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ARCHITECTURAL DESIGN

A. Applicable Codes
3) FGI Guidelines – 2014
8) NFPA 13, Automatic Sprinkler Systems, 2015
9) NFPA 70 National Electrical Code – 2014
10) NFPA 72 National Fire Alarm and Signaling Code – 2013
12) EXISTING BUILDING CONSTRUCTION DATA
   b. Mixed Occupancy Group B, Ambulatory Health Care Facilities
   c. 5 Stories, Not a Highrise Bldg.
   d. NFPA 220 Construction Type (Existing): Type II (222) (Self Protecting Structure
      Reinforcement Concrete)
   e. Fire Protection Requirements: Type II (222) Fully Sprinklered
   g. FBC Construction Type 1-B

Projects submitted for permitting after 31 December 2020 will be required to comply with the 7th Edition of the FBC and referenced material.

B. Project Scope
1) Provide signed and sealed construction documents and design calculations to provide a Net New MRI Equipment Room on the first floor of Moffitt’s MCC Building. The Net New MRI Room will replace the following existing spaces: 1202 Conference, 1204 Rad. Onc. Admin., 1204A Office, 1204B Office. The proposed equipment being installed is the Siemens Magnetom SOLA. Documentation of as-built conditions is required as the existing drawings are not dimensionally accurate to as-built conditions. Discrepancies range from 1” to 7”.
2) Project Functional Limit: Approximately 780 SF
3) Project will be submitted/reviewed by AHCA.
4) Project will be permitted with USF.
5) The A/E/I design shall be in accordance with Moffitt Cancer Center Design Guidelines and Standards.
6) The New MRI Equipment will be moved into the space down the path highlighted on the floor plan below. The existing structure below the new MRI space as well as the path for the rigging has been analyzed by structural engineer and has been deemed sufficient to support loads from new equipment. Refer to Structural portion of this report.

7) The following scope on the exterior of building will be required to install new equipment:
   a. Relocation of an existing Chiller serving adjacent MRI 1200.
   b. Addition of a new concrete pad in existing green space outside of new MRI for Chiller Equipment serving new MRI.
   c. The closest access point to the site is a parking area SE of the new MRI space. Concrete retaining walls and ramp down to basement entry is between parking lot and grassing yard where the New MRI Chiller would be located. A crane or similar means may be required to place new chiller on-site.
Above: View of grassy area outside of New MRI from opposite direction. Concrete retaining walls and ramp down to basement entry is between parking lot and grassing yard where the New MRI Chiller would be located.

8) Interior Scope
   a. Demolish existing wall between 1202 Conference & 1200A MRI Ctrl Rm and existing wall between 1202 Conference & 1204A Office & 1204 Rad.Onc. Admin. 1200A MRI Ctrl Rm will be enlarged to provide space for Net New MRI controls.
   b. Provide RF/Shielding (and associated framing) as required by manufacturer and physicist. Maintain existing smoke barrier along corridor.
c. All wall and ceiling framing/ceiling systems to be non-ferrous.
d. Remove and replace existing ceiling grid and tiles with square lay-in tiles and 15/16" grid per Moffitt Design Guidelines and Standards.
   i. Create lighting/ceiling design similar to other Moffitt MRI Rooms.
   ii. Additional ceilings outside of space may need to be removed/replaced for supporting utilities. This work will need to be coordinated with ICRA plans.
e. Replace Flooring and Base in space.
f. Provide new RF Shielded doors and frames as required by Manufacturer and Applicable codes. Provide provisions for access control as well as ferromagnetic detections/warning system.
g. Room to be painted per Moffitt Cancer Center Design Guidelines and Standards.
h. New Wall Protection per Moffitt Cancer Center Design Guidelines and Standards.
i. Existing Millwork/Furniture Systems in space will need to be removed. Provide new millwork as required by equipment manufacturer and users.
j. Provide new handwashing station directly accessible to MRI Scanner Room.

C. Construction Phasing
1) Project will be executed in one phase.
2) ICRA plans shall be provided for the 1st Floor and Ground Level below.
   a. On the Ground Level, there will be work above the ceiling in Pathology B040, Specimen B040E, Specimen B040F. These spaces have hard ceilings and will require the demolition and reinstallation of ceilings in these spaces.
      i. Additional ceilings outside of these spaces may need to be removed/replaced for supporting utilities. This work will need to be coordinated with ICRA plans.

STRUCTURAL ANALYSIS
A. Design Criteria, Codes/References and Materials
1) Design Criteria
   a. MRI – Siemens Magnetom SOLA- Planning Guide Sheets 1-10 dated 07.18
   b. Floor Live Load – 80 PSF

2) Codes and References
   b. ACI 318 – 14

3) Materials:
   a. Concrete 4,000 PSI Normal weight
   b. Reinforcing: ASTM A615 Grade 60
B. Analysis of Existing Structure
Analysis of the existing structure is based on the original building structural as-built drawings by Bentler & Heery dated 9/1/86.

The existing structure consists of a cast-in-place concrete pan joist system. Slab thickness is 4 ¾” supported by 6” wide by 18 ¾” total depth joists (14” deep rib + 4 ¾” slab) spaced at 3’-0” on center. Joists are supported by 18 ¾” cast in place concrete band beams typically centered on column lines. Column bays are typically 28’-0” by 28’-0”. All concrete is reinforced with mild reinforcing.

The existing structure was analyzed for the new MRI placed on the First Level between Grids 11-13 and B-C.

Proposed Location of MRI

The structure was analyzed utilizing commercial structural engineering software with a loading of the MRI magnet, which weighs 8,779 pounds, combined with a code prescribed live load of 80 PSF, a superimposed dead load of 16 PSF to account for finishes and miscellaneous MEP equipment, and the self-weight of the structure.

Structural analysis results indicate the existing structure has adequate capacity to support the new MRI in its proposed location. No structural strengthening of the existing structure is required to support the new MRI.

The existing structure along the travel path for installing the new MRI equipment was verified to have adequate structural strength to support the installation of the new equipment.
Proposed Installation Travel Path

The MRI vendor recommends that the mass of the floor should be 123 PSF to achieve good vibration and structure-borne noise sound isolation. The existing floor structure has an equivalent mass of 100 psf. We do not anticipate vibration to be problematic based on our previous experience. However, we recommend that a vibration analysis be conducted during the design phase of the project to assure the vibration environment is adequate to produce quality image performance.

MECHANICAL DESIGN – HVAC & PLUMBING

A. Review of Existing Mechanical Conditions
A. As-built mechanical drawings were not available for the proposed locations of the new MRI. A nondestructive visual site investigation was conducted 07/30/2020 to evaluate the existing mechanical system conditions in the proposed locations of the new MRI. The proposed location of the net new MRI is currently occupied by office spaces, admin workstations, and conference room. The spaces are served from an existing air handler AHU-MCC-GRD-06 located in the basement mechanical room. The system is a constant volume system with reheat coils serving different zones. There is one reheat coil serving the admin workstations, another serving 1204A office, 1204B office, and 1204C office, and lastly another reheat coil serving 1202 Conference room. The return ductwork is not insulated. There were chilled water lines in the shaft located in 1204D office space coming from the ground level and offsetting going to the floor above on second level. There is an existing MRI space adjacent to the proposed MRI location. The chiller
for the existing MRI is located parallel to the exterior wall of the proposed MRI space as referenced in Architecture, “B. Project Scope.”

**B. Mechanical Code Requirements**

1) ASHRAE Standard 170-2017 Table 6.4 requires MERV 7 filtration in filter bank 1 and MERV 14 filtration in filter bank 2.

2) ASHRAE Standard 170-2017 Table 7.1 under X-ray (diagnostic and treatment) requires 6 AC/hr minimum total, 2 AC/hr minimum for outside air, 72-78 Degrees Fahrenheit room design temperature, and max 60% RH.

3) FGI, 2014 Section 2.1-8.2.3.1 Provide return or exhaust air inlets shall be near the floor level when anesthesia scavenging systems are required.

**C. Review of Siemens Mechanical Environmental Requirements**

1. Siemens requires 70F +- 5F and 40-60% RH in the exam room, 70F +- 10F and 40-80% in the equipment and control areas. Also, 6 AC/hr for the exam room and recommends fresh air system with 30-50% fresh air intake.

**D. Mechanical System Analysis**

1. As-built condition drawings were not available for the proposed location of the net new MRI. The existing system is not adequately sized to meet the requirements of the net new MRI spaces. Any use of existing system will be required detailed investigation of as-built conditions and AHU capacity. Reference manufacturers cutsheet for approximate loads required. The existing return air ductwork is not insulated. There is currently no low return chase in the proposed location. Low return is a requirement for any anesthesia gases such nitrous oxide that will be present in the room. Coordinate with the vendor and RF shield consultant regarding the MRI machine gradient and proximity of electromagnetic components (motors, compressors, etc.) as the existing chiller may need to be relocated if in the same gradient at the proposed new MRI. There is no exhaust in the vicinity to exhaust 30-50% of space to meet Siemens fresh air intake recommendation.

**E. Plumbing Systems Description**

1. The proposed location of the net new MRI is currently occupied by office spaces, admin workstations, and conference room. There is an existing MRI adjacent to this space, with a sink located in the control room. There aren’t any existing as-built condition drawings for the proposed location of the new MRI. There are 1-1/2” hot water and domestic cold-water lines in the corridor adjacent to the proposed space. The new space will require stainless steel ADA compliant sink with ½” CW/HW and 2” waste connection with a 1-½” minimum and vent is to be tied into existing services above and below ceilings. Coordinate with pathology on ground level to connect to waste lines above ceiling and provide ICRA while this work is being done.

2. There is ¾” Vacuum, ½” Oxygen and ½” air currently serving Zone valve box ZV-1-10 serving the existing MRI space adjacent to the space. There did not appear to be any nitrous oxide in the vicinity of the proposed space. New MRI room requires ¾” WAGD, ½” Nitrous Oxide, ¾” Medical
Vacuum, ½” Medical Air and ½” Oxygen connections and a new zone valve box and medical alarms are to be added to the existing area alarm panel or provide a new one if there are not enough points in the AAP.

Fire Protection Systems Description

A. Fire Sprinkler System
1. The existing spaces have a fully sprinkled system with pendant heads. Replace existing sprinkler heads as necessary where ceilings are replaced and match finish and confirm they are Quick Response type and 155 Deg. Fahrenheit per Moffitt Design guidelines.

B. Fire Alarm System
1) The proposed location of the new MRI is protected by an existing EST fire alarm voice evacuation panel located in Electrical Room G126.

ELECTRICAL DESIGN

A. Power Distribution
1) Project will be submitted/reviewed by AHCA and the new proposed MRI is considered a General Care/Treatment Room per FGI Guidelines.

2) There are no distribution panels located within this area on the 1st floor. Distribution panels are located on the ground level below.

3) This proposed location of the net new MRI space is currently occupied by the following rooms: 1202 Conference, 1204 Rad. Onc. Admin., 1204A Office, 1204B Office.

4) Receptacles are located within these spaces and are circuited to normal branch panel L2J. These receptacles will be removed including associated conductors and conduit back to source. If these receptacles have dedicated circuits, make existing circuit breaker a spare in its respective panel. Additional investigation is required to determine if existing circuits are still being utilized for receptacles located outside the scope of work, remove back to nearest junction box to remain. There are no critical branch receptacles located within these spaces.

5) Per the FGI Guidelines, a minimum of five (5) duplex receptacles are required for the new MRI room. At a minimum, one (1) duplex receptacle is required to be connected to a critical branch panelboard. One (1) duplex receptacle is required to be connected to a normal branch panelboard. The remaining three (3) receptacles may be either be on normal or the critical branch. Five (5) duplex receptacles will be required in the control room, three (3) duplexes will be on the critical branch. The remaining two (2) duplex receptacles will be on the normal branch.
6) Existing 120/208V, 3 phase, 4 wire, critical branch panelboard LC2 located in Electrical Room 1069A does not have any spares or spaces available to serve new critical branch receptacles. Additional investigation is required to find a suitable 120/208V, 3 phase, 4 wire critical branch panelboard with available spares or spaces that serves this area. A new critical branch panelboard may be required in order to serve the MRI and control room. This new panel will help support other future imaging rooms within this area. Further investigation is required to determine whether this panelboard will be located within the area or if a new electrical closet is required.

7) Existing 120/208V 3 phase, 4 wire, normal branch panelboard L2J located in Electrical Room 1069A does have three (3) spaces available to serve new normal branch receptacles. If it is determined that this quantity is not sufficient to serve new receptacles for the new MRI, associated control room, and equipment room, then a new sub panel will need to be provided and fed from these three (3) spaces with a new 3 pole circuit breaker sized as necessary. Further investigation is required to determine whether this panelboard will be located within the area or if a new electrical closet is required.

8) Per the functionality program of this MRI, it will most likely treat patients that may be under anesthesia. Therefore, the new MRI will be required to be powered from the critical branch service. The closest critical distribution panel with spare capacity is located on the ground floor in Electrical room G125 located directly below the location of the new MRI space. This critical distribution panelboard CHDPG1 is a 480/277V, 3 phase, 4 wire, Square D I-Line HCP panelboard and nameplate indicates a 600A rating. This panelboard has many available spaces. However additional site investigation is required on this panelboard, it is fed from a 800A plug-on lug located within the panel. This may be a code violation.

9) A coordination study will be required on all affected panels serving the new MRI.

10) A thirty-day load study will be required on all affected panels serving the new MRI.

11) All new backboxes located in the MRI room will be required to be non-ferrous type.

12) Receptacles located within 6'-0” of any new sinks will be required to be GFCI type.

13) The existing AHU-MCC-GRD-06 is fed from normal branch distribution panel NHDP1 located in the mechanical room in the basement. Further investigation is required to determine if the AHU needs to be recircuited to the equipment branch due to the new MRI room being considered a General Care/Treatment Room per FGI guidelines.

14) The new chiller dedicated to the new MRI will be circuited to the equipment branch distribution panelboard HA located in Electrical Room G126A on the ground floor below. Existing panel HA is a 600A 480/277V, 3 phase, 4 wire, Square D I-Line HCWM type panelboard. This circuit will need to be routed up to the 1st Floor then routed underground to the expanded chiller yard located
on the exterior of the building. A lightning protection assessment will need to be performed to determine if this chiller yard will be required to have lightning protection.

**B. Lighting**
1) Existing light fixtures and associated controls in following rooms shall be removed: 1202 Conference, 1204 Rad. Onc. Admin., 1204A Office, 1204B Office.
2) Existing light fixtures are circuited to a 277V normal branch circuit H1F-17. This circuit may be retained for reuse in the renovation phase.
3) New dimmable LED Lighting will be used for the new MRI and new control room. Light fixtures in the MRI imaging room will be low voltage and pass through RF Filters. A portion of the new light fixtures in the MRI room will be connected to the 277V normal branch circuit retained from the demolition of existing light fixtures. A new 277V critical branch circuit will be required to serve the other new light fixtures in the MRI Imaging room and associated control room. The associated equipment room will have LED strip lighting and will be controlled using a single pole toggle switch circuit to the 277V critical branch. Additional investigation is required to determine the 277V critical branch circuit.
4) Additional investigation is required to determine if the new MRI room will require light fixtures connected to an emergency battery inverter system as a secondary emergency life safety option. This equipment will be located in the MRI equipment room.

**C. Grounding**
1) All panelboards that serve the new MRI shall be bonded together with #10 AWG conductor located in a ½” conduit.

**COMMUNICATION DESIGN**

**A. Telecommunications Infrastructure System (TIS)**
1) New telecommunication devices are required to support new equipment within the MRI imaging and control room.
2) All new backboxes located in the MRI room will be required to be non-ferrous type.
3) Utilize existing cable tray located in corridors for new data/voice cables and homerun to nearest telecommunications room.

**B. Nurse Call System**
1) New Nurse Call devices will be required to support the new MRI Imaging and Control Room. These devices will tie into the existing Rauland Borg Responder 5 Nurse Call System.