

SECTION 26 00 00

GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART ONE: GENERAL

1.1 General Requirements

- 1.1.1 **Scope:** It is the intent of these Drawings to define the equipment and materials to be furnished and installed at Pembroke Family Physicians pertaining to fit up of the addition space and renovations to other spaces in this medical office building.
- 1.1.2 **Provisions:** As used in this section, "provide" means "furnish and install", "furnish" means "to purchase and deliver to the project site complete with every necessary appurtenance and support and to store in a secure area in accordance with manufacturers instructions", and "install" means "to unload at the delivery point at the site or retrieve from storage, move to point of installation and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project".
- 1.1.3 **Existing Site Conditions – Responsibilities Prior to Bid:** Before submitting a bid, the Electrical Subcontractor shall visit and carefully examine site to identify existing conditions and difficulties that may affect the work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions.
- 1.1.4 **Existing Site Conditions – Responsibilities Prior to Starting Work:** Before starting work in a particular area of the project, the Electrical Subcontractor shall examine the conditions under which work must be performed including preparatory work performed under other Sections of the Contract, or by the Owner and report conditions which might adversely affect the work in writing to the Engineer. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.
- 1.1.5 **Coordination of Work:** The General Contractor shall coordinate the work of all trades including that of the electrical contractor, with all other subcontractors to determine whether there will be any interference with the electrical work. If the Electrical Subcontractor fails to check with the General Contractor and the electrical work is later found to interfere with the work of other subcontractors, then he shall make necessary changes, without additional cost to the Owner, to eliminate such interference.
- 1.1.6 **Intent of Design:** This performance specification is not intended to indicate and specify each component required, but does require that the components and materials be provided for a complete and operational installation.
- 1.1.7 **Discrepancies in Documents:** Each bidder shall be responsible for examining the specifications carefully before submitting his bid, with particular attention to errors, omissions, conflicts with provisions of laws and codes imposed by authorities having jurisdiction, conflicts between portions of specifications, and ambiguous definition of the extent of coverage in the contract. Any such discrepancy discovered shall be brought to the immediate attention of the Engineer for correction. Should any of the aforementioned errors, omissions, conflicts or ambiguities exist in the specification, the Electrical Subcontractor shall have the same explained and adjusted in writing before signing the contract or proceeding with work. Failure to notify the Engineer in writing of such irregularities prior to signing the Contract will cause the Engineer's interpretation of the Contract Documents to be final. No additional compensation will be approved because of discrepancies thus resolved.

1.2 Applicable Codes and Standards

1.2.1 **Work:** All work shall be in accordance with the laws, rules, codes, and regulations set forth by Local, State, and Federal authorities having jurisdiction. All products and materials shall be manufactured, installed and tested as specified, but not limited to the latest accepted edition of the following codes, standards and regulations:

NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
NEC	National Electrical Code (NFPA 70)

- 2.2.2 **Representation of Equipment:** All equipment installed on this project shall have local representation, local factory authorized service and a local stock of repair parts.
- 2.2.3 **Warranties:** No equipment or material shall be installed in such a manner as to void a manufacturer's warranty. The Electrical Subcontractor shall notify the Engineer of any discrepancies between the Contract Documents and manufacturer's recommendations prior to execution of the work. Refer to Division 1, General Requirements for Warranty Requirements.

2.3 Shop Drawings

- 2.3.1 **General Requirements:** After the Contract is awarded, but prior to proceeding with the Work, the Electrical Subcontractor shall obtain complete shop drawings, product data and samples from manufacturers, suppliers, vendors, and Subcontractors for all materials and equipment specified herein, and submit data and details of such materials and equipment for review by the Engineer. Submission of such items shall follow the guidelines set in the General Section of the Specification Document. Prior to submission of the shop drawings, product data and samples to the Engineer, the Electrical Subcontractor shall review and certify that the shop drawings, product data and samples are in compliance with the Contract Documents. Further, the Electrical Subcontractor shall check all materials and equipment after their arrival on the jobsite and verify their compliance with the Contract Documents. A minimum period of ten working days, exclusive of transmittal time will be required in the Engineer's office each time shop drawings, product data and/or samples are submitted or resubmitted for review. This time period shall be considered by the Electrical Subcontractor when scheduling his Work.
- 2.3.2 **Information to be included in Submittal:** The shop drawing submittal shall include all data necessary for interpretation as well as manufacturer's name and catalog number. Sizes, capacities, colors, etc., specified on the drawings shall be specifically noted or marked on the shop drawings.
- 2.3.3 **Responsibility of Submitted Equipment:** The Engineer's review of such drawings shall not relieve the Subcontractor of responsibility for deviations from the Contract Specifications, unless he has in writing called the attention of the Engineer to such deviations at the time of the submission. The Engineer's review shall not relieve the Electrical Subcontractor from responsibility for errors or omissions in such drawings.
- 2.3.4 **Proposal of Other Equipment:** If the Electrical Subcontractor proposes an item of equipment other than that specified which requires any redesign of the wiring or any other part of the mechanical, electrical or architectural layout, the required changes shall be made at the expense of the trade furnishing the changed equipment at no cost to the Owner.
- 2.3.5 **Substitution of Equipment of Equal Quality:** Manufacturer's names are listed herein and on the drawings to establish a standard for quality and design. Where one manufacturer's name is mentioned, products of other manufacturers will be acceptable if, in the opinion of the Engineer the substitute material is of quality equal to or better than that of the material specified. Where two or more manufacturer's names are specified, material shall be by one of the named manufacturers only.

2.4 Record Drawings

- 2.4.1 **General Requirements:** As work progresses, and for duration of the Contract, the Electrical Subcontractor shall maintain a complete and separate set of prints of Contract Drawings at job site at all times and record work completed and all changes from original Contract. Drawings shall clearly and accurately include work installed as a modification or added to the original design. At completion of work and prior to final request for payment, the Electrical Subcontractor shall submit a complete set of reproducible record drawings showing all systems as actually installed.

2.5 Equipment Specifications

- 2.5.1 **Panelboards:** Panelboards shall be of the sizes, rating and arrangement shown on the attached sketch. Panelboards shall be provided complete with all overcurrent devices, accessories and trim. All panelboards shall be provided with safety barriers for dead front construction. The required short circuit ratings of assembled panelboards are shown on the Drawings. The short circuit rating of every overcurrent device in the panel shall meet or exceed the panel rating. Unless otherwise noted on the Drawings, series rated combinations will not be permitted.

- A. Enclosures: Boxes shall be code gauge galvanized sheet steel. Trim shall be code gauge steel, ANSI-61 gray finish with stainless steel flush type lock/latch handle. All locks shall be keyed alike. Trim for surface mounted

locations and NEMA 4 for outdoor, wet and damp locations. A handle guard shall be provided to allow the toggle operator to be padlocked in the OFF position. Starters shall be provided with trip free melting alloy thermal overloads.

2.5.6 Lighting Systems

- A. Light fixtures shall be provided with housings, trims, ballasts, lamps, lamp holders, sockets, reflectors, wiring and other components required, as a factory-assembled unit for a complete installation. Provide electrical wiring within light fixtures suitable for connecting to branch circuit wiring in accordance with N.E.C. Article 410, Paragraph 25. Provide LED fixtures of sizes, types and ratings indicated and specified in the Lighting Fixture Schedule on the Contract Drawings.
- B. Occupancy Sensors: Occupancy sensors of the type and model specified on the drawings shall be provided, installed and wired into the local lighting circuit in the area that the sensors are installed. The engineer will consider equipment of another equal manufacturer, where suitable coverage can be documented.
 - Power Packs: Power packs shall be provided as required for each room provided with occupancy sensors as needed.
 - Installation Requirements: Provide all miscellaneous equipment and wiring for a complete installation.

2.5.7 Fire Alarm System:

- A. The intent is to add devices and associated equipment to the existing Simplex 4001 fire alarm panel currently in use at this facility. New devices shall be provided as shown and be of the make and manufacturer compatible with the existing equipment. It is understood from discussions with the manufacturer's Representative that the existing fire alarm control panel will have to be supplemented with a small addressable panel to connect the elevator module to the system. This shall be furnished as part of this project scope.
- B. All fire alarm work shall be coordinated with the Owner's Fire Alarm vendor, Protection Professionals, Contact: Rich Brobst, (207) 775-5755.
- C. The electrical contractor shall be responsible for furnishing all devices, wiring, auxiliary equipment, programming, and commissioning, required for a complete and operable system.
- D. Fire Alarm wiring shall be installed in red MC cable assemblies listed for use as fire alarm cable.
- E. The electrical contractor shall be responsible for obtaining approval with the Portland Fire Department and local authorities having jurisdiction.
- F. The Electrical Contractor shall also provide:
 - Wiring Diagrams: Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
 - Sequence of Operation: Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
 - Battery Calculation: Provide a complete battery calculation showing that the existing (or new if required) battery system provided meets the operational requirements as defined by NFPA.
- G. The Portland Fire Department may require a new AES wireless transmitter as part of the upgrade of the fire alarm system. Furnish a separate add alternate price for an AES Wireless Transmitter, Model 7788, and auxiliary equipment including: a 12V/7AH standby battery, 1640 plug-in transformer and Sentrol tamper switch to allow servicing without sending system into alarm. System shall be to City of Portland Fire Department standard.

2.5.8 Data System Wiring:

- A. The intent is to provide boxes and pathways for data and telephone wiring, from the voice/data jack to the head end equipment located in the basement.
- B. 2" x 4" work boxes shall be used at each voice and data jack. Cat 5E cabling shall be installed from the jack and run to the telephone/data panel in the basement for termination by the Owner's IT contractor.
- C. Furnish all jacks, cover plates, wiring and termination.

UL	Underwriters Laboratory
NESC	National Electrical Safety Code
FM	Factory Mutual Association
IBC	International Building Code
IECC	International Energy Conservation Code - 2009
Local AHJ	Local and State building, electrical, fire and health department and public safety codes agencies.

1.2.2 **Code Conflicts:** When requirements cited in this Paragraph conflict with each other or with Contract Documents, the most stringent requirements shall govern conduct of work. The Engineer may relax this requirement when such relaxation does not violate the ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing. Should the Electrical Subcontractor perform any work that does not comply with the requirements of the applicable building codes, state laws, and industry standards, he shall bear all costs arising in correcting these deficiencies.

PART TWO: SCOPE OF WORK

2.1 General Requirements

- 2.1.1 **General Scope:** The work to be accomplished under this section includes providing all labor, materials, equipment, consumable items, supervision, administrative tasks, tests and documentation required to install complete and fully operational electrical systems as described.
 - 2.1.2 **Administrative Responsibilities:** The Electrical Subcontractor shall file plans, obtain permits and licenses, pay fees and obtain necessary inspections and approvals from authorities that have jurisdiction, as required to perform work in accordance with all legal requirements.
- 2.2 Work to be Provided Under this Division
- 2.2.1 **General Scope:** The Work shall be complete from point of service to each outlet or device with all accessory construction and materials required to make each item of equipment or system complete and ready for operation. The work shall include but not be limited to the following: The Electrical Subcontractor shall provide:
 - A. **Demolition:** See demolition notes on drawings.
 - B. **Electric Service:** See drawings for base bid new service.
 - C. **Grounding System:** Provide all equipment and wiring to connect new feeders, equipment and other systems as required by the National Electrical Code to the existing building grounding system.
 - D. **Power Distribution Systems:** Intent is to provide additional equipment to the existing power distribution systems including panelboard, overcurrent devices, raceway, cable and wire.
 - E. **Feeder and Branch Circuit Wiring:** Provide feeder and branch circuits and devices for power to equipment and convenience receptacles. This includes branch wiring to system control panels furnished under other sections.
 - F. **Motor Circuit Wiring:** Provide all motor wiring, safety disconnects, and motor starters unless integral with equipment.
 - G. **Interior Lighting Systems:** Provide complete interior lighting system including normal and emergency fixtures, exit signs, lamps, controls, trim and accessories.
 - H. **Voice/Data Systems:** Furnish conduits and boxes for voice/data equipment as shown on the plans.
 - I. **Supports and Fittings:** Provide all support material and hardware for raceway, cable tray and electrical equipment.
 - J. **Terminations:** Provide terminations of all cable and wire unless otherwise noted.
 - K. **Penetrations:** Provide all building wall, floor and roof penetrations for raceway and cable tray where not provided by the General Contractor.

2.2 General Equipment and Materials Requirements

2.2.1 **General Requirements:** All equipment and materials shall be new and of the quality specified. All materials shall be free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged during construction shall not be repaired at the jobsite, but shall be replaced with new materials.

panels shall be of hinged door construction such that the gutter space may be exposed by a hinged door. Directory frames shall be metal frame with plastic covers.

- B. Bus Work: All bus work shall be 1000 amp/sq. in. copper or 750 amp/sq. in. aluminum. Unless otherwise noted on the drawings, neutral busses shall be 100% rated with adequate connections for all outgoing neutral conductors. Panelboards shall be provided with copper or aluminum ground busses.
- C. Circuit Breakers: Overcurrent devices shall be trip-free molded case, bolt-on, thermal magnetic circuit breakers. Main circuit breakers shall be individually mounted and bolted to bus assembly. Back-fed branch mounted circuit breakers are prohibited. Front faces of all circuit breakers shall be flush. Trip indication shall be clearly shown by the handle position between the ON and OFF positions. All connections shall be rated for 75°C copper conductors.

2.5.2 Grounding System:

- A. If the bid alternate is taken, contractor shall furnish a grounding electrode system sized for the new electrical service, including two 10' driven ground rods and bare copper ground wire and bonding connections to all required equipment and systems such as interior metal water, gas and sprinkler piping, roof mounted fans, pipes, ducts, railings, and other metallic equipment shall be bonded as required by Article 250 of the NEC. The points of attachment of these bonding conductors shall be located in readily accessible locations.
- B. Ground rods shall be 3/4-inch copper clad steel construction furnished in 10 foot lengths. Ground rods shall be driven vertically with the upper end of the rod not less than 2-1/2 feet below finished grade. When conditions require, ground rods may be driven at an angle not to exceed 45 degrees from vertical, with the driven end facing outside of the grounding ring.
- C. Bare grounding conductors shall be soft drawn stranded copper, sized in accordance with NEC Article 250 unless otherwise noted on the Drawings.
- D. Equipment Grounding System: A separate, insulated copper conductor, with green colored insulation, shall be provided in all raceways and with every feeder, branch and control circuit, in addition to the grounded metallic conduit system. The equipment grounding conductor shall be grounded at both ends. Care shall be taken not to create a parallel path to the neutral conductor by any other means of grounding.
- E. Grounding of Raceways: All metallic raceways shall be electrically continuous and bonded to the grounding system. All junction boxes, pull boxes, switch boxes, outlet boxes, etc., shall be bonded to the equipment grounding conductor by means of a green bonding jumper and screw. All devices (switches/receptacles etc.) having a grounding terminal shall have a bonding jumper installed tied directly to the equipment grounding conductor. (No exceptions).

2.5.3 Feeder and Branch Circuit Wiring:

- A. Provide feeder and branch circuits and devices for power to equipment and convenience receptacles. This includes branch wiring to system control panels furnished under other sections.
- B. All circuits feeding panels, circuit feeders and circuit wiring shall be copper, minimum size #12 AWG. Conductors shall be 600V rated with THHN/THWN insulation.
- C. All exposed wiring shall be in EMT conduit. EMT conduits shall be properly supported with hangers or clips at a spacing not to exceed 10 feet. Minimum conduit size is 3/4".
- D. Concealed wiring in walls and above ceilings shall be in MC or type NM cable assemblies.
- E. Flexible metal conduit shall be used for connections to vibrating equipment.
- F. All conduits or penetrations in fire rated walls shall be furnished with fire stopping material to maintain the integrity of the rating.

2.5.4 Disconnect Switches

- A. Safety Switches: Shall be fused or non-fused as required by code. Construction shall be heavy-duty horsepower rated type. Enclosure shall be NEMA 1 where installed indoors and Nema 3R where installed outdoors.

2.5.5 Manual Toggle Switches

- A. Manual motor starters: Shall be Single phase fractional HP manual motor starters shall be toggle operated, enclosed, one or two pole switches as required by the installation. The enclosure shall be NEMA 1 for indoor

PART THREE: EXECUTION

3.1 Equipment Arrangement and Access

- 3.1.1 **Location of Equipment:** Locate all equipment which must be serviced, operated or maintained in fully accessible positions. Minor deviations from the drawings may be made to allow for better accessibility at no additional cost to the Owner, but changes shall not be made without review by the Engineer. Minimum clearances in front of or around equipment shall conform to the latest applicable code requirements.
- 3.1.1 **Arrangement of Equipment:** The size of equipment shown on the drawings is based on the dimensions of a particular manufacturer. Where other manufacturers are acceptable, it is the responsibility of the Electrical Subcontractor to determine if the equipment he proposed to furnish will fit the space available. Layout drawings shall be prepared by the Subcontractor when required by the Engineer or Owner to indicate a suitable arrangement.

3.2 Work in Existing Panelboards

- 3.2.1 **General:** Work in existing panelboards has shown on the plans as best as possible during the field surveys performed when the facility was in full operation. All circuits shall be field verified prior to any work being performed on the circuits in question.

3.3 Equipment Labeling

- 3.3.1 **Panelboards:** All panelboards, cabinets and other specified equipment shall be labeled with engraved laminated plastic plates, minimum 3/4" high with 3/8" engraved letters. Punch tapes with mastic backings are not acceptable.
- 3.3.2 **Empty Conduits:** All empty conduits shall have labels tied to the pull string at each end of each empty conduit, marked as to identification of each end. Junction boxes with circuits provided for future use shall be labeled with appropriate circuit designation.
- 3.3.3 **Panelboard Directories:** Cardholders for panelboards shall be filled out with typewritten identification of each circuit, except that the word "spare" shall be written in soft pencil to identify all circuit breakers installed that are not used.

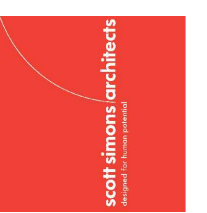
END OF SECTION 26 00 00

SWIFTCURRENT
Engineering Services
10 Forest Falls Dr. Unit 4b
Yormouth, ME 04096
Tel: (207) 847-9280

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GRAPHIC SCALE

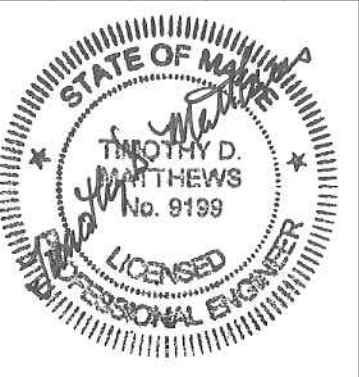
LDD PROJECT NAME:
N/A
DRAWING NAME:
FIELD BOOK USED:
N/A

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REFERENCES:

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SCALE:	DATE:
				10-16-15



PORTLAND PUBLIC LIBRARY
BURBANK BRANCH
377 Stevens Avenue
Deering Center
Portland, Maine 04103

CITY OF PORTLAND, MAINE
Addition + Renovation for
The Burbank Branch Library
ISSUED FOR BIDDING

ELECTRICAL SPECIFICATION

SHEET #
E0.1
PLAN NUMBER