

ADDENDUM

ADDENDUM NO: 02

PROJECT: IU BL563 Innovation Center RM139A/141 - New Wet Lab

PROJECT NO: CSO - 2025044
IU - 20250201

DATE: 10/22/2025

BY: Nick Wissing

This Addendum is issued in accordance with the provisions of "The General Conditions of the Contract for Construction," Article 1, "Contract Documents" and becomes a part of the Contract Documents as provided therein. This Addendum includes:

Addendum Pages: **ADD 1 of 3 through ADD 3 of 3**

Attached Documents: **A201, A203**

Attached Specifications: **12 35 57
20 00 60**

PART 0 - GENERAL INFORMATION

NONE

PART 1 - BIDDING REQUIREMENTS

NONE

PART 2 - SPECIFICATIONS

2.1 12 35 57 – PLASTIC-LAMINATE-CLAD LABORATORY CASEWORK

- A. Replace section in its entirety with revised section attached to this addendum
- B. Revisions include hinge type, removing drawer label requirement, epoxy countertop thickness and removal of installation requirements for service fittings.

2.2 20 00 60 – COMMON PIPE, VALVES, FITTINGS FOR FIRE SUPPRESSION, PLUMBING & HVAC

- A. Replace section in its entirety with revised section attached to this addendum.
- B. Revisions include clarifying all sanitary and vent piping is to be cast iron, clarifications to domestic water piping, and added information for heating water piping.

PART 3 - DRAWINGS

- 3.1 A201 – PLANS, ELEVATIONS, AND SCHEDULES
- A. Add Plan Note #4 to the Plan Note Schedule
 - B. Add Plan Note #4 to 2/A201 – LAB FLOOR PLAN
- 3.2 A203 – CASEWORK ELEVATIONS
- A. Add Plan Note Schedule to sheet
 - B. Add Plan Note #4 to details 2/A203, 3/A203, 4/A203 & 5/A203

PART 4 - OTHER ITEMS

NONE

PART 5 - QUESTIONS AND ANSWERS

- 5.1 Question: Section 123557 2.09.B, Please confirm concealed hinges are required. The typical IU lab has been using five knuckle hinges.
- 1. Answer: 5 knuckle hinges are required. Specs will be updated to match in this addendum.
- 5.2 Question: Section 123557 2.09.H, Please confirm label holders are required. None are shown on the elevation drawings and the typical IU lab does not have them.
- 1. Answer: Label holders are not required. Specs will be updated to match in this addendum.
- 5.3 Question: Section 123557 2.10.B, we can't locate sink sizes for SK-1, SK-2, or SK-3. Are the following Durcon sizes acceptable? SK-1 D55 25"x 15"x 10", SK-2 A55 25"x 15"x 4.8", SK-3 A25 18"x 15"x 5".
- 1. Answer: SK-1 size is acceptable. SK-2 should be 5" deep and SK-3 minimum size should be 25" x 15" x 5"
- 5.4 Question: Section 123557 2.10.C.1.a, ¾" thick epoxy countertops are specified but the drawings call out 1" thick countertops. Please confirm what is required.
- 1. Answer: 1 inch thick is required. Specs will be updated to match in this addendum.
- 5.5 Question: Section 123557 3.06, should this be deleted since all water and gas fixtures, and electrical devices are supplied and installed in other spec sections?
- 1. Answer: 123557.3.06 doesn't apply and will be removed but the expectation is that all services and scope will be coordinated among the different trades.

- 5.6 Question: A201, demolition note 3 has the window stools being removed but we can't locate where anything new is being installed in their place. Please clarify what is required.
1. Answer: Window stools will be replaced with epoxy countertops. Notes have been added to the plan and elevations calling this scope of work out.
- 5.7 Question: 6/A203, can the countertop mounted metal mechanical service enclosure be provided in plastic laminate to match the cabinets? The IU Bloomington labs we have seen usually have metal enclosures with metal cabinets, and laminate enclosures with laminate cabinets.
1. Answer: No, the mechanical service enclosure should be metal to match the shelving.
- 5.8 Question: 6/A203 is showing W3 walls plus the peninsula shelving frame in the 10" chase which does not leave any room for MEP items. Can the W3 walls be deleted at the peninsula sections and removable laminate panels provided instead?
1. Answer: Yes, providing removable laminate panels in lieu of W3 would be acceptable.

END ADDENDUM

SECTION 12 35 57 - PLASTIC-LAMINATE-CLAD LABORATORY CASEWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Plastic-laminate laboratory casework.
2. Utility-space framing at backs of base cabinets.
3. Filler and closure panels.
4. Laboratory countertops.
5. Shelves.
6. Laboratory sinks.

B. Related Requirements:

1. Section 012300 "Alternates" for work associated with alternate tops (phenolic vs. epoxy).
2. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking for anchoring laboratory casework.
3. Section 092216 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring laboratory casework.
4. Section 096513 "Resilient Base and Accessories" for resilient base applied to plastic-laminate-clad laboratory casework.

1.03 DEFINITIONS

- A. Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches (1200 mm) above floor, and visible surfaces in open cabinets or behind glass doors.

1. Ends of cabinets, including those installed directly against walls or other cabinets, are defined as "exposed."

- B. Semiexposed Surfaces of Casework: Surfaces behind opaque doors, such as cabinet interiors, shelves, and dividers; interiors and sides of drawers; and interior faces of doors. Tops of cases 78 inches (1980 mm) or more above floor and bottoms of cabinets more than 24 inches (600 mm) but less than 48 inches (1200 mm) above floor are defined as "semiexposed."

- C. Concealed Surfaces of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

- D. MDF: Medium-density fiberboard.

- E. Hardwood Plywood: A panel product composed of layers, or plies, of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive and faced both front and back with hardwood veneers.

1.04 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.

1.05 COORDINATION

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

1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For laboratory casework. Include plans, elevations, and attachment details.
 - 1. Indicate types and sizes of cabinets.
 - 2. Indicate locations of hardware and keying of locks.
 - 3. Indicate locations and types of service fittings.
 - 4. Indicate locations of blocking and reinforcements required for installing laboratory casework.
 - 5. Include details of utility spaces showing supports for conduits and piping.
 - 6. Include details of exposed conduits, if required, for service fittings.
 - 7. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
 - 8. Include coordinated dimensions for laboratory equipment specified in other Sections.
- C. Keying Schedule: Include schematic keying diagram, and index each key set to unique designations that are coordinated with the Contract Documents.
- D. Samples for Verification: Unless otherwise directed, approved full-size Samples may become part of the completed Work, if in an undisturbed condition at time of Substantial Completion. Notify Architect of their exact locations. If acceptable full-size Samples at Project site are not incorporated into the Work, retain and remove them when directed by Architect.
 - 1. One full-size base cabinet complete with hardware, doors, and drawers.
 - 2. One full-size wall cabinet complete with hardware, doors, and adjustable shelves.
 - 3. One Sample each of hinged and sliding doors.
 - 4. 6-inch- (150-mm-) square Samples for each type of countertop material.
 - 5. One of each service fitting specified, complete with accessories and specified finish.
 - 6. One of each type of sink and accessory item specified.

7. One of each type of hardware item specified.

1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

1.08 DELIVERY, STORAGE, AND HANDLING

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

1.09 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, utility roughing-in and wet work are complete and dry, and temporary 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 casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. CiF Laboratory Solutions.
 2. Case Systems.
 3. Stevens Industries, Inc.
 4. TMI Systems Design Corporation.
 5. Advanced Cabinet Systems.
 6. Kewaunee Scientific Corporation; Laboratory Products Group.
 7. ICI Scientific; Campbell Rhea.
 8. Euronique, Inc.
- B. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.
 1. Obtain countertops and sinks from casework manufacturer.
- C. 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 016000 "Product Requirements."

2.02 PERFORMANCE REQUIREMENTS

- A. 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).
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design laboratory casework and support framing system, including attachments to other work.
- C. Seismic Performance: Laboratory casework and support framing system, including attachments to other work, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.03 CASEWORK, GENERAL

- A. Casework Product Standard: Comply with SEFA 8 PL, "Laboratory Grade Plastic Laminate Casework."
- B. 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.

2.04 PLASTIC-LAMINATE CABINETS

- A. Design:
 - 1. Flush overlay.
- B. Exposed Materials:
 - 1. Plastic-Laminate Grade: VGS.
 - a. Colors and Patterns: As selected by Architect from manufacturer's full range, unless otherwise listed on the Finish Plan drawings.
 - 2. Unless otherwise indicated, provide specified edgebanding on all exposed edges to match face.
- C. Semiexposed Materials:
 - 1. Thermoset Decorative Panels: Provide thermoset decorative panels for semiexposed surfaces unless otherwise indicated.
 - a. Colors: As selected by Architect from manufacturer's full range. Reference finish drawings for selected finish as basis-of-design.

- b. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.

D. Concealed Materials:

1. Solid Wood: Any species, with no defects affecting strength or utility.
2. Plywood: Hardwood plywood.
3. Plastic Laminate: Type BKL.
4. Particleboard.
5. MDF.
6. Hardboard.

2.05 PLASTIC-LAMINATE CABINET MATERIALS

- A. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated, and made without urea formaldehyde.
- B. Particleboard: ANSI A208.1, Grade M-2; made with binder containing no urea formaldehyde.
- C. Hardboard: ANSI A135.4, Class 1 Tempered.
- D. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following, as scheduled on Finish Plan Drawings:
 - a. ABET Inc.
 - b. Arborite; a division of ITW Canada.
 - c. Formica Corporation.
 - d. Lamin-Art, Inc.
 - e. Panolam Industries International.
 - f. Wilsonart International; Div. of Premark International, Inc.
- E. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- F. Edgebanding for Plastic Laminate: Plastic laminate matching adjacent surfaces.
- G. Edgebanding for Thermoset Decorative Panels: PVC or polyester edgebanding matching thermoset decorative panels.

2.06 AUXILIARY CABINET MATERIALS

- A. Glass for Glazed Doors: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; not less than 5.0 mm thick.

2.07 COUNTERTOP AND SINK MATERIALS

- A. Epoxy: Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish. Reference bid alternate for alternative material for countertop. Sinks remain epoxy in both conditions.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Durcon, Inc.
 - b. Prime Industries, Inc.
 - c. Thermo Fisher Scientific.
 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. Color: Black.

2.08 FABRICATION

- A. Construction: Provide plastic-laminate laboratory casework of the following minimum construction:
1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch- (19-mm-) thick particleboard.
 2. Shelves: 3/4-inch- (19-mm-) thick plywood.
 3. Exposed Backs of Cabinets: 1/2-inch- (12.7-mm-) thick particleboard or MDF.
 4. Backs of Cabinets: 1/4-inch (6.4-mm) hardboard dadoed into sides, bottoms, and tops where not exposed, unless otherwise indicated.
 5. Drawer Fronts: 3/4-inch- (19-mm-) thick particleboard.
 6. Drawer Sides, Back and Sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 1mm PVC.
 7. Drawer Bottoms: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.
 8. Doors 48 Inches (1200 mm) High or Less: 3/4 inch (19 mm) thick, with particleboard or MDF cores and solid-wood stiles and rails.
 9. Stiles and Rails of Glazed Doors 48 Inches (1200 mm) High or Less: 3/4 inch (19 mm) thick, with particleboard cores.

- B. 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, and 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 specified channel material into rectangular frames instead of using U-shaped brackets.
- C. Removable Backs: Provide backs that can be removed from within cabinets at utility spaces.
- D. Filler and Closure Panels: Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as adjacent exposed cabinet surfaces 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.
 - 2. Provide utility-space closure panels at spaces between base cabinets where utility space would otherwise be exposed, including spaces below countertops.
 - 3. Provide closure panels at ends of utility spaces where utility space would otherwise be exposed.

2.09 HARDWARE

- A. General: Provide laboratory casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. **Butt Hinges: Stainless steel, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antrification 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: stainless-steel, back-mounted pulls. Provide two pulls for drawers more than 24 inches (600 mm) wide.
 - 1. Design: Rectangular loop pulls.
 - 2. Overall Size: 1-3/8 by 5-1/2 inches (35 by 140 mm).
- D. Sliding Door Pulls: Stainless-steel or chrome-plated recessed flush pulls.
 - 1. Design and Size: As selected from manufacturer's full range.
- E. Pulls: Stainless Steel, "Bentwire 128 SA001SS" from Stevens Industries, or approved equivalent.
- F. Door Catches: Dual, self-aligning, permanent magnet catches. Provide two catches on doors more than 48 inches (1200 mm) high.
- G. Drawer Slides: Standard Duty (Grades 1, 2, and 3): Side mounted and extending under bottom edge of drawer; full-extension type; epoxy-coated steel with polymer rollers.
- H. ~~Label Holders: Stainless steel, aluminum, or chrome plated; sized to receive standard label cards approximately 1 by 2 inches (25 by 50 mm), attached with screws or rivets. Provide on all drawers.~~

- I. Locks: Cam type with five-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281 or Type E07261.
 - 1. Provide a minimum of two keys per lock and two master keys.
 - 2. Provide on drawers and doors as indicated on drawings.
 - 3. Keying: Key locks alike within each room, key each room separately.
 - 4. Master Key System: Key all locks to be operable by master key.
- J. Adjustable Shelf Supports: Twin Pin Polycarbonate with 300lb each load rating. Includes anti-tip shelf tabs.
- K. Adjustable Shelf Supports: Mortise-type, powder-coated steel standards and shelf rests complying with BHMA A156.9, Type B04071 and Type B04091.
- L. Adjustable Wall Shelf Supports: Surface-type steel standards and steel shelf brackets, with epoxy powder-coated finish, complying with BHMA A156.9, Type B04102 and Type B04112.

2.10 COUNTERTOPS AND SINKS

- A. Countertops, 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), with continuous drip groove on underside 1/2 inch (13 mm) from edge.
- B. Sinks, General: Provide sizes indicated or laboratory casework manufacturer's closest standard size of equal or greater volume, as approved by Architect.
 - 1. Outlets: Provide with strainers and tailpieces, NPS 1-1/2 (DN 40), unless otherwise indicated.
 - 2. Overflows: provide overflow of standard beehive or open-top design with separate strainer. Height 2 inches (50 mm) less than sink depth. Provide in same material as strainer.
- C. Epoxy Countertops and Sinks:
 - 1. Countertop Fabrication: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and butt joints assembled with epoxy adhesive and concealed metal splines.
 - a. Countertop Configuration: Flat, 1 inch (19 mm) thick, with rounded edge and corners, and with drip groove and integral coved or applied backsplash.
 - 2. Sink Fabrication: Molded in one piece with smooth surfaces, coved corners, and bottom sloped to outlet; 1/2-inch (13-mm) minimum thickness.
 - a. Provide with polypropylene strainers and tailpieces.
 - b. Provide integral sinks in epoxy countertops, bonded to countertops with invisible joint line.

PART 3 - EXECUTION

3.01 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.

3.02 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; 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 Cabinets 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.
- 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. Set hinges snug and flat in mortises.
- F. Adjust laboratory casework and 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.

3.03 INSTALLATION OF COUNTERTOPS

- A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only 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. Use concealed clamping devices for field-made joints in plastic-laminate countertops. Locate clamping devices within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.
- C. Fastening:
 - 1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
 - 2. Secure epoxy countertops 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 countertops 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 required holes and cutouts for service fittings.
- E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.
- F. Provide scribe moldings for closures at junctures of countertop, 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.
- G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.04 INSTALLATION OF SINKS

- A. Comply with installation requirements in SEFA 2.3.
- B. Drop-in Installation of Epoxy Sinks: Rout groove in countertop 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

3.05 INSTALLATION OF LABORATORY ACCESSORIES

- A. Install accessories according to Shop Drawings, installation requirements in SEFA 2.3, 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.

3.06 — 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 according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions. Set bases and flanges of sink and countertop-mounted fittings in sealant recommended by manufacturer of sink or countertop material. Securely anchor fittings to laboratory casework unless otherwise indicated.~~

3.07 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 countertop 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 20 00 60 – COMMON PIPE, VALVES FITTINGS AND HANGERS FOR FIRE SUPPRESSION,
PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section specifies piping, valves and fittings including piping support for all systems. These systems include the following:
 - 1. System Piping Schedule #1
Heating Water
 - 2. System Piping Schedule #14
Sanitary Inside Building
Vent Inside Building
Storm Gravity Inside Building
 - 3. System Piping Schedule #17
Domestic Hot Water Aboveground
Domestic Cold Water Aboveground
 - 4. System Piping Schedule #19
Fire Protection
 - 5. System Piping Schedule #24
Acid Waste
- B. All specialty valves for specific systems are listed in specification sections for those systems. Specialty valves for specific systems can be found in the following sections:
 - 1. Plumbing Specialty Valves – 22 00 00 “Plumbing”
 - 2. Fire Protection Specialty Valves – 21 00 00 “Fire Protection”
 - 3. Refrigeration Specialty Valves – 23 00 00
 - 4. Hydronic Specialty Valves – 23 00 00 “Heat Transfer”
 - 5. Control Valves – 23 00 00 “Temperature Controls”
- C. Related sections include the following:
 - 1. 20 00 10 Common Work Results for Fire Suppression, Plumbing and HVAC
 - 2. 20 00 50 Common Materials and Methods for Fire Suppression, Plumbing and HVAC
 - 3. 20 01 80 Common Insulation for Plumbing and HVAC
 - 4. 21 00 00 Fire Suppression

- 5. Division 22 Plumbing
- 6. Division 23 Mechanical

1.3 SUBMITTAL

- A. Submit product data for valves and fittings used in each system.
- B. Submittal data to be in compliance with Section 20 00 10.
- C. Product data shall include pressure and temperature classifications, model numbers, material types, actuators, trim, valve handle extensions and all pertinent data as required for complete evaluation by Engineer.
- D. Maintenance data for valves shall include adjusting, servicing, disassembly, exploded view with part numbers and repair instructions.
- E. Piping submittals are not required. However, piping to meet all specifications.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.
- B. MSS Compliance: Comply with the various MSS Standard Practice documents referenced.
- C. All grooved joint couplings, fittings, valves and specialties shall be products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- D. Welded and Soldered Pipe
 - 1. Pipe welding shall comply with provisions of latest revision of applicable code, whether ASME Boiler & Pressure Vessel Code, ASTM Code for Pressure Piping, or such state or local requirements as may supersede code mentioned above.
 - 2. A copy of his welding procedure specification together with proof of its qualification as outlined and required by most recent issue of code having jurisdiction.
 - 3. Submit Operator's qualification record in conformance with provisions of code having jurisdiction, showing that operator was under proven procedure specifications submitted by Contractor.
 - 4. Standard procedure specifications and operators qualified by National Certified Pipe Welding Bureau shall be considered as conforming to requirements of these specifications.
 - 5. Welders to have ASME test papers not more than 5 years old.
 - 6. Each manufacturer or Contractor shall be responsible for quality of welding done by his organization and shall repair or replace work not in accordance with these specifications.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.

3. Set globe and gate valves closed to prevent rattling.
 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 5. Set butterfly valves closed or slightly open.
 6. Set butterfly valves closed or slightly open.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
 2. Store indoors and maintain valve temperature higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
 3. Stack piping above grade and covered.
- C. Use a sling to handle large valves. Rig to avoid damage to exposed parts. Do not use handwheels and stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 PIPE MATERIAL DESIGNATIONS

- A. Refer to System Schedules in Execution portion of this Section for designation of pipe types to be used for each piping system. When more than one piping type is designated, contractor may choose which type is installed.
- B. Piping Designations
1. CP-2 Steel:
 - a. 3/4" to 2" ASTM A53, Type S (seamless) or Type F (furnace-butt welded) Grade A Black steel (galvanized if so noted). U.S. Steel; Laclede; Republic; Youngstown, Jones & Laughlin.
 - b. 2-1/2" to 12" ASTM A53, Type E (electric resistance welded) Grade A Black steel (galvanized if so noted).
 - c. 14" to 20" ASTM A53, Type E (electric resistance welded) Grade B or Type S (seamless), (galvanized if so noted). U.S. Steel; Laclede; Republic; Youngstown; Jones & Laughlin.
 2. CP-8 Copper: ASTM B75, B88, B251 and B447; ASA H23.1-1947 seamless copper tubing, hard temper (soft copper if so noted). Type K or L. (as noted) Chase; Bridgeport, Anaconda; Scovill.
 3. CP-20 Ductile Iron Mechanical Joint: AWWA C151 with Mechanical Joint Bell and plain spigot end, cast iron pipe, centrifugally cast with asphaltum coating. Class as noted in schedule. Pipe to be marked and carry nominal weights and dimensions as required by state and local codes. As manufactured by James B. Clow & Sons; American Cast Iron Pipe; Alabama Pipe; U.S. Pipe & Foundry.
 4. CP-40 Cast Iron (HUB) Bell and Spigot: ASTM A74, extra heavy bell and spigot cast iron soil pipe centrifugally metal or sand spun cast with asphaltum coating. American Brass & Iron; Tyler; Charlotte. Pipe and fittings shall be labeled with the trademark of the Cast Iron Soil Pipe Institute.

5. CP-41 Soil Pipe: Cast Iron no hub ASTM A888, CISPI 301. No hub cast iron soil pipe centrifugally metal or sand spun cast with asphaltum coating. American Brass & Iron; Tyler; Charlotte. Pipe and fittings shall be labeled with the trademark of the Cast Iron Soil Pipe Institute.
6. CP-45 Polypropylene Acid Waste: ASTM D2843, ASTM 635, ASTM D4101, Schedule 40, solvent welded as manufactured by Orion, LabLine/Enfield.

2.2 PIPE FITTING DESIGNATIONS

- A. Refer to System Schedules in Execution portion of this Section for designation of fitting types to be used for each piping system. Fittings to be of the same strength of piping in each respective piping system. When more than one type is designated, contractor may choose which type is installed.
- B. Fitting Designations:
 1. CF-1 Malleable Iron: ASME B16.3. 300# (or as noted) black band malleable iron threaded fitting (galvanized if so noted). Grinnell; Flagg; Kuhns; Illinois Malleable, Stockham.
 2. CF-2 Cast Iron: ASME B16.4; 250# (or as noted) black cast iron threaded fitting (galvanized if so noted). Grinnell; Kuhns, Illinois Malleable; Stockham.
 3. CF-4 Flanged: 125# (or as noted) black cast iron, flanged fitting (galvanized if so noted). Grinnell; Kuhns; Stockham; Illinois Malleable.
 4. CF-5 Wrought Steel fittings: ASTM, B16.9, B16.11, B16.28. Steel butt welding fitting. All elbows shall be long radius, unless otherwise noted. Tube Turns; Midwest; Taylor Forge; Ladish; NIBCO; Grinnell; Weld Bend; Babcock Wilcox.
 5. CF-6 Grooved Mechanical-Joint Fittings: ASTM A 536, Grade 65-45-12 ductile iron; ASTM A 47 (ASTM A 47M), Grade 32510 malleable iron; ASTM A 53, Type F, E, or S, Grade B fabricated steel; or ASTM A 106, Grade B steel fittings with grooves or shoulders designed to accept grooved end couplings. All fittings shall be long radius unless otherwise specified. UL listed, FM approved for fire service. Victaulic; Anvil; Gruvlok.
 6. CF-8 Wrought Copper: ASME B16.22. Wrought copper solder joint fitting as manufactured by Flagg; Mueller; Chase, NIBCO; Anaconda; American Brass.
 7. CF-8A Wrought Copper Cold Press Fitting: Fitting specifically design to be field installed with handheld portable press tool. Fitting to be certified by NSF, UL and be compliant with ICC, UPC, PHCC, NFPA13, 13D and 13R. Fittings to be ProPress Smart Connect installed by RIGID Portable Press tool.
 8. CF-20 Mechanical Joint: AWWA C111 ductile or grey-iron, standard pattern, same class as noted for pipe. Alabama Pipe, U.S. Pipe & Foundry.
 9. CF-40 (HUB) Bell and Spigot: Cast iron bell and spigot Type fitting DWV configuration, extra heavy duty. American Brass & Iron; Tyler; Charlotte.
 10. CF-41 (NO-HUB) Mechanical Joint: Cast iron no hub type fitting - DWV configuration. American Brass & Iron; Tyler; Charlotte.

11. CF-47 Polypropylene: polyvinylchloride fittings, as manufactured by Orion, LabLine/Enfield.

2.3 PIPE JOINT DESIGNATIONS

- A. Refer to System Schedules in Execution portion of this Section for designations of joint types to be used for each piping system. When more than one type is designated, contractor may choose which type is installed.
- B. Piping Joint Designations:
 1. CJ-1 Threaded: threads shall conform to ASME B1.20.1, ASTM B16.3, B16.4, B16.12. Remove all burrs. Ream pipe ends to full bore and remove all chips. Use pipe compound on male ends only. Approved pipe compounds: Blue Seal; Key Tite.
 2. CJ-5 Welded Pipe: standard specification provision for fabrication and erection of piping systems as recommended by National Certified Pipe Welding Bureau. All welding of pipe, regardless of condition of is to be installed as follows:
 - a. Pipe welding shall comply with provisions of latest revision of applicable code, whether ASME Boiler & Pressure Vessel Code, ASTM Code for Pressure Piping, or such state or local requirements as may supersede code mentioned above.
 - b. A copy of his welding procedure specification together with proof of its qualification as outlined and required by most recent issue of code having jurisdiction.
 - c. Submit Operator's qualification record in conformance with provisions of code having jurisdiction, showing that operator was under proven procedure specifications submitted by Contractor.
 - d. Standard procedure specifications and operators qualified by National Certified Pipe Welding Bureau shall be considered as conforming to requirements of these specifications.
 - e. Welders to have ASME test papers not more than 5 years old.
 - f. Each manufacturer or Contractor shall be responsible for quality of welding done by his organization and shall repair or replace work not in accordance with these specifications.
 3. CJ-6: grooved mechanical-joint couplings: Two ductile or iron housing segments and synthetic rubber EPDM (+250°F) gasket of central cavity pressure-response design; with ASTM A449 nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings; Victaulic Installation-Ready Style 107H rigid coupling, or equal by Anvil or Gruvlok. UL classified in accordance with ANSI / NSF-61 for potable water service and shall meet the low-lead requirements of NSF-372. Tongue and recess couplings may only be used if the contractor uses a torque wrench for installation. Required torque shall be in accordance with the manufacturer's latest recommendations and each coupling shall be tagged or marked with indelible ink indicating the specific value of torque attained to confirm joint rigidity and proper installation.
 4. CJ-8: 95% tin, 4.85% copper, 0.15% selenium. Premium Contractor Grade solder. 410°F Minimum working temperature; 7130 PSI Tensile Strength, ASTM B32. Like Taramet Sterling, Taracorp.IMACO, Winston-Salem, NC. Cut ends of tubing square with wheel type cutter, ream to remove burrs, wipe clean on inside, apply paste type solder flux on external surface. Apply solder (no lead allowed).

5. CJ-20 Mechanical Joint: AWWA C 111 ductile - or grey - iron glands, rubber gasket and steel bolts. Reinforce joint at hydrants, fittings or valves with heavy wrought iron clamps and wrought iron rods in accordance with standard details of National Board of Fire Underwriters. Apply heavy coat of bituminous solution to assembly.
6. CJ-40 (HUB) Bell & Spigot: Gasket-ASTM C 564, Rubber. American Brass & Iron; Tyler; Charlotte.
7. CJ-41 (No HUB) Coupling: Stainless steel couplings CISPI 310 with ASTM A 167, Type 301 or ASTM A 666 Type 301 Stainless steel corrugated shield; stainless steel bands and sleeve. American Brass & Iron; Tyler; Charlotte.
8. CJ-44 Flanged Joints:
 - a. Cast-Iron Flanges and Flanged Fittings: ASME B16.21, Classes 25, 125 and 250; raised ground face, and bolt holes spot faced. Including bolts, nuts and gaskets.
 - b. Flange bolts and nuts: ASME B18.2, Carbon Steel unless otherwise indicated.
9. CJ-47 Polypropylene: groove pipe, snap-on joint and tighten. Orion, LabLine/Enfield.

2.4 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings: CPVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 1. Manufacturers:
 - a. Eslon Thermoplastics.
- B. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimension; one end with threaded brass insert, and one solvent-cement-joint end.
 1. Manufacturers:
 - a. Thomson Plastics, Inc.
- C. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 1. Manufacturers:
 - a. NIBCO, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure and temperature.

- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company/
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300- psig minimum working pressure as required to suit system pressures.
1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company
 - d. Pipeline Seal and Insulator, Inc.
 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and non-corrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and non-corrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.

- d. Victaulic Co. of America

2.6 UNIONS AND FLANGED CONNECTIONS

- A. 150-pound malleable iron with ground joint and brass to iron seats. Crane 1280.
- B. 125-pound wrought copper or cast brass union with solder joint fittings. Crane 633.
- C. 150-pound forged steel flanges with welding neck. Crane 568.
- D. 150-pound bronze flanges with tube stop. Mueller F900.

2.7 VALVE DESIGNATIONS

- A. Refer to System Schedules in Execution portion of this Section for designation of valve types to be used for each piping system.
- B. All valves shall be compatible with the type of piping material installed in the system.

PART 2 - PRODUCTS (Continued)

VALVE SCHEDULES

1	Refer to System Schedules in Execution portion of this Section for designation of valve types to be used for each piping system.		
2	VALVE DESIGNATION	CV-4	
3	TYPE	Globe	
4	MAXIMUM WORKING		
4.1	Pressure - PSIG	125	
4.2	Temperature - °F	Sat. Stm.	
5	SIZE LIMITS - Inches	1/2 - 2 1/2	
6	DESCRIPTION		
6.1	Body	Bronze	
6.2	Trim	Bronze	
6.3	Disc/plug	Renewable Composite	
6.4	Bonnet	Screw-in	
6.5	Stem	Rising-Silicon Bronze	
6.6	Seat	Integral	
6.7	Agency Compliance	MSS SP-80	
	APPROVED PRODUCTS	Soldered	Threaded
7.1	Nibco	S211	T211
7.2	Crane	1310	1
8	NOTES		
8.1	Provide manufacturer's standard stem packing for service intended.		
8.2	Valves with rising stems suitable for repacking under pressure.		

PART 2 - PRODUCTS (Continued)

VALVE SCHEDULES

- | | | | |
|-----|--|---------------------|----------------------------|
| 1 | Refer to System Schedules in Execution portion of this Section for designation of valve types to be used for each piping system. | | |
| 2 | VALVE DESIGNATION | CV-5 | CV-6 |
| 3 | TYPE | Globe | Angle |
| 4 | MAXIMUM WORKING | | |
| 4.1 | Pressure - PSIG | 125 | 125 |
| 4.2 | Temperature - °F | Sat. Stm. | Sat. Stm. |
| 5 | SIZE LIMITS - Inches | 3 - 12 | 3 - 12 |
| 6 | DESCRIPTION | | |
| 6.1 | Body | Iron ASTM A126 | Iron |
| 6.2 | Trim | Bronze | ASTM B-584 |
| 6.3 | Disc/plug | Renewable Composite | Renewable Composite |
| 6.4 | Bonnet | Bolted | Bolted |
| 6.5 | Stem | OS&Y | OS&Y |
| 6.6 | Seat | Renewable Rings | Renewable Rings, ASTM B584 |
| 6.7 | Agency Compliance | MSS SP-85 | MSS SP-85 |
| 7 | APPROVED PRODUCTS | | |
| 7.1 | Nibco | F-718-B | F-818-B |
| 7.2 | Crane | 351 | 353 |
| 7.3 | Jenkins | 613CJ | 615CJ |
| 8 | NOTES | | |
| 8.1 | Provide manufacturer's standard stem packing for service intended. | | |
| 8.2 | Valves with rising stems suitable for repacking under pressure. | | |

PART 2 - PRODUCTS (Continued)

VALVE SCHEDULES

- | | | |
|-------|---|--|
| 1 | Refer to System Schedules in Execution portion of this Section for designation of valve types to be used for each piping system. | |
| 2 | CLASS NO. | CV-20 |
| 3 | TYPE | Ball - Full Port |
| 4 | MAXIMUM WORKING | |
| 4.1 | Pressure - PSIG | 600 |
| 4.2 | Temperature - °F | Sat. Stm. |
| 5 | SIZE LIMITS - Inches | 1/2 – 2 1/2" |
| 6 | DESCRIPTION | |
| 6.1 | Body/End Piece | 2-Piece Construction - ASTM B 584 Bronze Body Alloy 844 Forging Brass ASTM B-124 Alloy 377 |
| 6.2 | Ball | Chromeplated Brass Full Port |
| 6.3 | Stem | Bronze or Brass |
| 6.3.1 | | Provide with Stem Extension on insulated pipes |
| 6.4 | Seats/Seals | Teflon |
| 6.5 | Agency Compliance | MSS SP-110 |
| 7 | APPROVED PRODUCTS | |
| 7.1 | Nibco | T-585-70 |
| 7.2 | Crane/Capri | 9202 |
| 7.3 | Conbraco Industries, Inc. | 70-100 |
| | Apollo Series | |
| 8 | NOTES | |
| 8.1 | Soldered valves are not allowed. | |
| 8.2 | Provide stem extension or valve manufacturers insulated extension handle system on all valves installed in insulated systems and specified to be insulated. | |

PART 2 - PRODUCTS (Continued)

VALVE SCHEDULES

- 1 Refer to System Schedules in Execution portion of this Section for designation of valve types to be used for each piping system.
- 2 CLASS NO. CV-23
- 3 TYPE Butterfly
- 4 MAXIMUM WORKING
 - 4.1 Pressure - PSIG 300
 - 4.2 Temperature - °F 200
- 5 SIZE LIMITS - Inches 3 – 6 (see note below)
- 6 DESCRIPTION
 - 6.1 Body/End Piece Duct. Iron ASTM A-126 Threaded Lug for dead end service
 - 6.2 Disc AL. Bronze ASTM B-148 Alloy 954/955; Coated Ductile Iron
 - 6.3 Stem 416 Stainless steel ASTM A-582
Collar bushings upper and lower bushing
Stem shall be offset from the disc centerline to provide complete 360-degree circumferential seating.
 - 6.4 Seats Pressure Responsive EPDM
 - 6.5 Agency Compliance MSS SP-67
- 7 OPERATOR
 - 7.1 Standard Lever-lock handle w/memory stop.
- 8 APPROVED PRODUCTS
 - 8.1 Nibco LD 2000-3
 - 8.2 Crane 14-TL
 - 8.3 Apollo 6L-31
 - 8.4 Lunkheimer FIG. 4735
 - 8.5 Stockham LD-711-BS3-E
 - 8.6 Victaulic VIC300 Series
- 9 NOTES
 - 9.1 Do not use butterfly valves on pipes size 2 1/2" and smaller.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install pipe, valves and fittings for each system as designated in the System Schedules on the following pages.
- B. Reference Products, Part 2 of this Section for specifications and manufacturers of pipes, valves and fittings designated to be installed in System Schedules.

PART 3 - EXECUTION (Continued)

SYSTEM PIPING SCHEDULE 1
 HEATING WATER

- 1 Install pipe, valves and fittings as designated in this Schedule for this System.
- 2 NOMINAL SIZE RANGE
 - 2.1 Minimal Diameter 3/4" 2 1/2"
 - 2.2 Maximum Diameter 2" 4"
- 3 DESIGN
 - 3.1 Working Pressure PSIG 160 160
 - 3.2 Working Temperature °F 250 250
- 4 PIPING MATERIAL DESIGNATIONS
 - 4.1 Soft "K" Copper (See Notes) CP-8 -
 - 4.2 Hard "L" Copper CP-8 CP-8
 - 4.3 Sch. 40 Bl. St. (See Notes) Not Allowed CP-2
- 5 FITTING DESIGNATIONS
 - 5.1 Wrought CF-8 CF-8
 - 5.2 Cast Iron Threaded - -
 - 5.3 Flanged - CF-4
 - 5.4 Butt Welded - CF-5
- 6 JOINT DESIGNATIONS
 - 6.1 Solder CJ-8 CJ-8
 - 6.2 Threaded - -
 - 6.3 Welded - CJ-5
 - 6.4 Flanged 125# - CJ-44
- 7 VALVE DESIGNATIONS
 - 7.1 Ball CV-20 CV-20
 - 7.2 Butterfly - CV-23
 - 7.3 Globe CV-4 CV-4, 5
- 8 NOTES
 - 8.1 Pipe installed below grade shall be continuous soft copper. No piping joints allowed below grade. All pipes above grade shall be straight lengths.
 - 8.2 Use Schedule 30 black steel pipe on all sizes 12" and over. Use 1/2" pipe only if shown.
 - 8.3 Mechanical T-bolted branch outlets not approved.

PART 3 - EXECUTION (Continued)

SYSTEM PIPING SCHEDULE 14
 SANITARY, VENT AND STORM GRAVITY-INSIDE BUILDING

- 1 Install pipe, valves and fittings as designated in this Schedule for this System.
- 2 ABOVE GRADE
 - 2.1 SANITARY & STORM PIPE DESIGNATIONS

FITTING DESIGNATIONS	JOINT DESIGNATIONS
2.1.1 1 1/2" and Larger	
2.1.1.1 Cast Iron No Hub CP-41	No Hub CF-41 Coupling CJ-41
 - 2.2 VENT PIPE DESIGNATIONS

2.2.1 1 1/2" and Larger	
2.2.1.1 Cast Iron No Hub CP-41	No Hub CF-41 Coupling CJ-41
- 3 BELOW FLOOR
 - 3.1 SANITARY, STORM AND VENT

3.1.1 2" and Larger	
3.1.1.1 Cast Iron No Hub CP-40	Hub CF-40 Gasket CJ-40
- 4 NOTES
 - 4.1 Underground, under building piping shall be heavy coated with tar finish or asphaltum on both inside and outside surfaces.

PART 3 - EXECUTION (Continued)

SYSTEM PIPING SCHEDULE 17
 DOMESTIC HOT & COLD WATER
 ABOVE GROUND

1 Install pipe, valves and fittings as designated in this Schedule for this System.

2 NOMINAL SIZE RANGE

2.1	Minimum Diameter	3/4"	2-1/2"
2.2	Maximum Diameter	2"	8"

3 DESIGN

3.1	Working Pressure PSIG	125	125
3.2	Working Temperature °F	250	250

4 PIPING DESIGNATIONS

4.1	Hard "L" Copper	CP-8	CP-8
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5 FITTING DESIGNATIONS

5.1	Wrought	CF-8	-
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6 JOINT DESIGNATIONS

6.1	Solder	CJ-8	CJ-8
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7 VALVES

7.1	Ball	CV-20	-
7.2	Angle	-	CV-6
7.3	Globe	CV-4, 5	CV-5
7.5	Butterfly	-	CV-23

8 NOTES

- 8.1 Install ball valves for balancing services.
- 8.2 Use flange joint on 3" and larger pipe when connection to equipment or valves.
- 8.3 See Division 22 "Plumbing" for special valves.
- 8.4 Mechanical T-bolted branch outlets not approved.
- 8.5 Cold Press, Grooved, and T-drill fittings are not approved.

PART 3 - EXECUTION (Continued)

SYSTEM PIPING SCHEDULE 19
FIRE PROTECTION

1	Install pipe, valves and fittings as designated in this Schedule for this System			
2	LOCATION LIMITES	BELOW GROUND	ABOVE GROUND	
3	NOMINAL SIZE RANGE			
3.1	Minimum Diameter	4"	1"	2 1/2"
3.2	Maximum Diameter	12"	2"	8"
4	DESIGN			
4.1	Working Pressure PSIG	175	175	175
4.2	Working Temperature °F	WOG	WOG	WOG
5	PIPING DESIGNATIONS			
5.1	Ductile Iron	CP-20	-	-
5.2	Sch. 40 Bl. St.	-	CP-2	-
5.3	Sch. 10 Bl. St.	-	-	CP-2
6	FITTING DESIGNATIONS			
6.1	Ductile Iron Mech. Joint	CF-20	-	-
6.2	Class 125 Cast Iron	-	CF-2	-
6.3	Class 150 Malleable Iron	-	CF-1	-
6.4	Steel Grooved	-	-	CF-6
7	JOINT DESIGNATIONS			
7.1	Mechanical Joint	CJ-20	-	-
7.2	Threaded	-	CJ-1	-
7.3	Mech. Grooved	-	-	CJ-6
8	NOTES			
8.1	Valves are specified in Fire Protection Section 21 10 00.			
8.2	Provide manufacturer's standard gasket for service intended on mechanical joint pipe.			
8.3	Provide thrust blocks, tie-rods on fittings below grade as required by NFPA #24, Chapter 8.			
8.4	The minimum burial depth of exterior fire protection systems shall be 5'-0".			
8.5	Mechanical T-bolted branch outlets not approved.			

PART 3 - EXECUTION (Continued)

SYSTEM PIPING SCHEDULE 24
ACID WASTE AND VENT

- 1 Install pipe, valves and fittings as designated in this Schedule for this System.
- 2 LOCATION LIMITS ALL LOCATIONS
- 3 NOMINAL SIZE RANGE
- 3.1 Minimum Diameter 1 1/2"
- 3.2 Maximum Diameter 4"
- 4 PIPING DESIGNATIONS
- 4.1 Polypropylene (Sch. 40) CP-45
- 5 FITTING DESIGNATIONS
- 5.1 Polypropylene (Sch. 40) CF-47
- 6 JOINT DESIGNATIONS
- 6.1 Polypropylene (Sch. 40) CJ-47
- 7 NOTES
- 7.1 Install all piping according to manufacturer's written instruction and in compliance with all applicable codes and regulations.
- 7.2 Pipe below grade shall be non-flame retardant. All fittings and joints shall be joined using fusion welding process.
- 7.3 Pipe above grade shall be flame retardant. Acid waste and vent pipe and fittings installed in return air plenum areas must be copolymer polypropylene joined by the electrical within fusion process with the addition of appropriate flame-attenuated fiberglass circulated insulation such as Micro-lok AP-T Plus as manufactured by Schuller Co. Any acceptable overwrap or insulation must comply with ASTM E84 25/50 requirements for flame and smoke development.
- 7.4 Accessible piping may be installed with mechanical joints. Inaccessible piping shall be installed with fusion welded joints.

3.2 PIPE SUPPORT

A. Pipe Support

1. Furnish and install supports, guides, anchors and swaybraces required for proper installation and support of pipelines except supports noted to be furnished by others.
2. Pipe suspension shall prevent excessive stress and excessive variation in supporting force. Fabrication and installation of supports for pipelines shall not constrain piping to cause excess transfer of load from supports to piping or from support to support when expansion or contraction occurs. Supports shall be capable of taking entire piping load imposed by expansion or contraction.
3. Where pipe vibration transmits objectionable vibration to building structure or attached equipment, hangers shall be supplemented by spring cushions or an energy absorbing means in the supports themselves, or through the addition of flexible piping connectors or other auxiliary equipment.
4. Piping system where flexibility is not desired shall be supported by rigid hangers.
5. See Section 20 00 10, "Attaching to Building Construction" for attaching pipe support to structure.

B. Vertical Pipe Risers

1. Support vertical runs under 15' long with hanger adjacent to elbows.
2. Support vertical runs over 15' with steel riser clamps. Weld clamps to pipe and support on building structure. Space clamps at every floor with maximum spacing of 28'.

C. Hanger Rods

1. Support horizontal pipe with hot rolled steel rod manufactured in accordance with ASTM A107. Space hanger rods to eliminate pipe sagging. Space hangers as listed below. Place hangers within 12" of each horizontal elbow.
2. Steel and Copper Hanger Spacing

<u>PIPE SIZE (NPS)</u>	<u>ROD SIZE (DIAMETER)</u>	<u>MAXIMUM HANGER SPACING</u>
1/2" thru 1-1/4"	3/8"	6'0"
1-1/2" and 3"	1/2"	10'0"
4" and 5"	5/8"	10'0"
6"	3/4"	10'0"
8" thru 12"	7/8"	15'0"
14" thru 18"	Two 7/8"	15'0"
20" thru 24"	Two 1"	15'0"

3. PVC Pipe Support Spacing

<u>PIPE SIZE (NPS)</u>	<u>ROD SIZE (DIAMETER)</u>	<u>MAXIMUM HANGER SPACING</u>
1/2" thru 1"	3/8"	3'0"
1-1/4" thru 3"	3/8"	4'0"
4" thru 5"	1/2"	4'0"
6"	1/2"	4'0"

4. Piping with caulked joints to be supported at each joint.
- D. Pipe Hangers (Pipe Suspended from Above)
1. For Hot Lines or Combination Hot and Cold Lines
 - a. 2" and smaller iron or steel pipe: adjustable steel clevis hangers. Elcen 12; Grinnell 260; Fee & Mason 239; Crawford 11.
 - b. 2" and smaller copper pipe: adjustable copper pipe ring. Elcen 394; Grinnell 97CP; Fee & Mason 365; Crawford.
 - c. 2-1/2" thru 12" iron, steel and copper pipe: adjustable steel clevis hangers. Elcen 12; Grinnell 260; Fee & Mason 239; Crawford 11.
 - d. 2-1/2" thru 12" iron, steel and copper pipe: adjustable swivel pipe roll (one hanger rod). Elcen 14; Grinnell 174; Fee & Mason 272; Crawford 129.
 - e. 14" thru 24" o.d. iron or steel pipe: single pipe roll with adjustable sockets (two hanger rods). Elcen 15; Grinnell 171; Fee & Mason 170; Crawford 15.
 2. For Cold Lines
 - a. All sizes iron or steel pipe: Elcen 12; Grinnell 260; Fee & Mason 239; Crawford 11.
 - b. All sizes copper pipe: adjustable copper-plated ring. Elcen 394; Grinnell 97CP; Fee & Mason 365; Crawford.
 3. All hangers used on lines requiring insulation and vapor barrier shall have hangers oversized to allow insulation to pass thru hanger. Install insulation cradles or wood blocks the same thickness as insulation so insulation will not be crushed. Insulation cradles or wood blocks shall be designed for this specific use.
- E. Pipe Carriers (Pipe Supported from Below on Racks, Piers, Stands or Trapeze Support)
1. For Hot Lines or Combination Hot and Cold Lines
 - a. 3" and smaller Pipe: roller chair with steel U bar support. Elcen 16; Grinnell 176; Fee & Mason 168; Crawford 130.
 - b. 4" and larger Pipe: adjustable pipe roll stand with base plate. Elcen 20; Grinnell 274; Fee & Mason 161; Crawford 19.
 2. For Cold Lines: all pipe sizes supported on steel pipe chair designed to contain pipe movement in direction perpendicular to pipe run but allow some movement in direction of pipe run.
 3. All hangers used on lines requiring insulation and vapor barrier shall have hangers oversized to allow insulation to pass thru hanger. Install insulation cradles or wood blocks the same thickness as insulation so insulation will not be crushed. Insulation cradles or wood blocks shall be designed for this specific use.
- F. For sprinkler piping support refer to NFPA#13 (3-10 hangers).
- G. Supports for sprinkler piping to be in conformance with NFPA 13, if modified by this section.
- H. For piping hanger rod attachment to building, see Section 20 00 10 "Attaching to Building Construction."

3.3 ESCUTCHEONS

- A. See Escutcheons, Section 20 00 50.

3.4 INSTALLATION OF VALVES

- A. Locate valves accessibly and arrange to permit easy removal of fixtures and equipment they serve.
- B. Unless otherwise noted, all valves shall be full size of lines in which they are placed.
- C. Install all piping and shut-off valves full pipe size as shown on Drawings. Reduce at control valves to control valve size.
- D. Valves mounted in horizontal lines shall not have their stems and bonnets pointed below horizontal position unless indicated on Drawings.
- E. Provide valves with 3/4" garden hose adaptor for draining low points, boilers, chillers, coils, etc. with cap and chain. Use ball valves for systems which operate below 120°F. Use gate (Crane 431) or globe valves for systems which operate above 121°F.
- F. Mount all globe valves to close against flow pressure. Flow should be against bottom of plug.
- G. Remove bonnets and trim from all valves before soldering, brazing or welding in piping system. Protect seating surfaces during installation. Clean valve parts thoroughly before reassembling. Install bonnet with valve in open position. Follow manufacturer's written instructions to protect valves from overheating during installation.
- H. Install all valves with discs or plugs in open position. Close only when assured that sealing parts are free from foreign material. Weld scale or similar foreign materials found embedded in sealing surfaces will require installation of new trim or complete valve.
- I. Install valves as required by control contractor.

3.5 INSTALLATION OF PIPING

- A. Offset piping to avoid interference with other work to increase head room under piping.
- B. Contractor may, at his option, use pipe bending equipment to form full lengths of pipe to proper configuration indicated on Drawings.
- C. Remove raised face from flanges that are to match cast iron flat face patterns.
- D. Coat studs, nuts, flange faces and metallic gaskets with material similar to molybdenum disulphide before assembly.
- E. Pipe sizes refer to nominal inside pipe diameter except on copper refrigeration lines and steel and wrought iron pipe 14" and larger.

- F. Bonney Weldolet Forge Branch Outlet Fittings may be used where steel with welding fittings are specified in lieu of branch outlet tees, provided branch tee is 2 sizes smaller than main. Nipples welded into mains not acceptable.
- G. Use galvanized fittings and unions with galvanized pipe.
- H. Caulk clearance space in floor sleeves with plastic compound or fire stop material as required.
- I. Caulk exterior wall sleeves with thiokol.
- J. Install chrome plated pipe escutcheons on bare exposed pipe at wall, floor and ceiling penetrations. Reference 20 00 50 Escutcheons.
- K. Use dielectric couplings when joining dissimilar piping materials.
- L. Piping shall not pass over electrical apparatus. If conflict is shown on Drawings, notify Engineer prior to installing pipe.
- M. Refer to General Requirements for installation of sleeves, escutcheons, cutting and fitting and attaching to building construction.
- N. Refer to Insulation Section 20 01 80 for insulation data. PVC in return air plenums shall be insulated
- O. Conceal all pipes where provisions have been made for this purpose.
- P. In case of conflict on Drawings as to pipe size, the larger pipe size shall be installed.
- Q. Joints shall be approved type, gas and watertight for system pressure.
- R. All pipes shall be cut square, reamed, chamfered and free of all burrs and obstructions. Pipe ends shall have full-bore openings and not be undercut.
- S. Piping not serving elevator equipment rooms shall not pass through elevator equipment rooms. If conflict is shown on drawings, notify Engineer prior to installing pipe.
- T. Install wells, thread-o-lets and T's as required by control contractor.
- U. Copper pipe shall not come in direct contact with mortar or grout. Where copper pipes are exposed to mortar or grout, pipes shall be wrapped with duct tape. This typically happens when pipes pass through masonry walls.
- V. All pipes to equipment and isolation valves shall be full pipe size as shown on Drawings regardless of equipment connection size. Use reducers at equipment to reduce to equipment size.
- W. Grooved product must be installed per manufacturer's written instructions, which may or may not include extreme lubricant, torque wrench and specified torque ratings. Manufacturer's representative must provide on-site training to field personnel on installation of product.
- X. No pulled "T" drilling of copper piping for branch takeoff's allowed.
- Y. Condensate piping shall be installed with slope of not less than 1/8" per foot.

- Z. If grooved piping system is used, it is not acceptable to use mechanical-T bolted branch outlet fittings.**

3.6 PIPE CLEANING

- A. Swab to remove dirt or scale.
- B. Flush water system until water runs clear.
- C. Operate steam systems until condensate runs clear.
- D. Clean all strainers and traps.

3.7 TESTING PIPING

- A. Test all piping at 1 1/2 times operating pressure.
- B. Test all concealed work before covering with earth, insulation or furring.
- C. Notify Engineer not less than 24 hours in advance of all tests.
- D. Furnish all fuel and necessary equipment required for tests.
- E. Promptly repair all leaks and reapply tests.
- F. Install blind flanges or plugs in order to make tests.
- G. See Specification Divisions 22 and 23 for additional pressure testing requirements.

3.8 STERILIZATION OF DOMESTIC WATER SYSTEM

- A. Flush system thoroughly until water runs clear.
- B. Entire system shall be filled with a water/chlorine solution containing 50 parts per million of chlorine. The system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing at least 200 parts per million of chlorine and allowed to stand for three hours.
- C. Following the allowed standing time, the system shall be flushed with clean potable water until chlorine does not remain in the water coming from the system.
- D. After the above requirements are satisfied, submit samples to local Board of Health for approval.
- E. Sterilization shall be redone until approval from the State Board of Health is obtained.

3.9 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook", using lead-free solder alloy complying with ASTM C 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook", "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Non-pressure Piping: Join according to ASTM D 2855.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Non-pressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.10 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.
5. "Pulled Tee's" in copper piping are not allowed.

3.11 GROOVED PIPING

- A. Grooved joints shall be installed in accordance with the manufacturer's latest published installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks. Gaskets shall be molded and produced by the coupling manufacturer, and shall be verified as suitable for the intended service. A factory-trained field representative (direct employee) of the mechanical joint manufacture shall provide on-site training for contractor's field personnel in the proper use of grooving tools and installation of grooved piping products. The factory-trained representative shall periodically review the product installation and ensure best practices are being followed. Contractor shall remove and replace any improperly installed products. A distributor's representative is not considered qualified to conduct the training.
- B. For applicable projects, the grooved coupling manufacturer shall provide inspection services and/or certify the installing contractor for the installation of their product. The manufacturer's factory trained representative shall provide certification training for the installing contractor's field personnel in the use of grooving tools, application of groove, and product installation. The training program shall be designed, developed, administered and evaluated in accordance to the ANSI/IACET Standard for Continuing Education and Training. (IACET-International Association for Continuing Education and Training)

END OF SECTION

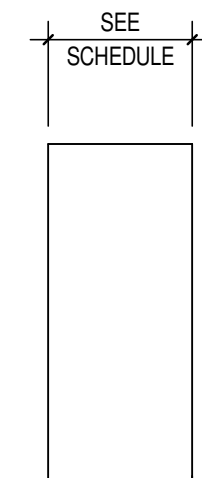
2025044/(IU Project #2025020)
BL563 Innovation Center – New Wet Lab 139A
Bloomington, Indiana
D&A#25068

SECTION 20 00 60
COMMON PIPE, VALVES, FITTINGS AND HANGERS
FOR FIRE SUPPRESSION, PLUMBING AND HVAC

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SPECIALTY EQUIPMENT SCHEDULE							
TYPE MARK	DESCRIPTION	SPEC SECTION	MANUFACTURER	MODEL NO.	REMARKS	FURNISHED BY	INSTALLED BY
AP1	1300 SERIES A2 BIOLOGICAL SAFETY CABINET	-	THERMOFISHER SCIENTIFIC	1377TU	-	OWNER	CONTRACTOR
AP2	LARGE INSECT REARING CHAMBER	-	-	-	-	OWNER	CONTRACTOR
AP3	SAFETY STATION W/ SHOWER AND EYEWASH	-	WATERSAVER	SS991	SEE PLUMBING	CONTRACTOR	CONTRACTOR
AP5	LAB APRON HOOKS	-	TMI	A1290	MOUNT TOP @ 60" A.F.F. 5 COAT HOOKS REQUIRED	CONTRACTOR	CONTRACTOR
AP6	REFRIGERATOR	-	-	-	COORDINATE HOOK-UPS PER ELECTRICAL/PLUMBING DRAWINGS.	OWNER	CONTRACTOR
AP7	UNDERCOUNTER REFRIGERATOR	11 31 13	-	-	-	OWNER	CONTRACTOR
AP8	INCUBATOR	-	-	-	-	OWNER	CONTRACTOR
AP9	OVEN	-	-	-	-	OWNER	CONTRACTOR
AP10	SMALL INSECT REARING CHAMBER	11 31 13	-	-	-	OWNER	CONTRACTOR

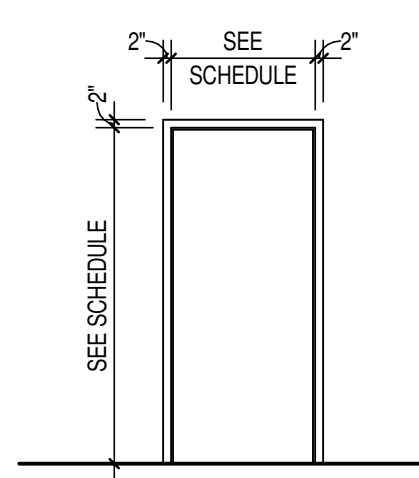
DOOR AND FRAME SCHEDULE													
DOOR	MARK	SIZE			FRAME				DETAIL				
		WIDTH	HEIGHT	THICKNESS	MATERIAL	FINISH	ELEVATION	GLASS	MATERIAL	FINISH	ELEVATION	GLASS	DETAIL
141A	SQL	2'-0"	7'-0"	1 3/4"	VS	US			VS	US			



D1

DOOR ELEVATIONS

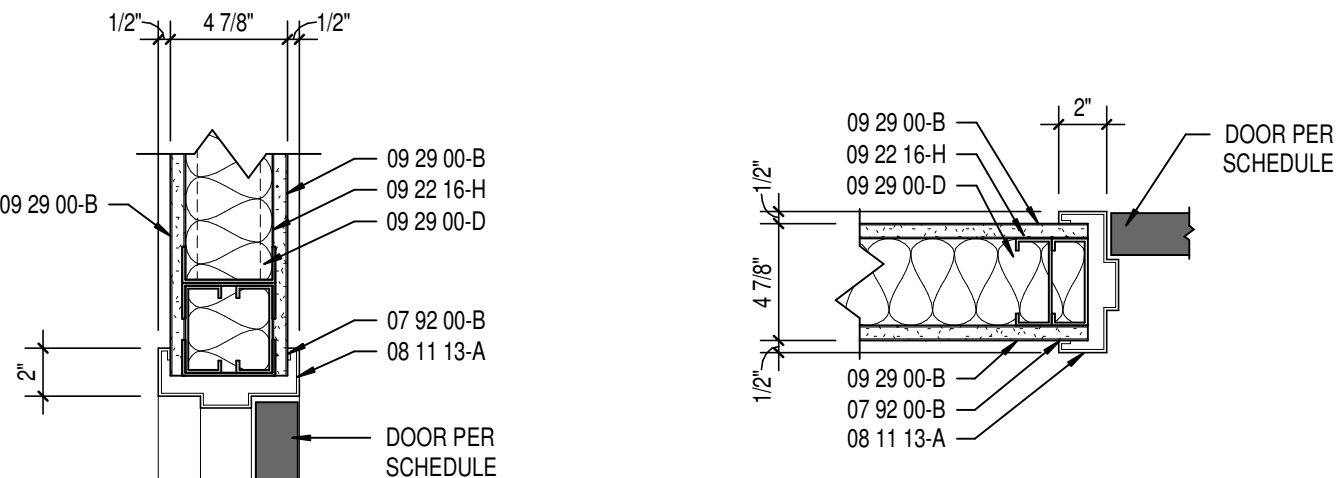
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F1

FRAME ELEVATIONS

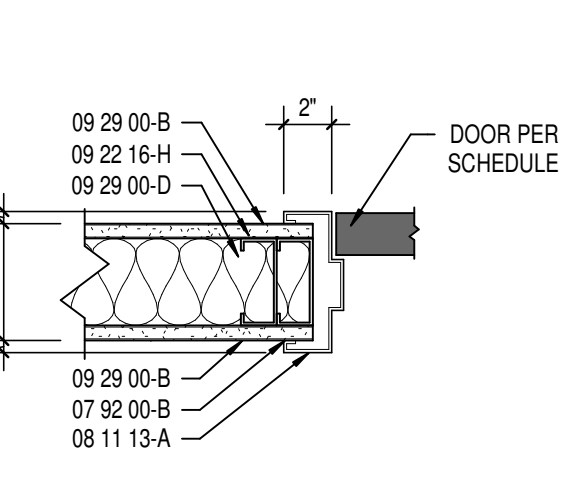
SCALE: 1/4" = 1'-0"



HEAD DETAIL - H1

HEAD DETAIL - H1

SCALE: 1 1/2" = 1'-0"



JAMB DETAIL - J1

JAMB DETAIL - J1

SCALE: 1 1/2" = 1'-0"

FINISH LEGEND

FLOOR FINISHES

RESILIENT SHEET FLOORING

RS1 MFR: GERRIOR
STYLE: MIPOLAM ELEGANCE/EVERCAPE
COLOR: 0322 JICANA

CASEWORK AND COUNTERTOPS

PLASTIC LAMINATE

PL1 MFR: FORMICA
STYLE: MATTE FINISH
COLOR: 6212-S8 WHEAT STRAND
LOCATION: CASEWORK

EPOXY RESIN COUNTERTOP

EP1 STYLE: EPOXY RESIN
COLOR: BLACK
LOCATION: WET LAB HOOD ROOM
NOTE: 1" THICK WITH 4" HIGH APPLIED CURB AND INTEGRAL DRIP EDGE. 1/8" BEVELED

WALL BASE

RUBBER BASE

B1 MFR: TARKETT, JOHNSONITE
STYLE: DURACOVE TP RUBBER
COLOR: #99 MOON ROCK
SIZE: 4"

WALL FINISHES

EPOXY PAINT

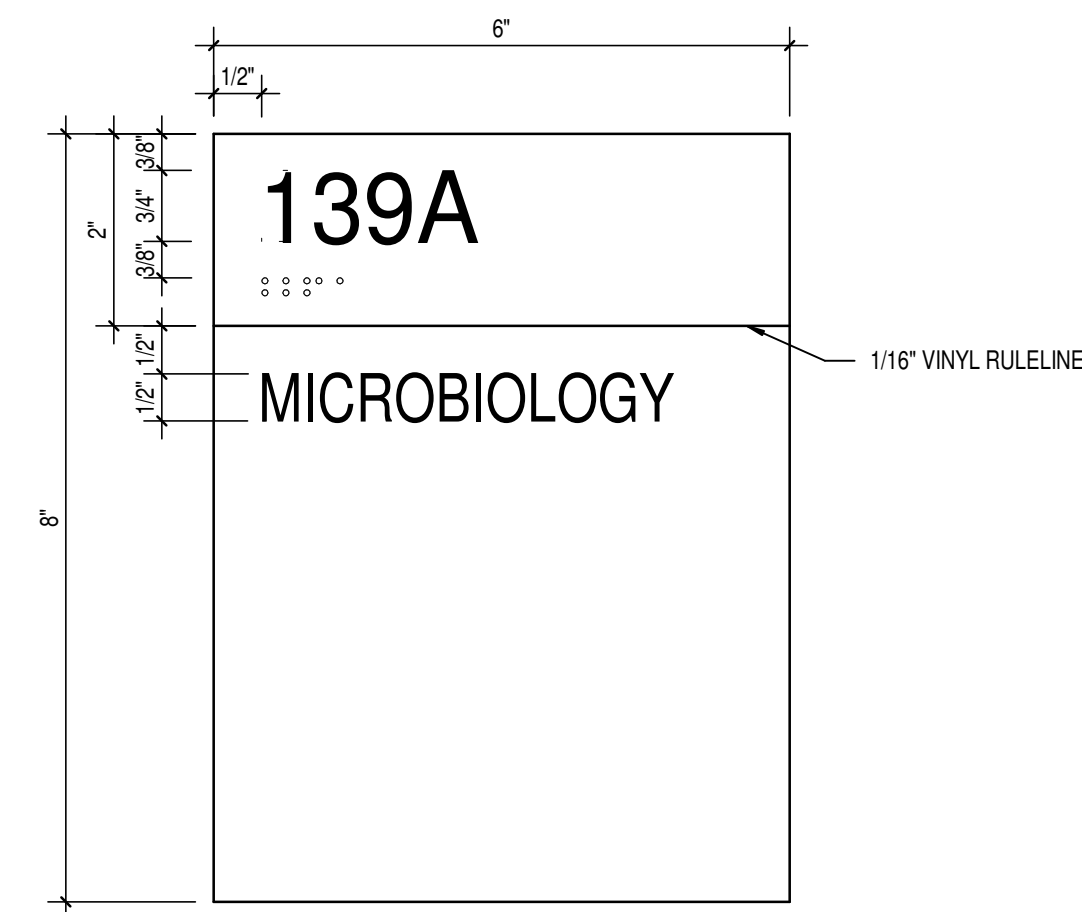
P1 MFR: SHERWIN WILLIAMS
COLOR: SW7558 MASON BLANCHE
NOTE: EPOXY PAINT, WALLS

EPOXY PAINT

P2 MFR: SHERWIN WILLIAMS
COLOR: SW7504 KEYSTONE GRAY
NOTE: EPOXY PAINT, DOOR FRAMES

GLAZING FILM

GF1 MFR: DECORATIVE FILMS
STYLE: SOLYX SWWF-WF
COLOR: WHITE FROST
NOTE: FULL HEIGHT OF WINDOW



4 SIGN TYPE A
SCALE: 6" = 1'-0"

GENERAL SIGNAGE NOTES

- FONT: TEXT TO BE RAISED 1/32" & 3/16" VINYL BLACK HELVETICA REGULAR FONT W/ BRILLE PER CODE REQUIREMENTS TO MATCH ROOM NUMBER. SEE SIGN TYPE DETAIL FOR MORE INFORMATION REGARDING TEXT HEIGHT AND LOCATION.
- MATERIAL: SIGN TO BE 1/8" BLACK PLEX W/ 45° BEVELED EDGES. BACKGROUND COLOR TO BE WHITE, MATTE POLYIMID RESIN ON 0.1" T1 POLYESTER CARRIER.
- MOUNTING: INSTALL SIGN 60" FROM A.F.F. TO TOP OF SIGN. SIGN SHALL BE INSTALLED ON THE WALL NEXT TO THE LATCH SIDE OF THE DOOR PER ADA GUIDELINES. SIGNAGE TO BE MOUNTED WITH VINYL TAPE AND SILICONE.

LAB REFLECTED CEILING PLAN

3 A201 SCALE: 1/4" = 1'-0"



GLASS SCHEDULE

GL1 - 1/4" CLEAR TEMPERED GLASS.

ABBREVIATIONS LEGEND

AL = ALUMINUM
AN = ANODIZED
BL = BORROWED LITE
GHM = GALVANNEAL HOLLOW METAL
GL = GLASS
HM = HOLLOW METAL
PT = PAINT
ST = STAIN
SS = STAINLESS STEEL
STL = STEEL
WD = WOOD
SOM = 30 MINUTE ASSEMBLY RATING
* = SEE REMARKS COLUMN FOR NOTES

GENERAL DOOR NOTES

- THESE GENERAL NOTES APPLY TO THE DOOR SCHEDULE.
- DOOR AND FRAME NUMBERS CORRESPOND TO RESPECTIVE ROOM NUMBER. IN ROOMS WITH MULTIPLE OPENINGS, A NUMERICAL SUFFIX HAS BEEN ADDED TO DOOR NUMBERS.
- VERTICAL FRAMING MEMBERS AT ALL DOOR FRAMES SHALL EXTEND TO STRUCTURE ABOVE.
- UNDERCUT ALL DOORS AS REQUIRED BY FINAL FINISH.
- PROVIDE CONTINUOUS SEALANT BETWEEN HOLLOW METAL FRAME PERIMETERS AND SURROUNDING WALL CONSTRUCTION.
- PROVIDE CONTINUOUS SEALANT BETWEEN INTERIOR AND EXTERIOR WINDOW, CURTAIN WALL AND STOREFRONT FRAME PERIMETERS AND SURROUNDING CONSTRUCTION UNLESS NOTED OTHERWISE.
- GROUT FULL HOLLOW METAL FRAMES IN MASONRY CONSTRUCTION.
- SPOT GROUT HOLLOW METAL FRAMES IN GYPSUM WALLS.
- INSTALL DOOR GLASS USING WET GLAZING METHOD.
- REFER TO SHEETS A201 FOR ADDITIONAL DOOR AND FRAME ELEVATIONS.
- COORDINATE THROAT OPENINGS WITH WALL WIDTH FOR ALL WRAP AROUND FRAMES.
- SCHEDULED HARDWARE FOR ALUMINUM DOORS SHALL BE PROVIDED BY HARDWARE SUPPLIER AND INSTALLED BY ALUMINUM SUPPLIER. ALUMINUM DOORS TO BE PREPARED BY ALUMINUM DOOR SUPPLIER IN ACCORDANCE WITH THE SCHEDULED HARDWARE.
- ALL NEW HOLLOW METAL DOORS, FRAMES AND BORROWED LITE FRAMES TO BE PAINTED AS INDICATED ON THE FINISH PLANS. SEE FINISH PLANS FOR WOOD DOOR FINISHES.
- PROVIDE SILENCERS ON ALL DOOR FRAMES.
- VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION OF DOORS AND FRAMES. BRING DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT.

KEYNOTE LEGEND

07 92 00-B SEALANT EACH SIDE, TYPICAL
08 11 13-A HOLLOW METAL DOOR/BORROWED LIGHT FRAME
09 22 16-H 3 5/8" STEEL STUD
09 29 00-B 5/8" GYPSUM WALL BOARD (SEE SPECS FOR TYPE)
09 29 00-D SOUND ATTENUATION INSULATION

WALL TYPES

W1

- 3 5/8" METAL STUDS @ 16" O.C.
- 5/8" GYPSUM WALL BOARD ON BOTH SIDES OF STUD, TAPED AND FINISHED.

W2

- 3 5/8" METAL STUDS @ 16" O.C.
- 5/8" GYPSUM WALL BOARD ON ONE SIDE OF STUD, TAPED AND FINISHED.

W3

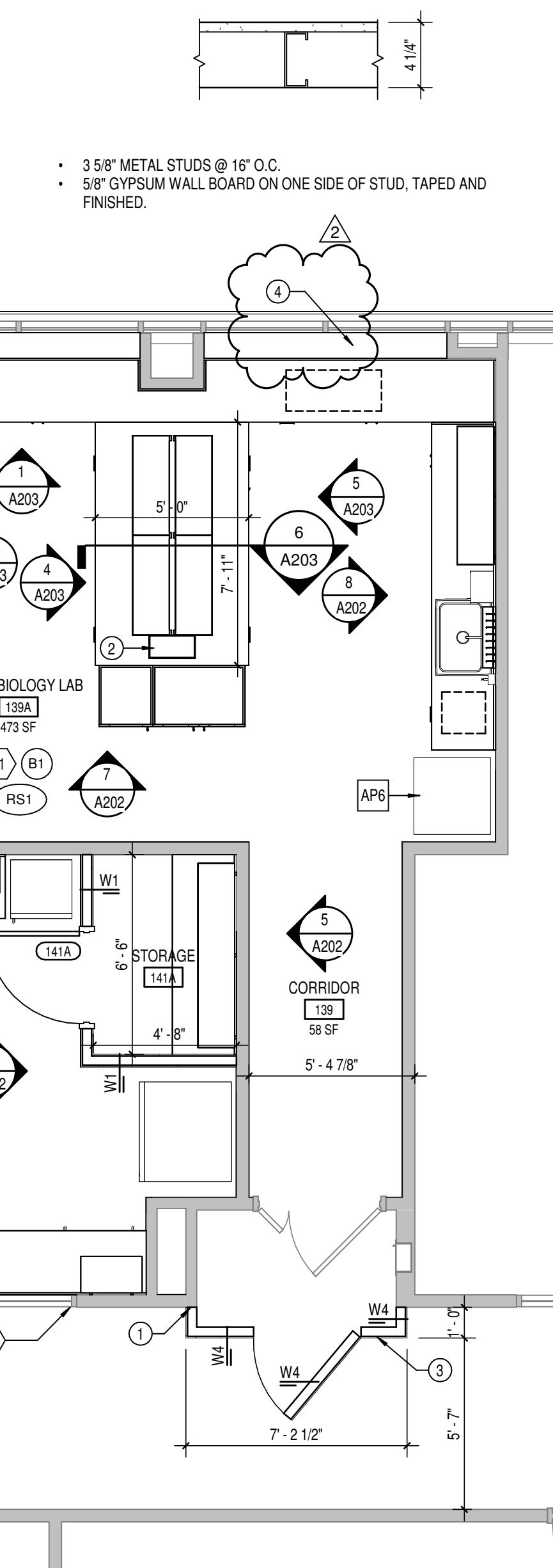
- 2 1/2" METAL STUDS @ 16" O.C.
- 5/8" GYPSUM WALL BOARD ON ONE SIDE OF STUD, TAPED AND FINISHED.

W4 - TEMPORARY CONSTRUCTION

- 3 5/8" METAL STUDS @ 16" O.C.
- 5/8" GYPSUM WALL BOARD ON BOTH ONE SIDE OF STUD

PLAN NOTES

- SIGN TYPE A LOCATION. AFTER TEMPORARY CONSTRUCTION ENTRANCE IS REMOVED. SEE A201 FOR MORE INFORMATION.
- 15 GA. METAL MECHANICAL SERVICE COLUMN ENCLOSURE. REFER TO DETAILS, SPECS, & MEP DRAWINGS FOR ADDITIONAL INFORMATION.
- TEMPORARY METAL STUD AND DRYWALL (UNFINISHED) CONSTRUCTION BARRIER/ENTRANCE TO BE INSTALLED TO EXISTING CEILING HEIGHT OR WITH A STUD AND DRYWALL CAR REMOVAL ONCE FINAL DOOR AND FRAME IS INSTALLED.
- NEW EPOXY COUNTER WINDOW STOOL.



LAB FLOOR PLAN

2 A201 SCALE: 1/4" = 1'-0"

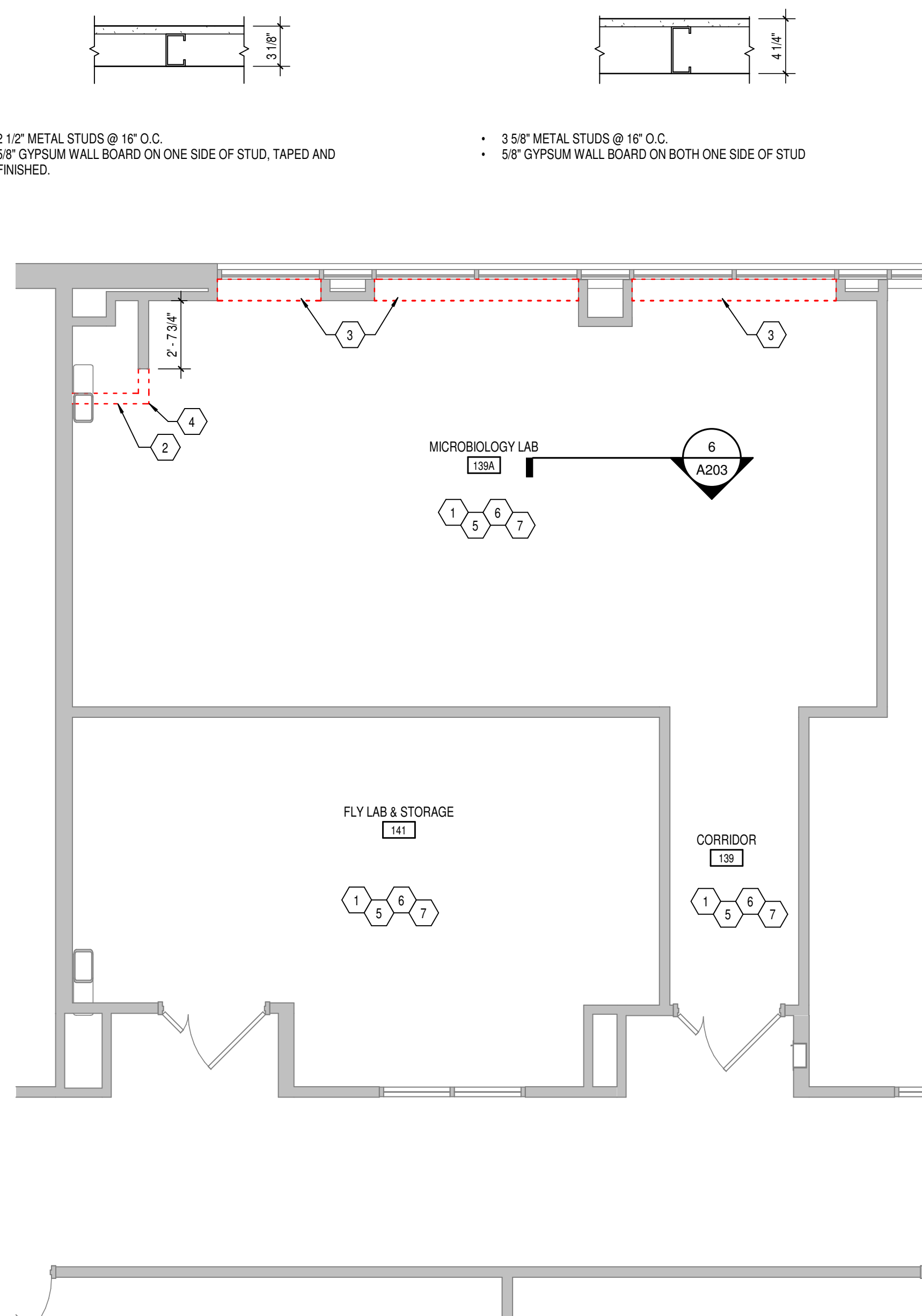


GENERAL NOTES

- COORDINATE THE WORK OF EACH TRADE WITH THE WORK OF OTHER TRADES.
- ALL WORK IS TO BE COMPLETED IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, RULES, REGULATIONS AND STANDARDS INCLUDING, BUT NOT LIMITED TO THOSE LISTED ON THE COVER SHEET. ALL APPLICABLE RULES & REGULATIONS ARE TO BE THE MOST CURRENT ADOPTED EDITIONS.
- FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO THE COMMENCEMENT OF WORK. DISCREPANCIES BETWEEN THE DOCUMENTS AND THE ACTUAL CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE COMMENCEMENT OF WORK.
- ALL DIMENSIONS ARE FROM CENTERLINE OF STRUCTURE. FINISH FACE OF WALL, FACE OF MASONRY, OR FACE OF EXISTING.
- ANY DIMENSIONS NOT SHOWN OR DEEMED QUESTIONABLE ARE TO BE VERIFIED BY ARCHITECT. DO NOT SCALE DRAWINGS.
- REFER TO WALL TYPE LEGEND ON SHEET A200 TO DETERMINE WHICH WALLS EXTEND TO DECK. SEE STRUCTURAL FOR TOP SUPPORT DETAIL. WHERE METAL STUDS EXTEND TO DECK, PROVIDE SLIP CONNECTIONS FOR FLOOR FLOOR DEFLECTION.
- ALL STEEL STUDS ARE TO BE BRACED ACCORDING TO MANUFACTURER LIMIT HEIGHT (L240).
- WHERE INSULATED OR SOUND WALLS EXTEND TO DECK, FILL DECK FLUTES WITH INSULATION SOUND ATTENUATION.
- REFER TO PLUMBING PLANS FOR LOCATION OF FLOOR DRAIN.
- PROVIDE MISCELLANEOUS SUPPORT FOR ALL CEILING SUSPENDED ITEMS.
- ALL DOOR FRAMES SHALL BE LOCATED 4" OFF FINISH WALLS OR 4" OFF MASONRY WALLS UNLESS NOTED OTHERWISE.
- ALL GLASS AT INTERIOR DOOR FRAMES, DOOR LITES AND WINDOW FRAMES IS TO BE 1/4" CLEAR TEMPERED GLASS UNLESS NOTED OTHERWISE.
- SEE A201 FOR EQUIPMENT SCHEDULE AND PLANS. PROVIDE BLOCKING IN STUD WALLS AND/OR GROUTED MASONRY CORES AS REQUIRED TO SUPPORT EQUIPMENT.
- PROVIDE FIRE RESISTANT TREATED WOOD BLOCKING. SUPPORTS ARE REQUIRED FOR ALL SURFACE MOUNTED ITEMS.
- WHERE DISSIMILAR FLOOR MATERIALS MEET, THEY SHALL DO SO UNDER THE CENTERLINE OF THE DOOR UNLESS NOTED OTHERWISE.
- APPLY SEALANT AT ALL JUNCTURES BETWEEN DIFFERENT MATERIALS (E.G. MASONRY TO GYPSUM WALL BOARD) UTILIZING THE APPROPRIATE TYPE PER SPECIFICATIONS. COLOR TO BE SELECTED BY ARCHITECT.
- APPLY SEALANT AT ALL COUNTERTOPS AND BACKSPLASHES AT JUNCTURE WITH WALL.
- ALL DOORS MUST BE INSTALLED WITH AT LEAST THE MINIMUM MANEUVERING CLEARANCE AT THE DOOR APPROACH PER THE MOST CURRENT AMERICANS WITH DISABILITIES ACT.

WALL TYPE NOTES

- SEE SPECIFICATIONS FOR GYPSUM WALL BOARD TYPE FOR EACH APPLICATION.
- FOR METAL STUD CONSTRUCTION AT CONVENTIONAL FRAMING, EXTEND METAL STUDS TO BOTTOM OF METAL DECK AND GYPSUM WALL BOARD TO 1" BELOW METAL DECK.
- METAL STUD WALLS WITH A " " SYMBOL FOLLOWING THE WALL TYPE SHALL HAVE FULL THICKNESS SOUND ATTENUATION BLANKETS EXTENDING FULL HEIGHT OF WALL. PROVIDE ACOUSTIC SEALANT AT TOP AND BOTTOM OF WALL TRACK AND PENETRATIONS.
- PROVIDE MOLD & MILDEW RESISTANT GYPSUM WALL BOARD AT EXTERIOR WALL LOCATIONS AND AT ALL WET AREA WALLS NOT RECEIVING WALL TILE.
- PROVIDE GLASS-MAT WATER RESISTANT BACKER BOARD IN LIEU OF GYPSUM WALL BOARD WHERE WALL TILE IS SPECIFIED. SEE A200 SERIES FINISH PLANS FOR LOCATIONS AND HEIGHTS. IF WALL TILE HEIGHT IS NOT FULL HEIGHT A.F.F., PROVIDE MOLD & MILDEW RESISTANT GYPSUM WALL BOARD ABOVE TOP OF WALL TILE HEIGHT.
- WALL TYPES ARE ASSUMED TO BE CONTINUOUS WITHIN THE SAME PLANE OR SURFACE UNTIL ANOTHER TAG IS SHOWN.



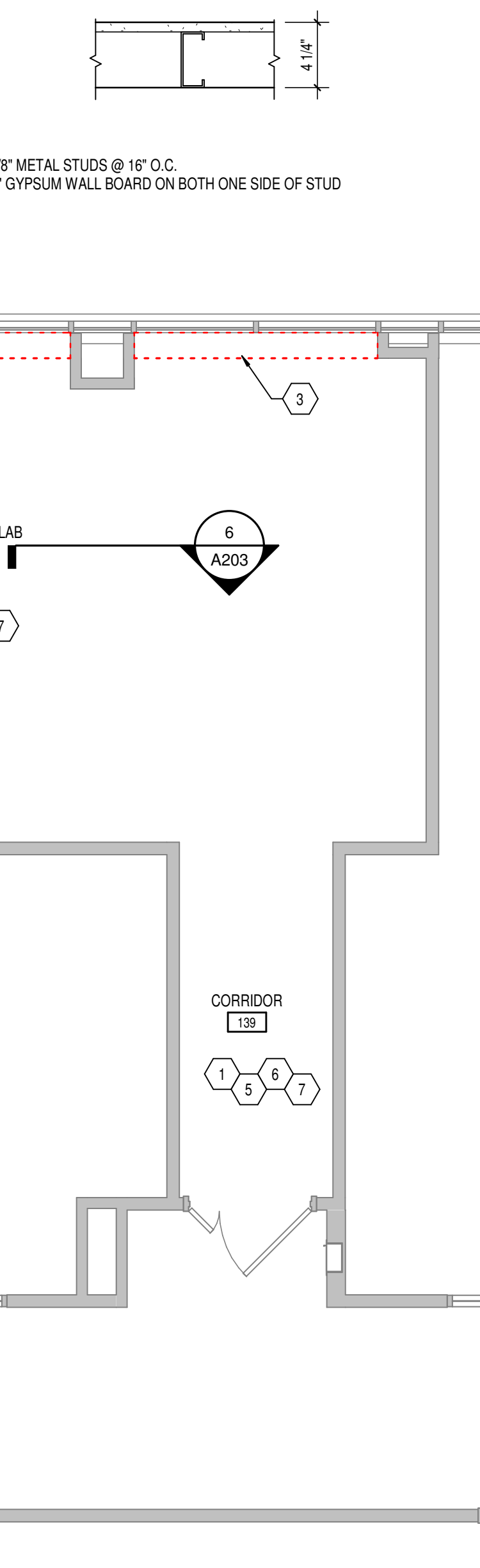
LAB DEMOLITION PLAN

1 A201 SCALE: 1/4" = 1'-0"



DEMOLITION NOTES

- REMOVE FLOORING AND BASE COMPLETE. PREPARE FLOOR TO RECEIVE NEW FINISH.
- REMOVE WALL AS INDICATED/REQUIRED FOR NEW WORK.
- REMOVE WINDOW STOOL COMPLETE.
- REMOVE & SALVAGE EXISTING STAINLESS STEEL CORNERGUARD.
- REMOVE LIGHT FIXTURES AND ALL CEILING MOUNTED EQUIPMENT COMPLETE.
- REMOVE CEILING TILES AND GRID COMPLETE.
- REMOVE GYPSUM BOARD AS REQUIRED TO RELOCATE POWER & DATA OUTLETS. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.



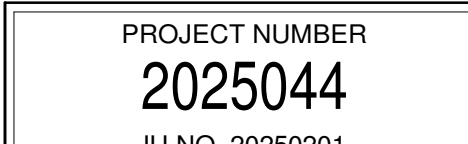
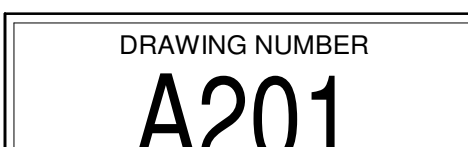
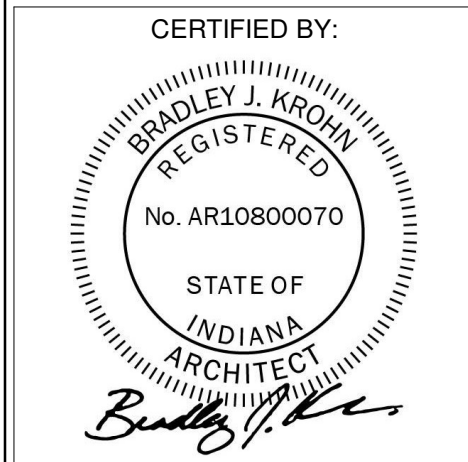
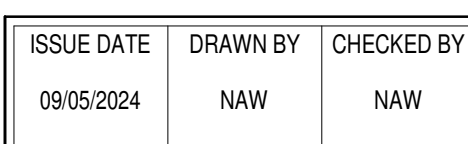
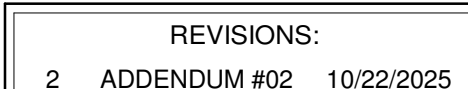
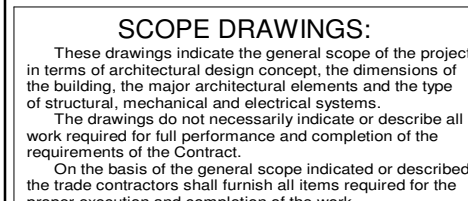
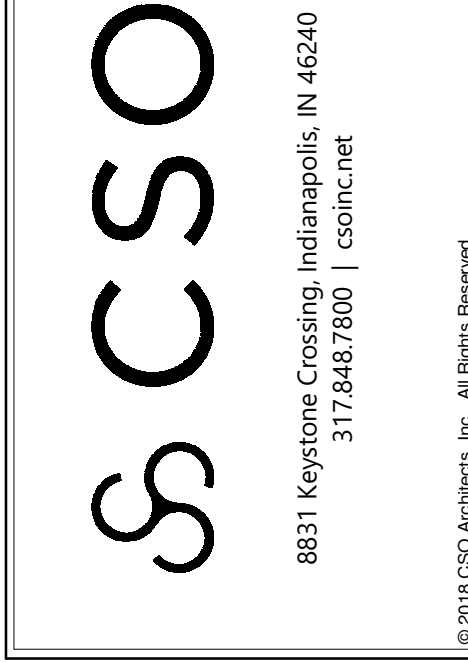
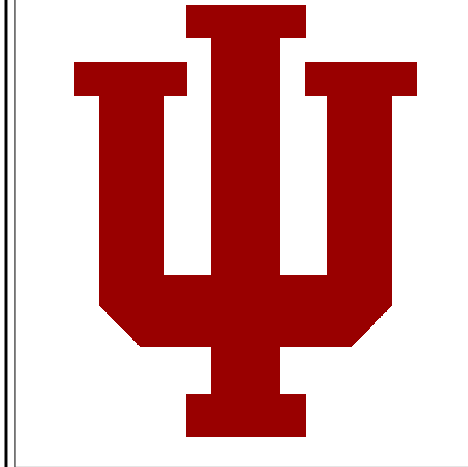
LAB DEMOLITION PLAN

1 A201 SCALE: 1/4" = 1'-0"



DEMOLITION NOTES

- REMOVE FLOORING AND BASE COMPLETE. PREPARE FLOOR TO RECEIVE NEW FINISH.
- REMOVE WALL AS INDICATED/REQUIRED FOR NEW WORK.
- REMOVE WINDOW STOOL COMPLETE.
- REMOVE & SALVAGE EXISTING STAINLESS STEEL CORNERGUARD.
- REMOVE LIGHT FIXTURES AND ALL CEILING MOUNTED EQUIPMENT COMPLETE.
- REMOVE CEILING TILES AND GRID COMPLETE.
- REMOVE GYPSUM BOARD AS REQUIRED TO RELOCATE POWER & DATA OUTLETS. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.



CASEWORK SCHEDULE - BASE						
TYPE MARK	DESCRIPTION	SPEC. SECTION	MANUFACTURER	MODEL	SIZE	TYPE COMMENTS
B1	BASE CABINET - 4 DRAWERS	12 35 57	TMI SYSTEMS	D4013	24"W x 32"H x 24"D	
B2	BASE CABINET - 4 DRAWERS	12 35 57	TMI SYSTEMS	D4013	24"W x 35"H x 24"D	
B3	BASE CABINET - 4 DRAWERS	12 35 57	TMI SYSTEMS	D4013	27"W x 32"H x 24"D	
B4	BASE CABINET - 4 DRAWERS	12 35 57	TMI SYSTEMS	D4013	21"W x 35"H x 24"D	
B5	BASE CABINET - 4 DRAWERS	12 35 57	TMI SYSTEMS	D4013	15"W x 35"H x 24"D	
B6	BASE CABINET - 1 DOOR 1 DRAWER	12 35 57	TMI SYSTEMS	D1120	21"W x 35"H x 24"D	
B7	BASE CABINET - 1 DOOR 1 DRAWER	12 35 57	TMI SYSTEMS	D1121	24"W x 35"H x 24"D	
B8	BASE CABINET - 2 DOOR 1 DRAWER	12 35 57	TMI SYSTEMS	D1122	27"W x 35"H x 24"D	
B9	BASE CABINET - 2 DOORS	12 35 57	TMI SYSTEMS	B2052	27"W x 32"H x 24"D	
B10	BASE CABINET - SINK CABINET - 2 DOOR	12 35 57	TMI SYSTEMS	B2522	36"W x 25"H x 24"D	
B11	BASE CABINET - 2 DOORS	12 35 57	TMI SYSTEMS	B2062	42"W x 35"H x 24"D	
B12	BASE CABINET - ADA SINK BASE	12 35 57	TMI SYSTEMS	B2545	33"W x 32"H x 24"D	REFER TO ELEVATIONS FOR SPLASH LOCATIONS

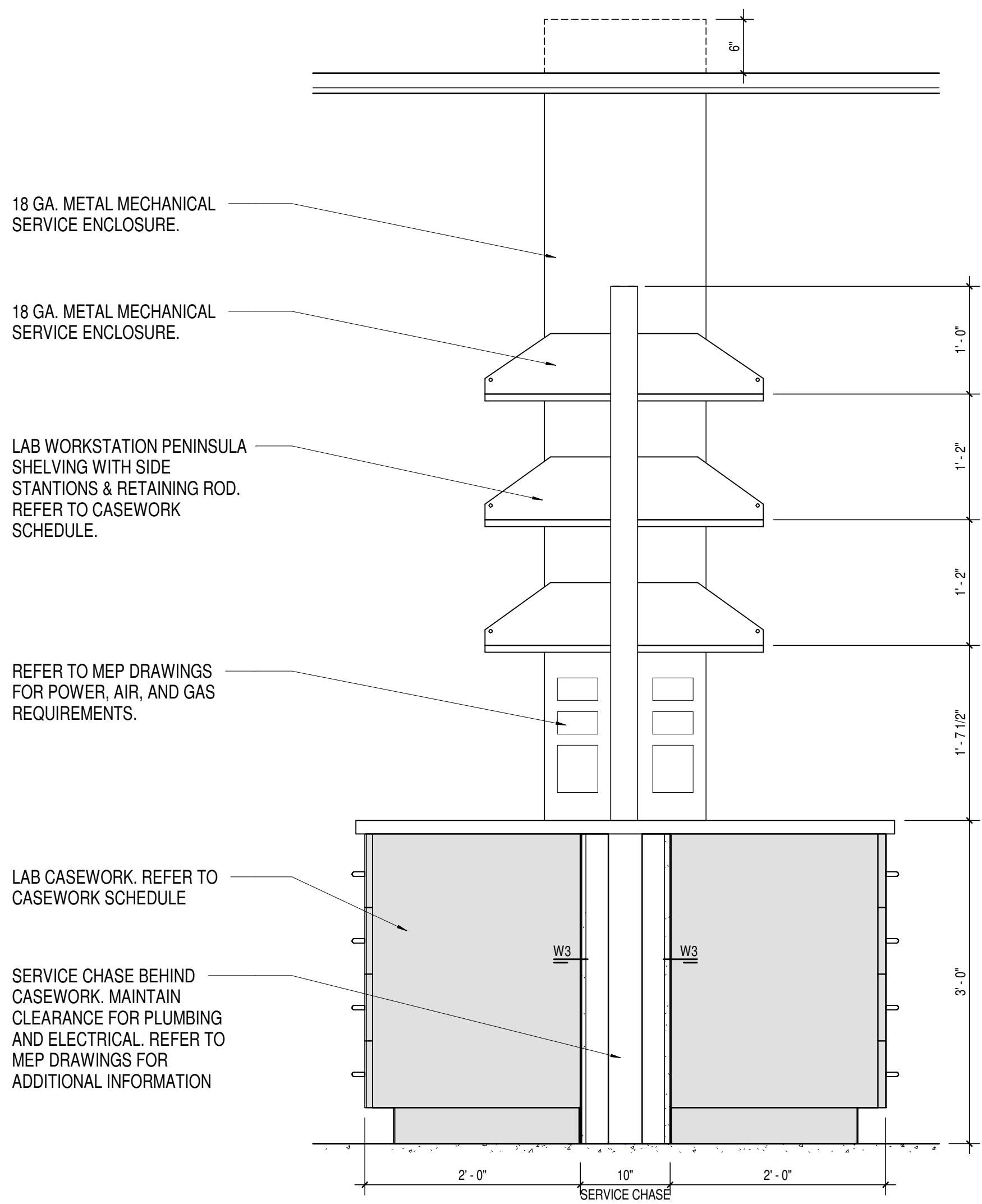
CASEWORK SCHEDULE - WALL						
TYPE MARK	DESCRIPTION	SPEC. SECTION	MANUFACTURER	MODEL	SIZE	TYPE COMMENTS
W1	WALL CABINET - 3 OPEN SHELVES	12 35 57	TMI SYSTEMS	-	48"W x 48"H x 15"D	
W2	WALL CABINET - 3 OPEN SHELVES	12 35 57	TMI SYSTEMS	-	54"W x 48"H x 15"D	
W3	WALL CABINET - 3 OPEN SHELVES	12 35 57	TMI SYSTEMS	-	60"W x 48"H x 15"D	
W4	PENINSULA SHELVING	12 35 57	HLS	-	67 1/2"W x 84"H x 12"D	FLOOR MOUNTED UPRIGHT POST AND HORIZONTAL TOP RAIL
W5	WALL SHELVING - SINGLE SHELF	12 35 57	TMI SYSTEMS	-	REFER TO ELEV.	

CASEWORK SCHEDULE - TALL						
TYPE MARK	DESCRIPTION	SPEC. SECTION	MANUFACTURER	MODEL	SIZE	TYPE COMMENTS
TS1	TALL STORAGE - 1 DOOR - GLASS FRONT	12 35 57	TMI SYSTEMS	T3052	21"W x 84"H x 24"D	
TS2	TALL STORAGE - 2 DOOR - GLASS FRONT	12 35 57	TMI SYSTEMS	T3052	36"W x 84"H x 24"D	

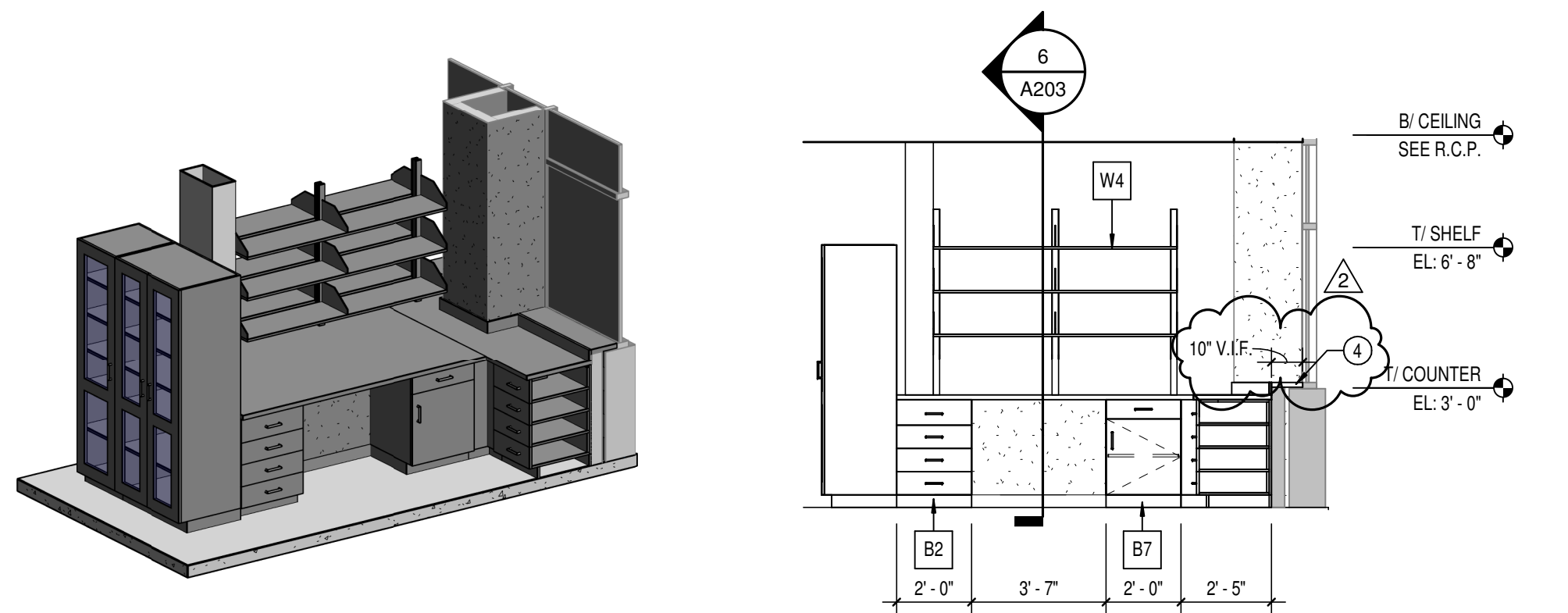
CASEWORK SCHEDULE - MISCELLANEOUS						
TYPE MARK	DESCRIPTION	SPEC. SECTION	MANUFACTURER	MODEL	SIZE	TYPE COMMENTS
CT1	EPOXY RESIN COUNTERTOP	12 35 57	KEWAUNEE	-	-	
CT3	COUNTERTOP SUPPORT BRACKET	12 35 57	TMI SYSTEMS	A7453	-	AS REQUIRED
FP1	FILLER PANEL	12 35 57	TMI SYSTEMS	-	-	
FP2	FILLER PANEL - CORNER	12 35 57	TMI SYSTEMS	-	-	
PB1	PEG BOARD DRYING RACK	12 35 57	INTER DYNE SYSTEMS	V2430	24"W x 30"H	

PLAN NOTES

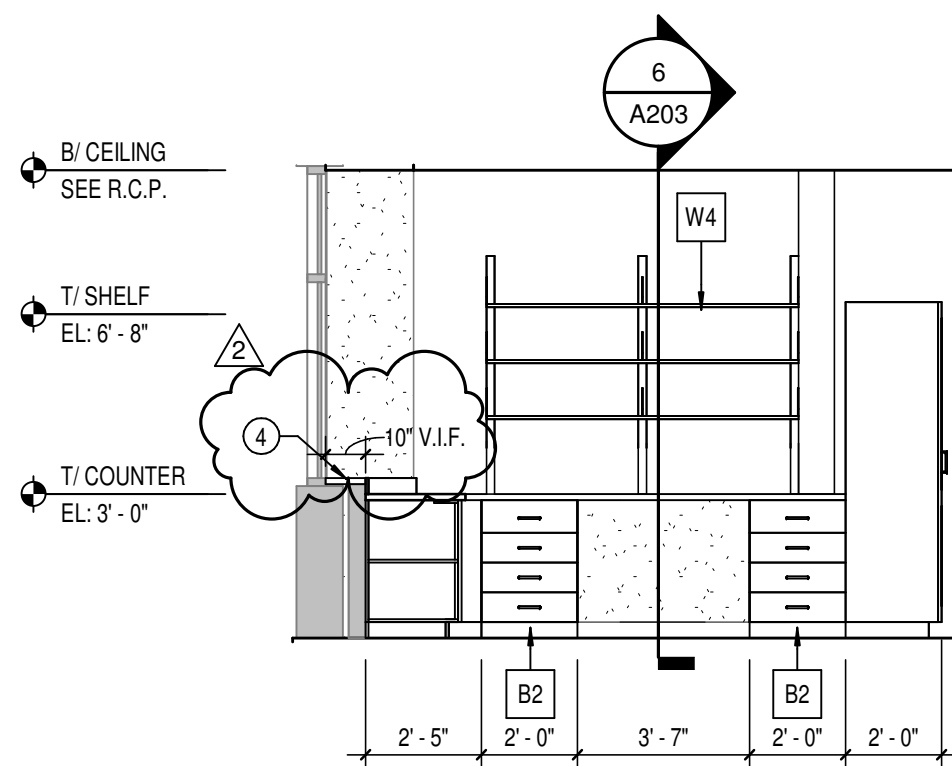
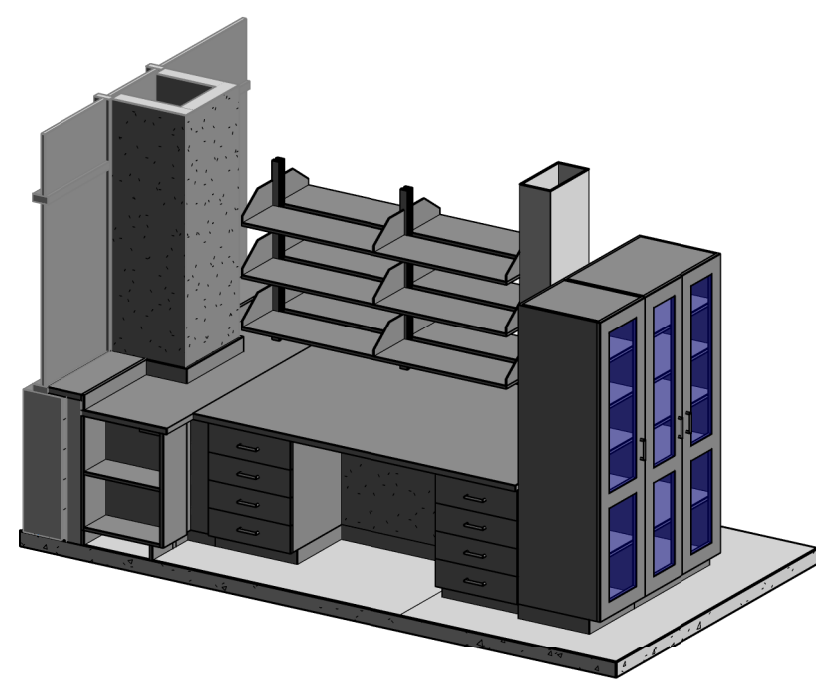
- SIGN TYPE A LOCATION, AFTER TEMPORARY CONSTRUCTION ENTRANCE IS REMOVED. SEE A203 FOR MORE INFORMATION.
- 18 GA. METAL MECHANICAL SERVICE COLUMN ENCLOSURE. REFER TO DETAILS, SPECS. & MEP DRAWINGS FOR ADDITIONAL INFORMATION.
- TEMPORARY METAL STUD AND DRYWALL (UNFINISHED) CONSTRUCTION BARRIER ENTRANCE TO BE INSTALLED UP TO EXISTING CEILING HEIGHT OR WITH A STUD AND DRYWALL CAP. DEMOLISH ONCE FINAL DOOR AND FRAME ARE INSTALLED.
- NEW EPOXY COUNTERTOP WINDOW STOOL.



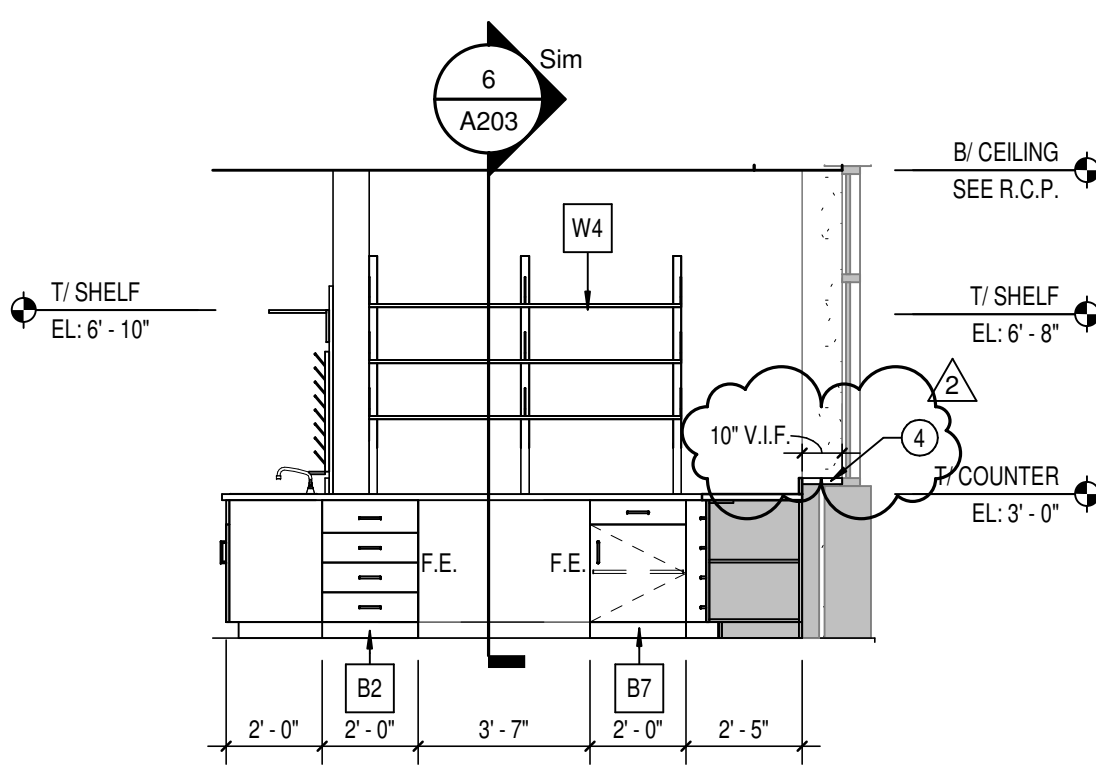
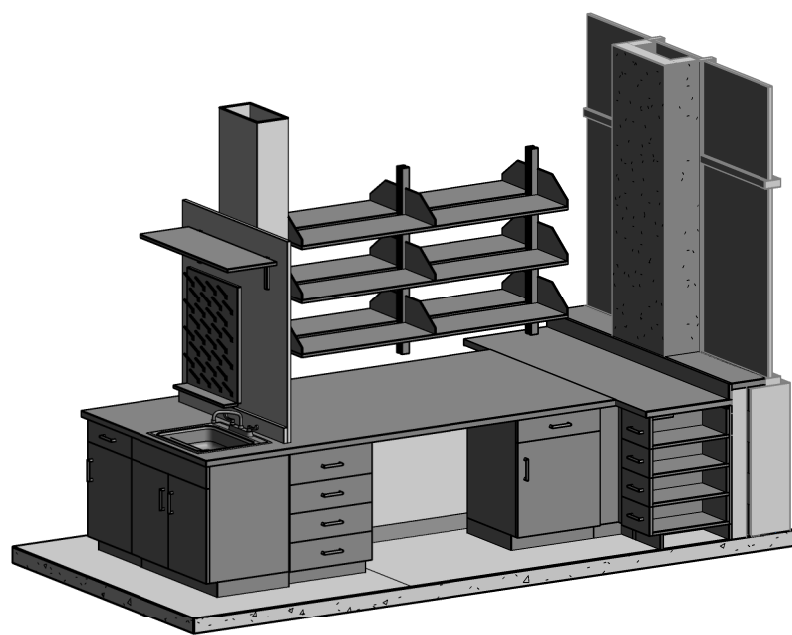
6 PENINSULA SECTION
SCALE: 1" = 1'-0"



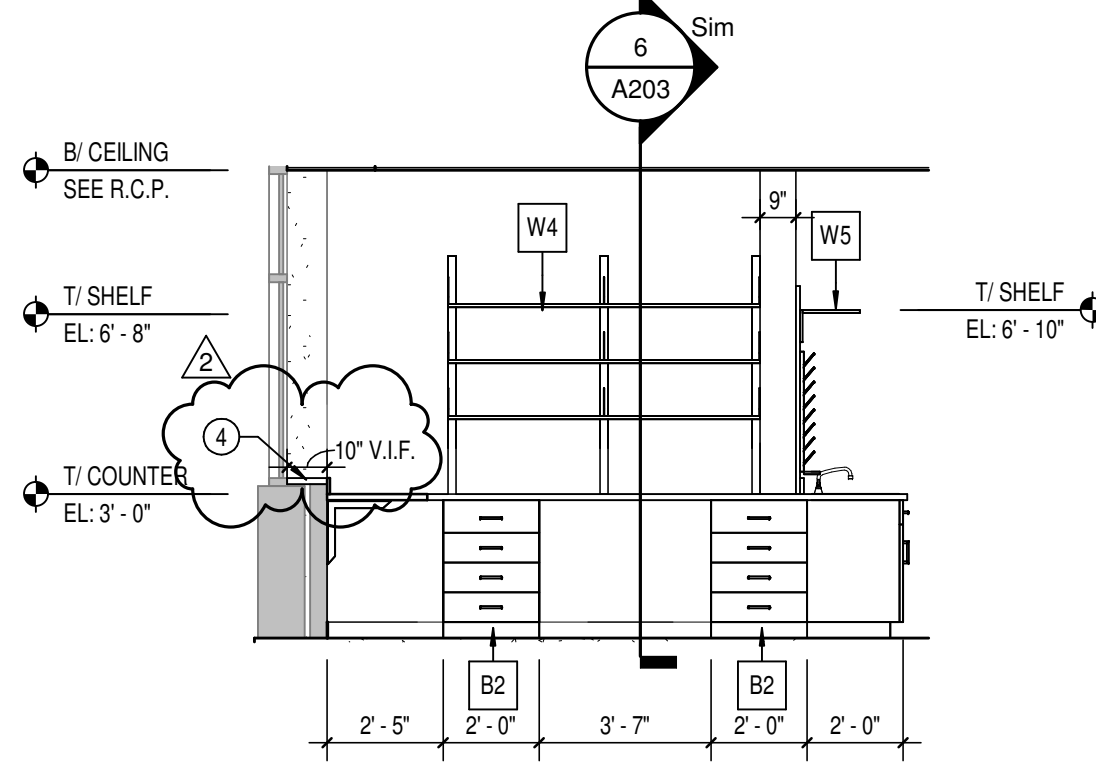
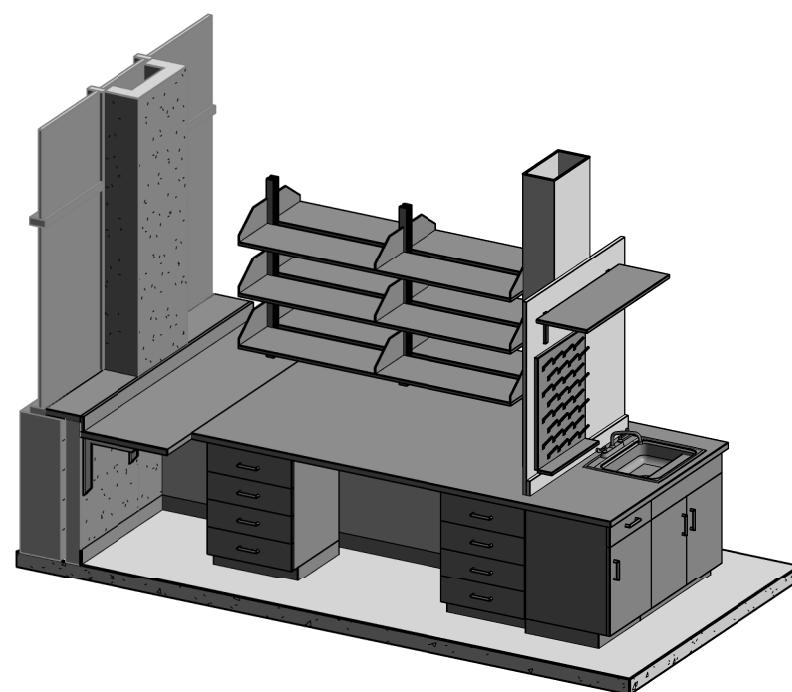
5 PENINSULA CASEWORK ELEVATION
SCALE: 1/4" = 1'-0"



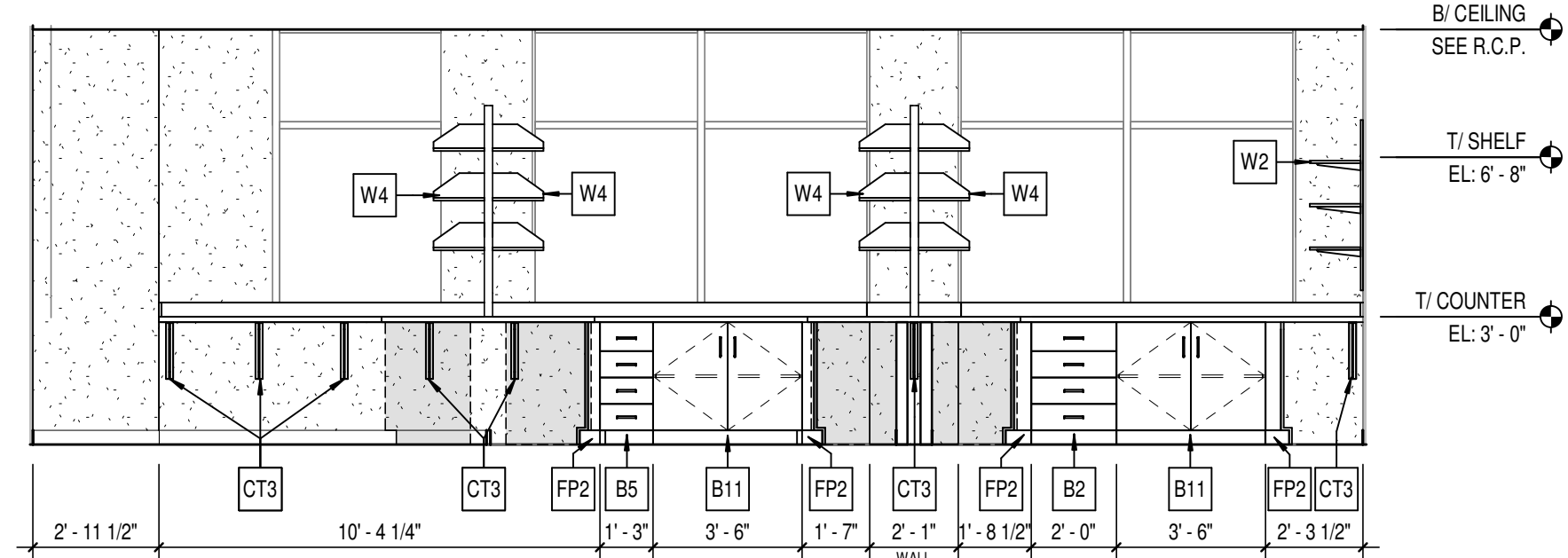
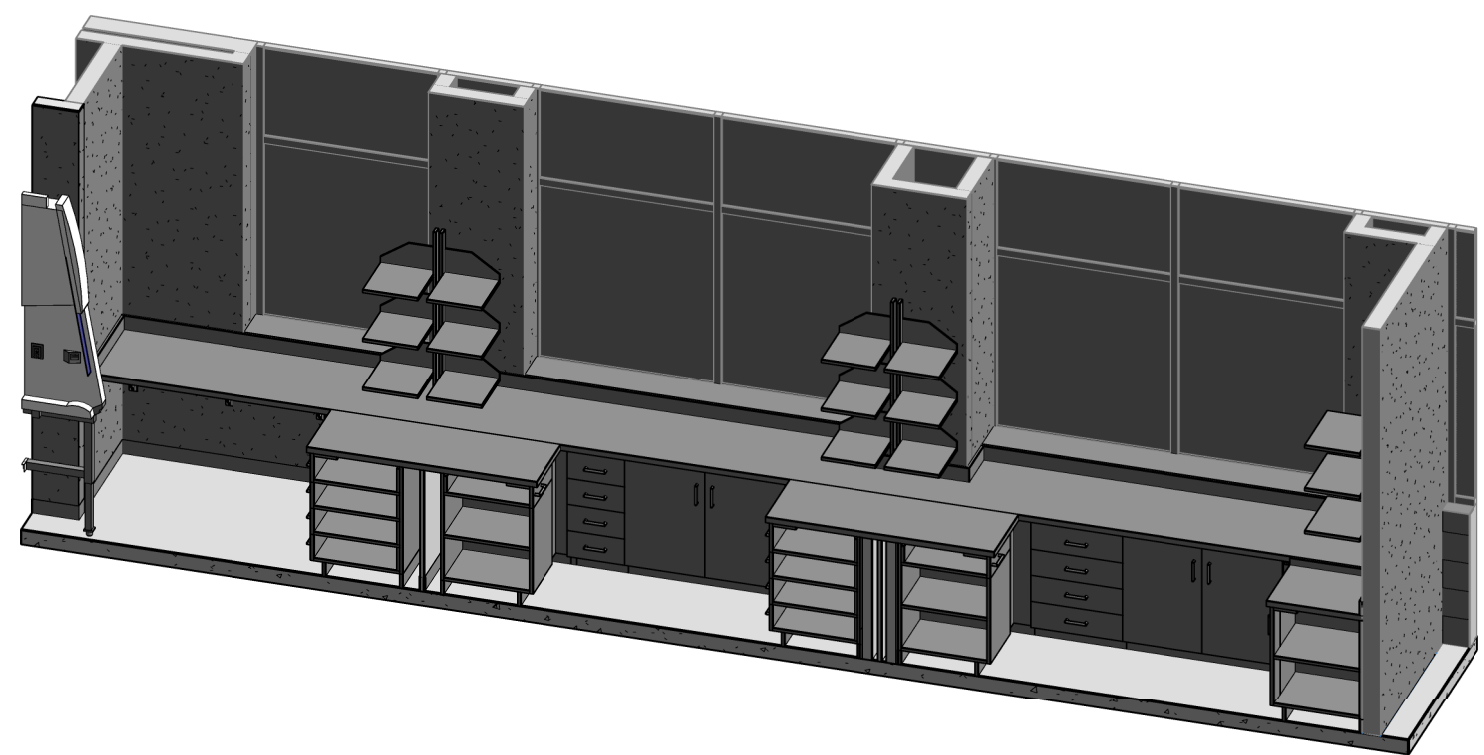
4 PENINSULA CASEWORK ELEVATION
SCALE: 1/4" = 1'-0"



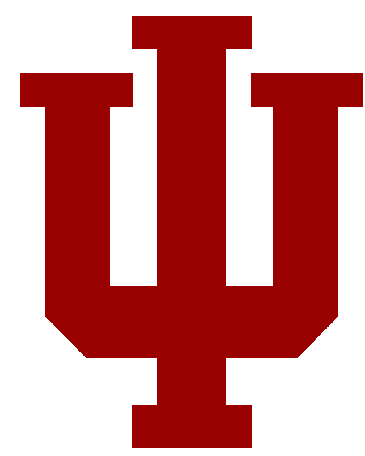
3 PENINSULA CASEWORK ELEVATION
SCALE: 1/4" = 1'-0"



2 PENINSULA CASEWORK ELEVATION
SCALE: 1/4" = 1'-0"



1 LAB CASEWORK ELEVATION - NORTH
SCALE: 1/4" = 1'-0"



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PROJECT:
INDIANA UNIVERSITY
BL563 - INNOVATION CENTER
RM 139A/141 NEW WET LAB
100% CONSTRUCTION DOC.
2719 E 10TH STREET, BLOOMINGTON, IN 47408

SCOPE DRAWINGS:
These drawings indicate the general scope of the project. The drawings are not intended to be used for the construction of the building. The drawings are not intended to be used for the construction of the building. The drawings are not intended to be used for the construction of the building.
REVISIONS:
1 ADDENDUM #01 10/17/2025
2 ADDENDUM #02 10/22/2025

ISSUE DATE 09/25/25
DRAWN BY NAW
CHECKED BY NAW

DRAWING TITLE:
CASEWORK
ELEVATIONS

CERTIFIED BY:
BRODIE J. KROHN
No. AR10800070
STATE OF INDIANA
ARCHITECT
Brodie J. Krohn

DRAWING NUMBER
A203

PROJECT NUMBER
2025044
IU NO. 20250201