Brattleboro Memorial Hospital
EXCEPTIONAL CARE FOR OUR COMMUNITY

Mr. Steven R. Gordon
President and CEO
Brattleboro Memorial Hospital
17 Belmont Avenue
Brattleboro, VT 05301

July 5, 2017

Donna Jerry
Green Mountain Care Board
89 Main Street
Montpelier, VT 05620

RE: Docket No. GMCB-001-16con. Response 5.

Dear Ms. Jerry: /Donna

Please find attached our responses to the questions presented in your letter from June 13, 2017. The responses are from our mechanical/electrical engineers Fitzemeyer & Tocci Associates. We look forward to continuing to work with the Green Mountain Care Board on this important project.

Sincerely,

Steven R. Gordon
President and CEO

cc. Office of the Health Care Advocate

17 Belmont Ave., Brattleboro, VT 05301 *Tel:* 802-257-0341 *Fax:* 802-257-8822 www.brattleborohospital.org

FITZEMEYER & TOCCI ASSOCIATES, INC.

Memo

300 UNICORN PARK DRIVE, 5TH FLOOR
WOBURN, MA 01801
(P) 781.481.0210 (F) 781.481.0203 (W) www.f-t.com

Date:	June 26, 2017
To:	Rob Prohaska, Brattleboro Memorial Hospital
From:	Jason Butler, Fitzemeyer & Tocci
Re:	BMH – Surgical Expansion Project CON Review Response
F&T Project #:	150030.01

The following is Fitzemeyer & Tocci's response to the Green Mountain Care Board information request dated June 13, 2017 regarding the CON application for the above-mentioned project.

HVAC

Schematic Design Narrative

1. **Chiller: Provide support for the recommendation of air cooled chillers given their high operational cost. Explain whether there is a plan to utilize water side economizers with the air-cooled chiller.**

   Response: Air-cooled chillers are recommended based on multiple factors. The efficiency of a water-cooled system is offset by its increased capital cost, water usage, complexity and maintenance requirements, so the operational cost favors air-cooled at this capacity. More importantly, for the surgical suite application, the chilled water needs to be available at all times to maintain temperature and humidity levels, and an air-cooled system is more suited to periodic winter operation than a water-cooled system.

2. **FGI Guidelines: Clarify which version of the FGI Guidelines will be followed. Summary indicates both 2010 and 2014 versions.**

   Response: The 2014 FGI Guidelines will be followed.

3. **Dehumidification Strategy: Describe how given OR conditions will be accomplished during high humidity summer operation. With straight chilled water cooling it may be difficult to attain surgical suite conditions.**

   Response: A split DX, low-suction temperature secondary cooling coil will be installed downstream of the chilled water coil to assist in dehumidification. The coil will be designed for low dewpoint discharge air in conjunction with the operating suite environmental requirements. The coil also provides emergency backup cooling.

4. **Safety Factors: Explain how spikes in temperature and RH above the given design criteria will be accounted for in system design to ensure OR area conditions do not creep outside the given criteria.**

   Response: All cooling equipment will be sized with a 15% safety factor. There will be additional capacity built in with the redundant cooling / dehumidification coils in the OR air handler.

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5. **Describe the strategy to avoid re-entrainment of building exhaust through the AHUs.**

   Response: All building exhaust discharge will be located a minimum of 25'-0" from the nearest air intake, including those on the air handlers.

6. **Describe water source/water treatment for humidification system.**

   Response: The humidification make-up water will be provided via a new reverse-osmosis water generator with supply and return loop.

Electrical

Schematic Design Narrative

1. **Normal power electrical service is specified for 600 amps, 208Y/120 volt. Clarify what equipment this branch will serve.**

   Response: The existing building is currently provided with a 208/120 V, 3 Phase, 4 wire electrical service. The 600A, 208/120 V, 3 Phase, 4 Wire electrical service outlined in the narrative shall provide normal power to the addition / renovation space during normal operating conditions. This includes providing normal power to the second elevator (reference item 13 below), non-critical equipment not listed below, non-critical branch circuits, etc.

2. **It is unclear what equipment will be powered from each electrical power branch. Provide clarification.**

   Response: In general, the essential power systems shall serve equipment as follows:
   a. Life safety Branch:
      i. Life safety lighting
      ii. Fire Alarm equipment (FACP, dampers, etc.)
   b. Critical Branch:
      i. Lights within the OR's and other critical care patient areas.
      ii. Task lighting within OR's.
      iii. Receptacles within the OR's.
      iv. Booms in the OR's.
      v. Nurse Station receptacles.
   c. Equipment Branch:
      i. HVAC equipment for supply / return air serving the OR's, Sub Sterile Rooms, Clean Core, Clean Corridor, and the CSR.

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ii. Cooling for OR's.
iii. OR / CSR Elevator.

3. **Confirm that motors ½ hp or greater fed with 3-phase power shall be provided with a dedicated disconnect switch at unit.**

   Response: Confirmed, all 3 phase motors and motors ½ HP and above shall be provided with disconnects at units.

4. **Confirm that motors less than ½ hp fed with single phase power shall be provided with a dedicated motor toggle switch with thermal overloads at unit.**

   Response: Confirmed, all single phase and motors less than ½ HP shall be provided with manual motor starters (toggle switches with thermal loads) at units.

5. **Clarify whether there will be day-light harvesting sensors & dimmable fixtures in general public areas.**

   Response: Daylight harvesting and dimming of general public shall be provided throughout the renovation space where appropriate. Dimming will provided in most areas, and LED light sources will be used for all space lighting.

6. **Identify the power branch that the lighting systems be powered from.**

   Response: Emergency egress lighting shall be fed from the life safety power branch, lighting within critical care areas shall be fed from the critical branch, and other, non-critical lighting shall be fed from the normal power branch.

7. **Clarify requirements for isolated ground receptacles for computer (PC) loads.**

   Response: The electrical system will be provided with dedicated grounds for all branch circuits, however, isolated ground receptacles are not intended to be used PC loads; no equipment requiring isolated grounds is planned.

8. **Article 517.41(e), of the "National Electric Code", (NEC) requires receptacle to have a distinct color and/or illuminated outlets. Clarify where these receptacles are going to be located and the methods.**

   Response: All receptacles (and coverplates) fed from emergency circuits (critical branch) shall be red and include indicator LED to confirm power is available at the receptacle. Receptacles within the following areas shall be on emergency circuits: OR's, nurse stations, bed locations, and other critical care areas; in accordance with all requirements of NEC 517, NFPA 99, and FGI Guidelines.

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9. **Narrative indicated fire alarm system duct smoke detectors to be installed for any unit 2000cfm or above. Upon activation, explain whether these devices will be set to the system into alarm or trouble mode.**

   Response: The activation of a duct smoke detector for HVAC units larger than 2000 cfm shall initiate a trouble alarm within the fire alarm system.

10. **There is no mention of an Uninterruptable Power Supply (UPS) system. Verify and describe this system.**

    Response: A central UPS system is not intended. All critical care medical equipment is intended to have integral batteries where backup power for said equipment is required.

11. **There is no mention of a CATV system. Verify and describe this system.**

    Response: CATV shall be provided within the addition, however, the CATV system shall be an extension of the buildings existing CATV system. Requirements for the CATV system are minimal and shall only include waiting areas.

12. **There is no mention of temporary light and power. Verify and describe this system.**

    Response: Temporary lighting and power shall be provided by the electrical contractor. The temporary electrical service shall be sized as required for construction at 208/120Volt, 3-Phase, 4-Wire with adequate poles and circuit breakers to support the needs of all contractors and subcontractors. The temporary power shall be provided from the existing facility distribution system.

13. **Describe the scope of work to provide both normal and emergency power to the elevator(s) if any.**

    Response: The elevator bank for the general circulation area shall be provided with normal branch power and the elevator bank serving the OR's and CSR shall be powered from the essential power system (equipment branch).

14. **Clarify the use of color coded fire alarm MC type cable**.

    Response: MC cable used for fire alarm wiring (if permitted by the local AHJ) shall be red type armored cable specifically listed for fire alarm use.

15. **Clarify the use of different colors & markings to provide clear indication between normal/ emergency/critical receptacles, wiring, conduit and junction boxes.**

    Response: The essential electrical systems shall have district labeling and color coding for each branch.

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16. **Clarify the color coding of the fire alarm wiring system**

    Response: All fire alarm devices shall be red with white lettering and all junction boxes serving fire alarm branch circuits shall be painted red. Fire alarm MC shall be as noted above.

17. **Clarify the use of stainless steel cover plates in procedure rooms.**

    Response: Stainless steel cover plates shall be used in all procedure rooms including the OR's and CSR.

18. **Clarify the labeling of all receptacles, switches, electrical switchgear, etc**.

    Response: All receptacle and light switch cover plates shall be labeled with branch circuit information (panelboard and circuit number). Labels shall be heavy duty, extra strength adhesive, polyester laminated black on clear labels. Additionally, emergency circuits shall be listed with the branch circuits serving them (i.e. life safety, critical, equipment). Panelboards, switchboards, and dry type transformers shall include factory engraved laminated-plastic or metal nameplates mounted with corrosion-resistant screws.

Fire Protection

Schematic Design Narrative

1. **Provide for review current hydrant flow test data to base hydraulic calculations on.**

   Response: The flow test must be less than a year old when the sprinkler contractor does the system hydraulic calculations. This test will be done during the initial construction document design phase.

2. **Quick response concealed type sprinklers are not approved by Factory Mutual. Comment on the option of specifying standard response concealed type sprinklers or quick response chrome plated recessed pendant sprinklers.**

   Response: Quick-response will be used to the extent practical. In cases where concealed is required, standard-response may be used. Under no circumstances will quick- and standard-response heads be installed together in the same space.

3. **Include seismic bracing requirements for entire standpipe/sprinkler system.**

   Response: The combination sprinkler / standpipe system will be seismically braced as required by size and location. These criteria will be specified and detailed in the construction documents. The installation will be reviewed as part of the fire protection engineering construction control process.

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4. **Include requirement for a "Fire-Watch" condition with local fire department when existing system is to be shut-down.**

   Response: A fire-watch will be specified to be required during any shut-down or other impairment of the existing sprinkler system before, during and after construction.

Plumbing

Schematic Design Narrative

Sanitary Drain & Venting Systems

1. **Provide listing and applicable year for Plumbing Code.**

   Response: The design will comply with the 2015 ICC International Plumbing Code, with current Vermont amendments (at time of construction document preparation).

Storm Drainage System

1. **Provide listing and applicable year for Plumbing Code**

   Response: The design will comply with the 2015 ICC International Plumbing Code, with Vermont amendments.

2. **Verify that an emergency overflow system is not required.**

   Response: The emergency overflow system requirement will be determined during the design development phase. The two options are an emergency overflow piping system which would discharge to grade and a roof parapet scupper system. The determination will be based on cost and the architectural construction of the building.

Medical Gas Systems

1. **Verify existing medical gas systems are sized to handle additional capacity.**

   Response: Medical air, Oxygen and Medical Vacuum systems are intended to be extended from existing systems. These systems' capacities will be verified during the design development phase and altered or expanded as required. The systems will be designed in compliance with NFPA 99.

2. **Verify that all valve box locations have a wall between the valve box and any oxygen outlets.**

   Response: Oxygen distribution will be designed with valve boxes separated from outlets by a wall.

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3. **Clarify requirements for vacuum relief line up through roof.**

   Response: Vacuum relief requirements will be determined during the design development phase, pending the final capacity of the system required. The system will be designed in compliance with NFPA 99. The relief termination will be located a minimum of 25'-0" from the nearest air intake, above the roof and above the snow line.

4. **Clarify requirements for pressure relief lines from medical gas manifolds up through roof.**

   Response: Manifold pressure relief requirements will be determined during the design development phase, pending the final capacity of the system required.

5. **Verify that after systems have been installed, a third-party testing company will test all systems to verify compliance with NFPA 99.**

   Response: Third-party compliance testing to NFPA 99 will be specified in the construction documents.

Plumbing Fixtures

1. **Confirm use of microbial handles for bacterial protection where applicable**

   Response: Anti-microbial handles, where applicable, will be specified in the construction documents.

2. **Confirm all plumbing fixtures comply with current "NO LEAD" criteria.**

   Response: All plumbing fixtures will be specified lead-free in compliance with current Vermont codes and guidelines.

3. **Confirm bariatric plumbing fixtures are not required.**

   Response: Bariatric services are not included in the current program.

4. **Verify all fixtures to be hospital grade.**

   Response: All plumbing fixtures will be specified for hospital use as appropriate, per the 2014 FGI Guidelines.

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Domestic Cold Water, Hot Water and Hot Water Return Systems

1. **Verify that domestic hot water is stored at 140 deg. F to prevent Legionella bacteria from developing.**

   Response: Domestic water heating is via an existing steam on-demand system. No hot water is stored for domestic use. Water is heated to 140°F prior to being mixed down to 120°F for use.

2. **Verify systems will be coordinated with local health department and meet health department criteria.**

   Response: All domestic water systems will be designed in compliance with local health department criteria.

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