

Addendum #3

To: Construction Documents dated April 10th, 2026

Project IN203 IU School of Medicine
Medical Education and Research Building
Lower Level Build-Out
IU 20250027 (BD #25011)
Indiana University – Indianapolis

Date: Friday, May 29th, 2026

This Addendum, issued prior to bidding, alters, amends, corrects, or clarifies the Proposal Documents to the extent stated herein and does thereby become a part of the Proposal Documents and will become part of the Contract Documents of the successful bidder(s).

ITEMS INCLUDED IN THIS ADDENDUM

1. Changes to the Project Manual
2. Changes to the Drawings
3. Response to Questions

PROJECT MANUAL

- A. 08 34 00 – SPECIAL FUNCTION DOORS
 1. Special-Lite’s SpecSlide Door System is an approved equal.
- B. 09 51 13 – ACOUSTICAL PANEL CEILINGS
 1. Removed room numbers from 2.7, D, 5.
- C. 11 53 13 – LABORATORY FUME HOODS
 1. Added ‘Hamilton Laboratory Solutions’ as an acceptable manufacturer.
- D. 12 35 53 – METAL LABORATORY CASEWORK
 1. Added ‘Hamilton Laboratory Solutions; Endeavor System’ as an acceptable manufacturer / product.
- E. 13 03 00 – CONTROLLED TEMPERATURE ROOMS
 1. Added ‘Control International, Inc.’ as an acceptable manufacturer.
- F. 22 67 20 – PURE WATER EQUIPMENT
 1. Paragraph 2.1, A; add the following:
 - a. “4. Water Control Corporation.”.
- G. 23 73 13 – INDOOR AIR HANDLING UNITS
 1. Clarifications:
 - a. The unit is schedule to ship on July 10, 2026. Contractor shall coordinate delivery and receiving with owner and Haakon. Contractor is responsible for receiving, rigging and installation.
 - b. Contractor may use a different path to get the unit into the space other than the existing area way in the mechanical room, but shall confirm the unit sections fit along the other paths. Shipping splits are shown on sheet M50-03.

DRAWINGS

‘G’ SERIES DRAWINGS

- A. G00-00 – COVER SHEET & SHEET INDEX
 1. Sheet Index – Added issuance column for Addendum No. 03.

‘A’ SERIES DRAWINGS

- B. A11-00 – ENLARGED FLOOR PLANS - BASEMENT
 1. DRAWING 1 – Added wall tags to south walls of room numbers 0025 and 0025A.
- C. A61-01 – PARTITION TYPE CHARTS

1. INTERIOR PARTITION CHARTS GENERAL NOTES – Revised note number 9.

'E' SERIES DRAWINGS

- A. E11-00B – ELECTRICAL POWER PLAN – BASEMENT – MED-ED – AREA B
1. Added additional dedicated circuits for HVAC controls panel in mechanical room.
 2. Revised note #2 to extend existing SIEMENS control system to new LARC suite. Revised lighting controls sequence of operations for LARC animal holding and procedure rooms.
- B. E70-02 – ELECTRICAL PANEL SCHEDULES
1. Added new 20A-1P breakers in panel BOSL2-S to serve additional dedicated circuits for HVAC controls panels in mechanical room.

RESPONSE TO QUESTIONS

Q 1. Reference drawings A11-00 and A61-50. A11-00 - Rooms 0021, 0025A, and 0025 show an orange dashed line. What does this line indicate? Drawing A61-50 includes a color-coded schematic showing the location of the lead line drywall by thickness. This schematic showing the locations of the lead does not match the orange hatched lines on Drawing A11-00. Please confirm that drawing A61-50 governs for lead lined drywall locations.

A. The orange dashed line is indicative of walls to receive Acrovyn wall protection (refer to A13-00 finish plan for wall protection types). The orange dashed line on sheet A11-00 is not indicative of lead shielding requirements. Refer to partition type tags on sheet A11-00 and lead shielding narrative on sheet A61-50 for lead lined shielding requirements.

Q 2. Drawing A61-50 - Confirm that the colored lines indicated on lead location schematic applies to one side of the partition only. For example, the partition separating rooms 0021 and 0025A is to receive 1/32" lead lined drywall on one side (to match the thickness on wall continuing to the south per general note 9 on A11-00) and standard type "X" drywall on the other side.

A. The above statement is accurate. The lead lined drywall shall be placed on the side of the wall that contains the radiation equipment.

Q 3. A61-01 – General Note 9 – This note indicates that lead lined drywall is scheduled for room 0023. No lead lined drywall is indicated via the orange hatched line or the color-coded schematic on drawing A61-50. Please confirm that no lead lined drywall is required in room 0023.

A. This was a typographical error and has been corrected as part of the drawing updates in Addendum No. 03. General Note 9 – should have listed room numbers 0021 and 0025A as opposed to room numbers 0021 and 0023.

Q 4. A61-01 – General Note 9 – The last sentence states that if one wall in a room is scheduled with 1/32" lead, all walls within the room are to receive 1/32" lead. The schematic on drawing A61-50 shows some walls within rooms 0021 and 0025A to receive 1/32" lead lined drywall and others to receive standard drywall with no lead. Please confirm that all walls within rooms 0021 and 0025A are to receive 1/32" lead.

A. Confirmed, all walls in room numbers 0021 and 0025A are to receive 1/32" lead shielding.

Q 5. Draw A44-00 – In the Equipment Plan Legend, does the red dashed outline have anything to do with us because we are installing items provided by owner?

A. We assume the legend on page A17-00 is what is being referred to. The red dashed outline indicates contractor furnished, contractor installed (GRCI) on emergency power and the red dashed outline with cyan infill indicates owner furnished, owner installed (OFI) on emergency power. Power should be provided by the contractor for both. Also, see page A68-00 for more specific equipment information.

Q 6. Regarding resinous spec 09 67 23-4, the system description is noted as a 4 mil primer with a 20 mil topcoat. However, under section 3.3 Installation, part C notes installation of a waterproof membrane over the entire substrate. This is a positive side membrane and typically not needed in a lower level. Is this a required part of the overall system?

A. The substrate needs to be prepared per resinous flooring manufacturer's requirements and in order to maintain the warranty requirements.

Q 7. Are the specs for the owner provided AHU on the drawings?

A. The AHU specs are in the spec book, not on the drawings.

Q 8. Are the lower level build-out bidders installing the AHU or is it delivered and installed by another contractor?

A. See the bid documents. Bidders will receive and install AHU.

Q 9. When does the AHU arrive?

A. Current ship date is 7/10/2026. This is subject to change.

Q 10. How is the AHU being brought into the building?

A It is the responsibility of the bidding contractor to note shipping split sizes shown on the plans to verify the sections of the AHU fit in whatever route is taken. There is an areaway immediately into the mechanical room. This areaway has a louvre that will have to be removed if this route is used. There is also an areaway in the immediately adjacent room with a large coiling door that could be used as long as the AHU pieces will fit the route (the double doors out of this room have a removable astragal).

Q 11. Will all contractors be required to where identification badges?

A Yes, the lower level is a secure area and all personnel should be identified as working on this project.

Q 12. Is there parking?

A There is not IU controlled or provided parking. The adjacent parking garage is IU Health owned. Contractors may reach out to IU Health.

Q 13. Is there a laydown area for staging material and work?

A A dumpster will be allowed in the loading dock area. All other laydown and staging space will be within the limits of the project area.

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Acoustical panels.
 2. Metal suspension system.
 3. Metal edge moldings and trim.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:
1. Acoustical panels.
 2. Metal suspension system.
 3. Metal edge moldings and trim.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension-system members.
 2. Structural members to which suspension systems will be attached.
 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
8. Minimum Drawing Scale: 1/8 inch = 1 foot. B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 1 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 1 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected

against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 ACOUSTICAL PANELS

- A. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

2.3 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING ACT-1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong 1911 Ultima Tegular Edge panel.

- B. Classification: Provide Class A panels complying with ASTM E 1264 for type and form as follows:

- 1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with factory-applied latex paint.

- C. Color: White

- D. LR: Not less than 0.88.

- E. NRC: Not less than 0.75 Type E-400 mounting per ASTM E 795.
- F. CAC: Not less than 35.
- G. Edge/Joint Detail: Tegular for 15/16" grid.
- H. Thickness: 3/4 inch
- I. Modular Size: 24 by 24 inches

2.4 LABORATORY INTEGRATED CEILING SYSTEM: ACT-2

- A. Subject to compliance with requirements, provide Armstrong World Industries 'TechZone' integrated ceiling system in configurations indicated.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Recycled Content (Field Panels): Postconsumer recycled content plus one-half of preconsumer recycled content not less than 70 percent.
- D. Provide ACT-2 field panels as follows:
 - 1. Armstrong World Industries 'Optima' with Humigard Plus
 - a. Type and Form: Type XII, fiberglass with acoustically transparent membrane; Form 2.
 - b. Pattern: E (lightly textured)
 - c. Color: White
 - d. Light Reflectance (LR): Not less than 0.90
 - e. Noise Reduction Coefficient (NRC): Not less than 0.90
 - f. Edge Detail: Square
 - g. Thickness: 3/4 inch.
 - h. Modular Size: 24 x 24 inches.
 - i. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

- E. Provide technical panels as follows:

1. Armstrong World Industries 'Metalworks'; unperforated
 - a. Color: White (WH)
 - b. Light Reflectance (LR): Not less than 0.89
 - e. Noise Reduction Coefficient (NRC): Not less than 0.40
 - f. Edge Detail: Square
 - g. Thickness: 5/8 inch.
 - h. Modular Size: 6 x 24 inches

2.5 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING ACT- 3

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong, 1937 Ultima Health Zone Tegular Edge.
- B. Classification: Provide panels complying with ASTM E 1264 for type and form as follows:
 1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with factory-applied latex paint.
- C. Color: White
- D. LR: Not less than 0.86.
- E. NRC: Not less than 0.70, Type E-400 mounting per ASTM E 795.
- F. CAC: Not less than 35.
- G. Edge/Joint Detail: Tegular for 15/16" grid.
- H. Thickness: 3/4 inch.
- I. Modular Size: 24 x 24 inches

2.6 LABORATORY INTEGRATED CEILING SYSTEM: ACT-4

- A. Subject to compliance with requirements, provide Armstrong World Industries 'TechZone' integrated ceiling system in configurations indicated.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Recycled Content (Field Panels): Postconsumer recycled content plus one-half of preconsumer recycled content not less than 70 percent.

D. Provide ACT-4 field panels as follows:

1. Armstrong World Industries 'Ultima Health Zone' with Humigard Plus

- j. Type and Form: Type XII, fiberglass with acoustically transparent membrane; Form 2.
- k. Pattern: E (lightly textured)
- l. Color: White
- m. Light Reflectance (LR): Not less than 0.90
- n. Noise Reduction Coefficient (NRC): Not less than 0.90
- o. Edge Detail: Square
- p. Thickness: 3/4 inch.
- q. Modular Size: 24 x 24 inches.
- r. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

E. Provide technical panels as follows:

1. Armstrong World Industries 'Metalworks'; unperforated

- c. Color: White (WH)
- d. Light Reflectance (LR): Not less than 0.89
- i. Noise Reduction Coefficient (NRC): Not less than 0.40
- j. Edge Detail: Square
- k. Thickness: 5/8 inch.
- l. Modular Size: 12 x 24 inches

2.7 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Armstrong Ceiling & Wall Solutions.
- 2. CertainTeed; SAINT-GOBAIN.
- 3. Rockfon; ROCKWOOL International.
- 4. USG Corporation.

- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.
 - 1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" in accordance with ASTM C635/C635M.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hotdip galvanized, G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white
- D. Wide-Face, Aluminum-Capped, Double-Web, Aluminum suspension system; Main and cross runners formed from aluminum; with prefinished, 15/16-inch- wide aluminum caps on flanges.
 - 1. Basis of Design: Armstrong Prelude Plus XL Aluminum Suspension System.
 - 2. Structural Classification: Intermediate-duty system.
 - 3. Face Design: Flat, flush.
 - 4. Cap Finish: Painted white

2.8 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing in accordance with ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Postinstalled expansion anchors.
 - b. Corrosion Protection, Carbon Steel: Components zinc plated in accordance with ASTM B633, Class SC 1 (mild) service condition.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than -0.135-inch- diameter wire. C. Hold-Down Clips: Manufacturer's standard hold-down.

2.9 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Armstrong Ceiling & Wall Solutions.
 2. CertainTeed; SAINT-GOBAIN.
 3. Rockfon; ROCKWOOL International.
 4. USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

- A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to postinstalled mechanical or adhesive anchors that extend through forms into concrete.
 - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 7. Do not attach hangers to steel deck tabs.
 - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.

9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 3. Install hold-down clips in areas indicated; space in accordance with panel manufacturer's written instructions unless otherwise indicated.

- a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 11 53 13 - LABORATORY FUME HOODS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Constant volume fume hoods.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for lateral support of fume hoods.
- B. Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings: For laboratory fume hoods.
 - a. Include plans, elevations, sections, and attachment details.
 - b. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports.
 - c. Indicate locations and types of service fittings together with associated service supply connection required.
 - d. Indicate duct connections, electrical connections, and locations of access panels.
 - e. Include roughing-in information for mechanical, plumbing, and electrical connections.
 - f. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from the above items.

- g. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
- h. Include coordinated dimensions for laboratory equipment specified in other Sections.

B. Informational Submittals:

- 1. Product Test Reports: Showing compliance with specified performance requirements for as-manufactured containment and static pressure loss, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency.
- 2. Source quality-control reports.
- 3. Field quality-control reports.

1.5 MAINTENANCE MATERIALS

- A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Locate concealed framing, blocking, and reinforcements that support fume hoods by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:

1. Air Master Systems Corp.
2. AT Villa.
3. Bedcolab.
4. Kewaunee Scientific Corporation.
5. Labconco Corporation.
6. Mott Manufacturing Ltd.
7. Lab Crafters, Inc.
8. **Hamilton Laboratory Solutions**

B. Basis of Design: Refer to equipment schedule, A68-00.

1. Nominal Size:
 - a. 5 feet (1.5 m).

C. Source Limitations: Obtain laboratory fume hoods from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110 as modified below:

1. As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
2. As-Installed (AI) Rating: AI 0.10 (0.10 ppm).
3. Average Face Velocity: 80 fpm plus or minus 10 percent with sashes fully open.
4. Face-Velocity Variation: Not more than 10 percent of average face velocity across the face opening with sashes fully open.
5. Sash Position: Fully open.
 - a. Test hoods with horizontal sashes with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
 - b. Test hoods with combination sashes fully raised, with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.

6. Release Rate: 4.0 L/min.

B. Static-Pressure Loss: Not more than 1/2-inch wg (124 Pa) at 100-fpm (0.51-m/s) face velocity with sash fully open when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

2.3 FUME HOODS, GENERAL

- A. Product Standards: Comply with SEFA 1, "Laboratory Fume Hoods - Recommended Practices."
- B. Constant-Volume Fume Hoods: Provide constant-volume fume hoods without bypass where indicated.

2.4 CONSTANT VOLUME HOODS

- A. Description: Constant volume fume hoods are sometimes called "conventional fume hoods." If VAV control is not used, face velocity increases as sash is closed.
- B. Provide the following:
 - 1. Provide VAV (variable air volume) fume hood and steel exterior. Sash height sensor, face velocity monitor, and air volume controller are to be provided by SIEMENS, IU's HVAC controls vendor. Fume hood to achieve minimum face velocity of 80 feet per minute.

2.5 MATERIALS

- A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.
- B. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- C. Glass-Fiber-Reinforced Polyester: Polyester laminate with a chemical-resistant gel coat on exposed faces, and having a flame-spread index of 25 or less according to ASTM E84.
- D. Epoxy: Factory molded, modified epoxy-resin formulation with smooth, nonspecular finish.
 - 1. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi (70 MPa).
 - b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F (127 deg C).
 - f. Flame-Spread Index: 25 or less according to ASTM E84.

2. Chemical Resistance: As follows when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
 3. Color: Durcon Graphite.
- E. Polypropylene: Unreinforced polypropylene complying with ASTM D4101, Group 01, Class 1, Grade 2.
- F. Glass: Clear, laminated tempered glass complying with ASTM C1172, Kind LT, Condition A, Type I, Class I, Quality-Q3; with two plies not less than 3.0 mm thick and with clear, polyvinyl butyral interlayer.
1. Safety Glass: Provide products complying with testing requirements in 16 CFR 1201 for Category II materials.
 2. Permanently mark safety glass with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- H. Fasteners: Provide stainless steel fasteners where exposed to fumes.
- 2.6 FABRICATION
- A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of being partly disassembled as necessary to permit movement through a 35-by-79-inch (889-by-2007-mm) door opening.
 - B. Steel Exterior: Fabricate from steel sheet, 0.048 inch (1.21 mm) thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.

- C. Stainless Steel Exterior: Fabricate from stainless steel sheet, 0.050 inch (1.27 mm) thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings.
- D. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.
- E. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.
- F. Interior Lining: Provide the following unless otherwise indicated:
 - 1. Glass-fiber-reinforced polyester, not less than 3/16 inch (4.75 mm) thick.
- G. Lining Assembly: Unless otherwise indicated, assemble with stainless steel fasteners or epoxy adhesive, concealed where possible. Seal joints by filling with chemical-resistant sealant during assembly.
 - 1. Fasten lining components together with stainless-steel cleats or angles to form a rigid assembly to which exterior panels are attached.
 - 2. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
- H. Molded Glass-Fiber-Reinforced Polyester Lining: Molded unit consisting of end panels, back panel, preset rear baffle, and top bonded together into a single piece; reinforced to form a rigid assembly to which exterior is attached.
 - 1. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
- I. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.
 - 1. Duct-Stub Material: Epoxy-coated steel unless otherwise indicated.
- J. Sashes: Provide operable sashes of type indicated.
 - 1. Fabricate from 0.050-inch- (1.27-mm-) thick stainless steel or 0.048-inch- (1.21-mm-) thick steel sheet, with chemical-resistant finish. Form into four-sided frame with bottom corners welded and finished smooth. Make top member removable for glazing replacement. Set glazing in chemical-resistant, U-shaped gaskets.
 - 2. Glaze with laminated safety glass.

- K. Airfoil: Unless otherwise indicated, provide airfoil at bottom of fume hood face opening with 1-inch (25-mm) space between airfoil and work top. Sash closes on top of airfoil, leaving 1-inch (25-mm) opening for air intake. Airfoil directs airflow across work top to remove heavier-than-air gases and to prevent reverse airflow.
 - 1. Fabricate airfoil from stainless steel .
- L. Light Fixtures: Provide LED light fixtures, of longest practicable length; complete with tubes at each fume hood. Shield tubes from hood interior with 1/4-inch- (6.35-mm-) thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Provide units easily replaceable from outside of fume hood.
- M. Filler Strips: Provide as needed to close spaces between fume hoods or fume hood base cabinets and adjacent building construction. Fabricate from same material and with same finish as fume hoods or fume hood base cabinets, as applicable.
- N. Ceiling Extensions: Provide filler panels matching fume hood exterior to enclose space above fume hoods at front and sides of fume hoods and extending from tops of fume hoods to ceiling.
- O. Finished Back Panels: Where rear surfaces of fume hoods are exposed to view, provide finished back panels matching rest of fume hood enclosure.
- P. Comply with requirements in other Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings. Securely anchor fittings, piping, and conduit to fume hoods unless otherwise indicated.

2.7 FUME HOOD SYSTEMS

- A. Base Stands: Comply with Section 12 35 53 "Metal Laboratory Casework". Provide metal base cabinets in finish matching fume hood exterior finish.
- B. Work Tops: Epoxy.
 - 1. Work-Top Configuration: Raised (marine) edge with beveled edge and corners.
 - 2. Where acid storage cabinets are indicated beneath fume hoods, provide holes in work tops as need to accommodate cabinet vents.

2.8 ACCESSORIES

- A. Sash Alarm: Provide fume hoods with audible and visual alarm that activates when sash is opened beyond preset position.
 - 1. Provide with silence and test switches.

- B. Sash Stops: Provide fume hoods with sash stops to limit hood opening to 18 inches of height. Sash stops can be manually released to open sash fully for cleaning fume hood and for placing large apparatus within fume hood.

2.9 CHEMICAL-RESISTANT FINISH

- A. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 - 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8M. Acceptance level for chemical spot test to be no more than four Level 3 conditions.
 - 2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fume hoods according to manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

- B. Comply with requirements in Section 12 35 53 "Metal Laboratory Casework" for installing fume hood base cabinets, work tops, and sinks.
- C. Comply with requirements for installing water and laboratory gas service fittings and electrical devices.
 - 1. Install fittings according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions. Set bases and flanges of sink and work top-mounted fittings in sealant recommended by manufacturer of sink or work-top material. Securely anchor fittings to fume hoods unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Field test installed fume hoods according to "Flow Visualization and Velocity Procedure" requirements in ASHRAE 110.
 - 1. Field test all installed fume hoods according to ASHRAE 110 as modified in "Performance Requirements" Article. If tested hood fails to meet performance requirements, field test additional hoods as directed by Architect.
 - 2. Coordinate testing and balancing for ASHRAE 110 as-installed (AI) rating of fume hoods between HVAC contractor and fume hood supplier.

3.4 ADJUSTING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.
- B. Coordination with the Commissioning process: The start-up, training, and documentation shall be coordinated with the commissioning process and protocols outlined in MEP Sections and Division 01. Attention is called to the requirement for development of start-up tests and checklists in the electronic format specified, documentation of the start-up and checkout activities via that electronic forum, submittal of operation and maintenance data electronically per those requirements, and approval of functional performance tests related to equipment of this section.

3.5 ADJUSTING AND CLEANING

- A. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

3.6 FUME HOOD SCHEDULE

A. Bench-Top Fume Hood Type S05:

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: VAV fumehood with varying exhaust flow based upon sash height in order to maintain a constant face velocity at the sash opening..
3. ASHRAE 110 As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
4. ASHRAE 110 As-Installed (AI) Rating: AI 0.10 (0.10 ppm).
5. Sash Configuration:
 - a. Operation: Vertical-sliding, single-hung sash.
 - b. Enclosure Height: 59 inches.
 - c. Enclosure Depth: 37.7 inches.
 - d. Interior Depth: 30 inches.
6. Work Top: Epoxy.
7. Service Fittings:
 - a. Laboratory Gas for Air and Vacuum: One flange-type fitting(s) with straight outlet and remote-control ground-key cock.
 - b. Electrical: One duplex receptacle at one end(s) of hood, mounted on exterior front face of end pilaster.
 - c. Provide GFCI receptacles.

END OF SECTION

SECTION 12 35 53 - METAL LABORATORY CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fixed metal laboratory casework.
- B. Modular laboratory bench system.
- C. Auxiliary cabinets.
- D. Hardware.
- E. Work Surfaces.
- F. Ceiling service panels.
- G. Laboratory accessories.
- H. Eyewash stations and emergency showers.
- I. Water and laboratory gas service fittings.
- J. Electrical and communication service fittings.

1.2 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.
- B. Coordinate installation of laboratory casework with installation of laboratory equipment.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings: For laboratory casework.

- a. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
 - b. Indicate types and sizes of casework.
 - c. Indicate manufacturer's catalog numbers for casework.
 - d. Show fabrication details, including types and locations of hardware.
 - e. Indicate locations and types of service fittings.
 - f. Include details of utility spaces showing supports for conduits and piping.
 - g. Include details of support framing system.
 - h. Include details of exposed conduits, if required, for service fittings.
 - i. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and laboratory equipment.
 - j. Include coordinated dimensions for laboratory equipment specified in other Sections.
 - k. Include electrical wiring diagram for lab benches illustrating connections to ceiling service panel, receptacle layout in raceway showing distribution of circuits, and power to task lights with occupancy sensors.
3. Samples: Laboratory casework manufacturer shall submit the following samples for approval by the Owner's Representative, prior to fabrication of the specified mock-up:
- a. One (1) 24-inch long standard, and one (1) end bracket, in finish and color specified.
 - b. Service Fixture: One (1) of each fixture type required.
 - c. Work Surface Material: One (1) of each type required, 12-inch by 12-inch by 1-inch thick, showing top, front edge and backsplash construction.
 - d. Adhesives and Sealants: One (1) of each type required in color specified.
 - e. Phenolic Resin Material (Cabinet): One (1) 12-inch by 12-inch piece of phenolic resin in color selected by Architect from manufacturer's full range.
 - f. Cabinet/Casework Hardware: One (1) full-size sample of each type required in finish specified.
 - g. Paint: One (1) sample of each movable table and movable laboratory bench system frame in color specified.
 - h. Adjustable Shelving: One (1) 30-inch by 12-inch deep shelf in finish and material specified.

4. Reviewed samples retained by the Owner's Representative.

B. Informational Submittals:

1. Qualification Data: For manufacturer.
2. Product Test Reports:
 - a. Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with

requirements of specified product standard and system structural performance specified in "Performance Requirements" Article.

- b. Work Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory work surface material with requirements specified for chemical and physical resistance.

1.4 SUBSTITUTIONS

A. Definitions:

1. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
2. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
3. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

B. Related Requirements: Section 01 25 00 "Substitutions" for substitution procedures, in addition to the following requirements:

1. Proposed substitutions require a detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated.
2. Proposed substitutions must indicate deviations, if any, from the basis-of-design material or system specified in the contract documents.
3. Proposed substitutions must provide cost information, including a proposal of change, if any, in the Contract Sum.
4. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with SEFA 8 M.

B. Mockups:

1. Laboratory casework manufacturer shall erect laboratory casework mock-ups at the locations directed by the Owner's representative. Once selected, the assemblies shall be constructed and assembled in accordance with the Construction Documents.
2. Laboratory Casework Design: The laboratory casework design will be confirmed by Owner upon review and approval of the mock-ups. All revisions to mock-ups to be incorporated in final design without change in contract sum.
3. Once installed and approved, the mock-ups shall be maintained by Owner as a standard for judging the completed Work.
4. Refer to A44 Series for draft mock-up locations. Final location to be determined by Owner. Mock-up components consist of one (1) Type_LBD - back-to-back bench, one (1) CSP1 - ceiling service panel, one (1) Type_MA - mobile base cabinet, and one (1) Type_OTWS- otolaryngology lab bench.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.7 FIELD CONDITIONS

- A. Field Measurements: Where laboratory casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.
- B. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.
- B. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Other manufacturers' laboratory casework of similar sizes and similar door and drawer configurations and complying with Specifications may be considered. See Section 01 60 00 "Product Requirements."

2.2 PERFORMANCE REQUIREMENTS

- A. Casework Product Standard: Comply with SEFA 8 M, "Laboratory Grade Metal Casework."
- B. Fixed Casework System Structural Performance: Laboratory casework and support framing system shall withstand the effects of the following gravity loads and stresses without permanent deformation, excessive deflection, or binding of drawers and doors:
 - 1. Support Framing System: 600 lb/ft. (900 kg/m) .
 - 2. Suspended Base Cabinets (Internal Load): 160 lb/ft. (240 kg/m) .
 - 3. Work Surfaces (Including Tops of Suspended Base Cabinets): 160 lb/ft. (240 kg/m).
 - 4. Wall Cabinets (Upper Cabinets): 160 lb/ft. (240 kg/m).
 - 5. Shelves: 40 lb/sq. ft. (200 kg/sq. m).
- C. Modular Laboratory Bench System Structural Performance: Modular Laboratory Benches and support framing system shall withstand the effects of the following gravity loads and stresses without permanent deformation, excessive deflection, or binding of drawers and doors:
 - 1. Work Surface Table Frame:
 - a. Load Rating: 100 lbs per linear foot of width to a maximum of 800 lbs.
 - b. Maximum allowable deflection of 0.125-in. at center rail with 800 lbs uniformly distributed on an 8-ft. table.
 - 2. Work Surfaces (Including Tops of Suspended Base Cabinets): 160 lb/ft.
 - a. Shelves: Load capacity of 40 lbs per linear foot up to 200 lbs on a 48-in. wide unit.
- D. Flammable Liquid Storage: Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with requirements in NFPA 30 by a testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 MANUFACTURERS

- A. Manufacturers:
 - 1. Kewaunee Scientific; Enterprise System.

2. Labcrafters; Dimension Series.
3. Mott Manufacturing; Optima Series.
4. ICI Scientific; Envision Series.
5. Air Masters Systems; Gemini Series
6. **Hamilton Laboratory Solutions; Endeavor Series**

- B. Basis of Design: Refer to laboratory casework, A44-00 and laboratory details, A67-01, A67-02, and A67-03.

2.4 METAL LABORATORY CASEWORK, GENERAL

- A. Casework: Die-formed metal sheet; each unit self-contained and not dependent on adjacent units or building structure for rigidity; factory-fabricated, factory-assembled, and factory-finished.
- B. Style: Flush overlay - square edge.
- C. Primary Cabinet Material:
1. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.

2.5 FIXED CASEWORK SYSTEM

- A. Provide casework manufacturer's standard integrated system that includes support framing, suspended modular cabinets, filler and closure panels, wall panes, undercabinet task-lighting fixtures, work surfaces, and fittings needed to assemble system. System includes hardware and fasteners for securing support framing to permanent construction.
1. All fixed casework doors and drawers to receive locking hardware.
 2. Cabinets can be removed and reinstalled without use of special tools for relocation within system.
 3. Base cabinets can be removed without providing temporary support for, or removing, work surface.
 4. Sinks are supported independent of base cabinets.
 5. Support framing has provision for fastening pipe supports at utility space in not more than 1-inch (25-mm) increments.
 6. System includes filler and closure panels to close spaces between support framing, cabinets, work surfaces, floors, and walls unless otherwise indicated. Fabricate panels from same material and with same finish as metal cabinets and with hemmed or flanged edges.

7. Shelves: Made from cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications. Weld shop-made joints. Provide metal shelf closures at bottom edge of shelf to conceal exposed struts / stiffeners.
 - a. Shelf Bracket Finish: Painted white.
 - b. Provide removable stainless steel shelf retaining rods on front edge of shelves. Provide tapered shelf brackets along sides of shelf. Gap between retaining rods and side shelf brackets shall be limited to 1/2-inch.

2.6 MODULAR LABORATORY BENCH SYSTEM

- A. General: Modular component system incorporating and/or accommodating compatible metal laboratory casework items, including: cabinets, shelves, work surface frames, ledges and supporting structures.
 1. Comply with SEFA 10.
 2. Modular bench system shall be pre-wired and pre-plumbed, equipped with cabling plug-ins and service line connections.
- B. Structural Modules: Primary support structures for adjustable work surfaces, shelving, utility delivery systems, and casework. Slotted channel design to provide support for components on 1 inch (25.4 mm) vertical increments.
 1. Wall Modules: Designed to mount directly to the floor.
 2. Island and Peninsula Modules: Designed to be supported directly on the floor or work surface.
 - a. Corner modules and/or columns for structural support and bracing at system ends and/or intersections.
- C. Work Surface Frames and Work Surfaces:
 1. C-Frames: Self-supporting frame capable of supporting the weights of the work surface and imposed loads, in addition to the weight of suspended base cabinets.
 - a. Provide channels for suspension of base cabinets at any point along their length.
 2. Core-based Frames: Shaped to allow cantilevering from structural modules and capable of supporting the weights of the work surface, suspended base cabinets, and imposed loads.
 - a. Provide channels for suspension of base cabinets at any point along their length.

3. Work Surfaces: Include type(s) specified below.
 - a. Material: Work surfaces made from phenolic resin.
 4. Work Surface Ventilation: Otolaryngology bench to include ventilation at the worksurface. Grille face to be provided by laboratory casework manufacturer. Shroud connecting grille to ductwork to be provided by HVAC contractor.
 - a. Grille Material: McNichols; perforated metal, slotted, carbon steel, cold rolled, 16 gauge (0.0598-in), 1/8-in by 1-in round-end slot, side staggered, 44 percent open area.
 - b. Item Number: 16890016M2.
 - c. Finish: Powder coated, white.
 - D. Shelves: Made from cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications. Weld shop-made joints. Provide metal shelf closures at bottom edge of shelf to conceal exposed struts / stiffeners.
 1. Shelf Bracket Finish: Painted white.
 2. Provide removable stainless steel shelf retaining rods on front edge of shelves. Provide tapered shelf brackets along sides of shelf. Gap between retaining rods and side shelf brackets shall be limited to 1/2-inch.
 - E. Accessory Components: Manufacturer's standard.
 1. Back Frame: Upright frame for mounting accessory components.
 - a. Load Capacity: 250 lb (114 kg), evenly distributed.
 - b. Mounting: Bolted to back of worksurface support frame.
 - c. Divider Uprights: Flexible locations for subdividing the back frame into smaller sections.
 - d. Electric Power Strip: Single receptacles at manufacturer's standard spacing with total current rating of 15 Amp.
- 2.7 AUXILIARY CABINETS
- A. Acid Storage Cabinets: Construction identical to other cabinets, with following exceptions:
 1. Completely lined with corrosion-resistant polypropylene liner material; stainless steel fasteners for all connections and hardware inside cabinet.
 2. Shelves: Perforated or vented, rigid polypropylene.
 3. Bottom Pan: Liquid tight, polypropylene liner covering entire bottom of acid storage cabinet.

4. Vents: Comply with SEFA 1.
 - a. Locate acid storage cabinet vents in accordance with manufacturer's instructions.
 - b. Vent base cabinets through work surface with manufacturer's vent kit.
 - c. Vent each acid storage cabinet separately.
 - d. When acid storage cabinets are installed below fume hoods, provide louvered cabinet doors.
 - e. Seal penetrations with chemical resistant sealant.

- B. Solvent (Flammable and Combustible Liquids) Storage Cabinets: Construction identical to other cabinets, with following exceptions:
 1. Construct to NFPA 30 and applicable OSHA requirements.
 2. Comply with SEFA 11.
 3. Fire Resistance: Maximum internal temperature of 325 degrees F (163 degrees C) at the center, and 1 inch (25.4 mm) from top of the cabinet when cabinet is subjected to a ten minute fire test that simulates fire exposure of a standard time-temperature curve specified in ASTM E119.
 4. Vents: Provide venting capable of achieving at least ten air changes per hour.
 - a. Tie into building lab exhaust system.
 - b. Tie into building hazardous exhaust system.
 - c. Vent Connections: 1-1/2 inch (38 mm) minimum diameter, corrosion resistant piping having flame spread index of 25 or less, when tested in accordance with ASTM E84.
 - d. Vent each cabinet separately with sufficient mixing distance for incompatible chemicals.
 - e. Provide minimum of two vents with fire arrestors for each cabinet.
 5. Signage: Provide manufacturer's standard signage reading "FLAMMABLE - KEEP FIRE AWAY" or similar message in bright red color.
 6. Shelves: Perforated or vented, rigid polypropylene.

- C. Mobile Cabinets: Same construction as fixed base cabinets, with modifications.
 1. 33 percent of all Type MA and Type MB mobile cabinets to receive locking hardware.
 2. Toe kick space eliminated.
 - a. Cabinet underside reinforced with 14 gauge, 0.0747 inch (1.9 mm) minimum steel channels to provide caster mounting points.
 - b. Four lockable casters, each with a load rating of 165 pounds (74.8 kg).
 3. For cabinets with drawers, include a counterweight to prevent the cabinet from tipping when one drawer is opened.

- a. Drawers rated at 50 pounds (22.7 kg), maximum.
4. Provide phenolic cabinet top.
 - a. Thickness: 1 inch.
 - b. Edge Treatment: Beveled edge.
5. Shelves: Made from cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications. Weld shop-made joints. Fold up front edge 3/4 inch (19 mm); fold up back edge 3 inches (75 mm).
 - a. Provide integral stiffening brackets, formed by folding up ends 3/4 inch (19 mm) and welding to upturned back edge.
 - b. Finish: Painted white.

2.8 CABINET HARDWARE

- A. General: Provide laboratory casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two for doors 48 inches (1200 mm) high or less and three for doors more than 48 inches (1200 mm) high.
- C. Hinged-Door and Drawer Pulls: Brushed aluminum, back-mounted pulls. Provide two pulls for drawers more than 24 inches (600 mm) wide.
 1. Design: Wire pulls.
 2. Overall Size: 1 by 4-1/2 inches (25 by 114 mm).
- D. Door Catches: Nylon-roller spring catches. Provide two catches on doors more than 48 inches (1200 mm) high.
- E. Drawer Slides: ANSI/BHMA A156.9.
 1. Heavy Duty (Grade 1HD-100): Side mount.
 - a. Type: Full extension.
 - b. Material: Epoxy-coated polymer slides.
 2. General-purpose drawers; provide 100 lb (45 kg) load capacity.
 3. File drawers; provide 150 lb (45 kg) load capacity.

- F. Locks: Cam or half-mortise type, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281, Type E07261, Type E07111, or Type E07021.
1. Tumbler: Five pin.
 2. Lock Locations:
 - a. All fixed casework cabinet doors and drawers.
 - b. 33 percent of all Type MA and Type MB pedestal cabinets.
 3. Keying: Key locks as directed.
 - a. Master key for up to 225 key changes.
 4. Key Quantity: Minimum of two keys per lock.
 5. Master Key System: Key locks to be operable by master key.
 - a. Master Keys: Provide two.
- G. Sliding-Door Hardware Sets: Laboratory casework manufacturer's standard, to suit type and size of sliding-door units.

2.9 WORK SURFACE

- A. Epoxy: Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Epoxy Scientific LLC.
 - b. Durcon; a Wilsonart Company.
 - c. Kemresin.
 2. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi (70 MPa).
 - b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F (127 deg C).
 3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:

- a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
 4. Location: As indicated on Drawings.
 5. Color: As indicated on Drawings.
- B. Phenolic Composite: Solid, high-pressure decorative laminate, complying with NEMA LD 3, Grade CGS.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Durcon.
 - b. Fundermax.
 - c. Trespa North America.
 2. Chemical Resistance: Composite work surface material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), ethyl acetate, ethyl alcohol, formaldehyde (37 percent), furfural, phosphoric acid (85 percent), sulfuric acid (33 percent), toluene, benzene, carbon tetrachloride, dimethyl formamide, hydrochloric acid (37 percent), hydrofluoric acid (48 percent), nitric acid (30 percent), sodium hydroxide (20 percent), and zinc chloride].
 3. Color: Charcoal.
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304.

2.10 METAL CABINET FABRICATION

- A. General: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Except where otherwise specified, integrally frame and weld cabinet bodies to form dirt- and vermin-resistant enclosures. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch (1.5 to 2.4 mm).

- B. Mechanical Grilles: Perforated metal grilles of material and finish indicated fabricated in one piece with rolled or formed top and sides.
- C. Undercounter Support Brackets: 22 by 28 in, welded from 1 by 2, 16 gauge steel tube, powder coated, white.
- D. Hinged Doors: Mortise for hinges and reinforce with angles welded inside inner pans at hinge edge.
- E. Drawers: Fronts made from outer and inner pans that nest into box formation, without raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal. Provide drawers with rubber bumpers, polymer roller slides, and positive stops to prevent metal-to-metal contact or accidental removal.
- F. Adjustable Metal Shelves: Front, back, and ends formed down, with edges returned horizontally at front and back to form reinforcing channels.
- G. Toe Space: Fully enclosed, 4 inches (100 mm) high by 3 inches (75 mm) deep, with no open gaps or pockets.
- H. Tables: Welded tubing legs, not less than 2 inches (50 mm) square with channel stretchers as needed to comply with product standard. Weld or bolt stretchers to legs and cross-stretchers, and bolt legs to table aprons. Provide leveling device welded to bottom of each leg.
 - 1. Leg Shoes: Black vinyl or rubber, open-bottom, slip-on type.
- I. Utilities: Provide space, cutouts, and holes for pipes, conduits, ducts, and fittings in cabinet bodies to accommodate utility services and their support-strut assemblies.
 - 1. Provide base cabinets with removable backs for access to utility space.
- J. Utility-Space Framing: Steel framing units consisting of two steel slotted channels complying with MFMA-4, not less than 1-5/8 inches (41 mm) square by 0.105-inch (2.66-mm) nominal thickness, that are connected at top and bottom by U-shaped brackets made from 1-1/4-by-1/4-inch (32-by-6-mm) steel flat bars. Framing units may be made by welding channel material into rectangular frames instead of using U-shaped brackets.
- K. Filler and Closure Panels: Provide where indicated and as needed to close spaces between casework and walls, ceilings, and equipment. Fabricate from same material and with same finish as casework and with hemmed or flanged edges unless otherwise indicated.
 - 1. Provide knee-space panels (modesty panels) at spaces between base cabinets, where cabinets are not installed against a wall or where space is not otherwise

closed. Fabricate from back-to-back panels or of hollow construction to eliminate exposed hemmed or flanged edges.

2. Provide utility-space closure panels at spaces between base cabinets where utility space would otherwise be exposed, including spaces below work surfaces.
3. Provide closure panels at ends of utility spaces where utility space would otherwise be exposed.

2.11 METAL CABINET FINISH

- A. General: Prepare, treat, and finish welded assemblies after assembling. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: After assembly, clean surfaces of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply laboratory casework manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8 M. Acceptance level for chemical spot test shall be no more than for Level 3 conditions.

2.12 STAINLESS-STEEL FINISH

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Stainless Steel Sheet and Plate Finishes:
 1. Directional Satin Finish: ASTM A480/ASTM A480M, No. 4.

2.13 WORK SURFACE FABRICATION

- A. Work Surfaces, General: Provide units with smooth surfaces in uniform plane, free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch (25 mm).
- B. Sinks, General: Provide sizes indicated or laboratory casework manufacturer's closest standard size of equal or greater volume, as approved by Architect.

1. Material: Epoxy, molded in one piece with smooth surfaces, coved corners, and bottom sloped to outlet; 1/2-inch (13-mm) minimum thickness.
2. Outlets: Provide with polypropylene strainers and tailpieces.

C. Epoxy:

1. Work Surfaces: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and butt joints assembled with epoxy adhesive and concealed metal splines.
 - a. Marine-Edge Configuration: 3/4 inch (19 mm) minimum thickness, with integral raised edge.
 1. Edges and Corners: Beveled.
 2. Backsplash: Integral coved.
 - b. Construction: Uniform throughout full thickness.
2. Integral Sinks: Bonded to countertops with invisible joint line.

D. Phenolic Composite:

1. Work Surface: Fabricate with holes for service fittings and accessories, and butt joints assembled with epoxy adhesive and concealed metal splines.
 - a. Flat Configuration: 3/4 inch (19 mm) thick with continuous drip groove on underside 1/2 inch (13 mm) from overhang edge and integral coved backsplash.
 1. Edges and Corners: Beveled.
 - b. Access Panel: Rout opening in work surface for lift-out / removable access panel of the same shape and size indicated on Drawings. Provide removable panel to fit opening of same material, finish, and edge treatment as work surface. Provide 1/4 inch lip below finished work surface to receive access panel. Install removable access panel level and flush with finished work surface.
2. Sinks:
 - a. Where indicated, provide undermount / underslung epoxy sinks mechanically fastened to the underside of work surface with silicone sealant.

E. Stainless Steel:

1. Work Surfaces: Made from stainless steel sheet, not less than 0.062-inch (1.59-mm) nominal thickness, with No. 4 satin finish.
 - a. Extend top down 1 inch (25 mm) at edges with a 1/2-inch (13-mm) return flange under frame. Apply heavy coating of heat-resistant, sound-deadening mastic to undersurface.
 - b. Provide raised (marine) edge around perimeter of work surfaces containing sinks.
 - c. Pitch work surfaces that contain sinks two ways to sink, where indicated, without channeling or grooving.
 - d. Reinforce underside of work surfaces with channels, or use thicker metal sheet where necessary to ensure rigidity without deflection.
 - e. Weld shop-made joints.
 - f. Where field-made joints are required, provide hairline butt joints mechanically bolted through continuous channels welded to underside at edges of joined ends. Keep field jointing to a minimum.
 - g. After fabricating and welding, grind surfaces smooth and polish to produce uniform, directionally textured finish with no cross scratches or evidence of welds. Passivate and rinse surfaces; remove embedded foreign matter and leave surfaces clean.

2. Shelves: Made from stainless steel sheet, not less than 0.050-inch (1.27-mm) nominal thickness, with No. 4 satin finish. Weld shop-made joints. Fold up front edge 3/4 inch (19 mm); fold up back edge 3 inches (75 mm).
 - a. Provide removable stainless steel shelf retaining rods on front edge of shelves. Provide tapered shelf brackets along sides of shelf. Limit gap between retaining rods and side shelf brackets to 1/2 inch.
 - b. After fabricating, grind welds smooth and polish to produce uniform, directionally textured finish with no cross scratches or evidence of welds. Passivate and rinse surfaces; remove embedded foreign matter and leave surfaces clean.

2.14 CEILING SERVICE PANELS

- A. Ceiling Service Panels: Designed to integrate into acoustical panel suspension grids for delivering multiple plumbing, electrical and data services.
 1. Fabricated to fit in 6-inches with TechZone System, integrated with standard 24 inches by 24 inches (600 mm by 600 mm) ceiling grid system.
 2. Enclosure Material: 16 gauge minimum sheet steel with chemical-resistant finish specified herein.
 3. Required Fitting Types: Quick-connect fittings and hoses.

- B. Cable, Cord, and Hose Management:

1. Provide integral cable, cord, and hose management system across the length of all mobile tables with integral electrical and data outlets.
2. Route electrical and data cables through management system to side of table where ceiling panel is located.
3. Provide coiled or sleeved management system to bind cables, cords, and hoses together between table and ceiling panel.
4. Color: White

2.15 LABORATORY ACCESSORIES

- A. Epoxy pegboards with pre-drilled or punched holes in a staggered pattern, designed to accept removable white polypropylene pegs. With each pegboard include a stainless steel drip-trough with drain outlet and matching diameter 36 inch (914 mm) long PVC drain hose.

2.16 EYEWASH STATIONS AND EMERGENCY SHOWERS

- A. General: Provide emergency equipment products complying with requirements of ANSI Z358.1.
- B. Manufacturers:
 1. Guardian Equipment.
 2. WaterSaver Faucet Co.
- C. Recessed Safety Station: Recessed barrier-free/face wash and shower safety station, matching fire extinguisher housing, with ceiling mounted exposed shower head and drain pan.
 1. Basis of Design Product: Refer to laboratory casework, A44-00.
 2. Shower head: 10-inch diameter stainless steel.
 - a. Valve: 1-inch IPS brass stay-open ball valve with stainless steel panic bar.
 3. Cover/Drain Pan: 18-gauge stainless steel combination cover and drain pan.
 4. Eye/Face Wash Spray Head Assembly: Two FS-Plus spray heads mounted on supply arms.
 - a. Valve: 1/2-inch IPS brass plug-type valve with O-ring seals.
 5. Supply: 1-inch NPT female inlet.
 6. Waste: 2-inch NPT female outlet.
 7. Sign: Furnish with ANSI-complaint identification sign.

- D. Eyewash/Drench Hose Unit: Epoxy counter-mounted.
1. Basis of Design: Refer to laboratory casework, A44-00.
 2. Spray Head Assembly: Two GS-plus spray heads with flip top dust cover, internal flow control and filter.
 3. Valve: 1/2-inch IPS stainless steel plug-type valve with O-ring seals. Swinging head assembly.
 4. Mounting: As indicated on Drawings.
 5. Construction: Type 316 stainless steel.
 6. Supply: 3/8-inch NPT female inlet.
 7. Sign: ANSI-compliant identification sign.

2.17 WATER AND LABORATORY GAS SERVICE FITTINGS

- A. Manufacturers:
1. Broen A/S.
 2. Chicago Faucets; Geberit Group.
 3. WaterSaver Faucet Co.
- B. Service Fittings: Provide units that comply with SEFA 7, "Recommended Practices for Fixtures." Provide fittings complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handle extension rods, and similar items.
- C. Materials: Fabricated from cast or forged red brass unless otherwise indicated.
1. Reagent-Grade Water Service Fittings: Polypropylene, PVC, or PVDF for parts in contact with water.
- D. Finish: Chromium plated.
1. Provide chemical-resistant powder coating in laboratory casework manufacturer's standard metallic brown, aluminum, white, or other color as approved by Architect.
- E. Water Valves and Faucets: Provide units complying with ASME A112.18.1, with renewable seats, designed for working pressure up to 80 psig (550 kPa).
1. Vacuum Breakers: Provide ASSE 1035 vacuum breakers on water fittings with serrated outlets.
 2. Aerators: Provide aerators on water fittings that do not have serrated outlets.
 3. Self-Closing Valves: Provide self-closing valves where indicated.

- F. Ball Valves: Chrome-plated ball and PTFE seals. Handle requires no more than 5 lbf (22 N) to operate. Provide units designed for working pressure up to 75 psig (520 kPa), with serrated outlets.
 - 1. Locking Safety Handles: Where ball valves are indicated for fuel-gas use, provide handles that must be pushed in or pulled up before being turned on.
- G. Ground-Key Cocks: Tapered core and handle of one-piece forged brass, ground and lapped, and held in place under constant spring pressure. Provide units designed for working pressure up to 40 psig (280 kPa), with serrated outlets.
- H. Needle Valves: Provide units with renewable, self-centering, floating cones and renewable seats of stainless steel or Monel metal, with removable serrated outlets.
 - 1. Provide units designed for working pressure up to 60 psig (410 kPa).
- I. Hand of Fittings: Furnish right-hand fittings unless fitting designation is followed by "L."
- J. Remote-Control Valves: Provide needle valves, straight-through or angle type as indicated for fume hoods and where indicated.
- K. Handles: Provide three- or four-arm, forged-brass or three- or four-wing, molded-plastic or powder-coated-metal handles for valves unless otherwise indicated.
 - 1. Provide lever-type handles for ground-key cocks. Lever handle aligns with outlet when valve is closed and is perpendicular to outlet when valve is fully open.
 - 2. Provide lever-type handles for ball valves unless otherwise indicated. Lever handle aligns with outlet when valve is closed and is perpendicular to outlet when valve is fully open.
 - 3. Provide heat-resistant plastic handles for steam valves.
 - 4. Provide knurled, molded-plastic handles for needle valves.
- L. Service-Outlet Identification: Provide color-coded plastic discs with embossed identification, secured to each service-fitting handle to be tamper resistant. Comply with SEFA 7 for colors and embossed identification.
 - 1. VAC: White.
 - 2. AIR: Yellow.
 - 3. RO Water: White.
 - 4. DI Water: White.

2.18 ELECTRICAL AND COMMUNICATION SERVICE FITTINGS

- A. Service Fittings, General: Provide units complete with metal housings, receptacles, switches, pilot lights, data communication outlets, cover plates, accessories, and gaskets required for mounting on laboratory casework.
- B. Electrical Wiring Devices: Comply with requirements in Section 26 27 26 "Wiring Devices" for receptacles, switches, pilot lights, cover plates, and accessories.
 - 1. Wiring devices, components, and accessories: UL listed and labeled as defined in NFPA 70 and marked for location and application.
 - 2. Devices that are manufactured for use with modular plug-in connectors may be substituted so long as connectors comply with UL 2459 and shall be made with stranded building wire.
- C. Receptacles: Comply with NEMA WD 1, NEMA WD 6, and UL 498. Duplex and Quadruplex type, Configuration 5 20R.
 - 1. Receptacle Grade: General grade unless otherwise indicated.
 - 2. Color of Receptacles: As selected by Architect unless otherwise indicated or required by NFPA 70.
 - 3. GFCI Receptacles: Straight blade, feed-through type. Comply with UL 943, Class A, General grade, and include indicator light that is lighted when device is tripped.
 - 4. TVSS (Transient Voltage Surge Suppressor) Receptacles: Comply with UL 1449, with integral TVSS in line to ground, line to neutral, and neutral to ground.
 - 5. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and a minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
 - 6. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."
 - 7. Receptacle Type: General grade.
 - 8. Identification: Distinctive marking on face of device to denote TVSS-type unit. Provide identification for outlets that are on back-up power.
 - 9. Color of standard power TVSS Receptacles: White.
 - 10. Color of EM Power TVSS Receptacles: Red.
- D. Switches: Comply with NEMA WD 1 and UL 20. Provide single-pole, double-pole, or 3-way switches as required; rated 120 to 277-V ac; and in amperage capacities to suit units served.
 - 1. Color of Switches: As selected by Architect unless otherwise indicated or required by NFPA 70.
 - 2. Provide pilot light adjacent to switch or neon-lighted handle, illuminated when switch is "ON," where noted as "PL" next to switch identification.
 - 3. Provide key-operated switch where noted as "KEY" next to switch identification.

4. Provide thermal-overload switches, single or double pole, as required, with maximum overcurrent trip setting to suit particular motor controlled.
- E. Data Communication Outlets: Two RJ-45 jacks for terminating 100-ohm, balanced, four-pair twisted-pair cabling complying with TIA-568-C.1; complying with Category 5e. Comply with UL 1863. Identify data plugs as
- F. Monitor Arms: Provide HermanMiller; Jarvis, single monitor arm, grommet / undercounter mounted, white.
- G. Cover Plates: Provide satin-finish, Type 304, stainless steel cover plates with formed, beveled edges.
- H. Cover Plate Plugs and Switches Color: Gray.
- I. Cover-Plate Identification: Use 1/4-inch- (6-mm-) high letters unless otherwise indicated. For stainless steel or chrome-plated metal, stamp or etch plate and fill in letters with black enamel.
 1. Provide at the following locations:
 - a. Receptacles other than standard 125-V duplex, grounding type.
 - b. Switches and thermal-overload switches.
 - c. Pilot lights when located remotely from associated equipment or switch, where function is not obvious.
 - d. Receptacles, switches, and other locations indicated.
 2. Provide the following information:
 - a. Voltage and phase for receptacles other than standard 125-V duplex, grounding type.
 - b. Indicate equipment being controlled by switches and thermal-overload switches.
 - c. Indicate equipment being controlled for pilot lights when located remotely from associated equipment or switch, where function is not obvious.
 - d. Number of the breaker in panelboard that controls device.
- J. Pedestal-Type Fittings: Cast-aluminum housings with sloped single face or two faces, as indicated, with neoprene gasket under base and with concealed mounting holes in base for attaching to laboratory casework. Provide holes tapped for conduits.
- K. Line-Type Fittings: Provide with cast-metal boxes with threaded holes for mounting on rigid steel conduit. Provide cover plates same size as boxes.
- L. Recessed-Type Fittings: Provide with galvanized-steel boxes.

- M. Finishes for Service-Fitting Components: Provide housings or boxes for pedestal- and line-type fittings with manufacturer's standard baked-on, chemical-resistant enamel in color as selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2. Install level, plumb, and true in line; shim as required using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet (1.5 mm in 3 m).
 - 2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet (3 mm in 3 m).
 - 3. Variation of Faces of Casework from a True Plane: 1/8 inch in 10 feet (3 mm in 3 m).
 - 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
 - 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.5 mm).
- B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets. Coordinate clear space with mechanical, electrical, and plumbing trades.
- C. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions, with fasteners spaced not more than 16 inches (400 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than two fasteners per side.

- D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 16 inches (400 mm) o.c.
- E. Install hardware uniformly and precisely.
- F. Adjust operating hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF WORK SURFACES

- A. Comply with installation requirements in SEFA 2. Abut top and edge surfaces true in plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints where indicated on Shop Drawings.
- B. Field Jointing: Where possible, make in same manner as shop-made joints, using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Shop prepare edges for field-made joints.
 - 1. Epoxy and Phenolic Work Surfaces: Secure field-made joints using concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten in accordance with manufacturer's written instructions to exert a uniform heavy pressure at joints.
- C. Fastening:
 - 1. Secure work surfaces, except for phenolic countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
 - 2. Secure phenolic work surfaces to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches (1200 mm) o.c.
 - 3. Where necessary to penetrate work surfaces with fasteners, countersink heads approximately 1/8 inch (3 mm) and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- D. Provide holes and cutouts required for service fittings.
- E. Provide scribe moldings for closures at junctures of work surfaces, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- F. Dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF SINKS

- A. Comply with installation requirements in SEFA 2.
- B. Drop-in Installation of Epoxy Sinks: Rout groove in work surfaces to receive sink rim if not shop prepared. Set sink in adhesive and fill remainder of groove with sealant or adhesive. Use procedures and products recommended by sink and countertop manufacturers. Remove excess adhesive and sealant while still wet and finish joint for neat appearance.
- C. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and work surfaces manufacturers' recommended chemical-resistant sealing compound or adhesive, and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement. Remove excess sealant or adhesive while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF LABORATORY ACCESSORIES

- A. Install accessories in accordance with Shop Drawings, installation requirements in SEFA 2, and manufacturer's written instructions.
- B. Securely fasten adjustable shelving supports, stainless steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.
- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.
- D. Securely fasten pegboards to partition framing, wood blocking, or reinforcements in partitions.

3.6 INSTALLATION OF ELECTRICAL RACEWAY

- A. 'Daisy Chaining', or the wiring of multiple devices in sequence, is not permitted.

3.7 INSTALLATION OF SERVICE FITTINGS

- A. Comply with requirements in other Sections for installing water and laboratory gas service fittings and electrical devices.

- B. Install fittings in accordance with Shop Drawings, installation requirements in SEFA 2, and manufacturer's written instructions. Set bases and flanges of sink- and work surface-mounted fittings in sealant recommended by manufacturer of sink or work surface material. Securely anchor fittings to laboratory casework unless otherwise indicated.

3.8 ADJUSTING

- A. Adjust operating equipment to efficient operation.
- B. Coordination with the Commissioning process: The start-up, training, and documentation shall be coordinated with the commissioning process and protocols outlined in MEP Sections and Division 01. Attention is called to the requirement for development of start-up tests and checklists in the electronic format specified, documentation of the start-up and checkout activities via that electronic forum, submittal of operation and maintenance data electronically per those requirements, and approval of functional performance tests related to equipment of this section.

3.9 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect work surfaces during construction with 6-mil (0.15-mm) plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches (1200 mm) o.c.

END OF SECTION

SECTION 13 03 00 - CONTROLLED TEMPERATURE ROOMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Prefabricated, modular, controlled temperature rooms designed and engineered to meet the specified operating criteria, complete with factory-tested self-contained mechanical conditioning system and controls, external structural support of ceiling panels and interconnection to building mechanical, plumbing and electrical as indicated/required. Components include the following:

1. Insulated metal panel construction.
2. Refrigeration equipment.
3. Dehumidification equipment
4. Ventilation equipment.
5. Plenums.
6. Digital controls.
7. Alarms.
8. Lighting.
9. Finish hardware
10. All other equipment necessary to achieve the environmental conditions specified herein.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Engineer, design, fabricate and erect modular controlled temperature rooms to comply with the following.
- B. Controlled temperature rooms: The following are controlled at sensor/chart recorder location.
1. Set Point for Cold Room: 4 deg. C, plus or minus 2 deg. C
 2. Temperature Uniformity: Not less than 2 deg. C, nor more than 8 deg. C within all areas of cold room.
 3. Humidity: 50 percent RH, plus or minus 20 percent; maintain uniformly.
 4. Ventilation: 35 cfm supply and exhaust (neutral pressure). For rooms larger than 150 sf., provide 50 cfm supply and exhaust (neutral pressure).
 5. Room shall recover to preset operating temperature within 5 minutes after door has been fully opened to 75 degrees F ambient for a period of 1 full minute.

- C. Noise Level: Maximum 65dBA with fan operational, exclusive of occupancy generated noise. Reduce fan noise by over-sizing fan or fans; reduce fan speed as required to furnish satisfactory air circulation; air velocity across coils not to exceed 500 fpm.
- D. Coordination Requirements with Other Trades:
 - 1. Floor slabs.
 - 2. Walls and ceiling construction enclosing the controlled cold lab rooms.
 - 3. Ventilation duct work including final duct connections to the controlled cold lab rooms and insulation.
 - 4. Electrical rough-ins, disconnects and final connections for all the controlled cold lab rooms.
 - 5. Condenser water supply, return, independent shut-off valves and condensate drain rough-in piping and final connections.
 - 6. Fire-suppression systems and devices.
 - 7. Remote monitoring through DDC system.

1.3 QUALITY ASSURANCE

- A. Manufacturer/Installer Qualifications: Provide cold room system produced by a manufacturer with not less than 10 years successful experience in the fabrication of assemblies of the type and quality required. A minimum of 200 rooms shall have been fabricated and installed within the last 5 years. Manufacturer shall assume responsibility for fabricating and installing cold room system.
- B. Comply with the latest revision of the codes, specifications, and standards of the following agencies except where more stringent requirements are shown or specified:
 - 1. National Electrical Code (NEC).
 - 2. National Electrical Safety Code.
 - 3. Occupational Safety and Health Administration (OSHA).
 - 4. American National Standards Institute (ANSI).
 - 5. Underwriters Laboratory (UL).
 - 6. National Electrical Manufacturers Association (NEMA).
 - 7. American Society of Mechanical Engineers (ASME).
 - 8. Air Movement and Control Association, Inc. (AMCA).
 - 9. Air-Conditioning and Refrigeration Institute.
 - 10. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).
 - 11. American Refrigeration Institute (ARI).

1.4 SUBMITTALS

- A. General: Submit in compliance with Division 01 section “Shop Drawings, Product Data and Samples”.
- B. Technical Data: Submit manufacturer's technical data (in formal submittal binder and tab form), for cold room components and systems including but not limited to the following:
 - 1. Written description of proposed system describing operating characteristics, and sequence of operation describing defrost, temperature control, humidity control, and chart recorder sensing methods and concepts.
 - 2. Insulated metal panels.
 - 3. Lighting.
 - 4. Fans and coils showing dimensions and required clearances, weights, capacities, ratings, and fan performance curves with operating point indicated.
 - 5. Motor electrical characteristics.
 - 6. Installation and maintenance instructions.
 - 7. Condensing unit specifications and submittals indicating such specified components as accumulators, separate receivers, and replaceable core filter-driers.
 - 8. Supply and exhaust ventilation venturi-type constant volume air valves.
 - 9. Capacities of refrigeration and drying/humidification systems, including number of evaporators.
- C. Cooling Load Calculations, Equipment Capacity Data: Submit cooling/ heating/ dehumidification calculations, design criteria and equipment capacity summary. Include typical load factors for ventilation loads, internal heat producing equipment for controlled temperature rooms (not less than 5 watts per square foot), typical pull down capacity for room temperature product entering the room, people, lighting, transmission, and door infiltration losses. Obtain and document user requirements, as required to perform these calculations.
- D. Shop Drawings: Submit shop drawings showing controlled temperature rooms and equipment dimensions, door and window locations, lighting, control panels, weight loadings, required clearances, field connection details, and methods of support. Draw to a scale of one half-inch to one foot. Show all required clearances for servicing.
 - 1. Separate drawing submittals are required for each individual cold box with unique room numbers, and unique component nomenclature and tagging to reflect the individual cold box. One set of drawings indicating “typical” cold boxes is not acceptable.

2. P & ID: Submit piping and instrumentation diagram showing mechanical system flow diagram, air flows, temperatures, pressures, interface with house mechanical systems, and sequence of operations, as well as house system control monitoring requirements. All P & ID components to be clearly labeled and cross referenced with a summary bill of materials/schedule, with tagging consistent with the submittals for ease of checking and verification.
 3. Coordinate with field mechanical contractor and indicate routing of condenser water, condensate and supply/exhaust ventilation air to nearest mains.
- E. Certification: Manufacturer shall certify in writing that controlled temperature rooms comply with specified requirements. Submit test data and report showing compliance with performance requirements. Submit commissioning plan for testing systems in accordance with the procedures listed in Part 3 of this Section. Submit for approval prior to commencement.
- F. Operation and Maintenance Manuals: Upon completion of work, provide Owner with approved operating and maintenance manuals containing approved shop drawings, as-built documents, equipment literature, cuts, bulletins, performance data, engineering data sheets, testing and certification documents, and written instructions relative to the care and operation of all equipment, controls, and systems. Manuals shall be properly indexed and bound in hard-back three ring binders.
- G. Training: Provide training to facility personnel in the proper maintenance and operation of the cold box.

1.5 QUALITY ASSURANCE

- A. Qualification Data: Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.
- B. Certificates:
1. CFC Compliance Certificate:
 - a. Insulated panels to comply with current EPA regulations and the Clean Air Act. Manufacture to supply Notarize Affidavit that the insulated panels are Class I foam type that conforms to current statues in effect at date of job site arrival.
 - b. CFC emission compliance foam type to be Factory Mutual Standard #4880, UL E-84, MEA 80-81M.
 - c. The affidavit to hold harmless and indemnify the Owner, architect, Engineer and the equipment consultant from any fines, summons or liabilities which may result from a violation.

d. EPA Venting Certificate:

1. Manufacturer to submit certificate that one job site mechanic has received accredited training conforming to the EPA an Clean-Air Act as of July 1, 1992.
2. Sub-manufacturer and / or general refrigeration manufacturer shall assume full responsibility for the actions of the employees or casual helpers in respect to “venting” of EPA regulated refrigerant gases.

- C. The affidavit to hold harmless and indemnify the Owner, architect, Engineer and the equipment consultant from any fines, summons or liabilities which may result from a “Venting Controlled Refrigerants”.

1.6 CLOSEOUT SUBMITTALS

- A. Warranty: Submit copy of warranty form for Owner’s approval prior to start of work.
- B. Closeout Submittals: Submit the following to the Owner.
1. Warranty.
 2. Maintenance and operating manual.
 3. Record documents.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver finished components and assemblies to site until installation spaces are ready to receive rooms.
- B. Wrap and crate finished components and assemblies at factory to prevent damage or marring of surfaces during shipping and handling.
- C. Store products off ground, under cover, protected from elements and construction operations.

1.8 QUALITY ASSURANCE

- A. Qualifications:
1. Contractor: Contractor is responsible for quality control of the Work.
 2. Manufacturer: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.

- a. Experience: Minimum of 5 years and 200 rooms installed in the last 5 years.
- b. Installer: An installer trained and approved by the manufacturer in the use of the materials and equipment to be employed in the Work.

- 1. Experience: Minimum of 5 years and 200 rooms installed in the last 5 years.
- 2. Maintenance Proximity: Facilities not more than 2 hours normal travel time from the project site.

- B. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
- C. Single Source Responsibility: Obtain materials from a single manufacturer for the complete system.
- D. Pre-Installation Meetings: Contractor to conduct meetings at site with installer prior to start of Work. Familiarize installer with conditions at site and related Work.

1.9 SITE CONDITIONS

- A. Field Measurements: Check actual spaces to receive controlled temperature rooms by accurate field measurements before fabricating panels; show recorded measurements on final shop drawings. Coordinate fabrication with construction progress to avoid delaying the work.

1.10 SEQUENCING AND SCHEDULING

- A. Schedule installation of the controlled temperature rooms in sequence with related elements of the Work specified in other sections to ensure that rooms are protected against damage from subsequent construction activity. Coordinate scheduling with the Owner.

1.11 WARRANTY

- A. Manufacturer warrants that cold room systems including, but not limited to panels, panel locking assembly, gaskets, entrance door and frame, hardware, mechanical and electrical systems, shall be free from defects in materials and workmanship under normal use and service. The manufacturer is obligated to repair or replace equipment covered by the warranty that proves to be defective within the warranty period.
- B. Warranty covers all parts except consumable items (belts, filters, fuses) for the warranty period. It does not cover normal maintenance and re-calibration labor after initial start-

up. Furnish a copy of the warranty in advance of the time when the unit is shipped. Period of warranty is as follows:

1. Insulated Metal Panels and Room Construction: Ten years from date of Substantial Completion.
2. Compressor: Five years from date of start-up and commissioning.

1.12 MAINTENANCE

A. Maintenance and Operating Manual: Submit for information. Assemble into binder.

1. Maintenance Practices: Manufacturer's recommended maintenance practices describing the materials, devices and procedures to be followed in cleaning and maintaining the Work.
2. Operating Instructions: Manufacturer's recommended operating instructions describing the procedures to be followed in operating the Work. Include manufacturer's brochures and lists describing the actual materials used in the Work.
 - a. Instructions for sequential operation, start-up and shut down, with pertinent control data and schematics, and room arrangement

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products by one of the following:

1. Estes Refrigeration, Inc.
2. Environmental Specialties, Inc.
3. Harris Environmental Systems, Inc.
4. Environmental Growth Chambers.
5. Biocold Enviromental, Inc.
6. Nor-Lake Scientific.
7. Thermolinear.
8. **Control International, Inc.**

2.2 FLOOR CONSTRUCTION

A. Floor sections shall be similar to all other sections but shall be made to withstand uniformly distributed floor loads. Load bearing shall be 500 psf for a 2 in. and 4 in. thick floor utilizing a 14 gauge galvanized steel interior surface.

- B. Floor shall be a maximum of 2 in. thick to maintain a seamless installation with the adjacent flooring. Floors for freezer-type carcass hold rooms to be maximum of 4 in. thick to maintain a seamless installation with the adjacent flooring.

2.3 INSULATED METAL PANEL CONSTRUCTION

- A. Foamed-in-place polyurethane insulation sandwiched between interior and exterior skins with tongue-and-groove panel edges.
 - 1. Panel Thickness: 4 inches.
 - 2. Panel Width: 12 inches min. width; 48 inches max. width; furnish in 6-inch increments.
 - 3. Panel height: 8 ft 6 inches.
- B. Interior and Exterior Wall Skins:
 - 1. Exterior Wall Panels: 24 gage stainless steel.
 - 2. Interior Wall Panels: 24 gage smooth galvanized steel; white polyester baked-on finish.
 - 3. Ceiling Panels: 24 gage smooth galvanized steel; white polyester baked-on finish.
- C. Wall Panel Reinforcement: Where indicated, reinforce wall panels with 16 gauge galvanized steel tapping plates permanently foamed within the panels to accommodate wall mounted equipment, shelving or casework.
- D. Reinforce roof in order to sustain weight of roof panels, and equipment loads. Reinforcement shall not violate the insulation value of the panels.
- E. Insulation: Foamed-in-place polyurethane insulation complying with the following requirements:
 - 1. R-Value: 33.3.
 - 2. Thermal Conductivity (K-factor): 0.121.
 - 3. Coefficient of Heat Transfer (U-factor): 0.030.
 - 4. In-place Density: 2.2 pcf.
 - 5. Compressive Strength at Yield Point: 19 pounds per sq. inch.
 - 6. Flame Spread: 25 or less in accordance with ASTM E 84.
 - 7. Smoke Developed: 450 or less in accordance with ASTM E 84.
- F. Panel Edges: Tongue-and-groove locking assemblies foamed-in-place at time of fabrication.
- G. Panel Locking Assembly: Provide manufacturer's standard joining mechanism for panel assembly, activated by hex wrench provided by manufacturer. Access ports shall be on interior to allow assembly from the inside and shall be covered by snap steel caps.

- H. Panel Gaskets: Continuous flexible vinyl gaskets foamed-in-place on interior and exterior edges of tongue rail, impervious to stains, grease, oil, and mildew.

2.4 INTERNAL CEILING

- A. Environmental rooms require the following construction criteria to accommodate the control requirements.
 - 1. Ceiling Panels: 4 and 5-inch thick with one-piece foamed-in-place edge caps. Metal face skins shall incorporate seams using a double 90° bend at a maximum width of two feet for additional strength. The joint between the ceiling and wall shall form a 45° angle to allow for easy cleaning.
 - 2. Ceiling Plenum: Provide uniform air circulation and distribution system throughout controlled environmental room utilizing a plenum ceiling. Plenum shall also house lighting fixtures, make-up air fan, and refrigeration devices. Clearance below finish ceiling plenum within room work area shall be unobstructed. Include supply and exhaust duct collars above ceiling sized and located as required by HVAC trade.
 - 3. Self supporting ceiling shall use galvanized hanger brackets which securely lock between ceiling panels and securely fasten to load bearing supports. System shall be designed to support the ceiling span.

2.5 HINGED ENTRANCE DOOR PANELS

- A. Provide infitting flush-design door similar in construction to wall panels. Door location and direction of swing are indicated on Drawings.
 - 1. Door Thickness: 4 inches.
 - 2. Door Size: 36 inches by 78 inches mounted in 40 inch wide panel.
- B. Magnetic core thermoplastic gaskets, installed on top edge and both sides of door, shall keep door in a closed position and form a tight seal. Provide flexible, dual-blade wiper gasket at the bottom of the door. Gaskets shall be replaceable and resistant to damage from oil, fats, water and detergent.
- C. Reinforce perimeter of door opening with heavy U-channel steel frame to prevent racking and twisting.
- D. Door Jamb: Manufacturer's standard, fully coved, extruded structural aluminum, welded, door jamb with anodized aluminum finish.
- E. Threshold: Extruded aluminum.
- F. Heater Wire (For rooms operating at or below 4 deg. C): Anti-sweat heater wire installed around entire perimeter of door opening and under threshold.

- G. Hardware: High-pressure die cast zinc with polished chrome finish. Provide extra-large 1/2-inch thick non-conducting tapping plates for attachment of the following hardware items:
 - 1. Hinges: Two spring-loaded, self-closing hinges.
 - 2. Latch: Provide positive door latch with inside safety release mechanism.
 - 3. Closer: Hydraulic, piston driven.
 - 4. Finish: Stainless steel, US 32D (dull stainless steel).
- H. Observation Window: 14-inch x 24-inch observation window, consisting of three panels of safety glass with sealed air spaces. Window shall be removable to allow replacement.
- I. Kickplate: 36-inch high by width of door, 1/8-inch thick stainless steel kickplate on interior and exterior of door and door frame.
 - 1. For doors with kickplates add a third door hinge.

2.6 ACCESSORIES

- A. Trim Strips: Provide trim strips of same material and finish as panel skin to close openings between insulated room and building partitions.
- B. Closure Panels: Provide closure panels of same material and finish as panel skin to close area between insulated room and building ceiling.
- C. Cylinder Lock: Cylinder lock and locking cam with non-conductive housing; with keying that matches facility and Owner keying requirements.
- D. One-Part Mildew-Resistant Silicone Sealant: Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide; intended for sealing interior joints with nonporous substrates and subject to in-service exposure to conditions of high humidity and temperature extremes.
- E. Sleeves for Service Piping: Stainless steel or Schedule 80 PVC pipe; sealed to room from both ends with silicone sealant. Provide sleeves of sufficient diameter to allow at least 1/8-inch clearance around service line. Seal void between service line and sleeve with silicone sealant. Provide caps to seal pass-through when not in use.
- F. Pressure Relief Port: Provide pressure relief port(s) to equalize the difference in exterior and interior pressure caused by sudden pressure changes. Provide adjustable round screw volume type, not removal blast gate type.
- G. Filler Panels: Where required, provide filler on exposed faces of rooms from top of room to finished ceiling line and from side edges to adjacent partitions to present a neat, finished installation. Fabricate from material matching wall / roof panel material and

finish. Provide cut-out for routing of condensate drain line through filler panel termination at floor drain.

2.7 LIGHTING

- A. Lighting: Provide required number of ceiling mounted, vapor proof, LED light fixtures to maintain light intensity of 100 ft- candle average when measured 40 inches above floor.
- B. Light switch with pilot light shall be located adjacent to door with wiring in rigid conduit concealed inside the door and terminated at surface mounted junction box on interior door frame.
 - 1. Dual 3-Way Switch: Provide 2 switches on each entrance door. Exterior switch has pilot light which illuminates when interior lights are on; interior switch has constantly burning pilot light which locates switch if interior lights are turned off from outside.

2.8 INSTRUMENTS AND CONTROL SYSTEMS

- A. General: Control panel with key-locked door and acrylic cover providing a view of controls and protection of controls.
 - 1. Provide conduit cover of construction to match exterior of unit.
- B. Temperature Controller:
 - 1. Temperature Uniformity: Chambers shall have a defined temperature uniformity across the work surface 40 inches off the floor and to within 12 inches of the walls. The uniformity is the variation between points across the plane as measured by a multi-point strip chart recorder with thermocouple sensing. The chamber uniformity standard is plus/minus 1.0 deg. C.
 - 2. Fully programmable electronic solid state controller; LED display of both actual room air temperature and set point; high/low audible and visual alarms, adjustable limits, alarm silencer with adjustable time delay; battery back-up for alarm. Control of all operating devices and alarm functions to be provided by a single PLC control. Control programming shall utilize a single user adjustable room temperature control setpoint with all other operating and alarm setpoints referenced to this control point (i.e. alarms result from deviation from setpoint rather than having independent alarm setpoints). Provide alarm for PLC failure. Locate sensors for all devices in the same location, and to detect average room temperature - inlet to the coil is recommended ; protect sensors against damage.
 - a. Temperature Control: +/- 2.0 deg. C.
 - b. Control Sensitivity: +/- 0.02 deg. C.

- c. Display/Set-Point Resolution: 0.1 deg. C.
- C. Safety Shut-Off: Controller shall shut off the dessicant dryer in the event of a high temperature alarm, and shut off refrigerant solenoid/evaporator fan equipment in the event of a low temperature alarm.
- D. Temperature Recorder: Housed in main control panel; single-pen, 10 in dia. circular chart capable of recording 7 days of operation with minus 50 deg. C to plus 75 deg. C recording range. Provide one year supply of charts. Provide written notification at conclusion of start up and commissioning, to general contractor to change out chart every week prior to user move-in.
- E. Defrost Cycle: Adjust duration and frequency so as to maintain box temperature criteria with no “spikes”.

2.9 MECHANICAL SYSTEM

- A. Redundancy: Mechanical redundancy is not required.
- B. Refrigeration System: Provide integrated industrial type refrigeration system consisting of evaporator and condensing unit that will achieve and maintain the set point temperature. Utilize hot gas modulation valves.
- C. Continuous Operation: Compressor and evaporator shall be designed to operate continuously.
- D. The refrigeration system shall be capable of maintaining the specified controlled temperature rooms conditions without operating at full capacity for more than 80 percent of the time under the following conditions:
 - 1. Ambient temperature and relative humidity surrounding controlled temperature rooms will vary between 70 deg. F (50 percent RH) and 75 deg. F (40 percent RH).
 - 2. Additional electrical load of 5 watts per square foot of floor area of controlled temperature rooms.
 - 3. Personnel entering and leaving temperature controlled room at the rate of six times per hour with maximum of 30 seconds door open time.
- E. Condensing Units:

1. Provide UL-labeled units complete with starters and fused disconnect switches for single point power connection. Units shall operate at 460/3/60, except 2-hp and less shall operate at 208/3 ph. Compressors shall be of the semi-hermetic reciprocating or scroll type, spring mounted. Select compressor to operate 16 to 18 hours at the specified evaporator temperature in an average ambient temperature of 100NF entering condensing unit. Provide water cooled condenser with cleanable shell and tube, strainer on inlet. Provide shut off valves, visible pressure and temperature gauges on inlet/outlet. Condenser water regulating valve to fail in open position in the event of power failure, in order to prevent high head pressure shut off. Include the following:
 - a. High/low pressure safety control (high pressure switch shall be auto-reset)
 - b. Receiver with fusible plug and inlet an outlet valves.
 - c. Water cooled condenser with pressure relief and inlet valve.
 - d. Liquid line dryer with replaceable core.
 - e. Combination sight-glass/moisture indicator.
 - f. Suction line filter.
 - g. Crank case pressure regulator.
 - h. Accumulator.
 - i. Thermal protection.
 - j. Type 404a refrigerant.
 - k. Vibration elimination device on suction, hot gas, and liquid lines.
 - l. Provide alarm point connection “fail to run”. Provide contact for Owner use and do not connect to temperature alarm. Form C, 2 AMP contacts shall close when compressor fails to start when called to operate.
 - m. Refrigeration components shall be designed for 250 psig working pressure of 150 percent of maximum operating pressure, whichever is greater.
 1. Suction and discharge service valves.
 2. Oil pressure control on 5 HP units and larger.
 3. Fused disconnect.
 4. Internal overload protection for compressor.
 - n. Solenoids that cycle for control shall be of the extended life or rapid cycle type with manual lift stems for serviceability.
 - o. Provision for external time delay start of compressors when on standby power source.
- F. Evaporator Unit: Copper tube, aluminum fin design with aluminum housing; minimum 8 fins/in, and 4 rows deep; air velocity less than 500 fpm; Coil and blowers shall be custom engineered for the specified design temperature. Commercial fan coil units are not acceptable.
- G. Refrigerant Piping and Piping Insulation:
 1. Refrigerant Piping Design Criteria:

- a. Suction Lines: Size for minimal system pressure drop and effective oil return and all operating load conditions. P trap spacing shall not exceed 15 feet.
- b. Hot Gas Lines: Size at same velocities and with the same P-traps as specified above for suction lines. Special care to be taken in the selection of hot gas valves to minimize disruptive noises from throttling valves.
- c. Liquid Lines: Size liquid lines for a maximum of 2 psig pressure drop.
- d. Evaporator Coil Condensate Lines: Condensate drainage shall be collected in a urethane insulated drain pan and run through a minimum 7/8-inch copper drain line to appropriate drain site; insulate and wrap drain line with heating cable, operate cable continuously below 0 deg. C. Rooms operating below 0 deg. C shall have automatic drain pan heaters. In instances where the drain line is terminated at the perimeter of the box, and piped by the field plumber, specify and indicate on the construction drawings that the line will be fully insulated if hidden inside a wall, and coordinate in the field.
- e. Seal penetrations to prevent infiltration and formation of condensate.
- f. Refrigerant Piping:
 1. Tubing: Nitrogenized CR, hard drawn seamless copper, type L, ASTM B280-83, ANSI B31.5-74, ANSI B16.22-80.
 2. Joints: Silver Solder, except hot gas lines which shall be silver brazed.
 3. Fittings: Wrought solder type, ASTM B68.80, ANSI B16.22-80.
 4. Unions: 3/4-inch and smaller; wrought solder type, ASTM 368.80, ANSI B16.22-80.
 5. Valves:
 - (a) Manual Shut-Off: Diaphragm packless type angle or globe with forged brass body, threaded bonnet, metal diaphragm, composition seat disc. solder to solder.
 - (b) Charging: Diaphragm packless type, solder to flare. Complete with seal cap and chain for flared charging connection.
- g. Silver Braze: AWS A.58-69-BAG-B.
 1. Tubing Hangers: F&M split ring type or Unistrut assemblies with proper tubing clamps to support liquid, suction, and hot gas lines individually. Space hangers appropriately for the smallest diameter line.
 2. During the soldering or brazing operation, protect valves (solenoid, expansion, etc.) and all components from the heat of the fabrication operation to avoid internal damage to the seats, seals or critical components.
 3. During the brazing operation an Argon or Nitrogen internal tube purge shall be a required part of the procedure.
- h. Piping Insulation:

1. Insulate all suction, hot gas, and drain lines with flexible, closed-cell elastomeric type with the following characteristics:
 - (a) Minimum thermal conductivity of 0.27 Btu-in/HR-ft²-oF at 75oF mean temperature, per ASTM C177 or ASTM C518.
 - (b) Flame-spread of 25 or less, and a smoke developed rating of 50 or less, per ASTM E84.
 - (c) Water vapor transmission shall be 0.10 perm-inches minimum, per ASTM E96, Procedure A.
 2. Insulation Thickness: 1 inch for lines 10 deg. F and below.
2. Refrigeration Control and Accessories
- a. Provide thermostatic expansion valves sized for proper tonnage and refrigerant and with external equalizers. Provide a sight flow indicator and strainer ahead of the expansion valve.
 - b. Solenoid Valves: Liquid line solenoid valves (UL listed), brass bodied with full line size connections.
 - c. Liquid Line Dryer: Provide removable cartridge type, liquid line dryer of ample size for each system.
3. Provide a suction line accumulator filter ahead of each compressor or suction header.
- a. Shut-Off Valve: Provide packless type back-seating refrigerant shut-off valves at each compressor, condenser and evaporator so that these items and their accessories may be removed individually for servicing.
 - b. Provide pressure and vacuum gauges with 3-1/2 inches dia. dials, rustproof case burden tube and rustproof dial on suction and hot gas lines of each compressor. Each gauge shall be compatible with R404a (where applicable).
- H. Provide high auto reset and low pressure switches at each condensing unit.
- I. Provide charging valve set in the liquid line (full line size).
- 2.10 DEHUMIDIFICATION SYSTEMS
- A. General: Humidification system is only required if the manufacturer determines it is needed to maintain the humidity specification.
 - B. Chamber Dehumidification: Provide regenerative type dessicant de-humidifier system to remove moisture, as required, from ventilation and internal sources. Room supply ventilation and room exhaust ventilation air flows shall be controlled with a self contained, venture-type, volume dampering system such as M & I, Phoenix, or similar (without the
- CONTROLLED TEMPERATURE ROOMS

use of electronic actuator/ controller) and which is capable of maintaining the low cfm flow rates, independent of house system static pressure fluctuation. Design system for neutral cold room pressure. Building mechanical contractor shall duct supply and exhaust with manual volume damper to cold box roof area. Cold Box contractor shall install remainder of supply air duct, exhaust duct and regenerative heat exhaust and connect to the house system. Regenerative air exhaust shall be connected at dryer unit with a thimble type two inch air gap connection. Dehumidification air will be recirculated and not be dependent on constant volume supply-exhaust terminal-box positions. Coordinate with house system design engineer that house system supply/exhaust pressures will not adversely affect box operation in any way. Heated, dry air shall be introduced into the room so as not to adversely affect room temperature fluctuation. Dampening system and controls shall have “fail” positions and safeties, to avoid creating negative box pressure. System shall be self-contained, only requiring manually dampered supply and exhaust duct hookups from house mechanical systems contractor.

2.11 ALARM AND SAFETY CONTROLS

- A. Equip controlled temperature rooms with an electronic high/low alarm and safety control of the solid state digital type mounted on the front of the control panel.
- B. The system shall provide the necessary sensing devices and circuits to take over control, initiate corrective action and activate an audible and visual signal device in event of deviation of more than 2 deg. C from the operating setpoint temperature.
- C. The alarm signal shall be uninterrupted until the room is restored to set temperature or silenced by an operator.
- D. A separate alarm shall be provided for high and low operating temperature. The alarm set point shall be digital and expressed in deg. C centigrade.
- E. Each alarm shall have an adjustable delay period of 0 to 15 minutes before alarm is activated. Alarm switching voltage shall be low voltage and low current.
- F. The audible alarm shall be switch selectable between a time delayed silence of 0 to 15 minutes and an alternate action in that once silenced, the alarm will remain silenced until the alarm condition clears. Upon clearing of the alarm condition, the audible alarm will sound again to notify the operator that room is back within its operating limits.
- G. High Temperature Alarm: Provide a multiple level alarm sequence with the first level sounding an alarm, and sending the alarm to the BAS as notification to the building maintenance staff that a room is in failure mode. The second level of alarm would shut down the equipment only if the room temperature continues to rise for a certain amount of time.

2.12 ELECTRICAL EQUIPMENT AND MATERIALS

- A. Electrical Requirements: Electrical components shall comply with requirements of UL and NEC. Final power connections are specified in a Division 26 section.
1. Receptacles: Provide 125 VAC, 200 amp NEMA 5-20R duplex receptacles with weatherproof covers mounted 45 inches A.F.F. Wire receptacles alternately with not more than 4 duplex receptacles per circuit. Provide two receptacles per wall.
 2. The junction box for each outlet shall be foamed into the insulated panel with a 1/2-inch EMT conduit from the junction box and extended to the top of the room to allow for electrical connection of the outlet. All conduit shall be hidden within the walls of the room. Exposed conduit on the interior or exterior of the room is not acceptable. Conduit and boxes shall be non-metallic.
- B. Provide required conduit, wire, boxes, and fittings for connection of the following:
1. Evaporation units to common junction box on top of room.
 2. Condensing units and/or control panels and evaporator units for control and/or power requirements.
 3. Door heaters to common junction box on top of room.
 4. Conduit and wire (factory furnished) from door magnetic switches to junction box on top of room.
 5. Temperature alarms to junction box on top of room.
 6. Note: Junction box shall be in an accessible location. If top of room is not accessible, coordinate new location with Contractor.
- C. Provide sealed fittings where conduit penetrates insulated enclosure.
- D. Coordinate wiring and connection point with Division 26 (Electrical).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine existing conditions prior to beginning work and notify Architect in writing of unsatisfactory conditions. Commencing installation constitutes acceptance of related work by other trades.

3.2 INSTALLATION

- A. Seal all joints, openings, piping, electrical and ductwork penetrations, in the outside and inside faces of controlled temperature rooms. At line of support on other floor

construction (outside and inside) seal with a formed cove of sealant or other coved trim member.

- B. Install closure panels and strips where installed unit results in a residual space, which is not of sufficient size to be cleaned or maintained. Seal joints, forming a cove of sealant or seal joint using a pre-manufactured trim member.
- C. General: Convenient access to equipment requiring regularly scheduled maintenance is essential. Do not install equipment in locations that do not provide easy access to the equipment.
- D. Install condensing units and evaporator units as indicated complete with all interconnecting refrigerant piping, conduit and wire as required. Seal where items penetrate insulated enclosure.
 - 1. Piping and conduit between condensing units and evaporator units shall be field routed by Contractor. Coordinate work with other contractors to avoid interferences.
 - 2. Where piping and conduit pass through floor slabs, core drill slab and install pipe sleeves extending 4 inches above slab. Provide firestopping at penetrations to achieve specified fire rating.
 - a. Coordinate location of penetrations with Contractor.
 - b. After Owner acceptance of testing, apply silicone caulk to inside of conduits that penetrate temperature controlled rooms room enclosure.
- E. Pipe Insulation: Apply in accordance with requirements of Division 15 Mechanical.
- F. Electrical Installation: Install electrical work in accordance with requirements of Division 26 Electrical.

3.3 TESTING

- A. Notify Owner and Architect fourteen days in advance of the testing date.
- B. Conduct testing to certify compliance with requirements listed in “System Performance Requirements” article in Part 1 of this Section. Testing shall include, but not be limited to, the following data:
 - 1. Control point setting.
 - 2. Date and time of test start.
 - 3. Chart speed.
 - 4. Point where temperature and stabilization are achieved.
 - 5. Point where door is opened.
 - 6. Signature and designation of individual conducting test.

7. Manufacturer and serial number of datalogger.
 8. Date of certification, name of testing laboratory and certificate number. Provide clearly legible printouts with no overprinting.
- C. Run-In Test (Simulated Load): Use multi point (12 sensor points) chart recorder to measure temperature settings and uniformity indicated in “System Performance Requirements” article. Measure temperature on a horizontal plane 40 inches above floor and within 12 inches of walls as well as other uniformly placed locations within the room, including the permanent room sensor location. Owner’s representative will select test sensor locations.
1. Room Temperature: Measure at eight locations within the room.
 2. Fluid Temperature in Vials: Measure fluid temperature inside vials at four locations within room.
 3. Run tests continuously for 72 hours with ventilation on, door traffic, and simulated internal heating load to certify compliance with performance requirements.
- D. Run-In Test (No Load): Conduct tests with room empty for 24 hours and check temperature/ humidity stability and tolerances as specified.
- E. Power Failure Test: Shut off power to the room, open the door, and allow room temperature to reach ambient. Shut the door, turn the power back on, and verify if the refrigeration/ dehumidification system turns on by itself, without operator intervention, and returns the room to the design temperature.
- F. Recovery Test: Room shall recover preset operating temperature within five minutes after door has been fully opened to 75o F ambient temperature for a period of one minute.
- G. Humidity: From ambient, room shall attain lowest condition and stabilize within eight hours. The humidity test shall be conducted utilizing recording type hygrometer sensitive to 2 percent differential in RH. Test shall be a minimum of 24 hours.
- H. Testing Refrigerant Piping:
1. Evacuate the system (both sides of expansion valve) to 26 inches of mercury vacuum. Use appropriate pressure gage. Check to assure that entire system is evacuated.
 2. Reclaim holding charge of refrigerant used for shipping, if applicable.
 - a. After 26 inches of mercury vacuum is obtained, isolate system from vacuum source.
 - b. Hold system at 26 inches of mercury vacuum for 20 minutes; a major leak will result in loss of vacuum.
 - c. Tap brazed joints with a rubber mallet, with sufficient force to disclose leaks that might start with expansion, contraction or vibration.

- d. If system holds 26 inches of mercury vacuum, disconnect vacuum source. Bleed in a small amount of freon R-404a gas, preventing liquid freon from entering the system. Turn suction shut-off valve to mid-position and open charge valve. Admit freon R-404a gas to 10 psig.
 - e. Disconnect freon supply and charge system with dry nitrogen gas to 250 psig. Use soap test to determine leak location.
 - f. For major leak repair, evacuate entire system and repair. After repair, repeat steps 1 through 7.
 - g. After major leak repairs, check refrigerant system with a halide leak detector. Caution: Freon that might be present in the area can interfere with the sensitive halide detector. Ventilate area to remove trace freon.
 - h. Do not repair leaks under pressure. Repair brazed joints using new material.
 - i. After system is determined to be leak-free, evacuate the system to 29" hg. vacuum. Maintain this pressure for 12 hours, continuously, to remove moisture from the system.
 - 1. After completion of above step, back seat suction shut-off valve, close vacuum source valves and disconnect vacuum source. System is ready to charge.
 - j. Tabulate test results in triplicate, and forward to Owner.
 - k. Provide a walk-through tour with the Owner's plant site refrigeration technician.
 - I. Insure that controlled temperature rooms are functioning properly and maintaining specified temperature. Make field adjustments prior to acceptance.
 - J. Thoroughly clean the inside and outside of controlled temperature rooms using sanitizing cleaning products.
 - K. Remove and dispose of packaging materials and protective coverings.
 - L. ADJUSTING
 - M. Repair or remove and replace defective work, equipment and accessories as required upon completion of installation.
- 3.4 CLEANING
- A. At the end of each work day, remove unused materials, debris and containers from the project site.
 - B. Clean exposed and semi-exposed surfaces, touch-up finish as required. Remove and refinish damaged or soiled areas.

3.5 DEMONSTRATION

- A. Factory trained manufacturer representative shall provide demonstrations to Owner' staff

3.6 PROTECTION

- A. Protect controlled temperature rooms after installation as required to prohibit damage. Replace or repair damaged work prior to acceptance. Remove protection at time of Substantial Completion.

END OF SECTION

IN203 Medical Education and Research Building Lower Level Build-Out IU 20250027

New Campus Road
Indianapolis, IN 46202

CONSTRUCTION DOCUMENTS
APRIL 10TH, 2026



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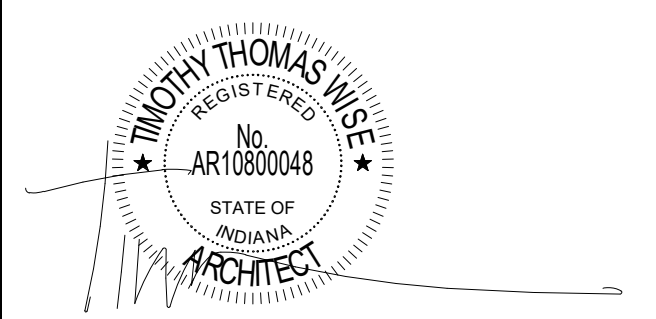
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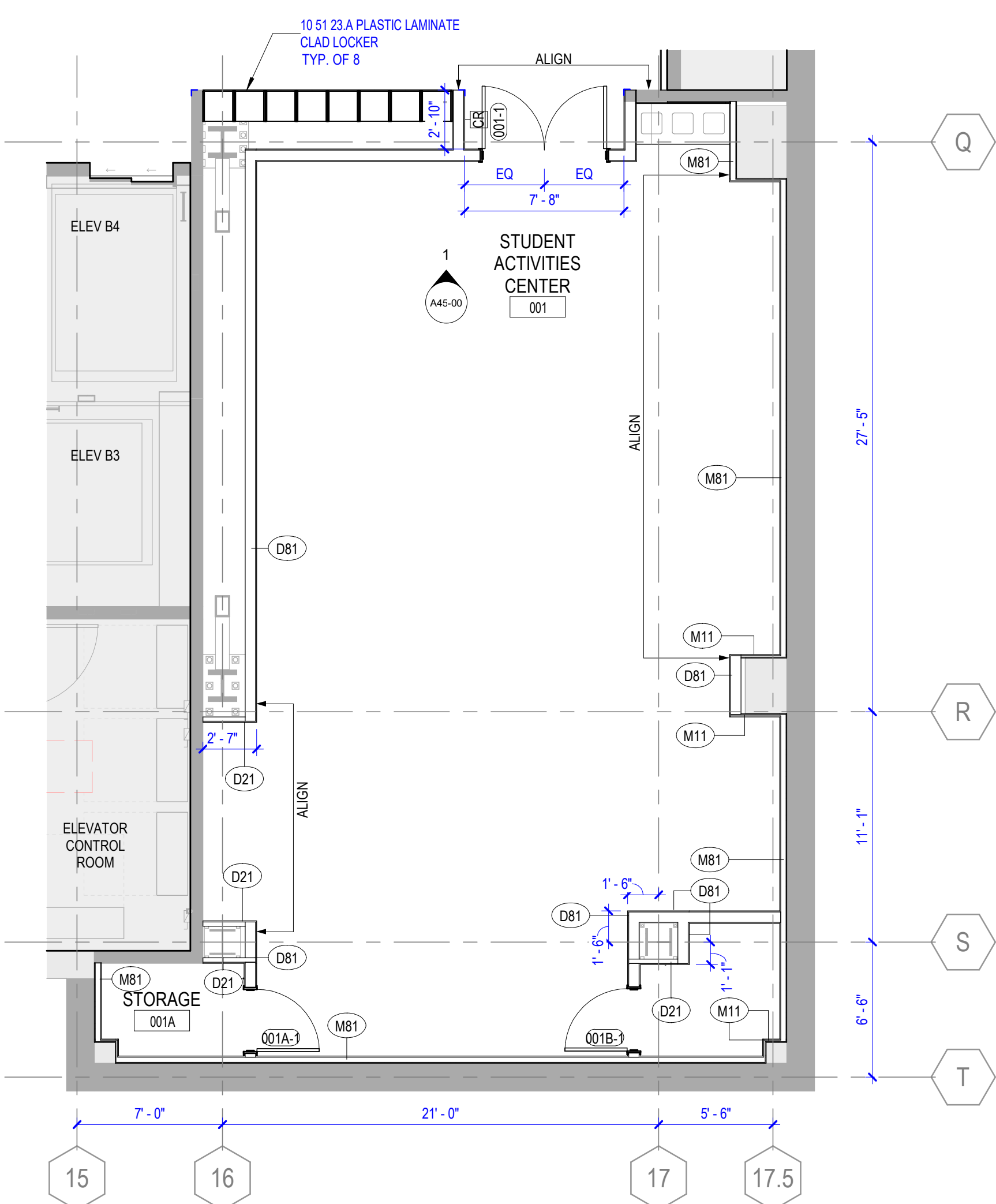


COVER SHEET & SHEET INDEX

G00-00

3 FLOOR PLAN - AREA C

SCALE 3/16" = 1'-0"



2 FLOOR PLAN - BASEMENT - AREA B

SCALE 3/16" = 1'-0"



1 FLOOR PLAN - BASEMENT - AREA A

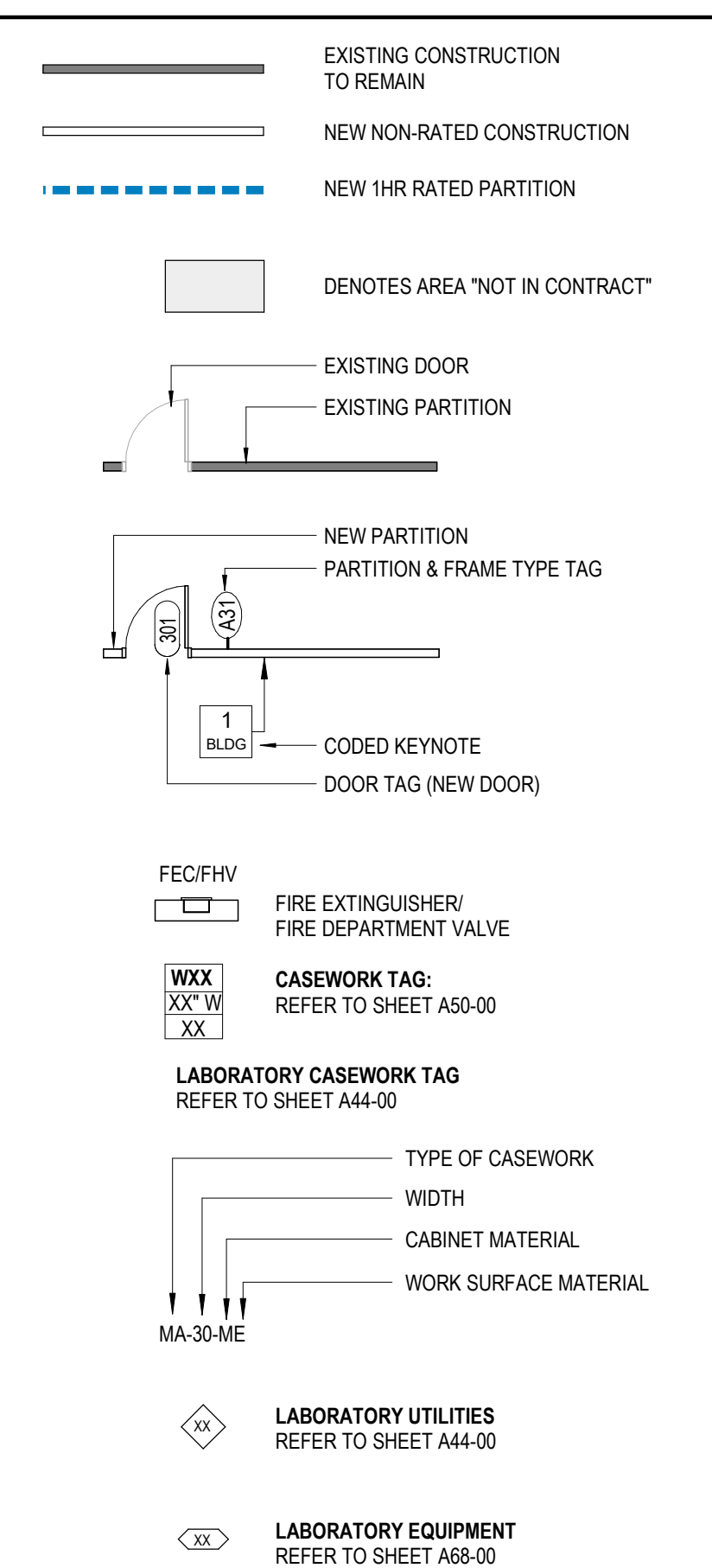
SCALE 3/16" = 1'-0"



FLOOR PLAN GENERAL NOTES

- ALL NEW PARTITIONS SHALL BE TYPE A81, UNO, REFER TO SHEET A61-01 FOR MORE INFORMATION. PARTITION TYPES AND FIRE RESISTIVE RATINGS INDICATED ARE TO BE CONTINUOUS FOR THE LENGTH AND HEIGHT OF THE PARTITION, INCLUDING ABOVE DOORS AND GLAZING.
- THE CONTRACTOR SHALL PATCH AND REPAIR ALL EXISTING & NEW WALL SURFACES PRIOR TO APPLYING FINISHES.
- WHERE EXISTING WALL BASE OR WALLCOVERING HAS BEEN REMOVED, SKIM COAT WALL SURFACE TO MAKE SMOOTH TO MATCH ADJACENT CONSTRUCTION SO AS NOT TO TELEGRAPH THROUGH NEW FINISH.
- WHERE PARTITION IS TO ALIGN WITH THE FACE OF AN EXISTING DRYWALL CORNER OR EDGE, REMOVE THE EXISTING CORNER BEAD, TAPE, APPLY JOINT COMPOUND, AND SAND SMOOTH. NEW AND EXISTING DRYWALL TO BE IN THE SAME PLANE WITH NO VISIBLE JOINTS.
- OPENINGS IN GYPSUM BOARD FOR ELECTRICAL AND COMMUNICATION RECEPTACLE, PIPING, DUCTWORK AND OTHER PENETRATIONS SHALL MAINTAIN TIGHT TOLERANCES, WITHIN 1/2 INCH OF EDGE OF PENETRATING ELEMENT. EXPOSED EDGES SHALL BE COVERED BY TRIM PLATES OR ESCUTCHEONS.
- SEAL PENETRATIONS IN GYPSUM BOARD CONSTRUCTION ABOVE FINISHED CEILING TO PREVENT SOUNDS LEAKAGE AT ACOUSTICAL PARTITIONS AND AT DEMISING PARTITIONS, UNLESS NOTED OTHERWISE. PENETRATIONS AND OPENINGS ABOVE CEILING IN EXISTING PARTITIONS SHALL BE FILLED OR SEALED TO MATCH EXISTING WALL CONSTRUCTION.
- OPENINGS IN RATED WALLS, FLOORS, CEILINGS AND ROOF ASSEMBLIES SHALL BE SEALED WITH A FIRE RESISTIVE JOINT SYSTEM OR PROTECTED WITH A FIRE-RATED CHASE.
- ALL GYPSUM BOARD WALLS TO RECEIVE TILE OR FRP FINISHES SHALL HAVE TILE BACKER BOARD. GYPSUM BOARD AT OTHER WALLS IN TOILET ROOMS AND KITCHENS TO BE WATER-RESISTANT GYPSUM BOARD. ALL GYPSUM BOARD CEILING SERVICES PROVIDED IN FOOD SERVICE AREAS AND TOILET ROOMS SHALL BE WATER-RESISTANT GYPSUM BOARD.
- ALL EXISTING CONCRETE WALLS AND CONCRETE OR STEEL COLUMNS ARE TO BE FURRED OUT WITH METAL STUDS OR HAT CHANNELS AS MINIMALLY AS REQUIRED FOR THE INSTALLATION OF CONDUIT, JUNCTION BOXES, ACCESSORIES, BLOCKING, ETC. EXCEPT WHERE THE WALLS AND COLUMN ENCLOSURES ARE REQUIRED TO ALIGN OR ARE DIMENSIONED TO THE CONTRARY.
- PROVIDE METAL BACKING PLATES OR FIRE-TREATED WOOD BLOCKING IN PARTITIONS FOR ALL WALL-ANCHORED CASEWORK, MILLWORK, FURNITURE, TVS/MONITORS, ARTWORK, GRAB BARS, RAILINGS, SHELVING, WALL MOUNTED DOOR STOPS AND OTHER WALL-ATTACHED ITEMS. COORDINATE WITH FURNITURE PLANS AND SPECIFICATIONS FOR WALL-MOUNTED FURNITURE LOCATIONS. COORDINATE PLACEMENT AND INSTALL BLOCKING PRIOR TO CLOSING WALLS.
- EXPOSED WOOD SHALL BE FINISH GRADE HARDWOOD - FILLED, SANDED, AND READY FOR SCHEDULED FINISH.
- CONTRACTOR SHALL SURVEY FLOOR ELEVATIONS TO DETERMINE SCOPE OF FLOOR LEVELING AND REMEDIAL REPAIR WORK, AND INCLUDE WORK IN CONTRACTOR SCOPE TO MEET FLOOR LEVELING REQUIREMENTS OF SPECIFICATIONS.
- PARTITIONS NOT DIMENSIONED ARE GENERALLY LOCATED BY ONE OF THE FOLLOWING CRITERIA:
A. CENTERLINE. CENTER OF PARTITION ALIGNS WITH THE CENTER OF GRIDLINE OR OBJECT CENTERLINE (SUCH AS A COLUMN OR MULLION). CENTER THE OVERALL PARTITION WIDTH RATHER THAN STUD WIDTH ON THE LINE.
B. ALIGN. LOCATE PARTITION FLUSH WITH FACE OF GYPSUM BOARD, OR OTHER SURFACE INDICATED.
C. MAINTAIN DIMENSIONS NOTED AS "MINIMUM," "CLEAR," OR "HOLD."
- WHEN UNDIMENSIONED PARTITIONS APPEAR IN CONJUNCTION WITH DOOR OPENINGS, DOOR WIDTH AND DOOR FRAME DETAILS DETERMINE LOCATION OF ADJACENT WALLS AND FRAMES.
- UNLESS NOTED OTHERWISE, DIMENSIONS NOTED "CLEAR" ARE TO THE FACE OF FINISHES (TILE, PAINT, WALLCOVERING). THIS INCLUDES FABRIC-WRAPPED PANELS, WOODGLASS MILLWORK PANELS. THIS IS OF PARTICULAR IMPORTANCE WHERE DIMENSIONS ARE CRITICAL, SUCH AS RESTROOMS.
- LAYOUT PARTITIONS FOR ARCHITECT TO REVIEW FOR DESIGN INTENT. DO NOT PROCEED WITH INSTALLATION OF RUNNERS OR STUDS WITHOUT THIS REVIEW.
- LOCATE DOORS 4" FROM FACE OF INTERSECTING PARTITION TO INSIDE EDGE OF DOOR FRAME, UNLESS NOTED OTHERWISE.
- WHERE NEW PARTITION IS A CONTINUATION OF AN EXISTING PARTITION, THE FACE OF THE NEW FINISHED PARTITION SHALL BE ALIGNED WITH THE FACE OF THE EXISTING FINISH.
- REFERENCE A00-01 FOR MOUNTING HEIGHTS AND PLACEMENT OF ACCESSORIES.
- REFERENCE A51-01 FOR ACCESSORY SCHEDULE.

FLOOR PLAN LEGEND



ARCHITECTURAL KEYNOTES

- <<< Indicates Sheet Keynote on Plan
- A01 HAND WASH SINK, SALVAGED FROM EXISTING. REFER TO PLUMBING DRAWINGS.
- A02 SOAP DISPENSER, SALVAGED FROM EXISTING. REFER TO A00-01 FOR MOUNTING HEIGHT.
- A03 PAPER TOWEL DISPENSER, SALVAGED FROM EXISTING. REFER TO A00-01 MOUNTING HEIGHT.
- A04 LAB CASEWORK CENTERED ON GRIDLINE.
- A05 UTILITY SPINE TO 42" AFF. BY LAB CASEWORK SUPPLIER
- A06 12" X 48" ADA SINK, FABRI-L-FLEX APPROXCH



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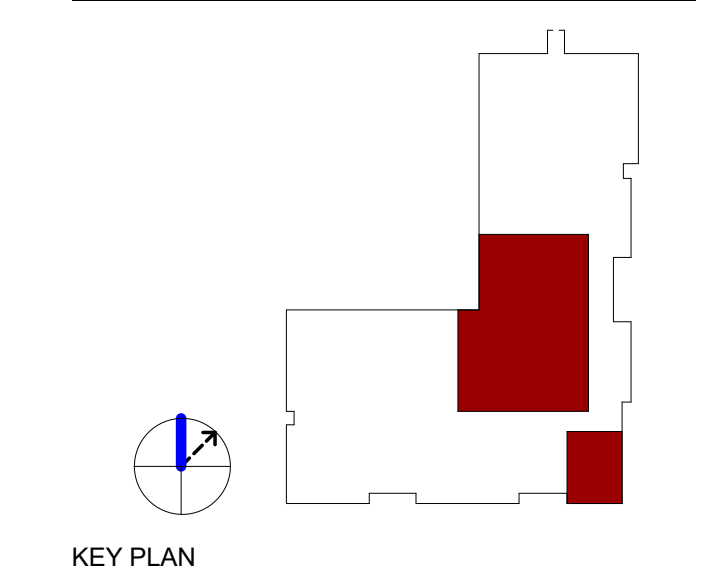
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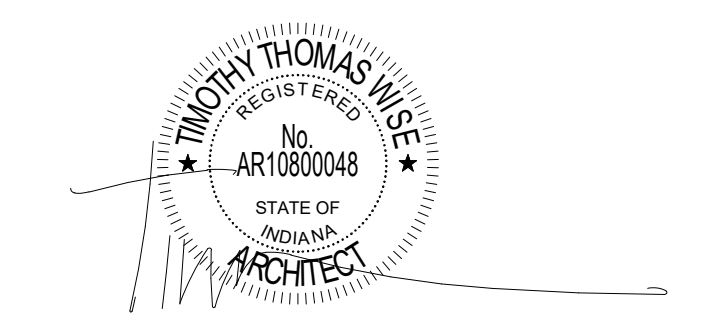
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KEY PLAN



CERTIFICATION

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IN203 Medical Education and Research Building Lower Level Build-Out IU 20250027

New Campus Road
Indianapolis, IN 46202

Project No.: 021692.000
Drawn By: MCC
Checked By: ADG
Scale: See Drawing
Issue Date: APRIL 10TH, 2026

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ENLARGED FLOOR PLANS - BASEMENT

A11-00

INTERIOR PARTITION CHARTS GENERAL NOTES

PARTITION TYPE GENERAL NOTES

- NOT ALL PARTITION TYPES SHOWN ARE UTILIZED.
- ALL PARTITIONS DESIGNATED TO EXTEND TO STRUCTURE ABOVE ARE 20'-0" IN HEIGHT.
- PARTITION TYPE, FIRE-RESISTANCE RATING AND STC RATING INDICATED FOR A GIVEN PARTITION ARE TO BE CONTINUOUS FOR THE LENGTH AND HEIGHT OF THAT PARTITION UNLESS OTHERWISE NOTED.
- CONSTRUCT FIRE-RESISTANCE RATED PARTITIONS BEFORE NON-RATED. ABUT NON-RATED PARTITIONS INTO RATED PARTITIONS.
- ISOLATE NON-LOAD-BEARING FRAMING FROM STRUCTURAL ELEMENTS TO PREVENT THE TRANSFER OF LOAD TO PARTITION FRAMING, UNLESS OTHERWISE NOTED. STOP VERTICAL STUDS 3" BELOW TOP OF CEILING RUNNER (TOP TRACK) TO ALLOW FOR VERTICAL DEFLECTION. DO NOT ATTACH STUDS OR GYP/SD BOARD TO CEILING RUNNER (TOP TRACK). THIS MAY ALSO BE ACHIEVED BY UTILIZING PROPRIETARY SYSTEMS DESCRIBED IN THE SPECIFICATIONS.
- PROVIDE DOUBLE-STUD FRAMING AT JAMS OF ALL PARTITION OPENINGS. WHERE CONTROL JOINTS ARE REQUIRED BASED UPON SPECIFIED FREQUENCY, AND ARE NOT SHOWN ON INTERIOR ELEVATIONS, LOCATE CONTROL JOINTS ON BOTH STRIKE AND HINGE SIDES OF DOORS. WHEN PROVIDING CONTROL JOINTS AT DOORS DOES NOT MEET THE SPECIFIED FREQUENCY, PROVIDE DOUBLE-STUD CONTROL JOINT CONSTRUCTION AND VERIFY LOCATION WITH THE ARCHITECT PRIOR TO PROCEEDING.
- PROVIDE SHEET METAL BLOCKING/BACKING FOR WALL-MOUNTED ITEMS SPECIFIED OR SHOWN IN THE DRAWINGS.
- REFER TO SHEET A61-50 FOR LEAD SHIELDING NARRATIVE. CONTRACTOR TO PROVIDE THE THICKEST REQUIRED SHIELDING OF UNIFORM THICKNESS ON (X) WALL PARTITIONS IN NEUROSURGERY INNOVATION (ROOM # 0021) AND PROJECTION (ROOM # 0023A) FOR INSTANCE. IF ONE WALL IN THE SPACE IS TO RECEIVE 132" LEAD SHIELDING, ALL WALLS IN THE SPACE SHOULD RECEIVE 132" LEAD SHIELDING. REFER TO SHEET A61-51 FOR TYPICAL LEAD SHIELDED PARTITION DETAILS.

FIRE-RESISTANCE RATED PARTITIONS (THE FOLLOWING NOTES APPLY TO ALL PARTITIONS INDICATED TO HAVE A FIRE-RESISTANCE RATING.)

- PROVIDE PERMANENTLY STENCILED IDENTIFICATION ABOVE THE CEILING WITHIN 15 FEET OF EACH END OF THE PARTITION AND AT INTERVALS NOT EXCEEDING 30 FEET HORIZONTALLY ALONG THE LENGTH OF THE PARTITION. THE IDENTIFICATION TEXT SHALL BE MINIMUM 5" HIGH WITH A MINIMUM OF 3/8" STROKE IN A CONTRASTING COLOR AND READ AS FOLLOWS: "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS".
- FIRE-RESISTANCE RATED PARTITIONS SHALL BE CONSTRUCTED FROM THE TOP OF NON-FINISHED FLOOR TO THE UNDERSIDE OF THE FLOOR OR ROOF STRUCTURE ABOVE.
- THROUGH-PENETRATIONS IN FIRE-RESISTANCE RATED PARTITIONS SHALL BE SEALED WITH MATERIALS AND ASSEMBLIES NECESSARY TO MAINTAIN THE REQUIRED FIRE-RESISTANCE RATING.

ACOUSTICAL PARTITIONS (THE FOLLOWING NOTES APPLY TO ALL PARTITIONS DESIGNATED TO HAVE EITHER SOUND ATTENUATION BLANKETS OR A SOUND TRANSMISSION CLASS (STC) RATING.)

- SEAL PARTITIONS AT ENTIRE PERIMETER WITH NON-HARDENING ACOUSTICAL SEALANT.
- SOUND ATTENUATION BLANKETS ARE TO FILL THE DEPTH OF THE FRAMING CAVITY UNLESS OTHERWISE NOTED.
- DO NOT COMPRESS SOUND ATTENUATION BLANKETS AT BLOCKING OR RECESSED ITEMS.
- SEAL ALL WALL INTERSECTIONS AND CONTROL JOINTS WITH NON-HARDENING ACOUSTICAL SEALANT.
- PROVIDE ACOUSTICAL PADS AROUND ANY ITEMS PENETRATING THE FACE OF PARTITION, INCLUDING ELECTRICAL AND TECHNOLOGY JUNCTION OR DEVICE BOXES.
- ELECTRICAL TECHNOLOGY BOXES ON OPPOSITE SIDES OF A PARTITION ARE TO BE SEPARATED BY A MINIMUM OF 1 STUD SPACE.



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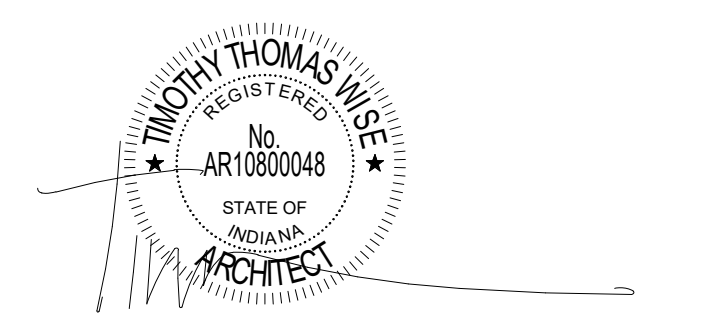
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KEY PLAN



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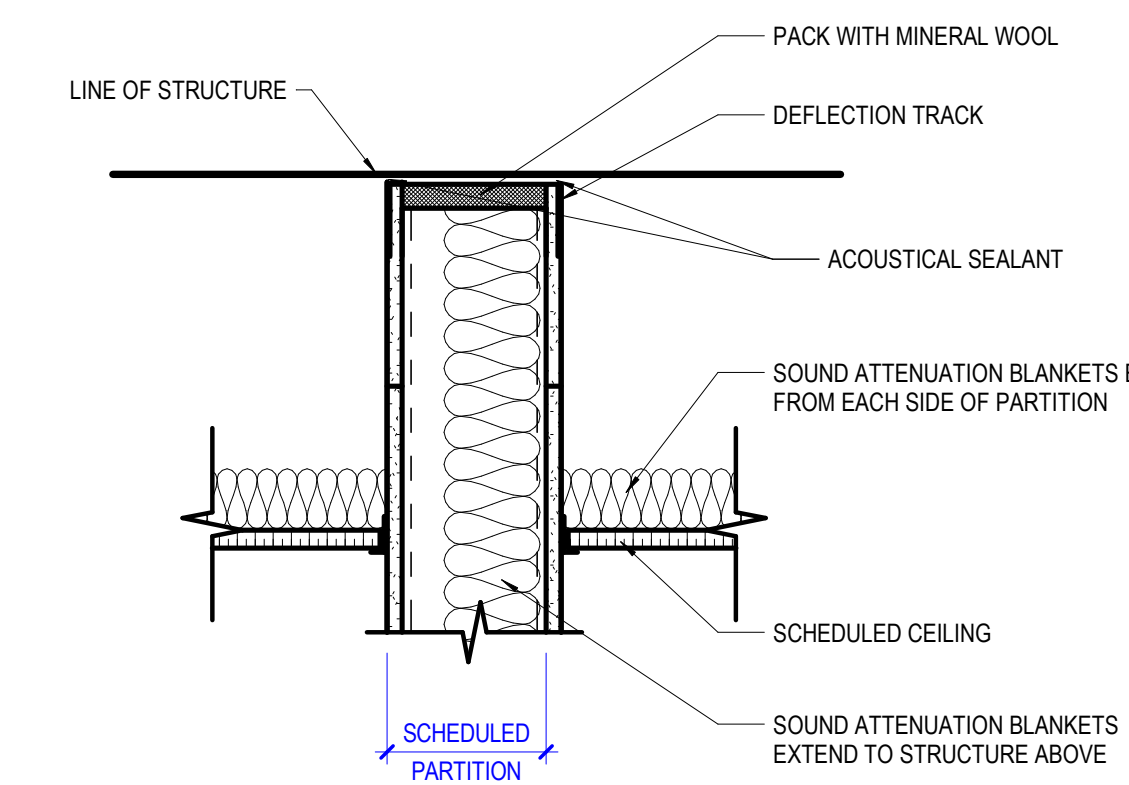
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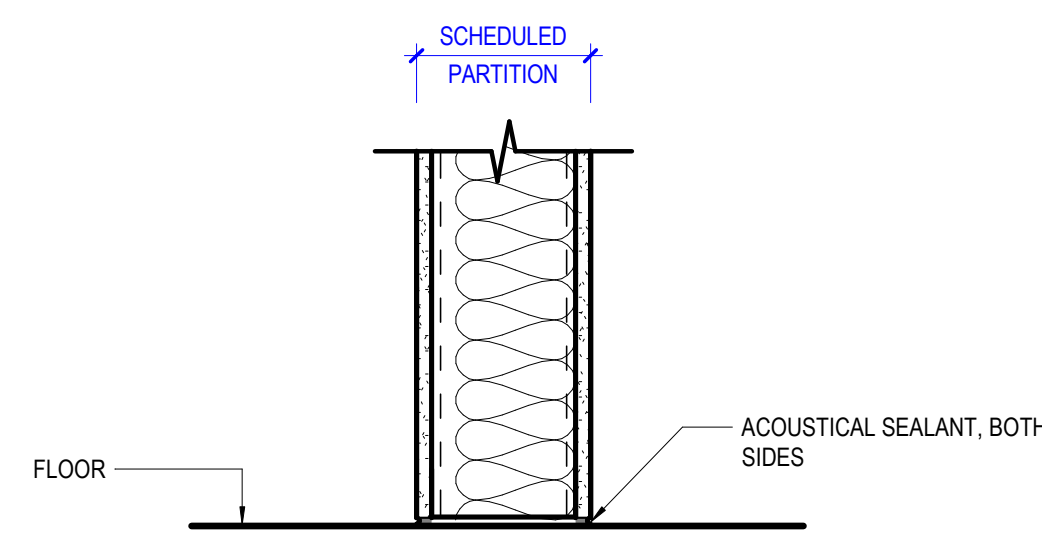
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PARTITION TYPE CHARTS

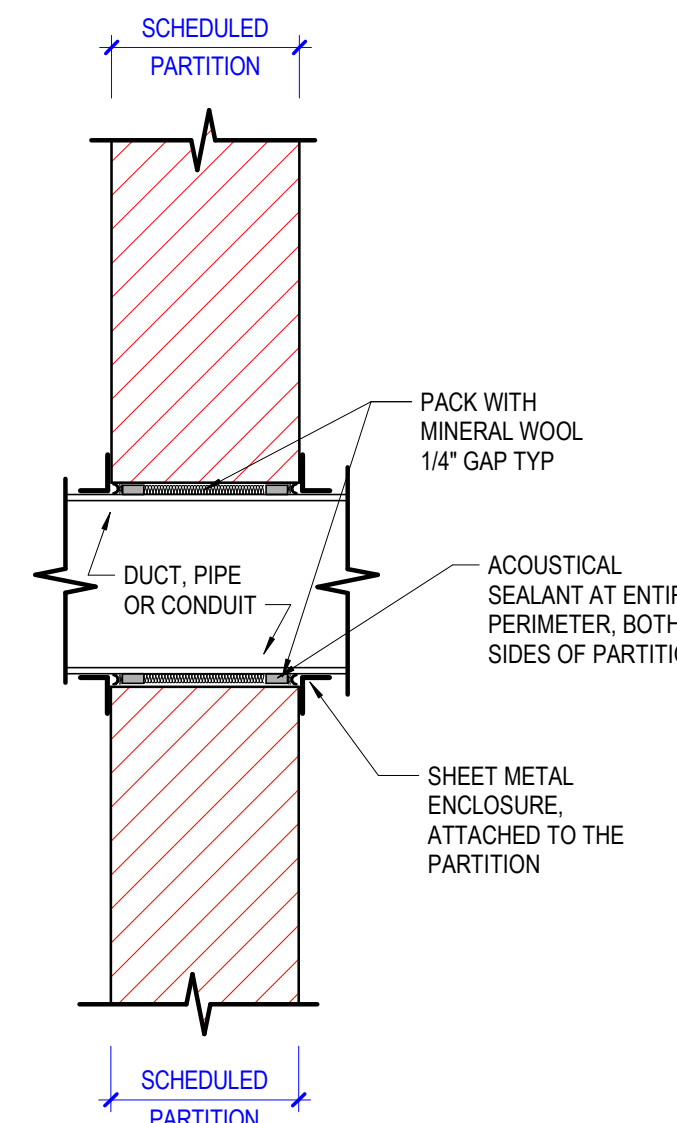
A61-01



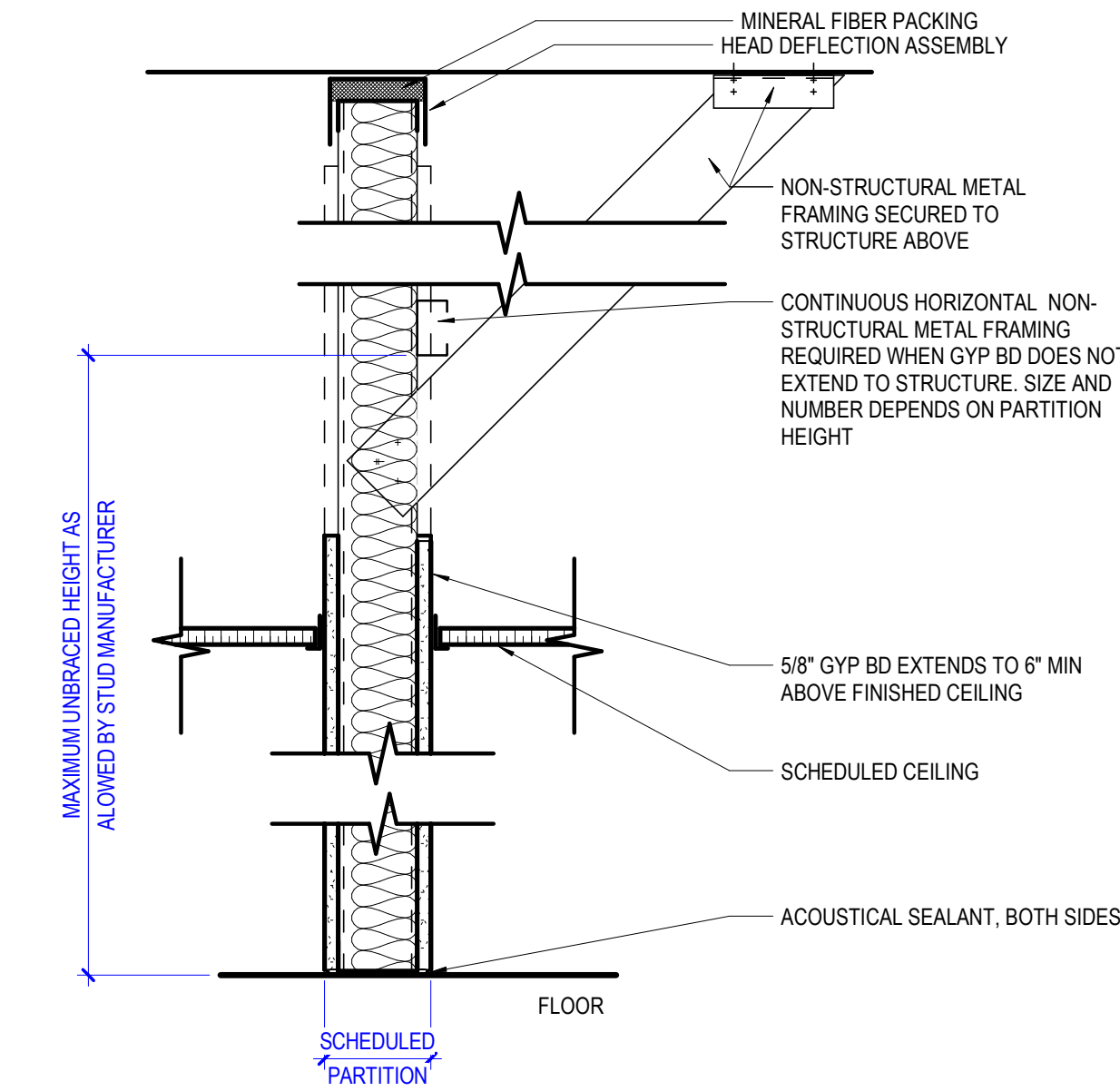
2 ACOUSTICAL PARTITION @ CEILING
SCALE 1 1/2" = 1'-0"



3 ACOUSTICAL PARTITION PLAN DETAIL
SCALE 1 1/2" = 1'-0"

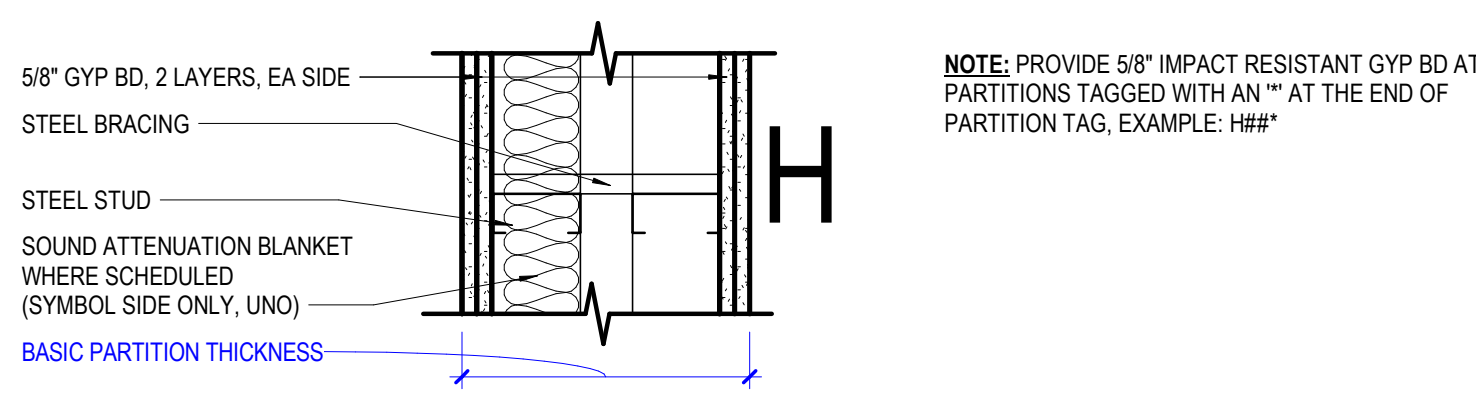


4 ACOUSTICAL SLEEVE SECTION
SCALE 1 1/2" = 1'-0"



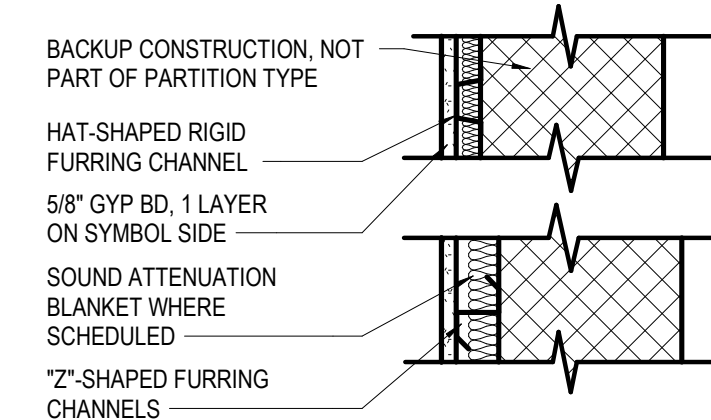
5 PARTITION SECTION
SCALE 1 1/2" = 1'-0"

1 ACOUSTICAL PARTITION @ FLOOR
SCALE 1 1/2" = 1'-0"



NOTE: PROVIDE 5/8" IMPACT RESISTANT GYP BD AT PARTITIONS TAGGED WITH AN "*" AT THE END OF PARTITION TAG, EXAMPLE: 1H#*

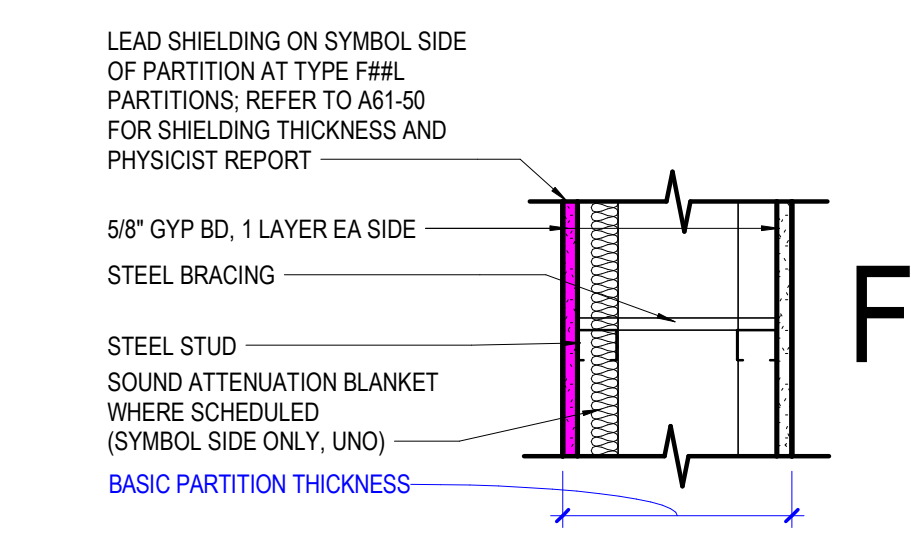
	H3L	H4L	H5L	H6L	H7L	H8L	H9L	H10L	STC
1-HR RATED WITH GYP BD TO STRUCTURE ABOVE	(H30)	(H40)	(H50)	(H60)	(H70)	(H80)	(H90)	(H100)	
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(H31)	(H41)	(H51)	(H61)	(H71)	(H81)	(H91)	(H101)	
NON-RATED WITH GYP BD TO 8" ABOVE CEILING	(H32)	(H42)	(H52)	(H62)	(H72)	(H82)	(H92)	(H102)	
NON-RATED WITH STUDS & GYP BD TO FINISHED CEILING	(H33)	(H43)	(H53)	(H63)	(H73)	(H83)	(H93)	(H103)	
STUD SIZE	2 1/2"	2 1/2"	3 5/8"	3 5/8"	4"	4"	6"	6"	
BASIC PARTITION THICKNESS	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	
FIRE TEST NUMBER	UL DES U420	UL DES U420	UL DES U420	UL DES U420	UL DES U420	UL DES U420	UL DES U420	UL DES U420	



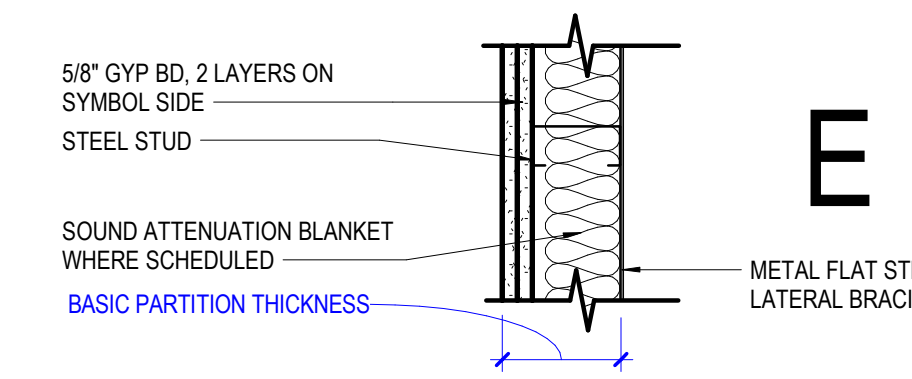
NOTE: PROVIDE 5/8" IMPACT RESISTANT GYP BD AT PARTITIONS TAGGED WITH AN "*" AT THE END OF PARTITION TAG, EXAMPLE: 1M#*

	M1L	M2L	M3L	M4L	M5L	M6L	M7L	M8L	STC
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(M11)	(M21)	(M31)	(M41)	(M51)	(M61)	(M71)	(M81)	
NON-RATED WITH GYP BD TO 8" ABOVE CEILING	(M12)	(M22)	(M32)	(M42)	(M52)	(M62)	(M72)	(M82)	
NON-RATED WITH GYP BD AND FURRING TO CEILING	(M13)	(M23)	(M33)	(M43)	(M53)	(M63)	(M73)	(M83)	
FURRING CHANNEL	7/8"	-	-	-	-	-	-	-	
2" CHANNEL	-	1"	1 1/2"	1 1/2"	2"	2"	3"	3"	
BASIC PARTITION THICKNESS, NOTE 1	1 1/2" +	1 5/8" +	2 1/8" +	2 1/8" +	2 5/8" +	2 5/8" +	3 5/8" +	3 5/8" +	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	

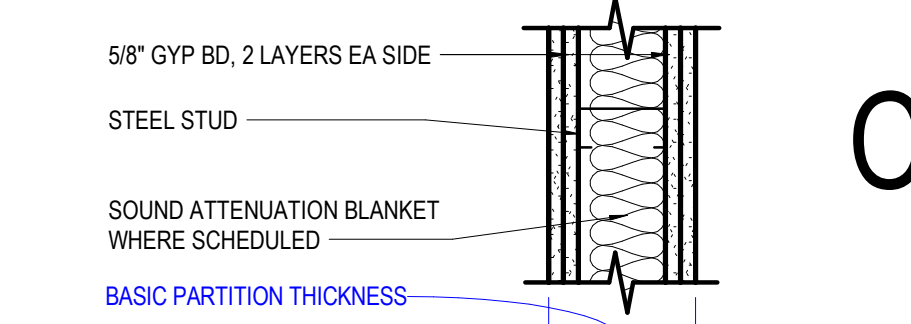
NOTE:
1. ALLOW SPACE FOR SHIMS BETWEEN BACKUP CONSTRUCTION AND FURRING PARTITION



	F3L	F4L	F5L	F6L	F7L	F8L	F9L	F10L	STC
1-HR RATED WITH GYP BD TO STRUCTURE ABOVE	(F30)	(F40)	(F50)	(F60)	(F70)	(F80)	(F90)	(F100)	
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(F31)	(F41)	(F51)	(F61)	(F71)	(F81)	(F91)	(F101)	
NON-RATED WITH GYP BD AND LEAD SHIELDING UP TO 8'-0" AFF	(F31L)	(F41L)	(F51L)	(F61L)	(F71L)	(F81L)	(F91L)	(F101L)	
NON-RATED WITH GYP BD TO 8" ABOVE CEILING	(F32)	(F42)	(F52)	(F62)	(F72)	(F82)	(F92)	(F102)	
NON-RATED WITH STUDS & GYP BD TO FINISHED CEILING	(F33)	(F43)	(F53)	(F63)	(F73)	(F83)	(F93)	(F103)	
STUD SIZE	2 1/2"	2 1/2"	3 5/8"	3 5/8"	4"	4"	6"	6"	
BASIC PARTITION THICKNESS	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	
FIRE TEST NUMBER	UL DES U420	UL DES U420	-	-	-	-	-	YES	

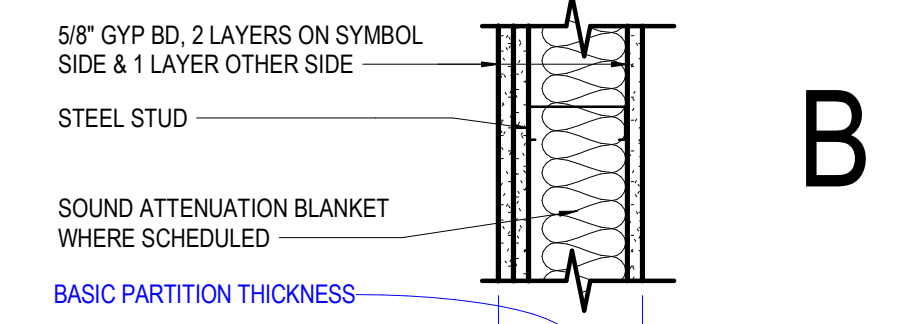


	E1L	E2L	E3L	E4L	E5L	E6L	E7L	E8L	E9L	STC
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(E11)	(E21)	(E31)	(E41)	(E51)	(E61)	(E71)	(E81)	(E91)	
NON-RATED WITH GYP BD TO 8" ABOVE CEILING	(E12)	(E22)	(E32)	(E42)	(E52)	(E62)	(E72)	(E82)	(E92)	
NON-RATED WITH STUDS & GYP BD TO FINISHED CEILING	(E13)	(E23)	(E33)	(E43)	(E53)	(E63)	(E73)	(E83)	(E93)	
STUD SIZE	2 1/2"	2 1/2"	3 5/8"	3 5/8"	4"	4"	6"	6"	1 5/8"	
BASIC PARTITION THICKNESS	3 3/4"	3 3/4"	4 7/8"	4 7/8"	5 1/4"	5 1/4"	7 1/4"	7 1/4"	2 3/4"	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	YES	

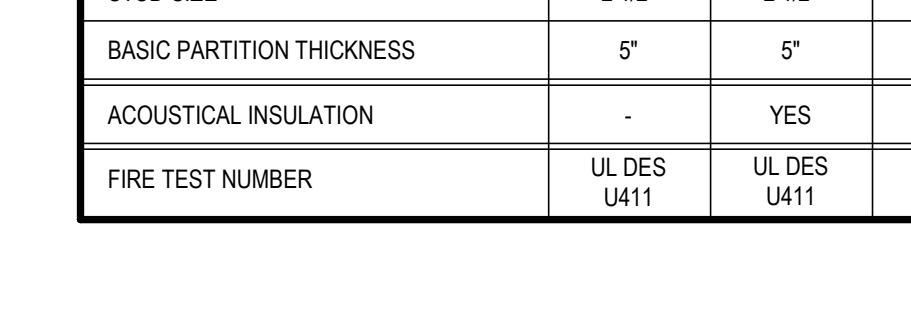


NOTE: PROVIDE 5/8" IMPACT RESISTANT GYP BD AT PARTITIONS TAGGED WITH AN "*" AT THE END OF PARTITION TAG, EXAMPLE: 1C#*

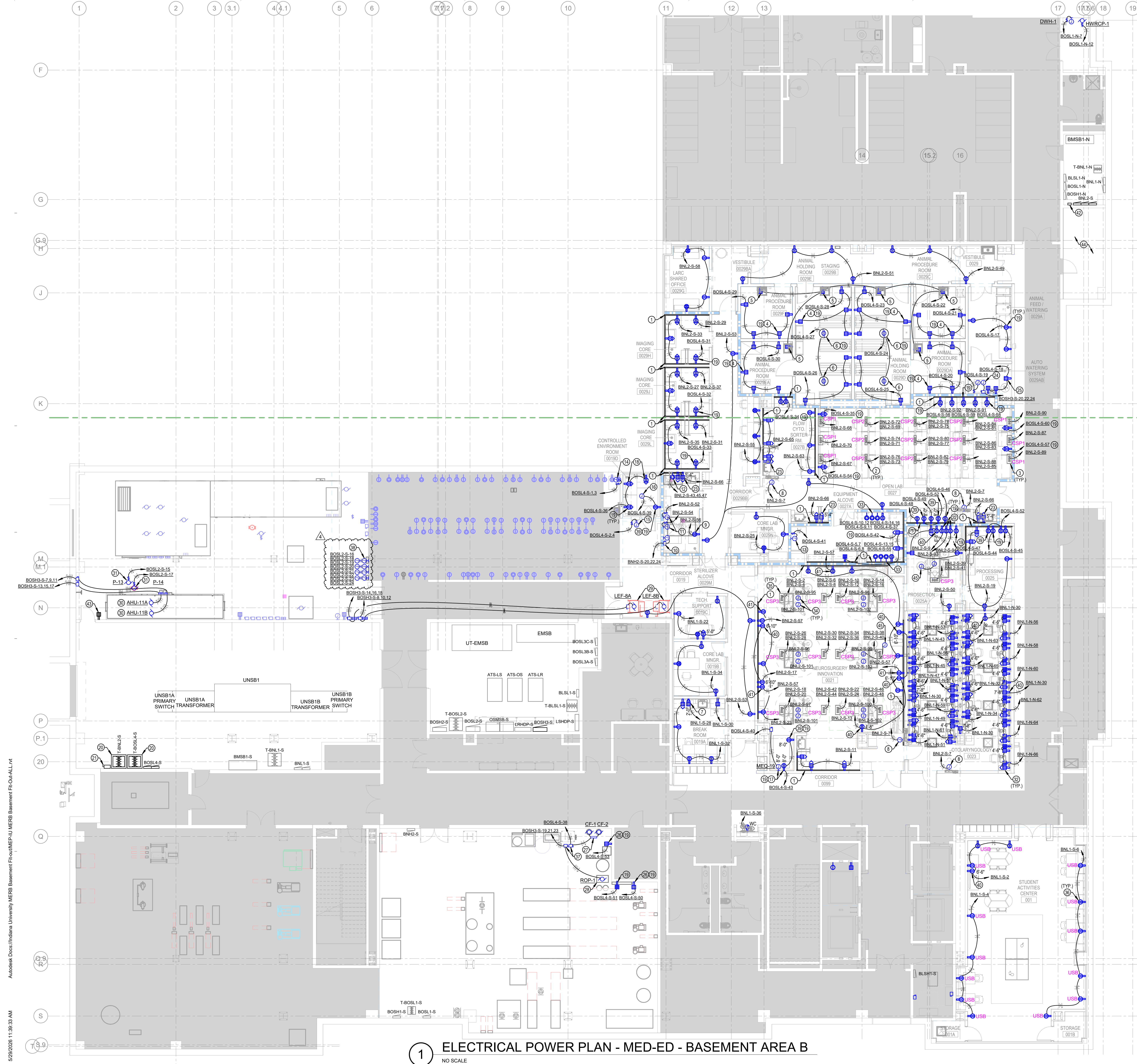
	C1L	C2L	C3L	C4L	C5L	C6L	C7L	C8L	STC
1-HR RATED WITH GYP BD TO STRUCTURE ABOVE	(C10)	(C20)	(C30)	(C40)	(C50)	(C60)	(C70)	(C80)	57
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(C11)	(C21)	(C31)	(C41)	(C51)	(C61)	(C71)	(C81)	57
STUD SIZE	2 1/2"	2 1/2"	3 5/8"	3 5/8"	4"	4"	6"	6"	
BASIC PARTITION THICKNESS	5"	5"	6 1/8"	6 1/8"	6 1/2"	6 1/2"	8 1/2"	8 1/2"	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	
FIRE TEST NUMBER	UL DES U411	UL DES U411	UL DES U411	UL DES U411	UL DES U411	UL DES U411	UL DES U411	UL DES U411	



	B1L	B2L	B3L	B4L	B5L	B6L	B7L	B8L	STC
1-HR RATED WITH GYP BD TO STRUCTURE ABOVE	(B10)	(B20)	(B30)	(B40)	(B50)	(B60)	(B70)	(B80)	
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(B11)	(B21)	(B31)	(B41)	(B51)	(B61)	(B71)	(B81)	
NON-RATED WITH GYP BD TO 8" ABOVE CEILING	(B12)	(B22)	(B32)	(B42)	(B52)	(B62)	(B72)	(B82)	
NON-RATED WITH STUDS & GYP BD TO FINISHED CEILING	(B13)	(B23)	(B33)	(B43)	(B53)	(B63)	(B73)	(B83)	
STUD SIZE	2 1/2"	2 1/2"	3 5/8"	3 5/8"	4"	4"	6"	6"	
BASIC PARTITION THICKNESS	4 3/8"	4 3/8"	5 1/2"	5 1/2"	5 7/8"	5 7/8"	7 7/8"	7 7/8"	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	
FIRE TEST NUMBER	-	UL DES U494	UL DES U465	UL DES U465	UL DES U465	UL DES U465	UL DES U465	UL DES U465	



	A1L	A2L	A3L	A4L	A5L	A6L	A7L	A8L	STC
1-HR RATED WITH GYP BD TO STRUCTURE ABOVE	(A10)	(A20)	(A30)	(A40)	(A50)	(A60)	(A70)	(A80)	49
NON-RATED WITH GYP BD TO STRUCTURE ABOVE, AND LEAD SHIELDING UP TO 8'-0" AFF	(A10L)	(A20L)	(A30L)	(A40L)	(A50L)	(A60L)	(A70L)	(A80L)	49
NON-RATED WITH GYP BD TO STRUCTURE ABOVE	(A11)	(A21)	(A31)	(A41)	(A51)	(A61)	(A71)	(A81)	49
NON-RATED WITH GYP BD TO 8" ABOVE CEILING	(A12)	(A22)	(A32)	(A42)	(A52)	(A62)	(A72)	(A82)	49
NON-RATED WITH STUDS & GYP BD TO FINISHED CEILING	(A13)	(A23)	(A33)	(A43)	(A53)	(A63)	(A73)	(A83)	
STUD SIZE	2 1/2"	2 1/2"	3 5/8"	3 5/8"	4"	4"	6"	6"	
BASIC PARTITION THICKNESS	3 3/4"	3 3/4"	4 7/8"	4 7/8"	5 1/4"	5 1/4"	7 1/4"	7 1/4"	
ACOUSTICAL INSULATION	-	YES	-	YES	-	YES	-	YES	
FIRE TEST NUMBER	-	UL DES U494	UL DES U465	UL DES U465	UL DES U465	UL DES U465	UL DES U465	UL DES U465	



GENERAL NOTES (POWER):

- A. REFER TO THE ARCHITECT'S REFLECTED CEILING PLANS, ELEVATIONS, AND CASEWORK DETAILS FOR EXACT LOCATIONS OF ALL WALL AND CEILING MOUNTED ELECTRICAL DEVICES.
- B. CONTRACTOR SHALL FOLLOW BRANCH CIRCUITING LAY-OUT, AS INDICATED ON THE FLOOR PLANS, WITH A MAXIMUM OF THREE (3) BRANCH CIRCUITS PER HOMERUN. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING. IF ADDITIONAL CONDUCTORS ARE RUN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DERATE ALL CURRENT CARRYING CONDUCTORS PER NEC 310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER NEC 300.17 AND ANNEX C. MULTITWISTED BRANCH CIRCUITS AS DEFINED IN NEC 100 / 210.4 (CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) SHALL NOT BE PERMITTED.
- C. IDENTIFY THE PANEL AND CIRCUIT NUMBER FOR ALL RECEPTACLES, SWITCHES, ETC. IN AREA OF CONSTRUCTION. PROVIDE CLEAR ADHESIVE LABELS WITH BLACK LETTERING. IN HEALTHCARE FACILITIES, ENGRAVE EMERGENCY DEVICE COVERPLATES IN PATIENT CARE AREAS. MARK INSIDES OF ALL DEVICE BOXES WITH PANEL AND CIRCUIT NUMBER.
- D. RECEPTACLES THAT ARE CONTROLLED BY AN AUTOMATIC MEANS SUCH AS OCCUPANCY SENSOR OR ENERGY MANAGEMENT SYSTEM SHALL BE MARKED IN ACCORDANCE WITH NEC 406.3(E).
- E. LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.

PLAN NOTES - E11-00B

1. PROVIDE LEGRAND WIREMOLD SERIES AL320 DUAL CHANNEL ALUMINUM RACEWAY AND FIELD WIRE RECEPTACLES. TYPICAL RACEWAY MOUNTED AT 40" TO BOTTOM OF RACEWAY UNLESS NOTED OTHERWISE. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL INFORMATION.
2. PROVIDE CONNECTION TO CEILING MOUNTED CONTROL PANEL IN THIS LOCATION. PROVIDE (2) NEMA L5-20R RECEPTACLES FOR INSTALLATION IN CEILING PANEL. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL INFORMATION.
3. PROVIDE CONNECTION TO CEILING MOUNTED CONTROL PANEL IN THIS LOCATION. PROVIDE (1) NEMA L5-20R RECEPTACLE FOR INSTALLATION IN CEILING PANEL. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL INFORMATION.
4. ALL RECEPTACLES IN THIS SPACE SHALL BE IP65 RATED.
5. PROVIDE ELECTRICAL CONNECTION FOR AUTOMATIC PLUMBING FIXTURES FURNISHED BY P.C. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
6. PROVIDE CEILING MOUNTED GFCI RECEPTACLE FOR UNDERCOUNTER MICROWAVE OVEN. COORDINATE MOUNTING LOCATION WITH ARCHITECTURAL CASEWORK DETAILS AND PROVIDE ACCORDINGLY.
7. PROVIDE RECEPTACLE FOR UNDERCOUNTER MICROWAVE OVEN. COORDINATE MOUNTING LOCATION WITH ARCHITECTURAL CASEWORK DETAILS AND PROVIDE ACCORDINGLY.
8. WIRE AND INSTALL HORN AND STROBE FOR EMERGENCY WASH STATION IN THIS LOCATION. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
9. PROVIDE HARDWIRED CONNECTION FOR ICE MAKER IN THIS LOCATION. PROVIDE TOGGLE SWITCH.
10. PROVIDE CONNECTION FOR STERILIZER BOILER. PROVIDE HEAVY DUTY NEMA 1 RATED 30A NON-FUSIBLE DISCONNECT. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. COORDINATE EXACT MOUNTING LOCATION WITH EQUIPMENT LOCATION PRIOR TO ROUGH-IN.
11. PROVIDE DEDICATED CONNECTION FOR STERILIZER CONTROLS AND STERILIZER BOILER CONTROLS. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. COORDINATE EXACT MOUNTING LOCATION WITH EQUIPMENT LOCATION PRIOR TO ROUGH-IN.
12. PROVIDE NEMA L15-20R RECEPTACLE FOR GLASS CLEANER IN THIS LOCATION.
13. PROVIDE CONNECTION FOR FUME HOOD FURNISHED BY OTHERS.
14. PROVIDE CONNECTION TO CONTROLLED ENVIRONMENT ROOM CONDENSING UNIT FURNISHED BY OTHERS. PROVIDE CONNECTION BETWEEN CONTROL PANEL AND EVAPORATOR AND FANS. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
15. PROVIDE ELECTRICAL CONNECTION FOR DEHUMIDIFIER FOR CONTROLLED ENVIRONMENT ROOM. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
16. PROVIDE JUNCTION BOX AND TOGGLE SWITCH FOR CONNECTION TO VAPOR FRIEDE COMPRESSOR. PROVIDE ADDITIONAL RECEPTACLE COVER PROTECT LIGHTING. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. COORDINATE EXACT MOUNTING LOCATION FOR DEVICES WITH ARCHITECT AND PROVIDE ACCORDINGLY.
17. WIRE AND INSTALL RECEPTACLES FOR CONTROLLED ENVIRONMENT ROOM. COORDINATE CONDUIT AND BACKBOX INSTALLATION WITH CEM MANUFACTURER REQUIREMENTS AND PROVIDE ACCORDINGLY.
18. PROVIDE RED RECEPTACLE FOR DEVICES IN THIS SPACE CONNECTED TO OPTIONAL STANDBY.
19. PROVIDE NEW 75VA NEMA 1 RATED DRY TYPE TRANSFORMER. REFER TO SINGLELINE FOR ADDITIONAL INFORMATION. PROVIDE TRANSFORMER WITH 4" CONCRETE HOUSEKEEPING PAD.
20. PROVIDE NEW HEAVY DUTY NEMA 1 RATED 200A NON-FUSIBLE DISCONNECT FOR TRANSFORMER SECONDARY CONDUCTORS SERVING NEW PANEL BNL2-N.
21. PROVIDE RECEPTACLE AND ROUGH-IN FOR AV DEVICES AT AV RACK MOUNTED IN CASEWORK IN THIS LOCATION. INSTALL RECEPTACLE IN BACKBOX FURNISHED BY AV VENDOR. REFER TO TECHNOLOGY DRAWINGS FOR ADDITIONAL INFORMATION.
22. PROVIDE RECEPTACLE MOUNTED IN CASEWORK FOR WATER PURIFIER. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL INFORMATION.
23. PROVIDE HARDWIRED ELECTRICAL CONNECTION FOR DISTRIBUTION PUMP FOR ANIMAL WATERING SYSTEM IN THIS SPACE. COORDINATE EXACT LOCATION WITH ANIMAL WATERING SYSTEM VENDOR DOCUMENTS AND PROVIDE ACCORDINGLY. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. PROVIDE TOGGLE SWITCH AND 30A NON-FUSIBLE DISCONNECT.
24. PROVIDE RECEPTACLES FOR REVERSE OSMOSIS UNIT AND UV LIGHT FOR ANIMAL WATERING SYSTEM IN THIS SPACE. COORDINATE EXACT LOCATION WITH ANIMAL WATERING SYSTEM VENDOR DOCUMENTS AND PROVIDE ACCORDINGLY. PROVIDE RED RECEPTACLES FOR DEVICES IN THIS SPACE CONNECTED TO OPTIONAL STANDBY.
25. PROVIDE DEDICATED GFCI RECEPTACLE FOR PLUMBING EQUIPMENT IN THIS LOCATION. COORDINATE EXACT MOUNTING LOCATION WITH P.C. PRIOR TO ROUGH-IN.
26. PROVIDE ELECTRICAL CONNECTION TO CARBON FILTER SYSTEM IN THIS LOCATION. PROVIDE CONNECTION TO SHED MOUNTED CONTROL PANEL. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
27. PROVIDE ELECTRICAL CONNECTION TO RO PUMP IN THIS LOCATION FURNISHED BY P.C. PROVIDE NEMA 1 RATED 30A NON-FUSIBLE DISCONNECT. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
28. PROVIDE CONNECTION TO EXHAUST FANS FURNISHED BY M.C. PROVIDE HEAVY DUTY NEMA 1 RATED 30A NON-FUSIBLE DISCONNECT WIRED AHEAD OF VFD. WIRE AND INSTALL INTEGRAL DISCONNECT AT UNIT FURNISHED BY M.C.
29. PROVIDE CONNECTION TO SUPPLY FANS FOR AIR HANDLING UNIT FURNISHED BY M.C. WIRE AND INSTALL VFD FURNISHED BY M.C. PROVIDE HEAVY DUTY NEMA 1 RATED 30A NON-FUSIBLE DISCONNECT WIRED AHEAD OF VFD.
30. PROVIDE CONNECTION TO ALINE PUMP FURNISHED BY M.C. PROVIDE TOGGLE SWITCH.
31. PROVIDE RECEPTACLES MOUNTED IN CASEWORK FOR LAB WORKSTATION IN THIS LOCATION. PROVIDE (2) QUAD RECEPTACLES MOUNTED LOW IN CASEWORK FOR LAB EQUIPMENT. PROVIDE (1) GENERAL USE DUPLEX RECEPTACLE ABOVE COUNTER. PROVIDE (1) RECEPTACLE FOR MONITOR. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL INFORMATION. AND COORDINATE MOUNTING CLOSELY WITH ARCHITECT PRIOR TO ROUGH-IN.
32. PROVIDE (3) 20R1P RECEPTACLES AND (1) DEDICATED DUPLEX RECEPTACLE FOR MASS SPECTROMETER EQUIPMENT IN THIS LOCATION. COORDINATE EXACT NEMA CONFIGURATION WITH EQUIPMENT AND PROVIDE ACCORDINGLY.
33. PROVIDE ELECTRICAL CONNECTION FOR CEILING MOUNTED BOOM ARM IN THIS LOCATION. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATION. PROVIDE DEDICATED CIRCUIT FOR BOO. PROVIDE ADDITIONAL CONNECTION TO CIRCUIT FOR BOOM MOUNTED MONITORS.
34. PROVIDE CONNECTION TO CEILING MOUNTED CONTROL PANEL IN THIS LOCATION. PROVIDE CONNECTION TO CEILING MOUNTED CONTROL PANEL IN THIS LOCATION. PROVIDE CORD REEL WITH DOUBLE SIDED DUPLEX RECEPTACLE. REFER TO CORD REEL DETAIL FOR ADDITIONAL INFORMATION. PROVIDE (2) NEMA 5-20R RECEPTACLES FOR INSTALLATION IN CEILING PANEL. PROVIDE DEDICATED CIRCUIT FOR CORD REEL RECEPTACLES. WIRE AND INSTALL CORD REEL PER MANUFACTURER RECOMMENDATIONS. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL INFORMATION.
35. PROVIDE RECEPTACLES IN THIS SPACE WITH USB-A & USB-C PORTS.
36. PROVIDE UNSTRUT MOUNTING FOR DISCONNECTS IN THIS LOCATION.
37. PROVIDE CONNECTION FOR HVAC CONTROL PANELS IN THIS LOCATION FURNISHED BY M.C. COORDINATE EXACT EQUIPMENT LOCATION WITH M.C. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS.
38. PROVIDE DUPLEX RECEPTACLE MOUNTED AT 90° TO SERVE TEMPERATURE SENSOR FOR FREEZERS IN THIS LOCATION.
39. PROVIDE DUPLEX RECEPTACLE FOR MONITOR MOUNTED IN RECESSED BACKBOX FURNISHED BY AV VENDOR. REFER TO TECHNOLOGY DRAWINGS FOR ADDITIONAL INFORMATION.
40. PROVIDE DUPLEX RECEPTACLE FOR C-ARM IN THIS SPACE. PROVIDE RECEPTACLE WITH LABEL READING "C-ARM".
41. RELOCATE EXISTING SPD TO THIS LOCATION. STACK VERTICALLY WITH EXTERNALLY MOUNTED SURGE PROTECTION DEVICE FOR NEW PANELBOARD.
42. PROVIDE NEW RECEPTACLE. CONNECT TO EXISTING BRANCH CIRCUIT PREVIOUSLY SERVING RECEPTACLE IN THIS AREA. COORDINATE MOUNTING LOCATION WITH MECHANICAL EQUIPMENT IN THIS SPACE.
43. ANY CONDUITS PASSING THROUGH CHEMICAL STORAGE SPACE SHALL BE CORROSION RESISTANT. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
44. PROVIDE ELECTRICAL CONNECTION TO TRANSFORMER IN SK ENCLASURE FURNISHED BY BOOM VENDOR. PROVIDE CONNECTION FROM TRANSFORMER TO BOOM IN THIS LOCATION. WIRE AND INSTALL PER MANUFACTURER RECOMMENDATIONS. REFER TO BOOM VENDOR DOCUMENTS FOR ADDITIONAL INFORMATION.

1 ELECTRICAL POWER PLAN - MED-ED - BASEMENT AREA B
NO SCALE



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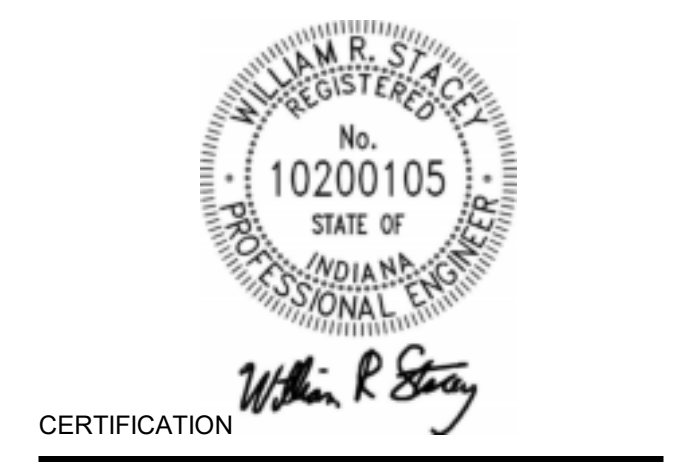
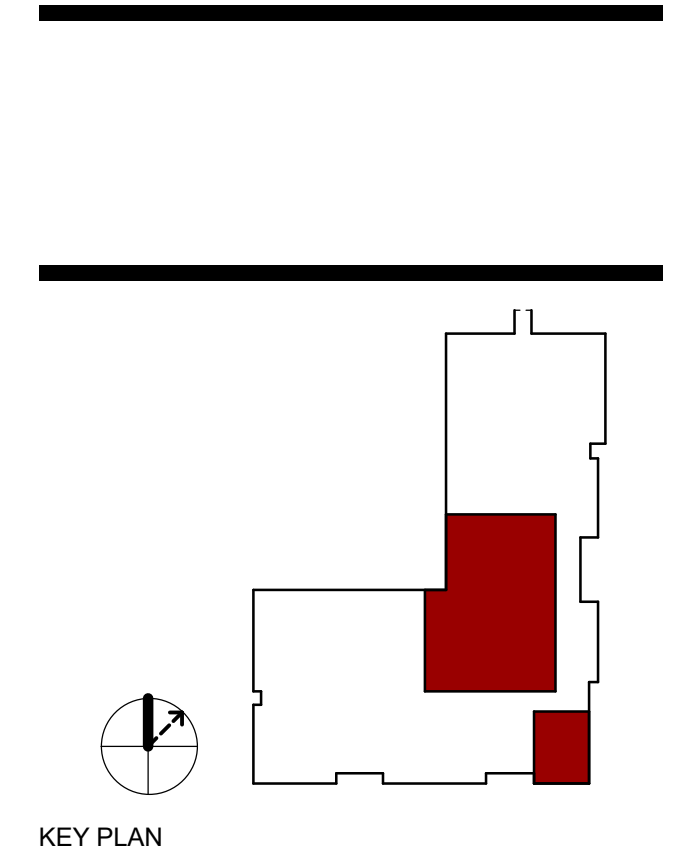
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CONSTRUCTION DOCUMENTS

IN203 Medical Education and Research Building Lower Level Build-Out IU 20250027

New Campus Road
Indianapolis, IN 46202

Project No.: 021692.000
Drawn By: NGM
Checked By: JAE
Scale: See Drawing
Issue Date: APRIL 10TH, 2026

REVISION SCHEDULE		
Rev. #	Revision Description	Issue Date
1	CONSTRUCTION DOCUMENTS	04.10.2026
2	ADDENDUM #1	05.15.2026
4	ADDENDUM #3	05.29.2026

ELECTRICAL POWER PLAN - BASEMENT - MED-ED - AREA B
E11-00B

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PLAN NOTES

- DEMOLISH EXISTING 2000A 80% RATED CIRCUIT BREAKER. PROVIDE NEW 2000A 100% RATED R-FRAME CIRCUIT BREAKER
- PROVIDE NEW 60A 3P BREAKER IN EXISTING SPACE IN EXISTING PANELBOARD. SHORT CIRCUIT RATING OF NEW BREAKER SHALL MATCH SHORT CIRCUIT RATING OF EXISTING BREAKERS IN THIS PANEL.
- PROVIDE NEW 20A 1P BREAKER IN EXISTING SPACE IN EXISTING PANELBOARD. SHORT CIRCUIT RATING OF NEW BREAKER SHALL MATCH SHORT CIRCUIT RATING OF EXISTING BREAKERS IN THIS PANEL.
- UTILIZE EXISTING SPARE 20A 1P BREAKER IN EXISTING PANELBOARD TO SERVE NEW LOAD.
- PROVIDE NEW 60A 3P BREAKER IN EXISTING SPACE IN EXISTING PANELBOARD. SHORT CIRCUIT RATING OF NEW BREAKER SHALL MATCH SHORT CIRCUIT RATING OF EXISTING BREAKERS IN THIS PANEL.

PANELBOARD AND WIRING SCHEDULE																	
PANEL: BNL2-S			MAINS TYPE: 225 MCB			SCCR (KA): 22 KA/C			AVAIL FAULT CURRENT (KA): 7.8 KA/C								
VOLTAGE: 208Y/120V/3P/4W			SPD: Yes			AVAIL FAULT CURRENT (KA): 7.8 KA/C			SCCR (KA): 22 KA/C								
AMPERE: 225 A			MOUNTING: SURFACE			SUPPLY FROM: T-BLSL2-S			SUPPLY FROM: T-BLSL2-S								
CIRCUIT DESCRIPTION	WIRE	GND	C	OC	P	CKT	A	B	C	CKT	P	OC	C	GND	WIRE	CIRCUIT DESCRIPTION	
SPD						60	3	0.0	0.5	2	1	20				0021 NEURO INN CTRL PNL REC	
						60	3	0.0	0.5	4	1	20				0021 NEURO INN CTRL PNL REC	
						60	3	0.0	0.5	6	1	20				0021 NEURO INN CTRL PNL REC	
EMERGENCY WASH STATIONS						20	1	7	0.0	0.5	12	1	20			0021 NEURO INN CTRL PNL REC	
0025A PROSECCION AV RACK						20	1	7	0.0	0.5	12	1	20			0021 NEURO INN CTRL PNL REC	
0021 NEURO INN SFT REC						20	1	13	0.5	0.5	12	1	20			0021 NEURO INN CTRL PNL REC	
0021 NEURO INN SFT REC						20	1	15	0.5	0.5	12	1	20			0021 NEURO INN CTRL PNL REC	
0025 PROCESSING REC						20	1	17	2.8	0.5	12	1	20			0021 NEURO INN CTRL PNL REC	
0025A PROSECCION REC						20	1	21	3.8	0.5	22	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	25	0.5	0.5	25	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	27	0.5	0.5	25	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	29	0.5	0.5	25	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	31	0.9	0.5	30	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	33	1.0	0.5	34	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	35	1.0	0.5	36	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	37	0.9	0.5	38	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	39	0.7	0.5	40	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	41	0.5	0.5	42	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	43	2.1	0.5	44	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	45	2.1	0.5	46	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	47	2.1	0.5	48	1	20			0021 NEURO INN CTRL PNL REC	
0029A CORE LAB MNGR REC						20	1	49	0.5	1.2	50	1	20			0025A PROSECCION S REC	
0029A CORE LAB MNGR REC						20	1	51	0.7	1.7	52	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	53	1.3	1.7	54	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	55	0.5	1.3	56	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	57	1.0	0.7	58	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	59	1.3	0.5	60	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	61	0.5	1.0	62	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	63	0.5	0.7	64	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	65	0.7	1.1	66	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	67	0.4	0.4	68	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	69	0.4	0.4	70	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	71	0.4	0.4	72	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	73	0.4	0.4	74	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	75	0.4	0.4	76	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	77	0.4	0.4	78	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	79	0.4	1.7	80	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	81	1.0	0.5	82	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	83	0.4	1.0	84	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	85	0.4	0.4	86	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	87	0.4	0.4	88	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	89	0.4	0.4	90	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	91	1.0	1.0	92	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	93	1.2	1.2	94	1	20			0029A ALC STER & BOKER CTRL	
0029A CORE LAB MNGR REC						20	1	95	0.2	0.2	96	1	20			0021 BOOM LIGHT	
0029A CORE LAB MNGR REC						20	1	97	0.2	0.2	98	1	20			0021 BOOM LIGHT	
0029A CORE LAB MNGR REC						20	1	99	0.2	0.2	100	1	20			0021 BOOM LIGHT	
0029A CORE LAB MNGR REC						20	1	101	0.5	0.5	102	1	20			0021 BOOM MONITORS	
SPARE						20	1	103	0.0	0.0	104	1	20			SPARE	
SPARE						20	1	105	0.0	0.0	106	1	20			SPARE	
SPARE						20	1	107	0.0	0.0	108	1	20			SPARE	
SPARE						20	1	109	0.0	0.0	110	1	20			SPARE	
SPARE						20	1	111	0.0	0.0	112	1	20			SPARE	
SPARE						20	1	113	0.0	0.0	114	1	20			SPARE	
SPARE						20	1	115	0.0	0.0	116	1	20			SPARE	
SPARE						20	1	117	0.0	0.0	118	1	20			SPARE	
SPARE						20	1	119	0.0	0.0	120	1	20			SPARE	
SPARE						20	1	121	0.0	0.0	122	1	20			SPARE	
SPARE						20	1	123	0.0	0.0	124	1	20			SPARE	
SPARE						20	1	125	0.0	0.0	126	1	20			SPARE	
TOTAL LOAD (KVA):			23.4 KVA			27.8 KVA			21.3 KVA			TOTAL CURRENT (A):			198 A		
TOTAL CURRENT (A):			198 A			234 A			178 A			TOTAL CONNECTED LOAD:			17346 VA		
TOTAL CONNECTED LOAD:			17346 VA			100.00%			17346 VA			TOTAL ESTIMATED DEMAND:			144 A		
EQUIP			3929 VA			100.00%			3929 VA			TOTAL ESTIMATED DEMAND:			106 kVA		
Lighting			51480 VA			59.72%			30730 VA			TOTAL ESTIMATED DEMAND:			201 A		
Receptacle												TOTAL ESTIMATED DEMAND CURRENT:			144 A		

PANELBOARD AND WIRING SCHEDULE																
PANEL: BNL1-N (EXISTING)			MAINS TYPE: 500A MCB			SCCR (KA): EXISTING			AVAIL FAULT CURRENT (KA): EXISTING							
VOLTAGE: 208Y/120V/3P/4W			SPD: Yes			AVAIL FAULT CURRENT (KA): EXISTING			SCCR (KA): EXISTING							
AMPERE: 600 A			MOUNTING: SURFACE			SUPPLY FROM:			SUPPLY FROM:							
CIRCUIT DESCRIPTION	WIRE	GND	C	OC	P	CKT	A	B	C	CKT	P	OC	C	GND	WIRE	CIRCUIT DESCRIPTION
SPD						60	3	1.0	0.0	2	1	20				EXISTING SPARE
EXISTING LTG ALKALINE						20	1	7	0.0	0.0	10	1	20			EXISTING SPARE
EXISTING LTG ANATOMY						20	1	9	0.0	0.0	10	1	20			EXISTING SPARE
EXISTING LTG STORAGE						20	1	11	0.0	0.0	10	1	20			EXISTING SPARE
EXISTING LTG EMBALMING						20	1	13	0.0	0.9	7.0	0.0	14	1	20	EXISTING REC ANIMAL BEDDING
EXISTING REC LAUNDRY						20	1	15	0.0	0.5	16	1	20			EXISTING REC ANIMAL FEED
EXISTING ELEC DRYER						20	1	17	0.0	0.0	20	2	20			EXISTING SPARE
EXISTING REC CORRIDOR						20	1	21	0.0	0.5	24	1	20			EXISTING REC ANIMAL FEED
EXISTING REC CORRIDOR						20	1	23	0.0	0.0	24	1	20			EXISTING 0031H REC
EXISTING REC RESEARCH SHELL						20	1	25	0.0	0.0	26	1	20			EXISTING SPARE
EXISTING REC DONOR RECEIVING						20	1	27	0.0	0.0	28	1	20			EXISTING SPARE
EXISTING REC DONOR RECEIVING						20	1	29	0.0	0.0	30	1	20			EXISTING SPARE
EXISTING REC TABLE WASH						20	1	31	0.0	1.5	32	1	20			0023 OTOLARYN MONITORS REC
EXISTING REC CHAM STORAGE						20	1	33	0.0	1.5	34	1	20			0023 OTOLARYN WORK STAT REC
EXISTING REC ELEC ROOM						20	1	35	0.0	0.0	36	1	20			EXISTING LOAD
EXISTING REC RESTROOM						20	1	37	0.0	0.0	38	2	20			EXISTING SPARE
EXISTING REC CORRIDOR						20	1	39	0.0	0.0	40	1	20			EXISTING SPARE
EXISTING REC RESEARCH SHELL						20	1	41	0.0	0.0	42	1	20			SPARE
0023 OTOLARYN WORK STAT REC																