

ATTACHMENT A

BASIC SCIENCE ELEVATORS

UF PROJECT NO: MP04706

GAINESVILLE, FLORIDA

CONSTRUCTION DOCUMENTS



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SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 GENERAL

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 8. Operation and maintenance data.
 9. Spare parts and maintenance materials.
 10. Warranties.

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1.2 CONTRACT DESCRIPTION

- A. The name of the project is “MP04706 Basic Science Elevators Modernization” located in Gainesville, Florida.
- B. The project is identified as WA18122 in Contract Documents.
- C. Work of the Project includes modernization of two elevators in Basic Science Building.
- D. Perform Work of the Contract under stipulated sum contract with Owner in accordance with Conditions of Contract.

1.3 WORK BY OWNER

- A. Items noted as NIC (Not in Contract), movable cabinets, furnishings and minor equipment, will be furnished and installed by Owner beginning at Substantial Completion.

1.4 CONTRACTOR’S USE OF PREMISES

- A. Limit use of premises to allow:
 - 1. Owner occupancy.
 - 2. Work by others and work by Owner.
 - 3. Work sequence to allow full access to adjacent properties.
 - 4. Use of premises by public is not allowed.

1.5 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

1.6 CASH ALLOWANCES

- A. Costs Included in Allowances: Cost of Product to Contractor or subcontractor, less applicable trade discounts; delivery to site and applicable taxes.
- B. Costs Not Included in Allowances But Included in Contract Sum/Price: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of Products from elements and from damage and labor for installation and finishing.
- C. Difference in cost will be adjusted by Change Order.

1.7 CONTINGENCY ALLOWANCES

- A. Include in the Contract, stipulated amount of 5% of Construction Cost for use upon Owner's instruction.

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- B. Contractor's costs for Products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit are included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

1.8 TESTING AND INSPECTION ALLOWANCES

- A. Testing and Inspection Allowances: Include in the Contract, reasonable sums for payment of testing and inspection services.
- B. Costs Included in Allowance: Cost of engaging testing or inspection firm, execution of tests or inspection, and reporting of results.
- C. Costs Not Included in Allowance:
 - 1. Incidental labor and facilities required to assist testing or inspection firm.
 - 2. Costs of re-testing upon failure of previous tests as determined by Architect/Engineer.
- D. Reports will be submitted by independent firm to Architect/Engineer, Contractor, and authority having jurisdiction, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as non-compliant.
- E. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer, Contractor, and authority having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and specifications section.
 - 6. Location in Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.

1.9 SCHEDULE OF VALUES

- A. Submit schedule on AIA Form G703. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed.

1.10 APPLICATIONS FOR PAYMENT

- A. Submit three 3 copies of each application on AIA Form G702 and G703.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

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- C. Payment Period: Monthly.

1.11 CHANGE PROCEDURES

- A. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's maximum price quotation or Contractor's request for Change Order as approved by Architect/Engineer.
- B. Change Order Forms: AIA G701.

1.12 UNIT PRICES

- 1. None.

1.13 COORDINATION

- A. Coordinate scheduling, submittals, and Work of various sections of specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.
- C. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.
- D. In finished areas, conceal pipes, ducts, and wiring within construction.

1.14 FIELD ENGINEERING

- A. Land Surveyor locate reference datum and protect survey control and reference points.
- B. Establish elevations, lines, and levels and certify elevations and locations of the Work conform with Contract Documents.
- C. Verify field measurements are as indicated on shop drawings or as instructed by manufacturer.

1.15 PRECONSTRUCTION SITE MOBILIZATION AND PREINSTALLATION MEETINGS

- A. The Construction Manager will schedule preconstruction site mobilization meeting after Notice of Award for affected parties.
- B. When required in individual specification section, convene preinstallation meeting at Project site prior to commencing work of section.

1.16 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

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- B. Preside at meetings, record minutes, and distribute copies within two days to those affected by decisions made.

1.17 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching new Work; restore Work with new Products.
- B. Submit written request in advance of cutting or altering structural or building enclosure elements.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 1. Fit several parts together, to integrate with other Work.
 2. Uncover Work to install or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Cut masonry and concrete materials using masonry saw or core drill. Restore Work with new Products in accordance with requirements of Contract Documents.
- E. Fit Work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- F. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. Refinish surfaces to match adjacent finishes.

1.18 SUBMITTAL PROCEDURES

- A. Submittal form to identify Project, Contractor, subcontractor or supplier; and pertinent Contract Document references.
- B. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- C. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of completed Work.
- D. Revise and resubmit submittals as required; identify changes made since previous submittal.
- E. Submittals shall be searchable electronic (*.pdf) format to facilitate the flow of information.
- F. All submittals shall be sent directly to the Architect only for review and distribution to professional consultants.

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1.19 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate within 15 days after date established in Notice to Proceed for Architect/Engineer review.
- B. Submit revised schedules with each Application for Payment, identifying changes since previous version. Indicate estimated percentage of completion for each item of Work at each submission.
- C. Submit Gantt chart with separate line for each major section of Work or operation section of Work, identifying first work day of each week.

1.20 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Notice to Proceed, submit list of major Products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.21 PRODUCT DATA

- A. Product Data:
 - 1. Submitted to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute in accordance with individual spec section requirements and for record documents purposes as specified.
- B. Submit electronically in PDF format.
- C. Identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this project.

1.22 SHOP DRAWINGS

- A. Shop Drawings:
 - 1. Submitted to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute in accordance with individual spec section requirements and for record documents purposes as specified.
 - 3. Shop Drawings may be submitted up to two times for review. Any Shop Drawing requiring additional submission will be considered an additional service and billed accordingly to the General Contractor.
- B. Submit electronically in PDF format.
- C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.

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1.23 SAMPLES

- A. Samples for Review:
 - 1. Submitted to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute in accordance with individual spec section requirements and for record documents purposes as specified.
- B. Samples For Selection:
 - 1. Submitted to Architect/Engineer for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturer's standard colors, textures, and patterns for Architect/Engineer selection.
 - 3. After review, provide copies and distribute in accordance with individual spec section requirements and for record documents purposes as specified.
- C. Submit samples to illustrate functional and aesthetic characteristics of Product.

1.24 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit manufacturer printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

1.25 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification sections, submit certifications by manufacturer to Architect/Engineer, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.26 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services

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of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

1.27 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturer's instructions.
- C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.28 TOLERANCES

- A. Monitor fabrication and installation tolerance control of installed Products over suppliers, manufacturers, Products, site conditions, and workmanship, to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply fully with manufacturer's tolerances.

1.29 REFERENCES

- A. Conform to reference standards by date of issue current as of date of Contract Documents.
- B. When specified reference standard conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

1.30 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.31 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.
- B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.

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- C. Accepted mockups shall be comparison standard for remaining Work.
- D. Where mockup has been accepted by Architect/Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

1.32 TESTING AND INSPECTION LABORATORY SERVICES

- A. Construction Manager will appoint, employ, and pay for specified services of independent firm to perform testing and inspection.
- B. Independent firm will perform tests, inspections, and other services as required.
- C. Cooperate with independent firm; furnish samples as requested.
- D. Re-testing required because of non-conformance to specified requirements will be charged to Contractor.

1.33 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or Product suppliers or manufacturers to furnish qualified staff personnel to observe site conditions and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturer's written instructions.

1.34 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify utility services are available, of correct characteristics, and in correct location.

1.35 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

1.36 TEMPORARY ELECTRICITY

- A. Provide temporary electricity and power outlets for construction operations, connections, branch wiring, distribution boxes, and flexible power cords as required. Do not disrupt Owner's need for continuous service.

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1.37 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain temporary lighting for construction operations.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Permanent building lighting may be utilized during construction. Repair, clean, and replace lamps at end of construction.

1.38 TEMPORARY HEATING AND COOLING

- A. Provide heating and cooling devices and heat and cool as needed to maintain specified conditions for construction operations.
- B. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.39 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.40 TELEPHONE AND FACSIMILE SERVICE

- A. Provide, maintain and pay for telephone and telephone facsimile service to field office at time of project mobilization. Allow Architect/Engineer incidental use.

1.41 TEMPORARY WATER SERVICE

- A. Provide, maintain and pay for suitable quality water service required for construction operations.

1.42 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. New facilities may not be used.
- B. Maintain in clean and sanitary condition.

1.43 FIELD OFFICES AND SHEDS

- A. Office: Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture and drawing display table.

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- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

1.44 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Designated existing on-site roads may be used for construction traffic.

1.45 PARKING

- A. Provide temporary parking areas to accommodate construction personnel.

1.46 PROGRESS CLEANING AND WASTE REMOVAL

- A. Collect and maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

1.47 PROJECT IDENTIFICATION

- A. Provide 8 foot wide x 6 foot high project sign of exterior grade plywood and wood frame construction, painted, to Architect/Engineer's design and colors. Identify the Owner, Construction Manager and Architect.
- B. Erect on site at location indicated by Construction Manager.

1.48 FIRE PREVENTION FACILITIES

- A. Prohibit smoking within buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

1.49 BARRIERS AND FENCING

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage.
- B. Construction: Contractor's option.

1.50 ENCLOSURES

- A. Provide temporary insulated weather tight closures to exterior openings to permit acceptable working conditions and protection of the Work.

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1.51 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Prohibit traffic or storage upon waterproofed or roofed surfaces.

1.52 SECURITY

- A. Provide security and facilities to protect Work and Owner's operations from unauthorized entry, vandalism, or theft.

1.53 WATER CONTROL

- A. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Provide erosion control.

1.54 POLLUTION AND ENVIRONMENTAL CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Provide dust control, erosion and sediment control, noise control, pest control and rodent control to allow for proper execution of the Work.

1.55 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities and materials prior to Substantial Completion review.
- B. Remove underground installations to minimum depth of 2 feet.
- C. Clean and repair damage caused by installation or use of temporary work.

1.56 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.
- B. Provide interchangeable components of same manufacture for components being replaced.

1.57 DELIVERY, HANDLING, STORAGE, AND PROTECTION

- A. Deliver, handle, store, and protect Products in accordance with manufacturer's instructions.

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1.58 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for manufacturers not named.

1.59 SUBSTITUTIONS

- A. Architect/Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.
- B. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- C. Submit two copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

1.60 CLOSEOUT PROCEDURES

- A. Submit written certification Contract Documents have been reviewed, Work has been inspected, and Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.
- B. Submit final Application for Payment identifying total adjusted Contract Sum/Price, previous payments, and amount remaining due.

1.61 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces.
- C. Clean debris from site, roofs, gutters, downspouts, and drainage systems.
- D. Replace filters of operating equipment.
- E. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.62 STARTING OF SYSTEMS

- A. Provide seven days notification prior to start-up of each item.
- B. Ensure each piece of equipment or system is ready for operation.
- C. Execute start-up under supervision of responsible persons in accordance with manufacturer's instructions.

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- D. Submit written report stating equipment or system has been properly installed and is functioning correctly.

1.63 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at designated location.

1.64 TESTING, ADJUSTING, AND BALANCING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Construction Manager will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.
- C. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with requirements of Contract Documents.
- D. Cooperate with independent firm; furnish assistance as requested.
- E. Re-testing required because of non-conformance to specified requirements will be charged to Contractor.

1.65 PROTECTING INSTALLED CONSTRUCTION

- A. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- B. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- C. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- D. Prohibit traffic from landscaped areas.

1.66 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of Contract Documents to be utilized for record documents.
- B. Record actual revisions to the Work. Record information concurrent with construction progress.
- C. Specifications: Legibly mark and record at each Product section description of actual Products installed.

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- D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction.
- E. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.67 OPERATION AND MAINTENANCE DATA

- A. Submit two sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers AND one searchable electronic (*.pdf) copy.
 - 1. PDF copy shall be subdivided by section and each section shall be bookmarked.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of project.
- C. Internally subdivide binder contents with permanent page dividers, logically organized, with tab titles legibly printed under reinforced laminated plastic tabs.
- D. Contents:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system.
 - 3. Part 3: Project documents and certificates.

1.68 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.69 WARRANTIES

- A. Provide duplicate notarized copies.
- B. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- C. Submit prior to final Application for Payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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END OF SECTION

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SECTION 02 05 00

DEMOLITION

PART 1 – GENERAL

- 1.1. Summary:
 - A. Includes But Not limited to:
 1. Complete wrecking of areas and the removal and disposal of demolished materials, as shown on the Drawings.
 - B. Related Sections:
 1. 01 00 00: General Requirements: Submittals
- 1.2. Submittals: See Section 01 00 00.
 - A. Demolition Schedule: Submit proposed methods and operations of demolition to the Architect for review prior to the start of work. Include in the schedule the coordination for shut-off, capping and continuation of utility services as required.
- 1.3. Job Conditions:
 - A. Partial Removal: Salvaged items must be transported from the site as they are removed.
 - B. Protections: Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.
 - C. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the Owner.

PART 2 – PRODUCTS

- 2.1. General:
 - A. Not Applicable.

PART 3- EXECUTION

- 3.1. Demolition:
 - A. Pollution Controls: Comply with governing regulations pertaining to environmental protection.
 - B. Dust Control: Adjacent areas to remain in operation during demolition activities shall be adequately protect from dust intrusion, either airborne or thru mechanical systems.
 - C. All surfaces of existing building or structures which are damaged during operations, or which the Contractor may elect to remove or alter in order to expedite or simplify operations under this Contract, shall be repaired (or replaced if removed) to the satisfaction of the Owner without cost to the Owner. Obtain approval of the Owner before performing any such removal or alteration. Repair or replacement shall be with materials equivalent to the original, and shall include all finishing and painting necessary.
- 3.2. Disposal of Demolished Materials:
 - A. General: Remove from the site all debris, rubbish, and other materials resulting from

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demolition operations.

- B. Title to Materials: Title to all materials and equipment to be removed, except as specified and/or noted otherwise, is vested in the Contractor upon executing of the Contract between Owner and Contractor. The Owner will not be responsible for the condition or loss of, or damage to, such property after Contract execution. Salvage items not wanted by the Owner shall be transported from the site as they are removed.

3.3 Cleanup:

- A. Debris and Rubbish: Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up spillage from streets and adjacent areas.
- B. Regulations: Comply with applicable Federal, State and Local hauling and disposal regulations.

END OF SECTION

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SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Firestopping through-penetrations of fire rated assemblies.
 - 2. Firestopping joints in fire rated assemblies.
 - 3. Firestopping tops of fire rated walls.
 - 4. Smoke sealing at joints between floor slabs and exterior walls.
 - 5. Smoke sealing penetrations and joints of smoke partitions.

1.2 SUBMITTALS

- A. Product Data: Submit data on product characteristics, performance and limitation criteria.
- B. Design Data: Provide schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
 - 1. Smoke Barrier Joints Air Leakage: Maximum 5 cfm per foot 0.30 inches water gage pressure differential

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- D. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- F. Perform Work in accordance with all Local, State and Federal Requirements.
- G. Installer Qualifications:
 - 1. Completed through-penetration firestop systems similar in material and design.
 - 2. Established a record of successful in-service construction performance.
 - 3. Possesses necessary experience, staff and training to install manufacturer's products.
 - 4. Qualification is not implied by manufacturer willingness to sell products to the Contractor.
- H. Maintain one copy of each document on site.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- B. Maintain this minimum temperature before, during, and minimum 3 days after installation of materials.
- C. Provide ventilation in areas to receive solvent cured materials.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver through-penetration firestop system products to the Project site in original, unopened containers or packages with intact and legible manufactures' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

PART 2 PRODUCTS

2.1 FIRESTOPPING

- A. Manufacturers:
 - 1. A/D Fire Protection Systems, Inc.
 - 2. Hilti Corp.
 - 3. 3M Fire Protection Products.
 - 4. Nelson Firestop Products.
 - 5. Specified Technologies.

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6. United States Gypsum Co.
 7. Substitutions: Permitted with Architect approval.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
1. Silicone Firestopping Elastomeric Firestopping: Single or Multiple component silicone elastomeric compound and compatible silicone sealant.
 - a. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
 2. Foam Firestopping Compounds: Single or Multiple component foam compound.
 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 7. Firestop Pillows: Formed mineral fiber pillows.
- C. Color: As selected from manufacturer's full range of colors.

2.2 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- B. Dam Material: Permanent:
1. Mineral fiberboard.
 2. Mineral fiber matting.
 3. Sheet metal.
 4. Plywood or particle board.
 - a. Interior Composite Wood and Agrifiber Products: Contain no added urea-formaldehyde resins.
 5. Alumina silicate fire board.
- C. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive work of this section.

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3.2 PREPARATION

- A. Clean substrate surfaces of matter effecting bond of firestopping material.
- B. Install backing materials to arrest liquid material leakage.

3.3 APPLICATION

- A. Apply primer where recommended by manufacturer for specific material and substrate.
- B. Apply firestopping material in sufficient thickness to achieve required fire rating, to uniform density and texture.
- C. Install material at walls or partition openings containing penetrating sleeves, piping, duct work, conduit and other items, requiring firestopping.
- D. Remove dam material after firestopping material has cured.

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning-Through-Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contactor's name, address and phone number.
 - 3. Through penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION

FIRESTOPPING
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SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sealants and joint backing.

1.2 SUBMITTALS

- A. Product Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications:
 - 1. Sealant/caulking contractor and job foreman shall have a minimum of 5 years experience installing sealants and caulking.
- B. Compatibility with Substrate:
 - 1. Applicator shall be responsible for verifying that sealants and caulking used are compatible with joint substances.
- C. Mock-Ups:
 - 1. The contractor may be required, at the owner's option, to install sealants and caulking in mock-ups prepared by other trades in order to demonstrate appearance and workmanship technique. Any mock-ups shall be done by those personnel who will be assigned to the project, using materials and techniques which will be used on the project.
- D. Joint Tolerance:
 - 1. Joint width/depth ratios are critical to sealant and caulking performance. Compliance with the manufacturer's limitation is required.
- E. Manufacturer:
 - 1. The manufacturer of the sealant and caulking used shall have been in the business of manufacturing the specified types of such sealants and caulking for not less than 10 years.
- F. Preconstruction Field-Adhesion Testing: Before installing sealant, Contractor shall field test the sealant adhesion to joint substrates as follows:
 - 1. Locate test joints where indicated or, if not indicated, as directed by Architect.
 - 2. Conduct a minimum of two (2) field tests for each type of sealant and joint substrate indicated. Perform additional tests as necessary If required by the sealant manufacturer.
 - a. For window and door metal that is not yet installed, a sample of the product may be acquired to test for adhesion with the sealants and/or waterproofing materials that will be used in construction.

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3. Notify Owner and Architect seven days in advance of dates and times when sealant joint tests will be performed. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
4. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - b. Install joint sealants in 5-foot joint lengths using same materials and methods required for joint preparation and joint sealant installation required for completed work. Allow sealants to cure fully before testing.
 - c. Make knife cuts as follows: A horizontal cut from one side of joint to the other followed 2 vertical cuts approximately 2" long at side of joint and meeting horizontal cut at of 2" cuts. Place a mark 1" from top of 2" piece.
 - d. Use fingers to grasp 2" piece of sealant just above 1" mark; pull firmly down at a 90 degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive compatibility, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
5. Provide a written report to document whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.5 PRODUCT DELIVERY AND STORAGE:

- A. Delivery shall be in the manufacturer's original unopened container, clearly identifying each product specified, relating it to the product literature submitted. Storage shall be in accord with manufacturer's recommendation, with proper precautions concerning shelf life, temperature, humidity and similar factors ensuring the fitness of the material when installed.

1.6 GUARANTEE:

- A. Sealant joints shall be guaranteed against adhesive and cohesive failure of the sealant and against water penetration through the sealed joint for 5 years. Both the contractor and the sealant/caulking contractor shall sign the guarantee. Manufacturer shall warrant the joint sealer materials and shall furnish such warranty to the architect.

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PART 2 PRODUCTS

2.1 JOINT SEALERS

- A. Manufacturers:
 1. Dow Corning Corp.
 2. GE Silicones.
 3. Pecora Corp.
 4. Sika Corp.
 5. Tremco Sealants & Waterproofing.
 6. Substitutions: Permitted with prior approval of architect.

2.2 Materials, General:

- A. Compatibility:
 1. Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors:
 1. Provide color of exposed joint sealers as selected by Architect from manufacturer's standard colors.

2.3 Materials:

- A. Exterior Sealant:
 1. Type: Low dirt pick-up, non-staining, medium-modulus, one-component, pre-pigmented, neutral-cure elastomeric silicone sealant;
 - a. Compliance:
 - 1) Sealant shall meet or exceed requirements of ASTM C920, Type S, Grade NS, Class 50, Use NT, G, M, A and O.
 - b. Acceptable Products:
 - 1) Dow Corning 756 SMS Building Sealant (20 yr non-stain warranty.)
 2. Type: Medium-modulus, one-component, pre-pigmented, neutral-cure elastomeric silicone sealant;
 - a. Compliance: Sealant shall meet or exceed requirements of ASTM C920, Type S, Grade NS, Class 50, Use NT G, M, A, and O.
 - b. Acceptable Products:
 - 1) Dow Corning® 795 Silicone Building Sealant (20 yr warranty)
 - 2) Dow Corning® 790 Silicone Building Sealant (20 yr warranty)
 - 3) Dow Corning® 791 Silicone Weatherproofing Sealant (20 yr warranty)
 - 4) Pecora 890/895
 - 5) Tremco, Spectrem 1/2.
- B. Floor Joint Sealant:
 1. ASTM C-920-79, Type S, Class 25, Grade P; TT-S-230(c), Class A, Type I; one component, self-leveling, polyurethane or polysulfide sealant, Shore A hardness greater than 35, joint movement range of $\leq 25\%$:
 - a. Acceptable Products:

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- 1) Pecora - NR 200
 - 2) Mameco - Vulkem 245
 - 3) Sika - Sikaflex 2CSL
 - 4) Architect approved equal prior to bid.
- C. Sealants in Wet Areas:
1. ASTM C-920-TS, Type S, Class 25, Grade NS; TT-S-1543 (a), Class A; one component, non-sag, mildew resistant, silicone sealant, Shore A hardness of 25-30.
 - a. Acceptable Product:
 - 1) Dow Corning – 786
 - 2) General Electric - Sanitary Sealant 1700
 - 3) Architect approved equal prior to bid.
- D. Caulking:
1. ASTM C-834-76 one component acrylic latex caulking, minimum 75% recovery per ASTM C-736-82. (For interior, non-structural applications not subject to any moisture contact and not used to separate conditioned environments from non-conditioned atmospheres.)
 - a. Acceptable Products:
 - 1) Pecora - AC-20
 - 2) Sonneborn - Sonolac
 - 3) Tremco - Acrylic-Latex
 - 4) Architect approved equal prior to bid.
- E. Primer:
1. Primer shall be used in accord with manufacturer's instructions, with all primers being applied prior to the installation of any backer rod or bond breaker tape. Manufacturer shall be consulted for all surfaces not specifically covered in submittal application instructions. If a stain-type primer is used, apply material in a manner that will prevent exposed stain residue related to application procedures.
- F. Backer Rod:
1. Shall be open or closed cell polyethylene or polyurethane as recommended by the sealant manufacturer.
 - a. Acceptable Manufacturers:
 - 1) ITP
 - 2) Dow-Ethnafoam
 - 3) Hercules
 - 4) Nomaco
 - 5) Architect approved equal prior to bid.
- G. Bond Breaker Tape:
1. An acceptable polyethylene or similar type bond breaker tape shall be used to prevent three-sided adhesion in locations where backer rod cannot be used.

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2.4 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
 - 1. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber D1565, open cell PVC D1667, closed cell PVC; oversized 30 to 50 percent larger than joint width; manufactured by.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings are ready to receive work.
- B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Perform acoustical sealant application work in accordance with ASTM C919.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

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END OF SECTION

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SECTION 09 90 00

PAINTING AND COATING

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints stains, varnishes, and other coatings.

1.2 SUBMITTALS

- A. Product Data: Submit data on coatings.
- B. Samples: Submit two paper chip samples, inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit maintenance and cleaning instructions.

1.4 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Maintain one copy of each document on site.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Store and apply materials in environmental conditions required by manufacturer's instructions.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers:
 - 1. Sherwin Williams
 - 2. PPG Architectural Finishes (Pittsburgh Paints, Porter Paints)
 - 3. Ben Moore
 - 4. Substitutions: Not Permitted

2.2 COMPONENTS

- A. Coatings: Ready mixed except field catalyzed coatings of good flow and brushing properties, capable of drying or curing free of streaks or sags.

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1. Interior Flat and Non-Flat Paints: Maximum volatile organic compound content in accordance with GS-11.
 2. Interior Anti-Corrosive Paints: Maximum volatile organic compound content in accordance with GC-03.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials required to achieve finishes specified.
1. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with SCAQMD Rule 1113.

2.3 SCHEDULE

A. INTERIOR MASONRY - (CMU)

1. Latex Systems – Sherwin Williams
 - a. Egg-Shell / Satin Finish
 - 1) 1st Coat: S-W Loxox Block Surfer, A24W200 (50-100 sq ft/gal)
 - 2) 2nd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20W12600 Series
 - 3) 3rd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20W12600 Series (4 mils wet, 1.6 mils dry per coat)
2. Latex Systems – PPG
 - a. Egg-Shell / Satin Finish
 - 1) 1st Coat: Perma-Crete LTC (75-125 sq ft/gal)
 - 2) 2nd Coat: SpeedHide Zero VOC Latex Satin, 6-4410XI
 - 3) 3rd Coat: SpeedHide Zero VOC Latex Satin, 6-4410XI
 - 4) (4-5 mils wet, 1.3-1.5 mils dry per coat)
3. Latex Systems – Ben Moore
 - a. Egg-Shell / Satin Finish
 - 1) 1st Coat: CoroTech Acrylic Block Filler, V114 (75-125 sq ft/gal)
 - 2) 2nd Coat: Eco Spec WB Eggshell, N374
 - 3) 3rd Coat: Eco Spec WB Eggshell, N374 (4 mils wet, 1.4 mils dry per coat)
4. Epoxy Coating System – SW Water Based Catalyzed Epoxy Eg-Shel)
 - a. Water-Based Epoxy Coating System-(interior and exterior).
 - 1) Prime Coat: S-W ProMar 200 Latex Primer, B28W2600 (4 mils wet, 1.2 mils dry).
 - 2) Intermediate Coat: Pro Industrial Water-based Epoxy Eg-Shel, B73-360 Series/B73V300
 - 3) Topcoat: Pro Industrial Water-based Epoxy Eg-Shel, B73-360 Series/B73V300

B. INTERIOR DRYWALL (Gypsum Board)

1. Latex Systems – Sherwin Williams
 - a. Egg-Shell / Satin Finish
 - 1) 1st Coat: S-W ProMar 200 Latex Primer, B28W2600 (4 mils wet, 1.2 mils dry)

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- 2) 2nd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20W12600 Series
 - 3) 3rd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20W12600 Series (4 mils wet, 1.6 mils dry per coat)
 2. Latex Systems – PPG
 - a. Egg-Shell / Satin Finish
 - 1) 1st Coat: SpeedHide Latex Sealer, 6-4900XI (4-5 mils wet, 1.2-1.3 mils dry)
 - 2) 2nd Coat: SpeedHide Zero VOC Latex Satin, 6-4410XI
 - 3) 3rd Coat: SpeedHide Zero VOC Latex Satin, 6-4410XI (4-5 mils wet, 1.3-1.5 mils dry per coat)
 3. Latex Systems – Ben Moore
 - a. Egg-Shell / Satin Finish
 - 1) 1st Coat: Ultra Spec 500 Interior Primer, N534 (4 mils wet, 1.1 mils dry)
 - 2) 2nd Coat: Eco Spec WB Eggshell, N374
 - 3) 3rd Coat: Eco Spec WB Eggshell, N374 (4 mils wet, 1.4 mils dry per coat)
 4. Epoxy Coating System – SW Water Based Catalyzed Epoxy Eg-Shel)
 - a. Water-Based Epoxy Coating System-(interior and exterior).
 - 1) Prime Coat: S-W ProMar 200 Latex Primer, B28W2600 (4 mils wet, 1.2 mils dry).
 - 2) Intermediate Coat: Pro Industrial Water-based Epoxy Eg-Shel, B73-360 Series/B73V300
 - 3) Topcoat: Pro Industrial Water-based Epoxy Eg-Shel, B73-360 Series/B73V300
- C. INTERIOR METAL – (Ferrous Metal)
1. Latex Systems – Sherwin Williams
 - a. Semi-Gloss Finish
 - 1) 1st Coat: S-W Pro Industrial Pro-Cryl® Primer, B66W1310 Series (2-4 mils dry)
 - 2) 2nd Coat: S-W Pro-Industrial Acrylic Semi-Gloss, B66-650 Series
 - 3rd Coat: Pro-Industrial Acrylic Semi-Gloss, B66-650 Series (6.0-12.0 mils wet, 2.1-4.2 mils dry per coat)
 2. Latex Systems – PPG
 - a. Semi-Gloss Finish
 - 1) 1st Coat: Pitt-Tech Plus Direct to Metal Primer, 90-912 (2-4 mils dry)
 - 2) 2nd Coat: Devflex HP Semi-Gloss, 4216 HP
 - 3) 3rd Coat: Devflex HP Semi-Gloss, 4216 HP (2.0-4.0 mils dry per coat)
 3. Latex Systems – Ben Moore
 - a. Semi-Gloss Finish
 - 1) 1st Coat: CoroTech Acrylic Metal Primer, V110 (2 mils dry)
 - 2) 2nd Coat: SuperSpec HP Acrylic Semi-Gloss, HP25/FP29

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- 3) 3rd Coat: SuperSpec HP Acrylic Semi-Gloss, HP25/FP29 (2.0-4.0 mils dry per coat)
 4. Epoxy Coating System – SW Water Based Catalyzed Epoxy Eg-Shel
 - a. Water-Based Epoxy Coating System-(interior and exterior).
 - 1) Prime Coat: S-W ProMar 200 Latex Primer, B28W2600 (4 mils wet, 1.2 mils dry).
 - 2) Intermediate Coat: Pro Industrial Water-based Epoxy Eg-Shel, B73-360 Series/B73V300
 - 3) Topcoat: Pro Industrial Water-based Epoxy Eg-Shel, B73-360 Series/B73V300
 5. Exposed Metal Ceiling, Bar joists, Ductwork & Misc metal scheduled for Dryfall
 - a. Waterbased EggShell Finish
 - 1) Spot Prime: Bare and rusty metal surfaces only with S-W Pro Industrial Pro-Cryl® Primer, B66W1310 Series (2-4 mils dry)
 - 2) Intermediate Coat: SW Pro Industrial Waterbased Acrylic Dryfall Eg-Shel, B42W82
 - 3) Topcoat: SW Pro Industrial Waterbased Acrylic Dryfall Eg-Shel, B42W82
- D. EXTERIOR METAL – (Ferrous)
1. Acrylic-Enamel Finish: Two finish coats over a rust-inhibitive primer (primer required for items not shop-primed)
 - a. Primer: S-W Pro Industrial Pro-Cryl® Primer, B66W1310 Series (2-4 mils dry): Applied at a dry film thickness of not less than 1.9 mils.
 - b. Exterior semigloss acrylic enamel finish: Pro Industrial Water Based Alkyd Urethane Semi-Gloss, B53-1150 : Applied at a dry film thickness of not less than 1.7 mils.
- E. EXTERIOR CONCRETE (Cementitious Siding, Flexboard, Transite Board, Non-Roof Shingles, Common Brick, Stucco, Tilt-up, Precast, and Poured-In-Place Concrete)
1. S-W Latex Systems
 - a. Gloss Finish
 - 1) 1st Coat: S-W Loxon Acrylic Concrete & Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)
 - 2) 2nd Coat: S-W A-100 Exterior Latex Gloss, A8 Series
 - 3) 3rd Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet, 1.3 mils dry per coat)
 - a) Early Moisture Resistant Finish
 - (1) 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)
 - (2) 2nd Coat: S-W Resilience Latex Gloss, K44 Series
 - (3) 3rd Coat: S-W Resilience Latex Gloss, K44 Series (4 mils wet, 1.44 mils dry per coat)
 - b. Semi-Gloss Finish
 - 1) 1st Coat: S-W Loxon Acrylic Concrete & Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)

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- 2) 2nd Coat: S-W Metalatex Semi-Gloss Coating, B42 Series
- 3) 3rd Coat: S-W Metalatex Semi-Gloss Coating, B42 Series (3-5 mils dry per coat)
- c. Satin Finish
 - 1) 1st Coat: S-W Loxon Acrylic Concrete & Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)
 - 2) 2nd Coat: S-W A-100 Exterior Latex Satin, A82 Series
 - 3) 3rd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet, 1.4 mils dry per coat)
 - a) Early Moisture Resistant Topcoat
 - (1) 1st Coat: S-W Loxon Acrylic Concrete Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)
 - (2) 2nd Coat: S-W Resilience Latex Satin, K43 Series
 - (3) 3rd Coat: S-W Resilience Latex Satin, K43 Series (4 mils wet, 1.52 mils dry per coat)
- d. Flat Finish
 - 1) 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)
 - 2) 2nd Coat: S-W A-100 Exterior Latex Flat, A6 Series
 - 3) 3rd Coat: S-W A-100 Exterior Latex Flat, A6 Series (4 mils wet, 1.4 mils dry per coat)
 - a) Early Moisture Resistant Topcoat
 - (1) 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 (8 mils wet, 3.2 dry)
 - (2) 2nd Coat: S-W Resilience Latex Flat, K42 Series
 - (3) 3rd Coat: S-W Resilience Latex Flat, K42 Series (4 mils wet, 1.52 mils dry per coat)
 - b) High Build Flat Coating
 - (1) 1st Coat: S-W Loxon® XP, A24-1400 Series (14-18 mils wet; 6.4-8.3 mils dry)
2. S-W Clear Water Repellant
 - a. Clear Siloxane
 - 1) 1st Coat: S-W Loxon 7% Siloxane Water Repellant, A10T7
 - 2) 2nd Coat: S-W Loxon 7% Siloxane Water Repellant, A10T7 (50-200 sq ft/ gal)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions are ready to receive Work.

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- B. Measure moisture content of porous surfaces using electronic moisture meter. Do not apply finishes unless moisture content is less than 12 percent.

3.2 PREPARATION

- A. Correct minor defects and clean surfaces affecting work of this section.
- B. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or applying finishes.
- C. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- D. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- E. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove foreign matter. Remove oil and grease with solution of tri-sodium phosphate, rinse well and allow to dry.
- F. Uncoated Steel and Iron Surfaces: Remove scale by wire brushing, sandblasting, clean by washing with solvent. Apply treatment of phosphoric acid solution. Prime paint after repairs.
- G. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Clean surfaces with solvent. Prime bare steel surfaces.
- H. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- I. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- J. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior paintable caulking compound after prime coat has been applied.
- K. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.

3.3 APPLICATION

- A. Sand wood and metal surfaces lightly between coats to achieve required finish.
- B. Where clear finishes are required, tint fillers to match wood.
- C. Prime concealed surfaces of interior and exterior woodwork with primer paint.

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- D. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- E. Finishing Mechanical And Electrical Equipment:
 - 1. Refer to Divisions 22, 23 and 26 for schedule of color coding, identification banding of equipment, duct work piping, and conduit.
 - 2. Color code items in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 - 3. Paint shop primed equipment.
 - 4. Remove unfinished louvers, grilles, covers, and access panels and paint separately. Paint dampers exposed behind louvers, grilles, convactor and baseboard cabinets to match face panels.
 - 5. Prime and paint insulated and exposed pipes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
 - 6. Paint interior surfaces of air ducts and convactor and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - 7. Paint exposed conduit and electrical equipment occurring in finished areas.
 - 8. Paint both sides and edges of plywood backboards.
 - 9. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- F. Cleaning: As work proceeds, promptly remove finishes where spilled, splashed, or spattered.

END OF SECTION

14 24 24
Elevator Modernization

**University of Florida Basic Science
206-25 & 206-26
UF Campus
Gainesville, FL 32603**

Consultant: VTE Solution
Indian Rocks Beach, FL
Phone: (877) 269-6151
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SPECIFICATION FOR MODERNIZATION OF ELEVATORS

**University of Florida Basic Science 206-25 & 206-26
 UF Campus
 Gainesville, FL 32603**

ELECTRIC TRACTION PASSENGER ELEVATOR

Part 1 GENERAL

Part 1.01 SUMMARY

- A) This section specifies required work to complete the modernization of Two (2) Electric Traction Passenger Elevators.
- B) Elevator work includes:
 - 1) Commercial, standard Electric Traction Passenger Elevators.
 - 2) Elevator car and hoistway signal equipment.
 - 3) Operation and control systems.
 - 4) Patching, painting etc. as indicated.
 - 5) Accessibility provisions for physically disabled persons.
- C) Engineering, equipment, labor, machines, control systems, devices and accessories as required for safely operating the specified elevator at rated speed with rated capacities.
- D) Delivery, staging, and hoisting of new equipment. Hoisting, dismantling, removal and disposal of existing equipment. Repair, cleaning and painting of reusable equipment.
- E) Materials and accessories as required for completing the elevator modernization.
- F) Hoistway, pit and machine room barricades for safety as required.
- G) Required hoisting, hoisting permits and traffic coordination and/or permits with local jurisdictions and the State of Florida as required.
- H) Required permits and coordination and/or permits with local jurisdictions, Bureau of Elevator Safety and the State of Florida as required.

Part 1.02 DEFINITIONS

- A) The following definitions shall be used throughout all general conditions, specifications and contract documents except where superseded in those documents.

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- 1) "Owner": University of Florida.
- 2) "Consultant": VTE Solution, LLC.
- 3) "Contractor": The Elevator Contractor unless stated differently.
- 4) "Contract": The Contract for the elevator modernization and other related work shall be deemed to be the Elevator Specifications provided to Contractor prior to execution.
- 5) "Contract Documents": The Contract for the elevator modernization and other related work to the elevator of the building, the Elevator Specifications (the "Specifications") and any Addendum shall comprise the Contract Documents. Additional Contract Documents may be created and incorporated upon written agreement by Owner and Contractor. Notwithstanding, any documents not furnished hereunder shall not be binding upon Contractor until such time Contractor is furnished with same and specifically accepts in writing.
- 6) "Contract Sum": The amount set forth in the Contract as priced by the "Contractor" for Bid Items, for Contractor's performance of the Work.
- 7) "Fire Alarm Contractor": Contractor approved to work on Fire Alarm System installed in University of Florida Basic Science 206-25 & 206-26, Gainesville, FL.
- 8) "Code": All applicable laws and codes, including but not limited to the electrical, fire, building, and Safety Codes for Elevators and Escalators codes designated by any authority having jurisdiction as detailed in the codes and standards reference section of this specification.
- 9) "Work": The services to be completed by Contractor are as specified in the Contract Documents. This Work includes all Services necessary, material and labor required to provide and install and/or repair equipment as specified under this specification. Schedules and completion dates shall be agreed to in writing by both parties before becoming effective.
- 10) "Provide": Provide all materials and labor required to furnish and install and or repair.
- 11) "Services": Services shall include, but shall not necessarily be limited to, all labor, transportation, supplies, materials, parts, tools, scaffolding, machinery, hoists, employee safety equipment, equipment, lubricants; supervision, applicable taxes, and all other work and materials expressly required under this Contract or reasonably inferred whether or not expressly stated herein necessary to maintain all equipment covered under this specification.
- 12) "Subcontractor": A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work and Services at the site. All Subcontractors must be licensed and insured and must provide proof of adequate insurance in the amounts specified herein prior to the commencement of any portion of the Work.

Part 1.03 CODE AND STANDARD REFERENCES

- A) All codes and standards referenced in this specification will be to the edition of the references as detailed in this section. All materials and Work and Services to be performed under these

specifications shall be in compliance with the Codes listed in this section or as determined by the authority having jurisdiction.

- B) Comply with applicable Florida Regulatory Requirements, Building Codes and Elevator Codes at the project site, including but not limited to the following:
- 1) Florida Statutes 399 and 553
 - 2) Florida Administrative Code 61C-5
 - 3) Florida Building Code 2017
 - 4) A17.1-2013 Safety Code for Elevators and Escalators
 - 5) ASME A17.3-1996 Safety Code for Existing Elevators and Escalators
 - 6) ASME A17.2-2017 Guide for Inspection of Elevators and Escalators
 - 7) ADAAG, Americans with Disabilities Act Accessibility Guidelines
 - 8) NFPA 70, National Electrical Code 2014
 - 9) NFPA 80, Fire Doors and Windows
 - 10) ANSI/UL 10B, Fire Tests of Door Assemblies
 - 11) NFPA 72, National Fire Alarm Code
 - 12) NFPA 101 Florida Edition
 - 13) O.S.H.A. Requirements for construction and repairs of existing buildings
 - 14) Elevator Industry Field Employees' Safety Handbook 2015
 - 15) Any and all onsite workmen and receiving of products to site are required to follow security and safety procedures as per policies due to facility regulations.

Part 1.04 RELATED WORK BY OTHERS

- A) All work, except work detailed in Part 1.05, Work by Elevator Contractor, shall be the responsibility of the Building Owner. All materials and work to be performed under these specifications shall be in compliance with the codes listed in Part 1.03 CODE AND STANDARD REFERENCES or as determined by the authority having jurisdiction.
- B) **Machine Room HVAC:** Machine room HVAC is required, to maintain temperature and humidity to between 55 deg F and 90 deg F with relative humidity of not more than 85% non-condensing. The Elevator Contractor shall provide actual calculations for total anticipated heat loads generated by all elevator machine room equipment.
- 1) Machine room HVAC must be positioned as approved by the Elevator Contractor and consultant. There shall be no drain lines or condensation allowing water in the machine room.
 - 2) Dedicated HVAC system for machine room is required to have an electrical disconnect lockable in the off position with proper labels identifying source of power and purpose.
 - 3) HVAC Contractor shall provide HVAC receptacle or disconnect switch as required for the installation of HVAC system by HVAC Contractor.

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- 4) HVAC Contractor is responsible for providing electrical power and code compliant disconnect switch for installation of HVAC equipment.
 - 5) Remote systems shall have a proper thermostat inside the machine room.
 - 6) Any existing vents in the machine room will be properly covered and protected.
- C) **Fire Alarm:** Fire alarm including heat and smoke sensing devices as per NFPA 70 National Electrical Code and NFPA 72 National Fire Alarm.
- 1) Unless otherwise required by the authority having jurisdiction, only the elevator lobby, elevator hoistway, and elevator machine room smoke detectors, or other automatic fire detection as permitted by NFPA 72 Section 21.3.9, shall be used to recall elevators for fire fighters' service.
 - 2) Smoke detectors shall not be installed in elevator pits to initiate elevator recall unless the smoke detector is listed for the environment.
 - 3) If a sprinkler is located in the pit of the elevator a Fire alarm Initiating Device is required in the pit or a flow switch, without any time delay, in the pit sprinkler branch line per NFPA 72 sections 21.3.3 & 21.3.7 to initiate recall in conformance with ASME A17.1, Part 2.27.3.
 - 4) Verify that proper connections exist for fire recall devices to the elevator controllers. If required, provide connection from new or existing fire recall devices to the elevator controllers in machine room. For each elevator within the building, a minimum of three separate elevator control circuits shall be terminated at the designated elevator controller within each elevator machine room in accordance with NFPA 72, section 21.3. Operation of the elevator shall be in accordance with Section 2.27 of ASME A17.1 Safety Code for Elevators and Escalators. The smoke detectors or other automatic fire detection as permitted by NFPA 72, shall actuate the elevator control circuits as detailed in NFPA 72.
 - 5) Fire alarm contractor shall demonstrate at time of elevator inspection, compliance and testing of all alarm initiating devices as required by ASME A17.1 Safety Code for Elevators and Escalators, ASME A17.2 and NFPA 72 National Fire Alarm Code.
 - 6) Installation of alarm system and devices shall conform to ASME A17.1 Safety Code for Elevators and Escalators, and NFPA 72 including NFPA 70 NEC.
 - 7) All conduit and wiring requirements for Fire Alarm System work is the responsibility of the Fire Alarm Contractor.
- D) **Electrical Requirements:** Electrical work required for elevator modernization shall be the responsibility of the Elevator Contractor. Electrical requirements shall include the following:
- 1) All Electrical work must be coordinated and scheduled with, at least 7 days' notice, with the building owner. Elevator shall be removed from service while electrical trades are working.
 - 2) Electrical requirements for hoistway and machine room HVAC, GFCI receptacles and disconnects, as required by NFPA 70, NEC and ASME A17.1 Safety Code for Elevators and Escalators. Additionally, Electrical Contractor shall provide and install conduits and wiring required for communication devices as detailed in this section.
 - 3) **Main Line Disconnect:** Main line disconnect is to be verified by Elevator Contractor as appropriate size and type for power requirements of new elevator equipment prior to

installation. Main line disconnect for elevator shall not be used for other conductors to pass thru disconnect switch boxes.

- a) If existing disconnect is not satisfactory, Electrical Contractor shall provide new disconnect for elevator main line power in accordance with NFPA 70, NEC. The disconnecting means shall be an enclosed externally operable fused motor circuit switch capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment.
- 4) **Cab Lighting Disconnect:** Cab Lighting disconnect is to be verified by Electrical Contractor as appropriate size and type for power requirements. Cab Lighting disconnect for elevator shall not be used for other conductors to pass thru disconnect switch boxes. Electrical Contractor shall provide new disconnect(s) for elevator cab lighting in accordance with NFPA 70, NEC.
 - a) The disconnecting means shall be an enclosed externally operable fused motor circuit switch capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment.
 - b) Car Light Source: A separate branch circuit shall supply the car lights, receptacle(s), auxiliary lighting power source, and ventilation on each elevator car. The overcurrent device protecting the branch circuit shall be located in the elevator machine room or control room/machinery space or control space. Required lighting shall not be connected to the load side of a ground-fault circuit interrupter.
- 5) **Machine Room Lighting and Receptacles:**
 - a) A separate branch circuit shall supply the machine room or control room/machinery space or control space lighting and receptacle(s).
 - b) Minimum lighting in machine room shall be 19 ft-c.
 - c) Required lighting shall not be connected to the load side of a ground-fault circuit interrupter.
- 6) **Pit Lighting and Receptacle(s):**
 - a) Verify that current pit lighting meets minimum 10 ft-c. at all locations in the pit. If pit lighting is below 10 ft-c requirement, provide additional lighting as detailed in this specification.
 - b) Verify that a separate branch circuit is installed to supply the hoistway pit lighting and receptacle(s).
 - c) Required lighting shall not be connected to the load side of a ground-fault circuit interrupter.

- d) The lighting switch shall be so located as to be readily accessible from the pit access door.
- e) Duplex Receptacle. At least one 125-volt, single phase, 15- or 20-ampere duplex receptacle shall be provided in the hoistway pit.
- 7) **Pit Receptacles:** Pit receptacles, with GFCI protection shall be installed in NEMA 4 devices where placed within 4'-0" of pit floor. Care must be taken not to place equipment in line with elevator equipment.
- 8) Each 125-volt, single-phase, 15- and 20-ampere receptacle installed in pits, in hoistways and on elevator car tops shall be of the ground fault circuit-interrupter type.
- 9) All 125-volt, single-phase, 15- and 20-ampere receptacles installed in machine rooms and machinery spaces shall have ground-fault circuit-interrupter protection for personnel.
- 10) All disconnects shall be labeled according to NFPA 70 National Electrical Code including source of power, State of Florida Elevator Serial Number, Elevator Number and all required warning signs.
- 11) All disconnects shall be installed with proper clearances in accordance to the applicable provisions of NFPA 70 National Electrical Code.
- 12) All conduit and wiring in the hoistway must be checked for proper installation and properly mounted in accordance with applicable provisions of NFPA 70 National Electrical Code.
- 13) Equipment grounding and bonding shall be provided in accordance with the requirements of NFPA 70 National Electrical Code. The equipment grounding conductor will be run with the circuit conductors and shall be a copper conductor. Ground all conductors, supports, controller enclosure, and other non-current conducting metal enclosures for electrical equipment in accordance with NFPA 70 National Electrical Code. The ground wires shall be solid or stranded; insulated, covered, or bare copper, sized as required by NEC, and shall be colored green if #6 AWG or smaller, and have green tape or adhesive marking if #4 AWG or larger.
- 14) Provide new electric wiring from disconnect switches to the terminals of the new elevator controllers in their new locations, inclusive of a normal 120 VAC, 15 AMP supply at each controller.
- 15) Provide new pit lighting and machine room lighting as per NFPA 70 National Electrical Code with enclosed and protected lamps.
- 16) All existing and new lighting fixtures in machine rooms, elevator cars and on top of car are to be suitably guarded in accordance with ASME A17.1 Safety Code for Elevators and Escalators clearance requirements and NFPA 70 National Electrical Code requirements for guarding.
- 17) Pit lighting switches and emergency stop switches shall be installed approximately 18" above first floor landing adjacent to opening and operable from side of pit access where pit ladder is installed.
- 18) Telephone lines and wiring to elevator controllers for telephone system including all wiring in machine room to be installed inside conduit as per NFPA 70 NEC. Conduit to be installed under Electrical Requirements.

E) **Emergency Generator:** These elevators are not provided with emergency generator power.

F) **Sprinklers:**

- 1) Verify that a code compliant shunt trip breaker is installed and located for disconnecting power to the elevator in conformance with applicable codes where sprinklers are located in elevator machine rooms, elevator hoistways and when any sprinkler is located above 24 inches in the pit.
- 2) Where elevator equipment is located, or its enclosure is configured such that application of water from sprinklers could cause unsafe elevator operation, means shall be provided to automatically disconnect the main line power supply to the affected elevator and any other power supplies used to move the elevator upon or prior to the application of water.
- 3) When sprinklers are installed in elevator pits, automatic fire detection shall be installed to initiate elevator recall in accordance with Part 2.27.3.2.1(c) of ANSI/ASME A.17.1/CSA B44, Safety Code for Elevators and Escalators, and the following shall apply:
 - a) Where sprinklers are located above the lowest level of recall, the fire detection device shall be located at the top of the hoistway.
 - b) Where sprinklers are located in the bottom of the hoistway (the pit), fire detection device(s) shall be installed in the pit in accordance with NFPA 72 Chapter 17.
 - c) Outputs to the elevator controller(s) shall comply with NFPA 72 Section 21.3.14.
 - d) Smoke detectors shall not be installed in elevator pits to initiate elevator recall unless the smoke detector is listed for the environment.
- 4) When sprinklers are installed not more than 600 mm (24 in.) above the pit floor, the following shall apply to elevator electrical equipment and wiring in the hoistway located less than 1 200 mm (48 in.) above the pit floor, except earthquake protective devices conforming as required to A17.1 Part 8.4; and on the exterior of the car at the point where the car platform sill and the lowest landing hoistway door sill are in vertical alignment.
 - a) Elevator electrical equipment shall be weatherproof (Type 4 as specified in NEMA 250).
 - b) Elevator wiring, except traveling cables, shall be identified for use in wet locations in accordance with the requirements in NFPA 70
- 5) If sprinkler head(s) are located in the machine room or hoistway, it will be required to install a heat detector within 24" of each sprinkler in order to automatically disconnect the main line power supply to the affected elevator(s) upon or prior to the application of water, in accordance with ASME A17 Safety Code for Elevators and Escalators, and NFPA 72 National Fire Alarm Code.

G) **Building General Construction:** Building general construction conditions will include, work detailed in this section, including cleaning and painting of miscellaneous surfaces. The Elevator Contractor shall not be responsible for all work as detailed in this section. All construction, cleaning and painting other than equipment directly supplied by the Elevator Contractor shall be performed by Work by Others.

- 1) Verify proper installation of 1 ½ hour "B-Label" door to machine room to include self-closing and self-locking requirements.

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- 2) Verify proper Class ABC Fire Extinguisher in machine room permanently mounted and conveniently located to the access door as required by ASME A17.1 Safety Code for Elevators and Escalators.
 - 3) Verify that all non-elevator related pipes, wiring, conduit have been removed and openings in machine rooms and hoistways to include a 2-hour fire rating. All foreign pipes, wiring or conduit not in use or directly related to the elevator system shall be removed from machine rooms and hoistways.
 - 4) All sills must be substantially level to all adjacent finished flooring surfaces.
 - 5) Machine room warning sign "Danger Authorized Personnel Only" shall be provided on the machine room door as required by NFPA 70 NEC.
 - 6) Install 1/8 inch metal plate over the original floor grating that has been abandoned as a hoistway vent and properly secure to the floor to eliminate any tripping hazard.
- H) Each contractor will be required to provide any cutting, patching including painting to match existing finishes of building.
- I) All above work and materials to be performed to meet compliance with Florida Building Code, ASME A17.1 Safety Code for Elevators and Escalators, NFPA 70 National Electrical Code, NFPA 13 National Sprinkler Code and NFPA 72 Fire Alarm Code or as determined by the authority having jurisdiction.
- J) Failure by above associated contractors to perform required testing at time of scheduled elevator acceptance testing and inspection will require full advance payment by contractor at fault for all expenses relating to re-inspection, permit and scheduling fees to building management.

Part 1.05 WORK BY ELEVATOR CONTRACTOR

- A) All work, except work detailed in Part 1.04, Related Work by Others, necessary for a complete and useable elevator system, shall be the responsibility of the Elevator Contractor. Specifically, to include non-traditional Contractor work detailed in Part 1.05 in addition to traditional Contractor work as detailed in all other sections of this specification. All materials and work to be performed under these specifications shall be in compliance with the codes listed in Part 1.03 CODE AND STANDARD REFERENCES or as determined by the authority having jurisdiction. As work progresses, Contractor shall consult with their Subcontractors, examine the Work installed by Subcontractors, and resolve all conflicts without expense to Owner and/or Consultant.
- B) **Telephone Lines:** A dedicated telephone line is available and required for the elevator.
- 1) Telephone lines and wiring to elevator controllers for telephone system including all wiring in machine room to be installed inside conduit as per NFPA 70 NEC.
 - 2) All emergency telephone devices shall include a minimum of 4 hours emergency backup power including power from emergency generator if supplied.
- C) **Patching:** Patching of all masonry openings inside the hoistway as required by elevator installation work shall be completed with fire rating of hoistway or machine room equal or greater than 2 hours in accordance with Florida Building Code.

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- 1) All openings required for the installation of new elevator components shall be the responsibility of the elevator contractor.
- 2) Surface restoration inside the hoistway shall be the responsibility of the Elevator Contractor.
- 3) Finished surface restoration of all surfaces outside the hoistway will be the responsibility of the General Contractor.

D) Coordination of Work:

- 1) Elevator Contractor shall coordinate as required with other contractors to ensure that schedules are met, and all work being performed in association with the elevator modernization project is acceptable.
- 2) Before proceeding with any Work, the Contractor shall carefully check and verify all pertinent dimensions and sizes and assume full responsibility for fitting the equipment and materials to the structure. Where the apparatus and equipment have been indicated on the drawings, the dimensions have been taken from typical equipment of the type specified in these specifications. The Contractor shall carefully check the drawings to verify that the equipment that will be actually provided will fit into the spaces available. Should the equipment not fit the specific structure shown on the drawings, all additional sub-framing members required to accommodate the equipment installation shall be provided and paid for by Contractor as part of the Work of this section. The Contractor shall submit all structural shop drawings and engineering calculations for the Consultant's review and written approval.
- 3) Contractor shall familiarize himself with the specifications, drawings, installation procedures and construction schedules for those phases of Work performed by his subcontractors. The Contractor shall also familiarize himself with the Owner's security and safety requirements and shall abide by and conform to such established regulations at all times. If the Contractor's Work or the Work of any of his subcontractors depends upon the execution of the Work of another subcontractor or upon his own Work, he shall so coordinate all phases of Work so as to avoid conflicts in installation procedures and construction schedules.
- 4) As work progresses, Contractor shall consult with his subcontractors, examine the Work installed by them, and resolve all conflicts without expense to Owner and/or Consultant.
- 5) Progress meetings shall be held at the job site, as and when requested by Owner or Consultant. The Contractor shall be represented at these meetings by persons familiar with the details of the scope of Work and authorized to conclude matters relative to Work progress, as may be necessary to expedite completion of Work.
- 6) All above work and materials to be performed to meet compliance with Florida Building Code, ASME A17.1 Safety Code for Elevators and Escalators, NFPA 70 National Electrical Code, NFPA 13 National Sprinkler Code and NFPA 72 Fire Alarm Code or as determined by the authority having jurisdiction.
- 7) Failure by above associated contractors to perform required testing at time of scheduled elevator acceptance testing and inspection will require full advance payment by contractor at fault for all expenses relating to re-inspection, permit and scheduling fees to building management.

Part 1.06 PAINTING

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- A) **Machine Room Painting:** Clean and Paint Machine Room Floor at the conclusion of all elevator work.
- B) **Hoistway Interior Painting:** Hoistway equipment painting shall be performed on conformance with the applicable sections of this specification.
- C) **Cleaning and Painting of Miscellaneous Surfaces:** The Contractor shall be responsible for all miscellaneous painting as detailed in this specification. The procedures proposed for the accomplishment of the work shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property, which is to remain undisturbed, and coordination with other work in progress. The work plan shall include a Safety and Health Plan describing procedures for handling monitoring, and disposition of Volatile Organic Compounds “VOCs” and other hazardous and toxic materials. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.
- D) **Painting Provisions:** For all painting performed, the following provisions shall apply:
 - 1) Provide all ferrous metals installed in the hoistway shop primed with a rust inhibitive primer.
 - 2) All cleaning or painting work that produces any vapors or fumes shall not be performed during normal business work hours. All cleaning or painting work that produces any vapors or fumes shall be performed with sufficient ventilation to prevent the vapors or fumes from permeating into the building. Work of this nature must be scheduled and coordinated with the Owner three (3) days prior to execution of work.
 - a) The procedures proposed for the accomplishment of the Work shall provide for safe conduct of the Work, careful removal and disposition of materials specified to be salvaged, protection of property, which is to remain undisturbed, and coordination with other work in progress. The Work Plan shall include a Safety and Health plan describing procedures for handling monitoring, and disposition of Volatile Organic Compounds “VOCs” and other hazardous and toxic materials. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.
 - b) All paint products and application method must be pre-approved prior to application by Owner or Owner’s agent. Paint products and application methods are to be equal or better than existing product applicable with matching color as approved by Owner.
 - c) All products of paint, thinners or cleaning agents must be pre-approved prior to use for VOC’s or any additional health concerns.
 - 3) Interior work zones having a volume of 1,000 cubic feet or less shall be ventilated at a minimum of 2 air exchanges per hour. Ventilation in larger work zones shall be maintained by means of mechanical exhaust. Solvent vapors shall be exhausted outdoors, away from air intakes, building occupants and workers. Building air conditioning return air inlets in the work zone shall be temporarily sealed before start of work until the prepared surfaces have dried and are free of odor. Operators and personnel in the vicinity of paint removal processes involving chemicals or mechanical action (sanding or blasting) shall wear respirators.

Part 1.07 ELEVATOR SYSTEM DESCRIPTION

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A) Elevator Arrangement: Quantity – One (1) with Elevator(s) Numbered are numbered as follows:

- 1) SN# 24282 (Basic Science 206-25)
- 2) SN# 24281 (Basic Science 206-26)
- 3) Specific requirements for the specific elevator or component shall be designated as such. It shall be the bidding Contractor's responsibility to review and verify as required for proper installation. Specifications for elevator include minimum requirements of elevator and it shall be the responsibility of the bidder to complete all work to code compliance.

B) Type:

- 1) SN# 24282 (Basic Science 206-25) – Passenger – Electric Traction - Geared Drive Machine.
- 2) SN# 24281 (Basic Science 206-26) – Passenger – Electric Traction - Geared Drive Machine.

C) Number of Stops & Openings:

- 1) SN# 24282 (Basic Science 206-25): 7 front (labeled G, 1, 2, 3, 4, 5 & 6) / No Rear Openings.
- 2) SN# 24281 (Basic Science 206-26): 4 front (labeled G, 1, 2 & 3) / No Rear Openings

D) Rise: All existing conditions

E) Rated Capacity/Speed: Maintain existing conditions

- 1) SN# 24282 (Basic Science 206-25)
 - a) Capacity rated at 4500 lbs.
 - b) Speed rated at 350 fpm
- 2) SN# 24281 (Basic Science 206-26)
 - a) Capacity rated at 4500 lbs.
 - b) Speed rated at 350 fpm

F) Minimum Car Inside: Maintain existing dimensions

G) Inside Cab Height: Maintain existing clear headroom dimensions inside car.

H) Entrance Width & Type:

- 1) SN# 24282 (Basic Science 206-25):
 - a) Front Openings: Side Opening Two Speed 4' 0" x 7'-0
 - b) Rear Openings: N/A
- 2) SN# 24281 (Basic Science 206-26):
 - a) Front Openings: Side Opening Two Speed 4' 0" x 7'-0
 - b) Rear Openings: N/A

I) Main Power Supply:

- 1) SN# 24282 (Basic Science 206-25) - Existing 208 VAC + or - 5% of normal, 3 Phase, 60 Cycle with a separate equipment grounding conductor.

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- 2) SN# 24281 (Basic Science 206-26) - Existing 208 VAC + or - 5% of normal, 3 Phase, 60 Cycle with a separate equipment grounding conductor.
- J) **Lighting Power Supply:** 120 Volts, 1 Phase, 15 Amp, 60 Hz.
- K) **Stopping Accuracy:** $\pm 1/4"$ under any loading condition or direction of travel.
- L) **Door Operating Equipment:** Door operating equipment shall be labeled with maximum door speed and Kinetic Energy shall not exceed 7.37 ft-lbf. as required by ASME A17.1 Safety Code for Elevators and Escalators.
- M) **Car Operation:**
- 1) Using a Simplex Selective Collective for elevator microprocessor-based controller, the operation shall be automatic by means of the car and hall buttons
 - 2) Provide microprocessor-based Simplex Selective Collective automatic operation control system, which utilizes on-board diagnostics for servicing, trouble-shooting, and adjusting without requiring the use of an outside service tool.

Part 1.08 SUBMITTALS

- A) **Product data:** Submit product data for the following:
- 1) Elevator car and hoistway fixtures.
 - 2) Operation, control, and signal systems.
 - 3) Motor & traction driving machine, speed governor and all major components of system including layout for machine room if equipment layout is changed all major components of system.
 - 4) Elevator cab interior materials and finishes.
- B) **Shop drawings:** Provide the following if equipment existing layout is changed.
- 1) Show equipment arrangement in the machine room, pit and hoistway plans, elevations, sections and details of assembly, erection, anchorage, and equipment location as required.
 - 2) Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
 - 3) Show floors served, existing travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
 - 4) Indicate electrical power requirements and branch circuit protection device recommendations and locations.
- C) **Certificates:** Inspection and acceptance certificates of elevator system installation.
- D) **Submittals at Project Close-Out:**
- 1) **Operation and Maintenance Data:** Include the following:
 - a) Product User Manuals and maintenance guides.
 - b) Parts list, with recommended parts inventory.

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- a) Furnish two (2) copies of bound Product User Manuals and maintenance guides for elevators. Furnish one (1) electronic copy of all project close-out submittals to Owner.
- 2) **Wiring Diagrams:** Provide complete as built wiring diagrams with all electrical connections of elevator systems.
 - a) Provide one set of as built wiring diagrams in the elevator machine room.
 - b) Provide one (1) additional hard copy and 1 electronic copy on separate USB Flash Drive, in PDF format to Elevator Consultant for review and delivery to Owner.
 - c) Provide legible schematic wiring diagrams of installed electrical equipment, including control equipment, and any changes and/or field modifications.
 - d) Provide legible copy of field pull sheets and wiring notes. Pull sheets to include wire numbers and colors. List symbols corresponding to identity or markings on machine room and hoistway apparatus.
 - e) Coded diagrams are not acceptable unless fully identified.

Part 1.09 QUALITY ASSURANCE

- A) **Contractor Qualifications:** Elevator Contractor shall provide pre-engineered elevator system components by manufacturer(s) regularly engaged in the manufacture of elevator systems and that complies with ASME A17.1 Safety Code for Elevators and Escalators in its entirety, Florida Statutes, Chapter 399, Florida Administrative Code 61C-5, all applicable sections of the Florida Building Code as referenced above in its entirety, and additional requirements specified herein.
- B) **Quality Assurance Program:** The Contractor shall have a documented, on-going quality assurance program.
- C) **Installer Qualifications:** The Contractor must have not less than ten years of satisfactory experience installing elevators equal in character and performance to the project elevator. All mechanics employed to work onsite must have a valid Certificate of Competency issued by State of Florida Bureau of Elevator Safety. There shall not be allowed onsite more than one helper or assistant unlicensed per onsite licensed mechanic.
- D) **Permits and Inspections:** The Contractor shall be responsible to obtain all permits, licenses and other fees that are necessary for proper completion and execution of the Work, which are specifically included in the Contract Sum, but not limited to required Florida Bureau of Elevator Safety permits as required by Florida Administrative Code 61C-5 for Alteration Permits, and local jurisdiction permits. Elevator Contractor is responsible for proper posting of all required licenses, permits and safety documentation.
- E) **Inspection and testing:** Elevator Installer shall obtain and pay for all required tests, permits and fees for elevator installation as required by the State of Florida.
 - 1) Owner has designated Vertical Transportation Equipment Solution (VTE Solution) as their consultant on this project. VTE Solution, in accordance with ASME A17.1 Safety Code for Elevators and Escalators, Inspection and Test Requirements, may be present for and review all acceptance inspections for this elevator. Elevator Installer in accordance with ASME A17.1 Safety Code for Elevators and Escalators, Inspection and Test Requirements will

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- schedule and coordinate all acceptance tests and arrange for inspection for this elevator. Elevator Contractor must notify building owner and elevator consultant 5 days prior to inspection advising of the date and time of all inspections and tests. Elevator consultant must qualify and approve any inspector prior to inspection other than State of Florida Bureau of Elevator Safety employed inspectors.
- 2) Elevator Contractor shall be solely responsible for the application, securing, maintaining, completion and posting of existing elevator permits as per Florida Statute 399 and delivery to the Owner upon completion and acceptance of elevator work, the certificate of operation.
 - 3) Failures by Contractor to successfully perform required testing and pass alteration acceptance inspection, at time of scheduled elevator acceptance testing, will require a re-inspection. All costs for re-inspection required due to Contractor fault will be paid by Contractor.
- F) **Signage:** All signage as required by Florida Building Code, ASME A17.1 Safety Code for Elevators and Escalators, NFPA 70 National Electrical Code and NFPA 72 Fire Alarm Code to be posted in elevator lobbies, fire alarm panels, disconnects, machine rooms and machine room doors.
- G) **Non-Proprietary Controls:** Letter of guarantee that any and all equipment installed shall be completely non-proprietary and shall not require the need for specialized testing or programming tools currently or in the future. Future information for trouble shooting or adjusting shall be available to any licensed elevator maintenance contractor by the supplier of the control system at a reasonable cost comparable to cost of competitive parts within marketplace. Contractor shall provide complete schematics and wiring diagrams for control systems including information for change of program, on board diagnostics or mnemonics, or other on-board switches or settings.
- 1) Any equipment that is provided for installation which would require any specialized tool, laptop computer, devices, manuals, source codes, access codes, objects, passwords and/or software to input parameters, make adjustments, troubleshoot, perform diagnostics, perform testing functions or required for any other type of maintenance or repair function shall be included with the modernization cost of this contract and will become the property of the Owner. At the time of bid submission, this shall be identified as such on the bid.
 - 2) Any controller by a manufacturer other than specified must be pre-approved prior to bid. Letter stating agreement to the above compliance shall be signed by an officer of Contractor and shall be notarized.
- H) **Contractor's Safety and Health Plan:** The contractor shall have in place a safety and health plan that, at a minimum, addresses OSHA requirements. The safety and health plan shall comply with the requirements of the Elevator Industry Field Employees' Safety Handbook. The program shall include job site cleanliness, hard hats, safety glasses, safety shoes, hearing protection, fall protection, proper use of ladders, barriers around hazards and proper scaffolding.
- I) **Protection of Spaces:** Contractor is responsible for all protection both inside and outside of hoistway to all personnel inside or outside of hoistway areas. This includes providing and maintaining of protective barricades at hall entrances, screening of each hoistway during work and protection from trip hazards due to storage or use of materials or drop cords.

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- 1) Contractor is to provide due care to protect building flooring and walls from excessive debris, dirt or damage due to workmen onsite.

Part 1.10 DELIVERY, STORAGE AND HANDLING

- A) Deliver elevator materials, components and equipment in manufacturer's protective packaging.
- B) Elevator equipment disassembled for replacement shall be neatly stored prior to removal from site and disposal, which is responsibility of Elevator Contractor.
- C) Store materials in a dry protected area if designated by owner. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling, or deterioration.
- D) Elevator Contractor shall be responsible for the material handling of all elevator equipment to site storage area. Elevator Contractor will be responsible for keeping all stored materials inside storage area with lock and key.
- E) Elevator Contractor's sole responsibility and liability shall be limited to the extent Elevator Contractor is at fault; and shall not be responsible for material once material arrives at jobsite.
- F) Elevator Contractor shall be responsible for the removal the existing equipment from the machine rooms and placement of the new equipment in the machine rooms.
- G) Owner shall afford the Contractor and separate contractors' reasonable opportunity for storage of materials and performance of their activities on the property and shall cooperate in coordinating operations with such other activities.
- H) Locked and protected storage for Elevator Contractor's tools or materials at site is contractor's responsibility. Key will be provided for elevator machine room, which is located on roof level of building above the hoistway and can be utilized for storage or securing of tools and equipment. This is the only area available on site for storage of any elevator materials, equipment or tools.
- I) Elevator Contractor will be provided a single location for either a storage trailer or POD. The cost of the storage container/trailer is the responsibility of the Elevator Contractor.
- J) Authorized elevator personnel only are responsible for temporary installed barrier panels as may be required during construction to protect the openings at elevator at each floor. Panels may be removed only while the authorized elevator personnel are to perform work in the immediate area of the unprotected opening. Authorized elevator personnel shall re-install all barriers as required to maintain the original solid and safe protection to the opening prior to leaving immediate work area of the opening.

Part 1.11 PROJECT CONDITIONS

- A) **Prohibited Use:** Elevator that is turned over to the Contractor for modernization work shall not be used for any purpose during the construction period before Substantial Completion. The elevator will only be turned over to the Owner upon completion of all modernization work, including successful completion of all required inspections and tests including acceptance by Consultant.
- B) **Painting:**

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- 1) For all painting performed the requirements of Part 1.06 Painting shall be complied with as required.

Part 1.12 WARRANTY

- A) **Warranty:** The Contractor's acceptance is conditional on the understanding that their warranty covers defective material and workmanship.
- 1) The guarantee period shall extend to one (1) year from the date of completion or acceptance thereof by beneficial use; whichever is earlier, of each elevator.
 - 2) The guarantee excludes ordinary wear and tear or improper use, vandalism, abuse, misuse, or neglect or any other causes beyond the control of the Contractor and this express warranty is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
 - 3) Any defective condition or workmanship not mutually agreeable as satisfactory to building Owner and Contractor shall be determined by the independent elevator Consultant as final for the replacement, repair or continued use or product or part in question.
 - 4) In addition to Contractor's above-mentioned warranties, Contractor shall, for the benefit of the Owner, obtain and assign to Owner if necessary, warranties from the manufacturers, producers and suppliers whose products are incorporated into or used in the work performed hereunder. All work and materials provided pursuant to the warranties hereunder shall be performed at no charge to the Owner.
- B) **Warranty Response Time:** Contractor shall respond to warranty calls within one hour and be on site within 2 hours.

Part 1.13 CONTRACT PREVENTIVE MAINTENANCE

- A) **Existing Elevator Maintenance Agreement:** Existing maintenance contract will continue for this elevator but will be held in abeyance for the warranty/maintenance period. There will be no follow-on maintenance contract awarded for any elevator scheduled for modernization under this specification. Upon the conclusion of each elevator warranty/maintenance period the current Elevator Maintenance Contractor for the University of Florida will resume normal maintenance on each elevator.
- 1) The elevator modernization contractor will assume maintenance on all elevator(s) that are the subject of this modernization specification once on-site modernization work commences on the elevator.
 - 2) Elevator taken out of service for modernization will not be billed for maintenance during any time the elevator is under modernization.
 - 3) Once the elevator is turned over for substantial use of the owner after modernization, no additional maintenance charges will be due for the elevator until after the maintenance period detailed in Contract Preventive Maintenance section herein subpart C), Modernization Maintenance Period as detailed below has ended.
- B) **Modernization Maintenance Period:** Maintenance service consisting of a minimum of monthly examinations, adjustments and lubrication of the elevator equipment shall be provided

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by the Elevator Contractor for a period of twelve (12) months after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the Elevator Contractor. All work shall be performed by competent employees during regular working hours of regular working days and shall include emergency 24-hour callback service at no additional charge. This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the Elevator Contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.

- 1) Elevator Contractor shall provide a service manual for each elevator describing monthly, quarterly and annual maintenance tasks. Each task shall include an area for signature by a Certified Elevator Technician upon completion of task. Service manual shall also include page/s for documenting all required inspections and tests. Service manual shall contain a section to record all related maintenance, repair and replacement information in accordance with ASME A17.1 Safety Code for Elevators and Escalators, Part 8.6 and remain on site.
- 2) Elevator Contractor shall provide monthly maintenance to all elevators that are the subject of this modernization contract starting at the time the elevator is turned over for modernization and shall continue for a 12-month period upon the completion of each elevator modernization. The Elevator Contractor shall provide one (1) hour per month dedicated to maintenance of this elevator.
- 3) The "per month" time is to be dedicated to ongoing comprehensive P.M. service with the goal to reduce unit shutdowns and to extend the useful life of the equipment.
- 4) The "per month" time shall not include call back times required for correction of calls placed with the elevator Contractor to correct operational issues with elevator.
- 5) Elevator Contractor shall provide documentation and shall perform monthly testing of fire service recall operation as per ASME A17.1 Safety Code for Elevators and Escalators and ASME A17.2.
- 6) Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Manufacturer of original equipment shall produce parts.
- 7) Manufacturer shall have a service office and full-time service personnel within 50-mile radius of the project site.
- 8) Maintenance service shall include all required tests for inspection services as required by Florida Elevator Bureau and ASME A17.1 Safety Code for Elevators and Escalators.
- 9) Elevator taken out of service for modernization will not be billed for maintenance during any time the elevator is under modernization.

Part 2 PRODUCTS

Part 2.01 ACCEPTABLE MANUFACTURER

- A) Only products and components produced or provided by manufacturer(s) regularly engaged in the manufacture of elevator products, and that complies with ASME A17.1 Safety Code for Elevators and Escalators in its entirety, ASME A17.2, Florida Statutes, Chapter 399, Florida

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Administrative Code 61C-5, all applicable sections of the Florida Building Code in its entirety, and additional requirements specified herein are acceptable. Only Bidders deemed qualified shall be notified by Request for Bid.

Part 2.02 MATERIALS, GENERAL

A) Colors, Patterns, and Finishes: As selected by the Owner or Owner's Representative from manufacturer's full range of standard colors, patterns, and finishes.

1) Steel:

- a) Shapes and bars: ASTM A 36.
- b) Sheet: ASTM A 366, cold-rolled steel sheet, commercial quality, Class 1, matte finish, stretcher leveled.
- c) Finish: Factory-applied baked or powder coated enamel.

2) Stainless Steel:

- a) Shapes and bars: ASTM A 276, Type 300 (18-8).
- b) Tubing: ASTM A 269, Type 300 (18-8).

Part 2.03 EQUIPMENT: MACHINE ROOM/SPACE COMPONENTS

A) Geared Drive Machine: Elevator Drive Motor shall be replaced with new VVVF AC Motor and Geared Drive Machine shall be retained and reutilized with refurbishment performed as follows:

1) **Hoisting Motor & Drive:** Install new Hoisting Motor and Drive:

a) **Drive:** Provide Variable Voltage Variable Frequency (VVVF) type.

(1) Hoist Motor: Standard, open drip proof AC motor. Motor armature shall be dynamically balanced and supported by ball bearings of ample capacity. New Hoisting Machine Motor, Imperial or equal, will be provided and will be specifically designed and rated for elevator duty with high starting torque and low starting current. The new motor will be fitted to the drive machine, adjusted, and aligned to run smooth and free of excessive vibration.

(2) The flux vector drive shall be capable of producing full torque at zero speed and shall not require DC injection braking in order to control the stopping of the car. The drive shall use a three-phase, full-wave bridge rectifier and capacitor bank to provide a DC voltage bus for the solid-state inverter.

b) The drive shall use power semiconductor devices and pulse width modulation, with a carrier frequency of not less than 2 kHz, to synthesize the three-phase, variable voltage variable frequency output to operate the hoist motor in an essentially synchronous mode. The drive shall have the capability of being adjusted or programmed to achieve the required motor voltage, current and frequency, in order to properly match the characteristics of the AC elevator hoist motor.

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- c) The drive shall not create excessive audible noise in the elevator motor. The drive shall be a heavy-duty type, capable of delivering sufficient current required to accelerate the elevator to contract speed with rated load. The drive shall provide speed regulation appropriate to the motor type.
- d) For non-regenerative drives, a means shall be provided for removing regenerated power from the drive's DC power supply during dynamic braking. This power shall be dissipated in a resistor bank, which is an integral part of the controller. Failure of the system to remove the regenerated power shall cause the drive's output to be removed from the hoist motor.
- e) A contactor shall be used to disconnect the hoist motor from the output of the drive unit each time the elevator stops. This contactor shall be monitored, and the elevator shall not start again if the contactor has not returned to the de-energized position when the elevator stops.
- f) An electro-mechanical switch shall open all power feed lines to the brake. A single ground, short circuit or solid-state control failure shall not prevent the application of the brake. The controller shall provide step less acceleration and deceleration and provide smooth operation at all speeds. The power control shall be arranged to continuously monitor the performance of the elevator in such a way that if the car speed exceeds 150 fpm during access, inspection or leveling, the car shall shut down immediately, requiring a reset operation.
- g) Existing coupling and bushing attaching motor to drive machine shall be replaced with a new coupling and bushing assembly.

B) Traction Machine: Existing geared traction machine will be reutilized.

- 1) The existing Hoisting Machines will be retained, repainted and reused in place with repairs as specified below.
- 2) Thrust bearings and worm shaft bearings shall be replaced with new bearing assemblies.
- 3) All other Hoisting Machine bearings and gears will be checked with notice to Consultant if any problems are found.
- 4) All Hoisting Machine seals and gaskets shall be replaced with new seals and gaskets.
- 5) The Gear Case Oil Reservoirs will be drained, thoroughly flushed, cleaned and refilled with new, high grade, high quality lubricant.
- 6) The entire Machine Assemblies will be adjusted, thoroughly cleaned and finish painted. Paint will be standard top-quality durable enamel.

C) Brake Assembly: Existing brake shall be retained, disassembled, cleaned and inspected with all brake pins being removed, polished and properly lubricated before re-assembling.

- 1) The brake assembly will be rebuilt with new components as necessary to provide a like new condition.
- 2) Install new brake shoes and properly adjust for smooth and quiet operation.

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- D) Emergency Brake Assembly:** An emergency brake assembly, “RopeGripper” as manufactured by Hollister Whitney shall be installed as per the requirements of ASME A17.1 to provide protection against car overspeed and unintended car movement.
- 1) Modification to existing machine beam, if required, to accommodate installation of RopeGripper shall be verified and the sole responsibility of the Elevator Contractor.
 - 2) The preferred method to mount a rope gripper assembly is to through bolt to the existing bed plate or machine beams.
 - 3) All bolts used in the mounting of the Rope Gripper shall be minimum Grade 5 bolt.
 - 4) Rope gripper assembly shall be located either in machine room. Pump assembly, if provided, shall be located in machine room adjacent to elevator drive machine.
- E) Counterweight:** With existing counterweights, counterbalance each elevator for smooth and economical operation by cast iron or steel plate weights contained in a structural steel frame. Counterweight shall equal a complete elevator car and approximately 40 percent of the specified load. If additional weights are required, Contractor shall provide and adjust for proper balance as a part of this specification and contract.
- F) Sheaves and Cable Guards:** Existing primary and secondary drive sheaves shall be retained and reutilized. New cable guards shall be provided as required by ASME A17.1.
- G) Suspension Ropes:**
- 1) Suspension ropes shall be retained and reutilized.
 - a) All suspension means shall be adjusted and installed with alternating shackle rod length so that shackles do not make contact and include anti-rotation devices.
 - b) Load-carrying rope must be vertically in line with shackle rod.
 - c) All required labels shall be affixed after installation.
 - d) All ropes are to be tensioned equally.
- H) Suspension Ropes:** Existing suspension ropes will be retained and reutilized with work completed for cleaning and lubrication as described in this specification. All required labels shall be affixed after properly filled in with applicable data.
- 1) **Cleaning of Suspension Ropes:** The suspension ropes shall be cleaned prior to rope lubrication being applied to the ropes.
 - e) Solvents shall not be used to clean suspension ropes.
 - f) Suspension ropes shall have a brush type cleaning device installed to allow the elevator car to run for a period of time to ensure that the ropes have been properly cleaned of all debris and build-up on the surfaces of the ropes.
 - g) All shackle rods shall be cleaned of rust and properly protected from rusting.
 - 2) **Lubrication of Suspension Ropes:** Suspension ropes shall be lubricated as detailed below:
 - a) Automatic rope lubricators shall be installed.

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- b) Lubricators shall be provided with lubricant compatible with the strand and core lubricants and have good rope penetrating properties as determined by the rope manufacturer.
 - c) Lubricant meeting these requirements is a light viscosity Spindle oil. It should have a Saybolt Seconds Universal (SSU) viscosity of 34 to 38 seconds at 210° F. Spindle oil lubricates and will also assist in keeping the hoist ropes clean. Spindle oil is best applied with a felt pad, wick-type lubricator.
 - d) After installing rope lubricators, the level of lubrication shall be monitored to ensure correct amount of lubrication is applied. To verify correct amount of lubrication, check for a film of lubricant in the drive sheave grooves. With the machine out of service, carefully wipe the groove. If the groove is dry, field lubrication is required.
 - e) The frequency of additional rope cleaning and lubrication shall be determined by the Elevator Maintenance Contractor.
- 3) **Rope Tensioning:** All ropes are to be tensioned equally.
- a) Suspension members are considered to be equally tensioned when the smallest tension measured is within 10% of the highest tension measured. Equal tension shall be maintained between individual suspension members in each set.
 - b) Written results of the measurement of the tension of all suspension members for traction elevator shall be provided and maintained in the elevator machine room as permanent records that are considered the property of the Owner.
- I) **Load Weighing Devices:** Draka Micelect Model # LW-ILC3-MSTD or approved EMCO equal load weighing device for 1:1 roping shall be installed to provide signals to the controller for various load monitoring and dispatching operations.
- J) **Centrifugal Speed Governor:** The centrifugal speed governor and tension sheave shall be replaced with a new governor assembly and tension sheave as required to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed. Governor as manufactured by Hollister Whitney or equal.
- 1) Speed-Governor Marking Plate shall be a metal plate securely attached to the speed governor and marked in a legible and permanent manner with letters and figures not less than 6 mm (0.25 inch) in height indicating all A17.1 code information.
- K) **Governor Rope:** Provide and install new governor rope as follows:
- a) Replace governor rope with traction steel ropes of size and number to ensure proper wearing qualities, consisting of at least six strands wound around a hemp core center.
 - b) All required labels shall be affixed after installation.
- L) **Elevator Controller:** The Elevator control system shall be Motion Control Engineering Controller Model Motion 4000, GAL Galaxy, Smartrise SRA AC, Elevator Controls Model V900 AC or preapproved equal. Provide above manufacturer's standard microprocessor operation system for each elevator as required to provide type of operation system indicated. The elevator controller shall use a microprocessor based logic system and shall be ASME A17.1 compliant including all applicable elevator and electrical safety codes to include the following:

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- 1) All power feed lines to the brake shall be opened by an electro-mechanical switch. A single ground, short circuit or solid-state control failure shall not prevent application of the brake.
- 2) The automatic leveling zone shall not extend more than 6 inches (152.4 mm) above or below the landing level, nor shall the doors begin to open until the car is within 6 inches (152.4 mm) of the landing. In addition, the inner leveling zone shall not extend more than 3 inches (76.2 mm) above or below the landing. The car shall not move if it stops outside the inner leveling zone unless the doors are fully closed and locked.
- 3) The system shall use an automatic two-way leveling device to control the leveling of the car to within 0.25 inches (6.35 mm) or better above or below the landing sill. Overtravel, undertravel or rope stretch must be compensated for and the car brought level to the landing sill.
- 4) The closed loop feedback power control shall be arranged to continuously monitor the actual elevator speed signal from the velocity transducer and compare it with the intended speed signal to verify proper and safe operation of the elevator.
- 5) During operation of the elevator with an overhauling load (empty car up or loaded car down), precision speed control shall be obtained by the regulation system used in the power control. The power control shall have the capability to maintain regulation under varying loads.
- 6) The controller shall provide stepless acceleration and deceleration and smooth operation at all speeds. The system shall provide the required electrical operation of the elevator control system including automatic application of the brake, which shall bring the car to rest in the event of a power failure.
- 7) The controller shall include absolute floor encoding which, upon power up, shall move the car to the closest floor to identify the position of the elevator. With absolute floor encoding it is not necessary to travel to a terminal to establish floor position.
- 8) The controller shall use a variable voltage, variable frequency drive to control three-phase AC induction and Permanent Magnet AC motors.
- 9) The drive shall use a three-phase, full-wave bridge rectifier and capacitor bank to provide a DC voltage bus for the solid-state inverter.
- 10) The drive shall use power semiconductor devices and pulse width modulation with a carrier frequency of not less than 8 kHz to synthesize the three-phase, variable voltage, variable frequency output to operate the hoist motor in an essentially synchronous mode.
- 11) The drive shall have the capability of being adjusted or programmed to achieve the required motor voltage, current and frequency to properly match the characteristics of the AC elevator hoist motor.
- 12) The drive shall not create excessive audible noise in the elevator motor.
- 13) The drive shall be a heavy-duty type, capable of delivering sufficient current to accelerate the elevator to contract speed with rated load. The drive shall provide speed regulation appropriate to the motor type.
- 14) A means shall be provided for removing regenerated power from the drive DC power supply during dynamic braking. This power shall be dissipated in a resistor bank which is

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an integral part of the controller. Failure of the system to remove the regenerated power shall cause drive output to be removed from the hoist motor.

- 15) A contactor shall be used to disconnect the hoist motor from the output of the drive unit each time the elevator stops. This contactor shall be monitored. The elevator shall not start again if the contactor has not returned to the de-energized position when the elevator stops.
- 16) All power feed lines to the brake shall be opened by an electro-mechanical switch. A single ground, short circuit or solid-state control failure shall not prevent application of the brake.
- 17) The controller shall provide stepless acceleration and deceleration and smooth operation at all speeds.
- 18) The controls shall be arranged to continuously monitor the performance of the elevator so that, if car speed exceeds 150 fpm during access, inspection, or leveling, the car shall shut down immediately, requiring a reset operation.
- 19) The controller shall include absolute floor encoding which, upon power up, shall move the car to the closest floor to identify the position of the elevator. With absolute floor encoding it is not necessary to travel to a terminal to establish floor position.
- 20) The controller shall have an RFI Filter to reduce EMI and RFI noise.
- 21) Failure of the brake to lift as detected by a mechanical switch (if provided) shall cause the control system to take the elevator out of service at the next stop where it shall remain out of service until the condition is corrected.
- 22) Hoistway Equipment Minimization:
 - a) The control system shall allow slowdown, emergency terminal, and hoistway access limit switches to be eliminated. These switches shall exist as virtual switches in system software.
 - b) The control system shall allow leveling magnets and/or vanes to be eliminated.
- 23) Programmable Logic:
 - a) All available programming options or parameters shall be field programmable, without need for any external device or knowledge of any programming languages. Programmable options and parameters shall be stored in nonvolatile memory. At a minimum, there shall be a 32-character alphanumeric display used for programming and diagnostics. Programmable parameters and options shall include, but are not limited to, the following:
 - (1) Number of Stops/Openings Served (Each Car)
 - (2) Selective Collective
 - (3) Programmable Fire Code Options/Fire Floors (Main, Alternates)
 - (4) Floor Encoding (Absolute PI)
 - (5) Digital Position Indicators/Single Wire Position Indicators
 - (6) Programmable CE Microcom floor labels
 - (7) Programmable Door Times

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- (8) Programmable Motor Limit Timer
- (9) Programmable Car Fan and Light Timer
- (10) Door Nudging, Automatic and Fire Operation
- (11) Parking Floor
- (12) Lobby Floor
- (13) Hall or Car Gong Selection
- (14) Standard Security
- (15) Anti-nuisance - Light Load Weighing and Photo Eye
- (16) Load Weighing for Light, Heavy and Overload Car
- (17) High Speed Inspection Enable
- (18) Door behavior selections
- (19) Door type selection
- (20) Fault Bypass – Inspection Operation
- (21) Fault Bypass – Automatic Operation

24) ADA Requirements:

- a) The elevator shall comply with ICC/ANSI A117.1, the American National Standard for Accessible and Usable Buildings and Facilities and the IBC, Chapter 11.
- b) Leveling Accuracy: The controller shall have a self-leveling feature that shall automatically bring the car to floor landings within a tolerance of 0.25 inches (6.35 mm) or better under all loading conditions up to the rated load.
- c) Leveling Accuracy: The controller shall have a self-leveling feature that shall automatically bring the car to floor landings within a tolerance of 0.25 inches (6.35 mm) or better under all loading conditions up to the rated load.
- d) Hall Lanterns: The controller shall have outputs to drive the visible and audible signals that are required at each hoistway entrance to indicate which elevator car is answering a call. Audible signals shall sound once for up, twice for down. (In-car lanterns located in cars, visible from the vicinity of hall call buttons, and conforming to the above requirements, shall be acceptable.)
- e) Car Position Indicators: The controller shall have a position indicator output to drive the required position indicator which shall indicate the corresponding floor numbers as the car passes or stops at a floor. An audible signal shall sound as the position indicator changes floors.
- f) Voice Annunciation: The controller shall have a voice annunciator output to facilitate announcement of car direction and floor number..

25) Environmental Considerations:

- a) The elevator control shall be capable of operating within the following environmental conditions:

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- (1) Ambient temperature: 32°F to 104°F (0°C degrees to 40°C degrees).
- (2) Humidity: Non-condensing up to 95%
- (3) Altitude: Up to 7,500 feet (2286 m)

26) Building and System Configuration:

- a) The elevator controller shall be microprocessor based and designed specifically for elevator applications. Elevator and drive logic shall be implemented independently of safety functions.
- b) Elevator logic shall be implemented to facilitate tight coordination between subsystems and enhance reliability. The implementation shall utilize a real-time, multi-tasking operating system to allow the processors to simultaneously execute elevator control logic, drive control logic, operator interface logic, and communication support.
- c) The elevator controller shall have an independent safety system in order to implement safety features required by ASME A17.1 code. The safety system shall incorporate check redundant, multi-processor, multi-path, solid-state, ASME compliant implementation that meets CSA and CE standards.
- d) The elevator controller shall be configured and packaged in such a way that external “jumpers” cannot be used (intentionally or unintentionally) while the elevator is running in any passenger mode of operation. Non-passenger modes of operation shall be provided, along with means to bypass safety functionality, to allow inspection testing and other setup and/or troubleshooting operations.
- e) The elevator control logic configuration shall be fully field programmable. Changes in number of floors, I/O configuration, starter setup, eligibility etc. shall not require the replacement/reprogramming of EEPROMs or other storage devices. Further, changes in the controller configuration shall be user adjustable in the field.

27) Diagnostics:

- a) The control system shall provide comprehensive means of accessing the computer memory for elevator diagnostic purposes. It shall have permanent indicators for important elevator status conditions as an integral part of the controller.
- b) The microprocessor boards shall be equipped with on-board diagnostics for ease of troubleshooting and field programmability of specific control variables. Field changes shall be stored permanently, using nonvolatile memory. The microprocessor board shall provide the features listed below:
 - (1) On-board diagnostic switches and an alphanumeric display to provide user friendly interaction between the mechanic and the controller.
 - (2) An on-board event log shall store and display time-stamped events for diagnostic purposes. (Viewable only with monitoring software.)
 - (3) An on-board real-time clock shall display the time and date and be adjustable by means of on-board switches.
 - (4) Field programmability of specific timer values (i.e., door times, etc.) may be viewed and/or altered through on-board switches and pushbuttons.

- (5) The elevator controller shall have extensive diagnostic capability. A built-in LCD display or equivalent shall allow access to major user functions and diagnostic features. The display shall be a multi-character, multi-line type with associated keypad to allow users to enter information. The display shall show data and menus in readily understood character format. No numeric, hexadecimal, or binary codes are acceptable.
- (6) Dedicated indicators shall be provided in a conspicuous location on the elevator controller to indicate important system statuses, such as when the safety string is made, when the door locks are made, when the elevator is on Inspection/Access, etc. In addition, other special or error conditions detected by the main processor or safety subsystem shall be displayed.

28) CAN Bus Connectivity:

- a) Circuit boards within the controller shall communicate through CAN Bus connections for reliable performance and simplified board replacement. Power for individual circuit boards shall also be distributed through the CAN Bus connection. Communication and power connection shall radiate from a central, multi-connection point such that single-point board failure shall not affect operation of other boards.

29) Universal I/O:

- a) Field I/O boards shall be universal in that 24V to 120V AC or DC connections shall be accepted without requirement for unique circuit boards for each. I/O boards shall provide built-in current limiting protection.

30) Intended Operation of Critical Components:

- a) Failure of any single magnetically operated switch, contactor, or relay to release in the intended manner; the failure of any static control device, speed measuring circuit, or speed pattern generating circuit to operate as intended; the occurrence of a single accidental ground or short circuit shall not permit the car to start or run if any hoistway door or gate interlock is unlocked or if any hoistway door or car door or gate contact is not in the made position. Furthermore, while on car top inspection or hoistway access operation, failure of any single magnetically operated switch, contactor or relay to release in the intended manner, failure of any static control device to operate as intended or the occurrence of a single accidental ground, shall not permit the car to move even with the hoistway door locks and car door contacts in the closed or made position.

31) Status Indicators:

- a) Dedicated permanent status indicators shall be provided on the controller to indicate when the safety string is made, when the door locks are made, when the elevator is operating at high speed, when the elevator is on independent service, when the elevator is on Inspection or Access, when the elevator is on fire service, when the elevator out of service timer has elapsed, and when the elevator has failed to successfully complete its intended movement. A means shall be provided to display other special or error conditions detected by the microprocessor.
- b) Every field connection input or output shall have a dedicated LED such that no volt

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meter or other test equipment is required to see when and input or output is active.

32) Parking Floor Function:

- a) Parking Floor: Elevator car shall be capable of parking on a designated floor after a predetermined time period. Any landing may be the parking floor. The car will go to the parking floor when it is free of call demand. A Parking Delay Timer will cause a free car to wait for a short time before parking. The timer shall be adjustable, with a value between 0.0 minutes (no delay) and 6.0 minutes.

33) Out of Service Timer

- a) An out of service timer (T. O. S.) shall be provided to take the car out of service if the car is delayed in leaving the landing while calls exist in the system.

34) Programmable Car Fan and Light Timer:

- a) Controls shall be provided that will de-energize ventilation fans and lighting systems when the elevator is stopped, unoccupied and with its doors closed for over 15 minutes.

35) High or Low Speed Inspection

- a) A selection shall be provided on the controller to select high or low speed during access or inspection operation as long as contract speed does not exceed 150 feet per minute.

36) Door Operation

- a) Door protection timers shall be provided for both opening and closing directions to protect the door motor and help prevent the car from getting stuck at a landing. The door open protection timer shall cease attempting to open the door after a predetermined time if the doors are prevented from reaching the open position. In the event that the door closing attempt fails to make up the door locks after a predetermined time, the door close protection timer shall reopen the doors for a short time. If, after a predetermined number of attempts, the doors cannot successfully be closed, the doors shall be opened, and the car removed from service.
- b) A minimum of four different door standing open times shall be provided. A car call time value shall predominate when only a car call is canceled. A hall call time value shall predominate whenever a hall call is canceled. In the event of a door reopen caused by the safety edge, photo eye, etc., a separate short door time value shall predominate. A separate door standing open time shall be available for lobby return.
- c) If the doors are prevented from closing for longer than a predetermined time, door nudging operation shall cause the doors to move at slow speed in the closed direction. A buzzer shall sound during nudging operation.

37) Door Pre-opening

- a) When selected, this option shall start to open the doors when the car is in final leveling, 3" (76.2 mm) from the floor. If pre-opening is not selected, the doors shall remain closed until the car is at the floor, at which time the doors shall commence opening.

38) Car and Hall Call Registration

- a) Car and hall call registration and lamp acknowledgment shall be by means of a single wire per call, in addition to the ground and the power bus. Systems that register the call

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with one wire and light the call acknowledgment lamp with a separate wire can be accommodated.

- b) The user shall be able to register car calls via the on-board LCD display and keypad.

39) Fire Service Operation

- a) Fire Phase I emergency recall operation, alternate level Phase I emergency recall operation and Phase II emergency in-car operation shall be provided according to latest applicable edition of ASME A17.1 and current Florida Statute 399 including Florida Regional Fire Service Key.

40) Independent Service

- a) Independent service operation shall be provided in such a way that actuation of a key switch in the car operating panel will cancel any existing car calls, and hold the doors open at the landing. The car will then respond only to car calls. Car and hoistway doors will only close with constant pressure on a car call pushbutton or door close button. While on independent service, hall arrival lanterns or jamb mounted arrival lanterns shall be inoperative.

41) Integral Voice Annunciation

- b) The controller shall include, as an integral part of the controller, a computer voice annunciator. The contractor shall only need to furnish wiring to the elevator cab and a speaker. The annunciator shall announce the floor number and the intended direction of travel.

42) Leveling

- a) The car shall be equipped with two-way leveling to automatically bring the car level at any landing, within the required range of leveling accuracy, with any load up to full load.

43) Test Switch

- a) A controller test switch shall be provided. In the test position, this switch shall allow independent operation of the elevator with the door open function deactivated for purposes of adjusting or testing the elevator. The elevator shall not respond to hall calls and shall not interfere with any other car in a duplex or group installation.

44) Inspection

- a) To enhance safety, an inspection switch, enable switch, and an up/down toggle switch shall be provided in the controller and on the car top to place the elevator on inspection operation and allow the user to move the car. Activation of the car top inspection switch shall render the controller inspection switch inoperative.

45) Uncanceled Call Bypass

- a) A timer shall be provided to limit the amount of time a car is held at a floor due to a defective hall call or car call, including stuck pushbuttons. Call demand at another floor shall cause the car, after a predetermined time, to ignore the defective call and continue to provide service in the building.

46) Anti-nuisance (Photo Eye)

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- a) The controller shall cancel all remaining car calls, if a user-determined number of car calls are answered without the computer detecting a change in the photo eye input (indicating that no one is passing through the car door).

47) Load Weighers

- a) Load weighing devices shall be installed to provide signals to the controller for various load monitoring and dispatching operations.
- b) By identifying the load (light, heavy or overload), the system can activate anti-nuisance car call cancellation, loaded car hall call bypass, or overload.

48) Absolute Floor Encoding

- a) The controller shall include absolute floor encoding, which upon power up, shall move the car to the closest floor to identify the position of the elevator.

49) Landing/Positioning System Information

- a) The landing/positioning system shall use a Gray code, magnetically permanent encoded tape and two, independent sensor heads in a single housing for absolute position control under all powered conditions. The tape shall provide a unique code for every 1mm of travel. A third, independent system shall provide speed feedback directly from the hoist motor. The system shall continuously compare inputs from the three independent systems to assure accuracy and safety.

50) Service Enhancements

- a) The manufacturer shall make software updates for controller and/or group control available via Internet download, email attachment, or physical EEPROM shipment. Internet downloads and email attachment deliveries require an optional, hand-held user interface to facilitate software transfer from the user's PC to the elevator or group.

51) Hand-held User Interface

- a) A hand-held user interface with all the functionality of the on-board LCD display and keypad shall be available. The hand-held interface shall allow the user system access via any system CAN Bus connection in the controller, from the car top, or in the car (if a CAN connection has been made available here).
- b) The hand-held interface shall connect to a standard PC, allowing system software updates to be delivered to the PC via Internet download or email attachment, transferred to the hand-held and uploaded to the elevator or group controller.

Part 2.04 EQUIPMENT: HOISTWAY

A) Platform:

- 1) **SN# 24282 (Basic Science 206-25):** Existing frame shall be retained.
 - a) Repair damaged platform located at the entrance side of elevator cab by removing diamond plate decking, cutting back and replacing damaged plywood with new marine grade plywood, replacing any damaged support members under the platform and

preparing the platform floor for installation of new flooring in conformance with Part 2.06 Car Components section of this specification.

- b) Underside of the platform shall be verified and maintained structurally sound and fireproof by the Contractor.
- 2) **SN# 24281 (Basic Science 206-26):** Existing frame shall be retained. Underside of the platform shall be verified and maintained structurally sound and fireproof by the Contractor.

B) Platform Guards:

- 1) Existing platform guards (aprons) shall be verified as having a straight vertical face, extending below the floor surface of the platform no less than 1 220 mm (48). If platform guard is not compliant with the 48-inch requirement it shall be removed and replaced as detailed below.
 - 2) New Platform Guards (Aprons) shall be installed. The entrance side of the platform of each elevator shall be provided with a smooth metal guard plate of not less than 1.5 mm (0.059 inch) thick steel, or material of equivalent strength and stiffness, adequately reinforced and braced to the car platform. The guard plate shall extend not less than the full width of the widest hoistway door opening. The guard plate shall have a straight vertical face, extending below the floor surface of the platform no less than 1 220 mm (48 inch).
- C) **Sling:** Existing steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure shall be retained.
- D) **Guide Rails:** Retain and reutilize with no alterations. Elevators with roller guides shall have the guide rails thoroughly cleaned and retained dry without lubrication. Existing car guide rails shall be verified as properly fastened to the building with steel brackets verified in alignment, secure to wall and brackets with surface planed smooth. Existing car guide rails shall be cleaned and aligned as necessary for the proper performance of the elevator.

E) Roller Type Guides:

- 1) **Elevator Car:** Roller type guides on top and bottom of cars shall have the existing roller guide wheels replaced with new OEM roller guide wheels. Roller guide assemblies will be required to be disassembled and all shoulder bolts removed and inspected. All shoulder bolts must be cleaned, polished, lubricated and reassembled to provide as new operation of the roller guide assemblies.
 - 2) **Counterweight Assembly:** Counterweight frame assembly shall have the existing roller guide wheels replaced with new OEM roller guide wheels, all pivot points lubricated and properly adjusted provide as new operation of the roller guide assemblies. Roller guide assemblies will be required to be disassembled and all shoulder bolts removed and inspected. All shoulder bolts must be cleaned, polished, lubricated and reassembled to provide as new operation of the roller guide assemblies.
- F) **Car Top Guard Railing:** A standard railing conforming to ASME A17.1 shall be provided on the outside perimeter of the car enclosure top on all sides where the perpendicular distance between the edges of the car enclosure top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance and on sides where there is no hoistway enclosure.

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- 1) If clearances require the standard railing to be located more than 100 mm (4 in.) from the edge of the outside perimeter of the car enclosure top, the top of the car enclosure outside of the railing shall be clearly marked.
 - 2) The marking shall consist of alternating 100 mm (4 in.) diagonal red and white stripes. The forces specified in ASME A17.1 shall not deflect the railing beyond the perimeter of the car top.
- G) **Buffers:** Retain existing buffers. Buffer data plates shall be maintained or replaced for compliance with ASME A17.1 Safety Code for Elevators and Escalators. All buffers shall be cleaned and painted. Verify the spring buffer(s) comply with the stroke and load requirements of the ASME A17.1 Safety Code for Elevators and Escalators. Buffer data plates shall be maintained or replaced for compliance with ASME A17.1 Safety Code for Elevators and Escalators.
- H) **Automatic Terminal Limits:** Replace Automatic slow down and final limit switches. Place electric limit switches in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current, slow down and stop the car if it runs beyond either terminal landing.
- I) **Automatic Self-Leveling:** Provide elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over-travel or under-travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained level to less than ¼ inch with the landing irrespective of its load.
- J) **Traveling Cable:** Existing traveling cable shall be removed and replaced with new traveling cable.
- 1) Traveling cable shall terminate at numbered terminal blocks in car and machine room.
 - 2) Traveling cable shall be provided with a separate shielded circuit for communication system and hang to obtain proper size of loop. Traveling cable outer covering will be of fire resistant and meet UL standard testing.
 - 3) Traveling cable will be hung free of all contact from hoistway or car equipment and shall be provided with 10 percent spare conductors for each car.
- K) **Hoistway & Machine Room Wiring:** Provide all new wiring throughout the elevator machine room and hoistway, adequately sized and constructed for the proper operation of the equipment.
- 1) Multi-conductor type wiring for light and signal circuits shall be used in the elevator hoistway. All conductors will be copper and the minimum size of conductors, excluding those which form an integral part of control devices, shall be No. 14 for lighting circuits and No. 18 for operating, control and signal circuits. All wiring will be installed in accordance with applicable NEC and latest applicable edition of ASME A17.1 codes. Hoistway door interlock wiring will be replaced with new SF-2 high heat resistance wiring and shall include a grounding conductor. All other new wiring will have flame retarding and moisture resistant outer covering.
 - 2) Equipment grounding shall be provided. The equipment grounding conductor shall be run with the circuit conductors and shall be a copper conductor. Ground all conductors, supports, controller enclosure, and other non-current conducting metal enclosures for

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- electrical equipment in accordance with NEC. The ground wires shall be solid or stranded; insulated, covered, or bare copper, sized as required by NEC, and shall be colored green if #6 AWG or smaller, and have green tape or adhesive marking if #4 AWG or larger.
- 3) Retain and reutilize to the maximum extent possible all ducts and conduit in machine room and hoistway. Install new ducts and conduit as required.
 - 4) Hoistway travel cable and associated wiring shall be coordinated with controller manufacture for wiring configuration requirements to match all controller wiring color coded and numbered diagrams for installation.
- L) **Pit Stop Switch:** Provide new pit stop switch as required by latest applicable edition of ASME A17.1 code.
- M) **Pit Light:** Pit lighting to be verified by Electrical Contractor as meeting minimum 10 ft-c requirement or additional pit lighting will be installed by electrical contractor as detailed in the Electrical Requirements section of this specification.
- N) **Pit & Hoistway Cleanup:** The hoistway surfaces and pit area shall be thoroughly cleaned to remove all excessive dust and debris from hoistway surfaces and pit area with proper disposal from property of all waste products from work under this specification.
- O) **Pit Ladder:** Verify that pit ladder is compliant with current edition of A17.1 Safety Code for Elevators and Escalators. If compliant, retain and reutilize existing pit ladder. If pit ladder is not in compliance with current A17.1 code, provide new pit ladder as required by latest applicable edition of ASME A17.1 code.
- 1) Pit ladder shall be positioned so that means to unlock the access door from inside the pit shall be located not more than 1 825 mm (72 in.) vertically above a rung, cleat, or step. The minimum distance from the top rung, cleat, or step to the top of the pit ladder or handhold shall not be less than 1 200 mm (48 in.). With the door in the closed position, in a plane not more than 1 000 mm (39 in.) horizontally from a rung, cleat, or step of the pit ladder.
- P) **Hoistway Door Equipment:**
- 1) **Hoistway Entrances:** Existing hoistway entrance assembly consisting of the elevator entrance frame, head jamb, strike jamb door panel and door sills shall be retained and reutilized. Verify and adjust as required to maintain all door gaps less than 3/8 inch in accordance with latest applicable edition of ASME A17.1 code.
 - 2) **Hoistway Entrance Assembly Refinishing:** Existing hoistway entrance assemblies consisting of the elevator entrance frame, head jamb, strike jamb & door panel shall have scratches removed, cleaned, reconditioned and refinish the damaged stainless-steel elevator hoistway entrance assemblies.
 - a) All the stainless-steel elevator hoistway entrance assembly surfaces to look new, bright, shiny (#4 brushed finish) and be free of rust, scratches and graffiti.
 - 3) **Hoistway Doors:** Existing hoistway shall be retained and reutilized.
 - a) Refurbish as required and replace all parts necessary to deliver doors in as new condition. Verify and adjust as required to maintain all door gaps less than 3/8 inch in accordance with latest applicable edition of ASME A17.1 code.

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- b) Hoistway doors that cannot be adjusted to maintain the door gaps to less than 3/8 inch shall be replaced with new door panels. Bidders are cautioned to verify the capability of all hoistway doors to be properly adjusted to maintain code required clearances and gaps as no request for any change order will be approved for this purpose. It is the Elevator Contractors responsibility to verify this prior to submission of a bid on this project.
 - c) Provide hoistway door pick-up assemblies to properly align with new car door clutch.
- 4) **Door Header Assembly:** Retain and reutilize existing hoistway door header assemblies.
- 5) **Hoistway Door Sill and Sill Support:** Retain and reutilize existing hoistway door sill and sill support.
- 6) **Interlocks:** All existing interlocks shall be replaced with new interlocks.
 - a) Equip each hoistway entrance with an approved type interlock (GAL or pre-approved equal) tested as required by code including SF-2 wiring and grounding. Interlock to be GAL Interlock, or pre-approved equal.
 - b) Interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.
- 7) **Hoistway Door Components:** Existing door hangers, door tracks, sheaves and door closers shall be replaced with all new OEM components.
 - a) Existing Hoistway door sheaves, door gibbs including shall be replaced with direct new OEM replacement components for all landings as specified below.
 - (1) Hangers: Provide an adjustable slide to accommodate the up-thrust of the doors.
 - (2) Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
 - (3) Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
 - (4) All hoistway door closers shall be replaced with new closers.
 - (5) Replace all door gibbs with direct OEM replacement door gibbs.
 - b) All missing secondary retainers installed at the bottom of each hoistway door shall be provided with direct OEM secondary retainers in conformance with applicable requirements of A17.1.
 - c) Door Bumpers: Provide and install new rubber door bumpers on new side opening car doors. Bumpers shall be installed at top and bottom of door jambs.
- Q) **Entrance Markings:** Replace all hoistway entrance markings and door jamb plates at each floor.
 - 1) **Jamb Braille:** All elevator hoistway entrances shall have raised and Braille floor designations provided on both jambs. The centerline of the characters shall be 60 in (1525 mm) above finish floor. Entrance jambs shall be marked with new 4" x 4" stainless steel

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- plates having raised floor markings with Braille adjacent. Such characters shall be 2 in (50 mm) high and shall comply with ICC/ANSI A117.1.
- 2) **Main Entry Level:** A raised star shall be provided on both jambs at the main entry level.
 - 3) **Car Identification:** The elevator identification alphanumeric designation shall be a minimum of 75 mm (3 in.) in height, painted on, engraved, or securely attached to the elevator entrance at the designated level.
- R) **Hoistway Floor Numbers:** After painting has been completed, the hoistways shall have floor numbers, not less than 100 mm (4 in.) in height, painted on the hoistway side of the enclosure or hoistway doors.
- S) **Floor Designations:** Floor designations shall be as listed in Elevator System Description, Number of Stops and Openings section of this specification.
- T) **Sight Guards:** Sight guards, if required, to reduce the opening between the leading edge of the hoistway door and the car door to maintain code required clearances, will be finished to match door panels. All existing sight guards will be inspected to ensure structural integrity, proper contour and secure attachment to the hoistway door panels.
- U) **Escutcheon Tubes:** Hoistway doors that do not have escutcheon tubes installed shall have escutcheon holes fitted with new escutcheon tubes to match existing OEM escutcheon tubes
- V) **Door Bumpers:** Provide and install new rubber door bumpers on all hoistway door jambs and on car door jamb. Bumpers shall be installed at top and bottom of door jambs.
- W) **Painting Inside Hoistway:** All painting on this project must be performed in conformance with Part 1.05 of this specification.
- 1) After removal of all old hardware and components for the hoistway as detailed above all existing components shall have all rust thoroughly removed and treated as detailed below.
 - 2) Remove rust, clean, degrease and paint any existing parts or components for a like new condition, including but not limited to the door panel surfaces, door track assemblies and door frame surfaces inside the hoistway.
 - 3) After painting has been completed, the hoistways shall have floor numbers, not less than 100 mm (4 inch) in height, painted on the hoistway side of the enclosure or hoistway doors.

Part 2.05 DOOR OPERATION

- A) **New Door Operator:** Provide elevator with a new complete door operator assembly and clutch assembly. Door operator to be a closed loop motor driven heavy-duty operator GAL MOVFR or pre-approved equal.
- 1) Door operator shall be a closed loop, microprocessor based system. The door operator will facilitate smooth operation under varying environmental influences such as, temperature, wind, friction, and component variation. The processor will monitor the door's actual position and velocity compared to its desired position and velocity. If variations are detected in the profile the command will be automatically corrected. The Closed Loop Door Operator control system shall not require machine room door control equipment.

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- 2) Door operation to comply with A17.1 requirements for Restricted Opening of Hoistway or Car doors of passenger elevator.
 - 3) Door Operator shall be provided with adjustable parameters, at a minimum, for the following:
 - a) Adjustable Parameters in the closing cycle for high speed, final speed, nudging speed, acceleration, deceleration, and slow speed torque.
 - b) Adjustable parameter for stall reversal – automatic reversal if the door meets an obstruction
 - c) Adjustable parameter for door reversal – to accomplish a quick but smooth reversal.
 - 4) Door noise not to exceed 58 dBA.
 - 5) Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
 - 6) Install door operator data plate as per A17.1 Safety Code for Elevators and Escalators and provide all door closing speed times to ensure code conformance to Kinetic Energy limitations of latest applicable edition of ASME A17.1 code.
 - 7) Door operator must be mounted so completely isolated from the car top. Mounting to car stiles by brackets as configured by GAL will be accepted for isolation.
- B) Door Zone Lock:** Install new door zone lock system with door operation to comply with the latest applicable edition of ASME A17.1 requirements for restricted opening of car doors of passenger elevator.
- 1) Door zone lock system shall be GAL LWZ-2 clutch and combination zone locking system, OEM or pre-approved equal.
 - 2) When the car is outside the unlocking zone, the car doors shall be so arranged that when in the closed position they shall be restricted from opening more than 100 mm (4 inch) from inside the car.
 - 3) Car doors shall be openable from outside the car without the use of a special tool(s).
 - 4) Car doors shall be openable from within the car when the car is within the unlocking zone.
- C) New Door Protection Device:** Door protection shall be a 3D infrared light screen type with a minimum of 154 light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen. A mechanical reopening device shall not be acceptable.
- 1) The light screen is to be totally immune to ambient light, including strobes, fluorescent, and direct sunlight (100,000 lux). Maximum allowable installed misalignment shall be plus or minus 30 degrees @ 3 feet. The receiver and light array cables shall be hi-flex robotic grade, a minimum of 15 feet in length, connector on each end, and interchangeable when connected to the power supply.
 - 2) Light beam and receiver arrays to operate independent of the power supply, allowing the use of any 18 – 25Vdc supply, and provide a continuously short-circuit protected NPN transistor output. The arrays shall incorporate Automatic Dynamic Gain Sensitivity Adjustment to compensate for severe misalignment, condensation, damaged or

contaminated lenses, and provide automatic on-the-fly dynamic adjustment as the doors open and close.

- 3) The power supply shall be dual voltage input (120-240Vac, 50/60Hz), provide LED indicators for power applied and relay operation, simulator test button for beam break, and push-to-test button for manual operation of master control relay. Nudge feature to be field installable in standard power supply with accessory relay to operate in either the delayed nudge mode or redundant mode, switch selectable. Nudge feature also to incorporate buzzer with enable/disable switch, and delay timer adjustable from 5 to 45 seconds for nudge operation.
 - 4) Provide nylon fasteners, which attach to array studs for mounting array to jam of side parting door. Molded tool for attaching fasteners to be included.
 - 5) All configurations shall meet or exceed ADA requirements, be CE certified, and UL/cUL listed. Door protection will be per these specifications and be manufactured by Janus Elevator Products Inc. Model "Panachrome 3D" including green and red illuminating visual warning signals to warn users of door movement. The device shall illuminate GREEN when opening, RED when closing and flash RED a couple of seconds prior to closing. The safety edge shall be capable of projecting light beams across the entire opening and the 3D portion will project beams on a 45 deg angle out into the hoistway. The 3D protection zone should move with the doors, so that if a person or object enters the zone after the doors have begun to close, the doors shall stop, and then reverse to reopen. The doors shall remain open until the expiration of an adjustable time interval (3D Timeout option only) and then close automatically.
- D) **Nudging Operation:** The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a field programmable time, a buzzer will sound, and the doors will close at reduced speed. If the infra-red door protection system detects a person or object while closing, the doors will stop and resume closing after the obstruction has been remove.

Part 2.06 CAR COMPONENTS

- A) **Cab Interior:** Existing elevator cabs shall be retained and refurbished as detailed below. Refurbish car enclosure with new wall cladding, trim and accessories. Maximum gaps at rear corners and against car front are 1/16" to be filled with color matching caulk.
- 1) **Finish Materials:** Provide the following materials and finishes for exposed parts of elevator cab enclosures and car doors as indicated:
 - a) All exposed screws inside the cab shall be tamper proof.
 - b) All materials to be selected and approved by architect.
 - 2) All refurbishment identified in this section is the responsibility of the Elevator Contractor to coordinate and complete.
 - 3) Elevator modernization contractor shall coordinate with elevator cab interior contractor to schedule the cab refurbishment work.

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- 4) Elevator modernization contractor is responsible to provide schedule that allows for coordination of the cab interior refurbishment. This schedule will have all cab interior work performed prior to elevator modernization contractor making final acceptance inspection and testing of this elevator.
 - 5) Elevator modernization contractor is responsible for all required door adjustments required for cab modernization contractor to complete all cab modernization work; no additional charges will be allowed for any door adjustments.
- B) Car Front Cladding:** Car front shall be re-clad as detailed below:
- 1) The existing swing return panels shall be rigidly secured to accept the installation of the new Car Operating Panel (COP).
 - 2) Car Return Panel: Install stainless steel: ASTM A 167, Type 300 stainless steel panels, No. 4 satin finish, extend one piece to cover all existing car box openings in return panel and wrap around car return panel.
 - 3) Car Door Header & Transom Assembly: Install stainless steel: ASTM A 167, Type 300 stainless steel panels, No. 4 satin finish, extend one piece to cover all existing car box openings in car door head jamb & Transom assembly.
 - 4) Car Strike Jamb: Install stainless steel: ASTM A 167, Type 300 stainless steel panels, No. 4 satin finish, extend one piece to cover all existing openings in car door strike jamb assembly.
- C) Cab Interior Painting:** Elevator Modernization Contractor shall be responsible for the following rust remediation prior to new cab interior finishes being installed:
- 1) The exposed metal surfaces on the inside of the cab interior shall be mechanically cleaned, primed and painted in conformance with the requirements detailed in the Painting subsection of the Project Conditions section of this specification. This will include all metal surfaces but not limited to cove base and ceiling areas of the cab.
- D) Cab Walls:** Re-clad with stainless steel, Rigitex vandal-resistant finish. Existing surface to be cleaned and prepared to accommodate new metal cladding. Rear wall to contain one vertical centerline hairline seam. Each sidewall to be installed to contain minimum vertical centerline hairline seams.
- E) Cab Enclosure Vents:** Also include 18 gauge brushed #4 finish stainless steel base with 3" tall vertical ventilation slots aligning with existing ventilation openings. Cab enclosure vents shall be repaired as necessary to provide proper cab enclosure ventilation. Openings shall be appropriately sized and be guarded to prevent straight through passage in accordance to the applicable requirements of the current A17.1 safety code.
- F) Cab Flooring:** Furnish and install new commercial rubber flooring tiles including installation of new underlayment. Flooring to be Norament Rubberized style flooring manufactured by nora systems, Inc. Color & Style to be selected by Architect.
- 1) Work to include removal of existing flooring.
 - 2) Included is to have installation of new 1/8" sheet aluminum on top of car subflooring. The cost of remedying any other conditions for the installation of the new flooring shall be included in the work and no change order will be approved. It will be the Elevator

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Contractor's responsibility to resolve all issues for a complete and finished floor. All material to be treated to meet Flame Spread and Smoke Density code requirements.

- 3) Flooring is to be installed in accordance with manufacturers' recommended adhesive and bonded to the underlayment.

G) Car Lighting & Ceiling: Furnish a new LED downlight ceiling faced with 20ga. satin (#4) stainless steel (Type 304). Ceiling face to be divided into a minimum of six (6) sections separated by 1/4" wide black painted reveals. Each section to contain an individual light fixture. Each fixture to be 2 3/4" diameter with a black trim bezel and three (3) LED bulbs (Tri-Fecta Fixtures) to comply with lighting requirements of A17.1 code. Edge to be painted black to match ceiling reveals. Included is a low voltage driver unit to be mounted on car top. Emergency escape hatch shall be incorporated into ceiling based on existing location of escape hatch in elevator canopy and shall have hairline joints in ceiling finish. Edge of ceiling to be held approximately 1" from transom & centered between side walls.

H) Handrails:

- 1) SN# 24282 (Basic Science 206-25): Install new hand rail (support rail) on rear wall as detailed below.
- 2) SN# 24281 (Basic Science 206-26): Install new hand rail (support rail) on rear wall as detailed below.
- 3) All support rails must be new 3/8" x 2" Flat bar Satin Finish Stainless Steel handrail, smooth and have no sharp edges, with Standoffs with threaded set pins on underside and Returned Ends. Handrail to stop prior to rear wall vertical flanking panels.
- 4) Support rails must be continuous and a minimum length of 42 inches (1067 mm) overall.
- 5) The inside surface of support rails must be 1 1/2 inches (38 mm) clear of the car wall.
- 6) The distance from the top of the support rail to the finished car floor must be at least 31 inches (787 mm) and not more than 33 inches (838 mm).
- 7) Padded or tufted material or decorative materials such as wallpaper, vinyl, cloth or the like may be not be used on support rails.
- 8) Handrails adjacent to entrances shall have the ends of the handrails beveled back to the cab enclosure wall(s).

I) Car Entrance:

- 1) **Cab Doors:** Replace & hang new cab door panels.
 - a) Provide new fire rated cab door panels mounted on existing car door hangers with new rubber door astragals.
 - b) New car door close contact switch shall be installed.
 - c) Finish for car door shall be ASTM A 167, Type 300 Stainless Steel Number 4 finish. Door shall be manufactured to include all mounting hardware requirements of the GAL door operating equipment. Door shall be manufactured by Gunderlin LTD or pre-approved equal by consultant.

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- d) Refurbish associated components as detailed below and replace all parts necessary to deliver doors in as new condition. Verify and adjust as required to maintain all door gaps in accordance with latest applicable edition of ASME A17.1 code.
- 2) **Car Door Hangers, Sheaves, and Tracks:** Existing door hangers, sheaves, tracks, door gibs including all required retainers shall be replaced with new components as detailed below:
 - a) Provide sheave type two-point galvanized suspension hangers and galvanized track for car sliding door, product GAL, or preapproved equal.
 - b) New components for all components shall be GAL or preapproved equal.
 - c) Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
 - d) Hangers: Provide an adjustable slide to accommodate the up-thrust of the doors.
 - e) Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
 - f) Car Door Guides: New car door slide guides shall be installed with tabs installed per manufacture's design. Bottom slide guides as manufactured by GAL replacement or preapproved equal. Car door guides shall be matched to existing car door sill.
- J) **Cab Top Enclosure:** The existing car top enclosure shall be retained and reutilized.
- K) **Car Steady Plates:** Existing car steady plates shall be rebuilt and adjusted to like new condition. All rubber spacers that are deteriorated will be replaced with new rubber components to hold the car steady and plumb.
- L) **Car Top Exit Switch:** Car top escape panels shall have switch assemblies including all wiring to install proper safety circuit as required by ASME A17.1. The top emergency exit cover shall open outward and shall be hinged or securely attached with a chain when in both the open and closed positions. If a chain is used, it shall be not more than 300 mm (12 inch) in length. The exit cover shall only open from the top of the car, where it shall open without the use of special tools
- M) **Car Top Lighting:** The elevator shall be provided with lighting and a duplex receptacle fixture on the car top. The lighting shall be permanently connected, fixed, or portable, or a combination thereof, to provide an illumination level of not less than 100 lx (10 fc) measured at the point of any elevator part or equipment, where maintenance or inspection is to be performed from the car top. All lighting shall be equipped with guards. The light switch shall be accessible from the landing when accessing the car top.
- N) **Car Top Inspection Station:** Provide a new car top inspection station with an "emergency stop" switch and constant pressure "up-down" direction buttons to make the normal operating devices inoperative and give the inspector complete control of the elevator. Car top Inspection unit manufactured by Vator Accessories, Inc., (630) 876-8370, Nylube Products Company, LLC. (248) 852-6500, Monitor Controls, or equal. Mount the car top inspection station as required by ASME A17.1 Safety Code for Elevators and Escalators.
 - 1) When the elevator is on inspection operation or when the hoistway access switch has been enabled, a continuous audible signal, audible at the location where the operation is activated

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shall sound when the "FIRE RECALL" switch is in the "ON" position or when the fire alarm initiating device is activated to alert the operator of an emergency.

- 2) Car Top Inspection Station must be approved by Consultant prior to Contractor ordering fixtures.
- O) **Cab Fan:** Provide and install new 2 speed quiet run fan manufactured by Nylube securely mounted in ceiling. Fan shall be protected from access through cab ceiling.
- 1) Ventilation fans in elevators that do not have their own air-conditioning system shall not consume more than 0.33 watts/cfm at the maximum speed of the fan.
 - 2) Controls shall be provided that will de-energize ventilation fans and lighting systems when the elevator is stopped, unoccupied and with its doors closed for over 15 minutes.
- P) **Car Operating Panel:** Provide new car operating stations as follows:
- 1) **Car Operating Station:** The car control station shall contain the devices required for specific operation mounted directly to an aluminum backing plate with a Stainless Steel # 4 brush finish applied faceplate. The panel shall consist of a series of modules, key switches or approved buttons for optimum viewing and accessibility. All engraving shall be on flush mounted hairline faceplates securely mounted to the aluminum backing plate.
 - a) The lowest section shall contain the "DOOR OPEN," "DOOR CLOSE," and car emergency signaling devices.
 - b) Intermediate section shall contain floor buttons, which illuminate when a call is registered and remain illuminated until the call is answered. Raised floor indications and handicap symbols shall be located immediately adjacent to the floor buttons.
 - c) Provide a lockable service compartment with recessed flush door. Door material and finish to match car station face plate or car return panel. Inside surface of door shall contain an integral flush window for displaying the elevator operating permit. Service cabinet shall contain all required and accessory key switches including independent service, fan switch, key stop switch, hoistway access and an emergency light test button in service cabinet.
 - d) The top section shall contain fire service features inside a locked cabinet in accordance with currently adopted edition of ASME A17.1, including operating instructions.
 - e) Plug connection for Fire Department Communications System shall be provided in the car operating panel which shall provide communications for Fire Department personnel from the Lobby Panel into each elevator car.
 - f) Swing of panel shall match car door configuration. Car operating panels shall swing open with the hinged side closest to the sidewall. Panel shall swing to open only to the open car side
 - g) All car and hall fixtures by Innovation Industries, or equal. All pushbuttons to be tamper resistant, Innovation Industries PB 39, Flush Button with Illuminated Halo and Center Jewel or pre-approved equal. Halo to be Blue LED light source.
 - h) Car operating panels by Innovation Industries "Prestige Series" Stainless Steel # 4 brushed finish, or pre-approved equal. No adhesive type applied plates will be accepted at either car or hall stations. All fixtures shall have a Blue LED lighting source

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- i) Car stations shall be pre-wired by the car station manufacture with terminal strip connection to control wiring.
- j) All hall and car push button lamps shall include long life LED type lamps.
- 2) **Position Indicators:** Each car operating panel to include a 2-inch electronic segmented digital position indicator mounted in the control panel for optimum viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped or passing. On one side of digital numeric indicator in the car panel will also be a matching indicator with direction of travel. Position Indicator shall have a Blue LED lighting source.
- 3) **Emergency Light:** Emergency lighting shall be incorporated into the car operating panel. Emergency light shall illuminate automatically upon loss of the building's normal power supply as required by latest edition of ASME A17.1.
- 4) **Emergency Communications System:** Provide a Kings III, Monitor Controls EMS G3, Wurtec S3, or approved equal, emergency communications device mounted in the car station panel. Emergency communications device shall comply with Americans with Disabilities Act (ADA) and with the currently adopted edition of ASME A17.1 Safety Code for Elevators and Escalators requirements.
- 5) **Special Accessories in Car Station Panel:**
 - a) Located in Service Compartment Subpanel w/ Clear Certificate Window, sized 6" x 9":
 - (1) Light key switch.
 - (2) Fan 2 speed key switch.
 - (3) Independent Operation Key Switch.
 - (4) Access Key Switch.
 - (5) Emergency Light Test Button.
 - (6) Keyed stop switch.
 - b) No applied plates.
 - c) Braille and engraving to include:
 - (1) Engraved Capacity and Identification Number of elevator.
 - (2) No Smoking sign shall be engraved on flush mounted hairline faceplate.
 - d) All push buttons and key switches as required for fire service operation.
- 6) **Fire Service Features:** Fire Fighters Service Key switch as required by the IBC including operations required by the currently adopted edition of ASME A17.1 Safety Code for Elevators and Escalators shall be engraved on a flush mounted hairline faceplate.
 - a) The "FIRE OPERATION" switch, the "CALL CANCEL" button, the "STOP" switch, the door open button(s), the door close button(s), the additional visual signal, and the operating instructions shall be grouped together at the top of the main car operating panel behind a locked cover.

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- b) The firefighters' operation panel cover shall be openable by the same key that operates the "FIRE OPERATION" switch. The cover shall be permitted to open automatically when the car is on Phase I Emergency Recall Operation and at the recall level. When the key is in the "FIRE OPERATION" switch, the cover shall not be capable of being closed. When closed, the cover shall be self-locking.
 - c) All buttons and switches shall be readily accessible, located not more than (72 inch) above the floor.
 - d) The front of the cover shall contain the words "FIREFIGHTERS' OPERATION" in red letters at least 0.4 in. high.
 - e) Firemans' Service Key: The designated fire key is: Emergency Response Region 3: Nassau, Duval, Clay, St. John, Flagler, Putnam, Bradford, Union, Baker, Levy, Alachua, Gilchrist: Yale Key No. R-80833-2006-3.
- 7) **Touch Activated Automatic Controls:**
- a) **SN# 24282 (Basic Science 206-25):** Touch-Activated Automatic Controls will not be installed inside the interior of the elevator car due to insufficient wall space to mount these devices. on the side where the car operating panel is located.
 - b) **SN# 24281 (Basic Science 206-26):** Touch-Activated Automatic Controls will be installed inside the interior of the elevator car on the side where the car operating panel is located.
 - c) Touch-Activated Automatic Controls for all floor designations, as listed in Elevator System Description, will be required to be within each elevator cab, one push panel per level served, spaced at 16" – 18" O.C.
 - d) Touch-Activated Automatic Door Controls will be required to be at each landing. Intermediate landings will be required to have an UP direction and a DOWN direction Touch Activated Automatic Control at each landing. Terminal landings shall be required to have one Touch Activated Automatic Control at each terminal landing.
 - e) Touch-Activated Automatic Door Controls are 36" tall and to be set 4" AFF for a total of 40".
 - f) Manufacturer: Wikk Industries, Inc., PO Box 167, 6169B Industrial Court, Greendale, Wisconsin 53129. Toll Free (877) 421-9490. Phone (414) 421-9490. Fax (414) 421-3158. Website www.wikk.com. E-mail: info@wikk.com.
 - i) **Touch Activated Automatic Door Controls Approval:** UF EH&S will provide final approval of the Touch-Activated Automatic Door Controls.
- 8) All required Braille for buttons and other switches as required by the FBC & A17.1 shall be securely fastened to the aluminum backing plate or directly engraved.
- 9) Integral telephone including engraved directly into the car-operating panel ADA required telephone instructions.
- 10) There shall be NO ADHESIVE APPLIED PLATES, SIGNS or PANELS affixed to the car-operating panel or other locations inside or outside the elevator cab.
- 11) Phone Response Location shall be designated by Owner.

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- Q) **Car Riding Lantern:** New tamper resistant, arrows thru engraved, clear epoxy filled, car-riding lanterns shall be installed in the elevator cab and located in the entrance jambs to replace the existing car riding lanterns.
- 1) The lantern bars, when illuminated, will indicate the intended direction of travel. The lanterns will illuminate, and a signal will sound when the car arrives at a floor where it will stop. The lanterns shall remain illuminated until the door(s) begin to close.
- R) **Car Operating Station & Fixture Approval:** Car Operating Station & fixtures must be approved by consultant prior to contractor ordering fixtures.
- S) All openings left from removal of current car devices, which are not re-clad, shall be covered with stainless steel: ASTM A 167, Type 300 stainless steel covers, No. 4 satin finish. All edges shall be finished in a manner that presents no sharp edges or corners.

Part 2.07 HALL FIXTURES

- A) **New Hall Stations, General:** Hall station shall be flush mounted and located adjacent to the entrance jamb. Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction. Faceplates shall be Stainless Steel architectural #4 brush finish. Provide one sets of risers. Riser shall include 1 for elevator front.
- 1) Hall stations shall be of one-piece construction, flush mounted.
 - 2) All switches, fixtures and pushbuttons shall be by Monitor Controls, Innovation Industries or pre-approved equal.
 - 3) All push buttons to be tamper resistant as follows:
 - a) Monitor Controls, Model HPS 1300, positive stop Flat Button with Illuminated Blue Center Jewel.
 - b) Innovation Industries PB 23, Flush Button with Illuminated Blue Center Jewel Stainless Steel with counter bored stop.
 - 4) Hall Stations shall be Monitor Controls, Model "Monitor Series" or Innovation Industries "Bruiser Series" Stainless Steel architectural #4 brushed finish. No adhesive type applied plates will be accepted at either car or hall stations. All fixtures shall have a Blue LED lighting source.
 - 5) In case of fire use stair signs shall be engraved into the hall station panel with exact signage as per Florida Building Code. No adhesive type applied signage plates will be accepted at this hall station.
 - 6) All hall and car push button assemblies shall include long life LED type lamps.
 - 7) Each terminal station shall contain one illuminating push button and other applicable accessories.
 - 8) Each intermediate station shall consist of two illuminating push buttons, one for the up direction and one for the down position.

- 9) Phase 1 Firefighter's Service key switch, with instructions, shall be incorporated into the hall station at the designated level. Fire Service instructions as per A17.1 Safety Code for Elevators and Escalators shall be engraved in the main floor hall station panel.
- B) Local Telephone Line Status Monitoring:** The telephone system for the elevator shall be compliant with the requirements of the A17.1, Requirement 2.27 and will include a verification means as required by the A17.1 code. If the verification means determines that the telephone line or equivalent means is not functional, an audible and illuminated visual signal shall be activated. A minimum of one visual and one audible signal shall be provided for each group of elevators controlled by a "FIRE RECALL" switch.
- 1) Verification of the telephone line operability shall be automatically performed at least on a daily basis and shall not require activation of the two-way communications link(s).
 - 2) The visual signal shall be located at the designated landing in the vicinity of the "FIRE RECALL" switch, be visible to elevator user(s), be labeled "ELEVATOR COMMUNICATIONS FAILURE" in red letters a minimum of 5 mm (0.25 inch) high, illuminate intermittently and continue to illuminate intermittently until the telephone line or equivalent means is functional.
 - 3) The audible signal shall be 10 dBA minimum above ambient but shall not exceed 80 dBA measured at the designated landing "FIRE RECALL" switch, sound at least once every 30 s with a minimum duration of half a second and continue to sound until silenced by authorized personnel or the telephone line or equivalent means is functional.
 - 4) The means to silence the audible signal shall be accessible only to authorized personnel. The signal when silenced shall remain silent unless activated by the next verification.
- C) Floor Identification Plates:** Replace all door jamb plates at each floor. Stainless steel jamb plates shall comply with Americans with Disabilities Act (ADA) and Florida Building Code 2010 requirements.
- D) Hoistway Access Switches:** New Hoistway Access Switches shall be provided and installed adjacent to the hoistway landing with which it is associated.
- 1) Hoistway access switches shall be provided at each terminal landing
 - 2) The switch shall be labeled "ACCESS" and shall be a three-position switch, labeled "UP," "OFF," and "DOWN" (in that order), with the "OFF" position as the center position. The switch shall be rotated clockwise to go from the "UP" to "OFF" to "DOWN" positions.
 - 3) The switch shall be of the continuous pressure spring-return type, and shall be operated by a cylinder-type lock having not less than a five-pin or five disk combination, with the key removable only when the switch is in the "OFF" position.
 - 4) The key shall be Group 1 Security.
- E) Touch Activated Automatic Controls:**
- 1) Touch-Activated Automatic Door Controls will be required to be at each landing. Intermediate landings will be required to have an UP direction and a DOWN direction Touch Activated Automatic Control at each landing. Terminal landings shall be required to have one Touch Activated Automatic Control at each terminal landing.

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- 2) Touch-Activated Automatic Door Controls are 36" tall and to be set 4" AFF for a total of 40".
- 3) Manufacturer: Wikk Industries, Inc., PO Box 167, 6169B Industrial Court, Greendale, Wisconsin 53129. Toll Free (877) 421-9490. Phone (414) 421-9490. Fax (414) 421-3158. Website www.wikk.com. E-mail: info@wikk.com.
- 4) **Touch Activated Automatic Door Controls Approval:** UF EH&S will provide final approval of the Touch-Activated Automatic Door Controls.

F) Hall Position Indicators: Provide new surface mounted hall position indicators as follows:

- 1) New 2-inch electronic segmented digital position indicators shall be provided and mounted in a module for optimum viewing above each elevator at the landing designated "G" which is the main entry floor for the building.
- 2) The position indicator shall be provided at the "G" floor landing above the door with a faceplate mounted at a 20-degree angle for viewing.
- 3) Digital characters to correspond to the floors as listed in the Elevator System Description, Part 1.07 of this specification. The digital display shall be Blue LED
- 4) As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped or passing.

G) Lobby Phone:

- 1) SN# 24281 (Basic Science 206-26): Rise has been verified to be less than sixty (60) foot and is not required to have a lobby phone installed.
- 2) SN# 24282 (Basic Science 206-25): Elevator Contractor is to verify the rise of this elevator.
 - a) If the elevator travel is (60 ft) or greater it will require a two-way voice communication means within the building to be provided within the vicinity of the designated landing.
 - (1) The means shall enable emergency personnel within the building to establish two-way voice communications to each car individually. Two-way voice communication shall be established without any intentional delay and shall not require intervention by a person within the car. The means shall override communications to outside of the building and comply with the following requirements:
 - (a) Two-way voice communications, once established, shall be disconnected only when emergency personnel outside the car terminates the call.
 - (b) Once the two-way voice communication has been established, the visual indication within the car shall illuminate. The visual indication shall be extinguished when the two-way communication is terminated.
 - (c) Operating instructions shall be incorporated with or adjacent to the two-way voice communication outside the car.
 - (d) Cutting and patching as may be required at the location of the lobby communication device is by Elevator Contractor.

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- (e) Conduit, as required, from the machine room or from inside hoistway junction box(es) at the designated floor to elevator lobby phone panel at designated location as required.
 - (f) Elevator contractor is responsible for all elevator related wiring to the lobby phone panel and/or elevator panel of the fire command center.
 - b) If the elevator travel is (75 ft) feet or more above the lowest level for fire emergency vehicle access shall meet the requirements of the FBC 2017 Section 911 which includes a fire command center as detailed in Section 911. If no fire command center room is available, the panel will be located vicinity of the designated landing. The remote Elevator Panel of the Fire Command Center will be installed at a location verified by the Fire Marshal.
 - (1) The panel will include a Stainless Steel # 4 finished face plate for surface mounting to wall as manufactured by Monitor Controls or Innovation Industries. Additional Features and/or Operations for the Fire Command Center Elevator Panel shall include the following:
 - (a) The communication means shall enable emergency personnel within the building to establish two-way voice communications to each car individually. Two-way voice communication shall be established without any intentional delay and shall not require intervention by a person within the car. The means shall override communications to outside of the building and comply with the following requirements:
 - (b) Two-way voice communications, once established, shall be disconnected only when emergency personnel outside the car terminates the call.
 - (c) Once the two-way voice communication has been established, the visual indication within the car shall illuminate. The visual indication shall be extinguished when the two-way communication is terminated.
 - (d) Operating instructions shall be incorporated with or adjacent to the two-way voice communication outside the car.
 - (e) Cutting and patching as may be required at the location of the lobby communication device is by Elevator Contractor.
 - (f) Conduit, as required, from the machine room or from inside hoistway junction box(es) at the designated floor to elevator lobby phone panel at designated location as required.
 - (g) Elevator contractor is responsible for all elevator related wiring to the lobby phone panel and/or elevator panel of the fire command center.
 - (h) Digital Position Indicator with 1-inch display numerals including direction of travel indicator for the elevator.
- B) Hall Fixtures Approval:** Hall fixtures listed above must be approved prior to ordering fixtures by Contractor.

Part 3 EXECUTION

Part 3.01 CONTRACTOR RESPONSIBILITY

A) Examinations:

- 1) Before starting elevator modernization, inspect hoistway, hoistway openings, pits and machine room, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator modernization until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- 2) Modernization constitutes acceptance of existing conditions and responsibility for satisfactory performance.

B) Crane Services: Elevator Contractor shall coordinate crane services, if required, for the removal the existing equipment from the machine rooms and placement of the new equipment in the machine rooms with building owner's representative.

C) Scheduling: Only one (1) elevator at a time will be turned over to the elevator contractor for modernization work. The subsequent elevator will only be turned over for modernization work upon completion of all modernization work on the first elevator, including successful completion of all required inspections and tests.

D) Signage:

- 1) University of Florida Representative and the Elevator Consultant, in accordance with the General Materials section of this specification, will approve all signage in order to maintain consistent appearance for entire elevator installation.
- 2) All signage as required by current edition of the Florida Building Code, A17.1 Safety Code for Elevators and Escalators, NFPA 70 National Electrical Code and NFPA 72 Fire Alarm Code to be posted in elevator lobbies, fire alarm panels, disconnects, machine rooms and machine room doors.
- 3) All existing signage will be replaced in conformance to the Current edition of the Florida Building Code, A17.1 Safety Code for Elevators and Escalators, NFPA 70 National Electrical Code and NFPA 72 Fire Alarm Code requirements as a part of this specification.

E) Installation:

- 1) Install elevator systems components and coordinate repairs of hoistway wall construction.
- 2) Competent licensed elevator installation personnel in accordance with Florida Statute 399 and A17.1 Safety Code for Elevators and Escalators, manufacturer's installation instructions and approved shop drawings shall perform work.
- 3) Comply with the NFPA 70 National Electrical Code for electrical work required during installation.
- 4) Perform work with competent, skilled workmen under the direct control and supervision of the Elevator Contractor's experienced foreman.
- 5) Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

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- 6) **Welded construction:** Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn Parts. Comply with AWS B2.1 Standard Welding Procedure and Performance Qualification.
 - 7) **Coordination:** Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
 - 8) **Install machinery, guides, controls, car and all equipment and accessories** to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.
 - 9) **Sound isolation:** Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and eliminate sources of structure-borne noise from the elevator system.
 - 10) **Lubricate operating parts of system, including ropes, as recommended by the manufacturer.**
- F) Data Plates, Tags & Signs:** Elevator Contractor shall be required to install all data plates as required by A17.1 Safety Code for Elevators and Escalators on complete elevator system including alteration and original equipment.
- 1) All data plates shall be manufactured and printed with proper data for each elevator by CodeDataPlate.com or approved equal.
 - 2) No ink-based markers shall be used for any data plates, tags or signs. All data plates, tags & miscellaneous signage shall be of such material and construction that the letters and figures stamped, etched, cast, or otherwise applied to the face shall remain permanently and readily legible.
- G) Field Quality Control:** The Elevator Contractor shall perform pre-testing of all required acceptance tests of the elevator system(s) prior to the scheduled Alteration Acceptance Testing and Inspection. The Elevator Contractor shall ensure the installation conforms to all applicable safety codes and contract requirements.
- H) Acceptance Testing & Inspection:**
- 1) **Acceptance Testing:** Upon completion of the elevator modernization perform and satisfactorily complete all acceptance tests as required by the State of Florida, AHJ (Authority Having Jurisdiction) and required by all applicable codes and governing regulations. Perform other tests, if any, as required by governing regulations or agencies.
 - 2) Advise Owner, Elevator Consultant, and governing authorities in advance as required of dates and times tests are to be performed on the elevator.
 - 3) **Acceptance Inspection:** University of Florida Basic Science 206-25 & 206-26 has designated VTE Solution, as their consultant on this project.
 - a) The Elevator Contractor shall be responsible, in accordance with A17.1 Safety Code for Elevators and Escalators for all acceptance inspections for this elevator.
 - b) Elevator Installer in accordance with A17.1 Safety Code for Elevators and Escalators, Inspection and Test Requirements will perform all acceptance tests for this elevator.

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- c) Elevator Contractor must notify building owner and elevator consultant 5 days prior to inspection advising of the date and time of all inspections and tests.
 - d) Elevator inspector other than Florida Bureau of Elevator Safety must be approved prior to inspection date by consultant.
 - e) **Alteration Acceptance Inspection Report:** At the conclusion of the alteration inspection of the elevator(s) the inspector shall provide a completed DBPR Form HR 5023-003 with signatures executed on the form.
- I) **Keys for Elevator Key Switches:** Provide a minimum of two (2) keys per cylinder used on all key switches for a single elevator. If there is more than one elevator, two (2) additional keys per cylinder will be required for each additional elevator. Each numbered set of keys shall be identified with their function on a labeled plastic tag with a split ring for each numbered set.
- J) **Adjusting:**
- 1) Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.
 - 2) The Elevator Contractor shall be required to perform and pass all required testing of all equipment as per A17.1 Safety Code for Elevators and Escalators and ASME A17.2.
 - 3) Elevator Contractor is to return at 30 days, 90 days and 180 days after final installation to examine and readjust rope tension and hoist machine as may be required for optimum performance.
- K) **Cleaning:**
- 1) Contractor shall keep the premises and surrounding areas free from accumulation of waste materials or rubbish caused by its operations. Upon completion of the Work, the Contractor shall remove all waste materials and Contractor's equipment and surplus materials. Contractor shall police the work area daily and any common area used by the Contractor each day and shall remove trash and debris from the work area and common area. Any trash that is stored on the common area shall be protected from wind so as to prevent trash being blown around the common area.
 - 2) Contractor shall ensure that no hazardous conditions exist as a result of any Work, including the removal of nails in the parking area and walkway.
 - 3) Contractor shall store all materials, supplies and equipment in a neat and orderly manner and dispersed to minimize fire hazards. The unloading of materials, supplies or equipment in the roadways or landscaped areas by vehicles, cranes or forklifts shall be coordinated at least 24 hours in advance with the Owner.
 - 4) Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided.
 - 5) For duration and/or completion of elevator work, remove tools, equipment, and surplus materials from site daily.
 - 6) Clean equipment rooms and hoistway.
 - 7) Remove trash and debris daily from premises.

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L) Protection:

- 1) During all elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Protect all areas of work from public access or dangers including tripping or fall hazards. Maintain protective measures throughout remainder of construction period.

M) Demonstration:

- 1) The Elevator Contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The Elevator Contractor shall demonstrate that control systems and operating devices are functioning properly.
- 2) Instruct Owner's personnel in proper use, operations, and daily care or operation of elevator. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
- 3) Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- 4) Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion.
- 5) Demonstrate that control systems and operating devices are functioning properly.
- 6) Final Electrical Schematics and Drawings
- 7) Maintenance Requirements.

N) Elevator Consultant's Punch-Out List Items:

- 1) Complete all of the consultant's punch-out list items as may be required. The elevator consultant shall provide a review and written punch list of deficiencies. The elevator consultant shall verify one time that the items from the punch list are completed after notice by the Elevator Contractor.

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SECTION 26 00 00

ELECTRICAL GENERAL

PART 1 - GENERAL

- 1.1 The work covered by this division consists of providing all labor, equipment, and materials and performing all operations necessary for the installation of the electrical work as herein called for and shown on the drawings.
- 1.2 Related Documents:
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
 - B. This is a Basic Requirements Section. Provisions of this section apply to work of all Division 26 sections.
 - C. Review all other contract documents to be aware of conditions affecting work herein.
 - D. Definitions:
 1. Provide: Furnish and install, complete and ready for intended use.
 2. Furnish: Supply and deliver to project site, ready for subsequent requirements.
 3. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.
- 1.3 Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work pay all fees and charges incidental thereto.
- 1.4 Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions, or inaccuracies of the said data.
- 1.5 Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.
- 1.6 Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be construed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.
- 1.7 Field Measurements and Coordination:
 - A. The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.
 - B. Verify all field dimensions and locations of equipment to ensure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.
 - C. Coordinate work in this division with all other trades in proper sequence to ensure that

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the total work is completed within contract time schedule and with a minimum cutting and patching.

- D. Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on electrical drawings, be guided by architectural details and conditions existing at job and coordinate this work with that of others.
- E. Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings, and passageways. Cut no structural members without written approval.
- F. Carefully examine any existing conditions, wiring, devices, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.
- G. Because of the small scale of the drawings, it is not possible to indicate all precise locations for all devices and equipment. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate devices, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or raceway cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8 Guarantee:

- A. The Contractor shall guarantee labor, materials, and equipment for a period of one (1) year from Substantial Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.
- B. Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

1.9 Approval Submittals:

- A. When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.
 - 1. Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.
 - a. Submittals shall be properly organized in accordance with the approved submittal control log.
 - b. Submittals shall not include items from more than one specification section in the same submittal package unless approved in the submittal control log.
 - c. Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers

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- in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.
- d. Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date on the cover sheet.
 - e. Submittals that include a series of fixtures or devices (such as lighting or panelboards) shall be organized by the device name or type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether those items are used on other fixtures.
 - f. Do not include pages in submittal which do not apply to the project. If submittal includes products not intended for installation, clearly indicate all materials in the submittal which are intended for installation.
 - g. The electrical design shown on the drawings supports the equipment basis of design specifications at the time of design. If equipment by any division is submitted with different electrical requirements, it is the responsibility of the submitting contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the proposed electrical configuration in the relevant submittal with a written statement that this change will be provided at no additional cost. Submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.
- B. If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.
 - C. Review of shop drawings, product literature, catalog data, or schedules shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.
 - D. Submit shop drawings as called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations, and details to scale (not smaller than 1/4" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.
- 1.10 Test Reports and Verification Submittals: Submit test reports, certifications, and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports, and take corrective action within the scheduled contract time.
- 1.11 O&M Data Submittals: Submit Operation and Maintenance data as called for in other sections. When a copy of approval submittals is included in the O&M Manual, only the final "Approved" or "Approved as Noted" copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M

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Manuals as required by Division 1 and as described herein. Submit manuals at the Substantial Completion inspection.

PART 2 - PRODUCTS

- 2.1 All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.
- 2.2 Equipment and Materials:
- A. All equipment and materials shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.
 - B. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings, and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated, or painted.
 - C. The label of the approving agency, such as UL, by which a standard has been established for the particular item, shall be in full view.
 - D. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.
 - E. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.
 - F. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.
 - G. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material, and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.
 - H. Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.
- 2.3 Requests for Substitution:
- A. Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product, or material specified.
 - B. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.
 - 1. Required product cannot be supplied in time for compliance with Contract time requirements.

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2. Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.
 3. Substantial cost advantage is offered to Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation, and other necessary services and similar considerations.
- C. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:
1. Principal of operation.
 2. Materials of construction or finishes.
 3. Thickness of gauge of materials.
 4. Weight of item.
 5. Deleted features or items.
 6. Added features or items.
 7. Changes in other work caused by the substitution.
 8. Electrical ratings and properties.
 9. If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

PART 3 - EXECUTION

- 3.1 Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any installation which is not orderly and reasonably neat, or does not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.
- 3.2 Coordination:
- A. The Contractor shall be responsible for complete coordination of the electrical systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for raceway or other appurtenances passing through slabs or walls.
 - B. Any additional steel supports required for the installation of any electrical equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.
 - C. It shall be the Contractor's responsibility to see that all equipment such as terminal cabinets, fire alarm components, control panels, and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.
 - D. All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.
 - E. The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of

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- inadequate protection.
 - F. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
 - G. Start of work will be construed as acceptance of suitability of work of others.
- 3.3 Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.
- 3.4 Phasing: Provide all required temporary wiring, lighting, fire alarm, equipment, and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.
- 3.5 Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.
- 3.6 Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts, and washers. Level equipment.
- 3.7 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 26. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.
- 3.8 Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.
- 3.9 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.
- 3.10 Record Drawings:
 - A. During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all switches, receptacles, devices, equipment, and other systems which are not installed exactly as shown on the contract drawings.
 - B. Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.
- 3.11 Acceptance:
 - A. Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.
 - B. Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any

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specific equipment operation and maintenance training.

- C. Operation and Maintenance Manuals: Provide O&M manual as dictated by Division 1. Furnish four complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section.

Manuals shall contain:

1. Detailed operating instructions and instructions for making minor adjustments.
 2. Complete wiring, control, and single line diagrams.
 3. Routine maintenance operations.
 4. Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
 5. Copies of approved submittals.
 6. Copies of all manufacturer's warranties.
 7. Copies of test reports and verification submittals.
- D. Record Drawings: Submit record drawings.
- E. Acceptance will be granted on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.
- F. Control Diagrams: Frame under clear plastic and mount on equipment room wall.
- G. Single Line Diagrams: Frame under clear plastic and mount on equipment room wall.

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PROJECT NAME
PROJECT NUMBER

ARCHITECT: Company Name

ENGINEER: Mitchell Gulledge Engineering

CONTRACTOR: Contractor Name

SUBCONTRACTOR: Sub Name

SUPPLIER: Supply Company

MANUFACTURER: Manufacturer

DATE: mm/dd/yyyy

SECTION: 26 XX XX/Section Name

SAMPLE

Any standard heading is acceptable.

1. Product 1: Manufacturer, Model

2. Product 2: Manufacturer, Model

3. Product 3: Manufacturer, Model

4. Product 4: Manufacturer, Model

5. Product 5: Manufacturer, Model

List each product individually. Include manufacturer name and model.

**Include GC or CM
Approval stamp indicating
review and acceptance by
responsible contractor.**

END OF SECTION

MG: 18150
WA: 18122

ELECTRICAL GENERAL
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SECTION 26 05 01

ELECTRICAL CODES AND STANDARDS

PART 1 - GENERAL

- 1.1 The work covered by this division consists of providing all labor, equipment, and materials and performing all operations necessary for the installation of the fire protection work as herein called for and shown on the drawings.
- 1.2 This is a Basic Electrical Requirements section. Provisions of this section apply to work of all Division 26 sections.

PART 2 - CODES

- 2.1 All work under Division 26 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.
- 2.2 Comply with regulations and codes of utility suppliers.
- 2.3 Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.
- 2.4 Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.
- 2.5 Additional codes or standards applying to a specific part of the work may be included in that section.
- 2.6 The following codes and standards shall govern all work:
 - A. Florida Building Code – Sixth Edition (2017)
 - B. Florida Building Code – Sixth Edition (2017) – Existing Building
 - C. Florida Building Code – Sixth Edition (2017) – Energy Conservation
 - D. Florida Building Code – Sixth Edition (2017) – Mechanical
 - E. Florida Building Code – Sixth Edition (2017) – Plumbing
 - F. Florida Building Code – Sixth Edition (2017) – Fuel Gas
 - G. Florida Building Code – Sixth Edition (2017) – Accessibility
 - H. Florida Fire Prevention Code Sixth Edition
 1. Fire Code (NFPA 1 – 2015 Edition)
 2. Life Safety Code (NFPA 101 – 2015 Edition)
 - I. National Electric Code (NFPA 70 – 2014)
 - J. Fire Alarm and Signaling Code (NFPA 72 – 2013)

PART 3 - STANDARDS

All materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

- 3.1 Underwriters' Laboratories (UL)
- 3.2 American National Standards Institution (ANSI)
- 3.3 American Society of Testing Materials (ASTM)
- 3.4 National Fire Protection Association (NFPA)

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ELECTRICAL CODES AND STANDARDS
26 05 01 - 1

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- 3.5 National Electrical Manufacturers Association (NEMA)
- 3.6 Institute of Electrical and Electronics Engineers (IEEE)
- 3.7 National Electrical Contractors Association (NECA)
- 3.8 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

END OF SECTION

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SECTION 26 05 02

ELECTRICAL RELATED WORK

PART 1 - DIVISION 1 - GENERAL REQUIREMENTS

- 1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- 1.2 This is a Basic Electrical Requirements section. Provisions of this section apply to work of all Division 26 sections.
- 1.3 Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 26 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

PART 2 - DIVISION 31 - EARTH WORK

- 2.1 Refer to Division 31, Sitework for:
 - A. Coordination with work of other trades.
 - B. Site domestic water piping.
 - C. Additional site electrical work.
- 2.2 The following work is part of Division 26:
 - A. All site electrical conduit, wiring, boxes, lights, and other appurtenances, except where provided by Utility.

PART 3 - DIVISION 3 - CONCRETE

- 3.1 Refer to Division 3, Concrete for:
 - A. Rough grouting in and around electrical work.
 - B. Patching concrete cut to accommodate electrical work.
- 3.2 The following is part of Division 26 work, complying with the requirements of Division 3:
 - A. Curbs, foundations, and pads for electrical equipment.
 - B. Man holes, hand holes, and vaults of electrical work.
 - C. Underground structural concrete to accommodate electrical work.
 - D. Concrete encasement of electrical conduits and cables.

PART 4 - DIVISION 4 - MASONRY

- 4.1 Refer to Division 4, Masonry for:
 - A. Installation of access doors in walls.

PART 5 - DIVISION 5 - METALS

- 5.1 Refer to Division 5, Metals for:
 - A. Framing openings for electrical equipment.
- 5.2 The following is part of Division 26 work:
 - A. Supports for electrical work.

PART 6 - DIVISION 6 - WOOD AND PLASTIC

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ELECTRICAL RELATED WORK
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6.1 Refer to Division 6, Wood for:

- A. Framing openings for electrical equipment.

PART 7 - DIVISION 7 - THERMAL AND MOISTURE PROTECTION

7.1 Refer to Division 7, Thermal and Moisture Protection for:

- A. Installation of all roof curbs and roof supports for electrical work.
- B. Caulking and waterproofing of all wall and roof mounted electrical work.
- C. Providing all roof curbs and all flashing for metal roofs.

7.2 The following is part of Division 26 work, complying with the requirements of Division 7.

- A. Fire barrier penetration seals.

PART 8 - DIVISION 9 - FINISHES

8.1 Refer to Division 9, Finishes for:

- A. Painting piping, and equipment.
- B. Painting structural metal and concrete for electrical work.
- C. Painting access panels.
- D. Painting color-coded electrical work indicated for continuous painting. See color schedule in Division 26 section, "Electrical Identification".
- E. Installation of access doors in gypsum drywall.

8.2 Colors shall be selected by the Architect for all painting of exposed electrical work in occupied spaces, unless specified herein. Do not paint insulated or jacketed surfaces.

8.3 Perform the following as part of Division 26 work:

- A. Touch up painting of factory finishes.
- B. Painting of all hangers.

PART 9 - DIVISION 10 - SPECIALTIES

9.1 Refer to Division 10 - Specialties for:

- A. Fire extinguishers and fire extinguisher cabinets and accessories.

PART 10 - DIVISION 11 - EQUIPMENT

10.1 Refer to Division 11 - Equipment for all food service equipment to be provided. This includes the cooking hoods with fire suppression.

10.2 Refer to Division 11 - Equipment for all laboratory equipment including cabinets, casework, student stations, demonstration desks, fume hoods, snorkel exhausts, canopy hoods, safety stations, eyewashes, and all related fixtures, fittings, and trim.

PART 11 - DIVISION 21 - FIRE PROTECTION

11.1 Fire Protection and Electrical Contractors shall coordinate the exact electrical requirements of all fire protection equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the fire protection equipment basis of design. If fire protection equipment is submitted with different electrical requirements, it is the responsibility of the fire protection contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the fire protection submittal with a written statement that this design will be

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- provided at no additional cost. Fire Protection submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost to the Owner.
- 11.2 Electrical Contractor is expected to be familiar with the entirety of the fire protection scope. Review fire protection sheets, specifications, and other portions of the Contract Documents prior to bidding. Electrical Contractor is responsible all line voltage (greater than 100V) work unless otherwise noted. Electrical Contractor shall coordinate with Fire Protection Contractor, and shall make themselves available as necessary to support the fire protection scope.
 - 11.3 Electrical contractor shall provide disconnect switches, starters, and contactors for fire protection equipment unless specifically noted as being furnished as part of fire protection equipment.
 - 11.4 Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all fire protection equipment, switches, starters, contactors, controllers, and similar equipment.

PART 12 - DIVISION 22 - PLUMBING

- 12.1 Plumbing and Electrical Contractors shall coordinate the exact electrical requirements of all plumbing equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the plumbing equipment basis of design. If plumbing equipment is submitted with different electrical requirements, it is the responsibility of the plumbing contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the plumbing submittal with a written statement that this design will be provided at no additional cost. Plumbing submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost to the Owner.
- 12.2 Electrical Contractor is expected to be familiar with the entirety of the plumbing scope. Review plumbing sheets, specifications, and other portions of the Contract Documents prior to bidding. Electrical Contractor is responsible all line voltage (greater than 100V) work unless otherwise noted. Electrical Contractor shall coordinate with Plumbing Contractor, and shall make themselves available as necessary to support the plumbing scope.
- 12.3 Electrical contractor shall provide disconnect switches, starters, and contactors for plumbing equipment unless specifically noted as being furnished as part of plumbing equipment.
- 12.4 Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all plumbing equipment, switches, starters, contactors, controllers, and similar equipment.

PART 13 - DIVISION 23 - HVAC

- 13.1 Mechanical and Electrical Contractors shall coordinate the exact electrical requirements of all mechanical equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the

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- mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost to the Owner.
- 13.2 Mechanical contractor shall provide all HVAC control wiring including the Energy Management Control system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, complying with the requirements of Division 26. The intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring, and associated raceway and boxes. Electrical contractor shall notify mechanical contractor upon discovery of any mechanical controls installation which does not meet Division 26 requirements.
 - 13.3 Electrical Contractor is expected to be familiar with the entirety of the mechanical scope. Review mechanical sheets, specifications, and other portions of the Contract Documents prior to bidding. Electrical Contractor is responsible all line voltage (greater than 100V) work unless otherwise noted. Electrical Contractor shall coordinate with Mechanical Contractor, and shall make themselves available as necessary to support the mechanical scope.
 - 13.4 Electrical contractor shall provide disconnect switches, starters, and contactors for mechanical equipment unless specifically noted as being furnished as part of mechanical equipment.
 - 13.5 Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all mechanical equipment, switches, starters, contactors, controllers, and similar equipment.

PART 14 - DIVISION 27 - COMMUNICATIONS

- 14.1 Electrical and Communications Contractors shall coordinate the exact Communications requirements of all electrical equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The Communications design shown on the drawings supports the electrical equipment basis of design. If electrical equipment is submitted with different Communications requirements, it is the responsibility of the electrical contractor to resolve all required Communications design changes (e.g. input/output voltage) and clearly show the new Communications design on the electrical submittal with a written statement that this design will be provided at no additional cost. Electrical submittals made with no written reference to the Communications design will be presumed to work with the Communications design. Any corrections required will be at no additional cost to the Owner.
- 14.2 Electrical Contractor is expected to be familiar with the entirety of the communications scope. Review communications sheets, specifications, and other portions of the Contract Documents prior to bidding. Electrical Contractor is responsible all line voltage (greater than 100V) work unless otherwise noted. Electrical Contractor shall coordinate with Communications Contractor, and shall make themselves available as necessary to support the communications scope.
- 14.3 Unless otherwise instructed by Construction Manager or General Contractor, Division 26 shall be responsible for Division 27.

PART 15 - DIVISION 28 - ELECTRONIC SAFETY AND SECURITY (ESS)

- 15.1 Electrical and ESS Contractors shall coordinate the exact electrical requirements of all ESS equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the ESS equipment basis of design. If ESS

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- equipment is submitted with different electrical requirements, it is the responsibility of the ESS contractor to resolve all required electrical design changes (e.g. input/output voltage) and clearly show the new electrical design on the ESS submittal with a written statement that this design will be provided at no additional cost. Electrical submittals made with no written reference to the ESS design will be presumed to work with the electrical design. Any corrections required will be at no additional cost to the Owner.
- 15.2 Electrical Contractor is expected to be familiar with the entirety of the fire alarm scope. Review fire alarm sheets, specifications, and other portions of the Contract Documents prior to bidding. Electrical Contractor is responsible all line voltage (greater than 100V) work unless otherwise noted. Electrical Contractor shall coordinate with Fire Alarm Contractor, and shall make themselves available as necessary to support the fire alarm scope.
- 15.3 ESS contractor shall provide ESS modules, detectors, and other appurtenances for unless specifically noted as being furnished as part of electrical equipment.
- 15.4 ESS contractor shall provide all ESS wiring, raceway and devices, and make final ESS connections to all electrical equipment, detectors, modules, contacts, controllers, and similar equipment.
- 15.5 Unless otherwise instructed by Construction Manager or General Contractor, Division 26 shall be responsible for Division 28.

END OF SECTION

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SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 Related Documents:

- A. Conform to Division 1 and other sections of this division.
- B. Division 26 Basic Materials and Methods sections apply to work of this Section.

1.2 Summary:

- A. The extent of electrical grounding and bonding work is indicated by drawings and schedules and as specified herein. Grounding and bonding work is defined to encompass systems, circuits, and equipment.
- B. The type of electrical grounding and bonding work specified in this Section includes the following:
 - 1. Solidly grounded.
- C. Applications of electrical grounding and bonding work in this Section include the following:
 - 1. Electrical power systems.
 - 2. Separately derived systems.
 - 3. Raceways.
 - 4. Service equipment.
 - 5. Enclosures, pull boxes, junction boxes, etc.
 - 6. Equipment.
 - 7. Lighting standards.
- D. Refer to other Division 26 sections for wires/cables, electrical raceways, boxes and fittings, and wiring devices which are required in conjunction with electrical grounding and bonding work.

1.3 Submittals:

- A. Submit in accordance with General, Supplementary, and Special Conditions.
- B. Product Data: Submit manufacturer's data on grounding and bonding products and associated accessories.

1.4 Codes and Standards:

- A. Codes and Standards:
 - 1. Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction, and current NEC as applicable to electrical grounding and bonding, pertaining to systems, circuits, and equipment.
 - 2. UL Compliance: Comply with applicable requirements of UL Standards No.'s 467, "Electrical Grounding and Bonding Equipment", and 869, "Electrical Service Equipment", pertaining to grounding and bonding of systems, circuits, and equipment. In addition, comply with UL Std. 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors". Provide grounding and bonding products which are UL listed and labeled for their intended usage. Solder lugs are not acceptable.

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PART 2 - PRODUCTS

2.1 Acceptable Manufacturers:

- A. All products shall be the produce of reputable and reliable manufacturers.
- B. The following manufacturers are recognized as being reputable and reliable:
 - 1. Burndy, Inc.
 - 2. Erico, Inc.
 - 3. Harger, Inc.
 - 4. Thermoweld, Inc.
- C. Additional manufacturers shall be considered reputable and reliable only if they verifiably satisfy the following requirements:
 - 1. History: Acceptable manufacturers shall have a history of producing similar products at least the past ten years. Such products shall have been sold in the state of Florida for at least the past five years.
 - 2. Volume: Acceptable manufacturers shall have produced and sold similar products in excess of one hundred (100) times annually the amount of product projected for used in this project. This requirement shall apply to each of the past ten years.
 - 3. Similar projects: Acceptable manufacturers shall have sold similar products which have been used in at least five similar projects in the past five years. Similar projects must be of a similar use, overall cost, and overall size.
- D. Documentation of the above manufacturer requirements shall be provided to Engineer upon request, but is otherwise unnecessary. If documentation is required, it shall consist of a signed statement from Manufacturer's representative on Manufacturer's letterhead (or the letterhead of Manufacturer's approved representative). Additional documentation may be required in rare cases.
- E. Any submittal by Contractor shall be considered indication by Contractor that Contractor stands behind for the suitability of a manufacturer, and that the manufacturer satisfies of the above requirements.
- F. Contact Engineer prior to bid with any questions regarding acceptable manufacturers.

2.2 Grounding and Bonding:

- A. Provide complete grounding and bonding assemblies, including, but not limited to,
 - 1. Cables/Wires,
 - 2. Connectors,
 - 3. Solderless Lug Terminals,
 - 4. Grounding Electrodes and Plate Electrodes,
 - 5. Bonding Jumper Braid,
 - 6. Surge Arresters, and
 - 7. Additional accessories needed for a complete installation.
- B. Where more than one type component product meets indicated requirements, selection is Contractor's option.
- C. Where materials or components are not indicated, provide products which comply with NEC, UL, and applicable industry standards.
- D. Conductors:
 - 1. Unless otherwise indicated, provide electrical grounding conductors for grounding system connections that match power supply wiring materials and are

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sized according to NEC.

E. Bonding Plates, Connectors, Terminals, and Clamps:

1. Provide electrical bonding plates, connectors, terminals, lugs, and clamps as recommended by bonding plate, connector, terminal, and clamp manufacturers for indicated applications.

PART 3 - EXECUTION

3.1 Examination:

- A. Examine areas and conditions under which electrical grounding and bonding connections are to be made and notify Engineer in writing of any condition detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer and Owner.

3.2 Installation of Electrical Grounding and Bonding Systems:

- A. General: Install electrical grounding and bonding systems as indicated, in accordance with manufacturer's instructions and applicable portions of current NEC, NECA's "Standard of Installation", and in accordance with recognized industry practices to ensure that products comply with requirements.
- B. Coordinate with other electrical work as necessary to interface installation of electrical grounding and bonding system work with other work.
- C. Provide all circuits with an insulated equipment grounding conductor. Under no circumstances shall raceways be the sole equipment grounding conductor.
- D. Terminate insulated equipment grounding conductors with grounding lug, bus, or bushing. Conductors shall not be looped under screw or bolt heads.
- E. Connect together service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.
 1. Provide minimum #12 AWG equipment grounding conductor in each conduit unless otherwise indicated. Equipment grounding conductor shall have continuous green insulation if #6 or smaller, green marking tape if #4 or larger.
 2. Equipment grounding conductor shall be connected to ground buses in equipment enclosures.
 3. Equipment grounding conductor bonded to all outlet, pull, and junction boxes by a lug or screw approved for the purpose before installation of the boxes. Ground pigtailed and/or ground clips are not acceptable.
- F. Grounding type bushings shall be installed on all feeder and subfeeder conduits entering panelboards, pull boxes and transformers and all conduit entering oversized, concentric, and eccentric knock-outs.
- G. Tighten grounding and bonding connectors and terminal, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torqueing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to assure permanent and effective grounding.
- H. Install clamp-on connectors on clean metal contact surfaces, to ensure electrical conductivity and circuit integrity. All ground clamps and lugs shall be listed for application and shall be made completely of bronze or brass.

END OF SECTION

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GROUNDING AND BONDING
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SECTION 26 05 31

WIRES AND CABLES

PART 1 - GENERAL

1.1 Related Documents:

- A. Conform to Division 1 and other sections of this division.
- B. This Section is a general Division 26 materials and methods section, and applies to all other Division 26 sections involving materials and methods specified herein.

1.2 Description of Work:

- A. Extent of electrical wire and cable work is indicated by drawings and schedules.
- B. Types of electrical wire, cable, and connectors specified in this Section include the following:
 - 1. Copper conductors.
 - 2. Fixture wires.
 - 3. Split bolt connectors.
 - 4. Wirenut connectors.
- C. Applications of electrical wire, cable, and connectors required for project are as follows:
 - 1. For power distribution circuits.
 - 2. For lighting circuits.
 - 3. For appliance and equipment circuits.
 - 4. For motor branch circuits.
 - 5. For control circuits.

1.3 Codes and Standards:

- A. NEC Compliance: Comply with NEC requirements as applicable to construction, installation, and color coding of electrical wires and cables.
- B. IEEE Compliance: Comply with applicable requirements of IEEE Std. 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 systems.
- C. ASTM Compliance: Comply with applicable requirements of ASTM B1, 2, 3, 8, and D 753.

PART 2 - PRODUCTS

2.1 General Wiring Products:

- A. Unless otherwise noted, all wiring shall be copper, with conductivity of not less than 98% at 20°C (68°F).

2.2 Acceptable Manufacturers:

- A. All products shall be the produce of reputable and reliable manufacturers.
- B. The following manufacturers are recognized as being reputable and reliable:
 - 1. Cerro Wire
 - 2. Encore Wire Corporation

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3. General Cable
4. Southwire Company
- C. Additional manufacturers shall be considered reputable and reliable only if they satisfy the following requirements:
 1. History: Acceptable manufacturers shall have a history of producing similar products at least the past ten years. Such products shall have been sold in the state of Florida for at least the past five years.
 2. Volume: Acceptable manufacturers shall have produced and sold similar products in excess of one hundred (100) times annually the amount of product projected for used in this project. This requirement shall apply to each of the past ten years.
 3. Similar projects: Acceptable manufacturers shall have sold similar products which have been used in at least five similar projects in the past five years. Similar projects must be of a similar use, overall cost, and overall size.
- D. Documentation of the above manufacturer requirements shall be provided to Engineer upon request, but is otherwise unnecessary. If documentation is required, it shall consist of a signed statement from Manufacturer's representative on Manufacturer's letterhead (or the letterhead of Manufacturer's approved representative). Additional documentation may be required in rare cases.
- E. Any submittal by Contractor shall be considered indication by Contractor that Contractor stands behind for the suitability of a manufacturer, and that the manufacturer satisfies of the above requirements.
- F. Contact Engineer prior to bid with any questions regarding acceptable manufacturers.
- 2.3 Building Wires: Provide factory fabricated wires of sizes, ampacity ratings, and materials for applications and services indicated.
 - A. Dual-listed THHN/THWN-2: For dry, damp, and wet locations.
 - B. All wiring for conventional devices shall be stranded wire with the exceptions as noted on the electrical drawings.
- 2.4 Color Coding: The following systems of color coding shall be strictly adhered to. There shall be no color change for switch legs. Switch legs shall be marked at all junctions with colored tape on each wire with tape of contrasting color. Three way travelers shall be purple. In cases where more than one set of travelers are in the same conduit, travelers shall be marked with circuit number and colored tape. Colored tape shall be same color as corresponding switch leg marking.
 - A. Note: Verify that the following corresponds to existing wiring prior to proceeding.
 - B. All wiring shall be the indicated color. Tape is not an acceptable method of indicating phase legs.
 - C. 120/208V Wye
 1. Phase A: Black
 2. Phase B: Red
 3. Phase C: Blue
 4. Neutral: White
 5. EGC (Ground): Green
 - D. 277/480V Wye
 1. Phase A: Brown
 2. Phase B: Orange

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3. Phase C: Yellow
4. Neutral: Grey
5. EGC (Ground): Green with Yellow Stripe

E. The color code assigned to each phase wire shall be consistently followed throughout.

PART 3 - EXECUTION

3.1 Delivery, Storage, and Handling:

- A. Deliver wire and cable properly packaged in factory fabricated type containers, or wound on NEMA specified type wire and cable reels.
- B. Store wire and cable in clean dry space in original containers. Protect products from weather, damaging fumes, construction debris, and traffic.
- C. 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.

3.2 Installation of Wires and Cables:

- A. General: Install electrical cables, wires, and wiring connectors in compliance with applicable requirements of NEC, NEMA, UL, and NECA's "Standard of Installation" and in accordance with recognized industry practices.
- B. Unless otherwise noted, all branch circuit conductors shall be 12 AWG minimum.
- C. Per UF Standards, demolish and replace of all aluminum branch circuit wiring discovered during construction.
- D. Install all line voltage wiring in conduit, unless otherwise indicated in writing by Engineer.
- E. Pull conductors simultaneously where more than one is being installed in same raceway.
- F. Use lubricant for pulling conductors. Use only products indicated for the purpose by the manufacturer.
- G. Use pulling means including, fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceway.
- H. Minimize conductor splices.
- I. Install splices and taps which possess equivalent or better mechanical strength and insulation ratings than conductors being spliced. Use splice and tap connectors which are compatible with conductor material.
- J. Provide a 6" loop in each conductor in all joint boxes and pull boxes.
- K. Conductors of systems of different voltages or types shall not enter the same conduit or junction box. The number of current carrying conductors and total number of conductors to be installed in conduits shall be as noted below.
 1. Single phase 120V or 277V circuits: Limit three per raceway.
 2. All other circuits: Dedicated raceway.
 3. Deviation of installation as identified above requires prior written approval from Engineer.
- L. Circuits shall be installed such that the continuity of the ground, neutral, and hot circuits shall not be interrupted by the removal of any device or fixture.
- M. For the purposes of thermal derating calculations, neutrals shall be considered current carrying except for balanced three-phase linear loads.
- N. Multiwire branch circuits are prohibited. All 120V and 277V circuits shall be provided a dedicated neutral conductor.

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3.3 Field Quality Control:

- A. Prior to energization of circuitry, check installed feeder wires and cables with megohmmeter to determine insulation resistance levels to ensure requirements are fulfilled. A list of feeders tested shall be submitted to the ENGINEER indicating the insulation resistance level for each cable. Owner shall be given the option to witness all tests.
- B. Prior to energization, test wires and cables for electrical continuity and for short circuits.
- C. Subsequent to wire and cable hook ups, energize circuitry and demonstrate functioning in accordance with requirements. Where necessary, correct malfunctioning units, and then retest to demonstrate compliance.

END OF SECTION

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SECTION 26 05 33

RACEWAYS

PART 1 - GENERAL

1.1 Related Documents:

- A. Conform to Division 1 and other sections of this division.
- B. This Section is a general Division 26 materials and methods section, and applies to all other Division 26 sections involving materials and methods specified herein.

1.2 Description of Work:

- A. Extent of raceway work is indicated by drawings and schedules.
- B. Types of raceways specified in this section include the following:
 - 1. Electrical metallic tubing (EMT)
 - 2. Rigid metal conduit, galvanized (RMC)
 - 3. Rigid nonmetallic conduit (RNC)
 - 4. Liquid tight flexible metal conduit (LFMC)
 - 5. Flexible metal conduit, steel only (FMC)

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers:

- A. All products shall be the produce of reputable and reliable manufacturers.
- B. The following manufacturers are recognized as being reputable and reliable:
 - 1. Allied Tube & Conduit
 - 2. Carlon
 - 3. Cantex
 - 4. Wiremold
 - 5. Wheatland Tube
- C. Additional manufacturers shall be considered reputable and reliable only if they verifiably satisfy the following requirements:
 - 1. History: Acceptable manufacturers shall have a history of producing similar products at least the past ten years. Such products shall have been sold in the state of Florida for at least the past five years.
 - 2. Volume: Acceptable manufacturers shall have produced and sold similar products in excess of one hundred (100) times annually the amount of product projected for used in this project. This requirement shall apply to each of the past ten years.
 - 3. Similar projects: Acceptable manufacturers shall have sold similar products which have been used in at least five similar projects in the past five years. Similar projects must be of a similar use, overall cost, and overall size.
- D. Documentation of the above manufacturer requirements shall be provided to Engineer upon request, but is otherwise unnecessary. If documentation is required, it shall consist of a signed statement from Manufacturer's representative on Manufacturer's letterhead (or the letterhead of Manufacturer's approved representative). Additional documentation may be required in rare cases.

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- E. Any submittal by Contractor shall be considered indication by Contractor that Contractor stands behind for the suitability of a manufacturer, and that the manufacturer satisfies of the above requirements.
- F. Contact Engineer prior to bid with any questions regarding acceptable manufacturers.

2.2 UL Listed Materials:

- A. Provide raceway products and components which have been UL listed and labeled for the intended use.
- B. Comply with applicable requirements of UL safety standards pertaining to electrical raceway systems.

2.3 Products – Metal Conduit and Tubing:

- A. General: Provide metal conduit, tubing, and fittings of types, grades, sizes, and weights (wall thicknesses) for each indicated use.
- B. Where types and grades are not indicated, provide proper selection determined by Contractor to fulfill wiring requirements, and comply with applicable portions of NEC for raceways.
- C. Minimum size conduit shall be 1/2" for all systems.
- D. Minimum size flexible conduit shall be 3/4" for all systems (3/8" for pre-assembled light fixture whips). Maximum length shall be 6 feet. Minimum length shall be 4 feet.
- E. Cast zinc conduit fittings are prohibited. Any cast zinc fitting installed by this project shall be replaced at Contractor's expense.
- F. All fittings shall be provided with insulated throats or plastic bushings prior to pulling wires or cables.
- G. Electrical Metallic Tubing (EMT):
 - 1. Conduit: Shall be mild steel, electrically welded, galvanized, and produced to ANSI Specification C80.3 and Federal Specification WW-C-563, latest revisions and shall be labeled with the Underwriter's Laboratories marking.
 - 2. Fittings: Couplings and connectors for conduit shall be set screw type, steel, or malleable iron.
- H. Rigid Steel Conduit:
 - 1. Conduit: Shall be mild steel, manufactured, hot-dipped galvanized, and produced to ANSI specifications C80.1 and Federal Specification WW-C 581, latest revisions, and shall be labeled with the Underwriters' Laboratories marking.
 - 2. Fittings: Cast malleable iron, galvanized, or cadmium plated.
 - a. Use Type 1 fittings for rain-tight connections.
 - b. Use Type 2 fittings for concrete tight connections.
- I. Flexible Metal Conduit:
 - 1. Conduit: UL 1. Formed from continuous length of spirally wound, interlocked zinc coated strip steel.
 - 2. Fittings: Flexible Metal Conduit Fittings: Provide conduit fittings for use with flexible steel conduit of threadless hinged clamp type. Inside type fittings are not allowed.
 - a. Straight Terminal Connectors: One piece body, female end with clamp and deep slotted machine screw for securing conduit, and male threaded end provided with locknut.
 - b. 45° or 90° Terminal Angle Connectors: Two piece body construction with

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removable upper section, female end with clamp and deep slotted machine screw for securing conduit, and male threaded end provided with locknut.

J. Liquid Tight Flexible Metal Conduit:

1. Conduit: Provide liquid tight flexible metal conduit; construct of single strip, flexible, continuous, interlocked, and double wrapped steel; galvanized inside and outside; coat with liquid tight jacket of flexible polyvinyl chloride (PVC).
2. Fittings: Provide cadmium plated, malleable iron fittings with compression type steel ferrule and neoprene gasket sealing rings, with insulated, or noninsulated throat.

K. No ENT, corrugated flexible conduit, or MT cable shall be installed or reused.

L. No intermediate metal conduit (IMC) shall be installed.

2.4 Products – Nonmetallic Conduit and Ducts:

- A. General: Provide nonmetallic conduit, ducts, and fittings of types, sizes, and weights for each indicated use. Where types and grades are not indicated, provide proper selection determined by Contractor to fulfill wiring requirements which comply with provisions of NEC and Specifications for raceways.
- B. 90°C, UL rated, constructed of polyvinyl chloride. For direct burial, UL listed and in conformity with NEC Article 352.
- C. Conduit and Tubing Accessories: Provide conduit, tubing, and accessories of types, sizes, and materials, complying with manufacturer's published product information, which mate and match conduit and tubing.

2.5 Pathways for Telecom Cables:

A. General

1. Any pathway that is not accessible or does not provide a clear and workable pathway will be rejected.
2. All components of pathway systems in contact with telecom cables shall be listed and indicated for the use. This includes Category 6 ratings, etc.

B. Conduits for Telecom Cables

1. Conduit intended for telecom cables shall be a minimum 1" trade size unless otherwise indicated.
2. Conduits terminating not into a box shall be capped with a bushing.
3. Conduits terminating at cable trays shall be bonded to the cable tray with a bonding jumper or a clip listed for the purpose.

PART 3 - EXECUTION

3.1 Examine areas and conditions under which raceways are to be installed, and substrate which will support raceways. Notify Owner and Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in acceptable manner.

3.2 Provide raceways for each installation location as follows:

- A. Below grade: PVC
- B. Within concrete: PVC
- C. Exterior above-grade locations: rigid galvanized steel
- D. Damp and wet locations: rigid galvanized steel
- E. Interior locations subject to physical abuse: rigid galvanized steel

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1. Exception: In corrosive environments such as agricultural buildings, green houses, etc., use Schedule 80 PVC with corrosion resistant hardware and accessories. Ensure proper support per NEC Article 352.
- F. Interior locations not subject to physical abuse: EMT
 1. Exception: In corrosive environments such as agricultural buildings, green houses, etc., use Schedule 40 PVC with corrosion resistant hardware and accessories. Ensure proper support per NEC Article 352.
- G. Whips to light fixtures: 48" to 72" FMC or prefabricated whip.
- H. Connections to any vibrating or mechanically active equipment: FMC.
 1. Exception: Utilize LFMC in exterior locations, or where subject to moist or humid atmosphere, or where subject to water, oil, or grease exposure.
- I. Connection to any equipment subject to movement: FMC
 1. Exception: Utilize LFMC in exterior locations, or where subject to moist or humid atmosphere, or where subject to water, oil, or grease exposure.
- J. FMC, LFMC, and LFNC shall not be used for any other applications without written consent from Engineer.

3.3 Raceway Size:

- A. Sizes of raceways shall be not less than NEC requirements using THHN/THWN2 for sizing and shall not in any case be less than indicated on the drawings.
- B. Larger size raceways and/or pull boxes shall be installed if there is excessive length of unbroken run or excessive number of bends.

3.4 General Requirements:

- A. Install conduits without damaging or penetrating structural members.
- B. Metallic conduit in contact with concrete, grout, mortar, or other cementitious products such as grouted cells, headers, lintels, etc. shall be provided a bituminous coating before installation.
- C. All conduit installed in walls and above ceilings shall be 100% complete and approved by inspectors before covering is installed. Such coverings include drywall, insulation, ceiling tiles, and any other material which obscures the installation.
- D. Conduit installed above accessible ceilings shall be supported from the building structure and shall not be supported from or attached to the suspended ceiling suspension system.
- E. Where feasible, avoid conduit runs within partitions and walls.
- F. Mechanically assemble metal enclosures, and raceways for conductors to form a continuous conductive system.
- G. Connect to electrical boxes, fittings, and cabinets to provide effective electrical continuity and rigid mechanical assembly.
- H. Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat all surfaces with corrosion inhibiting compound before assembling.
- I. Install expansion fittings in all raceways wherever structural expansion joints are crossed.
- J. Raceway penetrations of fire rated walls and/or floors shall be sealed to maintain the rating(s). All relevant materials and methods shall be per a UL detail satisfying NFPA rating requirements.

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- K. Fire rating of construction assemblies are specified under architectural section of the Contract Documents. Any ratings indicate within other portions of the Contract Documents is purely intended for the Contractor's convenience, and is not meant to replace a careful review of architectural life safety plans.
- L. Submit complete data on fire stopping materials and construction methods for review by Architect prior to proceeding with work.
- M. Coordinate with other work including wires/cables, boxes, and panel work, as necessary to interface installation of electrical raceways and components with other work.
- N. Use Manufacturer-provided dimensions to lay out all equipment electrical connections. Set conduit and boxes for connection to units only after receiving review of dimensions and coordinating with other trades.
- O. Provide nylon pull cord in empty conduits.
- P. Cut conduits straight, properly ream, and cut threads for heavy wall conduit deep and clean.
- Q. Field bend conduit with benders designed for the purpose.
- R. Any conduit with kinks, tears, or other material damage shall be replaced at Contractor's expense.
- S. Conduits are not to cross utility shafts or duct openings.
- T. Keep conduits a minimum distance of six inches (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.
- U. Support riser conduit at each floor level with clamp hangers.
- V. Use of running threads at conduit joints and terminations is prohibited.
- W. Complete installation of electrical raceways before starting installation of cables/wires within raceways.
- X. Under no circumstances shall PVC or PVC-coated conduit be utilized within an air plenum. In particular, Contractor is to avoid LFMC within air handler plenums, etc.

3.5 Flexible Conduit:

- A. Flexible conduit shall not pass through walls or ceilings. Provide a junction box at the point of transition.
- B. Flexible conduit shall not be used within walls, except where written permission is given by Engineer and Owner.

3.6 Conduits Installed in Exterior, Wet, or Damp Locations:

- A. Metallic raceways exterior, wet, or damp locations shall have conduit threads painted with cold galvanizing paint. Remove oil and clean prior to painting. Draw up coupling and conduit sufficiently tight to ensure water tightness.
- B. All wall penetrations entering wet locations shall be sloped downward at least 1/2".

3.7 Special EMT Requirements:

- A. EMT shall not be installed below 8" AFF.
- B. EMT shall not be installed exposed below 72" AFF.
- C. EMT shall be installed in dry and indoor locations only.

3.8 Conduits Installed Below Grade:

- A. All underground wiring and ductbanks shall have metalized warning tape installed above conduit, ductbank, or electrical line that identifies the specific system buried below. Tape shall consist of a minimum 3.5 mil solid foil core encased in a protective plastic jacket (total thickness 5.5 mils) and be 6" wide with black lettering imprinted on

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a color coded background that conforms to APWA color code specifications. Tape shall be installed from 18" to 30" above a conduit, ductbank, or electrical line, and in no case less than 6" below grade. No additional tracer wire is required.

- B. All rigid metal conduit below grade shall be provided a bituminous coating.
- C. Metallic raceways installed below grade shall have conduit threads painted with cold galvanizing paint. Remove oil and clean prior to painting. Draw up coupling and conduit sufficiently tight to ensure water tightness.
- D. Install all underground conduits a minimum of 42" below finished grade (to top of conduit), except where below building foundation. Underground conduit shall be inspected and approved prior to backfilling. Primary raceway shall be buried 48" to top of conduit.
- E. Conduit below concrete slabs and footers under or inside building foundations shall be minimum of 6" below bottom of concrete and/or at an adequate depth to conceal radius of bends.

3.9 Conduits within Concrete Slabs or Encased in Concrete:

- A. No conduit shall be installed within slabs without prior written approval from Structural Engineer. Provide Structural Engineer with whatever description and drawings of the proposed installation which Structural Engineer may require.
- B. All of the following are subject to the alteration by Structural Engineer:
 - 1. Place conduits between bottom reinforcing steel and top reinforcing steel. Place conduits either parallel, or at 90 degrees, to main reinforcing steel.
 - 2. Separate conduits by not less than diameter of largest conduit to ensure proper concrete bond.
 - 3. Conduits crossing in slab must be reviewed for proper cover by Engineer, Architect, and Owner.
 - 4. Embedded conduit diameter is not to exceed one-third (1/3) of slab thickness.

3.10 Coatings:

- A. Apply any coatings in accordance with manufacturer's instructions and recommendations.
- B. Reapply bituminous coating locally after making threaded connections.
- C. Any conduit requiring bituminous coating shall be coated without holidays. Inspect coating prior to burial or pouring, and touch up as needed.
- D. In lieu of bituminous coatings, raceways with factory-applied polyethylene or PVC protective coatings may be utilized. Install per manufacturer's instructions and recommendations. Seal all joints.

3.11 Conduits Above Grade:

- A. Install exposed conduits and all conduit above grade and extensions from concealed conduit systems neatly, parallel with, or at right angles to walls and building structure.
- B. Install exposed conduit work as not to interfere with ceiling inserts, lights, or ventilation ducts or outlets.
- C. Securing and Supporting:
 - 1. Secure conduits within three feet of fittings, boxes, etc., and on spacing not to exceed ten feet.
 - a. Conduits may be supported in lieu of securing, where permitted by Code.
 - 2. Support conduits by use of hangers, clamps, or clips.
 - 3. Conduit shall not be supported from suspended ceiling supports or grid systems.

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- D. Limit penetrations of vapor- and water-barriers. Utilize curbs, etc. wherever possible. Seal any penetrations of vapor- and water-barriers with approved methods.
- E. Conduit shall not be installed on roof tops or walkway covers.
- F. Conduit penetrating concrete floors not within 12" of walls shall have couplings installed flush with top slab.
- G. Flexible metal conduit shall not be installed in damp or wet locations, through walls, or used as a raceway in concealed or inaccessible areas. It shall be supported within 12" of connectors and at least once every 54".

3.12 PVC Conduits:

- A. PVC subject to physical damage shall be Schedule 80. All other PVC shall be heavy wall type (Schedule 40) conduit.
- B. PVC conduit shall be installed with rigid steel elbows and risers. (Exception: low voltage with inner ducts may be PVC.)
- C. Make solvent cemented joints in accordance with recommendations of manufacturer.
- D. Install PVC conduits in accordance with NEC and in compliance with local utility practices.
- E. Conduit and elbows shall be installed on the secondary side at power company's transformers. Wire and cable installation shall be such that wire pulling rope or cable will not damage elbows.
- F. Conduit, elbows, and risers shall be installed for all primary services per Utility and Owner requirements.
- G. All elbows shall be RMC, except where required otherwise by Utility.
- H. All risers shall be RMC, except where required otherwise by Utility.

3.13 General Conduit Fitting Requirements:

- A. Grounding type bushings shall be installed on all feeder and subfeeder conduits entering panelboards, pull boxes, and transformers and all conduit entering oversized, concentric, and eccentric knock-outs.
- B. Miscellaneous fittings such as reducers, chase nipples, 3 piece unions, split couplings, and plugs shall be designed and listed for the specific use.
- C. Provide either plastic bushings or plastic insulating throats for all fittings prior to pulling wire.
- D. Install insulated-type bushings for terminating conduits 1" and larger. Bushings are to have flared bottom and ribbed sides. Upper edge shall have phenolic insulating ring molded into bushing. Bushings shall be installed during rough-in and before installing conductors.
- E. Snap-on bushings are prohibited.

3.14 Threaded Conduit Fitting Requirements:

- A. Provided locknuts for securing conduit to metal enclosure with sharp edge for digging into metal, and ridged outside circumference for proper fastening.
- B. Bushings for threaded conduits smaller than 1" shall have flared bottom and ribbed sides, with smooth upper edges to prevent injury to cable insulation. Bushings shall be installed during rough-in and before pulling wire.
- C. Bushing of standard or insulated type shall have screw type grounding terminal. Bushings shall be installed on all threaded conduit.

3.15 Pathways for Telecom Cables:

- A. General

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1. Label all pathways for telecom cables in accordance with UF IT Labeling Standard. Refer to Appendix 1 of the University of Florida Telecommunications Standard.
- B. Cable Trays
1. Cable trays shall have devices installed at all corners and bends to protect cables and prevent minimum bend radius from being violated.
 2. Cable tray shall be trapeze- or wall-hung. Center-supported cable tray is not acceptable. Wall hung cable trays shall additionally be supported by threaded rod on the side of the cable tray farther from the wall.
- C. Conduits for Telecom Cables
1. Conduits intended for telecom cables shall not exceed the following:
 - a. Two 90° bends, turns, sweeps, etc. between pull boxes,
 - b. A total of 270° of bends, turns, sweeps, offsets, etc. between pull boxes,
 - c. 100' length between pull boxes, or
 - d. 200' total length.
 2. Changes in direction shall be made with sweeps, elbows, etc. Changes in direction shall not be made in pull boxes.
 3. Conduit bodies are not acceptable for telecom conduits, regardless of whether they may be used elsewhere in the project. This is not intended to indicate that conduit bodies are acceptable for other purposes.
 4. Ream and bush all conduits intended for telecom cables.
 5. Provide a 200lb nylon pull cord in each conduit intended for telecom cables.
 6. Provide a minimum of one 1" conduit from each work area outlet (telecom outlet box) to the nearest cable tray. Where no cable tray is within 30 feet, route conduit to nearest telecom room.

END OF SECTION

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SECTION 26 05 34

BOXES AND FITTINGS

PART 1 - GENERAL

1.1 Related Documents:

- A. Conform to Division 1 and other sections of this division.
- B. This Section is a general Division 26 materials and methods section, and applies to all other Division 26 sections involving materials and methods specified herein.

1.2 Description of Work:

- A. Extent of electrical box and associated fitting work is indicated by drawings and schedules.
- B. Types of electrical boxes and fittings specified in this Section include the following:
 - 1. Outlet boxes.
 - 2. Junction boxes.
 - 3. Pull boxes.
 - 4. Floor boxes.

1.3 Codes and Standards:

- A. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical wiring boxes and fittings.
- B. UL Compliance: Comply with applicable requirements of UL 50, UL 514 Series, and UL 886 pertaining to electrical boxes and fittings. Provide electrical boxes and fittings which are UL listed and labeled.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers:

- A. All products shall be the produce of reputable and reliable manufacturers.
- B. The following manufacturers are recognized as being reputable and reliable:
 - 1. CDR
 - 2. Hubbell-Raco
 - 3. MacLean Highline
 - 4. Republic Steel
 - 5. Square D
 - 6. Thomas & Betts
 - 7. Quazite
 - 8. Wiremold
 - 9. Legrand
- C. Additional manufacturers shall be considered reputable and reliable only if they verifiably satisfy the following requirements:
 - 1. History: Acceptable manufacturers shall have a history of producing similar products at least the past ten years. Such products shall have been sold in the state of Florida for at least the past five years.
 - 2. Volume: Acceptable manufacturers shall have produced and sold similar products in excess of one hundred (100) times annually the amount of product

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projected for used in this project. This requirement shall apply to each of the past ten years.

3. Similar projects: Acceptable manufacturers shall have sold similar products which have been used in at least five similar projects in the past five years. Similar projects must be of a similar use, overall cost, and overall size.

- D. Documentation of the above manufacturer requirements shall be provided to Engineer upon request, but is otherwise unnecessary. If documentation is required, it shall consist of a signed statement from Manufacturer's representative on Manufacturer's letterhead (or the letterhead of Manufacturer's approved representative). Additional documentation may be required in rare cases.
- E. Any submittal by Contractor shall be considered indication by Contractor that Contractor stands behind for the suitability of a manufacturer, and that the manufacturer satisfies of the above requirements.
- F. Contact Engineer prior to bid with any questions regarding acceptable manufacturers.

2.2 Products – Fabricated Materials:

A. Outlet Boxes:

1. Outlet wiring boxes shall be galvanized coated flat rolled sheet steel, of shapes, volumes, and dimensions as indicated, suitable for installation at respective locations.
2. Outlet boxes shall be constructed with mounting holes, and with cable and conduit size knockout openings in bottom and sides.
3. Minimum dimensions for device boxes, junction boxes, pull boxes, and other boxes in walls shall be a minimum of:
 - a. four inch (4") square, two and one-eighth inch (2-1/8") deep for telecommunications devices, and
 - b. four inch (4") square, one and one-half inch (1-1/2") deep for all other boxes.
4. Dimensions of ceiling boxes shall be a minimum of:
 - a. four inch (4") square or octagonal, one and one-half inch (1-1/2") deep for exposed work or furred ceiling work, and
 - b. three inches (3") deep for concrete work.
5. Plaster rings and/or fixture studs shall be provided where required.
6. Flush-mounted boxes shall be provided with extension rings and/or covers with sufficient depth to bring the covers flush with the finished wall.
7. Outlet boxes for exposed wall mounting shall be cast metal type "FS" or "FD" boxes with suitable cast aluminum covers.
8. Exterior boxes:
 - a. All exterior boxes shall be appropriately listed or indicated for the use.
 - b. Boxes for exterior receptacles shall be provided with in-use weatherproof receptacle covers. Such covers shall have spring hinged lids.
 - c. Weatherproof covers shall meet code requirements for covers intended for use with attachment plugs.
9. Sectional or gangable boxes shall not be installed.
10. Through-wall boxes shall not be installed.
11. Box extensions or "goofings" shall not be installed.
12. "Handy" boxes, etc. shall not be permitted.

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- B. All pull boxes used outside and underground shall be pre-cast concrete polymer, with concrete polymer cover. Such boxes shall be of sufficient size to make all entrances and exits from box in one horizontal plane.
- C. Junction and Pull Boxes: Provide galvanized code gauge sheet steel junction and pull boxes, with screw on covers; of types, shapes and sizes, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws, and washers.
- D. Floor Boxes: Provide raintight adjustable floor boxes as indicated, with threaded conduit entrance ends, and vertical adjusting rings, gaskets, brass floor plates with flush screw on covers with ground flange and stainless steel cover screws. Carpet and tile plates to be brass.
- E. Cover Plates:
 - 1. All cover plates shall be abuse resistant nylon or stainless steel.

PART 3 - EXECUTION

3.1 General:

- A. Install all electrical boxes and fittings as indicated, in accordance with manufacturer's instructions, applicable code, and recognized industry practices, to fulfill project requirements.
- B. The location of any pull box shall be approved by Architect and Owner before installation, unless said pull box is installed in an accessible above-ceiling space, or a dedicated mechanical or electrical room.
- C. Coordinate installation of electrical boxes and fittings with wire/cable, wiring devices, and raceway installation work.
- D. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.
- E. Provide knockout closures to cap unused knockout holes where blanks have been removed.
- F. All outlet and device boxes shall be independently supported from structure.
- G. Install electrical boxes only in accessible locations.
- H. Orient all boxes for ease of accessibility. Install overhead boxes cover-down unless otherwise directed.
- I. Coordinate all boxes with other trades.
 - 1. Any box without a minimum 6" front clearance will be adjusted or reinstalled at Contractor's expense.
 - 2. Any box installed such that access is effectively blocked by other trades shall be adjusted or reinstalled at Contractor's expense.
- J. Secure electrical boxes firmly and rigidly to structure, or solidly embed electrical boxes in concrete or masonry.
- K. Protect installed boxes from construction debris and damage.
- L. All outside, above grade pull boxes shall be galvanized.
- M. All flush mounted boxes, regardless of system or voltage, shall be installed flush within 1/8" of wall finish or finished face of tackboards, sound boards, cabinets, etc. Box extension or goof rings shall not be installed.
- N. Boxes shall not be installed back-to-back.
- O. Boxes within the same stud cavity shall be separated by a minimum of 12".
- P. Boxes for flush mounting in concrete block:
 - 1. Boxes for flush mounting in concrete block shall be provided covers with square

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- corners on the raised portion of the cover.
- 2. Such covers shall be of sufficient depth to be flush with the face of the block.
- 3. The bottom side of the covers or boxes shall be installed at the masonry course nearest to the dimension specified or noted, but not more than applicable code.
- 4. Boxes installed in block walls shall be secured in place with mortar.
- 5. Boxes shall be flush with any combustible surface including black splash, tack board or sound board.

Q. Exterior Boxes:

- 1. Unless otherwise noted, exterior boxes on walls shall be installed flush with wall. Coordinate with masonry as required.
- 2. Provide suitable installation for each application, including face plate gaskets and corrosion resistant plugs and fasteners.

3.2 Boxes in Rated Partitions:

- A. Maintain all fire and heat ratings by installing boxes in rated partitions according to a UL detail for an acceptable product. No UL rating detail shall be used prior to approval by Architect.
- B. All boxes installed in rated walls shall be rigidly secured to structure.
- C. All voids between boxes and surrounding wall surfaces shall be completely filled with an approved material.

3.3 Outlet Boxes:

- A. Position recessed outlet boxes accurately to allow for surface finish thickness.
- B. Set floor boxes level and flush with finish flooring material.
- C. Outlet Box Accessories: Provide compatible outlet box accessories as required for installation, including:
 - 1. box supports,
 - 2. bonding accessories,
 - 3. mounting ears and brackets,
 - 4. wallboard hangers,
 - 5. box extension rings,
 - 6. fixture studs,
 - 7. cable clamps, and
 - 8. metal straps for supporting outlet boxes.
- D. Rigidly support all outlet boxes from both sides, or from back, such that box cannot move or deflect into the wall when devices are installed or modified.

3.4 Identification:

- A. Box lids and conduit couplings shall be color coded as follows:
 - 1. 120/208V Wye: Black, with hand written white labels.
 - 2. 277/480V Wye: Brown
 - 3. Fire Alarm: Red
 - 4. Telecom: Blue
 - 5. All others: Paint a unique color.
 - 6. Exception: Coordinate color coding requirements with Architect and Owner where boxes are visible in public spaces.
- B. Covers of all junction boxes, pull boxes, etc. shall be marked by circuit number using indelible ink, 3/4" minimum height. Locate marker so it can be readily identified without

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removal of the cover plate.

1. Exception: Where box covers are visible in public spaces, marker label shall be on the inside of the box cover.

END OF SECTION

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SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 Related Documents:

- A. Conform to Division 1 and other sections of this division.
- B. This Section is a Division 26 Basic Electrical Materials and Methods section, and is part of each Division 26 section making reference to wiring devices specified herein.

1.2 Description of Work:

- A. Extent of electrical identification work is indicated by drawings, schedules, and other specification sections.
- B. Types of electrical identification work specified in this Section include the following:
 - 1. Equipment/System identification signs.
- C. See other specification sections for additional identification requirements for specific equipment and system components. Where electrical system signage is called for elsewhere in the Contract Documents, but not described in detail, provide signage per the requirements of this section.

PART 2 - PRODUCTS

2.1 Electrical Identification Materials:

- A. Engraved Plastic Laminate Signs:
 - 1. Provide engraving stock melamine plastic laminate, in sizes and thicknesses indicated.
 - 2. Engrave with engraver's standard letter style, of sizes and wording indicated.
 - 3. Default color shall be white face with black core plies, resulting in black letters on a field of white. Provide alternative colors as indicated on plans or in other specification sections.
 - 4. Signs for Fire Alarm warning systems shall be red face and white core plies, resulting in white letters on a field of red.
 - 5. Thickness: Minimum one-sixteenth inch (1/16"), except as otherwise indicated.
 - 6. Fasteners: Self-tapping stainless steel screws, except contact type permanent adhesive where screws cannot or should not penetrate substrate.

2.2 Lettering and Graphics:

- A. General: Coordinate names, abbreviations, and other designations used in electrical identification work with corresponding designations shown, specified or scheduled.
- B. Provide numbers, lettering, and wording as indicated, or, if not otherwise indicated, as recommended by manufacturer or as required for proper identification and operation/maintenance of electrical systems and equipment.

PART 3 - EXECUTION

3.1 Application and Installation:

- A. General Installation Requirements:

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1. Install electrical identification products as indicated, in accordance with manufacturer's written instructions, and requirements of NEC.
2. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.
3. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

B. Equipment/System Identification:

1. Provide engraved plastic laminate signs with text matching terminology and numbering of the contract documents. Provide signs for each unit of the following categories of electrical work:
 - a. Panelboards,
 - b. Electrical cabinets,
 - c. Disconnect enclosures,
 - d. Access panels/doors to electrical facilities,
 - e. Terminal cabinets,
 - f. Fire alarm control panels,
 - g. Fire alarm extender panels,
 - h. Any other enclosure housing active components.
2. Unless otherwise noted, install signs and labels to maximize visibility and readability without interference with operation and maintenance of equipment.
3. All power junction box covers shall be marked with panel name and circuit numbers. All other (Fire Alarm, intercom, etc.) junction box covers shall be marked according to system type. These markings shall be made with a permanent type marker.
4. Panel schedules shall be typed, and shall indicate room numbers and load information.
5. Above ceiling identification: to electrical equipment installed above finished ceiling, identification shall be placed:
 - a. on access panel,
 - b. next to access panel, or
 - c. on to a permanent part of the ceiling system, such as a tee-bar of a lay-in type ceiling.
6. Secure all labels and signs to substrate with approved fasteners, unless fasteners would violate listings or create an unsafe condition. Where fasteners cannot be used, utilize approved permanent adhesive means of attachment.

C. Other systems:

1. See specifications for raceway, wiring, and wiring devices for additional labeling and identification requirements.

END OF SECTION

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SECTION 26 27 26

GENERAL WIRING DEVICES

PART 1 - GENERAL

1.1 Related Documents:

- A. Conform to Division 1 and other sections of this division.
- B. This Section is a general Division 26 materials and methods section, and applies to all other Division 26 sections involving materials and methods specified herein.

1.2 Description of Work:

- A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems which are intended to carry but not utilize electric energy.
- B. Types of electrical wiring devices in this Section include the following:
 - 1. Receptacles
 - 2. Ground Fault Circuit Interrupters
 - 3. Switches
 - 4. Wall Plates

1.3 Codes and Standards:

- A. NEC Compliance: Comply with NEC as applicable to installation and wiring of electrical wiring devices.
- B. UL Compliance: Comply with applicable requirements of UL 20, 486A, 498, and 943 pertaining to installation of wiring devices. Provide wiring devices which are UL listed and UL-labeled.

1.4 Submittals:

- A. Submit in accordance with General, Supplementary, and Special Conditions.
- B. Product Data: Submit manufacturer's data on electrical wiring devices.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers:

- A. Manufacturers: Subject to compliance with requirements, manufacturers providing wiring devices which may be incorporated in the work include, but are not limited to, the following (for each type and rating of wiring device):
 - 1. Hubbell, Inc.
 - 2. Leviton Manufacturing Co., Inc.
 - 3. Pass and Seymour, Inc.
 - 4. Eaton, Inc.

2.2 Fabricated Wiring Devices:

- A. General: Provide factory fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and which comply with NEMA Stds. Pub/No. WD.
 - 1. Normal Power: Provide white color devices except as otherwise indicated.
 - 2. Emergency Power: Provide red color devices except as otherwise indicated.

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3. Optional Standby Power: Provide red color devices except as otherwise indicated.
4. Receptacles:
 - a. Receptacles shall be specification grade, with back-fed wiring connections.
 - b. All receptacles shall be duplex NEMA 5-20R unless indicated otherwise.
 - c. Base receptacle shall be NEMA 5-20R. Leviton 'S' Series (e.g. 5362-SW) is not acceptable. Provide additional features as described below.
 - d. Weatherproof: All receptacles marked 'WP' on plans shall be weatherproof-type, and shall be marked 'WP'. Such receptacles shall also be WR type unless otherwise indicated.

B. Switches:

1. Snap: Provide toggle switches, rated 20 amps at 120/277 volts, quiet type, UL I without derating for tungsten lamp loads or inductive loads. The following catalog numbers are Leviton. "Slim" series (e.g. 1221S) are forbidden.

Type	Catalog No.
Single Pole	1221
Two Pole	1222
Three Way	1223
Four Way	1224

2.3 Wiring Device Accessories:

A. Wall Plates:

1. Unless otherwise indicated, wall plate material shall be as follows:
 - a. Interior finished spaces: Nylon.
 - b. Interior unfished spaces: Galvanized.
 - c. Exterior: Cover as part of weatherproof assembly.
2. Provide commercial specification grade wall plates for single and combination wiring devices, of types, sizes, and with ganging and cutouts as indicated. Select plates which mate and match wiring devices. Construct with metal screws for securing plates to devices: screw heads to match finish of plates.

PART 3 - EXECUTION

3.1 Installation of Wiring Devices:

- A. Install wiring devices as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.
- B. Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt, and debris.
- C. Install wiring devices after wiring work is completed and inspected.
- D. Install wall plates after painting work is completed.
- E. Rear wire all wiring device connections. Side terminations are forbidden.
- F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A and B. Use

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properly scaled torque indicating hand tool.

- G. Orient all receptacles with the ground pin up, except:
 - 1. Where receptacle serves equipment which may have a 90° plug, orient receptacle ground pin down.
 - 2. Orient horizontally installed receptacles (e.g. receptacles in surface raceway) with the neutral pin up.

3.2 Protection of Wallplates and Receptacles:

- A. At time of substantial completion, replace any wall plates and/or receptacles which have been damaged during construction, including those burned and scored by faulty plugs.

3.3 Grounding:

- A. Provide equipment grounding connections for all wiring devices, unless otherwise indicated. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounds. Grounding conductor shall be bonded to all boxes with a separate screw. Screws used to support boxes are not to be used for grounding. Bonding screws shall be installed in box during rough-in installation. Bonding screws shall be green hexagonal type.

3.4 Identification:

- A. Switches: Each light switch shall be marked by circuit number using a numbered vinyl cloth adhesive marker, 1/4" minimum height. Locate marker behind cover plate so it can be readily identified by removal of the cover plate. Thomas and Betts E-Z Code Markers are acceptable.
- B. Receptacles: Each receptacle shall be marked by circuit number using a numbered vinyl cloth adhesive marker, 1/4" minimum height. Locate marker behind cover plate so it can be readily identified by removal of the cover plate. Thomas and Betts E-Z Code Markers are acceptable.
- C. Provide label on coverplate according to UF Standards.

3.5 Testing:

- A. Prior to energizing circuitry, test wiring for electrical continuity, and for short circuits. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements.

END OF SECTION

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SECTION 26 28 16

HEAVY DUTY SAFETY SWITCHES

PART 1 - GENERAL

1.1 Summary:

- A. Scope: Provide labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for safety switches as required for the complete performance of the work, and as shown on the drawings and as herein specified.
- B. Section Includes: the work specified in this section includes, but shall not be limited to, the following:
 - 1. Switches shall be furnished and installed at locations as shown on the drawings. Switches shall be of the type approved, indicated, and specified herein.

1.2 Submittals:

- A. General: See submittal procedures in Division 1.
- B. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the drawings and specifications. Clearly indicate all variations and options proposed for installation.
- C. Shop Drawings: Submit scaled shop drawings depicting the intended installation location for each safety switch, relevant clearance requirements, and all other equipment intended for installation nearby. Indicate all relevant dimensions, and document that installation is feasible as proposed.
- D. Include safety switches in dimensioned electrical room shop drawings.

1.3 Operation and Maintenance:

- A. Operation and Maintenance Data: Prior to substantial completion, submit operation and maintenance data for safety switches. Submit as indicated in Section 26 00 00 and Division 1.

1.4 Quality Assurance:

- A. Qualifications:
 - 1. Manufacturer qualifications: Manufacturer shall be a firm engaged in the manufacture of safety switches of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of five years.
 - 2. Installer qualifications: Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing safety switches similar in type and scope to that required for this project and shall be approved by the manufacturer.
 - 3. Documentation of qualifications, examples of past projects, and references, shall be provided to owner and/or engineer upon request, but are not required as part of the standard submittal procedure.
- B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of federal, state, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

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1. Without limiting the generality of other requirements of this section, all work specified herein shall conform to or exceed the applicable requirements of the following standards; provided, that wherever the provisions of said publications are in conflict with the requirements specified herein, the more stringent requirements shall apply:
 - a. Switches shall be manufactured in accordance with the following standards:
 1. UL 98 - enclosed and dead front switches
 2. NEMA KS 1 - enclosed switches
 3. NEMA 250 - enclosures for electrical equipment
- 1.5 Delivery, Storage, and Handling:
 - A. Deliver materials to the project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
 - B. Store materials in their original, undamaged packages and containers, inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
- 1.6 Warranty:
 - A. General: See closeout procedures in Division 1.
 - B. Special Warranty: Submit a written warranty executed by the manufacturer, the installer, and the contractor, agreeing to repair or replace safety switches that fail in materials or workmanship within the specified warranty period.
 1. Warranty period: Warranty period shall be one year from the date of substantial completion.
- 1.7 Operation and Maintenance:
 - A. Operation and Maintenance Data: Prior to substantial completion, submit operation and maintenance data for light fixtures. Submit as indicated in Section 26 00 00 and Division 1.

PART 2 - PRODUCTS

- 2.1 Manufacturers:
 - A. Approved Manufacturers: All safety switch products shall be the produce of one of the following:
 1. Square D (Schneider Electric)
 2. Bussmann (Eaton)
 3. General Electric
 4. Siemens
 - B. Basis of Design:
 1. Items specified are to establish a standard of quality for design, function, materials, and appearance.
 2. Equivalent products by other manufacturers are acceptable.
 3. The design professional will be the sole judge of the basis of what is equivalent.
 4. Any adjustments required to meet equivalency requirements shall be at contractor's expense.
 5. See drawings for additional basis of design information.

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2.2 Materials and Components:

A. General:

1. Minimum voltage rating shall be for the voltage indicated and scheduled on the drawings.
2. Minimum horsepower ratings shall be as indicated and scheduled on the drawings.
3. Minimum per-phase continuous current ratings shall be as indicated and scheduled on the drawings.
4. Fuses shall be provided as indicated on the drawings. Fuse clip current rating shall match equipment rating. Fuse current ratings shall be as indicated and scheduled on the drawings.
5. Provide 10% spare fuses, with a minimum of 3 spare sets. Spare fusing shall be provided within weatherproof containers for long-term storage (such as in ammo cans). Spray paint container with the wording "Spare Fuses" on the side.
6. Minimum neutral continuous current ratings shall be as indicated and scheduled on the drawings.
7. Minimum short circuit current rating shall be as indicated and scheduled on the drawings, in RMS symmetrical amperes at the AC voltage indicated for the safety switch.
8. Enclosure NEMA rating shall be as indicated and scheduled on the drawings.
9. Safety switches shall be suitable for use as service equipment when application requirements comply with UL 67 and NEC articles 230.

B. Switch Interior:

1. All switches shall have switch blades which are visible when the switch is off and the cover is open.
2. Lugs shall be front removable and UL listed for 75°C conductors.
3. All current carrying parts shall be plated to resist corrosion.
4. Switches shall have removable arc suppressors to facilitate easy access to line side lugs.
5. Switches shall have provisions for a field installable electrical interlock.

C. Grounding:

1. A solidly bonded copper equipment ground bar shall be provided.

D. Identification:

1. Nameplates shall contain product information and catalog number or factory order number. UL-listed label, and short circuit current rating shall be displayed on the interior.

E. Switch Mechanism:

1. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.
2. The operating handle shall be an integral part of the box, not the cover.
3. Provisions for padlocking the switch in the off position with a padlock shall be provided.
4. The handle position shall travel at least 90° between off and on positions to clearly distinguish and indicate handle position.

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5. All switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is on and prevent turning the switch on when the cover is open. The cover interlock mechanism shall have an externally operated override but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

F. Switch Enclosure:

1. General:
 - a. All switches shall have provisions to accept up to three 3/8 in hasp padlocks to lock the operating handle in the off position.
 - b. The enclosure shall have on and off markings stamped into the cover.
 - c. The operating handle shall be provided with a dual colored, red/black position indication.
2. Type 1:
 - a. Type 1 switch covers shall be attached with welded pin-type hinges.
 - b. Type 1 enclosures shall be finished with grey baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated steel.
 - c. Type 1 enclosures for switches rated 30-200A shall be provided with tangential knockouts to facilitate ease of conduit entry.
3. Type 3R:
 - a. NEMA 3R switch covers shall be top hinged, attached with removable screws and securable in the open position (type 3R).
 - b. Type 3R enclosures shall be finished with grey baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated galvanized steel.
 - c. Type 3R enclosures for switches rated 30-200A shall be provided with tangential knockouts to facilitate ease of conduit entry.
 - d. Type 3R enclosures through 200 ampere shall have provisions for interchangeable bolt-on hubs in the top endwall.

2.3 Elevator Disconnect Switch:

- A. The basis of design for safety switches connected to elevator equipment shall be Bussmann Quik-Spec power module switch elevator disconnect.
- B. Elevator equipment safety switches shall meet the following ratings:
 1. Voltage: As indicated on drawings.
 2. Amps/horsepower: As indicated on drawings.
 3. SCCR: 100kA or greater.
 4. Neutral lug matching phase rating.
 5. Enclosure NEMA type as indicated on drawings.
- C. Elevator equipment safety switches shall be provided with the following options:
 1. Integral 120V shunt trip.
 2. Integral 120V-secondary control transformer (match primary voltage indicated on drawings).
 3. Fire safety interface relay: 24VDC (for shunt-trip activation).
 4. Key test switch.
 5. Red on pilot light.
 6. A minimum of one NO/NC auxiliary contact.

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7. 1-pole relay for remote voltage monitoring.

PART 3 - EXECUTION

3.1 Examination:

- A. Verification of Conditions: examine areas and conditions under which the work is to be installed, and notify the contractor in writing, with a copy to the owner and the architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
 1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the installer.

3.2 Installation:

- A. General: install safety switches and accessories in accordance with reviewed product data, final shop drawings, manufacturer's written instructions and recommendations, and as indicated on the drawings.
 1. Install safety switches in accordance with manufacturer's written instructions, NEMA PB 1.1, and NEC standards.
 2. Install and configure software in accordance with manufacturer's written instructions.

3.3 Field Quality Control:

- A. Inspect complete installation for physical damage, proper alignment, anchorage, and grounding.
- B. Check tightness of bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.

3.4 Protection:

- A. Provide final protection and maintain conditions in a manner acceptable to the installer, that shall ensure that the safety switches shall be without damage at time of substantial completion.

END OF SECTION

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SECTION 26 51 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 Summary:

- A. Scope: Provide labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for interior lighting as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
- B. Section Includes: The work specified in this Section includes, but shall not be limited to, the following:
 - 1. Provide interior lighting fixtures as specified herein and where shown and scheduled on the Drawings.
 - 2. Provide all necessary accessories and appurtenances as required for a functional installation of the interior lighting system.

1.2 Submittals:

- A. General: See submittal procedures in Division 1.
- B. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Clearly indicate all variations and options proposed for installation.

1.3 Operation and Maintenance:

- A. Operation and Maintenance Data: Prior to substantial completion, submit operation and maintenance data for light fixtures. Submit as indicated in Section 26 00 00 and Division 1.

1.4 Quality Control:

- A. Qualifications:
 - 1. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of light fixtures of types, sizes, and performance required, and whose products have been in satisfactory use in similar service for a minimum of five years.
 - 2. Installer Qualifications: Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing light fixtures similar in type and scope to that required for this Project and shall be approved by the manufacturer.
 - 3. Documentation of qualifications, examples of past projects, and references, shall be provided to Owner and/or Engineer upon request, but are not required as part of the standard submittal procedure.
- B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.
 - 1. Without limiting the generality of other requirements of this Section, all work specified herein shall conform to or exceed the applicable requirements of the

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following standards; provided, that wherever the provisions of said publications are in conflict with the requirements specified herein, the more stringent requirements shall apply:

- a. NFPA 70, National Electrical Code
 - b. ANSI/UL 1598-08 NMX-J-307/1-ANCE/C22.2 NO.250.0-08, Luminaires
 - c. ANSI/UL 8750-2015 - Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products
 - d. UL 924 10th Edition - Standard for Emergency Lighting and Power Equipment
- C. Pre-Installation Conference: Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades. Pre-installation conference shall include, but shall not be limited to, the Contractor, the Installer, manufacturer's representatives, and any trade that requires coordination with the work. Date and time of the pre-installation conference shall be acceptable to the Owner and the Architect.
- D. Single Source Responsibility: Obtain each type of light fixture and required accessories from a single source with resources to produce products of consistent quality in appearance and physical properties without delaying the work. Any materials which are not produced by the manufacturer shall be acceptable to and approved by the manufacturer. This is not meant as a requirement that all light fixtures come from a single source. All parts and accessories for each individual light fixture shall meet this requirement.

1.5 Delivery, Storage, and Handling:

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. Store materials in their original, undamaged packages and containers, inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 Warranty:

- A. General: See closeout procedures in Division 1.
- B. Special Warranty: Submit a written warranty executed by the manufacturer, the Installer, and the Contractor, agreeing to repair or replace light fixtures that fail in materials or workmanship within the specified warranty period.
 - 1. Warranty Period: Warranty period shall be one year from the date of substantial completion.
- C. Provide additional Manufacturer's warranty information, as applicable.
- D. Per UF Standards, provide minimum two year warranty for mechanical defects. Warranty shall include parts and labor.
- E. Per UF Standards, provide minimum five year warranty for defective materials, including light source and driver. Warranty shall include parts and labor.

PART 2 - PRODUCTS

2.1 Manufacturers:

- A. Basis of Design:
 - 1. Items specified are to establish a standard of quality for design, function,

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- materials, and appearance.
- 2. Unless specifically noted otherwise, all Basis of Design light fixtures are open to submission of equivalent products.
- 3. The Design Professional will be the sole judge of the basis of what is equivalent.
- 4. Equivalency will be decided on quality, performance, aesthetics, and maintainability.
- 5. Owner will be given the opportunity to reject specific manufacturers of equivalent materials based on negative past experience.
- 6. Any adjustments required to meet equivalency requirements shall be at Contractor's expense.
- 7. See Drawings for schedules indicating additional Basis of Design information.

2.2 Materials and Components:

A. General:

- 1. Color temperature shall be as indicated on the Light Fixture Schedule.
- 2. Luminous output shall be as indicated on the Light Fixture Schedule. Alternate fixtures within 5% do not require justification.
- 3. Fixture or lamp life rating in hours shall be per the Basis of Design. Life rating for LED fixtures shall be to 70% or 90% intensity per the Basis of Design.
- 4. CRI shall be per the Basis of Design.
- 5. Where not specified elsewhere, Color Rendering Index (CRI) [Ra] ≥ 80 .
- 6. R9 value shall be per the Basis of Design. (Note: R9 is a color rendering criterion providing additional information beyond CRI.)
- 7. Where not specified elsewhere, R9 value shall be positive.
- 8. TM-30 data shall be comparable to the Basis of Design, as determined by the Design Professional. (Note: TM-30 are color rendering criteria providing additional information beyond CRI.)
- 9. Where not specified elsewhere, TM-30 ratings: 'Rf ≥ 75 , Rg ≥ 95 , and Rcs,h1 $\geq 8\%$.
- 10. Minimum rated life shall be comparable to Basis of Design, as determined by the Design Professional.
- 11. Where not specified elsewhere, minimum rated life shall be 68,000 hours at L70.
- 12. Materials (steel, aluminum, acrylic, polycarbonate, etc.) shall be per the basis of design.
- 13. Environmental ratings shall be per the Basis of Design.
- 14. Additional considerations shall be per notes on the Light Fixture Schedule and on the Drawings.
- 15. Confirm all finishes with Owner and Architect prior to ordering.
- 16. Per UF Standards, all fixtures shall be rated for a minimum of 80% output at 10 years of operation.

B. Compatibility with controls:

- 1. Per UF Standards, certify that fixtures have been tested, or will be tested, for flicker with controls as specified, including dimming.

C. Environmental Considerations:

- 1. All exterior fixtures shall be indicated for use in wet locations, even where installed in damp or dry locations.
- 2. Interior fixtures subject to high humidity or moisture shall be suitable for use in wet locations. This includes light fixtures for showers.

D. Construction/Finish:

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1. No visible welding, no plane-protruding screws, latches, springs, hooks, rivets or plastic supports viewed from the occupied (room) side are allowed.
- E. Maintainability:
 1. Power supplies/drivers/ballasts, LED arrays, boards or light engines shall be easily field replaceable using common hand tools (e.g., screwdrivers, pliers, etc.) and without uninstalling the luminaire.
- F. Maintenance Materials:
 1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - a. Fixtures: One for every thirty of each type and rating installed. Furnish at least one spare fixture for any type of fixture with at least ten units being installed by this project.
 - b. Lamps: One for every ten of each type and rating installed, rounded up. Furnish at least one of each type.
 - c. Track Heads: One for every ten of each type and rating installed, rounded up. Furnish at least one spare head for any type of head with at least ten units being installed by this project.
 - d. Diffusers and Lenses: One for every twenty of each type and rating installed, rounded up. Furnish at least one of each type.
 - e. Globes and Guards: One for every thirty of each type and rating installed, rounded up. Furnish at least one of each type.

PART 3 - EXECUTION

3.1 Examination:

- A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 Temporary Lighting:

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting.
- B. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.
- C. Contractor is responsible for replacing any light fixtures damaged over the course of construction.

3.3 Installation:

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Provide lamps in each luminaire.
- D. Supports:
 1. Sized and rated for luminaire weight.
 2. Able to maintain luminaire position after cleaning and relamping.

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3. Provide support for luminaire without causing deflection of ceiling or wall.
 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
 5. Fixtures larger than 24"x24" shall be supported by all four corners.
 6. Fixtures 24"x24" and smaller shall be supported by two corners.
- E. Flush-Mounted Luminaire Support:
1. Secured to outlet box.
 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 3. Trim ring flush with finished surface.
 4. Do not use ceiling system as support for pendant luminaires.
- F. Wall-Mounted Luminaire Support:
1. Attached to structural members in walls.
 2. Utilize back plates and/or other support methods were recommended by the manufacturer.
 3. Do not attach luminaires directly to gypsum board.
- G. Ceiling-Mounted Luminaire Support:
1. Do not support fixture from gypsum board.
 2. Support fixture from structure, as required by the assembly.
 3. Install per manufacturer's recommendations.
- H. Suspended Luminaire Support:
1. Provide architectural finish items (escutcheons, etc.) at all ceiling penetrations. Coordinate finish with Architect.
 2. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 4. Continuous Rows of Luminaires: Coordinate method of suspension with Architect.
 5. Do not use ceiling system as support for suspended luminaires. Connect support wires or rods to building structure.
- I. Ceiling-Grid-Mounted Luminaires:
1. Secure to any required outlet box.
 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- 3.4 Identification:
- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Electrical Identification".
 - B. Per UF Standards, label each light fixture with a date of installation.

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3.5 Field Quality Control:

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.
- D. Per UF Standards, certify that all light fixtures have been tested for flicker after installation of all lighting controls.

3.6 Adjusting:

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Architect.

3.7 Protection:

- A. Provide final protection and maintain conditions in a manner acceptable to the Installer, that shall ensure that the light fixtures shall be without damage at time of Substantial Completion.

3.8 Cleaning:

- A. Clean fixture surfaces of dirt, cement, plaster, and debris. Utilize cleansers compatible with fixture finishes and materials.

3.9 Training:

- A. Provide up to four hours of training from a factory authorized-representative, up to two sessions.
- B. Schedule training with Owner.
- C. Provide DVD recording of all training sessions. Ensure that audio is clear and intelligible.

END OF SECTION

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SECTION 28 00 00

ELECTRONIC SAFETY AND SECURITY GENERAL

PART 1 - GENERAL

- 1.1 The work covered by this division consists of providing all labor, equipment, and materials and performing all operations necessary for the installation of the electronic safety and security work as herein called for and shown on the drawings.
- 1.2 Related Documents:
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
 - B. This is a Basic Requirements Section. Provisions of this section apply to work of all Division 28 sections.
 - C. Review all other contract documents to be aware of conditions affecting work herein.
 - D. Definitions:
 1. Provide: Furnish and install, complete and ready for intended use.
 2. Furnish: Supply and deliver to project site, ready for subsequent requirements.
 3. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.
- 1.3 Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto.
- 1.4 Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions, or inaccuracies of the said data.
- 1.5 Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.
- 1.6 Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be construed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.
- 1.7 Field Measurements and Coordination:
 - A. The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.
 - B. Verify all field dimensions and locations of equipment to ensure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.
 - C. Coordinate work in this division with all other trades in proper sequence to ensure that

MG: 18150
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ELECTRONIC SAFETY AND SECURITY GENERAL
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the total work is completed within contract time schedule and with a minimum cutting and patching.

- D. Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on electronic safety and security drawings, be guided by architectural details and conditions existing at job and coordinate this work with that of others.
- E. Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval.
- F. Carefully examine any existing conditions, wiring, devices, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.
- G. Because of the small scale of the drawings, it is not possible to indicate all precise locations for all devices and equipment. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate devices, equipment, and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or raceway cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8 Guarantee:

- A. The Contractor shall guarantee labor, materials, and equipment for a period of one (1) year from Substantial Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.
- B. Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

1.9 Approval Submittals:

- A. When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.
 - 1. Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.
 - a. Submittals shall be properly organized in accordance with the approved submittal control log.
 - b. Submittals shall not include items from more than one specification section in the same submittal package unless approved in the submittal control log.
 - c. Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers

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- in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.
- d. Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date on the cover sheet.
 - e. Submittals that include a series of fixtures or devices (such as control panels, initiating devices, or notification appliances) shall be organized by the device name or type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether those items are used on other fixtures.
 - f. The electronic safety and security design shown on the drawings supports the equipment basis of design specifications at the time of design. If equipment by any division is submitted with different electronic safety and security requirements, it is the responsibility of the submitting contractor to resolve all required electronic safety and security design changes (wire and conduit size, point(s) of connection, etc.) and clearly show the proposed electronic safety and security configuration in the relevant submittal with a written statement that this change will be provided at no additional cost. Submittals made with no written reference to the electronic safety and security design will be presumed to work with the electronic safety and security design. Any corrections required will be at no additional cost.
- B. If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.
 - C. Review of shop drawings, product literature, catalog data, or schedules shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.
 - D. Submit shop drawings as called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than 1/4" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.
- 1.10 Test Reports and Verification Submittals: Submit test reports, certifications, and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports, and take corrective action within the scheduled contract time.
- 1.11 O&M Data Submittals: Submit Operation and Maintenance data as called for in other sections. When a copy of approval submittals is included in the O&M Manual, only the final "Approved" or "Approved as Noted" copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein. Submit manuals at the

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Substantial Completion inspection.

PART 2 - PRODUCTS

- 2.1 All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.
- 2.2 Equipment and Materials:
- A. All equipment and materials shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.
 - B. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated, or painted.
 - C. The label of the approving agency, such as UL, by which a standard has been established for the particular item, shall be in full view.
 - D. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.
 - E. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.
 - F. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.
 - G. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material, and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.
 - H. Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.
- 2.3 Requests for Substitution:
- A. Where a particular system, product, or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product, or material specified.
 - B. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.
 - 1. Required product cannot be supplied in time for compliance with Contract time requirements.
 - 2. Required product is not acceptable to governing authority, or determined to be

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- non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.
3. Substantial cost advantage is offered to Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation, and other necessary services and similar considerations.
- C. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:
1. Principal of operation.
 2. Materials of construction or finishes.
 3. Thickness of gauge of materials.
 4. Weight of item.
 5. Deleted features or items.
 6. Added features or items.
 7. Changes in other work caused by the substitution.
 8. Electronic safety and security ratings and properties.
 9. If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

PART 3 - EXECUTION

- 3.1 Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any installation which is not orderly and reasonably neat, or does not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.
- 3.2 Coordination:
 - A. The Contractor shall be responsible for complete coordination of the electronic safety and security systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for raceway or other appurtenances passing through slabs or walls.
 - B. Any additional steel supports required for the installation of any electronic safety and security equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.
 - C. It shall be the Contractor's responsibility to see that all equipment such as terminal cabinets, fire alarm components, control panels, and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.
 - D. All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.
 - E. The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.

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- F. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
 - G. Start of work will be construed as acceptance of suitability of work of others.
- 3.3 Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.
- 3.4 Phasing: Provide all required temporary wiring, lighting, fire alarm, equipment, and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.
- 3.5 Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.
- 3.6 Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts, and washers. Level equipment.
- 3.7 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 26. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.
- 3.8 Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.
- 3.9 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.
- 3.10 Record Drawings:
- A. During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.
 - B. Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.
- 3.11 Acceptance:
- A. Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.
 - B. Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.
 - C. Operation and Maintenance Manuals: Furnish four complete manuals bound in ring

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binders with Table of Contents, organized, and tabbed by specification section.
Manuals shall contain:

1. Detailed operating instructions and instructions for making minor adjustments.
 2. Complete wiring, control, and single line diagrams.
 3. Routine maintenance operations.
 4. Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
 5. Copies of approved submittals.
 6. Copies of all manufacturer's warranties.
 7. Copies of test reports and verification submittals.
- D. Record Drawings: Submit record drawings.
- E. Acceptance will be granted on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.
- F. Control Diagrams: Frame under clear plastic and mount on equipment room wall.
- G. Single Line Diagrams: Frame under clear plastic and mount on equipment room wall.

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PROJECT NAME
PROJECT NUMBER

ARCHITECT: Company Name

ENGINEER: Mitchell Gullledge Engineering

CONTRACTOR: Contractor Name

SUBCONTRACTOR: Sub Name

SUPPLIER: Supply Company

MANUFACTURER: Manufacturer

DATE: mm/dd/yyyy

SECTION: 26 XX XX/Section Name

SAMPLE

Any standard heading is acceptable.

1. Product 1: Manufacturer, Model

2. Product 2: Manufacturer, Model

3. Product 3: Manufacturer, Model

4. Product 4: Manufacturer, Model

5. Product 5: Manufacturer, Model

List each product individually.
Include manufacturer name and
model.

**Include GC or CM
Approval stamp indicating
review and acceptance by
responsible contractor.**

END OF SECTION

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SECTION 28 05 01

ELECTRONIC SAFETY AND SECURITY CODES AND STANDARDS

PART 1 - GENERAL

- 1.1 The work covered by this division consists of providing all labor, equipment, and materials and performing all operations necessary for the installation of the fire protection work as herein called for and shown on the drawings.
- 1.2 This is a Basic Electronic Safety and Security Requirements section. Provisions of this section apply to work of all Division 28 sections.

PART 2 - CODES

- 2.1 All work under Division 28 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.
- 2.2 Comply with regulations and codes of utility suppliers.
- 2.3 Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.
- 2.4 Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.
- 2.5 Additional codes or standards applying to a specific part of the work may be included in that section.
- 2.6 The following codes and standards shall govern all work:
 - A. Florida Building Code – Sixth Edition (2017)
 - B. Florida Building Code – Sixth Edition (2017) – Existing Building
 - C. Florida Building Code – Sixth Edition (2017) – Mechanical
 - D. Florida Building Code – Sixth Edition (2017) – Plumbing
 - E. Florida Building Code – Sixth Edition (2017) – Fuel Gas
 - F. Florida Building Code – Sixth Edition (2017) – Accessibility
 - G. Florida Fire Prevention Code Sixth Edition
 1. Fire Code (NFPA 1 – 2015 Edition)
 2. Life Safety Code (NFPA 101 – 2015 Edition)
 - H. National Electric Code (NFPA 70 – 2014)
 - I. Fire Alarm and Signaling Code (NFPA 72 – 2013)

PART 3 - STANDARDS

All materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

- 3.1 Underwriters' Laboratories (UL)
- 3.2 American National Standards Institution (ANSI)
- 3.3 American Society of Testing Materials (ASTM)
- 3.4 National Fire Protection Association (NFPA)
- 3.5 National Electrical Manufacturers Association (NEMA)

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- 3.6 Institute of Electrical and Electronics Engineers (IEEE)
- 3.7 Telecommunications Industry Association (TIA)
- 3.8 Electronics Industry Alliance (EIA)

END OF SECTION

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SECTION 28 05 02

ELECTRONIC SAFETY AND SECURITY RELATED WORK

PART 1 - DIVISION 1 - GENERAL REQUIREMENTS

- 1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- 1.2 This is a Basic Electronic safety and security Requirements section. Provisions of this section apply to work of all Division 28 sections.
- 1.3 Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 28 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

PART 2 - DIVISION 31 - EARTH WORK

- 2.1 Refer to Division 31, Sitework for:
 - A. Coordination with work of other trades.
 - B. Site domestic water piping.
 - C. Additional site Electronic Safety and Security (ESS) work.
- 2.2 The following work is part of Division 28:
 - A. All site ESS conduit, wiring, boxes, and other appurtenances.

PART 3 - DIVISION 3 - CONCRETE

- 3.1 Refer to Division 3, Concrete for:
 - A. Rough grouting in and around ESS work.
 - B. Patching concrete cut to accommodate ESS work.

PART 4 - DIVISION 4 - MASONRY

- 4.1 Refer to Division 4, Masonry for:
 - A. Installation of access doors in walls.

PART 5 - DIVISION 5 - METALS

- 5.1 Refer to Division 5, Metals for:
 - A. Framing openings for ESS equipment.
- 5.2 The following is part of Division 28 work:
 - A. Supports for ESS work.

PART 6 - DIVISION 6 - WOOD AND PLASTIC

- 6.1 Refer to Division 6, Wood for:
 - A. Framing openings for ESS equipment.

PART 7 - DIVISION 7 - THERMAL AND MOISTURE PROTECTION

- 7.1 Refer to Division 7, Thermal and Moisture Protection for:
 - A. Installation of all roof curbs and roof supports for ESS work.

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- B. Caulking and waterproofing of all wall and roof mounted ESS work.
- C. Providing all roof curbs and all flashing for metal roofs.

7.2 The following is part of Division 28 work, complying with the requirements of Division 7.

- A. Fire barrier penetration seals.

PART 8 - DIVISION 9 - FINISHES

8.1 Refer to Division 9, Finishes for:

- A. Painting piping, and equipment.
- B. Painting structural metal and concrete for ESS work.
- C. Painting access panels.
- D. Painting color-coded ESS work indicated for continuous painting. See color schedule in Division 28 section, "Electronic safety and security Identification".
- E. Installation of access doors in gypsum drywall.

8.2 Colors shall be selected by the Architect for all painting of exposed ESS work in occupied spaces, unless specified herein. Do not paint insulated or jacketed surfaces.

8.3 Perform the following as part of Division 28 work:

- A. Touch up painting of factory finishes.
- B. Painting of all hangers.

PART 9 - DIVISION 10 - SPECIALTIES

9.1 Refer to Division 10 - Specialties for:

- A. Fire extinguishers and fire extinguisher cabinets and accessories.

PART 10 - DIVISION 11 - EQUIPMENT

10.1 Refer to Division 11 - Equipment for all food service equipment to be provided. This includes the cooking hoods with fire suppression.

10.2 Refer to Division 11 - Equipment for all laboratory equipment including cabinets, casework, student stations, demonstration desks, fume hoods, snorkel exhausts, canopy hoods, safety stations, eyewashes, and all related fixtures, fittings, and trim.

PART 11 - DIVISION 21 - FIRE PROTECTION

11.1 Fire Protection and Electronic safety and security Contractors shall coordinate the exact ESS requirements of all fire protection equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The ESS design shown on the drawings supports the fire protection equipment basis of design. If fire protection equipment is submitted with different ESS requirements, it is the responsibility of the fire protection contractor to resolve all required ESS design changes (e.g. input/output voltage) and clearly show the new ESS design on the fire protection submittal with a written statement that this design will be provided at no additional cost. Fire Protection submittals made with no written reference to the ESS design will be presumed to work with the ESS design. Any corrections required will be at no additional cost to the Owner.

11.2 Electronic safety and security contractor shall provide fire alarm modules, detectors, and other appurtenances for fire protection equipment unless specifically noted as being furnished as part of fire protection equipment.

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- 11.3 Electronic safety and security contractor shall provide all fire alarm wiring, raceway and devices, and make final ESS connections to all fire protection equipment, detectors, modules, contacts, controllers, and similar equipment.

PART 12 - DIVISION 22 - PLUMBING

- 12.1 Plumbing and Electronic safety and security Contractors shall coordinate the exact ESS requirements of all plumbing equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The ESS design shown on the drawings supports the plumbing equipment basis of design. If plumbing equipment is submitted with different ESS requirements, it is the responsibility of the plumbing contractor to resolve all required ESS design changes (e.g. input/output voltage) and clearly show the new ESS design on the plumbing submittal with a written statement that this design will be provided at no additional cost. Plumbing submittals made with no written reference to the ESS design will be presumed to work with the ESS design. Any corrections required will be at no additional cost to the Owner.
- 12.2 Electronic safety and security contractor shall provide fire alarm modules, detectors, and other appurtenances for plumbing equipment unless specifically noted as being furnished as part of plumbing equipment.
- 12.3 Electronic safety and security contractor shall provide all fire alarm wiring, raceway and devices, and make final ESS connections to all plumbing equipment, detectors, modules, contacts, controllers, and similar equipment.

PART 13 - DIVISION 23 - HVAC

- 13.1 Mechanical and Electronic safety and security Contractors shall coordinate the exact ESS requirements of all mechanical equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The ESS design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different ESS requirements, it is the responsibility of the mechanical contractor to resolve all required ESS design changes (e.g. input/output voltage) and clearly show the new ESS design on the mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the ESS design will be presumed to work with the ESS design. Any corrections required will be at no additional cost to the Owner.
- 13.2 Mechanical contractor shall provide all HVAC control wiring including the Energy Management Control system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, complying with the requirements of Division 28. The intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring, and associated raceway and boxes. Electronic safety and security contractor shall notify mechanical contractor upon discovery of any mechanical controls installation which does not meet Division 28 requirements.
- 13.3 Electronic safety and security contractor shall provide fire alarm modules, detectors, and other appurtenances for mechanical equipment unless specifically noted as being furnished as part of mechanical equipment.
- 13.4 Electronic safety and security contractor shall provide all fire alarm wiring, raceway and devices, and make final ESS connections to all mechanical equipment, detectors, modules, contacts, controllers, and similar equipment.
- 13.5 All duct-mounted smoke detectors shall be furnished and wired by the ESS contractor and installed by the mechanical contractor.

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PART 14 - DIVISION 26 - ELECTRICAL

- 14.1 Electrical and ESS Contractors shall coordinate the exact electrical requirements of all ESS equipment being provided. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the ESS equipment basis of design. If ESS equipment is submitted with different electrical requirements, it is the responsibility of the ESS contractor to resolve all required electrical design changes (e.g. input/output voltage) and clearly show the new electrical design on the ESS submittal with a written statement that this design will be provided at no additional cost. Electrical submittals made with no written reference to the ESS design will be presumed to work with the electrical design. Any corrections required will be at no additional cost to the Owner.
- 14.2 ESS contractor shall provide ESS modules, detectors, and other appurtenances unless specifically noted as being furnished as part of electrical equipment.
- 14.3 ESS contractor shall provide all ESS wiring, raceway and devices, and make final ESS connections to all electrical equipment, detectors, modules, contacts, controllers, and similar equipment.

END OF SECTION

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SECTION 28 31 00

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 Related Documents:

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections apply to this section.
- B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following divisions apply:
 - 1. Division 21 – Fire Protection
 - 2. Division 23 – HVAC
 - 3. Division 26 – Electrical
- C. The system and all associated operations shall be in accordance with the following:
 - 1. Florida Building Code, 6th Edition (2017)
 - 2. Florida Fire Prevention Code, 6th Edition (2017)
 - a. 2015 NFPA 1, Florida Edition.
 - b. 2015 NFPA 101, Florida Edition.
 - 3. 2013 NFPA 72, National Fire Alarm Code
 - 4. 2014 NFPA 70, National Electrical Code
 - 5. 2015 NFPA 90A
 - 6. 2007 ASME A17.1, Safety Code for Elevators and Escalators
 - 7. 2008 ASME A17.3, Safety Code for Existing Elevators and Escalators
 - 8. 2009 ICC/ANSI A117.1 Accessible and Useable Buildings and Facilities
 - 9. Local jurisdictional adopted codes and standards
 - 10. ADA Accessibility Guidelines

1.2 Summary:

- A. This section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- B. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.
- C. The fire alarm system shall consist of all necessary hardware equipment and software programming to perform the following functions:
 - 1. Fire alarm system detection and notification operations.
 - 2. Control and monitoring of
 - a. elevators,
 - b. smoke control equipment,
 - c. door hold-open devices,
 - d. fire suppression systems,
 - e. emergency power systems, and
 - f. equipment as indicated in the drawings and specifications.

1.3 Definitions:

- A. ADA: Americans with Disabilities Act

MG: 18150
WA: 18122

FIRE ALARM SYSTEM
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- B. AHJ: Authority Having Jurisdiction
- C. ANSI: American National Standards Institute
- D. ASME: American Society of Mechanical Engineers
- E. FACP: Fire Alarm Control Panel
- F. FM: Factory Mutual
- G. IBC: International Building Code
- H. ICC: International Code Council
- I. IDC: Initiating Device Circuit
- J. IEEE: Institute of Electrical and Electronic Engineers
- K. IFC: International Fire Code
- L. IMC: International Mechanical Code
- M. IRI: Industrial Risk Insurers
- N. LED: Light-Emitting Diode
- O. NAC: Notification Appliance Circuit
- P. NFPA: National Fire Protection Association
- Q. NICET: National Institute for Certification in Engineering Technologies
- R. RAC: Releasing Appliance Circuit
- S. SLC: Signaling Line Circuit
- T. UL: Underwriters Laboratories

1.4 Scope of Work:

- A. This project is an elevator replacement project. New devices will be added in the pit, elevator equipment room and outside of elevator at landings. The existing building has an existing voice system.
- B. This project involves the expansion of an existing system. Of primary importance are:
 - 1. Notification coverage of the new and renovated building area.
 - 2. Manual initiation devices as required by Code.
 - 3. Automatic initiation devices as required by Code.
- C. See the electrical drawings for additional scope information.
- D. Note: Some portions of this specification may not be realizable with the existing system. Comply with those portions of this specification which the existing system is capable of supporting.
- E. Regardless of any other project conditions, the final product shall be compliant with current code requirements in all areas affected by this project. Where the existing system is incapable of addressing current code requirements, the required functionality shall be added.

1.5 System Description:

- A. General: Provide a complete, non-coded addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.
- B. Power Requirements:
 - 1. The control unit shall receive AC power via a dedicated circuit with in-line surge protection installed at the unit.
 - 2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 15 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic. Battery runtime

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- calculations shall include a twenty percent margin of safety.
3. All circuits requiring system-operating power shall be 24 VDC nominal voltage and shall be individually fused at the control unit.
 4. The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. "Power on" status shall be displayed continuously at the user interface while incoming power is present.
 5. The system batteries shall be supervised so that a low battery or a depleted battery condition, or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.
 6. The system shall support NAC lockout feature to prevent subsequent activation of notification appliance circuits after a depleted battery condition occurs in order to make use of battery reserve for front panel annunciation and control.
 7. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.
 8. Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply.
- C. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary.
1. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.
 2. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control panel. Loss of primary and secondary power shall not erase the instructions stored in memory.
 3. Panels shall be capable of full system operation during new site specific configuration download, master exec downloads, and slave exec downloads.
 4. Panels shall automatically store all program changes to the panel's non-volatile memory each time a new program is downloaded. Panels shall be capable of storing the active site-specific configuration program and no less than 9 previous revisions in reserve. A compare utility program shall also be available to authorized users to compare any two of the saved programs. The compare utility shall provide a deviation report highlighting the changes between the two compared programs.
 5. Panels shall provide electronic file storage with a means to retrieve a record copy of the site-specific software and up to 9 previous revisions. Sufficient file storage shall be provided for other related system documentation such as record drawings, record of completion, owner's manuals, testing, and maintenance records, etc.
 6. The media used to store the record copy of site-specific software and other related system documentation shall be electrically supervised. If the media is removed a trouble shall be reported on the fire alarm control panel.
- D. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.
- E. Recording of Events: The system shall be capable of recording all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout shall differentiate alarm signals from all other printed indications.

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F. Wiring/Signal Transmission:

1. Transmission shall be hard-wired using separate individual circuits for each zone of alarm operation, as required or addressable signal transmission, dedicated to fire alarm service only.
2. System connections for initiating device circuits shall be Class B signaling line circuits shall be Class B and notification appliance circuits shall be Class B.
3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.

G. Required Functions: The following are required system functions and operating features:

1. Priority of Signals: Fire alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority two, supervisory and trouble events have second-, third-, and fourth-level priority, respectively. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.
2. Noninterfering: An event on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACP after the initiating device or devices are restored to normal. The activation of an addressable device does not prevent the receipt of signals from subsequent addressable device activations.
3. Transmission to an Approved Supervising Station: Automatically route alarm, supervisory, and trouble signals to an approved supervising station service provider, under another contract.
4. Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and the remote annunciator, indicating the type of device, the operational state of the device (i.e. alarm, trouble or supervisory) and shall display the custom label associated with the device.
5. Selective Alarm: A system alarm shall include:
 - a. Indication of alarm condition at the FACP and the annunciator(s).
 - b. Identification of the device/zone that is the source of the alarm at the FACP and the annunciator(s).
 - c. Operation of audible and visible notification appliances until silenced at FACP.
 - d. Closing doors normally held open by magnetic door holders.
 - e. Shutting down supply and return fans serving zone where alarm is initiated.
 - f. Closing smoke dampers on system serving zone where alarm is initiated.
 - g. Transmission of signal to the supervising station.
 - h. Initiation of elevator Phase I functions (recall, shunt trip, illumination of indicator in cab, etc.) In accordance with ANSI/ASME A17.1, Safety Code for Elevators and Escalators, when specified detectors or sensors are activated, as appropriate.
6. Supervisory Operations: Upon activation of a supervisory device such as a fire pump power failure, low air pressure switch, and tamper switch, the system shall operate as follows:
 - a. Activate the system supervisory service audible signal and illuminate the LED at the control unit and the remote annunciator.

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- b. Pressing the supervisory acknowledge key will silence the supervisory audible signal while maintaining the supervisory LED "on" indicating off-normal condition.
 - c. Record the event in the FACP historical log.
 - d. Transmission of supervisory signal to the supervising station.
 - e. Restoring the condition shall cause the supervisory LED to clear and restore the system to normal.
- 7. Alarm Silencing: If the "alarm silence" button is pressed, all audible alarm signals shall cease operation.
- 8. Priority Two Operations: Upon activation of a priority two condition such as gas detection, chemical leak detection, intrusion alert, weather alert, the system shall operate as follows:
 - a. Activate the system priority two audible signal and illuminate the LED at the control unit and the remote annunciator.
 - b. Pressing the priority 2 acknowledge key will silence the audible signal while maintaining the priority 2 LED "on" indicating off-normal condition.
 - c. Record the event in the FACP historical log.
 - d. Transmission of priority two signal to the supervising station.
 - e. Restoring the condition shall cause the priority 2 LED to clear and restore the system to normal.
- 9. System Reset:
 - a. The "system reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("in progress", "reset completed") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-arming the system. The display message shall indicate "alarm present, system reset aborted".
 - b. Should an alarm condition continue, the system will remain in an alarmed state.
- 10. A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.
- 11. Walktest: The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one person test" program at the control unit shall activate the "one person testing" mode of the system as follows:
 - a. The city circuit connection and any suppression release circuits shall be bypassed for the testing group.
 - b. Control relay functions associated with one of the 8 testing groups shall be bypassed.
 - c. The control unit shall indicate a trouble condition.
 - d. The alarm activation of any initiating device in the testing group shall cause the audible notification appliances assigned only to that group to sound a code to identify the device or zone.
 - e. The unit shall automatically reset itself after signaling is complete.
 - f. Any opening of an initiating device or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.

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12. Install Mode: The system shall provide the capability to group all non-commissioned points and devices into a single "install mode" trouble condition allowing an operator to clearly identify event activations from commissioned points and devices in occupied areas.
 - a. It shall be possible to individually remove points from install mode as required for phased system commissioning.
 - b. It shall be possible to retrieve an install mode report listing that includes a list of all points assigned to the install mode. Panels not having an install mode shall be reprogrammed to remove any non-commissioned points and devices.
13. Module Distribution:
 - a. The fire alarm control panel shall be capable of allowing remote location of the following modules; interface of such modules shall be through a Class B supervised serial communications channel (SLC):
 - 1 Initiating device circuits
 - 2 Notification appliance circuits
 - 3 Auxiliary control circuits
 - 4 Graphic annunciator LED/switch control modules
 - a In systems with two or more annunciators and/or command centers, each annunciator/command center shall be programmable to allow multiple annunciators/command centers to have equal operation priority or to allow hierarchal priority control to be assigned to individual annunciator/command center locations.
 - 5 Initiating device signaling line circuits
 - 6 Notification appliance signaling line circuits
 - 7 Power supplies
14. The service provider shall provide a minimum of two technicians for any system testing or commissioning.

H. Analog Smoke Sensors:

1. Monitoring: FACP shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.
2. Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.
3. Programmable Sensitivity: Photoelectric smoke sensors shall have 7 selectable sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACP.
4. Sensitivity Testing Reports: The FACP shall provide sensor reports that meet NFPA 72 calibrated test method requirements.
 - a. Reports shall be capable of being printed for annual recording and logging of the calibration maintenance schedule.
5. The FACP shall automatically indicate when an individual sensor needs cleaning.

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The system shall provide a means to automatically indicate when a sensor requires cleaning. When a sensor's average value reaches a predetermined value, (3) progressive levels of reporting are provided. The first level shall indicate if a sensor is close to a trouble reporting condition and will be indicated on the FACP as "almost dirty". This condition provides a means to alert maintenance staff of a sensor approaching dirty without creating a trouble in the system. If this indicator is ignored and the second level is reached, a "dirty sensor" condition shall be indicated at the FACP and subsequently a system trouble is reported to the supervising station. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "dirty sensor" condition shall not affect the sensitivity level required to alarm the sensor. If a "dirty sensor" is left unattended, and its average value increases to a third predetermined value, an "excessively dirty sensor" trouble condition shall be indicated at the control unit.

6. The FACP shall continuously perform an automatic self-test on each sensor that will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "self test abnormal" trouble condition.
 7. Multi-sensors shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.2 to 3.7%/ft obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.
 8. Programmable Bases: It shall be possible to program relay and sounder bases to operate independently of their associated sensor.
 9. Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.
- I. Fire Suppression Monitoring:
1. Water Flow: Activation of a water flow switch shall initiate general alarm operations.
 2. Sprinkler Valve Tamper Switch: The activation of any valve tamper switch shall activate system supervisory operations.
 3. Water flow switch and sprinkler valve tamper switch shall be capable of existing on the same initiating zone. Activation of either device shall distinctly report which device is in alarm on the initiating zone.
- J. Audible Alarm Notification: By speakers in areas as indicated on drawings.
- K. Speaker: Speaker notification appliances shall be listed to UL 1480.
1. The speaker shall operate on a standard 25VRMS or 70.7VRMS NAC using twisted/shielded wire.
 2. The following taps are available: 0.25W, 0.50W, 1.0W, and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
 3. The speaker shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for general signaling.
- L. Manual Voice Paging:
1. The system shall be configured to allow voice paging. Upon activation of any speaker manual control switch, the alarm tone shall be sounded over all speakers in that group.

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2. The control unit operator shall be able to make announcements via the push-to-talk paging microphone over the pre-selected speakers.
3. Total building paging shall be accomplished by the means of an "All Call" switch.

M. Constant Supervision of Non-Alarm Audio Functions:

1. When required, the system shall be configured to allow Non-Alarm Audio (NAA) functions such as background music or general/public address paging.
2. During NAA operation, the speaker circuit shall be electrically supervised to provide continuous monitoring of the speaker circuit.
3. During an alarm condition, supervision shall be disabled and alarm signals delivered to speakers.

N. Firefighter's Phone: Provide a supervised, two-way communication system between the Command Center/main fire alarm control unit and emergency phones.

1. The firefighter's phone system shall be capable of handling single or simultaneous conversations with all phones connected into the system. As many as six phones shall be able to be connected into the active conversation.
2. The phone system circuits shall be designed to prevent static, hum, or other interference for clear, intelligible two-way conversation between all phones of the system.
3. The phone system circuits shall be supervised, such that the FACU shall be able to differentiate between whether a handset has been plugged into the emergency phone jack and whether the circuit has a shorted wire.
4. A beeping busy signal shall indicate to the person attempting to use a remote phone that the signal is being received at the control unit and that the lines are intact.
5. The act of plugging a handset into an emergency phone jack or removal of any phone from its normal hook position shall cause an audible and visual indication at the control unit. Picking up of the master phone and acknowledgment of the phone circuit shall silence the tone and allow for direct two-way communications.
6. The act of unplugging handsets in use and replacement of remote phones to their cradle shall restore normal supervisory functions.
7. Provide emergency phone jacks for installation in each elevator car by the elevator contractor. Required wiring from elevator controls to each elevator car shall be furnished and installed by the elevator contractor.
8. Provide emergency phone jacks as shown on the plans. Each jack shall be mounted on a stainless steel single gang plate with the words "Fire Emergency Phone" screened on each.
9. Provide a minimum of five (5) pluggable emergency phones within a storage cabinet.

1.6 Acceptance Submittals:

- A. General: Submit the following for review by owner, architect, and engineer prior to purchasing materials. Submit according to conditions of contract and Division 1 specification sections.
1. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.

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2. Wiring diagrams from manufacturer.
 3. Shop drawings showing system details including location of FACP, all devices, circuiting and details of graphic annunciator.
 4. System power and battery charts with performance graphs and voltage drop calculations to assure that the system will operate in accordance with the prescribed backup time periods and under all voltage conditions per UL and NFPA standards.
 5. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.
- B. Submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make an identical submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the authority, make resubmissions, if required, to make clarifications or revisions to obtain approval.
- 1.7 O&M Submittals:
- A. General: Submit the following for inclusion in operating and maintenance manual. Submit according to conditions of contract and Division 1 specification sections.
1. Updated system operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.
 2. Operating instructions for FACP.
 3. Operation and maintenance data. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
 4. Product certification signed by a certified representative of the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
 5. Record of field tests of system.
- 1.8 Quality Control:
- A. Installer Qualifications: A factory authorized installer shall perform the work of this section.
- B. Each and every item of the fire alarm system shall be listed under the appropriate category by a nationally recognized testing laboratory and shall bear the respective "NRTL" label.
- 1.9 Project Conditions:
- A. Interruption of Existing Fire-alarm Service: Do not interrupt fire-alarm service to facilities occupied by owner or others unless permitted under the following conditions, and then only after arranging to provide temporary guard service according to requirements indicated:
1. Notify architect no fewer than two days in advance of proposed interruption of fire-alarm service.

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2. Do not proceed with interruption of fire-alarm service without architect's written permission.

1.10 Software Service Agreement:

- A. Comply with UL 864.
 - B. Technical Support: Beginning with substantial completion, provide software support for two years.
 - C. Upgrade Service: Update software to latest version at project completion. Install and program software upgrades that become available within two years from date of substantial completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
1. Provide 30 days' notice to owner to allow scheduling and access to system and to allow owner to upgrade computer equipment if necessary.

1.11 Maintenance Service:

- A. Warranty Maintenance Service: Provide maintenance of fire alarm systems and equipment for a period of 12 months, using factory-authorized service representatives
- B. Basic Services: Routine maintenance visits on an "as needed" basis at times scheduled with the owner. Respond to service calls within 24 hours of notification of system trouble either by customer visit or other customer contact as necessary. Adjust and replace defective parts and components with original manufacturer's replacement parts, components, and supplies.
- C. Additional Services: Perform services within the above 12-month period not classified as routine maintenance or as warranty work when authorized in writing. Compensation for additional services must be agreed upon in writing prior to performing services.
- D. Maintenance Service Contract: No later than 60 days prior to the expiration of the warranty maintenance services, deliver to the owner a proposal to provide contract maintenance and repair services for an additional one-year term. As an option with this proposal, deliver to the owner a proposal to provide scheduled inspection and testing services for a one-year term. Owner will be under no obligation to accept maintenance service contract proposal or inspection and testing proposal.

1.12 Extra Materials:

- A. General: Furnish extra materials, packaged with protective covering for storage, and identified with labels clearly describing contents as follows:
 1. Break Rods for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed, rounded up. (e.g. if up to 6 units were installed, provide 1 spare. If 7 units were installed, provide 2 spares, etc.)
 2. Notification Appliances: Furnish quantity equal to 10 percent of each type and number of units installed, rounded up. (e.g. if up to 10 units were installed, provide 1 spare. If 11 units were installed, provide 2 spares, etc.)
 3. Smoke Detectors or Sensors, Fire Detectors, and Flame Detectors: Furnish quantity equal to 10 percent of each type and number of units installed, rounded up. (e.g. if up to 10 units were installed, provide 1 spare. If 11 units were installed, provide 2 spares, etc.)
 4. Detector or Sensor Bases: Furnish quantity equal to 2 percent of each type and number of units installed, rounded up. (e.g. if up to 50 units were installed, provide 1 spare. If 51 units were installed, provide 2 spares, etc.)
 5. Printer Ribbons: Furnish 6 spare printer ribbons when a printer is provided.

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PART 2 - PRODUCTS

2.1 Acceptable Equipment and Service Providers:

- A. Manufacturers:
 - 1. Subject to compliance with the requirements of this specification, provide products by one of the following:
 - a. Simplex (Tyco) – existing system
- B. Being listed as an acceptable manufacturer in no way relieves obligation to provide all equipment and features in accordance with these specifications.
- C. Alternate products must be submitted to the engineer two weeks prior to bid for approval. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.
- D. The equipment and service provider shall be a nationally recognized company specializing in fire alarm and detection systems. This provider shall employ factory trained and NICET Level III certified technicians, and shall maintain a service organization within 100 miles of this project location. The equipment and service provider shall have a minimum of 10 years experience in the fire protective signaling systems industry.

2.2 Systems Operational Description:

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Flame detectors.
 - 4. Smoke detectors.
 - 5. Duct smoke detectors.
 - 6. Verified automatic alarm operation of smoke detectors.
 - 7. Automatic sprinkler system water flow.
 - 8. Heat detectors in elevator shaft and pit.
 - 9. Fire-extinguishing system operation.
 - 10. Fire standpipe system.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances.
 - 2. Identify alarm at fire-alarm control unit and remote annunciators.
 - 3. Transmit an alarm signal to the remote alarm receiving station.
 - 4. Unlock electric door locks in designated egress paths.
 - 5. Release fire and smoke doors held open by magnetic door holders.
 - 6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 - 7. Close smoke dampers in air ducts of designated air-conditioning duct systems.
 - 8. Recall elevators to primary or alternate recall floors.
 - 9. Activate emergency lighting control.
 - 10. Activate emergency shutoffs for gas and fuel supplies.
 - 11. Record events in the system memory.
 - 12. Record events by the system printer.

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- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
 - 1. Valve supervisory switch.
 - 2. Low-air-pressure switch of a dry-pipe sprinkler system.
 - 3. Elevator shunt-trip supervision.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
 - 1. Open circuits, shorts, and grounds in designated circuits.
 - 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 - 3. Loss of primary power at fire-alarm control unit.
 - 4. Ground or a single break in fire-alarm control unit internal circuits.
 - 5. Abnormal AC voltage at fire-alarm control unit.
 - 6. Break in standby battery circuitry.
 - 7. Failure of battery charging.
 - 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 - 9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer where provided.

2.3 Addressable Initiating:

- A. Addressable Manual Pull Stations:
 - 1. General requirements for manual fire-alarm boxes: comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 - 2. Description: Addressable single-action type, red Lexan. Station shall mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units. Station shall be pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 - 3. Provide with a front-facing red LED that will flash each time it is scanned by the control unit (once every 4 seconds). In alarm condition, the station LED shall be on steady.
 - 4. Indoor Protective Shield: Where required, or as indicated on the drawings, provide a factory-fabricated, tamperproof, clear Lexan enclosure shield and red frame that easily fits over manual pull stations which shall be hinged at the top to permit lifting for access to initiate a local alarm. Unit shall be NRTL listed. Lifting the cover shall actuate an integral battery-powered audible horn intended to discourage false-alarm operation. The horn shall be silenced by lowering and realigning the shield. The horn shall provide 85dB at 10 feet and shall be powered by a 9 VDC battery.
 - 5. Pull station shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist.
 - 6. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

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B. Addressable Analog Smoke Sensors:

1. General Requirements for System Smoke Detectors:

- a. Comply with UL 268, "smoke detectors for fire protective signaling systems". Include the following features:
 - 1 Factory Nameplate: Serial number and type identification.
 - 2 Operating Voltage: 24 VDC, nominal and shall be two-wire type.
 - 3 Self-restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
 - 4 Plug-in Arrangement: Sensor and associated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection. Base shall provide break-off plastic tab that can be removed to engage the head/base locking mechanism. Provide terminals in the fixed base for connection to building wiring. No special tools shall be required to remove head once it has been locked. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control unit. Sensors shall include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP. Sensor address shall be located in base to eliminate false addressing when replacing sensors. Integral addressable module shall be arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit. Each sensor base shall contain an integral visual-indicating LED that will flash to provide power-on status each time it is scanned by the control unit (once every 4 seconds). In alarm condition, the sensor base LED shall be on steady. Base mounting: detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base.
- b. Each sensor base shall contain a magnetically actuated test switch to provide for easy pre-certification alarm testing at the sensor location.
- c. Each sensor shall be scanned by the control unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135 deg F and 15 deg F rate-of-rise for the heat sensor, but shall indicate a "wrong device" trouble condition.
- d. Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit. Provide multiple levels of detection sensitivity for each sensor.
- e. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
- f. The sensor's electronics shall be immune from nuisance alarms caused by EMI and RFI. Removal of the sensor head for cleaning shall not require the setting of addresses.
- g. Bases: CO sensor, relay output, sounder and isolator bases shall be supported alternatives to the standard base.

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2. Addressable Sensor Bases:

- a. Standard Base: Twist lock addressable base with address selection dip switch accessible from front with sensor removed. Integral red LED for power-on (pulsing), or alarm or trouble (steady on). Locking anti-tamper design mounts on standard outlet box.
- b. Sensor Base with Remote Device Connection: All standard base features with wired connection for either a remote LED alarm indicator or remote relay (relay is unsupervised and requires separate 24VDC).
- c. Supervised Relay Bases: All standard base features and shall be available in either a 4-wire sensor base to use with remote or locally mounted relay; requires separate 24 VDC, or as a 2-wire sensor base to use with remote or locally mounted relay; no separate power required. Supervised relay operation shall be programmable and shall be manually operated from control panel.
- d. Sensor Base with Built-in Electronic Alarm Sounder: All standard base features and piezoelectric sounder shall provide high output (88 dBA) with low current requirements (20 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder shall operation shall be programmable and shall be manually operated from control panel.
- e. 520 Hz Sensor Base with Built-in Electronic Low Frequency Sounder: All standard base features and piezoelectric sounder shall provide a low frequency 520 Hz square wave (85 dBA) with nominal current requirements (115 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder operation shall be programmable and shall be manually operated from control panel.
 - 1 Emitted tone shall be a 520Hz square wave signal in compliance with the requirements of the 2010 edition of NFPA 72 for sleeping areas.
 - 2 The 520Hz sounder base shall be listed to UL 268 and UL464, audible signal appliances.

C. Addressable Heat Sensors:

1. General Requirements for Heat Detectors: Comply with UL 521.
2. Heat detectors shall be sealed against intrusion by moisture, dust, and insects.
3. Thermal Sensor Combination Type: Fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
4. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag. Selectable rate compensated, fixed temperature sensing with or without rate-of-rise operation.
5. Mounting: Twist-lock base interchangeable with smoke-sensor heads.
6. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
7. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135 deg F or 155 deg F. Sensor rate-of-rise temperature detection shall be selectable at the FACP for either 15 deg F or 20 deg F per minute.
8. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32 deg F to 155 deg F.

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9. Unless otherwise indicated, sensors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for temperature by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
- D. Addressable CO Sensor:
 1. Addressable CO Sensor:
 - a. The CO sensor shall be an addressable carbon monoxide (CO) sensing module providing both CO toxic gas detection and enhanced fire detection, and shall be listed to UL 268, smoke detectors for fire alarm signaling systems and UL 2075, gas and vapor detectors and sensors; allowing systems to be listed to UL 2034, single and multiple station carbon monoxide alarms.
 - b. The CO sensor shall include CO sensor element mounted in the sensor base which can be easily replaced without replacing the complete sensor base assembly.
 - c. The CO sensor base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - d. The CO sensor base shall include an integral red LED to indicate the power-on, trouble, test mode, or alarm status.
 - e. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: nuisance alarm reduction mode and faster fire detection.
 - f. The CO sensor shall provide a 10 year life expectancy before replacement is necessary or required.
 - g. The CO sensor base shall report the following CO sensor troubles: communication loss, disabled, almost expired 12 months, almost expired 6 months, expired (end of life), and sensor missing/failed.
 2. Addressable CO Sensor Sounder Base:
 - a. The CO sensing element shall support operation with a sounder base; the CO sensor sounder base shall provide temporal code 3 (tc3) for fire, or temporal code 4 (tc4) for toxic carbon monoxide alarms.
 - b. The CO sensor sounder base shall be listed to ul464, audible signal appliances.
 - c. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: nuisance alarm reduction mode and faster fire detection.
 - d. The CO sensor sounder base shall include CO sensor element mounted in the sounder base which can be easily replaced without replacing the complete sensor base assembly.
 - e. The CO sensor sounder base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.

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- f. The CO sensor sounder sensor base shall include an integral red LED to indicate the power-on, trouble, test mode, or alarm status.
 - g. The CO sensor sounder base shall report the following CO sensor troubles: communication loss, disabled, almost expired 12 months, almost expired 6 months, expired (end of life), and sensor missing/failed.
 - h. The CO sensor sounder base shall be interchangeable with the CO sensor 520 Hz sounder base.
- 3. Addressable CO Sensor 520 Hz Sounder Base:
 - a. The CO sensing element shall support operation with a 520 Hz sounder base; the 520 Hz CO sounder base shall provide temporal code 3 (tc3) for fire, or temporal code 4 (tc4) for toxic carbon monoxide alarms.
 - b. Emitted tone shall be a 520Hz square wave signal in compliance with the requirements of the 2010 edition of NFPA 72 for sleeping areas.
 - c. The CO sensor 520Hz sounder base shall be listed to UL 268 and ul464, audible signal appliances.
 - d. CO sensor shall provide enhanced fire detection with the addition of two selectable modes of operation: nuisance alarm reduction mode and faster fire detection.
 - e. The CO sensor 520 Hz sounder base shall include CO sensor element mounted in the sounder base which can be easily replaced without replacing the complete sensor base assembly.
 - f. The CO sensor 520 Hz sounder base shall provide address selection in the base allowing the address to remain with its location when the sensor is removed for service or type change.
 - g. The CO sensor 520 Hz sounder base shall include an integral red LED to indicate the power-on, trouble, test mode, or alarm status.
 - h. The CO sensor 520 Hz sounder base shall report the following CO sensor troubles: communication loss, disabled, almost expired 12 months, almost expired 6 months, expired (end of life), and sensor missing/failed.
 - i. The CO sensor 520 Hz sounder base shall be interchangeable with the standard CO sensor sounder base.
- E. Addressable Circuit Interface Modules:
 - 1. Addressable Circuit Interface Modules: Arrange to monitor or control one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of waterflow, valve tamper, non-addressable devices, and for control of AHU systems.
 - 2. Addressable circuit interface modules will be capable of mounting in a standard electric outlet box. Modules will include cover plates to allow surface or flush mounting. Modules will receive their operating power from the signaling line circuit or a separate two wire pair running from an appropriate power supply, as required.
 - 3. There shall be the following types of modules:
 - a. Type 1: Monitor circuit interface module:
 - 1 For conventional 2-wire smoke detector and/or contact device monitoring with Class B or Class A wiring supervision. The supervision of the zone wiring will be Class B. This module will communicate status (normal, alarm, trouble) to the FACP.
 - 2 For conventional 4-wire smoke detector with Class B wiring

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supervision. The module will provide detector reset capability and over-current power protection for the 4-wire detector. This module will communicate status (normal, alarm, trouble) to the FACP.

- b. Type 2: Line powered monitor circuit interface module:
 - 1 This type of module is an individually addressable module that has both its power and its communications supplied by the two wire signaling line circuit. It provides location specific addressability to an initiating device by monitoring normally open dry contacts. This module shall have the capability of communicating four zone status conditions (normal, alarm, current limited, trouble) to the FACP.
 - 2 This module shall provide location specific addressability for up to five initiating devices by monitoring normally closed or normally open dry contact security devices. The module shall communicate four zone status conditions (open, normal, abnormal, and short). The two-wire signaling line circuit shall supply power and communications to the module.
 - c. Type 3: Single address multi-point interface modules:
 - 1 This multipoint module shall provide location specific addressability for four initiating circuits and control two output relays from a single address. Inputs shall provide supervised monitoring of normally open, dry contacts and be capable of communicating four zone status conditions (normal, open, current limited, and short). The input circuits and output relay operation shall be controlled independently and disabled separately.
 - 2 This dual point module shall provide a supervised multi-state input and a relay output, using a single address. The input shall provide supervised monitoring of two normally open, dry contacts with a single point and be capable of communicating four zone status conditions (normal, open, current limited, and short). The two-wire signaling line circuit shall supply power and communications to the module.
 - 3 This dual point module shall monitor an unsupervised normally open, dry contact with one point and control an output relay with the other point, using a single address. The two-wire signaling line circuit shall supply power and communications to the module.
 - d. Type 4: Line powered control circuit interface module:
 - 1 This module shall provide control and status tracking of a form "C" contact. The two-wire signaling line circuit shall supply power and communications to the module.
 - e. Type 5: 4-20 mA analog monitor circuit interface module:
 - 1 This module shall communicate the status of a compatible 4-20 mA sensor to the FACP. The FACP shall annunciate up to three threshold levels, each with custom action message; display and archive actual sensor analog levels; and permit sensor calibration date recording.
4. All circuit interface modules shall be supervised and uniquely identified by the control unit. Module identification shall be transmitted to the control unit for

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processing according to the program instructions. Modules shall have an on-board LED to provide an indication that the module is powered and communicating with the FACP. The LEDs shall provide a troubleshooting aid since the LED blinks on poll whenever the peripheral is powered and communicating.

2.4 Conventional Notification:

A. Standard Alarm Notification Appliances:

1. Speaker/Visible: Combination speaker/visible (S/V) units combine the speaker and visible functions into a common housing. The S/V shall be listed to UL 1971 and UL 1480.
 - a. Twisted/Shielded wire is required for speaker connections on a standard 25VRMS or 70.7VRMS NAC.
 - b. The following taps are available: 0.25W, 0.50W, 1.0W, and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
 - c. The S/V shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for general signaling.
 - d. The S/V installs directly to a 4" square, 1-1/2" deep electrical box with 1-1/2" extension.
2. Speaker: Speaker notification appliances shall be listed to UL 1480.
 - a. The speaker shall operate on a standard 25VRMS or 70.7VRMS NAC using twisted/shielded wire.
 - b. The following taps are available: 0.25W, 0.50W, 1.0W, and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
 - c. The speaker shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for general signaling.
 - d. The speaker installs directly to a 4" square, 1-1/2" deep electrical box with 1-1/2" extension.
3. High Intensity Horn/Visible: Combination audible/visible (A/V) notification appliances shall be listed to UL 1971 and UL 1480. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. Strobe appliances shall be provided with different minimum flash intensities of 135cd, 177cd, and 185cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific strobe.
 - a. Twisted/Shielded wire is required for speaker connections on a standard 25VRMS or 70.7VRMS NAC.
 - b. The following taps are available: 0.25W, 0.50W, 1.0W, and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
 - c. The S/V shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for general signaling.
 - d. The S/V installs directly to a 4" square, 1-1/2" deep electrical box with 1-1/2" extension.
4. Weatherproof Audible/Visible: Weatherproof horn/strobe shall be UL 1480 and UL 1971 listed for indoor applications with strobe intensity selectable as 15, 60,

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or 75 cd or UL 1638 listed for outdoor applications with strobe rated at 75 cd (wp75). The appliances shall be acceptable for indoor and outdoor, extended temperature, and extended humidity applications. The A/V device shall consist of a xenon flash tube and associated lens/reflector system, weatherproof cover, and weatherproof mounting box. The candela levels shall be selectable by using a hardware selector on the appliance.

- a. Twisted/Shielded wire is required for speaker connections on a standard 25VRMS or 70.7VRMS NAC.
 - b. The following taps are available: 0.25W, 0.50W, 1.0W, and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
 - c. The S/V shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for general signaling.
 - d. The S/V installs directly to a 4" square, 1-1/2" deep electrical box with 1-1/2" extension.
5. Visible/Only: Strobe shall be listed to UL 1971. The v/o shall consist of a xenon flash tube and associated lens/reflector system. The v/o enclosure shall mount directly to standard single gang, double gang, or 4" square electrical box, without the use of special adapters or trim rings. V/O appliances shall be provided with different minimum flash intensities of 15cd, 30cd, 75cd, and 110cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific visible/only appliance.
 6. High Intensity Visible/Only: High intensity visible/only: visible/only: strobe shall be listed to UL 1971. The v/o shall consist of a xenon flash tube and associated lens/reflector system. The v/o appliance shall mount directly to standard single gang, double gang, or 4" square electrical box, without the use of special adapters or trim rings. V/O appliances shall be provided with different minimum flash intensities of 135cd, 177cd, and 185cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific visible/only appliance.
 7. Weatherproof Visible Only: Weatherproof strobe shall be UL 1971 listed for indoor applications with strobe intensity selectable as 15, 60, or 75 cd or UL 1638 listed for outdoor applications with strobe rated at 75 cd (wp75). The appliances shall be acceptable for indoor and outdoor, extended temperature, and extended humidity applications. The v/o device shall consist of a xenon flash tube and associated lens/reflector system, weatherproof cover, and weatherproof mounting box. The candela levels shall be selectable by using a hardware selector on the appliance.
 8. Notification appliance circuit provides synchronization of strobes at a rate of 1Hz and operates speakers with a temporal code pattern operation. The circuit shall provide the capability to silence the audible signals, while the strobes continue to flash, over a single pair of wires. The capability to synchronize multiple notification appliance circuits shall be provided.
 9. Accessories: The contractor shall furnish any necessary accessories.
- B. NAC Power Extender:
1. The SLC NAC power extender panel shall be a stand-alone panel capable of powering a minimum of 4 notification appliance circuits. Notification appliance circuits shall be Class B rated at 2 amps each. Panel shall provide capability to be expanded to 8 notification appliance circuits.
 2. The internal power supply and battery charger shall be capable of charging up

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- 12.7 ah batteries internally mounted or 18 ah batteries mounted in an external cabinet.
- 3. The NAC extender panel may be mounted close to the host control unit or can be remotely located. The SLC addressable NAC extender panel when connected to an addressable panel shall connect to the host panel via an SLC communications channel. Via the SLC channel each output NAC can be individually controlled for general alarm or selective area notification.
- 4. For SLC connected NAC extender panels up to five panels can be connected on a single SLC channel.
- 5. When connected to a conventional (non-addressable panel) one or two standard notification appliance circuits from the main control unit may be used to activate all the circuits on the NAC power extender panel.
- 6. Alarms from the host fire alarm control panel shall signal the NAC power extender panel to activate. The panel shall monitor itself and each of its NACs for trouble conditions and shall report trouble conditions to the host panel.

2.5 Emergency Power Supply:

- A. General: Components include battery, charger, and an automatic transfer switch.
- B. Battery: Sealed lead-acid or nickel cadmium type. Provide sufficient capacity to operate the complete alarm system in normal or supervisory (non-alarm) mode for a period of 24 hours. Following this period of operation on battery power, the battery shall have sufficient capacity to operate all components of the system, including all alarm notification devices in alarm mode for a period of 15 minutes. Battery runtime calculations shall include a twenty percent margin of safety.

PART 3 - EXECUTION

3.1 Installation, General:

- A. Install system components and all associated devices in accordance with applicable NFPA standards and manufacturer's recommendations.
- B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
 - 1. Factory trained and certified personnel.
 - 2. National institute of certification in engineering technologies (NICET) fire alarm Level III certified personnel.
 - 3. Personnel licensed or certified by state or local authority.

3.2 Equipment Installation:

- A. Furnish and install a complete fire alarm system as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, Ethernet drops, and all other necessary material for a complete operating system.
- B. Existing fire alarm equipment shall be maintained fully operational until the new equipment has been tested and accepted.
- C. Equipment Removal: After acceptance of the new fire alarm system, disconnect and remove the existing fire alarm equipment and restore damaged surfaces. Package operational fire alarm and detection equipment that has been removed and deliver to the owner. Remove from the site and legally dispose of the remainder of the existing material.

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- D. Water-flow and Valve Supervisory Switches: Connect for each sprinkler valve required to be supervised.
- E. Device Location-indicating Lights: Locate in the public space immediately adjacent to the device they monitor.
- F. Install manual station with operating handle 48 inches (1.22 m) above floor. Install wall mounted audible and visual notification appliances not less than 80 inches (2.03 m) above floor to bottom of lens and not greater than 96 inches (2.44 m) above floor to bottom of lens.
- G. Mount outlet box for electric door holder to withstand 80 pounds pulling force.
- H. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control units, duct smoke detectors.
- I. Automatic Detector Installation: Conform to NFPA 72.

3.3 Preparation:

- A. Coordinate work of this section with other affected work and construction schedule.

3.4 Connections:

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in division 08 section "door hardware". Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet (1 m) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Smoke dampers in air ducts of designated air-conditioning duct systems.
 - 2. Alarm-initiating connection to elevator recall system and components.
 - 3. Alarm-initiating connection to activate emergency lighting control.
 - 4. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
 - 7. Supervisory connections at elevator shunt trip breaker.
 - 8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 9. Supervisory connections at fire-pump engine control panel.

3.5 Wiring Installation:

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the authority having jurisdiction and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electrical Code (NEC).
- B. Contractor shall obtain from the fire alarm system manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the contractor without the prior written approval of the fire alarm system manufacturer.

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- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.
- D. Mount end-of-line device in box with last device or separate box adjacent to last device for Class B supervision.

3.6 Identification:

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 section "Electrical Identification".
- B. Fire alarm system wiring shall be identified by tags at every point of access, including pull boxes, terminal boxes, device boxes, etc.
- C. Install framed instructions in a location visible from fire-alarm control unit.

3.7 Grounding:

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.8 Field Quality Control:

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
 - 1. Factory trained and certified.
 - 2. National institute for certification in engineering technologies (NICET) fire alarm certified.
 - 3. International municipal signal association (IMSA) fire alarm certified.
 - 4. Certified by a state or local authority.
 - 5. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the drawings and specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.
- D. Inspection:
 - 1. Inspect equipment installation, interconnection with system devices, mounting locations, and mounting methods.
 - 2. Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
- E. Acceptance Operational Tests:
 - 1. Perform operational system tests to verify conformance with specifications:
 - a. Each alarm initiating device installed shall be operationally tested. Each device shall be tested for alarm and trouble conditions. Contractor shall submit a written certification that the fire alarm system installation is complete including all punch-list items. Test battery operated emergency

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- power supply. Test emergency power supply to minimum durations specified. Test supervising station signal transmitter. Coordinate testing with supervising station monitoring firm/entity.
 - b. Test each notification appliance installed for proper operation. Submit written report indicating sound pressure levels at specified distances.
 - c. Test fire alarm control panel and remote annunciator.
 - d. Test 10% of existing system as required by NFPA 72. Coordinate exact scope of this work with Owner and AHJ.
2. Provide minimum 10 days notice of acceptance test performance schedule to owner, and local authority having jurisdiction.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Use NFPA 72 forms for documentation.
- H. Final test, record of completion, and certificate of occupancy:
- 1. Test the system as required by the authority having jurisdiction in order to obtain a certificate of occupancy. Provide completed NFPA 72 record of completion form to owner and AHJ.
- 3.9 Demonstration:
- A. Engage a factory-authorized service representative to train owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.
- 3.10 Cleaning and Adjusting:
- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
 - B. Occupancy Adjustments: When requested within one year of date of substantial completion, provide on-site assistance in adjusting sound pressure levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.
- 3.11 Training:
- A. Provide the services of a factory-authorized service representative to demonstrate the system and train owner's maintenance personnel as specified below.
 - 1. Train owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 2 hours' training.
 - 2. Schedule training with the owner at least seven days in advance.

END OF SECTION

UF PROJECT NO.: MP04706

Basic Science Elevators

UF BUILDING NO.: 0206
1333 CENTER DR
GAINESVILLE, FL 32610

PROJECT INFO.

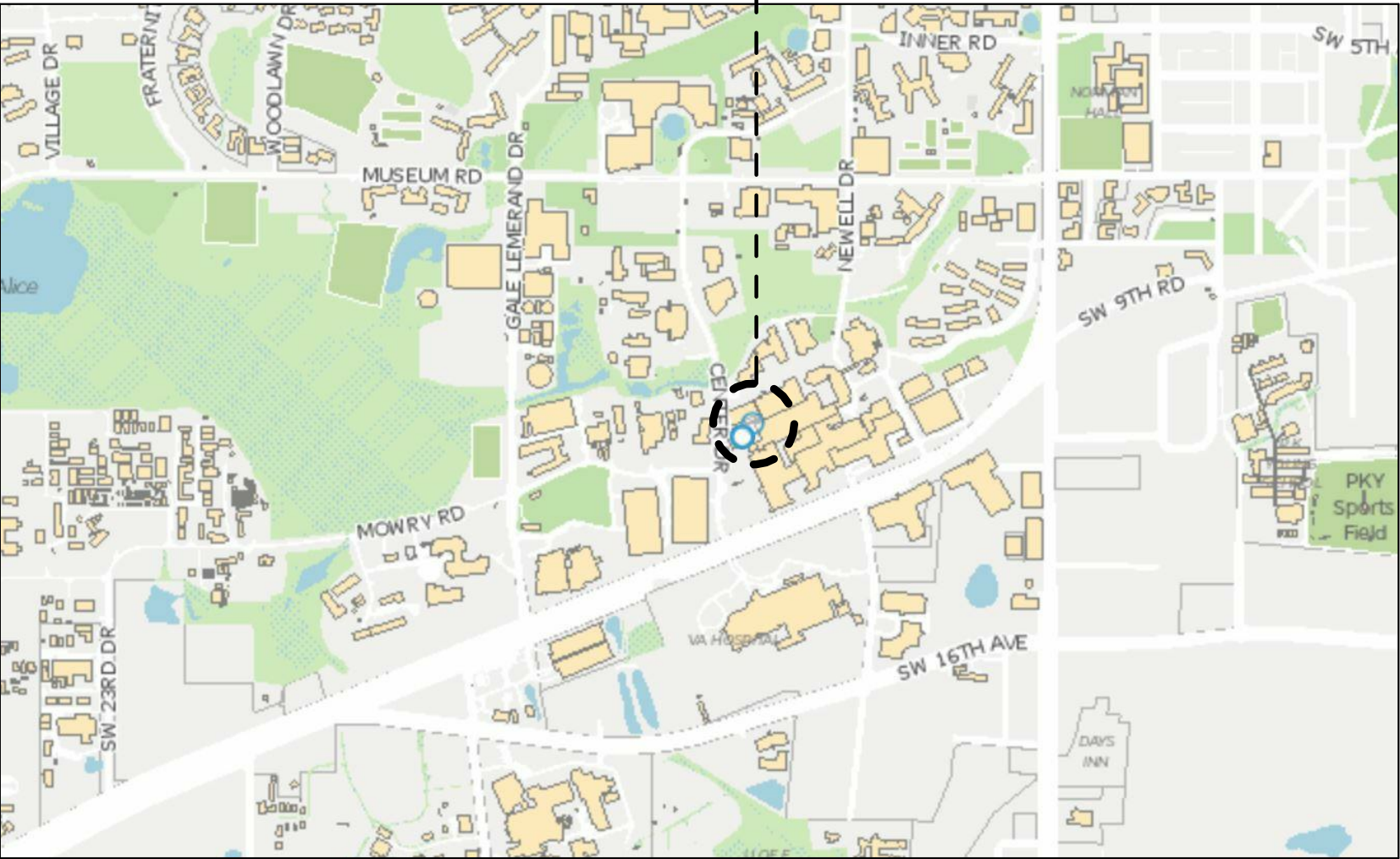
BUILDING INFORMATION

BUILDING OCCUPANCY CLASS:
CONSTRUCTION TYPE:
SPRINKLERED:

BUSINESS (B)
TYPE IIB
YES

LOCATION MAP

PROJECT LOCATION - - - - - 1



INDEX OF DRAWINGS

GENERAL	
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A101	ELEVATOR 1 PLANS AND SECTIONS
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E103	ELECTRICAL ELEVATOR 2 PLANS
E104	ELECTRICAL ELEVATOR 2 PLANS

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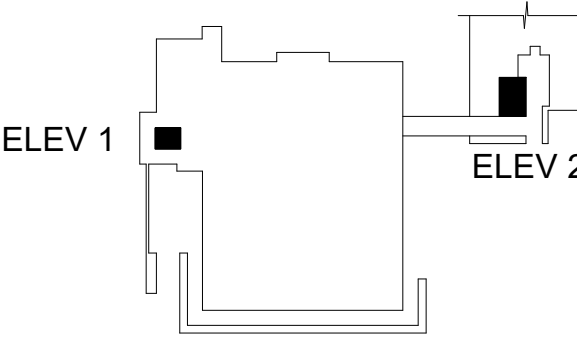
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SUBMITTAL:		ISSUE DATE:
100% CONSTRUCTION DOCUMENTS		04/05/2019
REVISION	DESCRIPTION	DATE

BASIC SCIENCE ELEVATORS

1333 CENTER DR
GAINESVILLE, FL 32610

KEY PLAN



DRAWING TITLE:

COVER

PROJECT NO.:	18122	DRAWN BY:	TMV
		CHECKED BY:	KAL

G000



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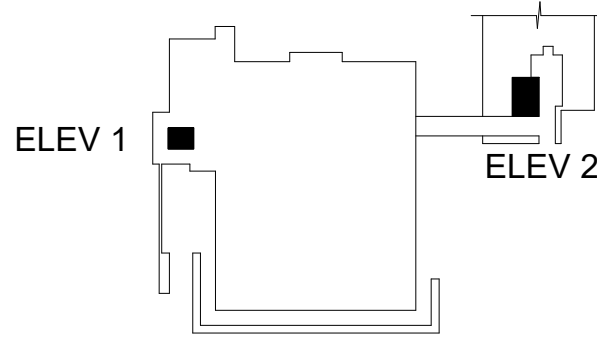
JOSEPH B. WALKER, AIA
LICENSE NO.: AR0017272

SUBMITTAL:		ISSUE DATE:
100% CONSTRUCTION DOCUMENTS		04/05/2019
REVISION	DESCRIPTION	DATE

BASIC SCIENCE ELEVATORS

1333 CENTER DR
GAINESVILLE, FL 32610

KEY PLAN



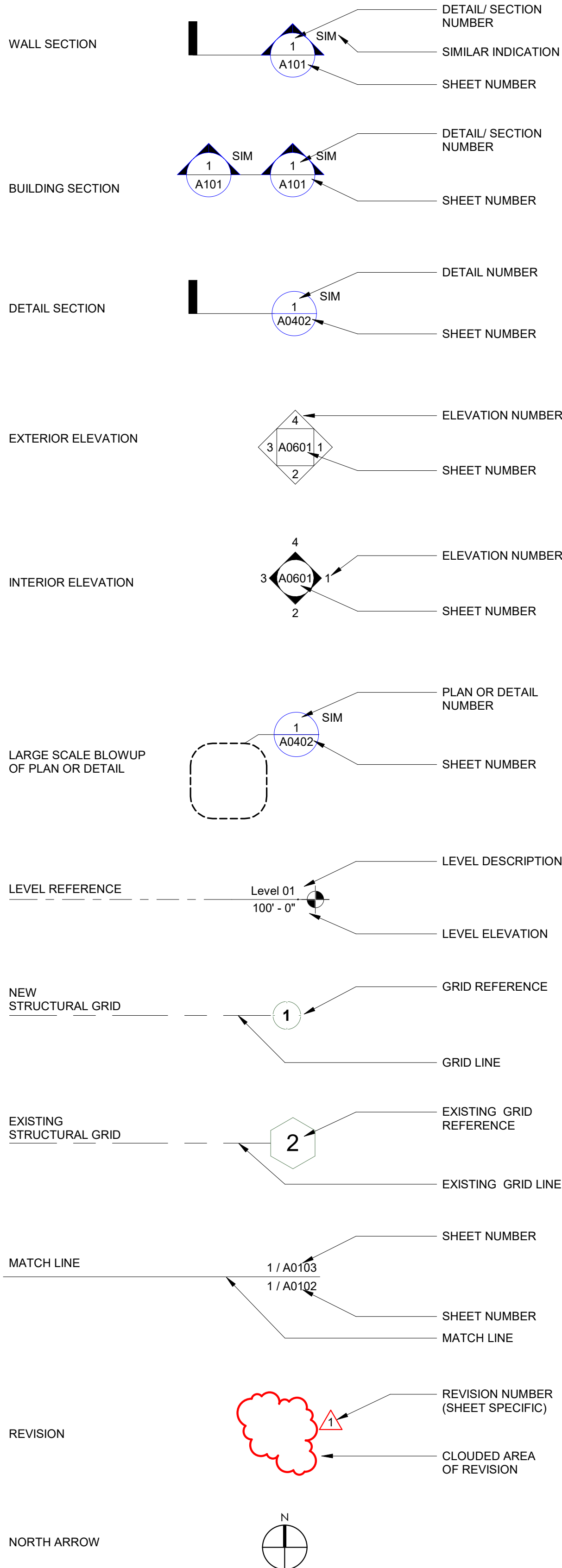
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GENERAL NOTES,
SYMBOL LEGEND AND
ABBREVIATIONS

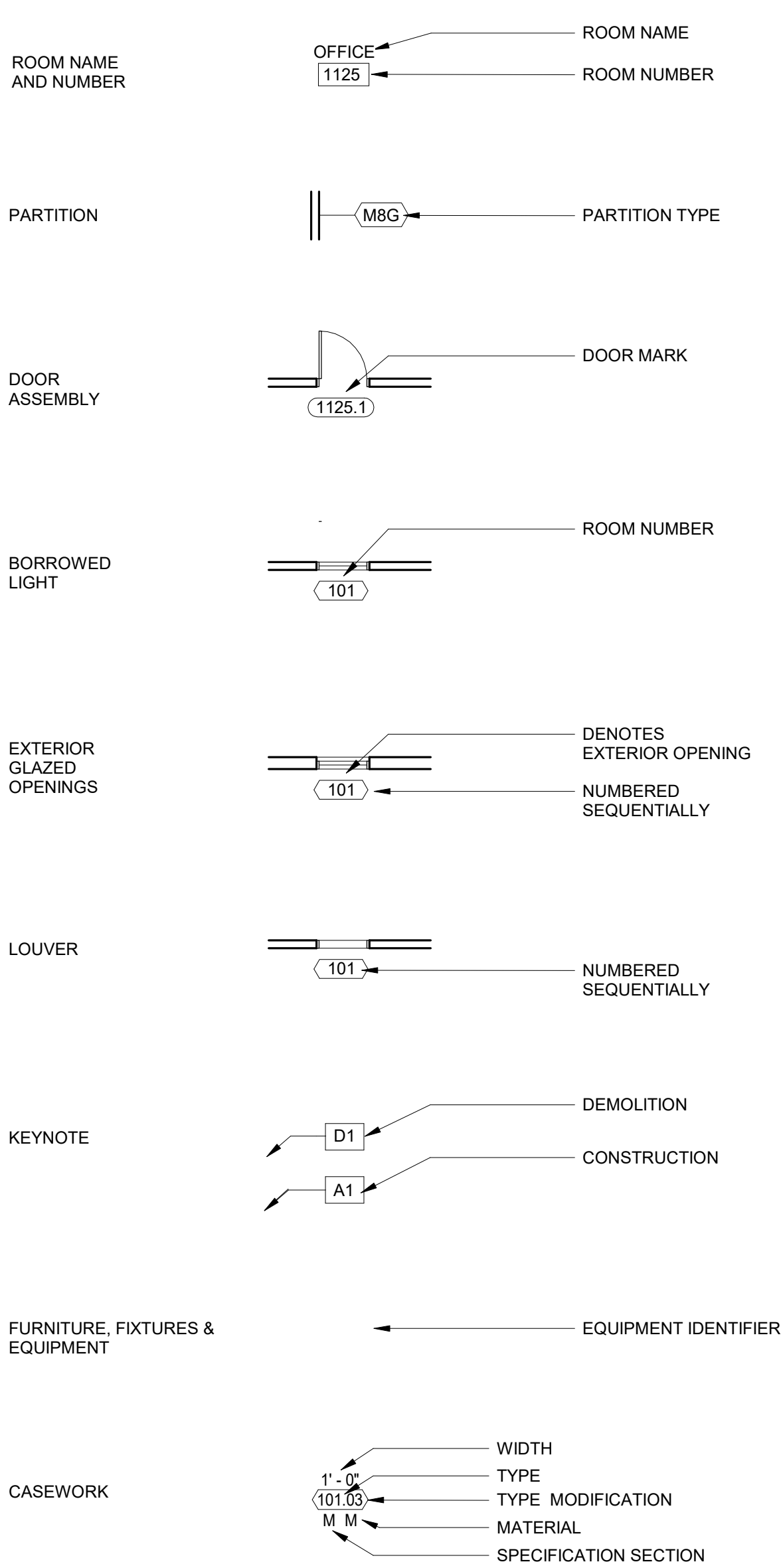
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		CHECKED BY:	KAL

G001

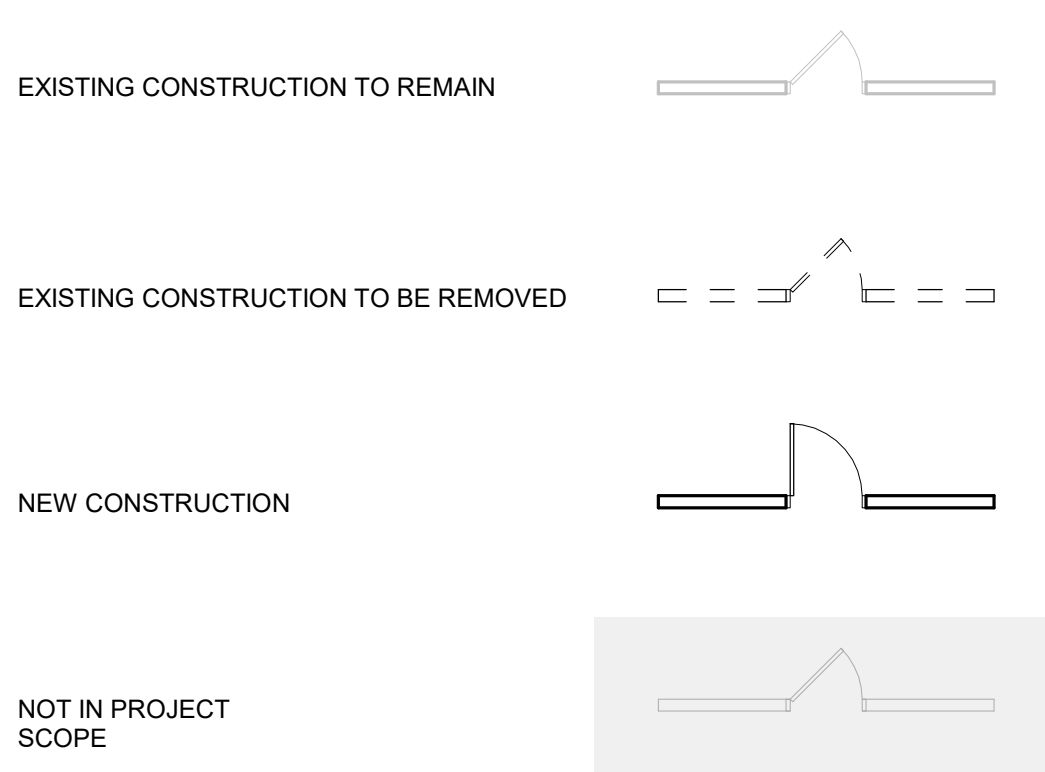
REFERENCE SYMBOLS (ALL DISCIPLINES)



REFERENCE SYMBOLS (ARCHITECTURAL)



TYPICAL PHASING GRAPHICS



ABBREVIATIONS

AC	AIR CONDITIONING
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ARCH	ARCHITECT(URAL)
AUTO	AUTOMATIC
BLDG	BUILDING
BRG	BEARING
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTALLED
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CL	CENTERLINE
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
CORR	CORRIDOR
DEMO	DEMOLISH(ITION)
DEPT	DEPARTMENT
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
EA	EACH
EJ	EXPANSION JOINT
ELEC	ELECTRIC(AL)
EOS	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
EXP	EXPANSION
EXT	EXTERIOR
EWC	ELECTRIC WATER COOLER
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FT	FOOT/FEET
FURN	FURNISH(ED)(INGS)
GA	GAUGE / GAGE
GWB	GYPSPUM WALL BOARD
HSS	HOLLOW STRUCTURAL SECTION
HVAC	HEATING-VENTILATING-AIR CONDITIONING
ID	INSIDE DIAMETER
INT	INTERIOR
LAV	LAVATORY
LWIC	LIGHTWEIGHT INSULATING CONCRETE
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER(D)
MIN	MINIMUM
MISC	MISCELLANEOUS
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED OWNER INSTALLED
OPP	OPPOSITE
ORD	OVERFLOW ROOF DRAIN
PCF	POUNDS PER CUBIC FOOT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
QTY	QUANTITY
R	RADIUS
RCP	REFLECTED CLEILING PLAN
RD	ROOF DRAIN
REF	REFRIGERATOR
REV	REVISE (ISION)
RO	ROUGH OPENING
RTU	ROOF TOP UNIT
SF	SQUARE FOOT (FEET)
SIM	SIMILAR
SPEC	SPECIFY(ICATION)
SS	STAINLESS STEEL
STC	SOUND TRANSMISSION CLASS
STRUC	STRUCTURE(AL)
TBD	TO BE DETERMINED
TEMP	TEMPORARY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL
T&G	TONGUE AND GROOVE
UC	UNDERCOUNTER
UOI	UNLESS OTHERWISE INDICATED
VIF	VERIFY IN FIELD
VTR	VENT THROUGH ROOF
WD	WOOD
WP	WORK POINT

GENERAL NOTES

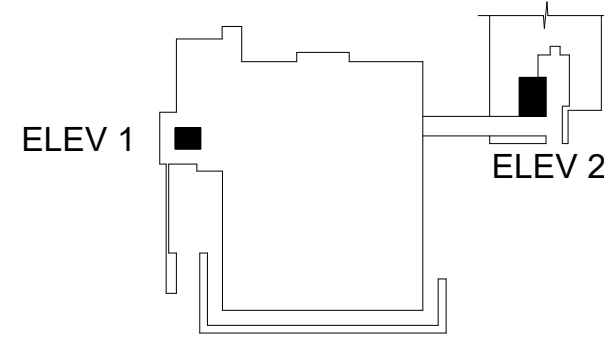
- DO NOT DETERMINE DIMENSIONS AND SIZE OF THE GRAPHIC REPRESENTATIONS SHOWN ON THE DRAWINGS BY USING MEASURING DEVICES (DO NOT "SCALE"). RELY ON THE NUMERIC DIMENSIONS SHOWN ON THE DRAWINGS FOR MEASUREMENT.
- REVIEW AND FIELD VERIFY ALL DIMENSIONS AND CONDITIONS RELATING TO THE EXISTING BUILDINGS THAT INTERFACE WITH THE NEW CONSTRUCTION. NOTIFY THE ARCHITECT WHEN EXISTING CONDITIONS VARY FROM THE PROJECT DRAWINGS.
- DETAILED DRAWINGS AND LARGER SCALE DRAWINGS TAKE PRECEDENCE OVER SMALLER SCALE DRAWINGS.
- UNLESS INDICATED OTHERWISE, PLAN DIMENSIONS ARE TAKEN FROM CENTERLINE OF STRUCTURE, FACE OF CONCRETE OR FACE OF STUD. PLAN DIMENSIONS TO PLUMBING FIXTURES AND ACCESSORIES ARE TAKEN FROM FINISHED FACE OF WALL.
- DOORS NOT OTHERWISE DIMENSIONED SHALL BE 8" FROM ADJACENT CMU OR CONCRETE WALL TO ROUGH DOOR OPENING, AND 5" FROM FACE OF ADJACENT STUD WALL TO ROUGH DOOR OPENING.
- PROVIDE ALL BLOCKING NECESSARY FOR THE ATTACHMENT OF MISCELLANEOUS EQUIPMENT INCLUDING BUT NOT LIMITED TO TOILET ACCESSORIES, DOOR HARDWARE, ELECTRICAL DEVICES, GRAB BARS, CASEWORK, MILLWORK, AND LABORATORY EQUIPMENT.
- FOR CONSTRUCTION DETAILS NOT SHOWN, USE THE PRODUCT MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS AND STANDARD DETAILS. IN STRICT ACCORDANCE WITH THE PROJECT SPECIFICATION REQUIREMENTS AND DESIGN INTENT.
- PROVIDE ACCESS DOORS OF APPROPRIATE SIZE, TYPE AND FIRE RATING FOR ALL CONCEALED ITEMS THAT REQUIRE ADJUSTMENT, MAINTENANCE, MONITORING, ETC. COORDINATE LOCATIONS WITH ARCHITECT.

SUBMITTAL:		ISSUE DATE:
100% CONSTRUCTION DOCUMENTS		04/05/2019
REVISION	DESCRIPTION	DATE

BASIC SCIENCE ELEVATORS

1333 CENTER DR
GAINESVILLE, FL 32610

KEY PLAN




DRAWING TITLE:

RATED WALL PENETRATION DETAILS

PROJECT NO.: 18122 DRAWN BY: TMV
CHECKED BY: KAL

G200

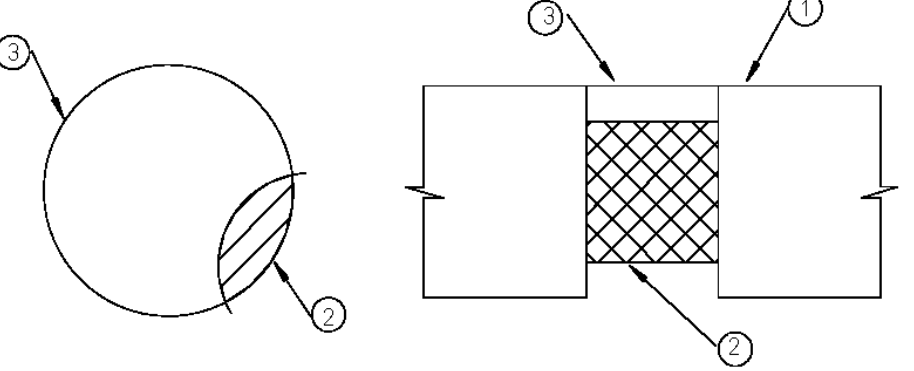


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR BLANK OPENINGS THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SIL AND FRYE-SIL SIL

CAJ0011

F-RATING = 2 HOUR
T-RATING = 1-1/2 & 2 HOUR

DRAWING NOT TO SCALE



PRE-RATED CONCRETE FLOOR OR WALL ASSEMBLY = MIN. 4-1/2" THICKNESS

MAX. DIAMETER OF OPENING = 24"


PACKING MATERIAL - MIN. 3-1/2" THICKNESS OF MINERAL WOOL INSULATION (MIN. 50 PCF) FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM

FRYE-SIL OR FRYE-SIL SIL - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING, FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACE OF WALL ASSEMBLY

NOTE: IF FRYE-SIL SIL IS USED, THE T-RATING = 1-1/2 HR

IF FRYE-SIL SIL IS USED, THE T-RATING = 2 HR

NOTE: APPLY FRYE-SIL SIL TO FLOOR APPLICATIONS ONLY

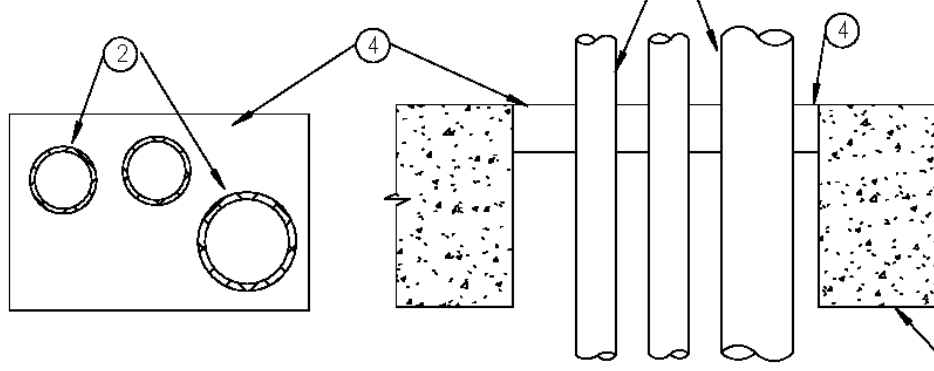


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR MULTIPLE METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SHIELD

CAJ1047

F-RATING = 2 HR
T-RATING = 0 HR

DRAWING NOT TO SCALE




PRE-RATED CONCRETE FLOORS OR BLOCK WALLS = MIN. 4-1/2" THICKNESS

MAX. AREA OF OPENING = 288 SQ. IN., WITH A MAX. DIMENSION OF 24"

METALLIC PIPE: A) STEEL PIPE - 8" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
B) CONDUIT - 4" DIAM. (OR SMALLER) EMT OR 8" DIAM. (OR SMALLER) STEEL CONDUIT
C) IRON PIPE - 8" DIAM. (OR SMALLER) REGULAR OR DUCTILE IRON PIPE
D) COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
E) COPPER PIPE - 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE

NOTE: THE MAXIMUM NUMBER OF PIPES WITHIN OPENING IS 3. THE ANNULAR SPACE BETWEEN PIPES SHALL BE MIN. 1-1/2" AND A MIN. 1/2" BETWEEN PIPES AND EDGE OF OPENING FORMING MATERIAL - (NOT SHOWN, OPTIONAL) NOM. 1" THICK POLYURETHANE BACKER ROD FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM

FRYE-SHIELD - MIN. 1/2" THICKNESS MASTIC APPLIED WITHIN ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF THE WALL ASSEMBLY

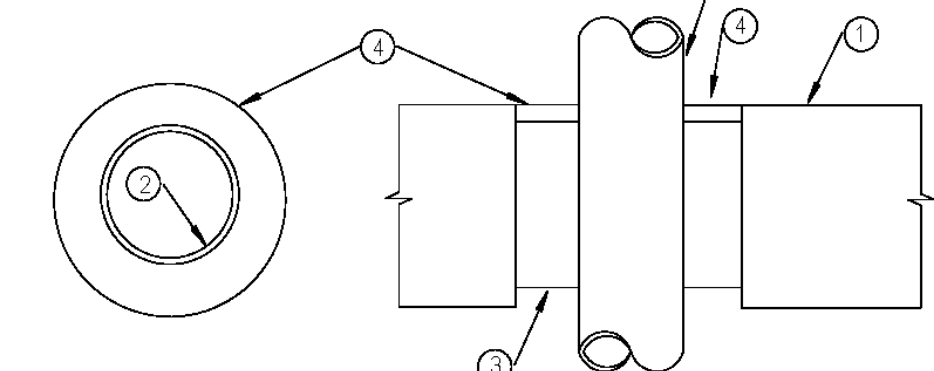


2 AND 4 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR SINGLE METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SIL

CAJ1064

F-RATING = 2 AND 4 HR
T-RATING = 0 HR


DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOORS OR BLOCK WALLS - SEE TABLE BELOW FOR MIN. THICKNESS
2 METALLIC PIPE: A) STEEL PIPE - 4" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
C) CONDUIT - 4" DIAM. (OR SMALLER) EMT OR STEEL CONDUIT
D) COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
E) COPPER PIPE - 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE

3 PACKING MATERIAL - SEE TABLE BELOW FOR THE MINERAL WOOL INSULATION REQUIREMENTS
4 FRYE-SIL - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN ANNULUS, FLUSH WITH TOP OF FLOOR SURFACE OR WITH BOTH SIDES OF THE WALL ASSEMBLY

MIN. THICKNESS OF CONCRETE, IN.	ANNULAR SPACE RANGE, IN.	MIN. PACKING MATERIAL THICKNESS, IN.	MIN. PACKING MATERIAL DENSITY, PCF	F-RATING HR.
4-1/2	1/2 TO 2-7/8	3-1/2	60	2
5-1/2	0 TO 1-7/8	5	40	4

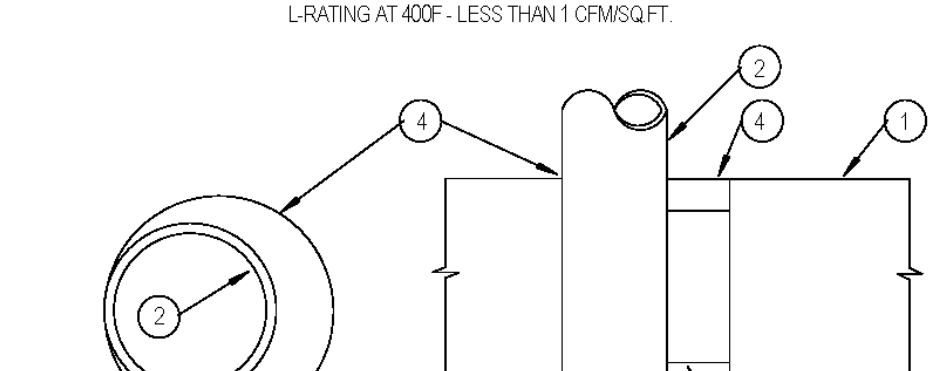


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR SINGLE METAL PIPE THROUGH CONCRETE FLOORS OR BLOCK WALLS USING TREMSTOP ACRYLIC


CAJ1205

F-RATING = 2 HR
T-RATING = 0 HR
L-RATING AT AMBIENT - LESS THAN 1 CFMSQ.FT.
L-RATING AT 400F - LESS THAN 1 CFMSQ.FT.

DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOORS OR BLOCK WALLS = MIN. 3-1/2" THICKNESS
THE ANNULAR SPACE RANGE SHALL BE MIN. 0" MAX. 7/8" FOR THIS FIRESTOP
2 METALLIC PIPE - 1/2" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL
> CONDUIT - NOM. 4" DIAM. (OR SMALLER) STEEL CONDUIT, OR EMT
> COPPER PIPE - 3" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER
> CAST IRON PIPE - 1-1/2" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER
> COPPER TUBING - 3" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER
3 PACKING MATERIAL - MIN. 4" THICKNESS OF MINERAL WOOL (MIN. 40 PCF) INSULATION, FIRMLY PACKED INTO OPENING AS A PERMANENT FORM
4 TREMSTOP ACRYLIC - MIN. 1/2" SEALANT APPLIED WITHIN ANNULUS, AND A MINIMUM 1/4" SEALANT APPLIED AT POINT CONTACT, AT THE FLOOR SURFACE FOR FLOORS, OR BOTH SURFACES FOR WALLS

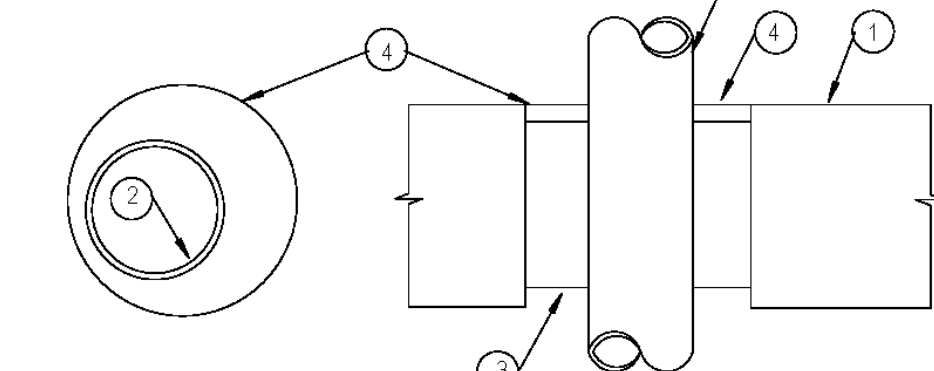


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR SINGLE METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SHIELD

CAJ1233


F-RATING = 2 HR
T-RATING = 0 HR

DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOORS OR BLOCK WALLS = MIN. 3" THICK CONCRETE FLOOR ASSEMBLY, MIN. 3-1/2" THICK CONCRETE WALL ASSEMBLY
2 METALLIC PIPE: A) STEEL PIPE - 8" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
B) IRON PIPE - 8" DIAM. (OR SMALLER) CAST OR DUCTILE IRON PIPE
C) CONDUIT - 4" DIAM. (OR SMALLER) EMT OR STEEL CONDUIT
D) COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
E) COPPER PIPE - 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE
THE ANNULAR SPACE BE MIN. 1/2" TO MAX. 7/8"

3 PACKAGING MATERIAL - MIN. 2-1/2" THICKNESS OF MINERAL WOOL (MIN. 40 PCF) INSULATION, FIRMLY PACKED INTO OPENING AS A PERMANENT FORM
4 FRYE-SHIELD - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL ASSEMBLY

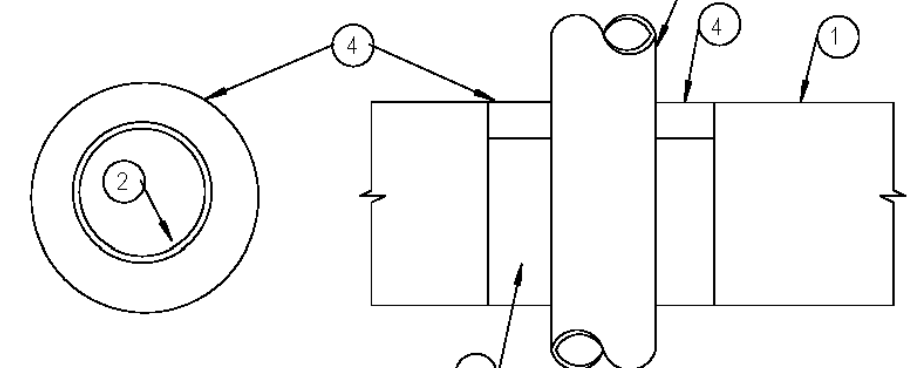


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR SINGLE METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING TREMSTOP IA

CAJ1302

F-RATING = 2 HR
T-RATING = 0 HR


DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOORS OR BLOCK WALLS = MIN. 4-1/2" THICKNESS
2 METALLIC PIPE: A) STEEL PIPE - 8" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
B) IRON PIPE - 8" DIAM. (OR SMALLER) CAST OR DUCTILE IRON PIPE
C) CONDUIT - 4" DIAM. (OR SMALLER) EMT OR STEEL CONDUIT
D) COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
E) COPPER PIPE - 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE

3 PACKING MATERIAL - SEE TABLE BELOW FOR MINERAL WOOL INSULATION (MIN. 40 PCF) REQUIREMENTS
4 TREMSTOP IA - SEE TABLE BELOW FOR MINIMUM THICKNESS OF SEALANT, APPLY SEALANT FLUSH WITH TOP OF FLOOR SURFACE OF WITH BOTH SIDES OF WALL ASSEMBLY

ANNULAR SPACE RANGE, IN.	MIN. THICKNESS OF SEALANT, IN.	F-RATING HR.	T-RATING HR.
1/2 TO 1-3/8	0	1	2
1-3/8 TO 1-3/4	4	12	

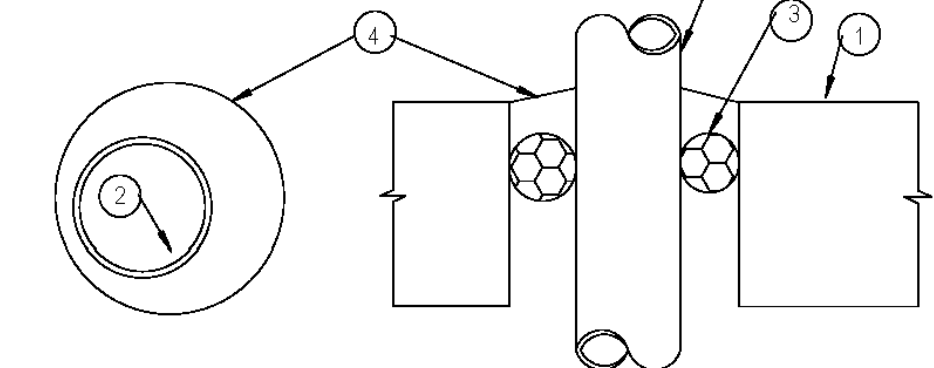


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR SINGLE METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING TREMSTOP IA

CAJ2184

F-RATING = 2 HR
T-RATING = 1-1/2 HR


DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOORS OR BLOCK WALLS = MIN. 4-1/2" THICKNESS
2 PLASTIC PIPE - A) NOM. 2" DIAM. (OR SMALLER) SCH. 40 PVC PIPE
B) NOM. 2" DIAM. (OR SMALLER) SDR17 PVC PIPE

3 FORMING MATERIAL - FOAMBACKER ROD FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM
4 TREMSTOP IA - SEALANT APPLIED WITHIN OPENING, FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL ASSEMBLY AS SHOWN IN TABLE BELOW. WHEN REQUIRED, APPLY ADDITIONAL SEALANT SUCH THAT A MIN. 1/8" CROWN IS FORMED AROUND THE PENETRATING ITEM

MAX. PIPE DIAMETER, IN.	ANNULAR SPACE, IN.	MIN. SEALANT THICKNESS, IN.	SEALANT CROWN REQUIRED
1-1/2	3/8 TO 3/4	1/2	YES
2	1/4 TO 3/8		NO

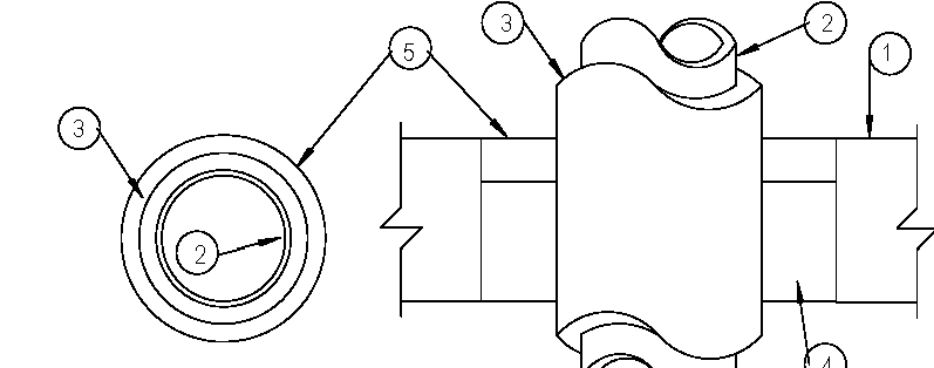


3 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR INSULATED METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SHIELD

CAJ5023

F-RATING = 3 HOUR
T-RATING = 1-1/2 HOUR


DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOOR OR WALL ASSEMBLY = MIN. 4-1/2" THICKNESS
2 METALLIC PIPE - 8" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE

THE NOM. ANNULAR SPACE OF 1 1/16" IS REQUIRED IN THE FIRESTOP SYSTEM

3 PIPE COVERING - NOM. 1" THICK (OR LESS) FIBERGLASS INSULATION
4 PACKING MATERIAL - MIN. 4" THICKNESS OF CERANLANT-PS OR CERAMIC FIBER INSULATION (MIN. 60 PCF) FIRMLY PACKED INTO OPENING AS A PERMANENT FORM
5 FRYE-SHIELD - MIN. 1-1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING, FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL ASSEMBLY

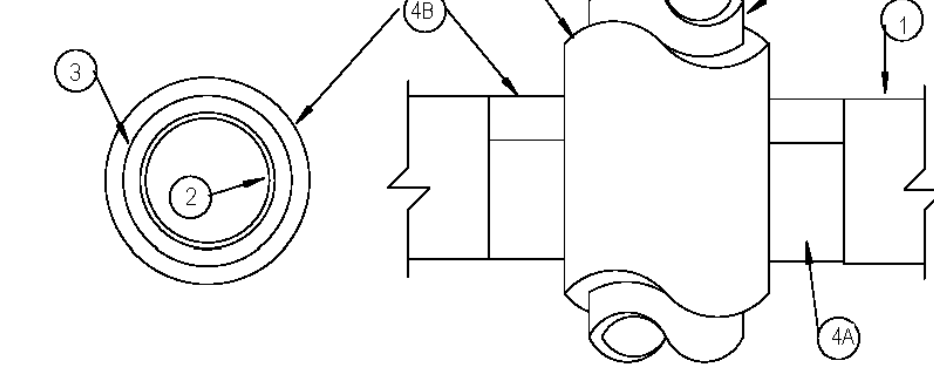


1-1/2 & 2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR INSULATED METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SIL AND FRYE-SIL SIL

CAJ5067


F-RATING = 1-1/2 & 2 HOUR
T-RATING = 1-1/2 & 1 HOUR

DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOOR OR WALL ASSEMBLY = MIN. 4-1/2" THICKNESS
2 METALLIC PIPE - 10" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL
> COPPER PIPE - 8" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER
> COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE M (OR HEAVIER) COPPER TUBING
3 PIPE COVERING - FIBERGLASS INSULATION, SEE TABLE BELOW FOR THICKNESS AND ANNULAR SPACE
4 PIPE COVERING ANNULAR SPACE - PACKING MATERIAL - MIN. SEALANT THICKNESS, IN. F-RATING HR. T-RATING HR.
4A PACKING MATERIAL - MINERAL WOOL INSULATION (MIN. 40 PCF) FIRMLY PACKED INTO OPENING TO THE MINIMUM REQUIRED THICKNESS IN THE TABLE ABOVE
4B FRYE-SIL AND FRYE-SIL SIL - MIN. THICKNESS OF SEALANT AS SPECIFIED IN THE TABLE ABOVE, APPLIED WITHIN OPENING FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL
NOTE: APPLY FRYE-SIL SIL TO FLOOR APPLICATIONS ONLY

MAX. PIPE DIAM, IN.	PIPE COVERING THICKNESS, IN.	ANNULAR SPACE, IN.	PACKING MATERIAL THICKNESS, IN.	MIN. SEALANT THICKNESS, IN.	F-RATING HR.	T-RATING HR.
3	1	1/4 TO 1-3/8	3-1/2	1/2	1-1/2	1/2
3	1	1/4 TO 5/8	3-1/2	1/4	1-1/2	1/2
4	1/2	1/4 TO 5/8	4-1/4	1/4	2	1/2
10	1	1/2 TO 1	4-1/4	1/4	2	1
10	2	1/2 TO 3/4	4-1/4	1/4	1-1/2	1-1/2

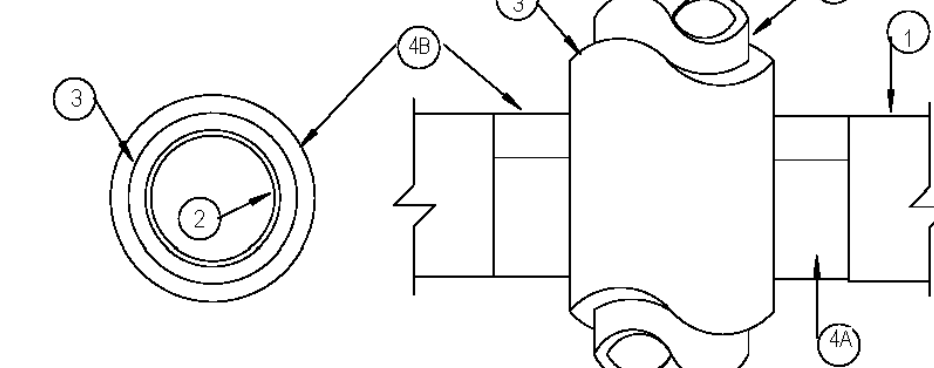


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR INSULATED METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING TREMSTOP ACRYLIC


CAJ5069

F-RATING = 2 HOUR
T-RATING = 1/2 & 1 HOUR

DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOOR OR WALL ASSEMBLY = MIN. 4-1/2" THICKNESS
2 METALLIC PIPE - 8" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL
> IRON PIPE - 8" DIAM. (OR SMALLER) CAST OR DUCTILE IRON
> COPPER PIPE - 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER
> COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
3 PIPE COVERING - NOM. 1" THICK (OR LEASS) FIBERGLASS INSULATION
4 FIRESTOP TREATMENT: PIPE TYPE ANNULAR SPACE, IN. T-RATING, H.
STEEL PIPE 1/2 TO 1 1
IRON PIPE 1/2 TO 1 1
COPPER PIPE 3/8 TO 1-1/2 1/2
COPPER TUBE 3/8 TO 1-1/2 1/2
4A PACKING MATERIAL - MIN. 4" THICKNESS OF MINERAL WOOL INSULATION (MIN. 40 PCF) FIRMLY PACKED INTO OPENING AS A PERMANENT FORM
4B TREMSTOP ACRYLIC - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING, FLUSH WITH TOP OF FLOOR OR BOTH SIDES OF WALL

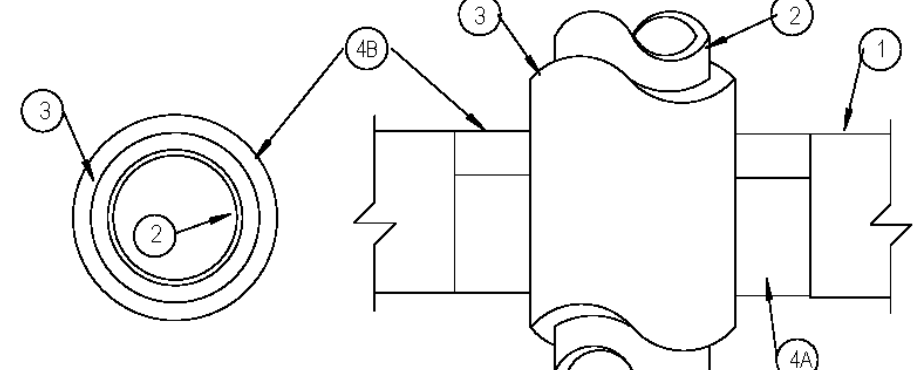


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR INSULATED METAL PIPE THROUGH CONCRETE FLOORS OR WALLS USING TREMSTOP IA

CAJ5121


F-RATING = 2 HR
T-RATING = 1-1/2 & 1 HR

DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOOR OR WALL ASSEMBLY = MIN. 4-1/2" THICKNESS
2 METALLIC PIPE: A) COPPER TUBING - NOM. 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
B) COPPER PIPE - NOM. 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE
C) STEEL PIPE - NOM. 4" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
D) IRON PIPE - NOM. 4" DIAM. (OR SMALLER) CAST IRON PIPE
E) CONDUIT - NOM. 4" DIAM. (OR SMALLER) EMT OR STEEL CONDUIT
3 PIPE COVERING - FIBERGLASS INSULATION, SEE TABLE BELOW FOR THICKNESS AND ANNULAR SPACE
4 PIPE COVERING ANNULAR SPACE - PACKING MATERIAL - MIN. SEALANT THICKNESS, IN. F-RATING HR. T-RATING HR.
4A PACKING MATERIAL - MINERAL WOOL INSULATION (MIN. 40 PCF) FIRMLY PACKED INTO OPENING TO THE MINIMUM REQUIRED THICKNESS IN THE TABLE ABOVE
4B TREMSTOP IA - MIN. THICKNESS OF SEALANT AS SPECIFIED IN TABLE ABOVE, APPLIED WITHIN OPENING, FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL

MAX. PIPE DIAM, IN.	PIPE COVERING THICKNESS, IN.	ANNULAR SPACE, IN.	PACKING MATERIAL THICKNESS, IN.	MIN. SEALANT THICKNESS, IN.	F-RATING HR.	T-RATING HR.
1	1	1/2 TO 1	0	1	2	1/2
4	2	1/2 TO 1-1/2	3-1/2	1	2	1/2

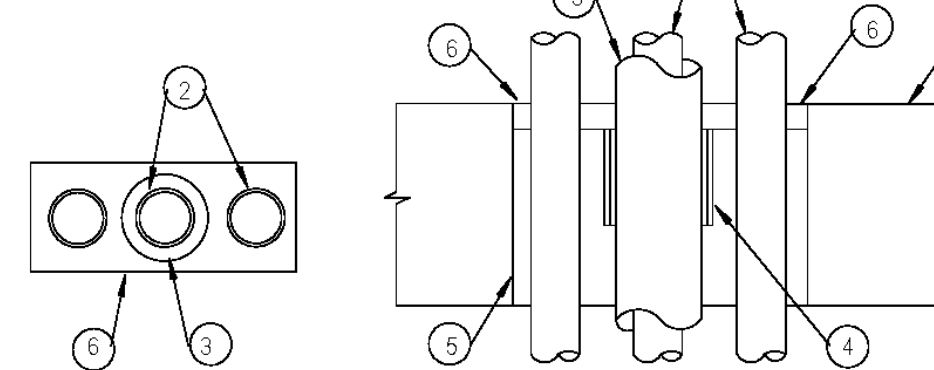


2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR MIXED ITEMS THROUGH CONCRETE FLOORS OR WALLS USING FRYE-SIL AND TREMSTOP WS


CAJ057

F-RATING = 2 HR
T-RATING = 0 & 1/2 HR

DRAWING NOT TO SCALE



1 PRE-RATED CONCRETE FLOORS OF BLOCK WALLS = MIN. 4-1/2" THICKNESS
MAX. AREA OF OPENING = 60 SQ. IN., WITH A MAX. DIMENSION OF 12"
2 METALLIC PIPE: A) STEEL PIPE - 3" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
B) CONDUIT - 3" DIAM. (OR SMALLER) EMT OR STEEL CONDUIT
C) COPPER TUBING - 3" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
D) COPPER PIPE - 3" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE
E) IRON PIPE - 3" DIAM. (OR SMALLER) CAST OR DUCTILE IRON PIPE
THE ANNULAR SPACE BETWEEN PIPES AND OPENINGS IS MIN. 1/4" TO MAX. 15/16"
3 PIPE COVERING - NOM. 3/4" THICKNESS OF FLEXIBLE FOAM (AB/PO) PIPE INSULATION
4 TREMSTOP WS - INTUMESCENT WRAP STRIPS WRAPPED AROUND PIPE COVERING (ITEM 3) TWO TIMES
5 PACKING MATERIAL - MIN. 4" THICKNESS OF MINERAL WOOL INSULATION (MIN. 40 PCF) FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM
6 FRYE-SIL - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING, FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SIDES OF WALL ASSEMBLY

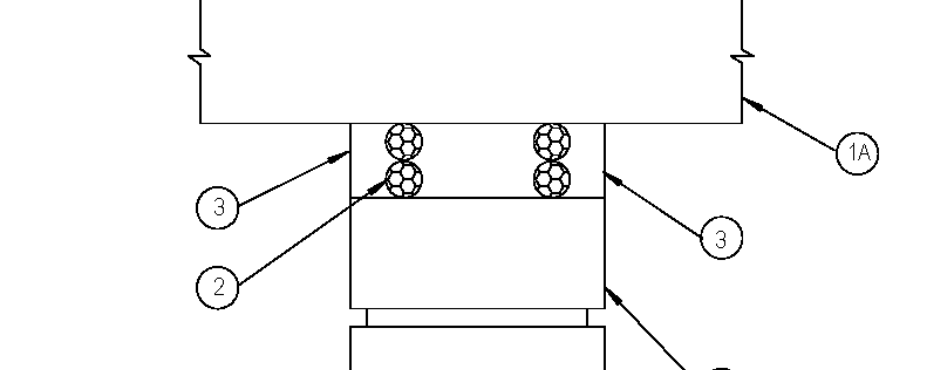


2 HOUR FIRE RATED JOINTS FOR CONCRETE FLOORS AND CONCRETE WALLS USING TREMSTOP ACRYLIC


HWD 0017

MOVEMENT CAPABILITIES = 25% COMPRESSION

DRAWING NOT TO SCALE



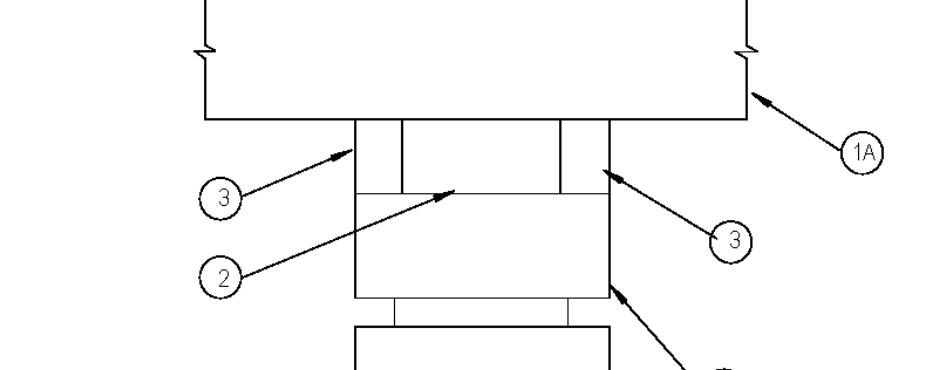
1 A) PRE-RATED CONCRETE FLOOR - MIN. 4-1/2" THICKNESS
B) PRE-RATED CONCRETE OR BLOCK WALL - MIN. 4-1/2" THICKNESS
MAX. JOINT WIDTH = 1"
2 PACKING MATERIAL - TWO LAYERS OF NOM. 7/8" DIAM. POLYURETHANE BAKER ROD, FRICTION FITTED WITHIN THE OPENING TO ACCOMMODATE THE REQUIRED THICKNESS OF SEALANT
3 TREMSTOP ACRYLIC - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING FLUSH WITH BOTH SURFACES OF THE WALL ASSEMBLY




2 HOUR FIRE RATED JOINTS FOR CONCRETE FLOORS AND WALLS USING DYMERIC

HWS 1004

DRAWING NOT TO SCALE



1 A) PRE-RATED CONCRETE FLOOR, MIN. 4-1/2" THICKNESS
B) PRE-RATED CONCRETE OR BLOCK WALL, MIN. 4-1/2" THICKNESS
MAX. JOINT WIDTH = 3"
2 PACKING MATERIAL - MIN. 3-1/2" MINERAL WOOL INSULATION (MIN. 50 PCF) FIRMLY PACKED INTO OPENING AS A PERMANENT FORM
3 DYMERIC - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING, FLUSH WITH BOTH SURFACES OF THE WALL ASSEMBLY

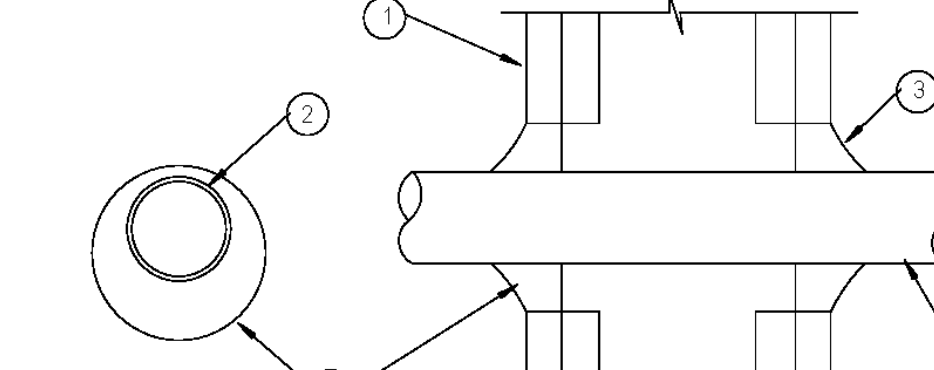


1 OR 2 HOUR FIRE RATED THROUGH PENETRATION FIRESTOP FOR SINGLE METAL PIPE THROUGH GYPSUM WALLS USING FRYE-SHIELD

WL 1057

F-RATING = 1 AND 2 HR
T-RATING = 0 HR

DRAWING NOT TO SCALE



1 PRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY
2 METALLIC PIPE - A) STEEL PIPE - 8" DIAM. (OR SMALLER) SCH. 40 (OR HEAVIER) STEEL PIPE
B) IRON PIPE - 8" DIAM. (OR SMALLER) CAST OR DUCTILE IRON PIPE
C) CONDUIT - 4" DIAM. (OR SMALLER) EMT OR RIGID STEEL CONDUIT
D) COPPER TUBING - 4" DIAM. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING
E) COPPER PIPE - 4" DIAM. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE
THE ANNULAR SPACE SHALL BE MIN. 1/4" TO MAX. 5/8" WITHIN THE FIRESTOP SYSTEM
3 FRYE-SHIELD - MIN. 1/2" THICKNESS OF SEALANT APPLIED WITHIN OPENING - ADDITIONAL SEALANT TO BE INSTALLED SUCH THAT A MIN. 1/4" CROWN IS FORMED AROUND THE PENETRATING ITEM

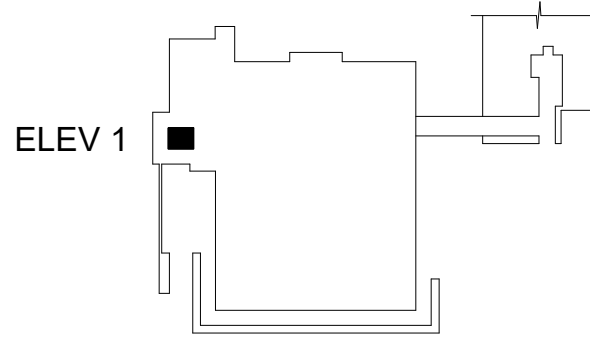
JOSEPH B. WALKER, AIA
LICENSE NO.: AR0017272

SUBMITTAL:		ISSUE DATE:
100% CONSTRUCTION DOCUMENTS		04/05/2019
REVISION	DESCRIPTION	DATE

**BASIC SCIENCE
ELEVATORS**

1333 CENTER DR
GAINESVILLE, FL 32610

KEY PLAN



DRAWING TITLE:

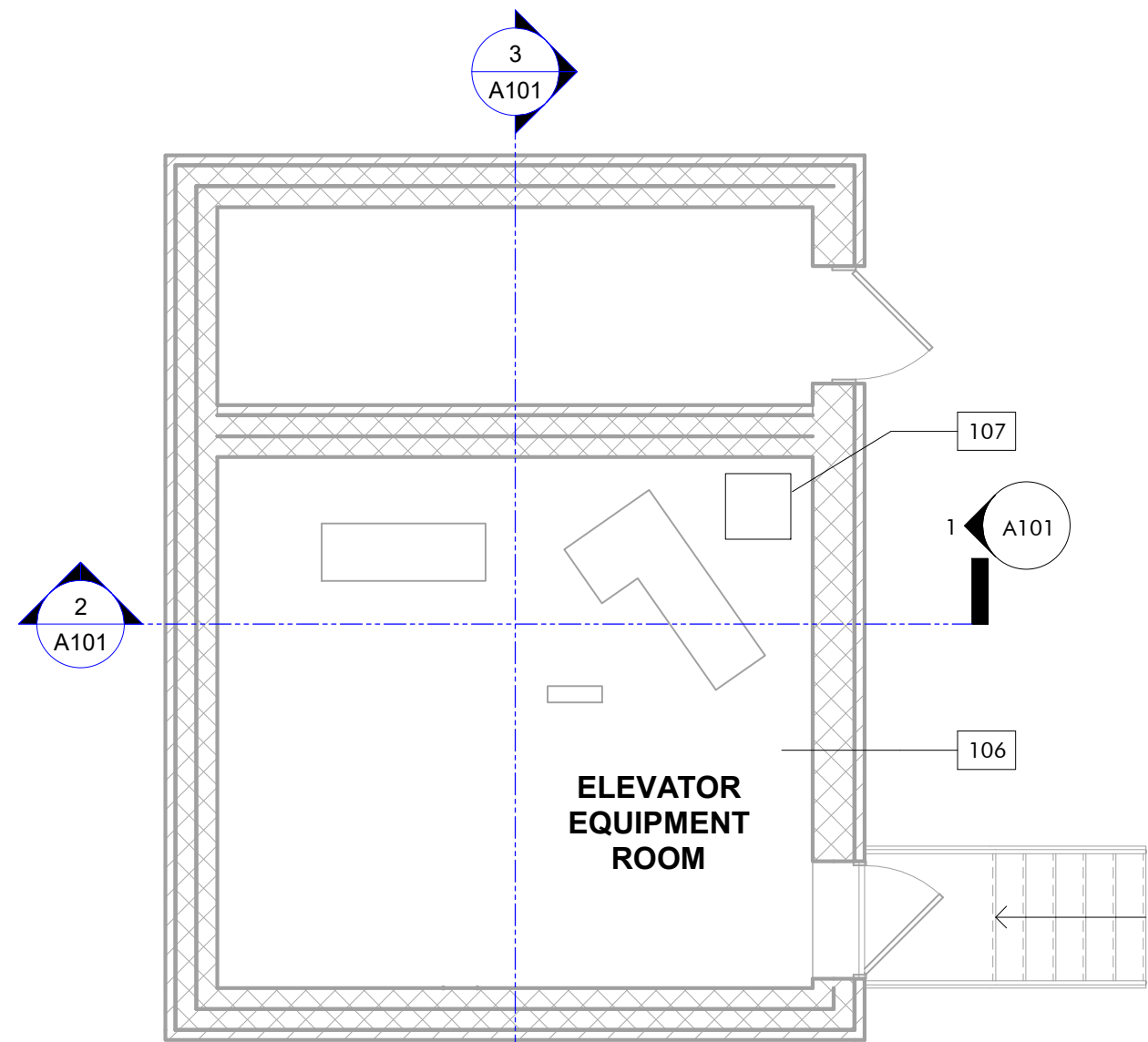
ELEVATOR 1 PLANS AND SECTIONS

PROJECT NO.:	18122	DRAWN BY:	TMV
		CHECKED BY:	KAL

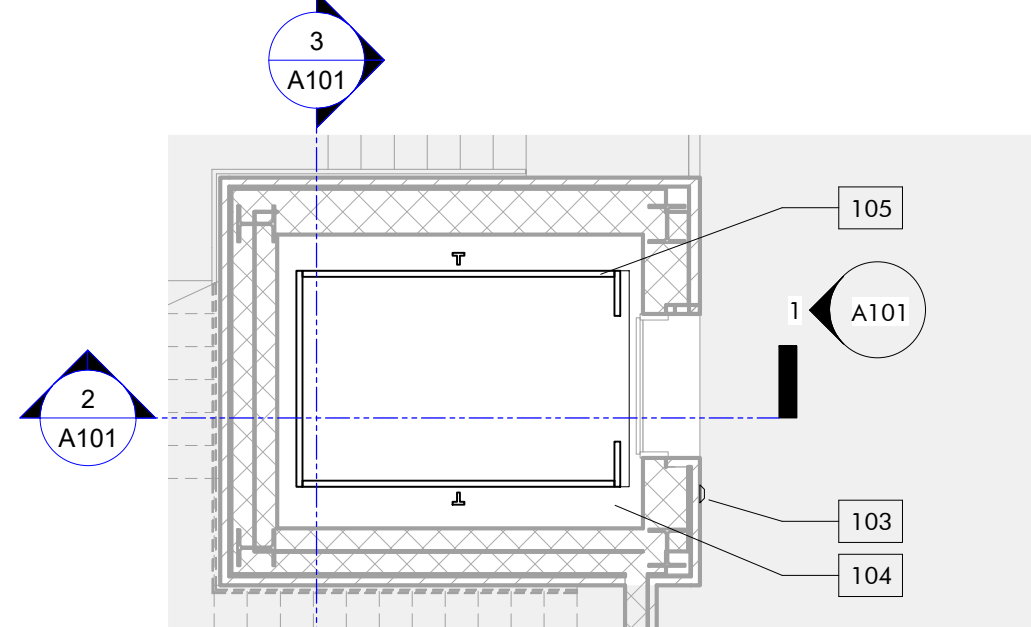
A101

GENERAL REQUIREMENTS

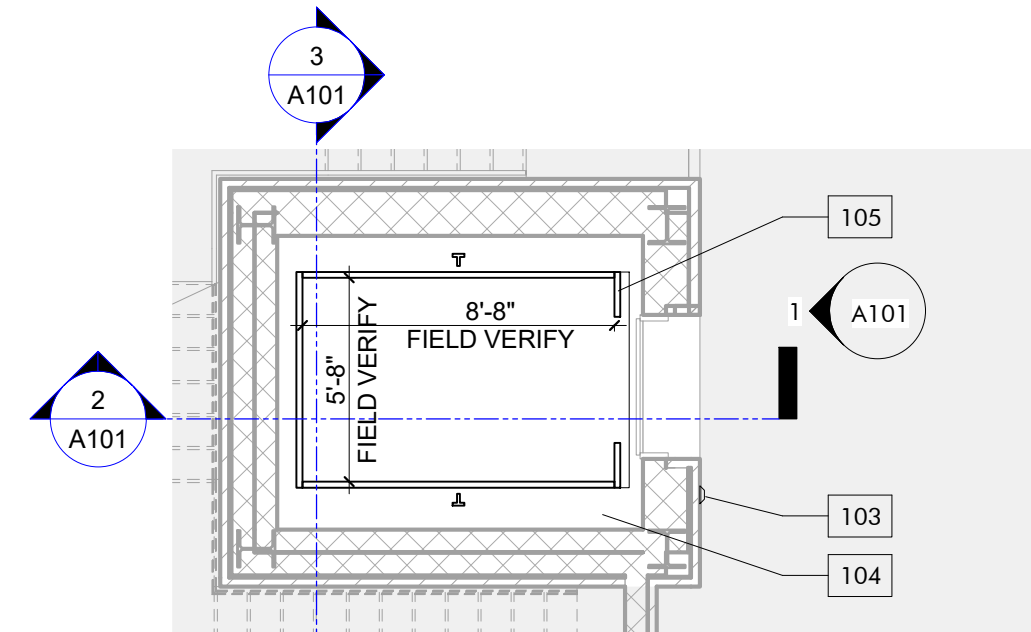
1. PROVIDE COMPLIANT TACTILE AND BRAILLE NOTIFICATION SIGN ON EACH LEVEL WHERE NONE IS PRESENT: "DO NOT USE IN CASE OF EMERGENCY".
2. REMOVE RUST, CLEAN, DEGREASE AND PAINT ANY EXISTING PARTS OR COMPONENTS TO REMAIN, AS SPECIFIED, FOR A LIKE NEW CONDITION.
3. PIT AND HOISTWAY METAL WITH RUST SHALL BE CLEANED AND TREATED WITH A RUST NEUTRALIZING/CONVERTING PRODUCT, AS SPECIFIED.
4. PATCH, REPAIR, OR REPLACE FLOOR, WALL AND CEILING FINISHES IN AREAS ADJACENT TO WORK AS REQUIRED TO COMPLETE MODERNIZATION SCOPE. FINISH SURFACES SHALL MATCH EXISTING.
5. ALL HOISTWAY AND ELEVATOR MECHANICAL ROOM PENETRATIONS SHALL BE SEALED TO MEET FIRE RATING.
6. CONTRACTOR SHALL SUBMIT TO ARCHITECT FOR REVIEW ALL FINISH SELECTIONS PRIOR TO ORDERING.



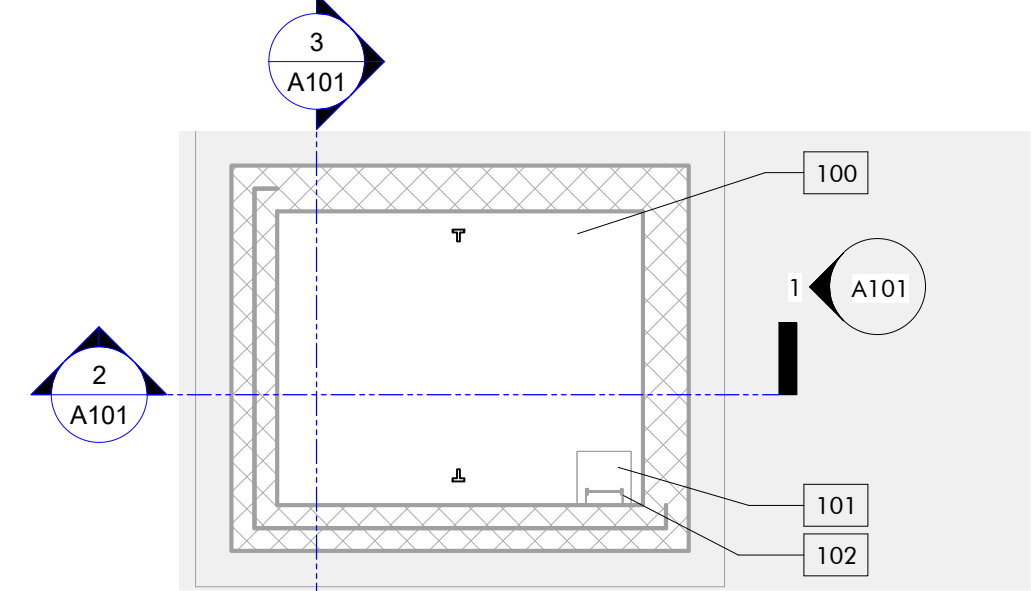
4 ELEVATOR 1 EQUIPMENT ROOM PLAN
3/16" = 1'-0"



5 ELEVATOR 1 PLAN - LEVELS 1 & 2 SIMILAR
3/16" = 1'-0"



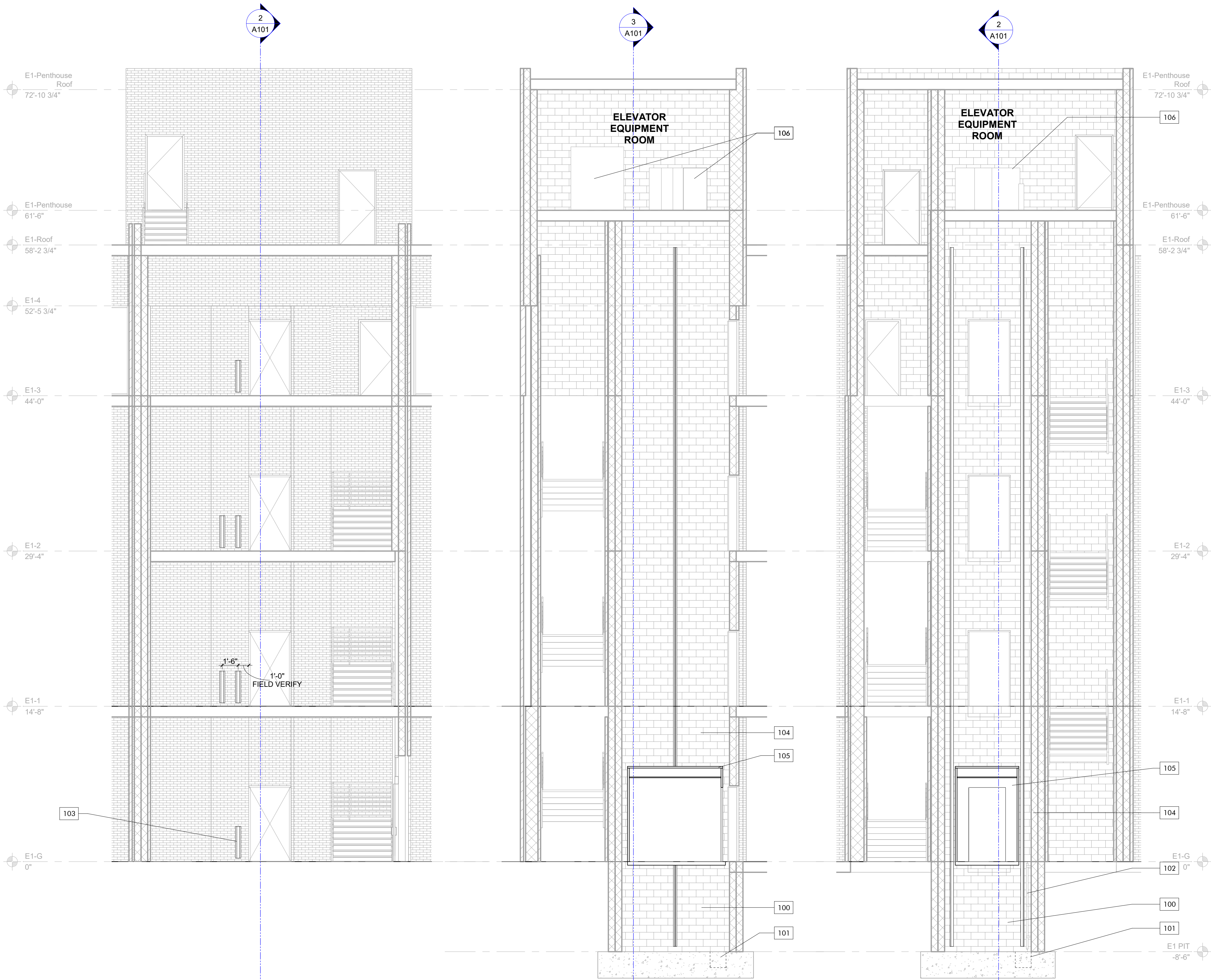
7 ELEVATOR 1 PLAN - GROUND AND LEVEL 3 SIMILAR
3/16" = 1'-0"



6 ELEVATOR 1 PIT
3/16" = 1'-0"

KEYNOTE LEGEND

- 100 EXISTING ELEVATOR PIT TO REMAIN, INSPECT FOR MOISTURE INTRUSION AND REPAIR AS NEEDED.
- 101 EXISTING HOISTWAY SUMP PIT.
- 102 VERIFY EXISTING PIT LADDER IS CODE COMPLIANT, REPLACE IF REQUIRED; CLEAN AND PAINT AS SPECIFIED. SEE DIVISION 14 SPECIFICATIONS FOR SCOPE OF WORK.
- 103 PROVIDE NEW ADA ACCESSIBLE PUSHBAR CONTROLS 4" AFF, TYPICAL.
- 104 EXISTING SHAFT; TREAT PENETRATIONS TO ACHIEVE A MINIMUM 2 HOUR FIRE RATED SEPARATION.
- 105 PROVIDE MODERNIZED ELEVATOR CAB FINISHES, ENTRY DOORS AND SHAFT COMPONENTS AS SPECIFIED.
- 106 MODERNIZED ELEVATOR EQUIPMENT, AS SPECIFIED, AND AS SHOWN ON MEP DRAWINGS. CLEAN AND PAINT EXISTING FLOOR SLAB WITH EPOXY BASED FLOOR PAINT.
- 107 EXISTING VENT TO BE COVERED BY STAINLESS STEEL SHEET COVER PLATE.



1 ELEVATION - ELEVATOR 1
3/16" = 1'-0"

2 SECTION - ELEVATOR 1
3/16" = 1'-0"

3 SECTION - ELEVATOR 1
3/16" = 1'-0"



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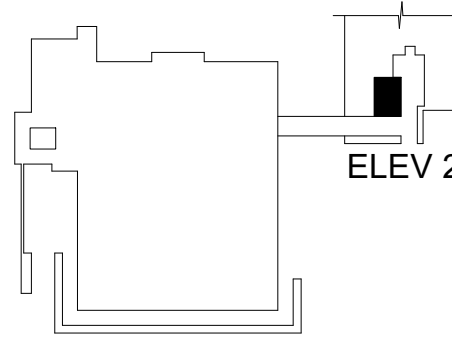
JOSEPH B. WALKER, AIA
LICENSE NO.: AR0017272

SUBMITTAL:		ISSUE DATE:
100% CONSTRUCTION DOCUMENTS		04/05/2019
REVISION	DESCRIPTION	DATE

BASIC SCIENCE ELEVATORS

1333 CENTER DR
GAINESVILLE, FL 32610

KEY PLAN



DRAWING TITLE:
ELEVATOR 2 PLANS AND SECTIONS

PROJECT NO.: 18122 DRAWN BY: TMV
CHECKED BY: KAL

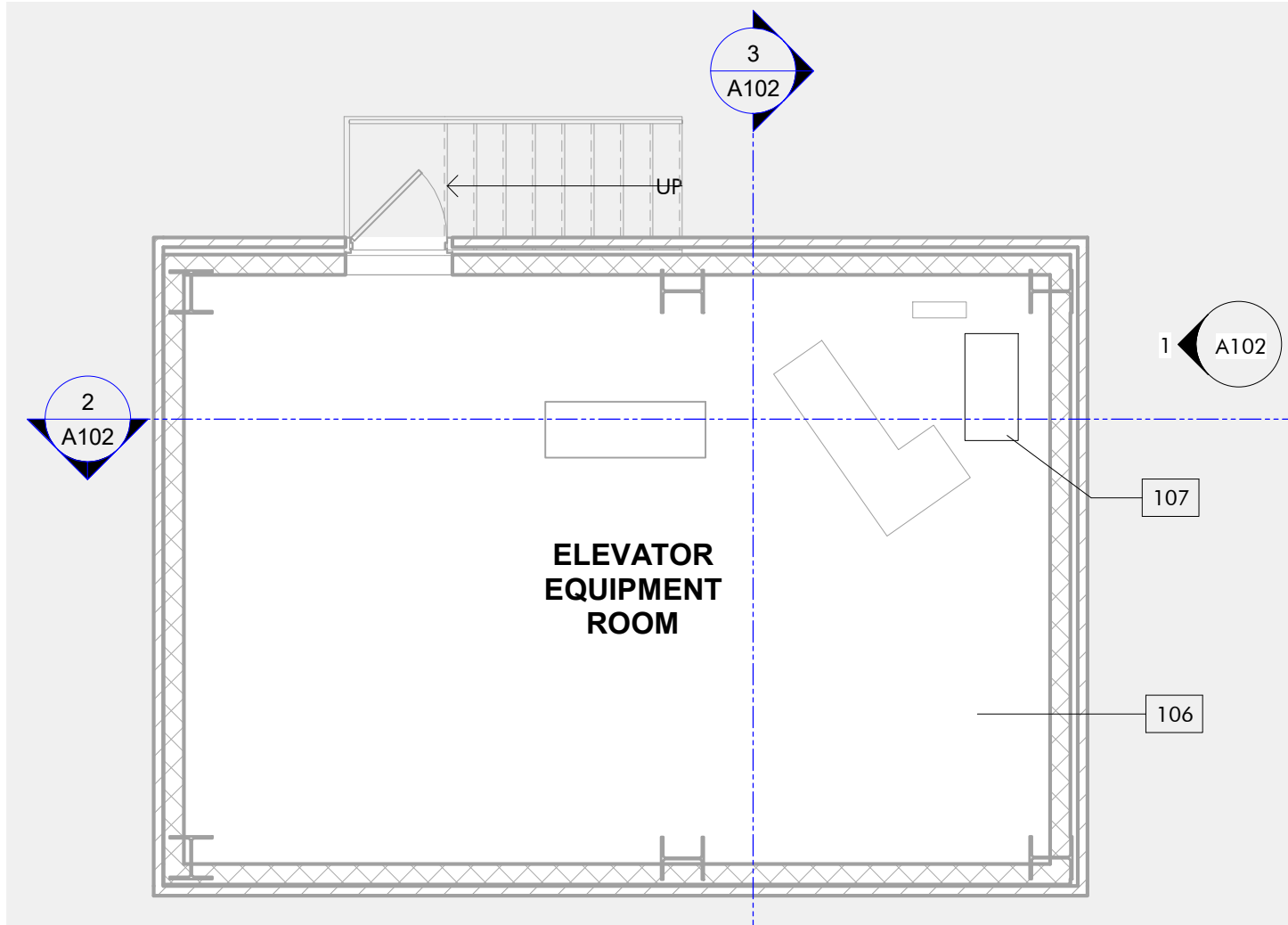
A102

GENERAL REQUIREMENTS

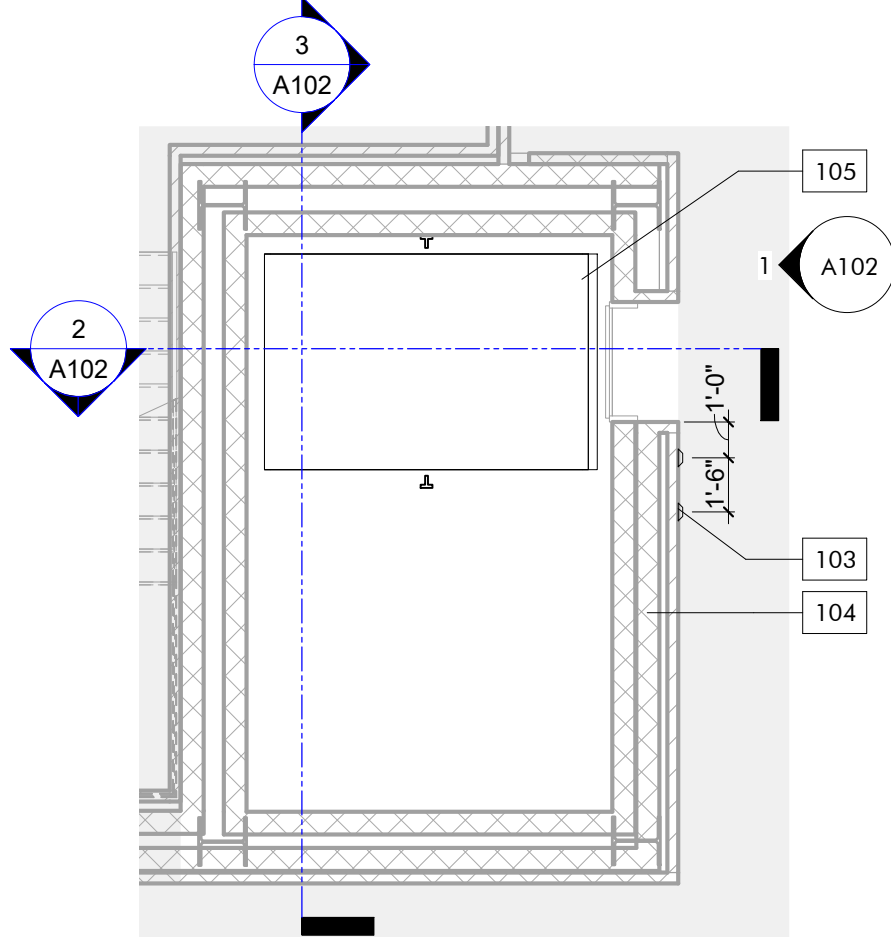
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KEYNOTE LEGEND

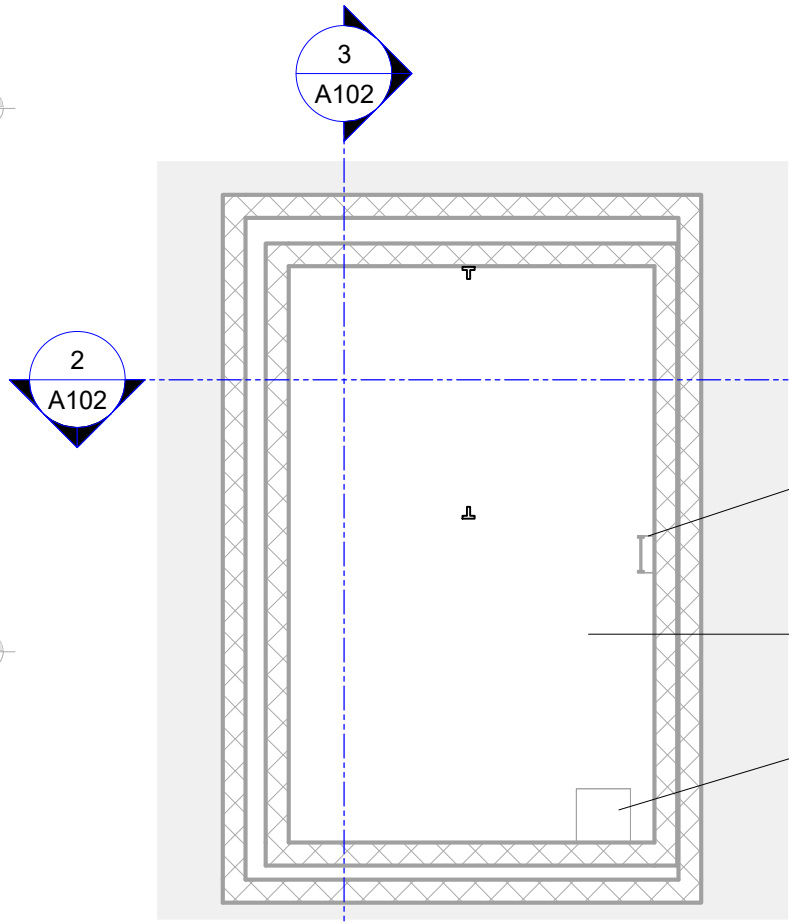
- | | |
|-----|--|
| 100 | EXISTING ELEVATOR PIT TO REMAIN. INSPECT FOR MOISTURE INTRUSION AND REPAIR AS NEEDED. |
| 101 | EXISTING HOISTWAY SUMP PIT. |
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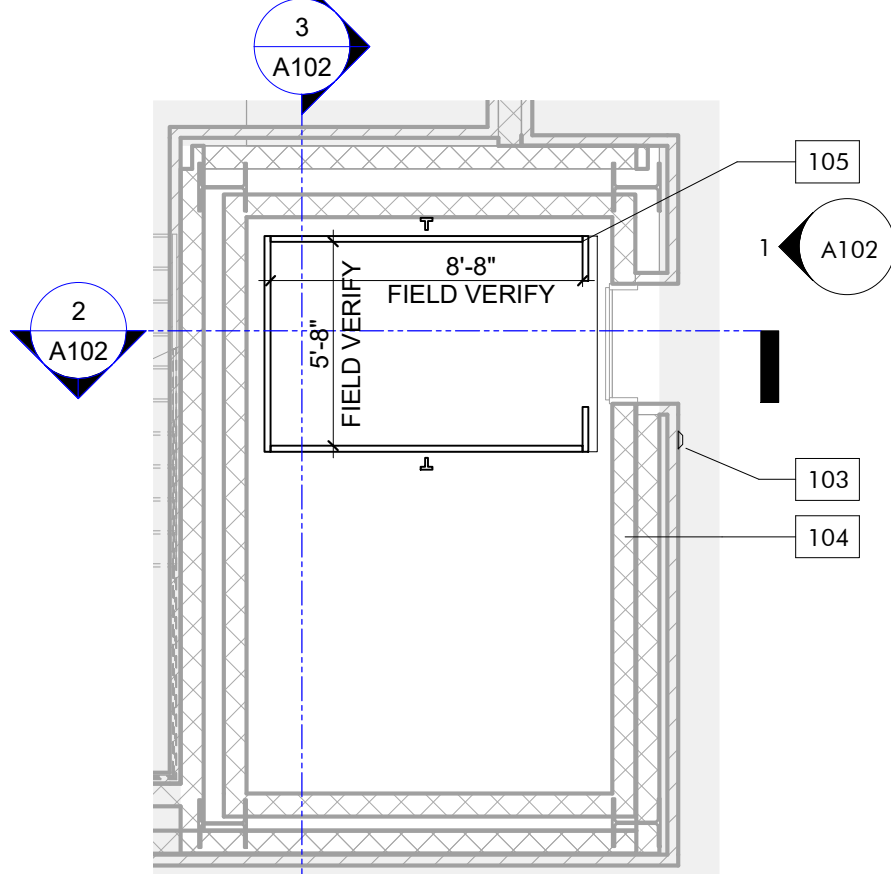
④ ELEVATOR 2 EQUIPMENT ROOM PLAN
3/16" = 1'-0"



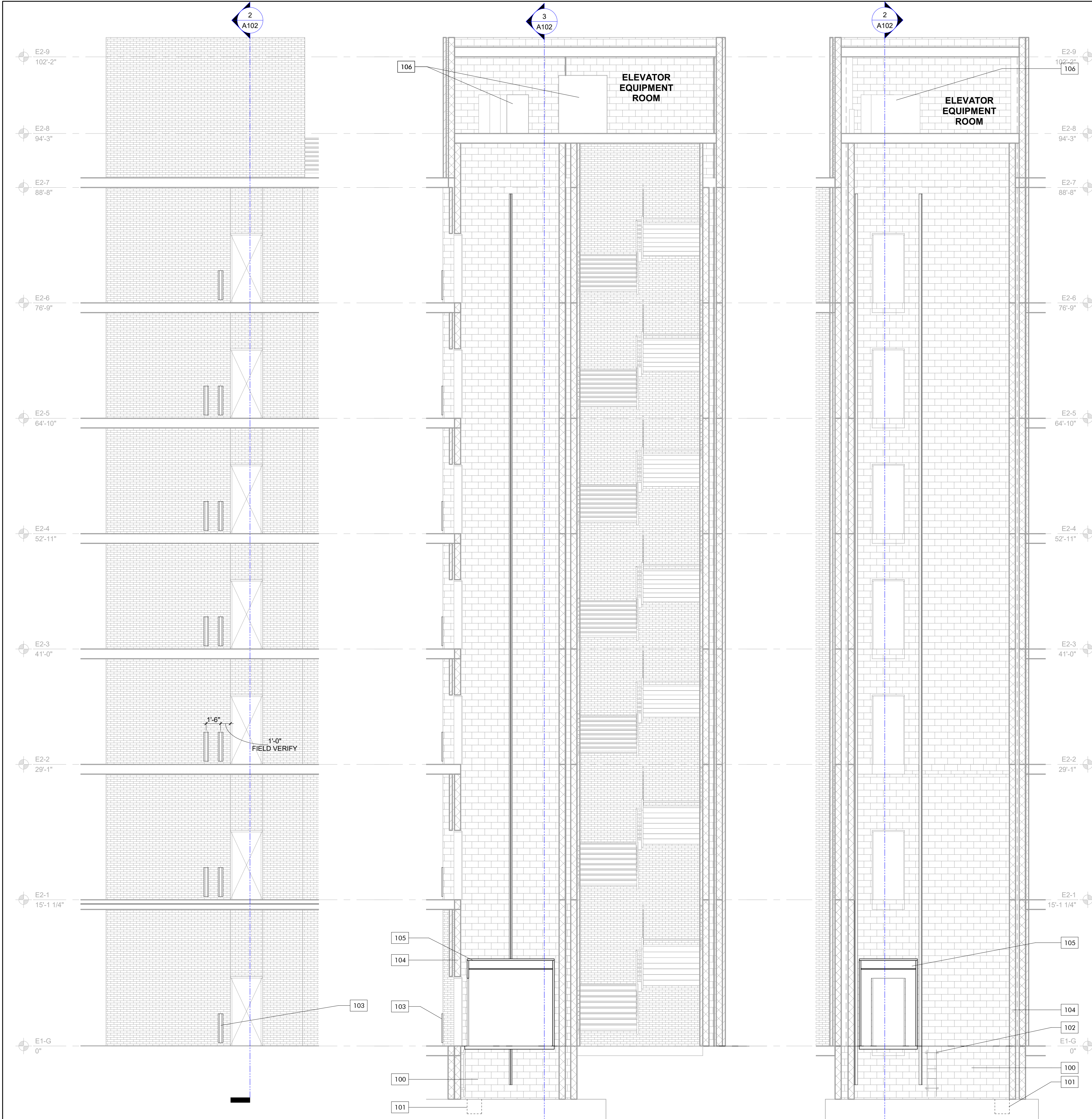
⑦ ELEVATOR 2 PLAN - LEVELS 1-5 SIMILAR
3/16" = 1'-0"



⑥ ELEVATOR 2 PIT
3/16" = 1'-0"



⑤ ELEVATOR 2 PLAN - GROUND & LEVEL 6 SIMILAR
3/16" = 1'-0"



① ELEVATION - ELEVATOR 2
3/16" = 1'-0"

② SECTION - ELEVATOR 2
3/16" = 1'-0"

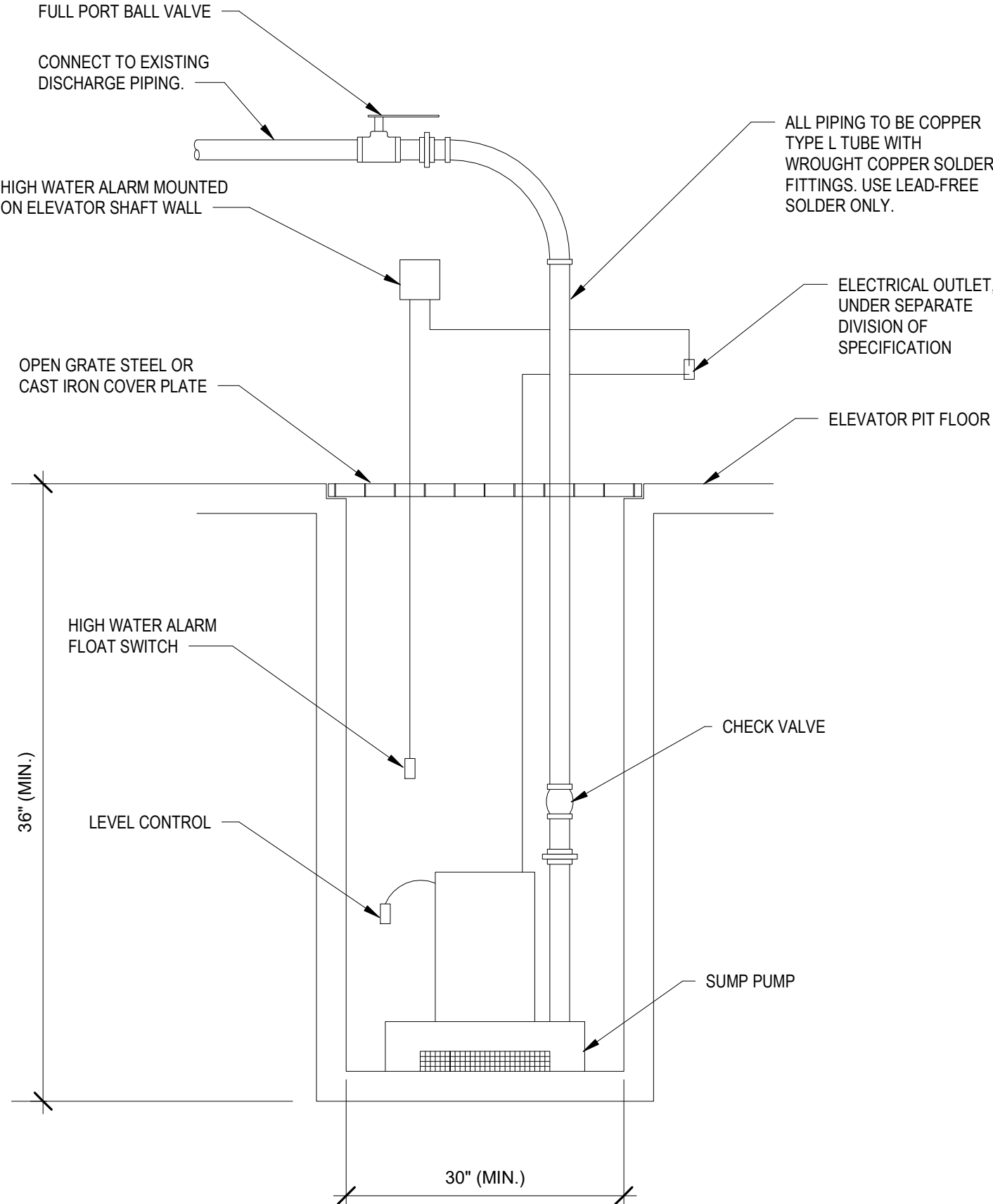
③ SECTION - ELEVATOR 2
3/16" = 1'-0"

PLUMBING ABBREVIATIONS

A	AMPS
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
AV	ACID VENT
AW	ACID WASTE
BFT	BELOW FINISHED FLOOR
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
CFH	CUBIC FEET PER HOUR
DEGF	DEGREE FARENHEIT
DIA	DIAMETER
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHR	DOMESTIC HOT WATER RETURN
EA	EACH
EX	EXISTING
EWIC	ELECTRIC WATER COOLER
EWI	ELECTRIC WATER HEATER
FBC	FLORIDA BUILDING CODE
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FFM	FEET PER MINUTE
FS	FLOOR SINK
FT	FEET
FT WG	FEET WATER GAUGE
GA	GAUGE
GAL	GALLONS
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GW	GAS WATER HEATER
HB	HOSE BIBB
HP	HORSEPOWER
IN	INCHES
IN WG	INCHES WATER GAUGE
KW	KILOWATTS
KWH	KILOWATT HOUR
LAV	LAVATORY
LB	POUND
LWT	LEAVING WATER TEMPERATURE
MBH	1,000 BTUH
MIN	MINIMUM
MR	MOP RECEPTOR
NC	NORMALLY CLOSED
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PH	PHASE
PSI	POUNDS PER SQUARE INCH
RPM	REVOLUTIONS PER MINUTE
SAN	SANITARY
SF	SQUARE FEET
SH	SHOWER
SK	SINK
SPEC	SPECIFICATION
SS	STAINLESS STEEL; SERVICE SINK
TD	TRENCH DRAIN
TMV	THERMOSTATIC MIXING VALVE
TYP	TYPICAL
UR	URINAL
V	VOLTS OR VENT
VFD	VARIABLE FREQUENCY DRIVE
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WH	WALL HYDRANT
WPD	WATER PRESSURE DROP

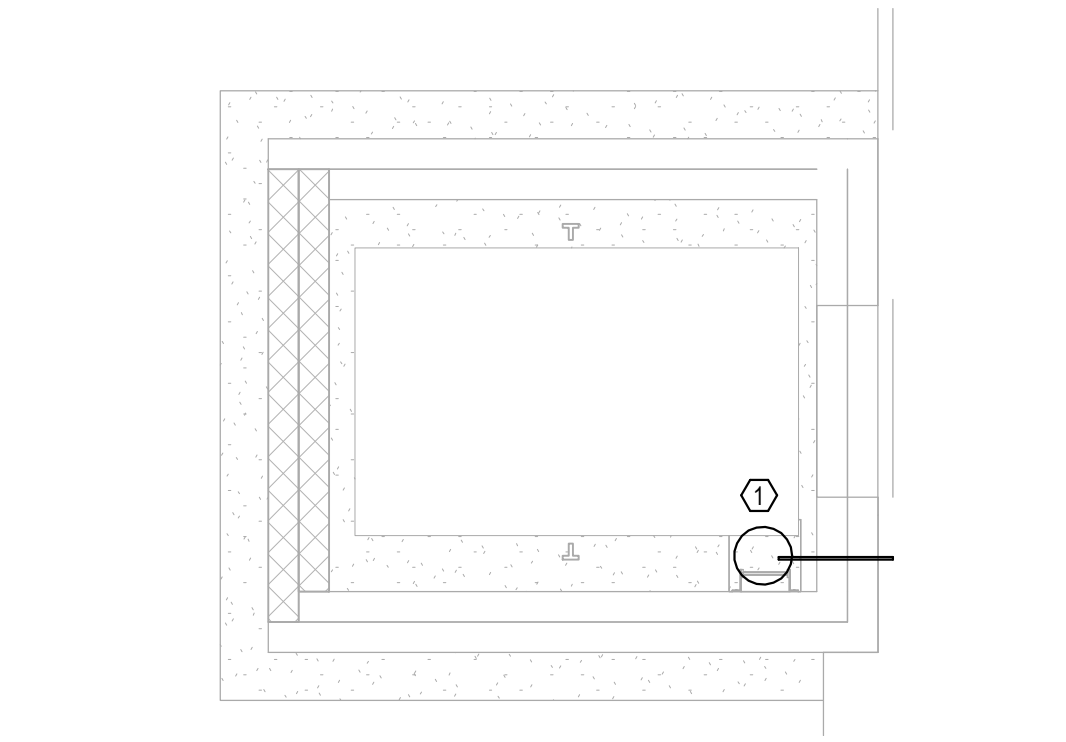
PLUMBING LEGEND

XX YY	EQUIPMENT TAG XX=EQUIP TYPE, YY=EQUIP. NO.
	CONNECT TO EXISTING
	GATE VALVE
	GLOBE VALVE
	CHECK VALVE
	BALL VALVE
	BUTTERFLY VALVE
	CALIBRATED BALANCING VALVE (CIRCUIT SETTER)
	RELIEF VALVE
	TWO WAY CONTROL VALVE
	THREE WAY CONTROL VALVE
	PLUG VALVE
	PRESSURE REDUCING VALVE
	STRAINER
	THERMOMETER
	SENSOR WELL
	UNION
	PRESSURE GAUGE
	ECCENTRIC REDUCER
	CONCENTRIC REDUCER
	VENTURI FLOW METER
	FLEXIBLE PIPE CONNECTION

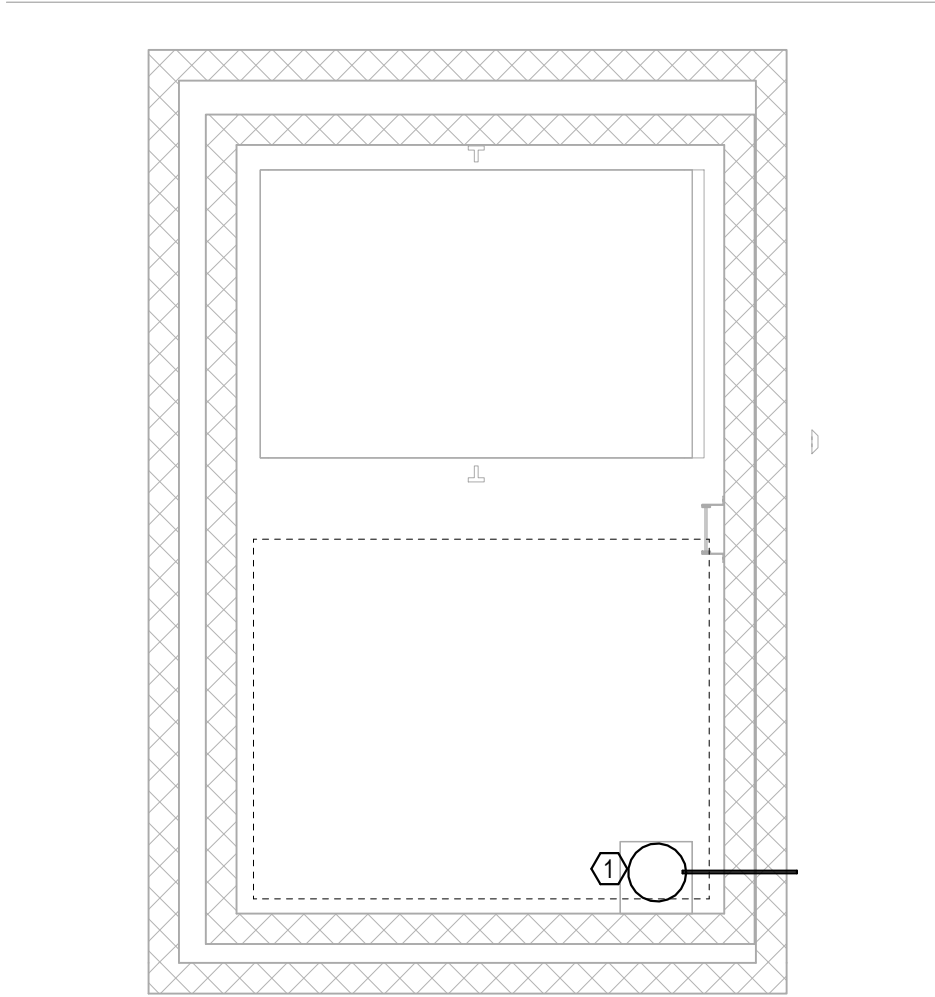


ELEVATOR SUMP PUMP DETAIL
NOT TO SCALE

SUMP PUMP SCHEDULE	
MARK	ESP-1
TYPE	SUBMERSIBLE CENTRIFUGAL
SERVICE TYPE	ELEVATOR
MANUFACTURER	LIBERTY PUMP
MODEL	ELV290
SOLID HANDLING SIZE (IN)	3/4"
FLOW RATE (GPM)	50
HEAD (FT WG)	26
MOTOR HP (QTY X HP)	1 X 3/4 HP
RPM	3450
ELECTRICAL (VOLTS-PHASE)	120-1
DISCONNECT	PLUG-IN
CONTROL TYPE	OIL SENSOR SWITCH
CONTROLLER	FLOAT CONTROL



ELEVATOR PIT ELEVATOR - PLUMBING
1/4" = 1'-0"



GROUND LEVEL ELEVATOR 2 PLUMBING
1/4" = 1'-0"

SHEET NOTES:

- ① INSTALL ESP-1 IN EXISTING SUMP PIT. INSTALL PER DETAIL ON THIS SHEET. CONNECT TO EXISTING DISCHARGE PIPING. BLOW DOWN EXISTING DISCHARGE PIPING TO ENSURE THAT IT IS CLEAR. VERIFY DISCHARGE LOCATION IN FIELD. DEMOLISH EXISTING SUMP PUMP.

CODES AND STANDARDS

ALL PROJECT WORK SHALL BE GOVERNED BY AND ADHERE TO THE FOLLOWING CODES AND STANDARDS.

- FLORIDA BUILDING CODE 6TH EDITION (2017)
- FLORIDA BUILDING CODE 6TH EDITION (2017) - PLUMBING
- FLORIDA FIRE PREVENTION CODE SIXTH EDITION (2017)
 - FIRE CODE (NFPA 1 - 2015 FLORIDA EDITION)
 - LIFE SAFETY CODE (NFPA 101 - 2015 FLORIDA EDITION)
- NATIONAL ELECTRIC CODE (NFPA 70) - 2014 EDITION
- ASME A17.1 SAFETY CODE FOR ELEVATORS AND ESCALATORS

PLUMBING GENERAL NOTES

- COORDINATE WORK WITH OTHER TRADES. PROVIDE OFFSETS AND RELOCATE AS REQUIRED TO INSTALL A COMPLETE SYSTEM WITHOUT INTERFERING WITH OTHER TRADES. COORDINATE ANY NECESSARY CHANGES WITH THE GENERAL CONTRACTOR.
- CONTRACTOR SHALL INSTALL ALL SYSTEMS IN THEIR ENTIRETY ACCORDANCE WITH REFERENCED CODES, STANDARDS, DRAWINGS AND SPECIFICATIONS.
- CONTRACTOR SHALL VISIT THE PROJECT SITE TO ACQUAINT THEMSELVES WITH THE EXISTING PROJECT CONDITIONS.
- CONTRACTOR SHALL NOTIFY AND COORDINATE WITH THE OWNER AND GENERAL CONTRACTOR PRIOR TO ANY SYSTEM SHUT DOWN. PROVIDE ONE WEEK OF PRIOR NOTICE.
- DO NOT CUT ANY BUILDING STRUCTURE WITHOUT PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER. PROVIDE OPENINGS IN THE STRUCTURE PER THE STRUCTURAL ENGINEER'S DIRECTIONS PRIOR TO OR DURING STRUCTURE INSTALLATION. (SEE STRUCTURAL DRAWINGS.) REQUEST INFORMATION WHEN REQUIRED TO VERIFY STRUCTURAL REQUIREMENTS WITH THE GENERAL CONTRACTOR.
- DO NOT HAMMER THROUGH CONCRETE WALLS TO INSTALL ANY ITEM. CORE DRILL, CUT HOLES OR PROVIDE SLEEVES DURING WALL INSTALLATIONS. DAMAGE DONE BY OTHER MEANS TO BLOCK WALLS SHALL BE REPAIRED TO THE SATISFACTION OF THE ARCHITECT.
- PROTECT PIPES FROM CONTACT WITH CONCRETE. USE SLEEVES PER SPECIFICATIONS. ALLOW FOR EXPANSION AND CONTRACTION OF PIPE SYSTEMS.
- PROVIDE FIRE STOPPING AT EACH RATED FLOOR OR WALL PENETRATION. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FIRE RATINGS AND SYSTEMS.



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MGE 16150

S. Andrew Mitchell
PE - 75609

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BASIC SCIENCE
ELEVATORS

1333 CENTER DR
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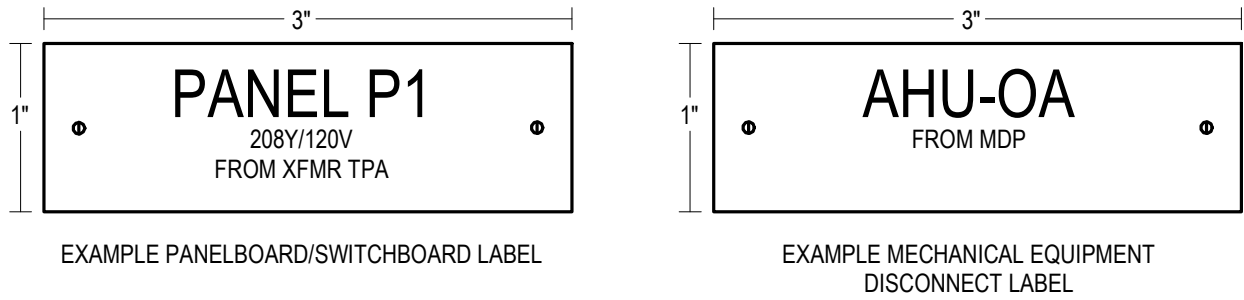
KEY PLAN

DRAWING TITLE:

PLUMBING FLOOR PLANS
& SCHEDULES

PROJECT NO.:	18122	DRAWN BY:	Author
		CHECKED BY:	Checker

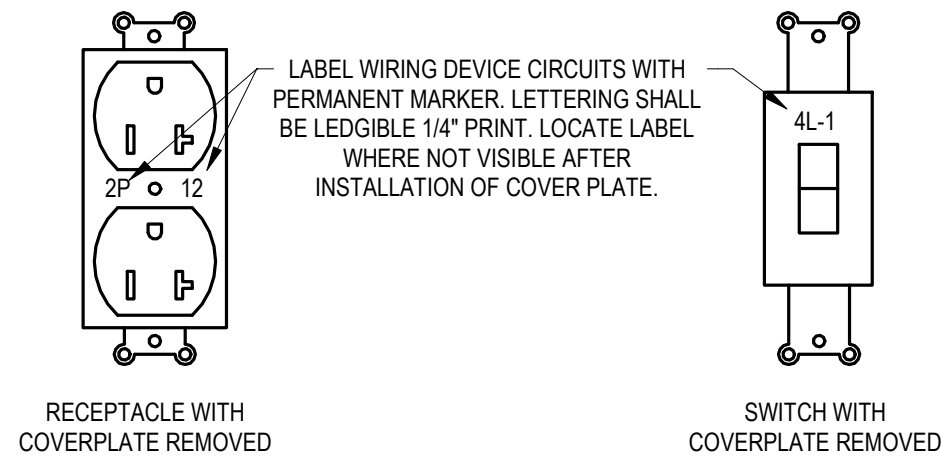
P001



PROVIDE ENGRAVED PLASTIC TAG WITH 1/4" HIGH LETTERS. NORMAL POWER: BLACK LETTERS ON WHITE BACKGROUND. STANDBY POWER: WHITE LETTERS ON RED BACKGROUND. DIMENSIONS SHOWN ARE MINIMUM.

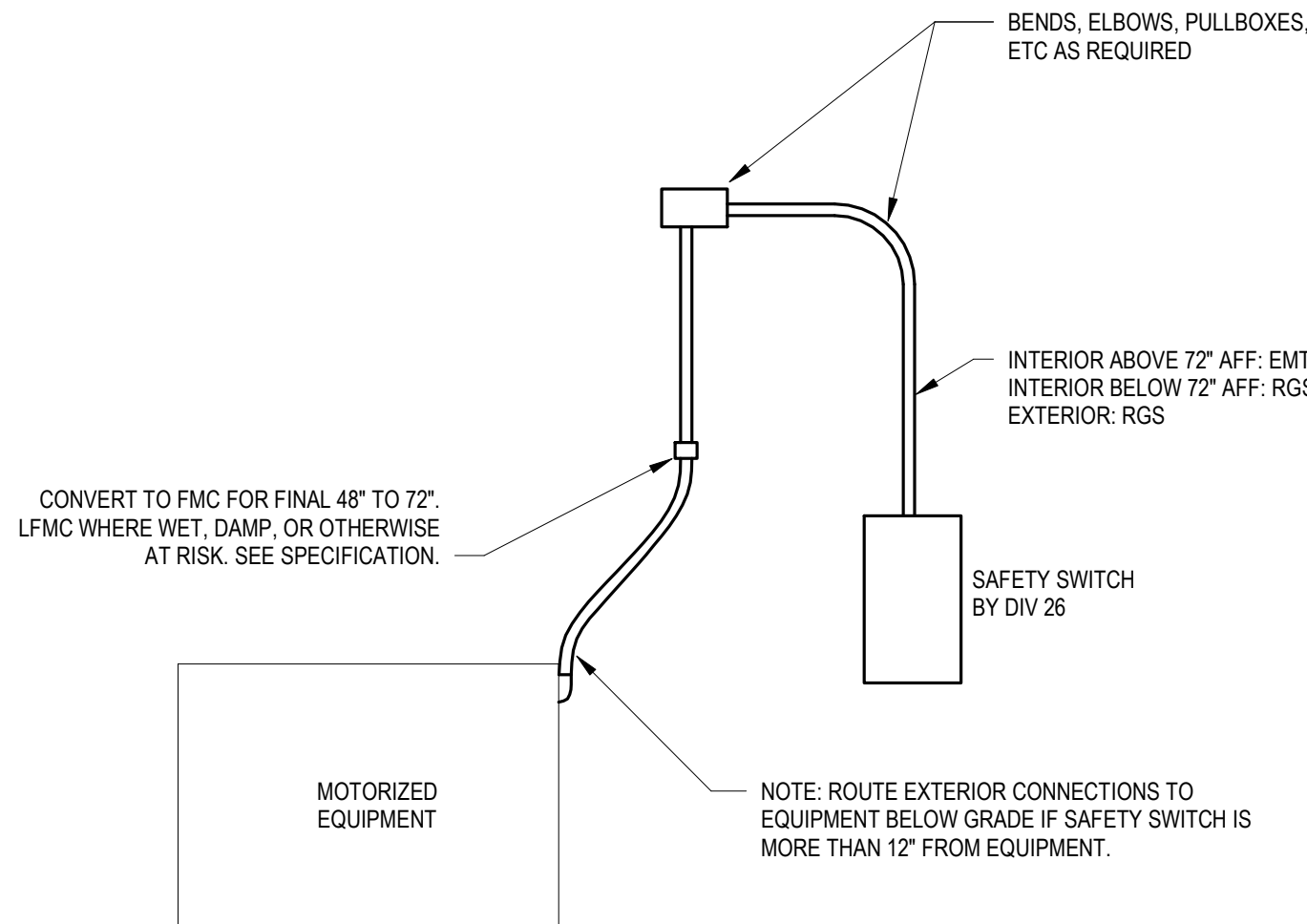
1 ELECTRICAL EQUIPMENT LABELING DETAIL

NOT TO SCALE



2 ELECTRICAL WIRING DEVICE LABEL DETAIL

NOT TO SCALE



3 MOTORIZED EQUIPMENT CONNECTION DETAIL

NOT TO SCALE

LEGEND

RECEPTACLE:

- Ⓢ DUPLEX RECEPTACLE. 18" AFF UNO.
- Ⓢ ABOVE COUNTER DUPLEX RECEPTACLE. 46" AFF UNO. COORDINATE WITH COUNTER, BACKSLASH, ETC.
- Ⓢ DUPLEX RECEPTACLE FACE DOWN IN CEILING.
- Ⓢ SPECIAL PURPOSE RECEPTACLE. 18" AFF UNO. COORDINATE WITH EQUIPMENT.
- Ⓢ SIMPLEX RECEPTACLE. 18" AFF UNO.

RECEPTACLE SUBSCRIPTS:

- G GFCI-TYPE RECEPTACLE.
- GCB GFCI-TYPE POWER FROM BRANCH CIRCUIT BREAKER.
- WP WEATHER RESISTANT WIRING DEVICE. WP RECEPTACLES SHALL BE WR TYPE WITH IN-USE COVERS.
- 6-3UR NEMA RECEPTACLE TYPE.

POWER EQUIPMENT AND CONNECTIONS:

- Ⓢ DISTRIBUTION PANELBOARD.
- Ⓢ PANELBOARD.
- Ⓢ ELECTRICAL CONNECTION TO EQUIPMENT. SEE ELECTRICAL EQUIPMENT SCHEDULE.
- Ⓢ JUNCTION BOX.
- Ⓢ SAFETY SWITCH. MOUNT AS INDICATED. 60" TO TOP UNO.
- Ⓢ FUSED SAFETY SWITCH. MOUNT AS INDICATED. 60" TO TOP UNO.

LIGHT FIXTURES:

LIGHT FIXTURES SHALL BE AS INDICATED IN LIGHT FIXTURE SCHEDULE. SEE LIGHT FIXTURE SCHEDULE.

LIGHT FIXTURES SUBSCRIPTS:

- a,b LOWERCASE LETTERS INDICATE SWITCHING/DIMMING ZONES.
- 24/7 LIGHT NOT SWITCHED BY OCCUPANCY SENSORS OR SWITCHES.
- EM PARTIAL SHADING OR 'EM' SUBSCRIPT INDICATES EMERGENCY FIXTURE. SEE LIGHT FIXTURE SCHEDULE.

LIGHTING CONTROLS:

- Ⓢ TOGGLE SWITCH. 46" AFF UNO.

LIGHTING CONTROLS SUBSCRIPTS:

- 2 2-POLE TOGGLE SWITCH.
- 3 3-WAY TOGGLE SWITCH.
- 4 4-WAY TOGGLE SWITCH.
- a,b LOWERCASE LETTERS INDICATE SWITCHING/DIMMING ZONES.

FIRE ALARM:

- FACP FIRE ALARM CONTROL PANEL.
- NAC NAC EXTENDER PANEL.
- Ⓢ FIRE ALARM AUDIBLE NOTIFICATION DEVICE. CEILING MOUNT.
- Ⓢ FIRE ALARM COMBINATION AUDIBLE/VISIBLE NOTIFICATION DEVICE. CEILING MOUNT. 75cd UNO.
- Ⓢ FIRE ALARM VISIBLE NOTIFICATION DEVICE. CEILING MOUNT. 75cd UNO.
- Ⓢ SMOKE DETECTOR. SYSTEM DETECTOR, UNLESS MARKED '120V'.
- Ⓢ CO DETECTOR. SYSTEM DETECTOR, UNLESS MARKED '120V'.
- Ⓢ ELEVATOR FIRE-ALARM INTERFACE.
- Ⓢ SMOKE DETECTOR. SYSTEM DETECTOR, UNLESS MARKED '120V'.
- Ⓢ DUCT MOUNTED SMOKE DETECTOR. COORDINATE MOUNTING AND SAMPLING TUBE WITH MECHANICAL.
- Ⓢ FIRE PROTECTION TAMPER SWITCH. COORDINATE WITH FIRE PROTECTION.
- Ⓢ FIRE PROTECTION FLOW SWITCH. COORDINATE WITH FIRE PROTECTION.
- Ⓢ FIRE PROTECTION PRESSURE SWITCH. COORDINATE WITH FIRE PROTECTION.
- Ⓢ ADDRESSIBLE INTERFACE MODULE, WITH INPUT/OUTPUT CAPABILITIES.
- Ⓢ MANUAL PULL STATION.

FIRE ALARM SUBSCRIPTS:

- 15cd CANDELA RATING OF VISIBLE NOTIFICATION APPLIANCE.
- 120V SESNORS: 120V-POWERED SINGLE- OR MULTIPLE-STATION DEVICE.
- 120V RELAYS: 120V RELAY.
- LTG RELAY FOR OCCUPANCY SENSOR OVERRIDE. COORDINATE WITH LIGHTING CONTROLS.

TELECOMMUNICATIONS:

- Ⓢ ROUGH-IN-ONLY TO. 18" AFF UNO. PROVIDE 1" TO ABOVE ACCESSIBLE CEILING.
- Ⓢ CEILING MOUNT TO ROUGH-IN.

TELECOMMUNICATIONS SUBSCRIPTS:

- AC ABOVE COUNTER

ANNOTATIONS:

- Ⓢ DEMOLITION SHEET NOTE.
- Ⓢ ELECTRICAL SHEET NOTE.
- Ⓢ MECHANICAL EQUIPMENT TAG.

GENERAL SUBSCRIPTS (APPLY TO ALL CATEGORIES):

- Ⓢ ELECTRICAL EQUIPMENT TAG.
- GCB FED FROM GFCI TYPE CIRCUIT BREAKER.
- 72" INDICATES HEIGHT OF FIXTURE. RECEPTACLE, BOX, CABINET, ETC. HEIGHT IS TO CENTERLINE UNLESS OTHERWISE INDICATED.
- EX EXISTING TO REMAIN
- WP WEATHERPROOF INSTALLATION, WITH APPROPRIATELY LISTED OR INDICATED PRODUCTS.

- A-1 ELECTRICAL HOME RUN TO PANELBOARD. UNDERLINED LABEL INDICATES PANELBOARD NAME AND CIRCUIT NUMBER. UNLESS INDICATED OTHERWISE, DEFAULT WIRING IS #12 & #12G. PROVIDE CONDUCTORS AS NEEDED FOR INDICATED SWITCHED LEGS, ZONES, ETC. SEE ELECTRICAL EQUIPMENT SCHEDULE FOR SPECIFIC CIRCUIT SIZING.

ABBREVIATIONS

- AC ABOVE COUNTER
- ACS (ELECTRONIC) ACCESS CONTROL SYSTEM
- AWG AMERICAN WIRE GAUGE
- BOD BASIS OF DESIGN
- C CONDUIT
- CB CIRCUIT BREAKER
- CFCI CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
- CFOI CONTRACTOR FURNISHED, OWNER INSTALLED
- CKT CIRCUIT
- CMS COMBINATION MOTOR STARTER
- DIV DIVISION
- ECB ENCLOSED CIRCUIT BREAKER
- EOR ENGINEER OF RECORD
- EX EXISTING TO REMAIN
- FSS FUSED SAFETY SWITCH
- G GROUND, GROUND FAULT CIRCUIT INTERRUPTER
- GCB GFCI CIRCUIT BREAKER
- LTG LIGHTING
- LTS LIGHTS
- MCC MOTOR CONTROL CENTER
- NAC NOTIFICATION APPLIANCE CIRCUIT
- OFCI OWNER FURNISHED, CONTRACTOR INSTALLED
- OFOI OWNER FURNISHED, OWNER INSTALLED
- PBD PANELBOARD
- PQM POWER QUALITY METER
- SPD SURGE PROTECTION DEVICE
- SLC SIGNALING LINE CIRCUIT
- SS SAFETY SWITCH
- SWBD SWITCHBOARD
- TBD TO BE DETERMINED
- TCR TELECOMMUNICATIONS ROOM
- TO TELECOMMUNICATIONS OUTLET
- TYP TYPICAL
- UF UNIVERSITY OF FLORIDA
- UFL UNIVERSITY OF FLORIDA
- UNO UNLESS NOTED OTHERWISE
- WAP WIRELESS ACCESS POINT
- WP WEATHER PROOF / WEATHER RESISTANT
- WR WEATHER PROOF / WEATHER RESISTANT
- WRT WITH RESPECT TO

CODES AND STANDARDS

ALL PROJECT WORK SHALL BE GOVERNED BY AND ADHERE TO THE FOLLOWING CODES AND STANDARDS.

- FLORIDA BUILDING CODE - SIXTH EDITION (2017)
- FLORIDA BUILDING CODE - SIXTH EDITION (2017). ENERGY CONSERVATION
- FLORIDA FIRE PREVENTION CODE- SIXTH EDITION (2017)
 - FIRE CODE (NFPA 1 - 2015 FLORIDA EDITION)
 - LIFE SAFETY CODE (NFPA 101 - 2015 FLORIDA EDITION)
- NATIONAL ELECTRIC CODE (2014 NFPA 70)
- FIRE ALARM AND SIGNALING CODE (2013 NFPA 72)
- SAFETY CODE FOR ELEVATORS AND ESCALATORS (ASME - A17.1)
- UNDERWRITERS' LABORATORIES (UL)
- AMERICAN NATIONAL STANDARDS INSTITUTION (ANSI)
- AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
- NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
- INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
- NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)
- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
- ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)
- TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)
- ELECTRONICS INDUSTRY ALLIANCE (EIA)

UF STANDARDS NOTES

UF IT NOTES:

UF IT OPERATES NETWORKING SYSTEMS IN THE AREA OF THIS PROJECT. ANY CONTRACTOR WORKING ON OR MANAGING WORK ON UF IT MATERIALS OR NETWORKS SHOULD BE AWARE OF ALL UF IT STANDARDS PRIOR TO PROCEEDING. BELOW IS A LIST OF ITEMS UF IT HAS REQUESTED BE EXPLICITLY STATED ON DESIGN DOCUMENTS.

- ADHERE TO UF TELECOMMUNICATIONS STANDARDS.
- DEMOLITION OF EXISTING WIRING DATA MUST BE PERFORMED BY A UF IT APPROVED INFRASTRUCTURE CONTRACTOR.
- WIRELESS ACCESS POINTS MUST BE REMOVED BY A UF IT APPROVED INFRASTRUCTURE CONTRACTOR.
- SUPPORT ANY CABLES WHICH ARE LEFT UNSUPPORTED BY REMOVAL OF CEILINGS, WALLS, ETC.

UF LABELING NOTES:

- THE UNIVERSITY OF FLORIDA REQUIRES EXTENSIVE LABELING OF ALL SYSTEM. CONTRACTOR SHALL OBEY ALL UNIVERSITY OF FLORIDA LABELING REQUIREMENTS.
- COLOR CODE BOX COVERS AND CONDUIT COUPLINGS PER UF STANDARDS AND PROJECT SPECIFICATION.
- LABEL EQUIPMENT, CONDUCTORS, BOX COVERS, AND WIRING DEVICES PER UF STANDARDS AND PROJECT SPECIFICATION.
- LABEL THE CEILING GRID AT EACH ABOVE-CEILING LIGHTING CONTROL DEVICE.
- LABEL CEILING GRID AT ANY OTHER ABOVE-CEILING ACTIVE COMPONENT OR DEVICE.

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION	BASIS OF DESIGN	LIGHT SOURCE	INITIAL LUMENS	COLOR TEMPERATURE	WATTAGE	VOLTAGE	MOUNTING	NOTES
4/VPL	4' VAPORTIGHT LED WRAP	H.E. WILLIAMS 96-4-L62840-PCFR-DRV-UNV	LED	6200 lm	4000 K	73 VA	UNV	CEILING OR SUSPENDED	

NOTES:

- SUBMIT ALTERNATES TO A/E FOR CONSIDERATION A MINIMUM OF 10 BUSINESS DAYS PRIOR TO BID. SUBMIT FIXTURE "CUT SHEET", INDICATING ALL INTENDED RATINGS AND OPTIONS.
- A/E WILL REVIEW ALTERNATES TO DETERMINE IF THEY ARE FUNCTIONALLY, AESTHETICALLY, AND STRUCTURALLY EQUAL. A/E RESERVE THE RIGHT TO REJECT ANY FIXTURES WHICH ARE NOT DEEMED EQUAL TO THE BASIS OF DESIGN.
- ALTERNATES REJECTED BY A/E SHALL NOT RESULT IN ADDITIONAL CHARGES TO THE OWNER.
- FIXTURES HALF SHADED OR MARKED 'EM' ON THE PLANS SHALL BE PROVIDED WITH BODINE BATTERIES PROVIDING AT LEAST 700lm OUTPUT FOR AT LEAST 90 MINUTES.

ELECTRICAL EQUIPMENT SCHEDULE

MARK	EQUIPMENT DESCRIPTION	VOLTAGE (V)	PHASES	WIRES	LOAD	MEANS OF DISCONNECT	FED FROM	OCP (A)	MCA (A)	CIRCUIT INFORMATION							NOTES
										# RUNS	PHASE	NEUTRAL	GROUND	CONDUIT	RATING	AMPACITY	
	ELEVATOR 1 MAIN POWER	208	3	4	40hp	SEE SPECIFICATIONS	EX PBD	200	200	1	3/0	3/0	6	1-1/4"	75°C	200	1,2
	ELEVATOR 1CAB LIGHTS	120	1	2	5A	N1 FSS 20/30/1	EX PBD	20	6	1	12	12	12	1/2"	60°C	20	1,2
	ELEVATOR 2 MAIN POWER	208	3	4	40hp	SEE SPECIFICATIONS	EX PBD	200	200	1	3/0	3/0	6	1-1/4"	75°C	200	1,2
	ELEVATOR 2 CAB LIGHTS	120	1	2	5A	N1 FSS 20/30/2	EX PBD	20	6	1	12	12	12	1/2"	60°C	20	1,2

DISCONNECTING MEANS ARE ABBREVIATED AS FOLLOWS: P&C = PLUG & CORD, SS = SAFETY SWITCH, FSS = FUSED SAFETY SWITCH, CB = CIRCUIT BREAKER, TS = TOGGLE SWITCH, N3R = NEMA 3R

NOTES: 1. FINAL EQUIPMENT SELECTION WAS NOT AVAILABLE AT THE TIME OF DESIGN. VALUES ARE SUBJECT TO CHANGE UPON ENGINEER'S RECEIPT OF ELEVATOR SUBMITTAL.

2. PROVIDE NEW 200A/3P CB IN EXISTING MSB. REPLACE EXISTING CONDUCTORS WITH 4#3/0 & #6G IN EXISTING 2"C.



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MGE 16150

Andrew P. McCaddin
PE - 83318

SUBMITTAL:		ISSUE DATE:
100% CONSTRUCTION DOCUMENTS		04/05/2019
REVISION	DESCRIPTION	DATE



BASIC SCIENCE ELEVATORS

1333 CENTER DR
GAINESVILLE, FL 32610

KEY PLAN

DRAWING TITLE:

ELECTRICAL LEGEND & SCHEDULES

PROJECT NO.: 18122 DRAWN BY: BNF
CHECKED BY: APM

E001



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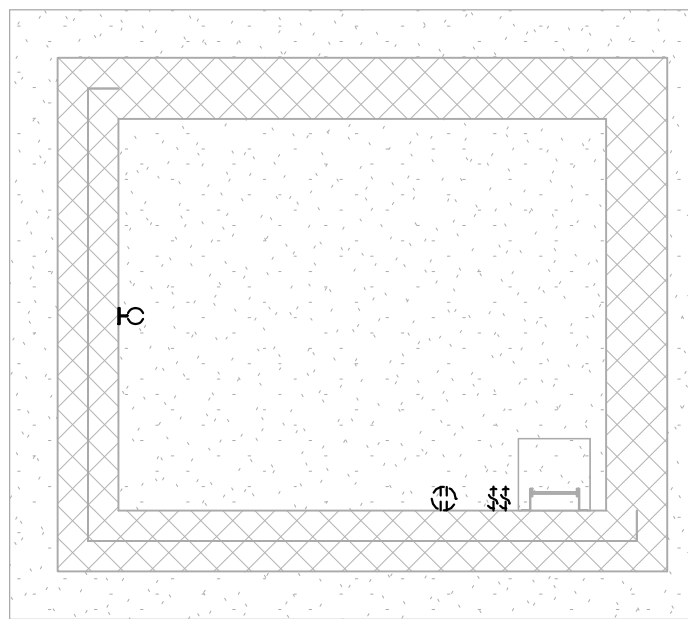
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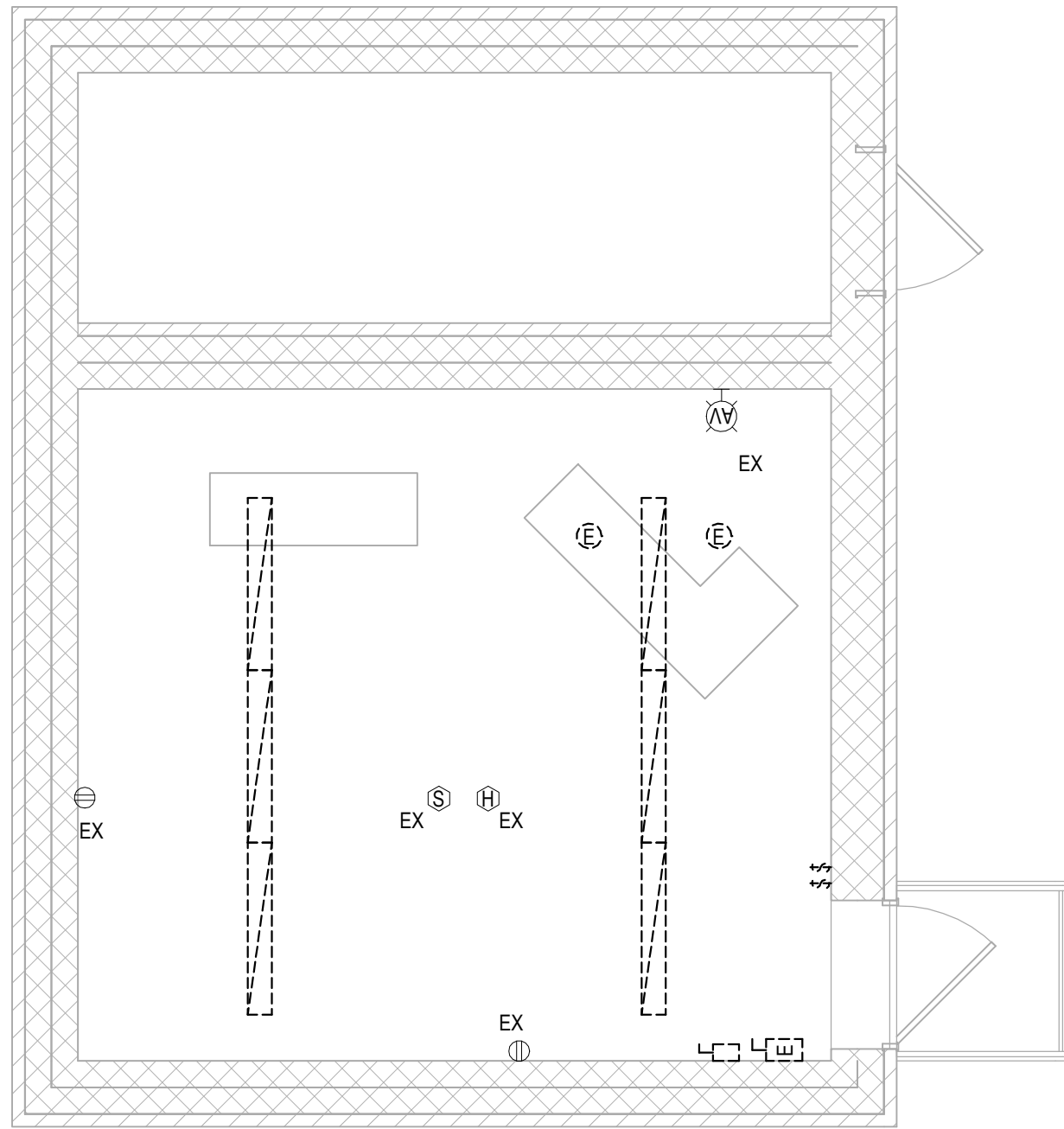
**ELECTRICAL ELEVATOR 1
& 2 PLANS - DEMOLITION**

PROJECT NO.:	18122	DRAWN BY:	BNF
CHECKED BY:	APM		

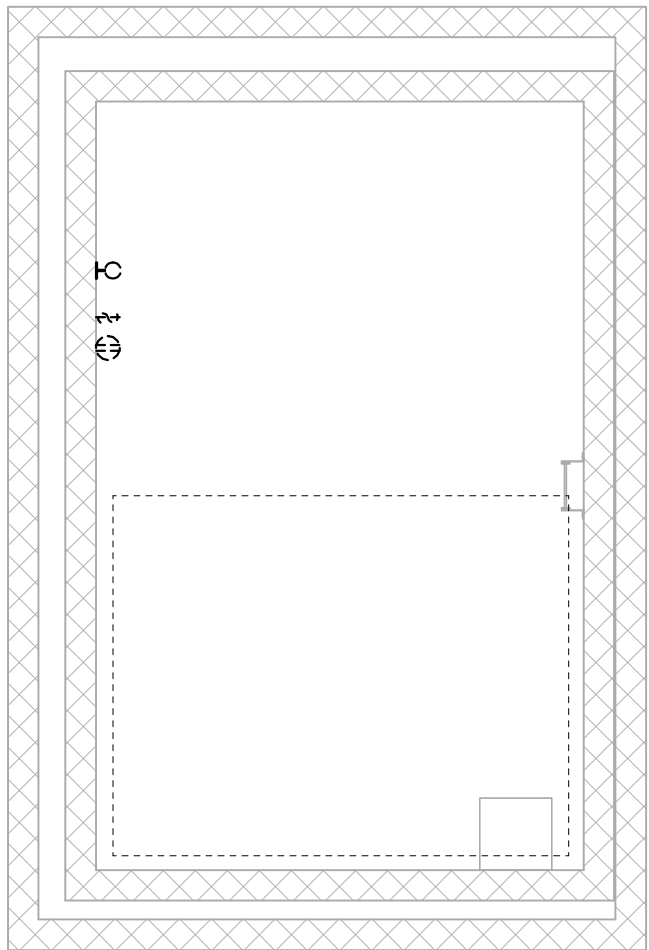
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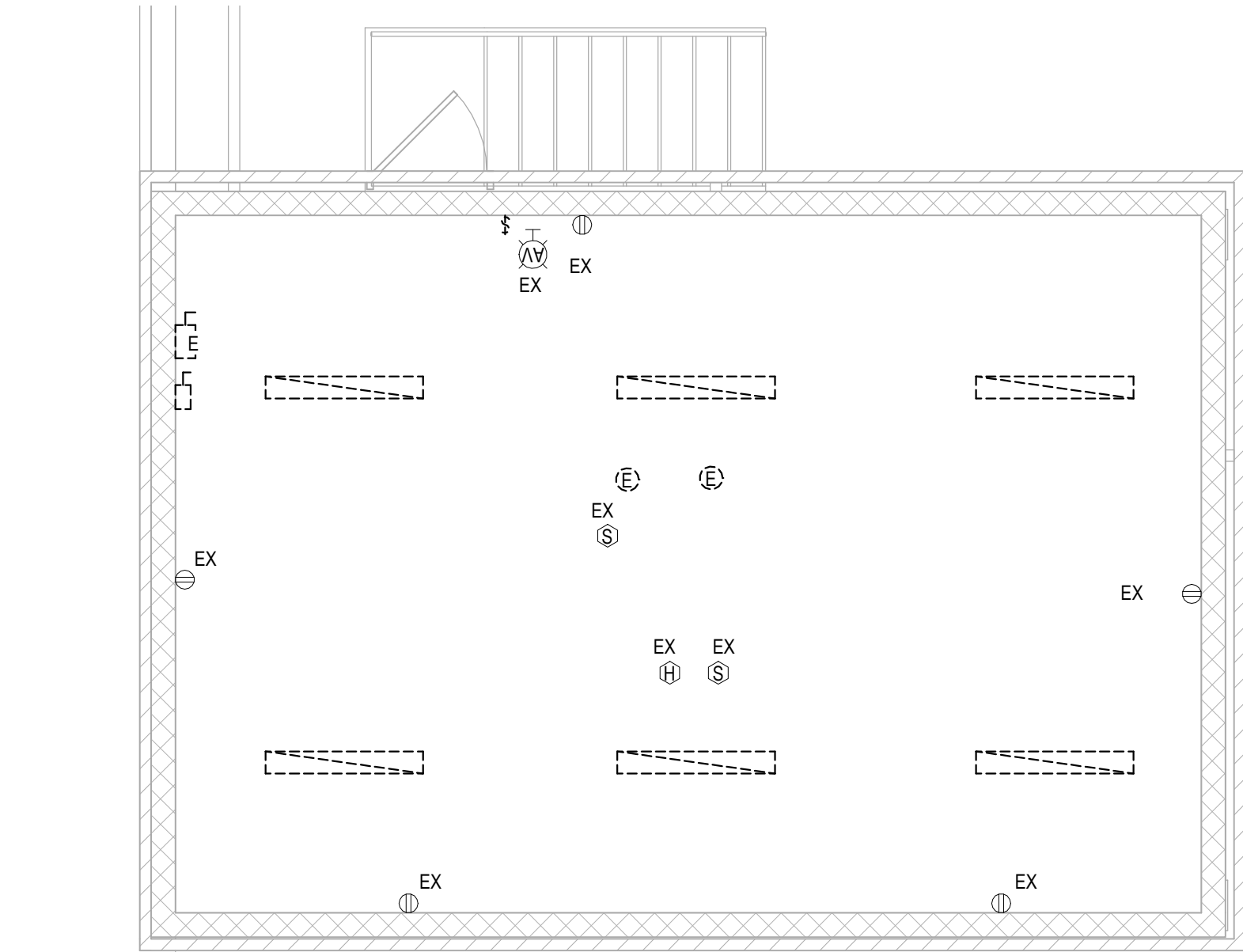
 **ELECTRICAL ELEVATOR PIT ELEVATOR 1 - DEMOLITION**
1/4" = 1'-0"



 **EQUIPMENT ROOM ELEVATOR 1 - DEMOLITION**
1/4" = 1'-0"



 **ELECTRICAL ELEVATOR PIT ELEVATOR 2 - DEMOLITION**
1/4" = 1'-0"



 **ELECTRICAL LEVEL 7 EQUIPMENT ROOM ELEVATOR 2 - DEMOLITION**
1/4" = 1'-0"

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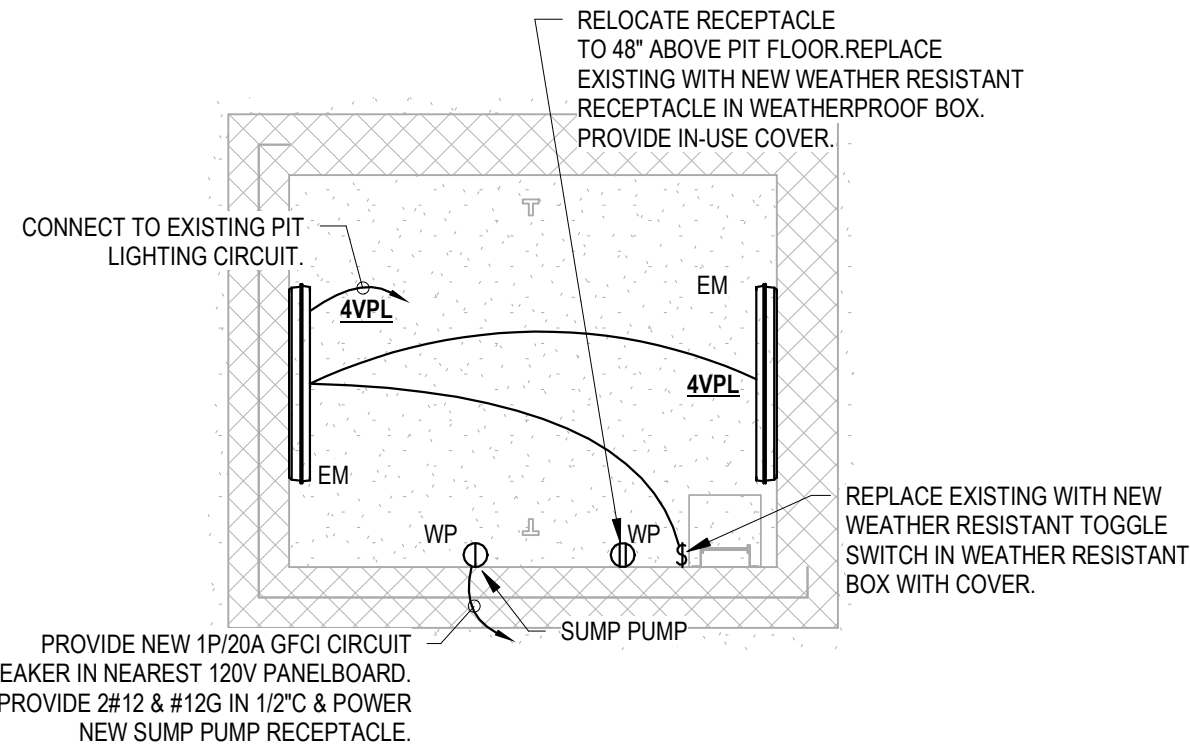
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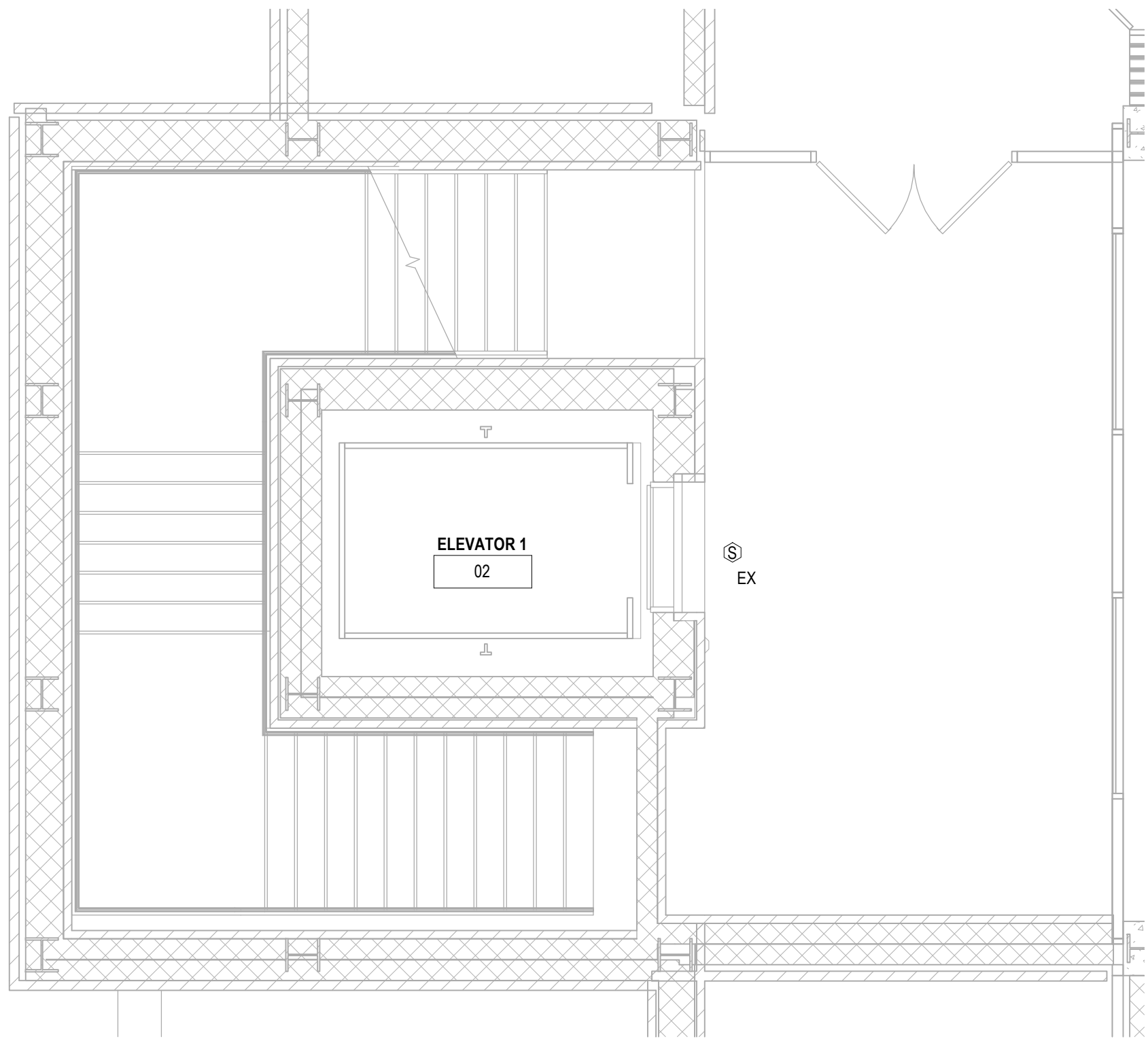
**ELECTRICAL ELEVATOR 1
PLANS**

PROJECT NO.: 18122 DRAWN BY: BNF
CHECKED BY: APM

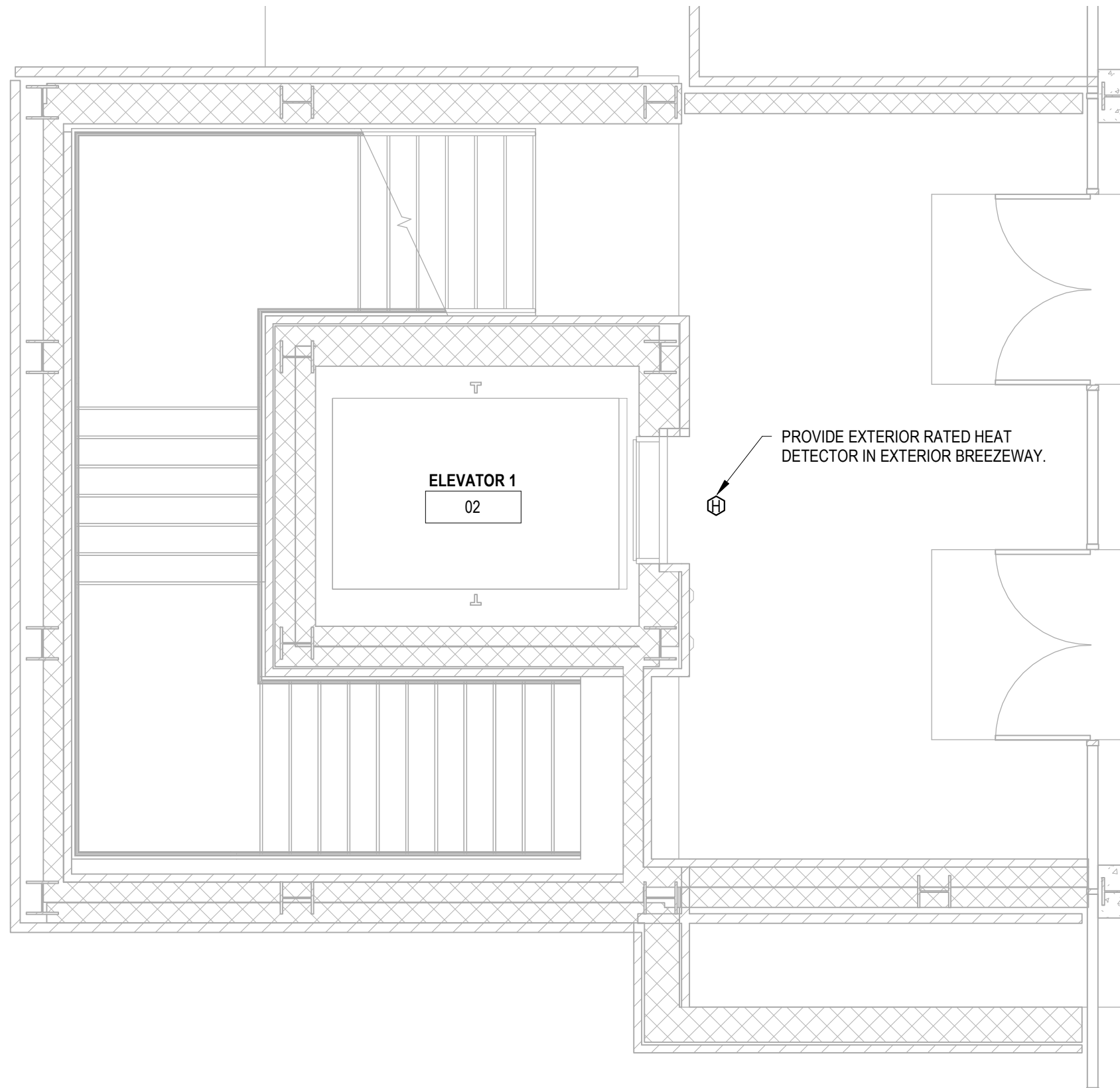
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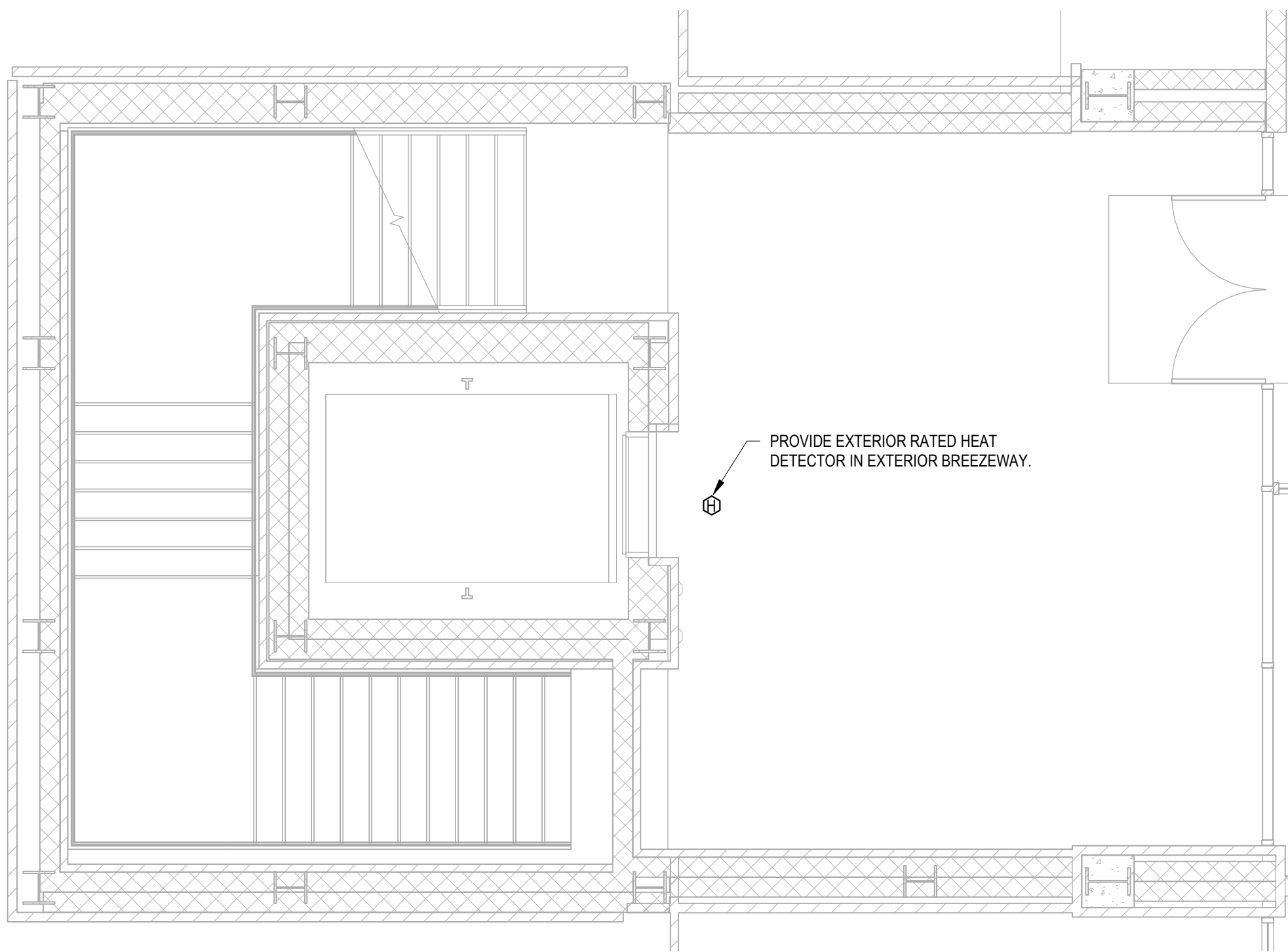
ELECTRICAL ELEVATOR PIT ELEVATOR 1
1/4" = 1'-0"



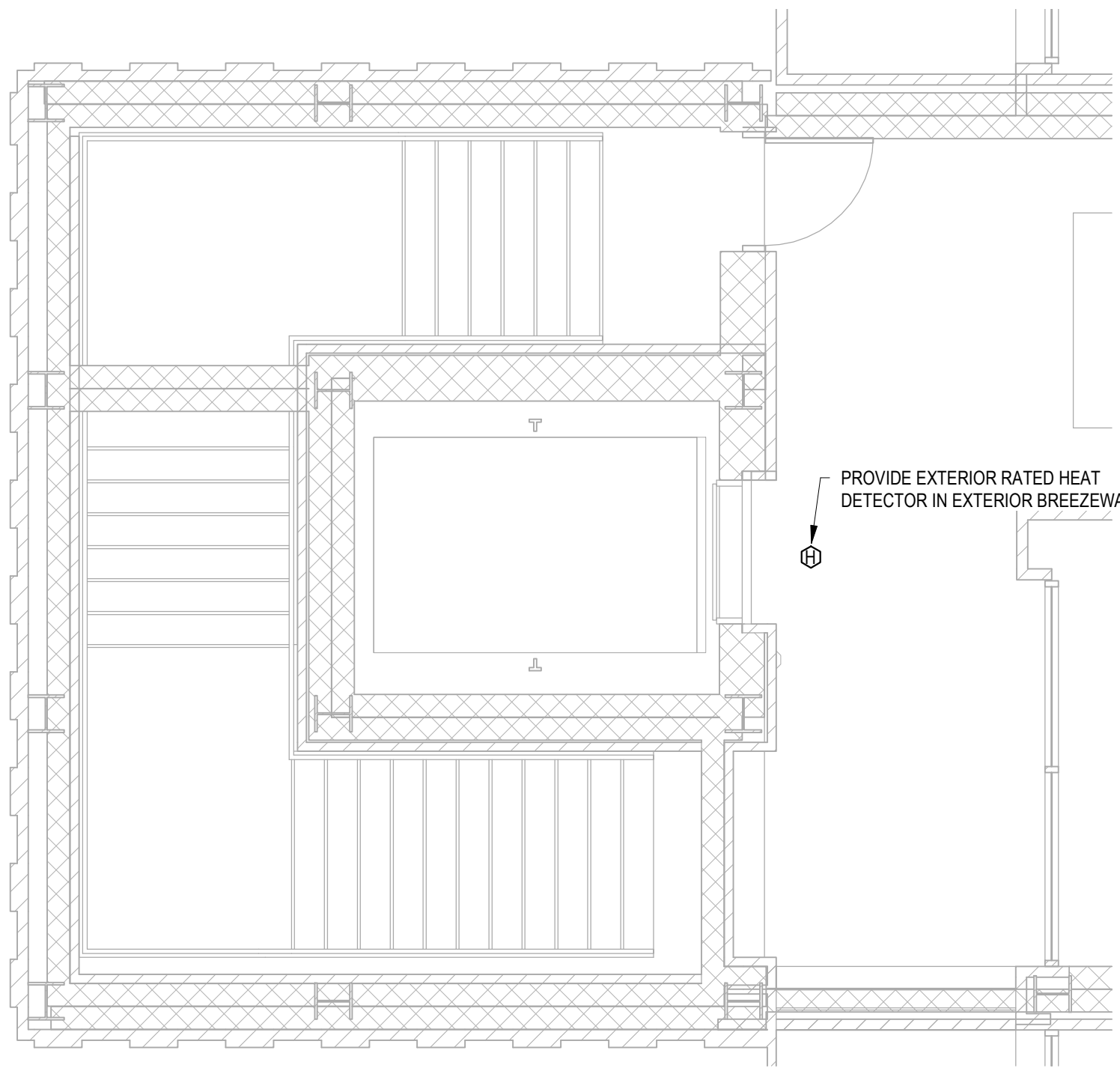
ELECTRICAL GROUND LEVEL ELEVATOR 1
1/4" = 1'-0"



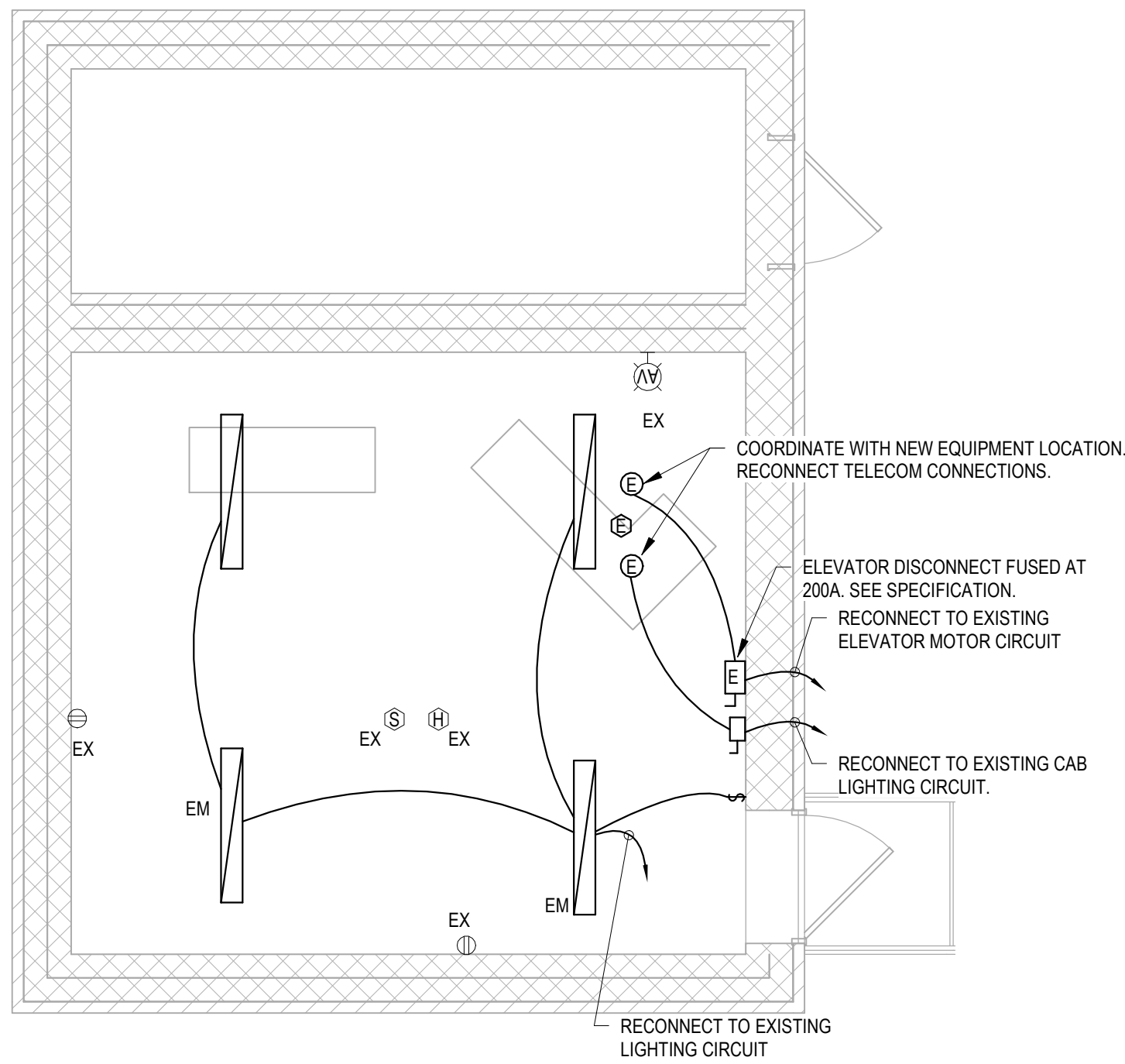
ELECTRICAL LEVEL 1 ELEVATOR 1
1/4" = 1'-0"



ELECTRICAL LEVEL 2 ELEVATOR 1
1/4" = 1'-0"



ELECTRICAL LEVEL 3 ELEVATOR 1
1/4" = 1'-0"



EQUIPMENT ROOM ELEVATOR 1
1/4" = 1'-0"

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FLORIDA

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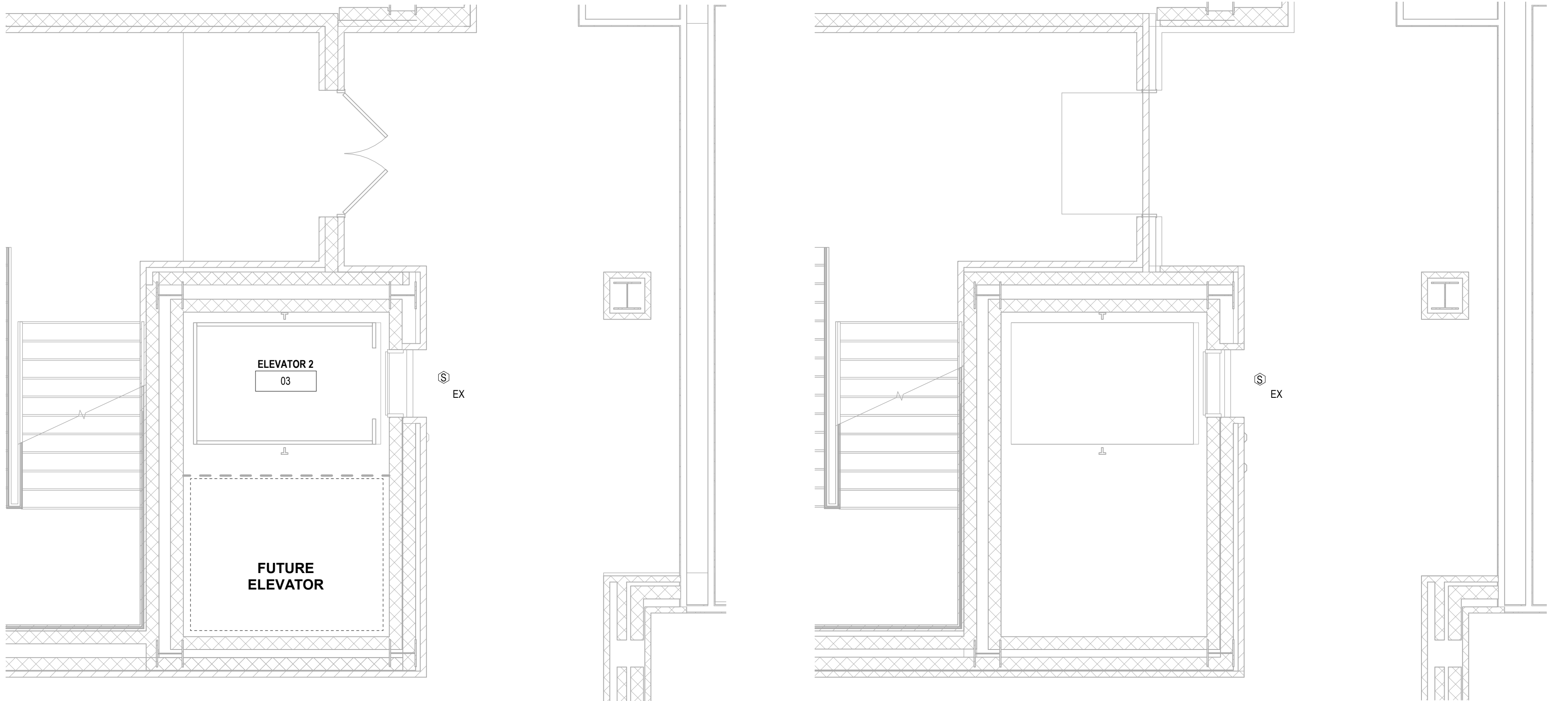
KEY PLAN

DRAWING TITLE:

**ELECTRICAL ELEVATOR 2
PLANS**

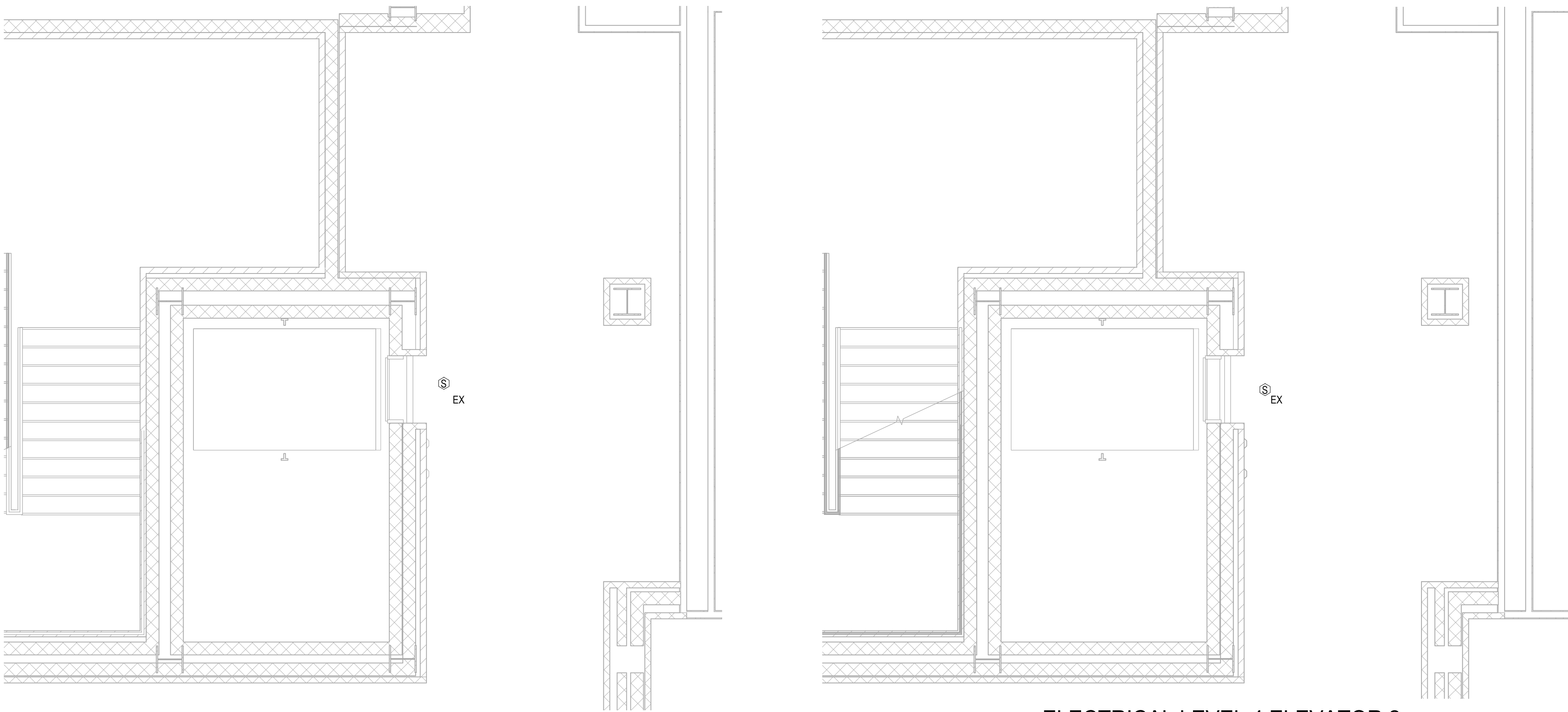
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CHECKED BY:	APM		

E103



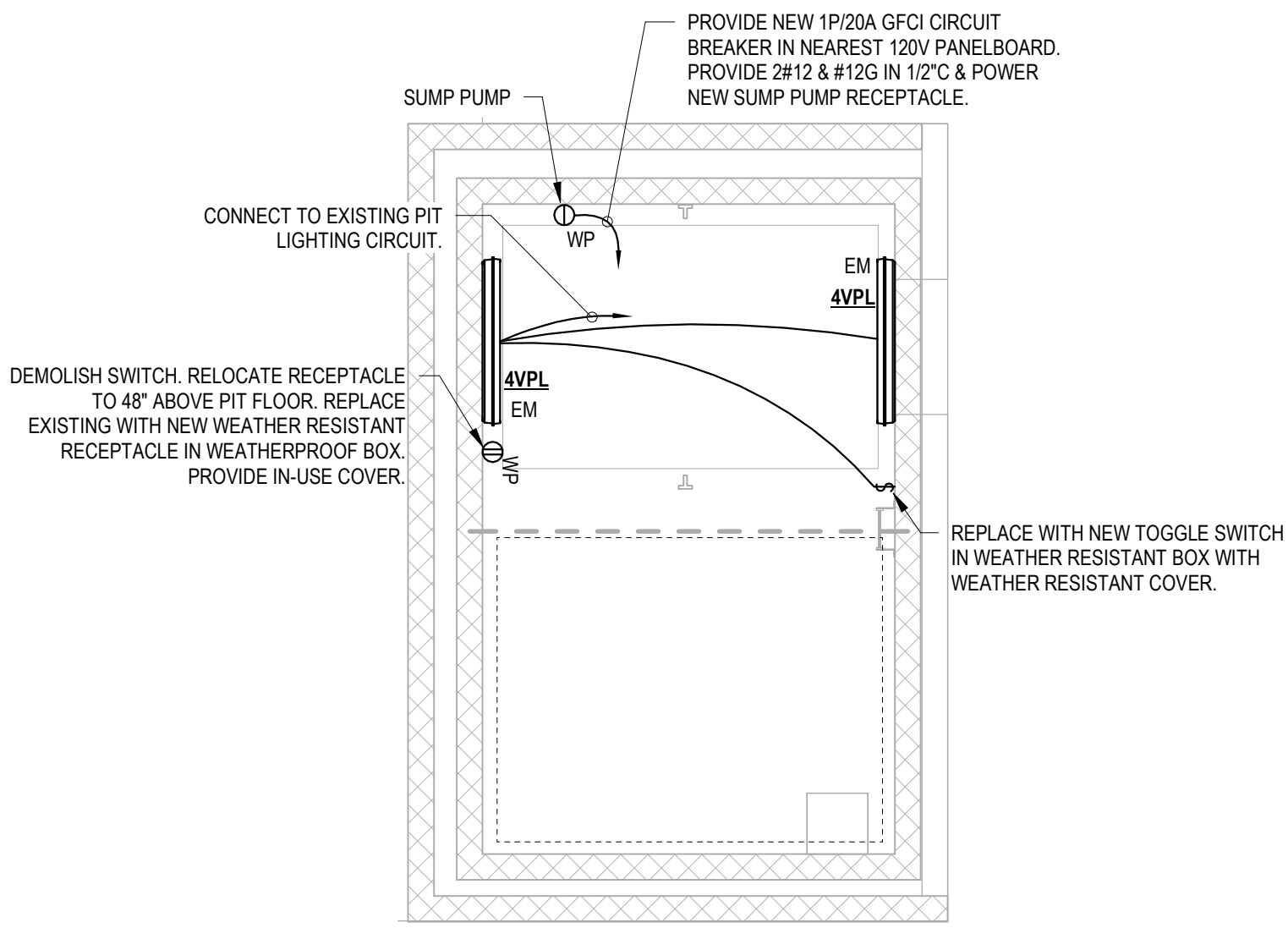
ELECTRICAL GROUND LEVEL ELEVATOR 2
1/4" = 1'-0"

ELECTRICAL LEVEL 1 ELEVATOR 2
1/4" = 1'-0"

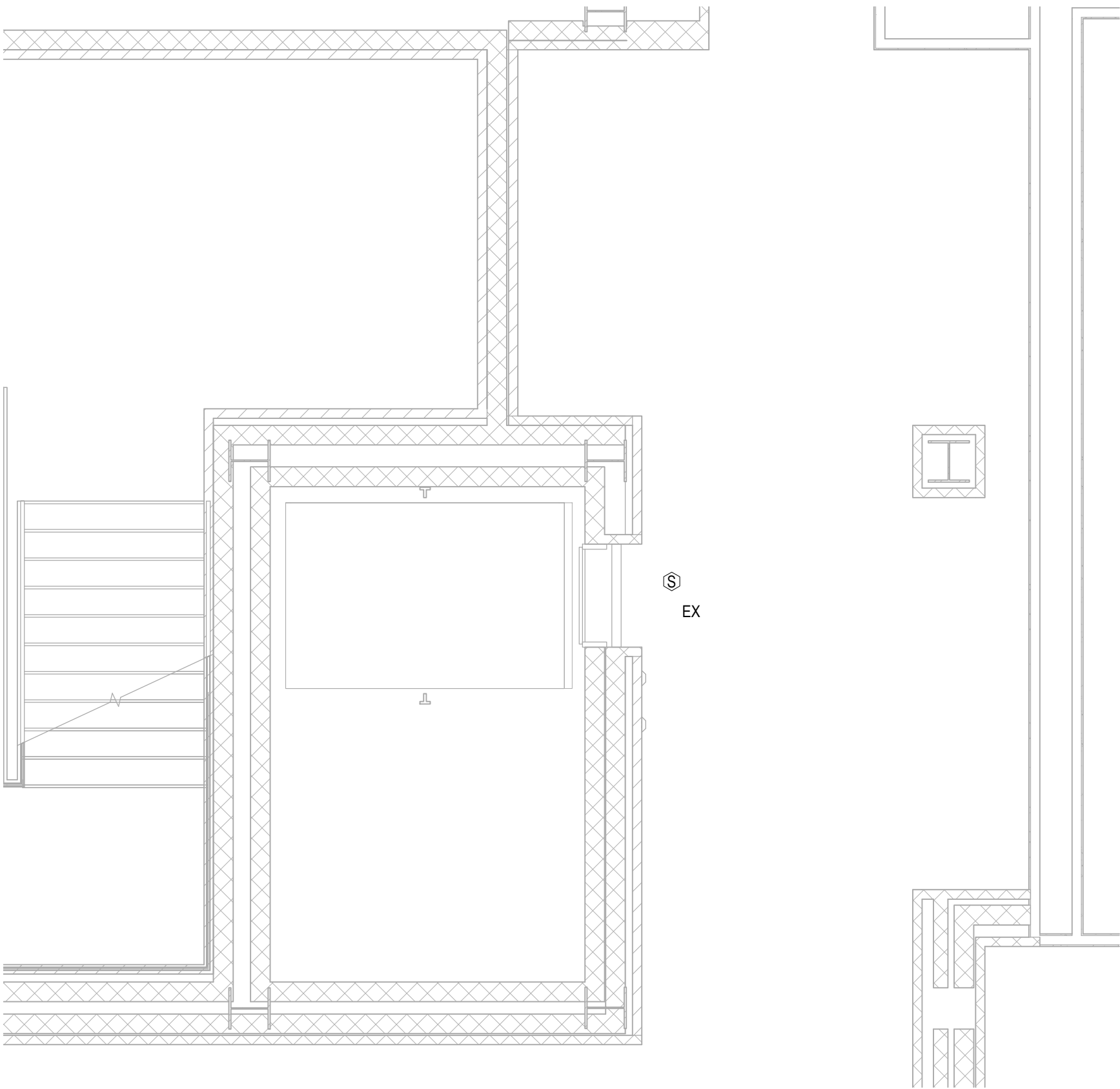


ELECTRICAL LEVEL 3 ELEVATOR 2
1/4" = 1'-0"

ELECTRICAL LEVEL 4 ELEVATOR 2
1/4" = 1'-0"



ELECTRICAL ELEVATOR PIT ELEVATOR 2
1/4" = 1'-0"



ELECTRICAL LEVEL 2 ELEVATOR 2
1/4" = 1'-0"



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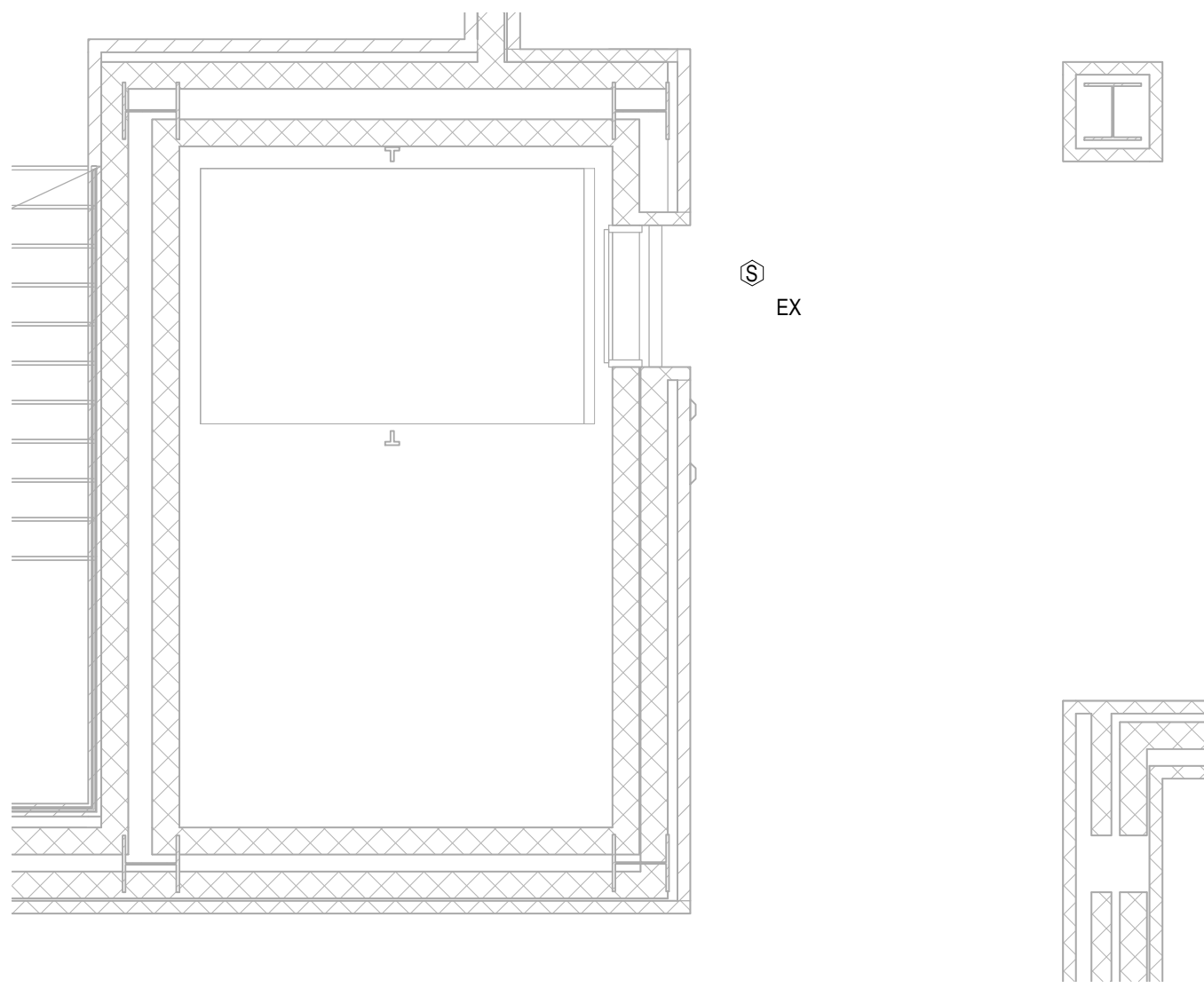
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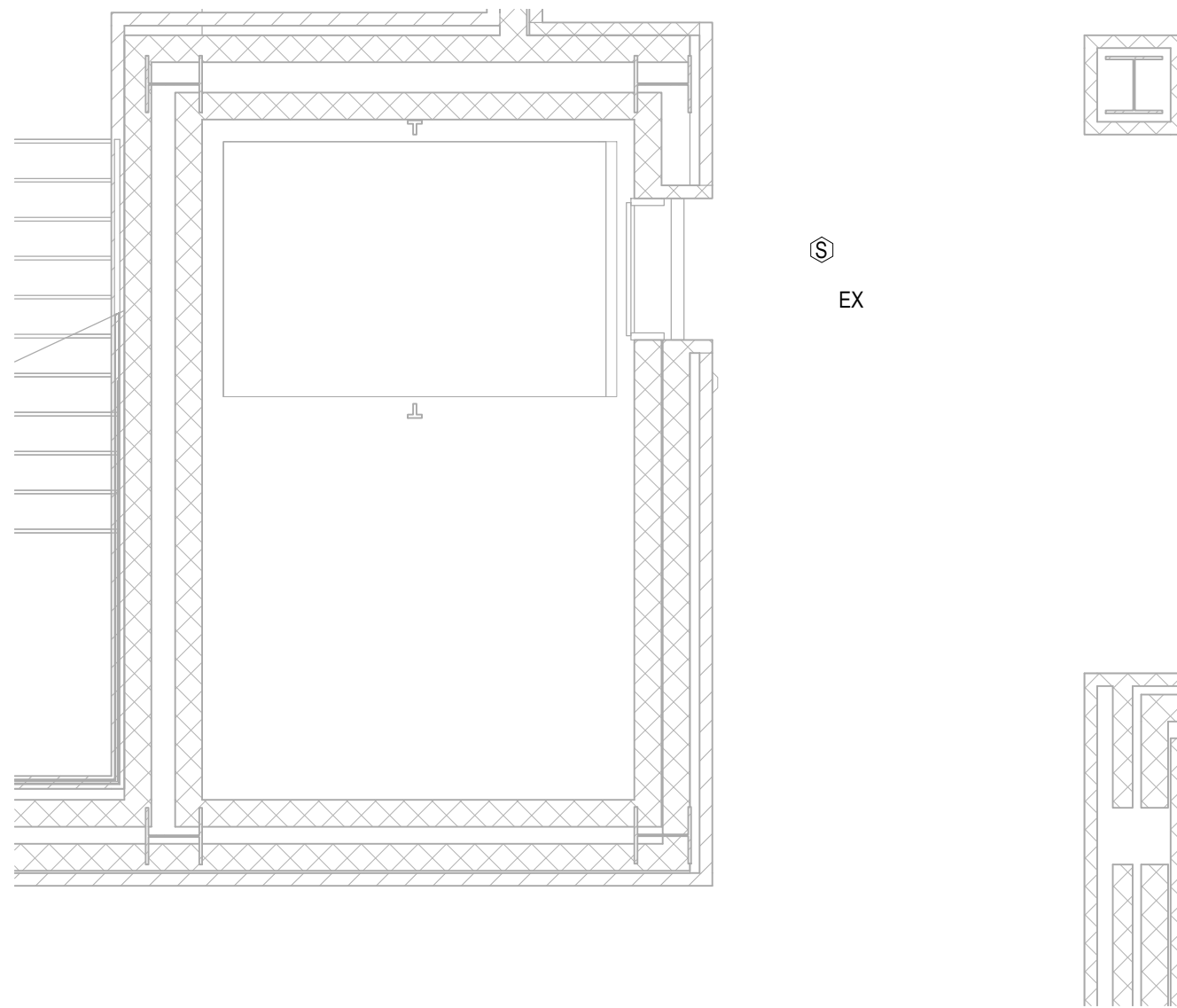
**ELECTRICAL ELEVATOR 2
PLANS**

PROJECT NO.:	18122	DRAWN BY:	BNF
		CHECKED BY:	APM

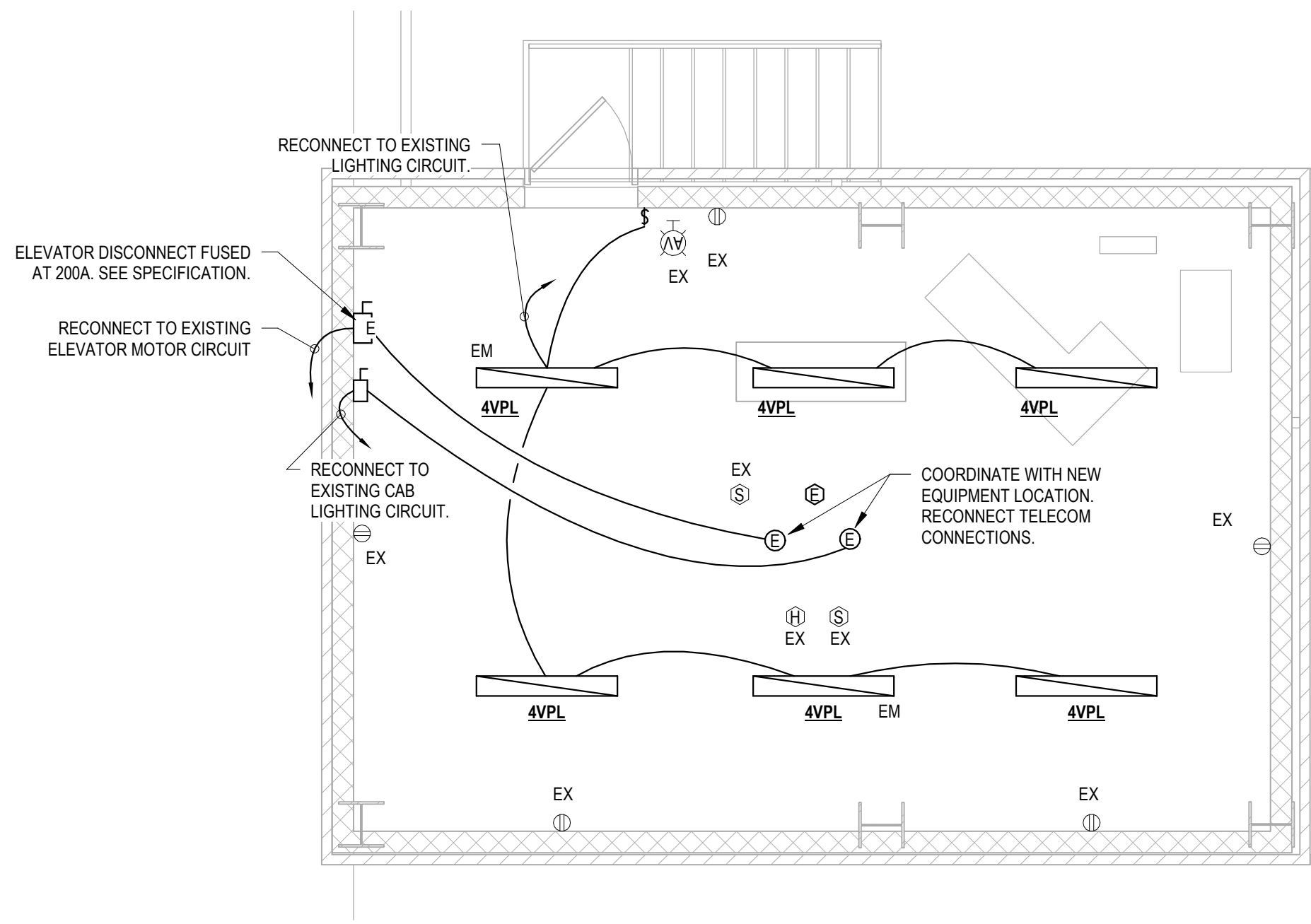
E104



ELECTRICAL LEVEL 5 ELEVATOR 2
1/4" = 1'-0"



ELECTRICAL LEVEL 6 ELEVATOR 2
1/4" = 1'-0"



ELECTRICAL LEVEL 7 EQUIPMENT ROOM ELEVATOR 2
1/4" = 1'-0"