

**APPENDIX C – DESIGN AND RENOVATION MRI  
PART B  
RFP # HPEI-51**

**1. General**

This Appendix outlines the infrastructure design and renovation requirements required for the installation of the MRI unit located at the Queen Elizabeth Hospital (QEH). The Proponent is responsible for the design, procurement, construction and management of renovations and modifications required for the installation of their proprietary MRI equipment. Responsibilities shall also include, but are not limited to: demolition, detailed design, preparing design drawings (stamped by a Professional Engineer licensed for the Province of PEI), and specifications, provide equipment shop drawings, permitting, logistics, procurement, subcontracting, construction, and construction management supervision.

The proponent is also responsible for the installation, start-up, and commissioning of their proposed MRI equipment.

**2. Site Condition**

Before submitting proposals, proponents are to inspect the building and proposed location and inquire to satisfy themselves as to all relevant building infrastructure information including structural, mechanical and electrical services, at the Mandatory Infrastructure Site Visit. Proponents are responsible for any and all upgrades or revisions required to existing services/structure in order to complete equipment installations.

**3. Insurance**

In addition to the insurance requirements outlined in Service Agreement the successful proponent shall identify intended insurers and shall obtain confirmation from those insurers of the proponent's ability to obtain the follow insurance:

- a) Workers' Compensation Insurance
- b) Builder's Risk Insurance

**4. Design and Renovations Scope**

The design and renovations scope to accommodate the proponent supplied 1.5T MRI for the Queen Elizabeth Hospital is to include:

- a) All materials and labor to plan, design, engineer, renovate and install the new wide bore 1.5T MRI, and all sub-components, in such a manner to ensure it fits and is fully functional within the existing space. This will include all architectural, shielding, structural, electrical systems, mechanical systems, and communications renovations

required for new equipment and layout including any additional items outlined in the RFP.

- b) Obtaining all permits, inspections and approvals required. This will include all electrical and mechanical structural and architectural permits.
- c) Defining requirements, determining existing conditions, and implementing necessary modifications to dependent building systems, e.g. HVAC, power. These systems will need to meet the criteria for proponent equipment specifications and CSA requirements for safe clinical operation of an MRI.
- d) Removal and disposal of existing MRI and all associated equipment, devices and wiring in accordance within all applicable environmental regulations.
- e) The scope may include changes or modification to lighting, HVAC system, receptacles, conduit, fire alarm modifications, communication systems, medical gas, plumbing, fire protection, card swipe, nurse call, door hardware and electrical panels.
- f) System HVAC air balancing and/or re – balancing as required.

## **5. Detailed Design Requirements**

### **5.1. General**

All renovations are to be designed and constructed using current Canadian, and provincial and standards, some of which are identified within this section.

### **5.2. Codes and Regulations**

All work is to be carried out in strict accordance with all provincial OHS procedures and all Fire Safety Act and the following requirements must be met.

All designs are to be prepared by, and documents are to bear the stamp of professionals registered to practice in the province of PEI for work as it applies to Architectural, Mechanical, Electrical, Civil and Structural disciplines.

Designs are to meet or exceed the requirements of current editions of all applicable local and national codes and standards, including but not limited to:

- a) National Building Code of Canada
- b) National Fire Code of Canada
- c) ASHRAE
- d) IES
- e) PEI Building Code Regulations
- f) Barrier Free Design CAN/CSA-B651
- g) Canadian Standards Association (CSA)

During the course of the work, the Proponent is responsible for approvals and consultation with relevant authorities having jurisdiction in the place of work.

### **5.3. Electrical**

The electrical systems will be designed to conform to the latest edition of the Canadian Electrical Code CSA C22.1-09, Z32-09 and the latest edition of:

- a) National Building Code of Canada (NBCC)
- b) National Fire Code (NFC)
- c) National Fire Protection Association (NFPA)
- d) Provincial Fire Commissioner's Regulations
- e) Essential Electrical Systems for Hospitals CAN/CSA-232.4
- f) Installation of Fire Alarm Systems CAN/ULC-S524
- g) Inspection and Testing of Fire Alarms Systems
- h) CAN/ULC-536
- i) Verification of Fire Alarm Systems CAN/ULC-S537
- j) CSA Z3.8.5-95 Commissioning of Electrical Equipment and Systems in Health Care Facilities
- k) CSA Z318.7-95 Commissioning of Communications Systems in Health Care Facilities
- l) CSA Z32 Electrical Safety and Essential Electrical Systems in Healthcare facilities (latest edition)
- m) CSA C282 Emergency Electrical Power Supply for Building

Lighting levels throughout the project must be designed in accordance with the standard on illumination Systems in Health Care Facilities CAN/CSA-Z317.5-98 (R2007).

All electrical equipment must be CSA certified. Where certification is not available, equipment will be factory tested and inspected by CSA prior to delivery.

#### **Conduit and Wire**

Materials:

- a) Above ground conduit in dry, interior areas will be thin wall EMT.
- b) All conduit with circuits 120V or greater will contain green insulated bonding conductors;
- c) Rack supports will be provided where conduits are grouped; and
- d) Wiring will be stranded copper type RW90 for all power wiring 600V and below.

Special Design Requirements:

- a) branch circuit wiring will be sized to meet voltage drop requirements of CSA 732.0-M86; and
- b) two hour fire related mineral insulated cable for feeders to life safety loads.

#### **Distribution Equipment**

Materials:

- a) panelboards will contain bolt-on moulded case breakers;
- b) transformers will be dry type;

- c) motor starters and control centers will be EEMAC standard with NEMA ratings, if required.
- d) Labeling and identification with Lamicold plates to the established current hospital standard.

### **Receptacles**

#### **Materials:**

- a) Hospital grade, Hubbell standard of acceptance

#### **Special Design Requirements:**

- a) Each receptacle will be identified by the brand circuit and panel to the current hospital standard

### **Grounding**

#### **Materials:**

- a) Ground bus connections-compression type.
  - b) Ground conductors – copper.
- Panel boards serving common areas must have ground buses bonded.

## **5.4. Lighting Systems**

Lighting levels throughout the project must be designed in accordance with the standard on illumination Systems in Health Care Facilities CAN/CSA-A317.5.

#### **Materials:**

- a) Lighting design/materials must be compliant with low RFI requirements for MRI suites

## **5.5. Fire Protection Systems**

The fire alarm system must match existing, extended from the existing hospital system. (See Existing Physical Environment Table).

All sprinkler work to be completed in accordance with latest edition of NBC and NFPA 13 Standards.

## **5.6. Telephone/Data System**

All work must be done in accordance with the established requirements of Health PEI. Category 6 copper cabling and outlets must be provided for voice and data.

## **5.7. Security**

The security system must match existing, extended from the existing hospital system. Card access to be an extension of the existing Atlantic Alarm system if required.

## **5.8. Mechanical Design Criteria**

Ventilation and air conditioning to be in accordance with CSA Z317.2-10. (See Existing Physical Environment Table).

Commissioning to be completed to ASHRAE Guideline 1-1996, Guideline for Commissioning of HVAC Systems, HVAC Systems Commissioning Manual prepared by SMACNA, ASHRAE Guidelines 5-1994 (RA2001)

Tab to be performed in accordance with the requirements of Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.

Plumbing work to be carried out to National Plumbing Code of Canada, 1995 and CAN/CSA A317.1-09.

## **5.9. Building Control System**

The existing energy management system (Johnston Meta System) to be extended to automate and monitor operation of any new mechanical systems that may be required.

### **5.10. Medical Gas**

Medical Gas work to be completed in accordance with CAN/CSA-Z396.1-09. Testing of medical gas system to be completed by owner.

### **5.11. Metal Fabrication**

Structural steel to CSA-G40.21 Grade 300W.

Fabricates structural steel in accordance with CSA-S16, S136

## **6. Safety**

All work shall be carried out in strict accordance with safety procedures, Fire Safety Act, Occupational Health and Safety Act and Workers Compensation Act.

## **7. Infection Control**

All work shall be carried out in strict compliance with latest version of CSA Z317.13-13 Infection Control during construction or renovation of Health Care Facilities. Preventive measures Level IV required. This will require Proponent to review construction methodologies and receive Infection Control approvals before work can commence.

## **8. Project Schedule**

Proponent shall provide as part of their proposal a detailed Project Schedule, this should include document submittal dates, milestones and also NSHA required inputs.

## **9. Detailed Design and Document Review**

Proponent is responsible for organizing both preliminary and detailed design review and optimization sessions. Proponent shall also provide design drawings, specifications and shop drawings for review and approval prior to procurement and installation activities commencing.

As a minimum, design will also be subjected to review and approval by Infection Control, clinical staff, and building operations groups to ensure compliance.

## **10. Subcontractors**

Successful proponent is to list consultants, contractors and sub-contractors and their qualifications and references proposed to complete installation. Owner reserves the right to reject any consultant or contractor deemed not to have adequate qualifications.

## **11. Proposal Cost Breakdown**

Proponents are requested to provide the detailed cost breakdown associated with each component of the scope of work, including but not limited to: consultants (design and architectural), demolition, electrical modifications, mechanical modifications, equipment to be purchased, project management, and installation and commissioning efforts.

## **12. Project Close Out**

Upon completion of renovations and equipment installation, proponents are to supply complete as-built drawings (A Cad format), maintenance manuals (PDF format) including shop drawings, balancing reports (if applicable) warranty information and any equipment information requested within RFP.

Building Systems	Existing Physical Environment
HVAC	<p>MRI Suite * currently fed from Air Handling Unit AHU-21, which feed the MRI suite plus the MRI department. Designed to CSA Z317.2 Standard with a minimum total air change /hour of 9, and minimum total outside air change/hr of 3. Space temperature maintained between 20 – 24 deg. C and 30 – 60% relative humidity. Total supply air into space equaling 624 litres/sec (1,322 cfm). Total return air equaling 479 L/s (1014 cfm). Exhaust from space equaling 33 L/s (70 cfm).</p> <p>Space consist of four(4) separate heating/cooling zones these being; MRI Rm. 211; MRI Control Rm. 212; Patient Prep. Rm. 210 and Review Rm. 206.</p> <p>25 mm (1”) heating water supply (HWS) and 25 mm (1”) heating water return (HWR) exist in the ceiling space to provide heating water supply and return water to both perimeter radiation and ventilation re-heat coils. Re-heat coil loop is separate from the baseboard heating loop.</p> <p>A separate split A/C Unit is used to cool the Back Equipment Room. Unit sized for equipment loads.</p> <p>All controls are tied into exiting Johnston Control “MetaSys” system for space condition control.</p>
Plumbing	<p>Domestic cold water size = 38 mm (1 ½ inch)  Domestic hot water size = 25 mm (1 inch)  Sanitary = 100 mm (4 inch) U/G, a 50 mm (2”) is stub up in wall in Equipment Room. 205.</p>
Medical Gas	<p>25 mm (1 “) Vacuum; 13mm (1/2”) Med. Air; 13mm (1/2”) Oxygen and 13 mm (1/2”) Nitrous Oxide fed a Local Area Alarm Panel located in Patient Prep Rm. 210. Oxygen, vacuum and medical air outlets exist in MRI Rm 211; Patient Prep. Rm. 210. Nitrous Oxide outlet also exist in MRI Rm. 211.</p>
Fire Protection	<p>50 mm (2”) wet pipe system exist in the ceiling space. A 50 mm (2”) Double Pre-Action System exist for the MRI Rm. 211. A recessed Fire extinguisher cabinet exit in the Patient Prep. Rm 210.</p>
Card Swipe	<p>A single card swipe is used on the main door from waiting area to Patient Prep. Rm. 210. Current Card swipe system is with Atlantic Alarm and Sound.</p>
Nurse Call	<p>Nurse Call in both Patient Prep. Bays (Rm. 210) and in washroom (Rm. 207). Washroom has NC Interface station and Emergency Pull station. Patient Prep. Bays have NC Patient Station and an Emergency Station.</p>
Electrical	<p>Lighting is 347 volts throughout.  A single electrical distribution Panel Exist in the Equipment Rm. 205. MRI supply 480 V from XRay Penthouse switchboard XRLV4 thru 380/480 step up transformer. Current breaker size is 150 amps. Switchboard and breaker is currently being upgraded.</p>