minimum, internal diagnostic registers are to provide the following:
1. Type of digital (input or output) or intelligent (analog, BCD, etc.) input/output module inserted in a particular slot.
 2. If an input/output module is not in a slot or in an incorrect slot.
 3. Type of intelligent input/output module failure.
 4. Rack and slot location of the input/output module causing a system failure.
 5. Status of input/output module fuse.
 6. Processor key switch status.
 7. Processor diagnostic LED status.
 8. Type and cause of processor failure.
 9. Type of incorrect operator action attempted and reason for same.

2.17 ENVIRONMENTAL SPECIFICATION

- A. Environmental:
1. Humidity rating of 0 to 95% relative humidity (non-condensing).
 2. Ambient temperature rating of 0 to 60C (32°to 140°F) operational and -40°to 176°F) storage.
- B. Design and test equipment/components to operate in an industrial environment per NEMA Standard ICS 2-230 (ARC Test) and IEEE C37. ~0a CSWC.
- C. Design equipment/components and modules to provide for free air flow convection cooling requiring no internal fans.

PART 3- EXECUTION

3.01 EXAMINATION

- A. Examine the areas, surfaces, anchors and ground that are to receive materials, fixtures, assemblies, components and equipment. Report the unsatisfactory conditions in writing to the Architect/Designer.

3.02 INSTALLATION

- A. Use methods for installing cables and/or fibers to prevent damage to cables and wires during installation. Provide compounds that are not injurious to the cable and wire jackets and do not harden or become adhesive if used.
- B. Make all cable splices in tamper-resistive, accessible, junction boxes.

3.03 DEMONSTRATION

- A. Comply with all requirements of Specification Section 28, "Field Services" section
- B. In addition to the requirements of section 28 demonstrate to the Owner's designated representatives and Architect, the features and functions of the system and sub-systems. Instruct the Owner and designated representatives in the proper operation and maintenance of the system.
- C. Provide digitally recorded high quality and high-resolution recordings of the training sessions and maintenance procedures.

END OF SECTION

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