ELECTRICAL SPECIFICATIONS

SECTION 16A - ELECTRICAL WORK

1. GENERAL

A. The GENERAL and SPECIAL CONDITIONS listed under Division 1 shall govern this work where applicable.

B. The Contractor shall provide labor, materials, equipment, and services necessary for the construction of the complete functioning electrical system.

C. Labor and materials, although not specifically mentioned, but necessary for the completion of work and the successful operation of the electrical systems, shall be supplied as if specifically indicated.

D. Materials and equipment installed as part of the permanent installation shall be new unless otherwise indicated or specified, and shall be approved by the Underwriter's Laboratories, Inc. for installation in each particular case where standards have been established.

E. Wiring in finished areas shall be concealed in walls or above ceilings wherever possible. Exposed locations shall be pre-approved by the Architect prior to rough-in. Exposed wiring at finished areas shall be installed in surface metal raceway per architect's approval. Exposed surfaces shall be primed and finish painted as directed. Wiring in mechanical and electrical spaces is to be run exposed.

2. SCOPE

A. The Contractor shall provide all labor and materials required to install a complete system of electrical work as indicated on the drawings and/or herein specified. Work includes but is not limited to the following:

1. The relocation of an electric panel and new breakers as scheduled and necessary for new equipment.
2. Reconnection of mechanical units.
3. Power and lighting branch circuits and controls.
4. Lighting system complete with lamps.
5. Final connections of owner furnished and mechanical equipment.

3. REGULATIONS AND CODE REQUIREMENTS:

A. Work shall conform to the requirements of the latest editions of the following codes, regulations and specifications.

1. National Electrical Code (NFPA 70)
2. National Fire Protection Association (NFPA)
3. Underwriters Laboratories, Inc.
4. International Building Code
5. Maryland, County and City requirements

4. CERTIFICATES:

A. The Contractor shall, at his expense, have an inspection made by the Electrical Inspection department of the complete electrical installation and shall deliver certificate approval of the completed work.

5. PERMITS:

A. The contractor shall obtain and pay for all permits required for his work and low voltage wiring permit.

6. SHOP DRAWINGS:

A. The contractor shall submit five (5) copies of shop drawings and manufacturer's catalog cuts showing all details of equipment to be furnished.

7. GUARANTEE:

A. In addition to the guarantee obligations specified in other divisions, the Contractor shall guarantee the complete electrical system installation free from all mechanical and electrical defects for the period of one year from date of final acceptance by the Owner.

8. DRAWINGS AND SPECIFICATIONS:

A. The drawings are intended to show the general arrangement of outlets. Door swings shall be checked for arrangement of switches, installed on the latch side. Contractor shall check structural plans, mechanical plans and specifications so that he may coordinate his work with these trades.

B. Outlets shall be located uniformly with respect to beams, partitions, ducts, openings, etc., and the general locations shall be checked with the Architect before installing. Should there be any interference between the electrical outlets and other trades, the contractor shall notify the Architect so that the proper location may be decided upon. No outlets shall be installed in back of ducts, grilles, or inaccessible places.

9. GROUNDING:

A. Provide grounding of conduit, panelboards, boxes, cabinets and equipment shall conform to the requirements of the latest edition of the National Electric Code.

10. DISTRIBUTION EQUIPMENT:

A. Panels are manufactured by Cutler-Hammer. New breakers shall be manufactured by Cutler-Hammer. The panels shall be provided with a type written circuit directory including all loads.

B. Circuit breakers serving the mechanical and refrigeration equipment shall be HACR rated. Circuit breakers serving the lighting shall be switching duty rated.

11. EQUIPMENT CONNECTIONS AND DISCONNECTS:

A. Power wiring shall be installed and connected under this section, unless already provided on the equipment.

12. CONDUCTORS:

A. Secondary conductors shall be copper, 98% conductivity covered with 600 volt standard type THHN/THWN insulation.

B. Conductors shall have the following information surface printed throughout the entire length of the conductors.

1. Cable manufacturer
2. Trade name of wire
3. Size of wire
4. Type of insulation
5. Voltage classification

C. Wire shall be in strict accordance with the latest edition of the National Electrical Code.

D. Wire number 8 and larger shall be stranded.

E. A color coding system shall be used throughout the building and match the existing color coding.

13. WIRING METHODS:

A. Feeders rated 100A or greater shall be conductors ran in conduit.

B. Concealed branch circuit wiring shall be type MC cable with insulated grounding conductor minimum. Type MC cable in Patient Care Areas shall be constructed of interlocking cable armor with a grounding conductor in addition to an insulated grounding conductor meeting the requirements for Health Care Facilities for Patient Care Areas as per NEC Article 517.

C. Branch circuit wiring in exposed unfinished areas shall be installed in EMT conduit where subject to damage. Where wiring is not subject to damage type MC cable shall be permitted. Conductors installed exposed in finished areas shall be installed in surface metal raceway.

D. Circuit wiring shall be provided with insulated dedicated neutral and grounding conductors. Each switch box shall contain a neutral and grounding conductor.

14. OUTLET BOXES:

A. Outlet boxes in concealed or unfinished locations shall be galvanized stamped steel of sizes required by the NEC.

B. Boxes in wet or exposed locations shall be cast with gasketed cover.

C. Provide covers for boxes.

15. PULL-BOXES AND JUNCTION BOXES:

A. Pull-boxes shall be provided as shown or wherever required to facilitate pulling of wires and cables, or as junction points. Such boxes shall be installed in accessible locations.

16. WIRING DEVICES:

A. Receptacles and switch plates shall be type 302 stainless steel non-magnetic. Provide WP lift covers for outdoor receptacles. New receptacle in exam and procedure rooms shall be hospital grade. New general purpose receptacles and switches shall have white finish. New receptacle and switches shall be as follows or equal by Hubbell, P&S or Arrow Hart.

1. Hospital Grade Duplex receptacles: Leviton #16362-SGW
2. Duplex receptacles: Leviton #DR15S-W (NEMA 5-15R) for multi-outlet circuits and #16352-GY for "dedicated" 20 amp circuits.
3. GFI receptacles: Leviton #7899-HGW (NEMA 5-20R)
4. Dimming Switches: Architectural style 0-10VDC. Switches shall be fully compatible with lighting fixture LED drivers.

B. 20 AMP rated receptacles shall be used for dedicated 20 AMP circuit connections per NFPA 70 requirements.

17. LIGHTING FIXTURES:

A. The Contractor shall provide labor and materials, equipment and services necessary for and incidental to the installation of lighting fixtures.

B. Provide a fixture for each outlet shown on the drawings. Fixtures shall be complete with lamps, lenses, glassware, mounting brackets, etc., for a complete assembly. Fixtures shall be UL listed.

B. Motion sensors shall be corner ceiling mounted PIR sensing with 20-amp rated power pack. Wall mount power pack in ceiling space above room light control switch.

18. COMMUNICATION SYSTEM:

A. Contractor to coordinate outlet box locations with Owner's equipment supplier. All low voltage wiring is to be plenum rated.

B. For each outlet provide 4"x4"x2-1/8" deep box with raised coverplate and 1" conduit into accessible ceiling space with insulated bushing.

SECTION 16B - DEMOLITION WORK

1. SCOPE:

A. Material and equipment made superfluous by reason of the new work shall become the property of the contractor and shall be removed from the site unless the equipment is specifically indicated to be retained by the Owner, in which case the contractor shall disconnect & remove the equipment and return to the Owner.

B. The contractor shall furnish all labor, material and equipment necessary to complete the demolition work.

C. The work shall include removal and relocation of existing equipment as shown on the drawings.

2. SITE VISIT:

A. Prior to preparing the bid, the contractors shall visit the site and familiarize themselves with all existing conditions. Make all necessary investigations as to locations of utilities and all other matters which can affect the work. No additional compensation will be made to the contractor as a result of failure to get familiar with the existing conditions under which the work must be performed.

3. OUTAGES:

A. All electrical/telephone service work which will interfere with the normal use of occupied areas in any manner, shall be done at such times as shall be mutually agreed upon by the Contractor and the Owner.

B. Unless otherwise specified, outages any services, required for the performance of this contract and affecting areas other than the immediate work area shall be scheduled at least ten (10) days in advance. All such outages shall be performed on other than normal duty hours.

C. The Contractor shall include in his price the cost of all premium time required for outages and other work which interferes with the normal use of other building. Which will be performed, in most cases, during other than normal work time and at the convenience of the Owner.

4. CUTTING AND PATCHING:

A. Cutting and patching associated with the work in the existing structure shall be performed in a neat and workmanlike manner. Existing surfaces, which are damaged by the Contractor shall be repaired or replaced with new materials.

B. Structural members shall not be cut or penetrated. Holes cut through concrete and/or masonry to accommodate non-percussive methods.

C. Patching of areas, disturbed by installation of new work and/or required demolition, shall match existing adjacent surface as to material texture and color.

SECTION 16C - FIRE ALARM SYSTEM

1. GENERAL

A. The contractor shall furnish and install labor, materials, equipment and services necessary to update the existing Fire Alarm System as specified herein and shown on plans. The system shall consist of updating the existing Control Panel, Power Supply and Battery Cabinet, Smoke Detectors, Alarm Signals and other necessary devices to be wired, connected and left in first class operating condition. All equipment shall be the product of one manufacturer, and shall be approved by the Underwriter's Laboratory. Operational functions and features, dimensions and finishes shall be furnished in strict compliance to specifications and the drawings. New fire alarm system components shall be be fully compatible with the existing system equipment.

B. The System shall comply with the latest applicable sections of the following codes, regulations, and guidelines:

1. National Fire Protection Association (NFPA)
2. Underwriters Laboratory, Inc. (UL)
3. Factory Mutual Approval Guide (FM)
4. International Building Code
5. Applicable State & Local Jurisdiction Regulations Amendments, and Codes
6. American with Disabilities Act (ADA)

C. Provide battery & power supply calculations of the existing system with new devices incorporated into the calculations.

D. All new devices and system updates are to be fully compatible and listed for use with the existing Control Panel.

E. Submit complete fire alarm shop drawings to the City Fire Marshal for approval.

2. SMOKE DETECTORS:

A. Smoke detectors shall be photoelectric type

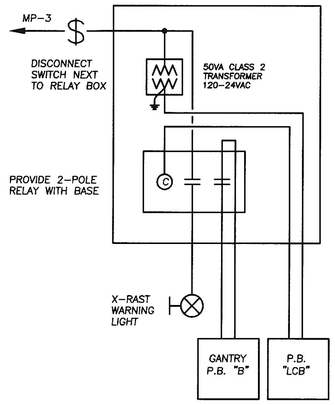
B. Provide duct type smoke detectors for each new mechanical unit. Detectors shall be photoelectric type with a duct housing, full duct width sampling tube and status/reset switch.

C. Auxiliary contacts shall be provided for each detector to control the HVAC unit. Connections shall be coordinated with the mechanical work.

3. ALARM DEVICES:

A. Fire alarm system audible/visual signals shall be flush mounted combination horn/strobes or strobe lights. A common housing shall be utilized for combination units. Housing shall match the existing devices.

B. Strobes shall be Xenon type in accordance with ADA (NFPA 72) requirements. Candela ratings shall be as indicated. Multiple strobes visible in each area shall be synchronized.



X-RAY WARNING LIGHT SCHEMATIC

NO SCALE

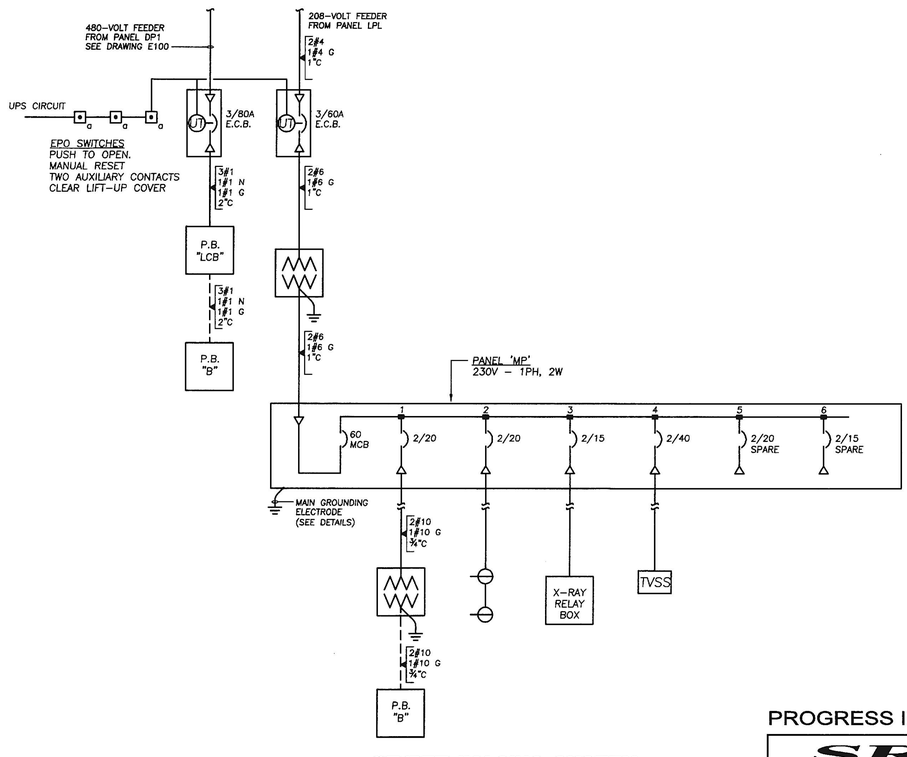
PANEL RP

VOLTAGE: 120 / 208 — PHASE, WIRE: 3 PH , 4 W — 225 AMP MAIN LUGS — A.I.C.: 22K — MOUNTED: FLUSH

CKT	SERVING	C/B P	C/B TRIP	WIRE QTY	WIRE AWG	KVA	PH	KVA	WIRE QTY	WIRE AWG	C/B P	C/B TRIP	SERVING	CKT
1	LTS ENTRY/CORR	1	20	2	12	1.1	A	0.5	2	12	1	20	REC KITCHEN	2
3	LTS OFFICES/EXAM	1	20	2	12	1.1	B	0.5	2	12	1	20	REC KITCHEN	4
5	LTS PET/CT	1	20	2	12	0.8	C	0.5	2	12	1	20	REC KITCHEN	6
7	LTS MRI	1	20	2	12	0.6	A	1.2	2	12	1	20	DISHWASHER	8
9	VVT BOXES	1	20	2	12	0.6	B	0.9	2	12	1	20	DISPOSAL	10
11	SPARE	1	20				C	0.6	2	12	1	20	REC REFRIGERATOR	12
13	REC TOILETS	1	20	2	12	0.6	A	0.2	2	12	1	20	REC ROOFTOP	14
15	REC ULTRASOUND	1	20	2	12	0.4	B	0.8	2	12	1	20	ROOFTOP HEAT TRACE	16
17	REC ULTRASOUND	1	20	2	12	1.5	C				1	20	SPARE	18
19	REC WORKSTATION	1	20	2	12	1.6	A				1	20	SPARE	20
21	REC RECEPTION	1	20	2	12	1.2	B				1	20	SPARE	22
23	REC DRESS	1	20	2	12	1.0	C				1	20	SPARE	24
25	REC DR OFFICE	1	20	2	12	0.6	A						BUSSED SPACE	26
27	REC DRESS/WAIT	1	20	2	12	1.0	B						BUSSED SPACE	28
29	REC OFFICE	1	20	2	12	1.2	C						BUSSED SPACE	30
31	REC TELECOMM	1	20	2	12	0.4	A	3.0	2	8	2	40	DSS 1 AC UNIT	32
33	SPARE	1	20				B	3.0						34
35	SPARE	1	20				C	2.0	2	10	2	30	DSS 2 AC UNIT	36
37	SPARE						A	2.0						38
39	SPARE						B	2.0	2	10	2	30	DSS 3 AC UNIT	40
41	SPARE						C	2.0						42

TOTAL DEMAND KVA (PER PHASE): A: 11.5 B: 10.9 C: 9.1 — DESIGN KVA: 35 — DESIGN AMPS: 96

NOTES:



CT/PET IMAGING SYSTEM DISTRIBUTION DIAGRAM

NO SCALE

PROGRESS ISSUE 11-11-2014

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DEVELOPER / OWNER: CHESAPEAKE MEDICAL IMAGING

ISSUE DATE

ELECTRICAL SPECIFICATIONS AND DETAILS

E200

project no. : 14-080