

PROJECT	MSB 2 <sup>ND</sup> FLOOR LAB RENOVATION	ADDENDUM NUMBER	1
PROJECT NO.	A-22-010	DATE	3/9/2023
PROJECT LOCATION	UW-MADISON MADISON, WI		
OWNER	UW-MADISON		
PREPARED BY	T. VanOudenhoven		

NAME	COMPANY	EMAIL	PHONE
Mike Morris	University of Wisconsin Systems	mike.morris@uwss.wisconsin.edu	(608) 262-1796

*This Addendum is issued pursuant to the Instructions to Bidders and/or Conditions of the Contract. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.*

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## **PART 1 - NEW DOCUMENTS ISSUED WITH THIS DOCUMENT**

### **1.1 NEW PROJECT MANUAL DOCUMENTS AND SPECIFICATIONS**

A. 11 53 13 – Laboratory Fume Hoods

### **1.2 NEW DRAWING SHEETS**

A. None

### **1.3 NEW SKETCHES**

A. None

### **1.4 ADDITIONAL DOCUMENTATION: Asbestos Testing and Change of Custody**

- A. (262301765) Rooms 2125, 2135, & 2145; Drywall and Ceiling Tile
- B. (262301763) Rooms 2124, 2125, & 2145; Vinyl Baseboard with Associated Mastics
- C. (PO 11074) Rooms 2124, 2125, 2135 & 2145; Fume Hood Baffle & Joint Compound
- D. (262301782) Rooms 2125, 2135, & 2145; Joint Compound
- E. (262301780) Rooms 2124, 2125, 2135, & 2145; Floor Tile with Associated Mastics

## **PART 2 - DOCUMENTS DELETED BY THIS DOCUMENT**

### **2.1 DELETE THE FOLLOWING FROM THE PROJECT MANUAL**

A. 12 35 53.16 – Plastic Laminate Clad Laboratory Casework

## 2.2 DELETE THE FOLLOWING DRAWING SHEETS

- A. None

## PART 3 - REVISED DOCUMENTS ISSUED WITH THIS DOCUMENT

### 3.1 REVISED PROJECT MANUAL DOCUMENTS AND SPECIFICATIONS

- A. Table of Contents Technical Specifications

- 1. TC-1 through TC-5

- B. 12 35 53 – General Requirements for Laboratory Casework – Provided casework material clarification.

- C. 12 35 53.13 Metal Laboratory Casework – Provided casework material clarification.

### 3.2 REVISED DRAWING SHEETS

- A. Q1.1 – EQUIPMENT SCHEDULES

- 1. Updated Stand-by Power

- B. Q1.2 – EQUIPMENT SCHEDULES

- 1. Updated Stand-by Power

- C. Q8.1 – UNIQUE CASEWORK ELEVATIONS

- 1. Revised casework note.

- D. F2.1.1 – 2<sup>ND</sup> FLOOR PLAN – FIRE PROTECTION

- 1. Revise plan to omit sprinklers and branch piping. Contractor to provide sprinkler layout per NFPA 13 and revised room layouts.

- E. P2.0.1 – 1<sup>ST</sup> FLOOR PLAN – PLUMBING

- 1. Add removal of piping for removed sink on floor above.

- F. P2.1.1 – 2<sup>ND</sup> FLOOR PLAN PLUMBING

- 1. Add removal of sink.
  - 2. Add piping and outlets for gas at sinks and compressed air at lab benches.
  - 3. Corrected number of CA connections noted.

- G. M2.1.1 – 2<sup>ND</sup> FLOOR PLAN – VENTILATION

- 1. Add General Note 7.

- H. M6.0.0 – MECHANICAL SCHEDULES

- 1. Revise SD-1.

- I. E2.1.1 – 2<sup>ND</sup> FLOOR PLAN – LIGHTING

- 1. Revise keynote 5.
  - 2. Add downlights over countertop surface and associated dimmer.

3. Revise wall dimming occ sensor to wall dimmer and ceiling sensor in PI Offices.
- J. E2.1.2 – 2ND FLOOR PLAN – POWER
1. Revise BSC's, -20 Freezers to be emergency power.
  2. Revise duplex on north walls of PI offices to quad receptacles.
  3. Revise circuitry of receptacle outside of PI B office to connect to existing general power circuit serving Lab.
  4. Demo existing wall duct.
  5. Add keynote 6-8/
  6. Show existing emergency power receptacles in corridor as being demolished.
- K. E6.1.0 – ELECTRICAL SCHEDULES
1. Revise luminaire "F2" configuration in description.
  2. Revise panel schedules.
- L. T000 – TECHNOLOGY COVERSHEET
1. Add Information Outlet (Wall) Existing to Technology Symbols List.
  2. Add Note #2 to Technology Symbol Notes.
- M. T2.1.1 – 2<sup>ND</sup> FLOOR PLAN – TECHNOLOGY
1. Revise Keynote #1.
  2. Add (9) existing to remain data outlets along north wall in Detail 2.
  3. Add (1) existing to remain data outlet on south wall of LAB A 2145 in Detail 2.
  4. Revise (8) C2 outlets to (9) existing to remain outlets along north wall in Detail 1.

## **PART 4 - PROPOSED CHANGES IN THE WORK**

4.1 None

## **PART 5 - CLARIFICATIONS**

5.1 None

END OF DOCUMENT



# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
Tel/Fax: (773) 313-0099 / (773) 313-0139  
<http://www.EMSL.com/chicagolab@emsl.com>

**EMSL Order:** 262301765  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715

**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 02/28/2023  
**Collected Date:**

**Project:** MICROBIAL SCIENCES-RM. 2125,2135 AND 2145-DRYWALL AND CEILING TILE

## Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
2023-7208-Drywall 262301765-0001	MICROBIAL SCIENCES BUILDING-RM.2125-DRYWALL	Brown/White Non-Fibrous Homogeneous	10% Cellulose 3% Glass	87% Non-fibrous (Other)	None Detected
2023-7208-Joint Compound 262301765-0001A	MICROBIAL SCIENCES BUILDING-RM.2125-DRYWALL	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2023-7209-Drywall 262301765-0002	MICROBIAL SCIENCE BUILDING-RM. 2135-DRYWALL	Brown/White Non-Fibrous Homogeneous	10% Cellulose 3% Glass	87% Non-fibrous (Other)	None Detected
2023-7209-Joint Compound 262301765-0002A	MICROBIAL SCIENCE BUILDING-RM. 2135-DRYWALL	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2023-7210 262301765-0003	MICROBIAL SCIENCES BUILDING-RM 2145-DRYWALL	White Non-Fibrous Homogeneous	2% Cellulose 3% Glass	95% Non-fibrous (Other)	None Detected
2023-7211 262301765-0004	MICROBIAL SCIENCES BUILDING-RM 2125-2'X2'-PLAIN WHITE CEILING TILE	Gray/White Fibrous Homogeneous	30% Cellulose 30% Min. Wool	30% Perlite 10% Non-fibrous (Other)	None Detected
2023-7212 262301765-0005	MICROBAL SCIENCES BUILDING-RM. 2125-2'X2'-PLAIN WHITE CEILING TILE	Gray/White Fibrous Homogeneous	30% Cellulose 30% Min. Wool	30% Perlite 10% Non-fibrous (Other)	None Detected
2023-7213 262301765-0006	MICROBIAL SCIENCES BUILDING-RM. 2135-2'X2'-PLAIN WHITE CEILING TILE	Gray/White Fibrous Homogeneous	30% Cellulose 30% Min. Wool	30% Perlite 10% Non-fibrous (Other)	None Detected
2023-7214 262301765-0007	MICROBIAL SCIENCES BUILDING-RM. 2145-2'X2'- PLAIN WHITE CEILING TILE	Gray/White Fibrous Homogeneous	30% Cellulose 30% Min. Wool	30% Perlite 10% Non-fibrous (Other)	None Detected
2023-7215 262301765-0008	MICROBIAL SCIENCES BUILIDNG-RM. 2145-2'X2' - PLAIN WHITE CEILING TILE	Gray/White Fibrous Homogeneous	30% Cellulose 30% Min. Wool	30% Perlite 10% Non-fibrous (Other)	None Detected

Initial report from: 02/28/2023 14:20:54



# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162

Tel/Fax: (773) 313-0099 / (773) 313-0139

<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301765

**Customer ID:** UNWS78

**Customer PO:** MSN0172795

**Project ID:**

Analyst(s)

Mazen Elkhatib (10)

James Hahn, Laboratory Manager  
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL NVLAP Lab Code 200399-0

Initial report from: 02/28/2023 14:20:54



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

**Asbestos Chain of Custody**  
**EMSL Order Number (Lab Use Only):**

262301765

EMSL ANALYTICAL, INC.  
2225 W. HUBBARD ST  
CHICAGO, IL 60612  
PHONE: 773-313-0099  
FAX: 773-313-0139

<b>Company : University of Wisconsin - Madison (UNWS78)</b>		<b>EMSL-Bill to:</b> <input type="checkbox"/> Same <input type="checkbox"/> Different <small>If Bill to is Different note instructions in Comments**</small>	
<b>Street: 30 East Campus Mall</b>		<i>Third Party Billing requires written authorization from third party</i>	
<b>City: Madison</b>	<b>State/Province: WI</b>	<b>Zip/Postal Code: 53715-1227</b>	<b>Country: USA</b>
<b>Report To (Name): Christopher Heidel</b>		<b>Fax #:</b>	
<b>Telephone #: 608-575-3628</b>		<b>Email Address: christopher.heidel@wisc.edu</b>	
<b>Project Name/Number: Microbial Sciences- Rms. 2125, 2135 &amp; 2145- Drywall &amp; Ceiling Tile</b>			
<b>Please Provide Results:</b> <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email <b>Purchase Order: MSN0172795</b> <b>U.S. State Samples Taken: WI</b>			

**Turnaround Time (TAT) Options\* - Please Check**

3 Hours  
  6 Hours  
  24 Hrs  
  48 Hrs  
  3 Days  
  4 Days  
  5 Days  
  10 Days

\*For TEM Air 3 hours/6 hours, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input checked="" type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS-198.6-NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative) <b>Other:</b> <input type="checkbox"/>
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Check For Positive Stop - Clearly Identify Homogenous Group

**Samplers Name: Christopher Heidel**      **Samplers Signature:** *X Christopher Heidel*

Sample #	Sample Description	Volume/Area (Air)/ HA # (Bulk)	Date/Time Sampled
2023-7208	Microbial Sciences Building- Rm. 2125- Drywall		02/24/2023
2023-7209	Microbial Sciences Building- Rm. 2135- Drywall		02/24/2023
2023-7210	Microbial Sciences Building- Rm. 2145- Drywall		02/24/2023
2023-7211	Microbial Sciences Building- Rm. 2125- 2' X 2'- Plain White Ceiling Tile		02/24/2023
2023-7212	Microbial Sciences Building- Rm. 2125- 2' X 2'- Plain White Ceiling Tile		02/24/2023

**Client Sample # (s):** 2023-7208 - 2023-7215      **Total # of Samples:** 8

**Relinquished (Client):** *X Christopher Heidel*      **Date:** 02/27/2023      **Time:** 1630

**Received (Lab):** *[Signature]*      **Date:** 2-28-23      **Time:** 8:18AM

**Comments/Special Instructions:** Bill To - University of Wisconsin, Attn: Accounts Payable, 21 North Park, Suite 5301, Madison, WI 53715-1218, 608-262-1526

EFED-7965-8559-5160  
1044





# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
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<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301763  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715  
**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 03/01/2023  
**Collected Date:**  
**Project:** MICROBIAL SCIENCES-RMS.2124,2125& 2145-VINYL BASEBOARDS WITH ASSOC. MASTICS

## Test Report: Asbestos Analysis of Non-Friable Organic Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
2023-7216-Vinyl Baseboard 262301763-0001	MICROBIAL SCIENCES BUILDING-RM2124-4" DARK GRAY VINYL BASEBOARD WITH ASSOC. YELLOW MASTIC	Gray Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7216-Mastic 262301763-0001A	MICROBIAL SCIENCES BUILDING-RM2124-4" DARK GRAY VINYL BASEBOARD WITH ASSOC. YELLOW MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7217-Vinyl Baseboard 262301763-0002	MICROBIAL SCIENCES BUILDING-RM2125-4" DARK GRAY VINYL BASEBOARD WITH ASSOC. YELLOW MASTIC	Gray Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7217-Mastic 262301763-0002A	MICROBIAL SCIENCES BUILDING-RM2125-4" DARK GRAY VINYL BASEBOARD WITH ASSOC. YELLOW MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7218-Vinyl Baseboard-Cove Base 262301763-0003	MICROBIAL SCIENCES BUILDING-RM2145 4" DARK GRAY VINYL BASEBOARD WITH ASSOC. YELLOW MASTIC	Gray Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7218-Vinyl Baseboard-Mastic 262301763-0003A	MICROBIAL SCIENCES BUILDING-RM2145 4" DARK GRAY VINYL BASEBOARD WITH ASSOC. YELLOW MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and meet method specifications unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. EMSL suggests that samples reported as < 1% or none detected undergo additional analysis via TEM. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL NVLAP Lab Code 200399-0

Initial report from: 03/01/2023 10:24:31





# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
Tel/Fax: (773) 313-0099 / (773) 313-0139  
<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301763  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715  
**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 03/01/2023  
**Collected Date:**  
**Project:** MICROBIAL SCIENCES-RMS.2124,2125& 2145-VINYL BASEBOARDS WITH ASSOC. MASTICS

## Test Report: Asbestos Analysis of Non-Friable Organic Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
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Analyst(s)

Mazen Elkhatib (2)  
Selina Zeiss (4)

James Hahn, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. EMSL suggests that samples reported as < 1% or none detected undergo additional analysis via TEM. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL NVLAP Lab Code 200399-0

Initial report from: 03/01/2023 10:24:31



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

262301763

EMSL ANALYTICAL, INC.  
2225 W. HUBBARD ST  
CHICAGO, IL 60612  
PHONE: 773-313-0099  
FAX: 773-313-0139

Company : University of Wisconsin - Madison (UNWS78)		EMSL-Bill to: <input type="checkbox"/> Same <input type="checkbox"/> Different If Bill to is Different note instructions in Comments**	
Street: 30 East Campus Mall		Third Party Billing requires written authorization from third party	
City: Madison	State/Province: WI	Zip/Postal Code: 53715-1227	Country: USA
Report To (Name): Christopher Heidel		Fax #:	
Telephone #: 608-575-3628		Email Address: christopher.heidel@wisc.edu	
Project Name/Number: Microbial Sciences- Rms. 2124, 2125 & 2145- Vinyl Baseboard with Assoc. Mastics			
Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email Purchase Order: MSN0172795 U.S. State Samples Taken: WI			
Turnaround Time (TAT) Options* - Please Check			
<input type="checkbox"/> 3 Hours	<input type="checkbox"/> 6 Hours	<input checked="" type="checkbox"/> 24 Hrs	<input type="checkbox"/> 48 Hrs <input type="checkbox"/> 3 Days <input type="checkbox"/> 4 Days <input type="checkbox"/> 5 Days <input type="checkbox"/> 10 Days
*For TEM Air 3 hours/6 hours, please call ahead to schedule. *There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.			
<b>PCM - Air</b> <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input checked="" type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)		<b>TEM - Air</b> <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	
		<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative) <b>Other:</b>	
<input type="checkbox"/> Check For Positive Stop - Clearly Identify Homogenous Group			
Samplers Name: Christopher Heidel		Samplers Signature: <i>Christopher Heidel</i>	
Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
2023-7216	Microbial Sciences Building- Rm. 2124- 4" Dark Gray Vinyl Baseboard with Assoc. Yellow Mastic		02/24/2023
2023-7217	Microbial Sciences Building- Rm. 2125- 4" Dark Gray Vinyl Baseboard with Assoc. Yellow Mastic		02/24/2023
2023-7218	Microbial Sciences Building- Rm. 2145- 4" Dark Gray Vinyl Baseboard with Assoc. Yellow Mastic		02/24/2023
Client Sample # (s):	2023-7216 - 2023-7218	Total # of Samples:	3
Relinquished (Client):	<i>Chris Heidel</i> Date: <i>02/27/2023</i>	Time:	<i>1630</i>
Received (Lab):	Date: <i>2-28-23</i>	Time:	<i>8:18AM</i>
Comments/Special Instructions: Bill To - University of Wisconsin, Attn: Accounts Payable, 21 North Park, Suite 5301, Madison, WI 53715-1218, 608-262-1526			

EFED-7965-8559-5160  
30 of 4

# WISCONSIN OCCUPATIONAL HEALTH LABORATORY (WOHL) SAMPLE SUBMISSION FORM

Bill To UW MADISON SAFETY DEPT.  
30 East Campus Mall Room 260  
MADISON, WISCONSIN 53715

WOHL COMP# \_\_\_\_\_  
 Phone # 608-575-3628  
 FAX # 608-262-6767

Send Results To ATTN:  
Christopher Heidel

Project Microbial Sci. Bldg.- 2<sup>nd</sup> Floor  
 P.O. # 11074

Email Address  
abatement@fpm.wisc.edu  
 Date Sampled 02-24-2023

SPECIAL INSTRUCTIONS  
**RUSH TAT**  
**Page 1 of 2**

Turnaround: **XX- RUSH** PRIORITY NORMAL

LAB USE ONLY	CUSTOMER FIELD #	SAMPLE MEDIA	Location	ANALYSIS REQUEST
WOHL SAMPLE #				
	2023-7197	PLM	Microbial Sciences Building- Rm. 2124- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic	ASBESTOS IDENTIFICATION
	2023-7198	PLM	Microbial Sciences Building- Rm. 2125- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic	ASBESTOS IDENTIFICATION
	2023-7199	PLM	Microbial Sciences Building- Rm. 2135- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic	ASBESTOS IDENTIFICATION
	2023-7200	PLM	Microbial Sciences Building- Rm. 2145- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic	ASBESTOS IDENTIFICATION
	2023-7201	PLM	Microbial Sciences Building- Rm. 2145- Yellow/Tan Mastic Underneath White Floor Tile with Black Spots	ASBESTOS IDENTIFICATION

CHAIN OF CUSTODY: Relinquished \_\_\_\_\_ Date \_\_\_\_\_ Received \_\_\_\_\_ Date \_\_\_\_\_

**UPS, Fed-Ex & Other Shippers**  
 Wisconsin Occupational Health Lab  
 2601 Agriculture Drive  
 Madison, WI 53718

**US Postal Service**  
 Wisconsin Occupational Health Lab  
 PO Box 7996  
 Madison, WI 53707-7996

**Phone** 608 224-6210  
 800 446-0403  
**FAX** 608 224-6213

**Sampling Questions**  
[WOHLsampling@mail.slh.wisc.edu](mailto:WOHLsampling@mail.slh.wisc.edu)  
**Web Page/Order Media**  
<http://www.slh.wisc.edu/wohl>

SAMPLE CONDITION

\_\_\_\_\_ OK

\_\_\_\_\_ NOT OK

See Sample Receipt Record

# WISCONSIN OCCUPATIONAL HEALTH LABORATORY (WOHL) SAMPLE SUBMISSION FORM

Bill To UW MADISON SAFETY DEPT.  
30 East Campus Mall Room 260  
MADISON, WISCONSIN 53715

WOHL COMP# \_\_\_\_\_  
 Phone # 608-575-3628  
 FAX # 608-262-6767

Send Results To ATTN:  
Christopher Heidel

Project Microbial Sci. Bldg.- 2<sup>nd</sup> Floor  
 P.O. # 11074

Email Address  
abatement@fpm.wisc.edu  
 Date Sampled 02-24-2023

SPECIAL INSTRUCTIONS  
**RUSH TAT**  
**Page 2 of 2**

Turnaround: **XX- RUSH** PRIORITY NORMAL

LAB USE ONLY	CUSTOMER FIELD #	SAMPLE MEDIA	Location	ANALYSIS REQUEST
WOHL SAMPLE #				
	2023-7202	PLM	Microbial Sciences Building- Rm. 2145- Fume Hood- Rear Baffle	ASBESTOS IDENTIFICATION
	2023-7203	PLM	Microbial Sciences Building- Rm. 2145- Fume Hood- Rear Baffle	ASBESTOS IDENTIFICATION
	2023-7204	PLM	Microbial Sciences Building- Rm. 2145- Fume Hood- Rear Baffle	ASBESTOS IDENTIFICATION
	2023-7205	PLM	Microbial Sciences Building- Rm. 2145- Joint Compound	ASBESTOS IDENTIFICATION
	2023-7206	PLM	Microbial Sciences Building- Rm. 2135- Joint Compound	ASBESTOS IDENTIFICATION
	2023-7207	PLM	Microbial Sciences Building- Rm. 2125- Joint Compound	ASBESTOS IDENTIFICATION

CHAIN OF CUSTODY: Relinquished \_\_\_\_\_ Date \_\_\_\_\_ Received \_\_\_\_\_ Date \_\_\_\_\_

**UPS, Fed-Ex & Other Shippers**  
 Wisconsin Occupational Health Lab  
 2601 Agriculture Drive  
 Madison, WI 53718

**US Postal Service**  
 Wisconsin Occupational Health Lab  
 PO Box 7996  
 Madison, WI 53707-7996

**Phone** 608 224-6210  
 800 446-0403  
**FAX** 608 224-6213

**Sampling Questions**  
[WOHLsampling@mail.slh.wisc.edu](mailto:WOHLsampling@mail.slh.wisc.edu)  
**Web Page/Order Media**  
<http://www.slh.wisc.edu/wohl>

SAMPLE CONDITION

\_\_\_\_\_ OK

\_\_\_\_\_ NOT OK

See Sample Receipt Record



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

262301782

EMSL ANALYTICAL, INC.  
2225 W. HUBBARD ST  
CHICAGO, IL 60612  
PHONE: 773-313-0099  
FAX: 773-313-0139

Company : University of Wisconsin - Madison (UNWS78)		EMSL-Bill to: <input type="checkbox"/> Same <input type="checkbox"/> Different <small>If Bill to is Different note instructions in Comments**</small>	
Street: 30 East Campus Mall		Third Party Billing requires written authorization from third party	
City: Madison	State/Province: WI	Zip/Postal Code: 53715-1227	Country: USA
Report To (Name): Christopher Heidel		Fax #:	
Telephone #: 608-575-3628		Email Address: christopher.heidel@wisc.edu	
Project Name/Number: Microbial Sciences- Rms. 2125, 2135 & 2145- Joint Compound			
Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email Purchase Order: MSN0172795 U.S. State Samples Taken: WI			

**Turnaround Time (TAT) Options\* - Please Check**

3 Hours   
  6 Hours   
  24 Hrs   
  48 Hrs   
  3 Days   
  4 Days   
  5 Days   
  10 Days

\*For TEM Air 3 hours/6 hours, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<p><b>PCM - Air</b></p> <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <p><b>PLM - Bulk (reporting limit)</b></p> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS-198.6-NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)	<p><b>TEM - Air</b></p> <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <p><b>TEM - Bulk</b></p> <input checked="" type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <p><b>TEM - Water: EPA 100.2</b></p> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<p><b>TEM- Dust</b></p> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <p><b>Soil/Rock/Vermiculite</b></p> <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative) <p><b>Other:</b></p>
--	---	---

Check For Positive Stop - Clearly Identify Homogenous Group

Samplers Name: Christopher Heidel      Samplers Signature: *Christopher Heidel*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
2023-7219	Microbial Sciences Building- Rm. 2125- Joint Compound		02/24/2023
2023-7220	Microbial Sciences Building- Rm. 2135- Joint Compound		02/24/2023
2023-7221	Microbial Sciences Building- Rm. 2145- Joint Compound		02/24/2023

Client Sample # (s):	2023-7219 - 2023-7221	Total # of Samples:	3
Relinquished (Client):	<i>Christopher Heidel</i>	Date:	<i>02/27/2023</i> Time: <i>1630</i>
Received (Lab):	<i>[Signature]</i>	Date:	<i>2-28-23</i> Time: <i>8:18 AM</i>
Comments/Special Instructions: Bill To - University of Wisconsin, Attn: Accounts Payable, 21 North Park, Suite 5301, Madison, WI 53715-1218, 608-262-1526			

6 Fed-7905-8559-5160  
4 of 4



# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
Tel/Fax: (773) 313-0099 / (773) 313-0139  
<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301780  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715  
**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 03/02/2023  
**Collected Date:**  
**Project:** MICROBIAL SCIENCE-RMS. 2124,2125,2135 & 2145-FLOOR TILE W/ ASSOC.MASTIC

## Test Report: Asbestos Analysis of Non-Friable Organic Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
2023-7222-Floor Tile 262301780-0001	MICROBIAL SCIENCES BUILDING-RM. 2124-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7222-Mastic 262301780-0001A	MICROBIAL SCIENCES BUILDING-RM. 2124-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7223-Floor Tile 262301780-0002	MICROBIAL SCIENCES BUILDING-RM 2125-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7223-Mastic 262301780-0002A	MICROBIAL SCIENCES BUILDING-RM 2125-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7224-Floor Tile 262301780-0003	MICROBIAL SCIENCES BUILDING-RM 2125-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7224-Mastic 262301780-0003A	MICROBIAL SCIENCES BUILDING-RM 2125-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and meet method specifications unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. EMSL suggests that samples reported as < 1% or none detected undergo additional analysis via TEM. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL NVLAP Lab Code 200399-0

Initial report from: 03/02/2023 10:53:57



# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
Tel/Fax: (773) 313-0099 / (773) 313-0139  
<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301780  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715  
**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 03/02/2023  
**Collected Date:**  
**Project:** MICROBIAL SCIENCE-RMS. 2124,2125,2135 & 2145-FLOOR TILE W/ ASSOC.MASTIC

## Test Report: Asbestos Analysis of Non-Friable Organic Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
2023-7225-Floor Tile 262301780-0004	MICROBIAL SCIENCES BUILDING-RM 2135-12"X12" WHITE FLOOR TILE WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7225-Mastic 262301780-0004A	MICROBIAL SCIENCES BUILDING-RM 2135-12"X12" WHITE FLOOR TILE WITH ASSOC. YELLOW/TAN MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7226-Floor Tile 262301780-0005	MICROBIAL SCIENCES BUILDING-RM 2145-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected
2023-7226-Mastic 262301780-0005A	MICROBIAL SCIENCES BUILDING-RM 2145-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	Yellow Non-Fibrous Homogeneous	100 Other	None	No Asbestos Detected

Analyst(s)

Mazen Elkhatib (4)  
Selina Zeiss (6)

James Hahn, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and meet method specifications unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. EMSL suggests that samples reported as < 1% or none detected undergo additional analysis via TEM. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL NVLAP Lab Code 200399-0

Initial report from: 03/02/2023 10:53:57



# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
Tel/Fax: (773) 313-0099 / (773) 313-0139  
<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301780  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715

**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 03/02/2023  
**Collected Date:**

**Project:** MICROBIAL SCIENCE-RMS. 2124,2125,2135 & 2145-FLOOR TILE W/ ASSOC.MASTIC

## Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
2023-7222-Floor Tile 262301780-0001	MICROBIAL SCIENCES BUILDING-RM. 2124-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
2023-7223-Floor Tile 262301780-0002	MICROBIAL SCIENCES BUILDING-RM 2125-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
2023-7224-Floor Tile 262301780-0003	MICROBIAL SCIENCES BUILDING-RM 2125-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
2023-7225-Floor Tile 262301780-0004	MICROBIAL SCIENCES BUILDING-RM 2135-12"X12" WHITE FLOOR TILE WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
2023-7226-Floor Tile 262301780-0005	MICROBIAL SCIENCES BUILDING-RM 2145-12"X12" WHITE FLOOR TILE WITH BLACK SPOTS WITH ASSOC. YELLOW/TAN MASTIC	White/Black Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected

Analyst(s)

James Hahn (5)

James Hahn, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. EMSL recommends that samples reported as none detected or <1% undergo additional analysis via PLM to avoid the possibility of false negatives.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL

Initial report from: 03/02/2023 10:53:57





EMSL ANALYTICAL, INC.  
LABORATORY - PRODUCTS - TRAINING

# Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

26230178

EMSL ANALYTICAL, INC.  
2225 W. HUBBARD ST  
CHICAGO, IL 60612  
PHONE: 773-313-0099  
FAX: 773-313-0139

Company : University of Wisconsin - Madison (UNWS78)		EMSL-Bill to: <input type="checkbox"/> Same <input type="checkbox"/> Different <small>If Bill to is Different note instructions in Comments**</small>	
Street: 30 East Campus Mall		Third Party Billing requires written authorization from third party	
City: Madison	State/Province: WI	Zip/Postal Code: 53715-1227	Country: USA
Report To (Name): Christopher Heidel		Fax #:	
Telephone #: 608-575-3628		Email Address: christopher.heidel@wisc.edu	
Project Name/Number: Microbial Sciences- Rms. 2124, 2125, 2135 & 2145- Floor Tile with Assoc. Mastics			
Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email Purchase Order: MSN0172795 U.S. State Samples Taken: WI			

**Turnaround Time (TAT) Options\* - Please Check**

3 Hours   
  6 Hours   
  24 Hrs   
  48 Hrs   
  3 Days   
  4 Days   
  5 Days   
  10 Days

\*For TEM Air 3 hours/6 hours, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<p><b>PCM - Air</b></p> <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <p><b>PLM - Bulk (reporting limit)</b></p> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input checked="" type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)	<p><b>TEM - Air</b></p> <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <p><b>TEM - Bulk</b></p> <input checked="" type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA, 600 sec. 2.5 <p><b>TEM - Water: EPA 100.2</b></p> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<p><b>TEM- Dust</b></p> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <p><b>Soil/Rock/Vermiculite</b></p> <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative) <p><b>Other:</b></p>
--	--	---

Check For Positive Stop - Clearly Identify Homogenous Group

Samplers Name: Christopher Heidel      Samplers Signature: *Christopher Heidel*

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
2023-7222	Microbial Sciences Building- Rm. 2124- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic		02/24/2023
2023-7223	Microbial Sciences Building- Rm. 2125- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic		02/24/2023
2023-7224	Microbial Sciences Building- Rm. 2125- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic		02/24/2023
2023-7225	Microbial Sciences Building- Rm. 2135- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic		02/24/2023
2023-7226	Microbial Sciences Building- Rm. 2145- 12" X 12" White Floor Tile with Black Spots with Assoc. Yellow/Tan Mastic		02/24/2023

Client Sample # (s):	2023-7222 - 2023-7226	Total # of Samples:	5
Relinquished (Client):	<i>Christopher Heidel</i>	Date:	<i>02/27/2023</i>
Received (Lab):	<i>[Signature]</i>	Date:	<i>2-28-23</i>
Comments/Special Instructions:	Bill To - University of Wisconsin, Attn: Accounts Payable, 21 North Park, Suite 5301, Madison, WI 53715-1218, 608-262-1526		

\* Please see Notes on Page 2 \*

EPED-7965-8559-5160





# EMSL Analytical, Inc.

4140 Litt Drive Hillside, IL 60162  
Tel/Fax: (773) 313-0099 / (773) 313-0139  
<http://www.EMSL.com> / [chicagolab@emsl.com](mailto:chicagolab@emsl.com)

**EMSL Order:** 262301782  
**Customer ID:** UNWS78  
**Customer PO:** MSN0172795  
**Project ID:**

**Attention:** Christopher Heidel  
University of Wisconsin Safety EHS  
30 East Campus Mall  
Madison, WI 53715

**Phone:** (608) 575-3628  
**Fax:** (608) 262-6767  
**Received Date:** 02/28/2023 8:18 AM  
**Analysis Date:** 03/02/2023  
**Collected Date:**

**Project:** MICROBIAL SCIENCES-RMS.2125,2135 AND 2145-JOINT COMPOUND

## Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
2023-7219 262301782-0001	MICROBIAL SCIENCES BUILDING RM.2125-JOINT COMPOUND	White Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
2023-7220 262301782-0002	MICROBIAL SCIENCES BUILDING RM.2135 JOINT COMPOUND	White Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
2023-7221 262301782-0003	MICROBIAL SCIENCES BUILDING RM.2145 JOINT COMPOUND	White Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected

Analyst(s)

James Hahn (3)

James Hahn, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. EMSL recommends that samples reported as none detected or <1% undergo additional analysis via PLM to avoid the possibility of false negatives.

Samples analyzed by EMSL Analytical, Inc. Hillside, IL

Initial report from: 03/02/2023 10:18:10

1	<b>TABLE OF CONTENTS TECHNICAL SPECIFICATION</b>		
2	<b>VOLUME 3 of 3</b>		
3	UW-Madison Project No. <b>00060-2201</b> / UWSA Project No. <b>A-22-010</b>		
4			
5	<b><u>VOLUME 1</u></b>		
6	Division 00 – Division 01: General Prime Contractor		
7			
8	<b><u>VOLUME 2</u></b>		
9	Division 00 – Division 01: MEP (Mechanical, Electrical, Plumbing and Fire Protection)		
10			
11	<b><u>VOLUME 3</u></b>		
12	<b>DIVISION 02 – EXISTING CONDITIONS</b>		
13	Section	Title	Pages Thru
14	02 05 00	Common Work Results for Existing Conditions	02 05 00-03
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21	<b>DIVISION 04 – MASONRY</b>		
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23	Not Used		
24			
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28			
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31	21 10 00	Water-Based Fire Protection Systems	21 10 00-7
32			
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36	22 05 14	Plumbing Specialties	22 05 14-2
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39	22 07 00	Plumbing Insulation	22 07 00-5
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27			
28		<b>DIVISION 28 – ELECTRONIC SAFETY AND SECURITY</b>	
29	Section	Title	Pages Thru
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31			
32		<b>DIVISION 30 – COMMON WORK RESULTS FOR ALL EXTERIOR WORK</b>	
33	Section	Title	Pages Thru
34	Not Used		
35			
36		<b>DIVISION 31 – EARTHWORK</b>	
37	Section	Title	Pages Thru
38	Not Used		
39			
40		<b>DIVISION 32 – EXTERIOR IMPROVEMENTS</b>	
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43			
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40	PLUMBING DETAILS	P4.0.0
41		
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9		
10	***	



**SECTION 11 53 13**  
**HIGH PERFORMANCE LABORATORY FUME HOODS**  
**DFD Master Specification dated 2/20/2020**  
**PART 1 – GENERAL**

**SCOPE**

This section includes specifications for high performance laboratory fume hoods. Included are the following topics:

**PART 1 – GENERAL**

- Scope
- Related Work
- Reference Standards
- Design Requirements
- Quality Assurance
- Delivery, Storage and Handling
- Project Conditions
- Sequencing and Scheduling
- Training
- Submittals
- Warranty

**PART 2 – PRODUCTS**

- Manufacturers
- Fume Hood Services, Fixtures and Accessories
- Mott Manufacturing Limited Requirements
- Flow Safe Requirements
- Lab Crafters Requirements
- Hamilton Requirements
- Kewaunee Requirements
- Performance Requirements

**PART 3 – EXECUTION**

- Installation
- Adjustments and Calibration
- Cleaning
- Protection of Finished Work
- Construction Verification Items
- Functional Performance Testing
- Field Installed Testing
- Agency Training
- Instructional Signage

**RELATED WORK**

Applicable provisions of Division 1 shall govern all work under this section.

**Related Sections and Divisions:**

Section 01 91 01:	Commissioning Process
Section 12 35 53:	General Requirements for Laboratory Casework and Fume Hoods
Division 22 -	Plumbing utilities and final connections to fume hoods.
Division 23 -	HVAC utilities and final connection to fume hoods.
Division 26 -	Electrical utilities and final connections to fume hoods.

**REFERENCE STANDARDS**

ANSI/AIHA	Z9.5 - 2003 Laboratory Ventilation Standard
ASHRAE 110-1995	Method of Testing Performance of Laboratory Fume Hoods
ASTM A336	Steel, Sheet, Carbon, Cold Rolled, Commercial Quality
ASTM E84	Surface Burning Characteristics of Building Materials
FS DD-GI403	Glass, Plate (Float), Sheet, Figured, and Spandrel (Heat Strengthened and

UW-Madison Project No. 0060-2201 / UWSA Project No. A-22-010

1		Fully tempered).
2	NFPA 45	Fire Protection for Laboratories Using Chemicals.
3	NFPA 56F	Non-Flammable Medical Gas Systems.
4	NFPA 70	National Electric Code.
5	OSHA 29CFR Part 1910	Occupational Exposures to Hazardous Chemicals in Laboratories
6	UL 1805	Laboratory Fume Hoods and Cabinets

7

8 **DESIGN REQUIREMENTS**

9 Fume hoods shall function as ventilated, enclosed work spaces, designed to capture, confine and exhaust fumes and vapors  
10 produced or generated within the enclosure in accordance with the performance requirements specified in Part 2 of this section.

11

12 Constant volume, bench-type fume hood shall maintain essentially constant exhaust volume at any sash position. Maximum  
13 variation in exhaust CFM, static pressure and average face velocity as a result of sash adjustment shall not exceed 5% for any  
14 sash position at the specified exhaust volume.

15

16 Design face velocity with sash in full open position is 50 feet per minute. The vertical sash opening height used to measure the  
17 face velocity shall be 27-1/2 inches.

18

19 Fume hood shall be designed to minimize static pressure drop through hood. Maximum average static pressure loss readings  
20 taken three diameters above the hood outlet from four points, 90 degrees apart, shall not exceed 0.15 inches water column with  
21 sash in full open position at design face velocity.

22

23 Fume hoods shall be available in standard widths of 4, 5, 6, 7, & 8 feet.

24

25 The fume hood manufacturer shall provide a pre-piped, pre-wired junction box at the top of the fume hood for a single point  
26 connection of 120v AC power to supply receptacles, light switch and fixture, along with any other control or accessory requiring  
27 an electrical supply. Transformers required to step voltage down for fume hood controls or accessories shall be pre-installed and  
28 pre-wired in the factory by the fume hood manufacturer. Division 16 contractor will provide 120v AC power connection at  
29 junction box.

30

31 All work must conform to all State of Wisconsin Codes.

32

33 **QUALITY ASSURANCE**

34 Fume Hood must be Underwriters Laboratories subject 1805 classified. The 1805 standard covers electrical and mechanical  
35 hazards, investigates the flammability of materials and measures the effectiveness of airflow characteristics. Proper labeling  
36 must be affixed to the face of each fume hood indicating classification to the UL 1805 standard for Laboratory Fume Hoods. UL  
37 listing covering electrical components only or other listings that do not encompass all issues covered in UL 1805 is insufficient.  
38 All factory testing shall be performed in a U.L. certified test facility.

39

40 Installer's Qualifications: Factory trained and certified by the manufacturer, and have five years or more experience in  
41 installation of laboratory fume hoods, casework and equipment of type specified. Installer shall be knowledgeable with  
42 calibration procedures for the fume hood alarm and monitor specified in Part 2 – Products.

43

44 **DELIVERY, STORAGE, AND HANDLING**

45 Handling: Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film  
46 or other protective coating. Protect all work surfaces throughout construction period with 1/4 inch corrugated cardboard  
47 completely covering the top and securely taped to edges. Any tape used on fume hood surfaces shall be non-delaminating.  
48 Manufacturer shall be responsible for removal of taping adhesive. Sash and counterbalance mechanism shall be secured for  
49 shipping .

50

51 **PROJECT CONDITIONS**

52 The fume hood manufacturer and installer shall review all project conditions and building limitations such as doorway sizes,  
53 corridor widths, ceiling heights, obstructions, etc. prior to bidding the project. The fume hood manufacturer and installer shall  
54 determine any disassembly and re-assembly methods necessary for access of each fume hood into its final location. Costs  
55 associated with disassembly, re-assembly and access to the fume hood final locations shall be included in the bid.

56

1 **SEQUENCING AND SCHEDULING**

2 Do not deliver or install fume hoods until the following conditions have been met:

- 3
- 4 • Building areas requiring the installation of fume hoods shall be dry and not exposed to construction activities or
- 5 adverse weather conditions which may damage finished materials.
- 6 • Interior building temperatures shall not register below 65 degrees F. in areas of fume hood installation to permit
- 7 the proper curing of epoxy sealants and adhesives.
- 8 • Walls and partitions must be in place and finished with at least the primer coat of paint. If finish painting is to take
- 9 place after fume hood installation, protect fume hoods by covering and masking prior to commencement.
- 10 • Overhead soffits and ceiling grid must be in place and overhead lighting must be installed and connected prior to
- 11 fume hood installation.
- 12 • All flooring required to be placed under fume hoods and base cabinets must be installed prior to material delivery.

13

14 **TRAINING**

15 Fume hood manufacturer’s representative shall provide a minimum of 1 hour of training for owner’s designated personnel in the  
16 operation and maintenance of the fume hoods. Training shall include demonstration on procedures for testing and calibration of  
17 fume hood monitors and alarms and all control devices.

18

19 Provide the users with a professional quality CD (minimum 15 minutes in length) on proper hood usage. The CD shall convey:

- 20
- 21 • The basic concept of a fume hood and how it serves to protect users.
- 22 • The function of the sash and its proper use.
- 23 • Safety rules for proper movement in the work zone.
- 24 • Safety rules for fume hood loading.
- 25 • A high volume smoke demonstration on the hood’s containment potential and how improper use can compromise
- 26 containment.
- 27 • Fume hood alarm features and how the user should respond to these.

28

29 **SUBMITTALS**

30 Submit sufficient quantities of shop drawing review copies to allow the following distribution:

31		
32	Project Operating and Maintenance Manuals	2 copies
33	Division of Facilities Development	1 copy
34	A/E	1 copy
35		

36 Each fume hood shop drawing review copy shall include the following information:

37

38 Manufacturer’s product data for each type of hood specified. Include component dimensions, configurations,  
39 construction details, joint details, and attachments. Indicate location, size, and service requirements for each utility  
40 connection. Clearly identify all features on the submittals.

41

42 3/4 inch = 1 foot scale plans and elevations of individual and/or battery of hoods showing cross sections, rough-in and  
43 anchor placements, tolerances, and clearances. Indicate relation to other laboratory equipment, surrounding walls,  
44 windows, doors, and other building components.

45

46 Provide 1/4 inch = 1 foot rough-in plan drawings for coordination with trades.

47

48 3 inch by 5 inch finish samples of color of finish for fume hoods, work surfaces and for other prefinished equipment and  
49 accessories for selection by the Owner’s Representative.

50

51 Sound data for 63, 125, 250, 500, 1000, 2000, 4000 hertz octave bands.

52

53 Test Reports for each size hood verifying conformance to performance tests specified in Part 2 - Products. Reports  
54 may be submitted in electronic format, but written copy’s must also be submitted. Reports must be “third party”  
55 validated.

1  
2 Fume hood instructional signage specified in Part 2 – Products.

3  
4 Operation and maintenance manuals outlining proper operating and maintenance procedures for each different type of  
5 fume hood. O&M manuals shall include a complete parts list for the fume hood.

6  
7 Operation and calibration manual for the fume hood monitors and alarms.

8  
9 **WARRANTY**

10 Provide a 1-year warranty for parts and labor against defects in materials and workmanship.

11  
12 **PART 2 - PRODUCTS**

13  
14 **MANUFACTURERS**

15 Fume hood is owner furnished and contractor installed.

- 16  
17
  - Labconco

18  
19 Other manufacturers and/or products must undergo independent testing according to the performance requirements specified in  
20 this section. Independent testing shall be conducted by a firm designated by the Owner. Results must be reviewed and  
21 approved by the owner prior to approval for bidding.

22  
23 **FUME HOOD SERVICES, FIXTURES AND ACCESSORIES**

24 Reference fume hood drawings, details and schedule for all service rough-in locations, fixture quantities and fixture mounting  
25 locations. The fume hood services and fixtures specified are common to both manufacturers listed above.

26  
27 All service controls, switches and electrical receptacles shall be mounted at locations on the front of the fume hood post(s).  
28 Fume hoods specified or noted on the drawings to be ADA compliant shall have all fixture controls, switches and receptacles  
29 mounted at a maximum height of 54 inches off the floor.

30  
31 **PIPING SERVICES**

32 Factory pre-piping shall extend 2 inches beyond top or bottom of the fume hood per rough-in locations on drawings. Pressure  
33 test all piping in factory. Pipe ends shall be capped until final connection is made by division 22 and division 23 contractors.

34  
35 **Water Service**

36 3/8 inch, type L copper water tube, H (drawn temper, ASTM B88; wrought copper pressure fittings, ANSI B16.22 lead free (<.2%)  
37 solder, ASTM B32 flux, ASTM B813 copper phosphorous brazing alloy, AWS A5.8 Bcup.

38  
39 Cold water piping, fittings and valve bodies shall be factory insulated with ½" thick closed cell elastomeric insulation. Slip  
40 insulation over piping where possible. Seal joints and seams with full bed of adhesive on both surfaces. Taped joints and seams  
41 are not acceptable.

42  
43 **PLUMBING FIXTURES**

44 **Cup Sinks**

45 Modified epoxy resin, oval cup sinks, nominal 3 inch x 6 inch, 1-1/2 inch IPS outlet, color: black.

46  
47 There shall be no raised lip around cup sinks in the fume hood work surface; drainage should be allowed to enter the cup sink.

48  
49 **Single service cold water fixtures**

50 Forged brass valve bodies, 80 psi working pressure, renewable type neoprene valve disc and a replaceable stainless steel seat.  
51 Valve body shall be front loaded type mounted inside superstructure wall.

52  
53 Fixture outlets shall be brass, stem type with 90 degree tip, panel mounted in side wall liner of fume hood above cup sink.  
54 Fixture outlet shall have removable serrated tips, acid and solvent resistant epoxy finish. . Fixture outlet shall have a color-coded  
55 mounting washer. Fixture control handle mounted in exterior superstructure post shall be chrome four arm handle with plastic  
56 color-coded center index button that matches color of serrated tip mounting washer.

1  
2 Water fixtures shall be factory pre-piped with vacuum breakers in State of Wisconsin – Department of Commerce approved  
3 configuration.

4  
5 Vacuum breaker equal to Watersaver Faucet Co. L100 shall be mounted on exterior, top front corner of fume hood  
6 superstructure post. Vacuum breaker shall have polypropylene flow cup with air pocket for buoyancy and tight seal under low  
7 flow conditions.

8  
9 Vacuum, Natural Gas, Nitrogen, Compressed Air Fixtures

10 Forged brass valve bodies, 125 psi working pressure, needle valve construction with renewable type stainless steel floating cone  
11 and a replaceable stainless steel seat. Valve body shall be front loaded type mounted inside superstructure wall.

## 12 ELECTRICAL SERVICES

13 The following specifications are for factory pre-wired electrical services within the laboratory fume hood. All materials and  
14 installation methods shall meet the requirements of the National Electric Code.

15  
16  
17 Wiring: minimum #12 copper, type THHN/THWN insulation. Wire color coding shall be black for current carrying conductors,  
18 white for neutral conductors and green for ground conductors.

19  
20 Conduit: 1/2 inch, flexible metal conduit, galvanized spiral strip. Secure conduit to superstructure framework with conduit  
21 clamps.

22  
23 Junction Boxes: 4 inch square by 2-1/8 inch deep, code gauge galvanized steel, screw covers.

24  
25 Spring Wire Connectors: Solderless spring type pressure connector with insulating covers for splices and taps.

## 26 ELECTRICAL FIXTURES

27 All electrical devices shall be UL listed.

28  
29  
30 Fume hood light fixture shall have two lamps, rapid start, fluorescent type with sound rated electronic ballasts mounted on  
31 exterior of fume hood roof. Fixture shall be mounted in roof liner and sealed behind a laminated safety glass panel to isolate light  
32 fixture from fume hood interior. Interior of light fixture shall be white, high reflecting plastic enamel. Lamps shall be removable  
33 from the exterior of the fume hood.

34 Average illumination of work surface shall be at least 90 foot candles.

35  
36 Lamps must be provided with fume hood light fixtures.

37  
38 Light fixture switch shall be toggle type mounted in front post of superstructure. Switch cover plate shall be stainless steel with a  
39 brushed finish and labeled "LIGHT".

40  
41 Receptacles shall be duplex, GFCI, grounding type, hospital grade. Reference drawings for quantities, locations, amperage and  
42 voltage ratings of receptacles. Provide flush, stainless steel, brushed finish receptacle cover plates.

43  
44 Unless noted otherwise, receptacles shall be 120v AC, 20A.

45  
46 Fume light fixture, switch and receptacles shall be pre-wired by fume hood manufacturer to a junction box on the exterior roof of  
47 the fume hood for a single point power connection by the electrical contractor.

## 48 VENTILATION CONNECTIONS

49 Fume hood exhaust collar shall be rectangular or round with a parabolic, bell shaped, or tapered entry at the connection to fume  
50 hood to minimize static pressure drop. Collar shall be constructed of type 316L stainless steel or steel with a reagent resistant  
51 coating.

52  
53  
54 Coordinate with division 23 contractor for final exhaust duct connection to fume hood collar.

1 Provide 1-1/2" diameter polypropylene vent pipe connecting from the rear of the acid storage base cabinet to the inside hood  
2 chamber behind the rear baffle plate. Seal vent pipe penetration and extend minimum of 1" above fume hood work surface.  
3

#### 4 CEILING CLOSURE PANELS AND FILL PANELS

5 Do not utilize or provide ceiling enclosure panels.  
6

#### 7 INSTRUCTIONAL SIGNAGE

8 Provide instructional signage to explain the fume hood operational and safety instructions. Mount the signage on the front of  
9 each fume hood in plain view of user. Signage shall be plastic engraved laminate or directly applied silkscreen using chemical  
10 resistant epoxy ink. Signage shall have red background and white lettering (Font equal to Arial, 14 pt. or equal) to provide visual  
11 attraction.  
12

13 See templates attached to the end of this specification for signage wording.  
14

15 Sign shall also include manufacturer's model number for the fume hood.  
16

#### 17 OPERATION and MAINTENANCE MANUALS AND TRAINING CD

18 The fume hood manufacturer shall provide a 8-1/2 x 11 sized, rigid plastic or stainless steel pocket permanently attached to the  
19 front of each fume hood for storage of operation and maintenance manuals.  
20

21 Each fume hood shall be provided with its own copy of the fume hood operation and maintenance manual and the fume hood  
22 monitor/alarm operation and calibration manual that was approved during the shop drawing review. Note that these copies do  
23 not need to be the actual stamped and approved copies, but they must be duplicates of the shop drawing review copies that  
24 were stamped and approved. The manuals shall be provided in the pocket permanently attached to each fume hood.  
25

26 A jacketed copy of the instructional training CD shall be provided for each fume hood in the permanently attached pocket on the  
27 fume hood.  
28

#### 29 SAFETY MONITOR AND ALARM SYSTEM

30 Acceptable safety monitors/alarms are:  
31

32 TSI, Model FMH 10  
33 Flow Safe, Model HAM-VFV  
34 TEL, Model AFA 1000  
35

36 Safety monitor and alarm shall continuously monitor face velocity and provide audible and visual alarm if face velocity falls below  
37 low alarm setpoint or rises above high alarm setpoint.  
38

39 The monitor shall have one set of dry contacts for connecting alarm to either set back sequence or building management system.  
40

41 Monitor and velocity sensor shall be factory installed and prewired on hood complete with low voltage transformer and  
42 transformer cable.  
43

44 The calibration of the monitor shall be completed in the field by the fume hood installer. Reference Part 3 – Execution. Monitor  
45 shall be adjusted for an 40 FPM low alarm, 500 FPM high alarm.  
46

47 The fume hoods will have VAV fume hood controls provided by division 23 with the fume hood monitor provided with the VAV  
48 fume hood controls.  
49

50 All fume hoods in room 2145 and 2125

#### 51 LABCONCO REQUIREMENTS

##### 52 SUPERSTRUCTURE

53 Rigid, self-supporting assembly of double wall construction, maximum 4-7/8" thick. Wall consists of a sheet steel exterior shell  
54 and a corrosion resistant inner liner, and houses and conceals steel framing members, attaching brackets and remote operating  
55 service fixture mechanisms and services.  
56

1 Exterior shell to be high quality, cold rolled, mild steel meeting requirements of ASTM A366; gauges U.S. Standard and  
2 galvanized. Finish with electrostatically applied reagent resistant polyester/urethane powder coat, minimum thickness 1.2 mils.  
3 Panels shall be fastened together using galvanized steel angles and channels, minimum 14 gauge. Panels and brackets  
4 attached with stainless steel screws with plastic caps on hood interior as needed for a secure superstructure.  
5

6 Overall depth of fume hood superstructure, not including down-flow airflow chamber, shall be 38.625 inches.  
7

8 Inner liner shall be fiberglass reinforced polyester panel; smooth finish and white color in final appearance. Flexural strength:  
9 14,000 psi. Flame spread: 25 or less per U.L. 723 and ASTM E84-80. All interior seams to be sealed and caulked.  
10

11 Access to fixture valves concealed in wall provided by exterior removable access panels and gasketed access panels on the  
12 inside liner walls. Gaskets: White 70 durometer PVC for interior access panels. Gasket interior access panels to eliminate air  
13 leakage and to retain liquids inside hood.  
14

15 Baffle providing controlled air vectors into and through the fume hood shall be fabricated of the same material as the liner.  
16 Supports, and brackets to be non-metallic. High performance 1-piece baffle will be used. Baffle shall incorporate exhaust  
17 opening at work surface. Baffle to be non-adjustable, but removable for periodic cleaning and retrieval of debris.  
18

19 Fume hood shall be equipped with a 2" high rectangular exhaust duct connection measuring 36" long x 3" wide.  
20

21 Access opening perimeter shall have air foil or streamlined shape with all right angle corners radiused or angled.  
22

23 Bottom horizontal air foil shall be angled design to minimize reverse flows and eddy currents at the work surface. Bottom air foil  
24 shall be stainless steel with polyester/urethane powder coating to increase acid and abrasion resistance. Air foil and sill to be no  
25 more than 1/2" above the height of the work surface.  
26

27 Air foil shall not be removable without use of special tools.  
28

29 Provide a steel safety bar with polyester/urethane powder coating across the full width of the bottom in front of the air foil  
30 positioned to prevent users from directly blocking the air foil with their body. The safety bar shall be located approximately 4  
31 inches from the front edge of the bottom air foil and should not be removable without special tools.  
32

### 32 FASTENINGS

33 Exterior structural members attachments: Sheet metal screws, zinc plated.  
34

35 Interior fastening devices protected by plastic caps. Exposed screws not acceptable.  
36

37 Exterior side access panel member fastening devices to be concealed spring steel clips.  
38

### 38 WORK SURFACE

39 Modified epoxy resin 1-1/4" thick surface, dished at least 1/2" to contain spills, color: black.  
40

41 Work surface cutout for cup sink shall have rabbet perimeter to allow flush mounting of cup sink rim with dished surface. Raised  
42 cup sink lips are prohibited.  
43

44 Cup sinks shall be located in front half of work surface under water fixture. Coordinate installation with acid storage base  
45 cabinets beneath cup sink. Provide penetration through acid storage base cabinet for cup sink drain.  
46

47 Reference drawings and details for right hand or left hand cup sink locations.  
48

### 49 SASH

50 Combination vertical and horizontal sash shall have a 26 inch high access opening along with a fixed top viewing panel to  
51 provide a 35" high overall sight line. Sash frame on sides shall be no more than 1.5" wide, corrosion resistant steel with chemical  
52 resistant powder coating. Sash frame shall ride in extruded PVC sash guides. Bottom edge of sash frame shall be formed to  
53 minimize air flow turbulence into the hood. Horizontal sliding panels shall be 7/32" thick laminated safety glass, top hung on  
54 nylon tired stainless steel ball bearing wheels and provided with finger pulls. Horizontal sash panels shall be mounted to prevent  
55 easy removal. Fixed top viewing panel shall be minimum 7/32" thick laminated safety glass. Exposed glass edges of viewing

1 panels and sash panes shall have stainless steel or plastic trim to protect operators from injury and prevent glass edges from  
2 chipping.

3  
4 Sash counter balance system with sprocket and chain drive with single weight shall be self-leveling, prevent sash tilting, and  
5 permit ease of operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its  
6 full length of opening. Life cycle test sash and weight. Open and close sash against rubber bumper stops.

7  
8 Sash chain and pulley assembly: Chain to be ANSI #35 steel, single strand with an average tensile strength of 2,400 pounds,  
9 maximum working load of 480 pounds. Pulley assembly for sash chain shall be finished bored steel drive sprockets. Idler  
10 sprockets; double sealed ball bearings type, lubricated. All sprockets steel with zinc dichromate finish.

11  
12 Auto-Sash mechanism shall be designed to promote usage of sash as an upper body and face shield. Sash operating position  
13 shall be based on the combination sash fully lowered with horizontal panels opened to the desired configuration of the user.  
14 Combination sash shall have the capability to be raised to full 26" vertical opening for loading, unloading and setup of large  
15 apparatus. A lock-open lever shall be provided. When lock-open is not engaged, the combination sash shall lower automatically  
16 to a nominal 18" position when released. Auto-sash function shall be life cycle tested and not incorporate the need for motor  
17 drives.

#### 18 19 DOWN-FLOW AIRFLOW CHAMBER

20 Airflow chamber shall assist fume hood containment by directing room air between the operator and the hood from above sash  
21 opening. Chamber will be low resistance, 18 gauge steel with integral distribution media and polycarbonate honeycomb flow  
22 straightener at outlet. Multiple 24v DC Axial Fans shall be an integral part of the chamber. Housing to be powder-coat finished.  
23 The fans shall activate automatically when the combination sash is raised above the 18 inch open position. Fan speed is  
24 adjustable by a rheostat. The fans shall be controlled by a circuit board mounted on the top of the airflow chamber in a steel  
25 housing complete with rocker on/off switch to facilitate hood servicing. Vertical sash position shall be monitored by a string-pot  
26 type linear encoder. Upper and lower limits shall be re-programmable in the field if needed. Circuit board shall be equipped with  
27 an audible and visual alarm which will sound and illuminate if any one of the fans stops turning when needed. Down-flow fan  
28 control circuit board shall have integral monitoring with the following sequence of operation:

- 29  
30 -When sash is raised above upper limit (18") fans turn on, amber light turn on, intermittent alarm turns on.  
31 -If tachometer sensor for any of the fans shows zero rotation, constant alarm turns on, RED indicator lamp turns on and fault  
32 output relay closes.  
33 -continue monitoring fan rotation as long as sash is above upper limit - cancel alarm, red light and relay if all fans start spinning.  
34 -When sash is below upper limit (18") for more than 1 minute, turn off fans, stop monitoring fans.  
35 -if sash is between lower limit (1") and upper limit (18"), illuminate amber light  
36 -if sash is below lower (1") limit, illuminate green light  
37

38 In addition to the above, the down-flow fan controller shall have the following features:

- 39 -RED, AMBER AND GREEN panel mount indicator lights on hood side post  
40 -TTL level RS232 communications port for future use  
41 -0 to 5v analog output proportional to sash position  
42 -voltage-free relay output for remote monitoring of fault condition  
43 -Support for up to eight axial fan with tachometer monitoring for each  
44 -Microcontroller shall be replaceable for future software updates  
45 -Audible alarm shall be of the piezo type with a frequency of 4khz and a sound pressure level of 75 dbA measured 12" from the  
46 buzzer.  
47  
48

#### 49 SAFETY MONITOR AND ALARM SYSTEM

50 Reference fume hood services, fixtures and accessories.

#### 51 52 53 PERFORMANCE REQUIREMENTS

54 The fume hoods specified must meet the following performance requirements which is an owner modified version of the  
55 ASHRAE 110-1995 standard, Method of Testing Performance of Laboratory Fume Hoods. This test has already been



1 successfully completed by Mott, Hamilton, Flow Safe, Kewaunee and Labcrafters and so is not required for these three  
2 manufacturers unless there have been significant changes to the hood design since it was tested.  
3

4 The manufacturers will furnish the specified fume hoods in sizes scheduled on the drawings, the test facility, and ventilation  
5 equipment necessary to perform the specified tests. An owner designated, independent, third party testing firm will perform the  
6 testing at the manufacturer's site according to the following specifications. The test report will be prepared and submitted by the  
7 testing firm. All costs associated with the performance testing are to be included in the project bid.  
8

9 TEST FACILITY:

10 The manufacturer's test facility shall be sufficient size to provide similar conditions the fume hood will experience in normal as-  
11 used operating conditions. Provide make-up air and general exhaust system controls so that space pressure can be fluctuated  
12 between +0.015 inches w.c. to -0.015 inches w.c.  
13

14 TESTING EQUIPMENT:

15 Hot wire thermal anemometer probe equal to TSI Velocicalc 8384 and recently calibrated (within one year) by a certified facility  
16 or by ISA Certified Level III Technologist.  
17

- 18 • 30 second smoke bombs or titanium tetrachloride smoke sticks. Caution: Titanium tetrachloride is hazardous and skin  
19 contact or inhalation must be avoided.  
20
- 21 • Smoke machine, Comet 4 Colt or equal theatrical smoke generator.  
22
- 23 • Tracer gas: Industrial grade 3, sulfur hexa-flouride gas supplied from a cylinder.  
24
- 25 • Ejector system: Tracer gas ejector will be the same as outlined in ANSI/ASHRAE 110-1995 standard.  
26
- 27 • Critical orifice: Sized to provide tracer gas at eight liters per minute at an upstream pressure of 30 psig.  
28
- 29 • Detection instruments: Foxboro Miran IA, Foxboro Miran Sapphire, or equal. Calibration of analyzer must be  
30 performed at time of testing. Analyzer will be calibrated to 0 to 0.15 PPM full-scale range versus analyzer output.  
31
- 32 • Recorder with an accuracy better than plus or minus 0.05% of full scale, and be indicating recording at real time.  
33
- 34 • Three dimensional mannequin, overall height 67 inches, clothed in smock.  
35
- 36 • Cross flow fan consisting of a blower, plenum chamber and filters at outlet to produce steady flow. Blower speed shall  
37 be adjustable through a variac to produce variable flow rates from the cross flow fan.  
38
- 39 • Ten cardboard boxes each measuring 12 inches high x 9 inches wide x 8 inches deep used for fume hood loading  
40 during tracer gas containment tests.  
41

42 PRELIMINARY TEST AND DATA:

43 Provide a sketch of test room indicating room layout, hood and door locations, location of significant equipment including  
44 hood(s), test equipment and air supply system.  
45

46 Face velocity measurements:

47 Face velocity shall be determined by averaging a minimum of 12 readings at the hood face. Take readings at center of grid  
48 made up of sections of equal area across the top, center and bottom of the full sash opening. Each reading is recorded after a  
49 minimum 10 second duration at each point.  
50

51 Sash operation:

52 Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical  
53 rising sash holds at any height without creeping up or down.  
54

55 Exhaust airflow variations:

1 Monitor exhaust airflow with various vertical and horizontal sash positions from fully open to completely closed. Airflow must not  
2 vary more than 5 % between any positions.  
3

4 Fume hood static pressure drop:

5 The fume hood static pressure will be measured per ANSI/ASHRAE 41.3-1989 standard of pressure measurement, in the center  
6 of the exit plane 6 inches above the top plane of the collar. Static pressure shall not exceed 0.15 inches w.c. at 50 FPM sash  
7 face velocity through the fully open sash.  
8

9 Local Smoke Test:

10 Move smoke stick in a pattern smoke inside the fume hood along both inside walls and work surface in a line 6 inches behind  
11 and parallel to the hood face, and along the top of the face opening. Swab an 8 inch diameter circle on the back of the hood. All  
12 smoke should be carried to the back of the hood and exhausted.  
13

14 Test the operation of the bottom air bypass airfoil by running smoke under the airfoil.

15 If visible smoke flows out of the front of the fume hood, the hood fails the test.  
16

17 Large Volume Smoke Test:

18 Using the smoke machine, generate a pattern smoke inside the fume hood along both inside walls and work surface in a line 6  
19 inches behind and parallel to the hood face, and along the top of the face opening. All smoke should be carried to the back of  
20 the hood and exhausted.  
21

22 Test the operation of the bottom air bypass airfoil by running smoke under the airfoil.

23 If visible smoke flows out of the front of the fume hood, the hood fails the test.  
24

25 TRACER GAS CONTAINMENT TESTING:

26 Containment tests shall be performed statically and dynamically using an owner modified ANSI/ASHRAE 110-1995 method of  
27 testing performance of laboratory fume hoods as specified below.  
28

29 All containment testing shall be performed with the fume hood loaded with 12 inch long x 9 inch wide x 8 inch deep boxes. The  
30 boxes shall be arranged to sit on the 9x8 side. The configuration shall be five 9 inch wide boxes across and two rows high,  
31 centered in the fume hood. Spacing between the boxes will be approximately 2 inches. The back of the boxes shall be  
32 positioned approximately two inches in front of the fume hood baffles. Bottom boxes shall rest on the work surface and not be  
33 elevated above work surface.  
34

35 All static containment testing shall be performed with an induced 75 FPM cross draft. The cross draft plenum fan shall be  
36 arranged so the outlet of the plenum is even with one side of the fume hood and positioned 15 inches from the front of the sash.  
37 The cross draft velocity shall be measured at a single point behind the head of the mannequin, 18 inches from the closed sash.  
38

39 Containment testing shall be performed with the gas detector probe in the mannequin positioned at 26 inches above the work  
40 surface and also at 18 inches above the work surface.  
41

42 Fume hood shall at no time exceed a maximum spill above 0.05 PPM at 8.0 liter/minute tracer gas release. Fume hoods  
43 exceeding this spillage rate during the test procedure fail the test.  
44

45 Containment tests shall be conducted at full 27-1/2" vertically open sash at 50 FPM plus or minus 3 fpm average sash face  
46 velocity for the mannequin and ejector positions specified below.  
47

48 The gas ejector shall be installed in test positions per ANSI/ASHRAE 110-1995 guideline. For a typical bench type hood, three  
49 positions are required: left, center and right as seen looking into the hood. In the left position the ejector centerline shall be 12  
50 inches from the left inside wall of the hood. In the center position the ejector shall be equal distance from the inside sidewalls. In  
51 the right position the ejector centerline shall be 12 inches from the right inside sidewall of the hood. The ejector body shall be  
52 positioned 6 inches behind the hood face in all positions.  
53  
54  
55

1 Position the mannequin facing the front of the hood, centered on the ejector. Fix detector probe in the region of the nose and  
2 mouth of the mannequin. Installation shall insure that method of attachment of the probe does not interfere with the flow patterns  
3 around the mannequin. Perform tests with the detector probe 9 inches in front of the ejector (3 inches in front of sash) and 26  
4 inches above the work surface. Repeat the containment tests with the detector probe 9 inches in front of the ejector and 18  
5 inches above the work surface.

6  
7 Fume hoods shall pass the three position static tracer gas containment test in the manufacturer's test facility for both detector  
8 probe elevations. At no time can a peak spill exceed 0.05 PPM. Fume hoods exceeding this level fail the test.  
9

10 The mannequin shall be positioned in the center test position with the detector probe 9 inches in front of the ejector and 26  
11 inches above the work surface. The dynamic (SME) and (SPE) containment tests specified below shall be conducted and the  
12 results recorded. The tests will be repeated with the mannequin lowered so the detector probe is 9 inches in front of the ejector  
13 and 18 inches above the work surface. Record these results. At no time can a peak spill exceed 0.05 PPM. Fume hoods  
14 exceeding this level fail the test.  
15

16  
17 Sash Movement Effect (SME) dynamic containment test:

18 The ejector shall be located in the center test position and mannequin shall be positioned as specified in the preceding  
19 paragraph with the sash fully closed. The block valve shall be opened releasing 8 liters per minute SF6 gas. At thirty  
20 seconds, the sash shall be fully opened vertically in a smooth motion at a velocity between 1.0 ft/s and 1.5 ft/s. At  
21 sixty seconds, the sash shall be fully lowered in a smooth motion at a velocity between 1.0 ft/s and 1.5 ft/s. The cycle  
22 shall be repeated at thirty second intervals for the duration of the five minute. The sash movement effect (SME) is the  
23 maximum peak tracer gas concentration determined in the test. The sash movement performance rating of the hood  
24 shall be recorded as SME-AM yyy, where yyy equals peak sash movement effect concentration in PPM. At no time  
25 can a peak spill exceed 0.05 PPM.  
26

27 Space Pressure Effect (SPE) dynamic containment test:

28 The ejector shall be located in the center test position and mannequin shall be positioned as specified in the preceding  
29 paragraph with the sash at 27-1/2" full vertical opening. The block valve shall be opened releasing 8 liters per minute  
30 SF6 gas. The test chamber room shall be set for -0.05 inches w.c. pressure with the test room door closed. At thirty  
31 seconds, the test chamber door shall be abruptly opened in less than one second. At sixty seconds the test chamber  
32 door shall be abruptly shut in less than one second. The cycle shall be repeated at thirty second intervals for the  
33 duration of the five minute test. The space pressure effect (SPE) is the maximum peak tracer gas concentration  
34 determined in the test. The space effect rating of the hood shall be recorded as SPE-AM yyy, where yyy equals peak  
35 space effect concentration in PPM. At no time can a peak spill exceed 0.05 PPM.  
36  
37  
38  
39

#### 40 SUMMARY OF REQUIRED CONDITIONS FOR CONTAINMENT TESTING

- 41 Note: 1) All tests shall be conducted with a 27.5 inch high fully open sash.  
42 2) All conditions shall include loading fume hoods with boxes.  
43 3) A 75 FPM cross draft shall be induced across the fume hood face for all static tests (conditions 1  
44 through 6)  
45  
46

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Condition No.	Gas Sensor Height Above Work Surface	Mannequin Ejector Position	Test Type		Sash Face Velocity (FPM)
			Static	Dynamic	
1	26 inches	Center	Static		50
2	26 inches	Left	Static		50
3	26 inches	Right	Static		50
4	18 inches	Center	Static		50
5	18 inches	Left	Static		50
6	18 inches	Right	Static		50
7	26 inches	Center	Dynamic (SME)		50
8	26 inches	Center	Dynamic (SPE)		50
9	18 inches	Center	Dynamic (SME)		50
10	18 inches	Center	Dynamic (SPE)		50

**TEST REPORT:**

Provide three copies of final test report in a bound manual. Provide a cover page identifying the project title, location and UW project number. Performance test technician and witnesses shall sign and date the report.

For each fume hood type tested, the test report shall include the following:

- copy of the room layout sketch
- preliminary test data information and observations of smoke testing results.
- graphical results of concentrations for the duration of each test condition along with peak value of concentration for the duration of each test described in the summary above.
- recorded data from the analyzer results for each test condition.

The summary of containment test conditions specified above identifies the different parameters for each test condition. The report format shall reference each test condition specified above.

The summary of test conditions shall be conducted for each type and size of hood scheduled on the drawings.

**PART 3 - EXECUTION**

**INSTALLATION**

Assemble hood components into complete installation. Components include: work surface, pre-piped and pre-wired superstructure, cup sink.

Coordinate with base cabinet and casework installation. Coordinate fume hood installation with HVAC, plumbing and electrical services.

Install hoods plumb, level, rigid and securely anchored in accordance with manufacturer recommendations.

Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

Set cup sinks in work surfaces with using manufacturer recommended black, chemical resistant caulk. Set base cabinet vents the connect to fume hood.

Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations. Owner will install Vac Breaker. Owner will procure and install the required airflow monitor prior to the contractor install of fume hood.

**ADJUSTMENTS AND CALIBRATION**

Repair or remove and replace defective work, as directed by the Owner's Representative upon completion of installation.

1  
2 Adjust sash fixtures, accessories and other moving or operating parts to function smoothly.  
3  
4 Calibration of the fume hood monitor and alarm system will be done by the owner. Calibration shall take place either in  
5 conjunction with, or after the fume hood ventilation systems have been adjusted by the Division 23 testing and balancing firm.  
6 Alarm calibration shall include zeroing the monitor, calibration of reading through measurement, and setting high/low alarm set  
7 points.  
8  
9 Test each monitor and alarm to insure its proper operation.  
10  
11 Submit a calibration and test report at the completion of the work to document  
12  
13 **CLEANING**  
14 Clean finished surfaces, touch up as required and remove or refinish damaged or soiled areas, as  
15 acceptable to Architect/Engineer. Clean sashes and work surfaces free of smudges, dust and debris.  
16  
17 Vacuum clean the upper side of the fume hood to prevent debris from entering the work zone. This area shall be inspected and  
18 the manufacturer and installer required to provide clean up.  
19  
20 Protection: Advise Contractor of procedures and precautions for protection of materials and installed  
21 fume hoods from damage by work of other trades.  
22  
23 **PROTECTION OF FINISHED WORK**  
24 Provide all necessary protective measures to prevent damage to equipment from exposure to other construction activity.  
25  
26 Advise Contractor of procedures and precautions for protection of material and installed fume hoods from damage by work of  
27 other trades.  
28  
29 **CONSTRUCTION VERIFICATION**  
30 Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 11 08 00 in  
31 accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.  
32  
33 **FUNCTIONAL PERFORMANCE TESTING**  
34 The owner will certify the fume hood as ready for use utilizing the functional performance test forms supplied under specification  
35 Section 11 08 00 in accordance with the procedures defined for functional performance testing in Section 01 91 01 or 01 91 02.  
36  
37 **FIELD INSTALLED TESTING**  
38 After the fume hoods are installed and balanced and the HVAC system is balanced, the owner will provide standard ASHRAE  
39 110 testing of every fume hood.  
40  
41 **AGENCY TRAINING**  
42 All training provided for agency shall comply with the format, general content requirements and submission guidelines specified  
43 under Section 01 91 01 or 01 91 02.  
44  
45 **INSTRUCTIONAL SIGNAGE**  
46 The manufacturer shall provide their respective operating instruction sign on their fume hoods and shall also provide the safety  
47 instruction signs on their fume hoods.  
48  
49 Signage shall have solid red background with white lettering.  
50  
51 END OF SECTION  
52



- 1 A135.4 – Basic Hardboard.
- 2 Business and Institutional Furniture Manufacturers Association (BIFMA).
- 3 Environmental Protection Agency (EPA).
- 4 (Method 24) 40 CFR 59, Subpart D – National Volatile Organic Compound Emission Standards for
- 5 Architectural Coatings.
- 6 Factory Mutual (FM).
- 7 Forest Stewardship Council (FSC).
- 8 National Electrical Manufacturers Association (NEMA).
- 9 National Fire Protection Association (NFPA).
- 10 NFPA 30 - Flammable and Combustible Liquids Code.
- 11 NFPA 45 – Standards on Fire Protection for Laboratories Using Chemicals
- 12 Office of Safety and Health Administration (OSHA).
- 13 United States Department of Commerce, National Institute of Standards and Technology
- 14 Scientific Equipment and Furniture Association (SEFA).
- 15 SEFA Desk Reference.
- 16 Underwriters Laboratories (UL).

17

18 **PREINSTALLATION CONFERENCE**

19 Before Work begins, conduct conference at Project site to comply with requirements of applicable Division 01 Sections.

20 Required Attendees:

- 21 Owner.
- 22 Architect.
- 23 Contractor, including superintendent.
- 24 Installer, including project manager and supervisor.
- 25 Manufacturer/fabricator's qualified technical representative.
- 26 Installers of other construction interfaced with Work.

27 Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed  
28 procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited  
29 to, following topics:

- 30 Review Work requirements (Drawings, Specifications, and other Contract Documents).
- 31 Review required submittals, both completed and yet to be completed.
- 32 Review and finalize construction schedule related to Work and verify availability of materials,  
33 installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- 34 Review required inspection, testing, certifying, and material usage accounting procedures.
- 35 Review environmental conditions and procedures for coping with unfavorable conditions.
- 36 Resolve deviations or differences between Contract Documents and the manufacturer/fabricator's  
37 specifications.

38 Record discussions of conference, including decisions and agreements reached, and furnish copy of record  
39 to each party attending. If substantial disagreements exist at conclusion of conference, determine how  
40 disagreements will be resolved and set date for reconvening conference.

41

42 **COORDINATION**

43 Coordinate layout and installation of framing and reinforcements for lateral support of fume hoods, wall and tall  
44 cabinets.

45

46 Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.

47

48 **ACTION SUBMITTALS**

49 Product Data: Submit manufacturer's data for each item of laboratory furnishings and equipment. Include component  
50 dimensions, configurations, construction details, joint details, and attachments. Indicate location, size, and service  
51 requirement for each utility connection.

52

53 Shop Drawings: Include the following:

54 Location of assemblies in each room to include plans, elevations, sections, and attachment details. Include  
55 roughing-in information for mechanical, plumbing, and electrical connections.

56 Details of construction.

1 Details of connections between units and to adjacent work.  
2 Indicate details for anchoring laboratory casework and fume hoods to permanent building construction  
3 including locations of blocking and other supports. Include calculations demonstrating that anchorages  
4 comply with seismic performance requirements.  
5 Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory  
6 equipment. Indicate clearances from the above items  
7 Location and size of holes and cutouts.  
8 Dimensional locations for rough-in of mechanical and electrical services.  
9 Molded epoxy resin tops jointing pattern.  
10 Include coordinated dimensions for laboratory equipment specified in other Sections.

11  
12 **Samples:**  
13 Submit Samples which conform to specified requirements, including construction and finishes. Samples will  
14 be retained for comparison with Work fabricated and will be returned upon completion of the Contract.  
15 Submit the following Samples for approval:  
16 Casework: Metal finish, service fixture finish, and work tops.  
17 Fume Hoods: Exterior finishes, interior lining, and work tops.  
18 One full size combination drawer and cupboard base cabinet with all hardware.

19  
20 **Keying Schedule:** Include schematic keying diagram, and index each key set to unique designations that are  
21 coordinated with the Contract Documents.

22  
23 **Delegated-Design Submittal:** Refer to Section 013573 "Delegated Design Requirements and Procedures" for  
24 delegated design submittal procedures and requirements.  
25 Provide delegated-design submittals for seismic restraints for laboratory casework and fume hoods.

## 26 27 **INFORMATIONAL SUBMITTALS**

28 **Manufacturer's Project Acceptance Document:** Certification by the manufacturer that its product(s) are approved,  
29 acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or  
30 required, and that a warranty will be issued.

31  
32 **Qualification Data:** For manufacturer/fabricator, installer and professional engineer.  
33 For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and  
34 experience. Include lists of completed projects with project names and addresses, names and addresses of  
35 Architects and Owners, and other information specified.  
36 Architect may waive submittal of qualification data for available manufacturers listed in this Section.

37  
38 **Test Reports:** Submit test reports verifying conformance to specified performance tests.

39  
40 **Field Quality Control Reports:** Written report of testing and inspection required by "Field Quality Control".

## 41 42 **CLOSEOUT SUBMITTALS**

43 Furnish maintenance instructions and complete touchup kit for each type and color of laboratory paint finish provided.  
44 Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged casework and  
45 fume hood finishes.

46  
47 **Operation & Maintenance Manuals:** Provide complete written instruction manuals outlining safe operating procedures,  
48 safety guidelines, and proper maintenance procedures for equipment and fume hoods.

49  
50 **Warranty:** Provide manufacturer's written warranty covering materials and installation (labor) stating obligations,  
51 remedies, limitations and exclusions.

52  
53 **Receipts:** Furnish receipts for keys and other loose items.

## 54 55 **QUALITY ASSURANCE**

56 **Single Source Responsibility:** Provide casework, work surfaces, laboratory furnishings, and accessories, all furnished



1 by a single laboratory furniture company.  
2 Manufacturer/Fabricator Qualifications: Manufacturer/fabricator with not less than 10 years experience with successful  
3 production of products and systems similar to scope of this Project, with a record of successful in-service performance  
4 and completion of projects for a period of not less than 10 years, and with sufficient production capability, facilities, and  
5 personnel to produce required Work.  
6 Modern plant with proper tools, dies, fixtures, and skilled production staff to produce high quality laboratory  
7 casework and equipment, and shall meet the following minimum requirements:  
8 10 years or more experience in manufacture of laboratory casework and equipment of type  
9 specified.  
10 10 installations of equal or larger size and requirements.  
11  
12 Installer Qualifications:  
13 Experience: Installer with not less than 10 years experience in performing specified Work similar to scope of  
14 this Project, with a record of successful in-service performance and completion of projects for a period of not  
15 less than 10 years, and with sufficient production capability, facilities, and personnel to produce required  
16 Work.  
17  
18 Supervision: Installer shall maintain a competent supervisor who is at Project during times specified Work is  
19 in progress, and, who is experienced in installing systems similar to type and scope required for Project.  
20  
21 Manufacturer/Fabricator Acceptance: Installer shall be certified, approved, licensed, or acceptable to  
22 manufacturer/fabricator to install products.  
23  
24 Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of  
25 manufacturer with minimum of 10 years experience in providing recommendations, observations, evaluations, and  
26 problem diagnostics. Sales representatives are not acceptable.  
27  
28 Mock-ups: Prior to fabrication and installation, provide a laboratory mock-up where indicated on drawings. Location  
29 may be changed to meet construction phasing with approval of Architect. Components utilized meet the requirements  
30 of the Drawings and Specifications. The purpose of the mock-up is to verify designs and confirm or modify the  
31 sequence of installation between the various trades. Approved mock-up serves as the standard of quality against  
32 which the remaining laboratory work is measured. Build mock-up to comply with the following requirements, using  
33 materials indicated for the completed Work:  
34  
35 Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect.  
36 Contractor shall provide structural support framework.  
37 Provide laboratory casework and furnishings. Furnishings, such as the fume hood, must be  
38 installed, complete with fixtures and accessories, but does not need to be operational.  
39  
40 Provide plumbing pipe, valves, fittings, and accessories required to make connections to complete  
41 the laboratory mock-up. Fixtures and furnishings are not required to be operational, but must be  
42 installed to review and ensure proper coordination.  
43  
44 Provide electrical systems in conjunction with the laboratory mock-up. Power receptacles, raceway,  
45 data back boxes and conduit must be installed, but do not need to be operational. Lighting to be  
46 fully operational.  
47  
48 Connections to the laboratory furnishings are required, but the systems do not need to be operational.  
49  
50 Clean exposed faces of mock-up.  
51  
52 Notify Architect fourteen days in advance of the dates and times when mock-up will be installed and ready for  
53 review.  
54  
55 Make such changes and alterations to mock-up as may be discussed, agreed upon, and documented in  
56 writing resulting from the review. Modifications to the mock-up that are agreed upon in writing will be

1 incorporated into the overall design of the project without change in contract sum. Obtain  
2  
3 Architect's acceptance of mock-up before starting fabrication.  
4  
5 Maintain mock-up during construction in an undisturbed condition as a standard for review of the completed  
6 Work.  
7  
8 Acceptance of mock-up does not constitute acceptance of deviations from the Contract Documents  
9 contained in mock-up unless such deviations are specifically noted by Contractor, submitted to Architect in  
10 writing, and accepted by Architect in writing.  
11

12 Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.  
13

#### 14 **DELIVERY, STORAGE, AND HANDLING**

15 Schedule delivery of casework and equipment so that spaces are sufficiently complete that material can be installed  
16 immediately following delivery.  
17

18 Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film  
19 or other protective coating. Protect all work surfaces from damage throughout construction period. Do not allow  
20 standing on work surfaces during the construction period. Provide signage marked in large lettering that reads: "NO  
21 STANDING".  
22

#### 23 **FIELD CONDITIONS**

24 Do not deliver or install equipment until the following conditions have been met:

25 Building areas requiring the installation of laboratory casework: Dry and unexposed to adverse weather  
26 conditions which may damage finished materials.  
27

28 The air conditioning or heating system: On and functioning in areas of casework installation to maintain the  
29 temperature between 60 and 85 degrees Fahrenheit (16 and 30 degrees Celsius) with the relative humidity  
30 between 45 percent and 65 percent.  
31

32 Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions  
33 by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication  
34 schedule with construction progress to avoid delaying the Work.  
35

#### 36 **SEQUENCING AND SCHEDULING**

37 All overhead mechanical, electrical and plumbing rough-in work: Complete prior to laboratory casework deliveries.  
38

39 All mechanical, electrical and plumbing rough-in work required along walls and service islands, where lab furnishings  
40 are to be installed: Complete prior to delivery of materials.  
41

42 Walls and partitions must be in place and finished with at least the primer coat of paint. If finish painting is to take place  
43 after lab casework and furnishings installation, protect the casework and furnishings by covering and masking prior to  
44 commencement.  
45

46 All necessary wood or metal blocking must be done by the trade involved with wall erection and installed within  
47 partitions prior to delivery of casework and furnishings.  
48

49 Overhead soffits and ceiling grid must be in place prior to casework installation.  
50 Overhead lighting must be installed and connected prior to casework installation.  
51

52 All flooring required to be placed under lab casework and furnishings must be installed prior to material delivery.  
53

54 Concrete floors must be level within 1/8 inch (3 mm) of level per 10 foot (3 m) run, nonaccumulative, when tested with  
55 a straight edge in any one direction.  
56

1 Wet operations to be performed must be complete prior to material deliveries.

2  
3 **WARRANTY**

4 Manufacturer's Warranty: Furnish manufacturer's written material and labor warranty signed by an authorized  
5 representative using manufacturer's standard form agreeing to furnish materials and labor required to repair or replace  
6 work which exhibits material defects caused by manufacture or design and installation of product. "Defects" is defined  
7 to include but not limited to deterioration or failure to perform as required.

8 Warranty Period: Manufacturer shall warrant the products to be free from material and labor defects for a  
9 period of 1 year from date of operational acceptance by the Using Agency.

10  
11 Date of operational acceptance shall be after factory check, test and start-up services is complete, the unit is  
12 operating in a satisfactory manner, and the equipment has been satisfactorily commissioned by the Using  
13 Agency.

14  
15 The Using Agency will perform routine maintenance as described in the Manufacturers Standard Operation  
16 and Maintenance manuals during the warranty period. Using Agency performance shall in no way invalidate  
17 said warranties.

18 Installer's Warranty: Furnish installer's written workmanship warranty signed by an authorized representative using  
19 installer's standard form agreeing to provide labor required to repair or replace work which exhibits workmanship  
20 defects. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

21 Warranty Period: Installer shall warrant the installation to be free from workmanship Defects for a period of 1  
22 year from date of operational acceptance by the Using Agency.

23  
24  
25 **PART 2 – PRODUCTS**

26  
27 **MANUFACTURERS AND PRODUCTS**

28 Acceptable Manufacturers/Fabricators and Products: Subject to compliance with requirements of Contract Documents  
29 as judged by the Architect, provide product by one of manufacturers/fabricators listed. If not listed, submit as  
30 substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".

31 Air Master Systems Corporation.  
32 Kewaunee Scientific Corporation  
33 Bedcolab, Ltd.  
34 Mott Manufacturing Limited; Altus.

35  
36 Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a  
37 standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be  
38 considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the  
39 Architect.

40  
41 Furnish and install casework, fume hoods, furnishings and equipment specified in the following sections by the same  
42 supplier.

43 [115313 – Laboratory Fume Hoods](#)  
44 [123553.03 – Adaptable Laboratory Casework Systems](#)  
45 [123553.13 - Metal Laboratory Casework.](#)  
46 [123553.16 – Plastic Laminate Casework.](#)  
47 123553 – General Requirements for Laboratory Casework and Fume Hoods  
48

49  
50 **PERFORMANCE REQUIREMENTS**

51 Contract Documents Design Intent: Drawings and Specifications indicate design intent for products and systems and  
52 do not necessarily indicate or specify total Work required and shall not be construed as an engineered design. Furnish  
53 and install all Work required for a complete installation.

54  
55 Coordination of Contract Documents and Work:

56 Product Variations: In the event of minor differences between products and systems of acceptable or

1 available manufacturer/fabricators, Contractor shall notify Architect of such differences and resolve conflicts  
2 in a timely manner. Failure of Contractor to provide notification shall be construed as acceptance of  
3 conditions indicated, and changes caused by minor differences between products and Contract Documents  
4 shall be included in the Work at no additional cost to Owner.  
5

6 Allowable Adjustments: Minor dimension and profile adjustments may be made in interest of fabrication or  
7 erection methods or techniques or ability to satisfy design intent, provided design intent is maintained as  
8 determined by Architect. Proposed deviations shall include a detailed analysis of impact to adjacent  
9 substrates or other building systems, including related design or construction cost impacts. If accepted by  
10 Architect, deviations causing changes in materials, constructability, substrates, or conditions shall be  
11 included in the Work at no additional cost to Owner.  
12

13 Material properties indicated in this Section shall be considered as minimum properties.  
14

15 **CASEWORK, GENERAL**

16 Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing  
17 agency, and marked for intended location and application.  
18

19 **MATERIALS**

20 Sheet Steel: ASTM A1008 /1008M mild steel, cold-rolled, pickled, double annealed, and free from rust, scales, deep  
21 scratches, buckles, ragged edges, and other defects. Provide metallic furniture stock sheets.  
22

23 ~~Stainless Steel:~~

24 ~~Type: Unless otherwise noted on Drawings or elsewhere in this Section, provide Type 304; ASTM~~  
25 ~~Specification Number A240/240M; stainless steel for tops, sinks, umbilical collar, shelves, and casework;~~  
26 ~~gage as indicated on Drawings.~~  
27

28 ~~Finish: Exposed surfaces ground and polished to a Number 4 satin finish. Provide Type 304 with a tumbled~~  
29 ~~finish approximating a Number 4 finish for nuts, screws, bolts, and rivets. Provide the grain finish direction as~~  
30 ~~follows:~~

- 31 ~~Vertical on door and drawer fronts~~
- 32 ~~Vertical on tall storage cabinets door fronts and end panels.~~
- 33 ~~Horizontal on all other exterior surfaces.~~

34 ~~Welding: Provide all stainless steel welding material of type similar to sheet material. Provide welds made~~  
35 ~~without discoloration; ground, polished, and passivated to blend harmoniously with a Number 4 satin finish.~~  
36  
37

38 Metal Gages for Sheet Steel and Stainless Steel:

39 Construct metal cabinets of sheet steel with minimum thickness in U.S. standard gage (mm) as follows:  
40

Corner gussets for leveling bolts	11 gage (3.2 mm)
Apron corner braces, wall rail systems	12 gage (2.7 mm)
Drawer support, hinge reinforcement, reinforcing gussets	14 gage (1.9 mm)
Horizontal rails and top rails, aprons, support struts, adjustable wall and island shelving, shelving hat channels	16 gage (1.5 mm)
Cabinet tops, end panels, bottoms, backs, toespace rails, security panels, vertical posts, vertical dividers, glazed doors, scribe strips, filler panels	18 gage (1.2 mm)
Door Panels	18 gage (1.2 mm) exterior 20 gage (0.9 mm) interior
Enclosures, drawer fronts and bodies, pull-out tablet fronts and bodies, cabinet shelving, closure panels, overhead service carriers	20 gage (0.9 mm)

41

42 Plastic Laminate:

43 Grade VGP: For horizontal surfaces. High pressure decorative laminate, laboratory grade, chemically resistant,

1 meeting or exceeding NEMA Standard LD 3 Grade VGP. Low glare, finely ground textured finish with gloss  
2 reading of 12.  
3 Grade VGS: For vertical surfaces. High pressure decorative laminate, finely ground textured finish, meeting or  
4 exceeding NEMA Standard LD 3, Grade VGS.  
5 Grade BKL: Backing sheets. High pressure phenolic meeting or exceeding NEMA Standard LD 3, Grade BKL.  
6 Grade VGL: Cabinet liner. Thermo fused melamine resin, polyester thermo fused or a melamine impregnated foil with  
7 an acid catalyzed lacquer finish, laminated to a sanded core material under pressure and heat. Finely ground  
8 textured finish. Liner shall meet or exceed NEMA Standard LD 3, Grade VGL.  
9 Grade CLS: High pressure cabinet liner. High pressure decorative laminate, finely ground textured finish, meeting or  
10 exceeding NEMA Standard LD 3 Grade CLS.  
11 Core Material:  
12 a. Particleboard: ANSI A208.1, Grade M-2.  
13 a. Exterior-Glue Particleboard: ANSI A208.1, Grade M-2, Exterior glue.  
14 Laminate Adhesives: Bond laminate to core with a liquid polyvinyl acetate adhesive at temperatures above 60 degrees  
15 F at a pressure no less than 15 pounds per square inch. Laminate and core material; laminated and cured in  
16 a controlled environment between 40 percent and 60 percent relative humidity.  
17 Edgebanding: High grade PVC edging applied, under heat and pressure, by edge banding machine with hot  
18 melt waterproof adhesive of same color as edging. Trim and buff smooth with all edges and corners radiused.  
19

#### 20 Epoxy Resin Sheets:

21 Molded from modified epoxy resin that has been compounded and cured to provide optimum physical and  
22 chemical resistance required of a heavy duty laboratory working surface. Uniform mixture throughout, not  
23 dependent on a surface coating.

#### 24 Physical Properties:

25 Compressive Strength (ASTM D695): 30,600 psi (211,000 kPa).  
26 Flexural Strength (ASTM D790): 12,800 psi (88,200 kPa).  
27 Tensile Strength (ASTM D638): 10,100 psi (69,600 kPa).  
28 Heat Distortion (ASTM D648): 330 degrees Fahrenheit (165 degrees Celsius).  
29 Water Absorption (ASTM D570): 0.018 percent.  
30 Hardness, Rockwell M (ASTM D785): 108.  
31 Fire Resistance (ASTM D635): Self Extinguishing.  
32 Nonporous surface and edges.  
33 Microbial Characteristics: Will not support micro-organic growth.  
34  
35

#### 36 Glass:

37 Laminated safety glass: Two outer plies of glass with a vinyl interlayer, nominal 1/4 inch (6 mm) thick.  
38 Tempered safety glass: Heat treated glass, nominal 1/8 inch (3 mm) thick with a minimum of 88 percent  
39 clarity.

#### 40 Sealant:

41 Epoxy sealant: two-component epoxy compound.  
42 Silicone sealant: one-part water base silicone sealing compound, in custom color matching color of surface  
43 to be sealed, Dow Corning 732 RTV or General Electric SCS 1200.  
44

#### 45 **HARDWARE**

46 Drawer and Hinged Door Pulls: 3/8 inch (10 mm) diameter stainless steel wire pull, 4-3/4 to 5-1/16 inches (120 mm to  
47 128 mm) center to center with radiused corners and a projection of 1 inch to 1-1/2 inches (25 mm to 40 mm). Model  
48 115.61.602 as manufactured by Hafele America, Lamp Model SST-30L as manufactured by Sugatsune America, Inc.,  
49 Model 1.381.128 as manufactured by Ironmonger Inc., or Model DP57C as manufactured by Mockett.  
50

51 Drawer and Hinged Door Pulls: 3/8 inch (10 mm) diameter stainless steel bow wire pull, 4-3/4 to 5 inches (120 mm to  
52 128 mm) center to center with radiused corners and a projection of 1 inch to 1-1/2 inches (25 mm to 40 mm). Model  
53 DP33B as manufactured by Mockett, or Model SS Bow 128 as manufactured by Schaub & Company.

54 Provide with a clear abrasion and acid resistant coated finish.

55 Provide with an abrasion and acid resistant powder coated finish with color selection by Owner's  
56 Representative.

57 Mount door pulls vertically and drawer pulls horizontally.

58 Provide drawers 28 inches (710 mm) wide and smaller with one pull per drawer face at centerline of cabinet.

1  
2 Drawer and Pullout Shelving Slides:  
3 Description: Full extension, ball bearing, rail mounted, multimembered slides fabricated of minimum 16 gage  
4 (1.6 mm) steel with an electro-zinc finish.  
5 Acceptable Manufacturers:  
6 Accuride International Incorporated, Santa Fe Springs, California  
7 CompX Precision Slides, Waterloo, Ontario Canada  
8 Knappe and Vogt, Grand Rapids, Michigan  
9 Drawer and Pullout Shelving Slide Ratings:  
10 Drawer Width: 0-24 inches (0-610 mm) Maximum dynamic load rating 100 pounds (45 kg)  
11 Drawer Width: Over 24 inches (610 mm) Maximum dynamic load rating 200 pounds (90 kg)  
12  
13 Slides shall have progressive movement with a positive stop at full extension or at a minimum 1 inch (25 mm) over  
14 travel and permit removal of drawer without use of tools. Drawers shall not lift out or otherwise be removable without  
15 the release of a locking device on each slide.  
16  
17 Dynamic Load Rating: Slides meet BIFMA "Business Institutional Furniture Manufacturers Association" Standards.  
18 0.017 pounds per cubic inch at full travel plus or minus 1/4 inch for 50,000 cycles.  
19  
20 Pull-out Shelf Bumper: Provide on hinged side of pull-out shelf.  
21 Basis of Design: Bainbridge Manufacturing, Inc., Part Number 1934.  
22  
23 Hinges:  
24 Description: Institutional type, 5-knuckle, projecting barrel, minimum 2-1/2 inches (60 mm) long. Hinges for  
25 wood cabinets to have a wraparound design and slotted screw holes for adjustability.  
26 Material: Type 304 stainless steel, minimum 0.095 inches (2.4 mm) thick.  
27 Provide minimum of 2 hinges for doors under 48 inches (1200 mm) high; minimum of 3 hinges for doors 48  
28 inches (1200 mm) to 84 inches (2130 mm) high; and minimum of 4 hinges for doors over 84 inches (2130  
29 mm) in height.  
30 Mounting: Drill each leaf for screw attachment to door and frame. Use stainless steel flathead screws.  
31  
32 Door Catches: Roller or magnetic type, adjustable, roller type operating with a built-in tension spring. Provide all parts  
33 of cadmium plated steel except roller. Attach to top of base cabinet doors, the bottom of wall cabinet doors, and at the  
34 top and bottom of tall cabinet right-hand doors. Provide a vertical sliding bolt assembly, astragal strip and dummy pull  
35 for the left-hand door of tall cabinets. Vertical sliding bolts; concealed in the stiles of glazed doors and between pans of  
36 solid doors to engage stainless steel keepers.  
37  
38 Shelf clips: Die formed steel, zinc plated or polycarbonate clip with grooved plug and spring clip. Provide shelf clips  
39 adjustable on 1-1/4 inch (32 mm) centers and meet seismic requirements. For metal cabinets shelf adjustment holes  
40 are on nominal 1/2 inch (12 mm) centers.  
41 Locks:  
42 Provide with all base.  
43 Provide with all chemical storage cabinets.  
44 Unless otherwise directed, key locks differently within a room, differently between rooms. Provide Master key  
45 per Department with a Grandmaster for the building.  
46 Description: 5-pin tumbler, heavy duty cylinder cam lock type.  
47 Acceptable Manufacturers:  
48 CompX National, Greenville, South Carolina.  
49 Corbin, Berlin, Connecticut.  
50 Best Lock Corporation, Indianapolis, Indiana.  
51 Illinois Lock Company, Wheeling, Illinois.  
52 Finish: Exposed surfaces of locks shall match other casework hardware.  
53 Keying: Capacity for 2000 primary key changes. Master key 1 level with built-in flexibility to accommodate, if  
54 required, 3 levels; 1 Grandmaster, 59 Master groups and 70 Submaster groups with 13 primary changes  
55 under each.  
56 Keys: Stamped brass available from manufacturer or local locksmith, and supplied in the following quantities

1 unless otherwise specified:  
2 2 for each keyed different lock.  
3 3 for each group keyed alike locks.  
4 2 for master keys for each system.  
5 Provide controlled key blanks and registered key plan.  
6 Label Holders: Formed steel with satin chrome finish, 3-1/2 inch wide by 1-1/2 inch high (90 mm wide by 36 mm high),  
7 to accept card size of 2-3/4 inch wide by 1-1/4 inch high (70 mm wide by 32 mm high), screw installed.  
8  
9 Leveling Glides: 2 inch (48 mm) diameter, two-piece pivot construction, steel housing, non-marring, phenolic or  
10 translucent plastic insert, 1/2 inch (12 mm) diameter, minimum 1-1/2 inch (36 mm) long zinc plated stems.  
11  
12 Casters - Swivel Type: 4 inch (100 mm) overall height, with wheel lock. Provide minimum load rating of 300 pounds  
13 (136 kg) per caster.  
14 Basis of Design: Payson Model 050-3UM WK.  
15  
16 Table Leg Shoes: 2-1/2 inch (63 mm) high vinyl with bottom covered, color to match base selected by the Architect for  
17 the room finish.  
18  
19 Anti-Tip Interlock: Provide in all mobile cabinets with drawers and adjustable pullout shelves. Provide with snapper  
20 actuator, lockbar, adjustable locking pins, drawer wedges, lockbar retainers, and wedge lock.  
21 Basis of Design: CompX Timberline, System 350.  
22  
23 Drawer Protection and Identification Plate: Plate, Type 304 stainless steel, 16 gage with a number 4 finish. Attach plate  
24 to drawer with flathead stainless steel screws countersunk at each corner. Engrave each plate with 1/2 inch high  
25 numbering. Numbering selected by the Owner's Representative. Padlock eyes, Type 304 stainless steel, 12 gage with  
26 a number 4 finish. Padlock provided by Owner.  
27  
28 **UNDER-COUNTER CORROSIVE and/or base STORAGE CABINETS (METAL)**  
29 Design: Construct cabinets in accordance with OSHA Regulations and the requirements of International Fire Code,  
30 Chapter 50 Hazardous Materials. Provide cabinets Factory Mutual (FM) approved or Underwriters Laboratories (UL)  
31 listed.  
32  
33 Casing: Bottom, top, back, door, and sides of cabinet shall be at least 18 gage (1.2 mm) sheet steel, double walled  
34 with 1 1/2 inch (36 mm) air space. Joints shall be welded airtight. Provide with adjustable zinc plated leveling legs.  
35  
36 Door: Provide with continuous piano hinge and a 3 point latching arrangement with door sill raised at least 2 inches (50  
37 mm) above the bottom of the cabinet to retain spilled liquid within the cabinet. When more than 1 door is used, there  
38 shall be a rabbetted overlap of not less than 1 inch (25 mm). Provide self-closing, self-latching door(s) with fusible  
39 link(s) to hold doors wide open and melt at 165 degrees Fahrenheit (73.8 Celsius) for automatic closure. Provide with  
40 keyed lock.  
41  
42 Ventilation: Provide a 2 inch (50 mm) polypropylene vent pipe at the outside rear of the cabinet with 2 inlets, 1 high and  
43 1 low. Extend vent pipe to 4 inches (100 mm) above the hood work surface.  
44  
45 Shelving: Provide each cabinet with a full width adjustable shelf.  
46 Liner: Provide cabinet with ChemCor thermoplastic coating on all interior surfaces as provided on the Justrite Centura  
47 line, or similar.  
48  
49 Bottom Pan: Provide with 1/4 inch (6 mm) thick heat welded, polypropylene or ABS plastic pan, liquid tight, removable,  
50 1 inch (25 mm) deep.  
51  
52 Hardware: All exposed to outside and inside of cabinet shall be Stainless Steel.  
53 Finish: Provide as specified for Metal Finish in this section.  
54  
55 **ADJUSTABLE HEIGHT TABLES - METAL LEG FRAME**  
56 Perimeter rails: 2 inches by 2 inches by 12 gage (50 mm by 50 mm by 2.7 mm) steel channel with a continuous inner

1 reinforcement U-channel. Spot weld inner reinforcement channel approximately 12 inches (300 mm) on center,  
2 staggering weld on each side.  
3  
4 Reinforcing cross rails: 2 inches by 2 inches (50 mm by 50 mm) by 16 gage steel C-channel. Attach to front and back  
5 perimeter rails at intervals not more than 33 inches (840 mm) on center.  
6  
7 Legs: 2 inches by 2 inches (50 mm by 50 mm) by 16 gage steel tube with welded leg bracket. Attach legs with 2 bolts  
8 to front and back perimeter rails and welded to end perimeter rails. Provide each leg with a recessed leveling glide.  
9  
10 Stretcher rails: 2 inches by 2 inches by 16 gage steel tube. Connect by welding between two end legs and between  
11 two back legs.  
12  
13 Casters: Provide swivel type with retractable integral leveling glide and lock.  
14  
15 Finish: Finish as specified for Metal Finishes under this section.  
16  
17 Tops: As specified for Work Surfaces under this section.  
18

## 19 FINISHES

### 20 Metal Finishes:

21 Finish casework, casework support structure, fume hood super-structure and other laboratory furnishings.

22 Preparation: Spray clean metal with a heated cleaner / phosphate solution, pretreat with iron phosphate  
23 spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to  
24 application of finish.

25 Application: Electrostatically applied epoxy or urethane powder coat painting process that coats all hidden  
26 and exposed surfaces with an acid and abrasion resistant coating. Bake in a controlled high temperature  
27 oven to ensure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory  
28 furniture quality finish of the following thicknesses:

29 Exterior and interior surfaces exposed to view: 1.5 mil average and 1.2 mil minimum.

30 Backs of cabinets and other surfaces not exposed to view: 1.0 mil average.

31 Finish drawer bodies in matching or harmonizing color and apply corrosion resistant treatment to  
32 selected, concealed interior parts.

33 Color: Select from standard colors.

### 34 Metal Finish Performance Requirements:

35 Abrasion Resistance: Maximum weight loss of 5.5 mg per 100 cycle when tested on a Taber  
36 Abrasion Tester Number E40101 with 1000 gm wheel pressure and Calibrase Number CS10  
37 wheel.

38 Hardness: Surface hardness equivalent to 4H or 5H pencil.

39 Humidity Resistance: Withstand 1,000 hour exposure in saturated humidity at 100 degrees  
40 Fahrenheit (38 degrees Celsius).

41 Moisture Resistance: No visible effect to surface finish after boiling water trickled over test panel  
42 inclined at 45 degrees Fahrenheit for 5 minutes. No visible effect to surface finish following 100  
43 hour continuous application of a water soaked cellulose sponge, maintained in a wet condition  
44 throughout the test period.

45 Adhesion: Score finish surface of test panel with razor blade into 100 squares, 1/16 inch by 1/16  
46 inch (1.6 mm by 1.6 mm), cutting completely through the finish but with minimum penetration of the  
47 substrate, and brush away particles with soft brush. Minimum 95 squares shall maintain their finish.

48 Salt Spray: Withstand minimum 200 hour salt spray test, conforming to ASTM B117-59 procedure.

### 49 Plastic-Laminate-Clad Finish

50 Exposed: Low glare, finely ground textured finish with gloss reading of 12. Color selection by the Owner's  
51 Representative.

52 Cabinet Liner Color: Color selection by the Owner's Representative

53 Edgebanding Color: Color selection by the Owner's Representative.

### 54 Plastic-Laminate-Clad Finish Performance Requirements:

55 Cleaning resistance: 70% Ethanol, 5-10% Bleach, Lysol  
56



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
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**WORK SURFACES**

Epoxy Resin:

Available Manufacturers:

- American Epoxy Scientific, LLC.
- Durcon, a Wilsonart Company
- Kewaunee Scientific Corporation

Thickness: 1 inch (25 mm) thick unless otherwise noted on Drawings. Check thickness before fabrication. Each corner of top shall not deviate more than plus or minus 1/32 inch (1.5 mm) from nominal.

Warpage: Check top for warpage before fabrication. Place slab on a true plane formed by a surface plate of Tool Room Grade B or better. Measure in unrestrained condition. Top will be accepted for use if there is no gap exceeding 1/16 inch (1.5 mm) in a 36 inch (0.9 m) span or 3/32 inch (2.5 mm) in a 96 inch (2.4 m) span.

Fabrication:

Provide in longest practical lengths. Bond all joints with a highly chemical and corrosion resistant cement having similar properties as the base material. Provide a 1/8 inch (3 mm) wide drip groove on underside of all exposed edges set back 1/2 inch (12 mm) from edge of top. Finish exposed edges.

Size Tolerances: Length, plus or minus 1/8 inch (3 mm). Width, plus or minus 1/16 inch (1.5 mm).

Squareness: Plus or minus 1/64 inch (0.4 mm) for each 12 inches (300 mm). A top spanning 48 inches (1.2 m); held to plus or minus 1/16 inch (1.5 mm).

Location Of Cutouts And Drillings: Plus or minus 1/8 inch (3 mm).

Sizes Of Cutouts And Drillings: Plus 1/8 inch (3 mm), minus 0.

Curbs: Supply loose for field application. Provide curbs 4 inches (100 mm) high by 3/4 inches (19 mm) thick unless otherwise indicated on Drawings. Where tops abut wall, casework, or fume hood, supply an end curb. Caulk joints between curb and walls, fume hoods, and cabinets with acid-resistant silicone caulk.

Color: Manufacturer's standard black color.

**SINKS**

Epoxy Resin Sink:

Available Manufacturers:

- American Epoxy Scientific, LLC.
- Durcon, a Wilsonart Company.
- Or equal, (no known equal).

Description: Integrally molded from modified thermosetting black epoxy resin, and oven cured. Minimum wall thickness of 1/2 inch (12 mm) with all interior corners coved to 1-1/2 inch (36 mm) radius and bottoms pitched to end outlet opening.

Sink mounting methods:

Drop-in: Supported by an upper flange from the work surface. Top edge of sink positioned 1/8 inch (3 mm) below the work surface with a 30 degree bevel from the top of the work surface to the top of the sink lip. Joint between sink and work surface shall not exceed 1/8 inch (3 mm) plus or minus 1/16 inch (1.5 mm). Seal joint between sink and top with epoxy sealant.

Under Mount: Support sink at bottom using an upper direction compression support system. Seal joint between top and sink with silicone sealant.

Provide sink with the following accessories:

Outlet: 1-1/2 inch (36 mm) NPS.

Overflow: Open end overflow standpipe. Overflow to be 2 inches (50 mm) shorter than depth of sink.

Strainer: Removable disc strainer.

Tailpiece: Town & Country Plastics Model PP-18, R&G Sloane Part Number 7218; or Scientific Plastics Company, Inc., Part Number W81595-158.

Epoxy Resin Rectangular Cupsink:

Manufacturers:

- American Epoxy Scientific, LLC.
- Durcon, a Wilsonart Company.
- Or equal, (no known equal).

1 Description: 4-3/8 inches by 13-3/4 inches by 5-7/16 inches (105 mm by 350 mm by 140 mm) ID with a  
2 minimum wall thickness of 3/8 inch (9 mm). Integrally molded from modified thermosetting black epoxy resin,  
3 oven cured. Cove corners and pitch bottom to outlet opening.  
4 Provide sink with the following accessories:  
5 Removable Splash Guard: Type 316 stainless steel, 1/8 inch (3 mm) diameter rod perimeter frame  
6 with 0.028 wire diameter 8 by 8 mesh per square inch (645 mm) screen. Spot weld screen to  
7 frame. Provide 1-1/2 inch (38 mm) opening at each end for hose/tube pass through.  
8 Strainer: Removable disc strainer.  
9 Tailpiece: Town & Country Plastics Model PP-18; R&G Sloane Part Number 7218; or Scientific  
10 Plastics Company, Inc., Part Number W81595-158.  
11

## 12 **LABORATORY SERVICE FIXTURES**

### 13 **General:**

14 Installation: Provide and install at point of use all service fixtures. Connect to the service piping systems  
15 specified in Division 22. Provide the product of one manufacturer for all laboratory service fixtures, including  
16 fixtures supplied with fume hoods and emergency shower and eye wash units. Provide all fixtures designed  
17 for laboratory use and comply with SEFA 7.  
18

19 Refer to Laboratory Fixture Schedule for fixture types and descriptions.  
20

### 21 **Acceptable Manufacturers:**

22 WaterSaver Faucet Company  
23 Broen-LAB A/S  
24 Chicago Faucet Company  
25

26 **Materials:** Provide the bodies of service valves, fixtures and accessories of cast or forged brass with a minimum copper  
27 content of 85 percent. Fabricate assembly components and operating parts such as valve stems, renewable units,  
28 packing nuts, outlet nozzles, and straight serrated hose ends from solid brass bar stock. Fabricate replaceable seats,  
29 needle cones, valve disc screws, and other accessories from monel metal or stainless steel alloys especially selected  
30 for use intended.  
31

32 Provide water faucets that meet the requirements of the United States Safe Drinking Water Act as lead-free,  
33

34 **Assembled at the factory:** Service fixtures, including the mounting of valves and shanks to turrets, flanges, and other  
35 mounting accessories.  
36

37 Furnish and install nipples, locknuts, washers, shanks and other accessories required to properly mount and connect  
38 the fixtures.  
39

40 **Testing:** Individually factory test fixtures. Valves and fixtures, except water fixtures, shall withstand a test pressure of  
41 100 pounds per square inch (690 kPa). Test water fixtures at 80 pounds per square inch (550 kPa).  
42

43 Fixtures located on the same plane shall have their handles project the same distance from the plane of reference to  
44 present a uniform, related appearance, regardless of valve type.  
45

46 Identify mechanical services with full view colored index buttons in accordance with U.S. Standard Color Code.  
47

### 48 **Water Valve:**

- 49 • Renewable unit containing all working parts which are subject to wear, including stainless steel or monel  
50 metal seat, monel metal screw, heavy duty seat disk, Teflon packing, and an integral or external adjustable  
51 volume control.
- 52 • Provide unit capable of being readily converted from compression to self closing, and vice versa, without  
53 disturbing faucet body proper and shall also be capable of being readily converted from water construction to  
54 needle valve or steam valve construction without disturbing faucet body.
- 55 • Provide unit sealed in valve body with special composition gasket. Metal-to-metal or ground-joint type of  
56 sealing not acceptable.

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Needle Valves:

- Vacuum, gas, and air needle valves shall have a stainless steel replaceable floating cone that is precision ground and self-centering.
- Action of valve: Slow compression for fine control under pressure up to 150 psi (1050 kPa) and shall have parts subject to wear, easily replaceable.

Fine Needle Valves:

- Fine stem threads with approximately 30 threads per inch (25 mm).
- Renewable stainless steel needle and seat with 1/8 inch (3 mm) orifice.
- Constructed to maintain a constant flow rate of 4 bubbles per 15 seconds as valve is tested out under 50 pounds (350 kPa), 100 pounds (700 kPa), 150 pounds (1050 kPa), 200 pounds (1400 kPa), and 250 pounds (1720 kPa) of nitrogen pressure,

Laboratory Ball Valves: Straight pattern body, valve stem with integral chrome plated ball and TFE-coated O-rings stem seals in valve body, molded TFE valve seals, and tested at 125 psi nitrogen under water. Valves shall have chrome plated forged brass lever-type handle with screw-on type index requiring less than 5 pounds pressure to actuate. Provide with removable 10 serrated hose end.

Steam Valves: Bonnet assembly similar to needle valve fixture. Provide valve stem with flat Teflon valve disc and renewable, stainless steel valve seat.

Goosenecks: Hot water/cold water gooseneck mixers shall swivel. Provide swivel point at turret or at valve level if wall or panel mounted. Provide swing joints with heavy Teflon packings. All goosenecks shall provide full thread for attachment of antisplash outlet fixtures, serrated tips or filter pumps.

Vacuum Breakers: Provide vacuum breakers, integral with the gooseneck where required. Vacuum breakers shall have a forged brass body, renewable seat and a special design valve member for fine flow control. Vacuum breakers shall not spill over at low water volume. At fume hoods provide vacuum breakers externally mounted on face of fume hood superstructure where required as part of the factory pre-piping.

Aerators: Aerators shall have 3/8 inch (10 mm) NPS male inlet. Provide with integral flow control that adjusts between 0.5 GPM (1.29 LPM) and 3.0GPM (7.77 LPM). Flow control to be set as indicated on Drawings.

Serrated Tips: Serrated tip fixtures shall have 3/8 inch (10 mm) IPS thread with hose end being tapered and shall not have less than 10 serrations. Provide 1/8 inch (3 mm) diameter of orifice in serrated tip, except where otherwise specified. For water units provide with integral flow control that adjusts between 0.5 GPM (1.29 LPM) and 3.0 GPM (7.77 LPM). Flow control to be set as indicated on Drawings..

Turrets: Round type design, brass drop forging, as indicated on Drawings. One-way or two-way as required with 3/8 inch (10 mm) IPS female inlet thread for connections. Furnish units with brass shanks, brass locknuts, and washers. Infrared Sensor Operator: Infrared sensor operator shall include the infrared sensor with range between 2 inches (50 mm) and 8 inches (200 mm), thermostatic mixing valve, solenoid valve with strainer filter, battery powered control module, and plug-in adapter for 120 VAC power supply.

Fixture Finish: Fixtures shall be coated with an electrostatically applied epoxy powder coating in the color of **silver metallic**.

Faucet and Valve Handles: Finished to match fixture finish, 4-arm type or wrist blade type with removable screw-on type colored plastic discs with identification lettering stamped on disc in a contrasting color as scheduled below.

Service	Index Color	Letter Color	Symbol
Air	Orange	Black	AIR
Carbon Dioxide	Pink	Black	CO2
Chilled Water Return	Green	White	CHWR

Chilled Water Supply	Green	White	CHWS
Compressed Air	Orange	Black	CA
Cold Water - Potable	Green	White	CW
Hot Water - Potable	Red	White	HW
Gas	Blue	White	GAS
Industrial Cold Water	Green	White	ICW
Industrial Hot Water	Red	White	IHW
Lab Air	Orange	Black	LA
Purified Water	White	Black	PW
Nitrogen	Brown	White	N2
Special Gas	Light Blue	Black	SG
Steam	Black	White	STM
Vacuum	Yellow	Black	VAC

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Faucet and Valve Handles: Molded plastic or wrist blade type with a colored screw-on type index disc. Provide color coded handle and index disc to match the fixture's service index color. Provide color code requirements for indexing service fixtures as follows:

Service	Index Color	Letter Color	Symbol	Handle Color
Air	Yellow	Black	AIR	Blue
Carbon Dioxide	Black	White	CO2	Blue
Chilled Water Return	Red	White	CHWR	Green
Chilled Water Supply	Blue	White	CHWS	Green
Compressed Air	Yellow	Black	CA	Blue
Cold Water - Potable	Blue	White	CW	Green
Hot Water - Potable	Red	White	HW	Green
Gas	Yellow	Black	G	Yellow
Industrial Cold Water	Blue	White	ICW	Green
Industrial Hot Water	Red	White	IHW	Green
Lab Air	Yellow	Black	LA	Blue
Purified Water	White	Black	PW	Green
Nitrogen	Green	White	N2	Blue
Special Gas	Varies by gas	Varies by gas	Varies by gas	Varies by gas
Steam	Red	White	STM	Green
Vacuum	Black	Grey	VAC	Grey

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Wrist blade Handles: Install handles so blades are perpendicular to the benchtop in the off position and horizontal to the benchtop in the open position.

**UNDERCABINET/SHELVING TASK LIGHTING**

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Description: UL1598, UL2108 and UL8750 listed, LED light fixture in lengths equal to the cabinet or shelf it is mounted to. Provide standard output, neutral white, color temp to match general room lighting color temp, minimum 90 CRI or higher, daisy chained together with integral individual dimming from 0 to 100 percent and rocker switch on each fixture. Provide with occupancy sensor and automatic shut-off after 10 hours in silver, anodized aluminum, or white finish.

Acceptable Manufacturers:

LightCorp; Model: Reed Primer – Standard Output.

Mocha Lighting; Model: Lungo – Low Voltage.

BOCA Flasher; Model: TASK Master.

**EMERGENCY SHOWER AND EYE WASH UNITS**

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Deck Mounted Swing-Down Eyewash:

Deck mounted, "AutoFlow", swing-down eyewash unit.

Valve: Plug-type design with Teflon coated "O" rings to seal valve orifice. Water flow activated by swinging outlet heads from the vertical to the horizontal position. Water to turn on when the arm

1 assembly is no more than 30 degrees from horizontal.  
2 Furnish with 2 polypropylene fine spray heads with polyurethane filter, integral volume control and  
3 integrated nylon flip-top dust covers.  
4 Finish: Match laboratory services fitting finish.  
5

6  
7 **UMBILICALS/SERVICE DROPS**

8 Description: Construct of 18 gage (1.2 mm) sheet metal with collar at top. Provide bottom curb in same material as  
9 benchtop, properly cemented to benchtop. Provide top collar of 16 gage (1.6 mm) sheet steel.

10  
11 Provide 1 inch by 1 inch (25 mm by 25 mm), 18 gage (1.2 mm) angle at curb.  
12

13 Umbilicals shall have removable sections for easy access to piping and conduit. Exposed fasteners will not be allowed.  
14 Removal of sections shall not disturb ceiling or benchtop. Construct hanger clips of 18 gage (1.2 mm) sheet metal and  
15 spot welded to removable section.

16  
17 On freestanding umbilicals provide a pipe support channel, spot welded to the fixed enclosure section. On wall or  
18 corner umbilicals, attach pipe support channel to the wall.

19 Basis of Design: Unistrut

20 Finish: Finish as specified for metal finish in this section, with color selected by Owner's Representative.  
21

22 **CEILING SERVICE PANELS**

23 Description: Construct of 18 gage (1.2 mm) sheet metal. Form panel from one sheet with edges formed up 1 inch (24  
24 mm) and returned back. Reinforce with welded hat channels for the full length of the panel. Panels to fit into a 24 inch  
25 by 24 inch (609 mm by 609 mm) T-grid acoustical suspended ceiling structure.  
26

27 Ceiling service panels provide a means to mount and disconnect quick connect service fixtures, electrical and data  
28 outlets. Panels accommodate single sided and back-to-back bench configurations.  
29

30 Provide with cover plates. Coordinate locations of services, service fixtures, electrical and data, junction boxes with  
31 other trades.  
32

33 Finish: Finish as specified for metal finish in this section, with color selected by Owner's Representative.  
34

35 **SLEEVES IN COUNTERTOPS**

36 Description: 14 gage (2.0 mm), Type 304 stainless steel, with a Number 4 finish.  
37

38 Extend sleeves 1 inch (25 mm) above the countertop and provide with a flange on the bottom for fastening to the  
39 underside of the countertop. Install with clear silicone sealant between the outside of the sleeve and the countertop.  
40 Provide top edge of sleeve with a smooth radius to prevent chafing of insulation on hoses.  
41

42 **OVERHEAD SERVICE CARRIERS (STRUT ASSEMBLY)**

43 Description: Construct of metal framing system components in dimensions indicated in drawings. Coordinate  
44 connection of services, point exhaust, electrical and data raceway with other trades.

45 Available Manufacturers:

46 Unistrut Corporation.

47 Elcen.

48 Grinnell Power Strut  
49

50 Securely and rigidly fasten the entire assembly, including diagonal braces, to structural slab above or to a structural  
51 grid where provided.  
52

53 Ceiling Trim Plate: Provide ceiling trim plate at each vertical support that penetrates the ceiling system.

54 Finish assembly as specified for metal finish in this section. Paint all exposed piping and conduit servicing the carrier.

55 Color selected by Owner's Representative.  
56

1 **UTILITY DROPS**

2 Description: Construct of metal framing system components. Unistrut part numbers are referenced.

3 Available Manufacturers:

- 4 Unistrut Corporation.
- 5 Elcen.
- 6 Grinnell Power-Strut.

7  
8 Fasten members to overhead structure and to curbed opening in benchtops Vertical members are not required for wall  
9 mounted condition.

10  
11 Fasten members to overhead structure and to finished floor. Vertical members are not required for wall mounted  
12 condition.

13  
14 Finish assembly as specified for metal finish in this section, with color selected by Owner's Representative.

15  
16 **SOURCE QUALITY CONTROL TESTING OF METAL FINISH**

17 Metal Finish: Meet or exceed the latest edition of the following Section and Articles of SEFA-8-M Recommended  
18 Practices

19  
20 Testing Requirements: Provide a third party tester that is not a representative of the Manufacturer or Installation  
21 Contractor

22  
23 Test Results: Submit a certified report providing test results and indicating the finish conforms with or exceeds the  
24 above SEFA-8-M Recommended Practices.

25  
26 **SOURCE OF QUALITY CONTROL TESTING OF EPOXY RESIN WORK SURFACE**

27 Meet or exceed the latest edition of the following Section and Articles of SEFA-3 Recommended Practices:

- 28 2.1 Chemical/Stain Resistance Test
- 29 Test Method A
- 30 Test Method B

31  
32 Testing Requirements: Provide a third party tester that is not a representative of the Manufacturer or

33  
34 Installation Contractor

35 Test Results: Submit a certified report providing test results and indicating the finish conforms with or exceeds the  
36 above SEFA-3 Recommended Practices

37 **SOURCE QUALITY CONTROL TESTING OF PLASTIC LAMINATE WORK SURFACES**

38 Meet or exceed the latest edition of the following Section and Articles of SEFA-3 Recommended Practices:

- 39 2.1 Chemical/Stain Resistance Test:
- 40 b. Test Method A.
- 41 c. Test Method B.

42 Testing Requirements: Provide a third party tester that is not a representative of the Manufacturer or Installation  
43 Contractor.

44 Test Results: Submit a certified report providing test results and indicating the finish conforms with or exceeds the  
45 above SEFA-3 Recommended Practices.

46  
47  
48 **PART 3 – EXECUTION**

49  
50 **EXAMINATION**

51 Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for  
52 compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory  
53 conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular  
54 area will be construed as acceptance of surface conditions.

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**DELIVERY**

Delivery casework systems in two stages:  
    Deliver fixed casework and fume hoods  
    Deliver flexible casework systems

**PREPERATION**

General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

**INSTALLATION**

General:  
Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified.

- Respective manufacturer/fabricator's written installation instructions.
- Approved submittals.
- Contract Documents.

Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

Install casework, tables, casework support systems, overhead service drops, fume hoods and local point exhaust devices in accordance with manufacturer's instructions and approved Shop Drawings, and under the supervision of the manufacturer's trained personnel.

    Include installation of service fixtures. Final connections to services are specified in Division 22.

Anchor casework and fume hoods securely in place with appropriate seismic tie-down kits, in accordance with delegated design calculations and requirements.

Casework Installation:

    Install, plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Securely anchor to building structure. Where laboratory furniture abuts other finished work, scribe and apply filler strips for accurate fit with fasteners concealed where practicable.

    Installation of each individual bench run shall start at the high point of the floor under that bench run with levelers screwed in as much as possible.

    Where required, assemble units into one integral unit with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm).

    At fixed casework installations provide galvanized backer plates at toe kicks to receive applied base where floor elevation deviations cause gaps over one inch between bottom of cabinet base and floor.

    Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.

    Lubricate operating hardware as recommended by Manufacturer.

    Securely fasten tall cabinets, fume hood superstructures and tall flammable storage cabinets to solid support material near top of cabinet.

    Reinforcement of stud walls to support cabinets, shelving, and other wall mounted laboratory furnishing items: Done during wall erection by trade involved. Laboratory furniture company/supplier is responsibility for indicating on Shop Drawings the accurate location and sizing of reinforcement.

Work Surface Installation:

1 Field jointing where practicable: Made in same manner as factory jointing using dowels, splines, adhesives,  
2 and fasteners recommended by Manufacturer. Locate field joints as shown on accepted Shop Drawings,  
3 factory prepared so that there is no job site processing of top and edge surfaces.  
4 Abut top and edge surfaces in 1 true plane, with internal supports placed to prevent any deflection.  
5 Provide all holes and cutouts as required for built-in equipment and mechanical and electrical service  
6 fixtures. Prior to making openings, verify size of opening with actual size of equipment to be used. Form  
7 inside corners to a radius of not less than 1/8 inch (3 mm). After sawing, rout and file cutouts to ensure  
8 smooth, crack free edges. Seal exposed edges after cutting with a waterproofing material recommended by  
9 manufacturer.  
10 Secure tops to support with concealed Z-Type, angle type fastening, "Liquid Nails", Ply400/Ply 200 adhesive  
11 or equivalent. Fastening devices spaced no more than 3 feet (0.9 m) on center. Adhesives shall be liberally  
12 applied for solid anchoring of tops.  
13 Epoxy Resin Work Surface Joints: 3/32 inch (2.38 mm) flush and smooth with epoxy sealant.  
14 Caulk joints between curb and walls, fume hoods, and cabinets with acid-resistant silicone caulk.

15  
16 Sink Installation: Set in chemical resistant sealing compound sinks which were not factory installed and secured and  
17 supported per manufacturer's recommendations.

18  
19 Accessory Installation: Install accessories, fixtures and equipment in accordance with manufacturer's  
20 recommendations ready for final connection to services.

#### 21 22 **FIELD QUALITY CONTROL**

23 Manufacturer/Fabricator's Field Service: Manufacturer/fabricator's qualified technical representative shall inspect first  
24 day's Work and periodically inspect Work to ensure installation is proceeding in accordance with  
25 manufacturer/fabricator's designs, recommendations, instructions, and warranty requirements. Representative shall  
26 submit written reports of each visit indicating observations, findings, and conclusions of inspection.

27  
28 Owner's Testing Agency Field Service: The Owner may employ and pay a qualified independent testing agency to  
29 perform field quality control. Materials and installation failing to meet specified requirements shall be replaced at  
30 Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at  
31 Contractor's expense.

#### 32 33 **ADJUSTING**

34 Repair or remove and replace defective work, as directed by Owner's Representative upon completion of installation.  
35 Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

#### 36 37 **CLEANING AND PROTECTION**

38 Clean shop finished casework and fume hoods, touch up as required, and remove and refinish damaged or soiled  
39 areas.

40  
41 Cover casework for protection against soiling and deterioration during remainder of construction period.  
42 Clean countertops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or  
43 oils.

44  
45 Protect casework and fume hoods before, during, and after installation. Materials damaged due to improper protection  
46 are cause for rejection.

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48 **END OF SECTION**



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**SECTION 12 35 53.13  
METAL LABORATORY CASEWORK**

**PART 1 - GENERAL**

**SCOPE**

Section includes metal laboratory casework with lab-grade plastic laminate fronts

Related Requirements:

Refer to Section 12 35 53 General Requirements for Laboratory Casework for all References, Approved manufacturers, Materials, Hardware, Finishes, Installation, etc.

**PART 2 – PRODUCTS**

**MANUFACTURERS AND PRODUCTS**

Refer to Section 12 35 53 for approved manufacturers.

**CASEWORK DESIGN**

Comply with SEFA 8-M "Laboratory Grade Metal Casework."

Minimum standards for work within this Section: Construct in accordance with Laboratory Grade of the Woodwork Institute - Manual of Millwork, or Premium Grade of the Architectural Woodwork Institute/AWMAC - Quality Standards, latest editions unless otherwise specified herein.

Comply with SEFA 8-PL "Laboratory Grade Plastic Laminate Casework."

Full overlay style: Square edged door and drawer fronts overlapping the openings on all four sides. In elevation, hold the reveal between end panel and door or drawer edge to a maximum of 1/8 inch (3 mm) wide. Hold spaces between abutting doors and drawers to a maximum of 1/8 inch (3 mm) wide, both horizontally and vertically, and shall be accurate and uniform, forming a continuous reveal throughout full length of assembled casework. Hold the reveal between top of cabinet and door or drawer edge to a maximum of 1/4 inch (6 mm) wide.

Self-Supporting Units: Completely welded shell assembly without applied panels at ends, backs or bottoms, so that cases can be used interchangeably or as a single, stand-alone unit.

Interior of Case Units: Easily cleanable, flush interior. Base cabinets, 30 inches (750 mm) and wider, with double swinging doors shall provide full access to complete interior without center vertical post.

Drawers: Sized on a modular basis for interchange to meet varying storage needs, and designed to be easily removable in field without the use of special tools.

Case Openings: Rabbeted-like joints all 4 sides of case opening for hinged doors and 2 sides for sliding doors in order to provide dust resistant case.

Secure intersection of case members with spot and arc welds.

Testing of Casework, Tables, and Shelving: Meet or exceed SEFA 8-M.

**CASEWORK FABRICATION**

General: Include completely enclosed vertical posts. Include the items of cabinet construction listed..

Floor Mounted Base Cabinets:

End Panels and Backs:

End panels and back formed from a single steel sheet with front edges formed to a channel shape and further offset to form a strike for doors and drawers.

Reinforce at front and rear corners with vertical posts containing shelf adjustment holes, maximum 1/2 inch (12 mm) on centers.

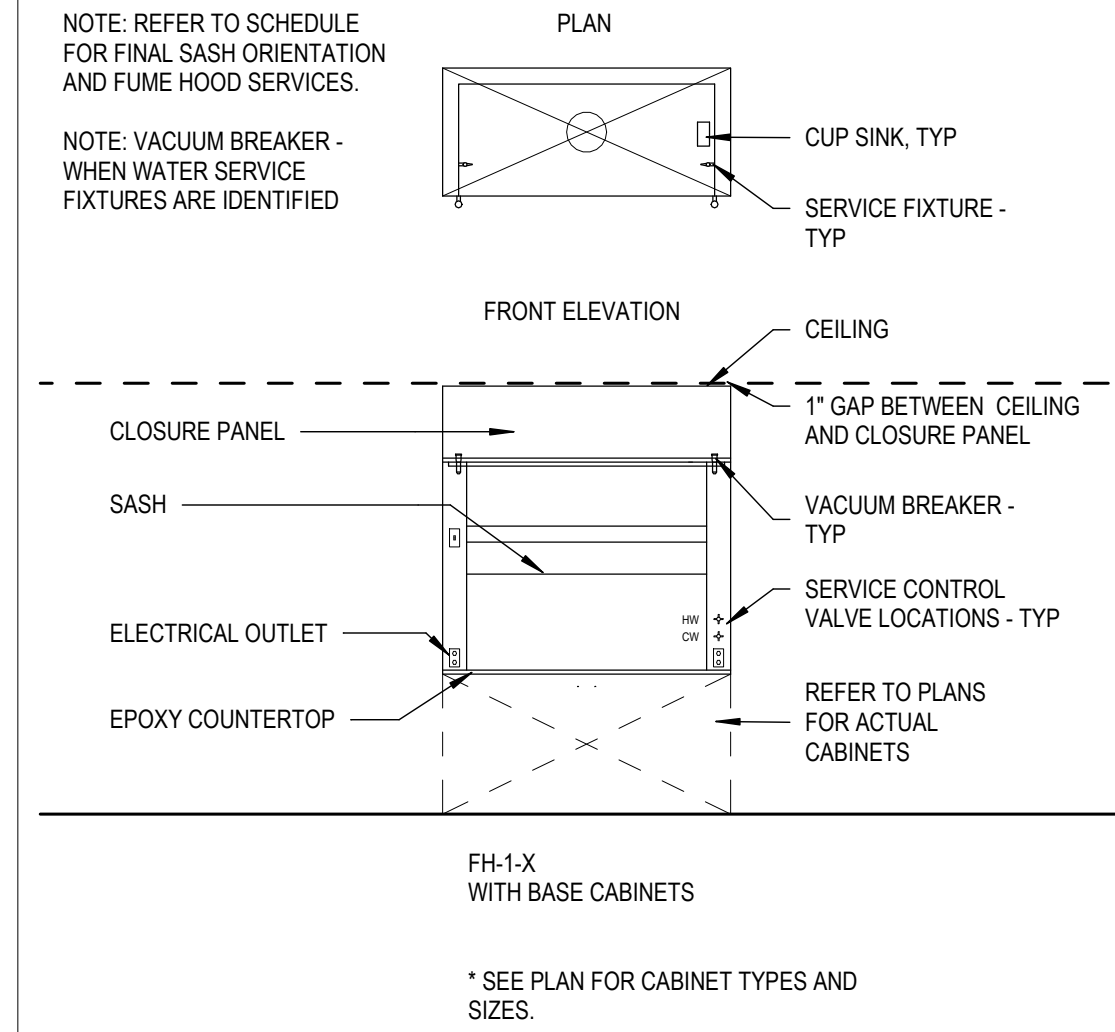
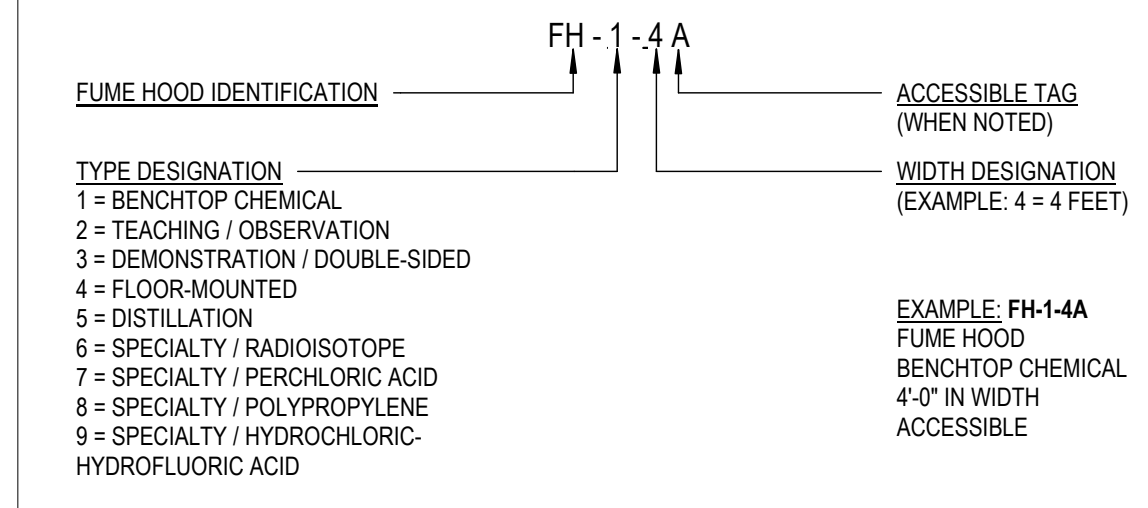
1  
2 Provide removable backs on all base cabinets, except units with security panels and sink cabinets,  
3 to allow access to service piping from the front of the unit  
4  
5 All sink cabinets to have partial height back panels to allow passage of drain line and piping to  
6 service chase.  
7  
8 Bottoms:  
9 Bottom and bottom rail formed from a single piece of metal with both sides and back formed up  
10 with a radius between flange and bottom for ease of cleaning. Form front rail to provide a strike for  
11 doors and drawers.  
12  
13 Reinforce at front corners with gussets.  
14  
15 Front Top Rails:  
16 Provide flush at face of cabinet and interlock within the flange at the top of the end panels. Form  
17 front of rail to provide a strike for doors and drawers.  
18  
19 Reinforce at front corners with gussets.  
20  
21 Toe Space Rails:  
22 Install between end panels to provide a minimum toespace of 3 inches (75 mm) deep by 4 inches  
23 (100 mm) high.  
24 Provide corner gussets at front and rear corners with 3/8 inch (10 mm) diameter leveling screws  
25 integral with bottom flange. Provide leveling bolt access hole with removable cover.  
26  
27 Intermediate Rails:  
28 Provide between drawers and doors, and between drawers at all security panels.  
29 Recessed behind doors and drawer fronts.  
30 Removable for later revision in cabinet configuration.  
31  
32 Security Panels: Provide on all base cabinets with locks, between drawers and door, and between drawers.  
33  
34 Vertical Dividers:  
35 Vertical divider 3/4 inch (19 mm) double wall assembly.  
36 Reinforce at front and rear corners with vertical posts.  
37  
38 Adjustable Shelves:  
39 Provide one shelf per cupboard unit. Form front and back edges down 3/4 inch (19 mm) and  
40 returned back 3/4 inch (19 mm). Form ends down 3/4 inch (19 mm).  
41 For shelves over 36 inches (915 mm) long or 16 inches (400 mm) deep, reinforce with a welded  
42 hat channel for the full length of the shelf.  
43 Adjustable on 1/2 inch (12 mm) centers.  
44 Front edge of shelf to be within 1 inch (25 mm) of inside face of door.  
45 Hinged Doors:  
46 3/4 inch (19 mm) medium density particleboard.  
47 Exposed exterior surfaces: Grade VGS laminate.  
48 Interior surface: Grade CLS laminate.  
49 Exposed edges: 1/8 inch (3 mm) PVC edgebanding.  
50  
51 Drawers  
52 Sides and back: 1/2 inch (12 mm) medium density particleboard. Grade VGL laminate on both  
53 sides. 1/64 inch (0.40 mm) edgebanding on top edge.  
54 Subfront: 5/8 inch (16 mm) medium density particleboard. Grade VGL laminate on exposed  
55 surface. 1/64 inch (0.40 mm) edgebanding on top and side edges.  
56 Bottom: 1/4 inch (6 mm) hardboard, prefinished on both sides with color to match interior liner.

1 Attach back and subfront to sides with 5/16 inch (8 mm) dowels spaced at 1-1/4 inch (32 mm)  
2 centers and glue. Dado bottom into back, subfront, and sides sealed with hot melt glue around  
3 drawer bottom perimeter.  
4 Removable drawer heads: 3/4 inch (19 mm) medium density particleboard. Grade VGS laminate  
5 on exposed exterior surface Grade VGL laminate on interior surface. 1/8 inch (3 mm) PVC  
6 edgebanding on all edges.  
7  
8 Drawer body: One-piece construction including bottom, 2 sides, back, and inner front. Fully covered  
9 at interior bottom.  
10 Drawers shall close against rubber bumpers.  
11 Provide security panels for drawers with keyed different locks.  
12  
13 Filler Panels:  
14 Provide filler panels or scribe strips at exposed to view areas between back of cabinets and walls, between  
15 backs of cabinets at end of island or peninsula benches, and at any other area necessary to enclose gaps.  
16 For floor mounted cabinets provide all filler panels with bottom 6 inches (152 mm) fixed and the top portion  
17 removable.  
18 Grind edges and radius corners to eliminate sharp edges.  
19 Secure to frame and/or cabinet back and wall with metal angle and oval head screws with finishing washers.  
20  
21  
22  
23 Mobile Base Cabinets:  
24 Provide mobile cabinets as described under Floor Mounted Base Cabinets above, unless modified under this  
25 Paragraph:  
26 Top and top rail: Formed from a single piece of metal with both sides and back formed up with a radius  
27 between flange and bottom for ease of cleaning. Form front rail to provide a strike for doors and drawers.  
28 Reinforce at front corners with gussets.  
29 Backs: Provide solid fixed backs on all base cabinets.  
30 Omit toe space base and provide swivel type casters.  
31  
32 Work Surface: Provide all mobile casework units with a 3/4 inch thick epoxy top.  
33  
34 Anti-Tip Interlock: Provide in all cabinets with drawers and adjustable pullout shelves.  
35 Counterweight: Provide in all cabinets.  
36  
37 Hinged Framed Glass Doors:  
38  
39 Frame: Outer head of one piece construction. Inner head consisting of top, bottom and side framing members  
40 removable for replacement of glass.  
41  
42 Glass: laminated safety glass.  
43 Provide continuous vinyl glazing retainer to receive glass.  
44  
45 Tall Cabinets:  
46 End Panels and Backs:  
47 End panels and back formed from a single steel sheet with front edges formed to a channel shape  
48 and further offset to form a strike for doors and drawers.  
49 Reinforce at front and rear corners with full upright posts containing shelf adjustment holes,  
50 maximum 1/2 inch (12 mm) on centers.  
51 Bottoms:  
52 Bottom and bottom rail formed from a single piece of metal with both sides and back formed up  
53 with a radius between flange and bottom for ease of cleaning. Form front rail to provide a strike for  
54 doors and a 4 inch (100 mm) high base.  
55 Provide corner gussets at front and rear corners with 3/8 inch (10 mm) diameter leveling screws  
56 integral with bottom flange. Provide leveling bolt access hole with removable cover.



FUME HOOD SCHEDULE (FH-##) - OFCI																
TAG	DESCRIPTION	BOD MANUFACTURER	BOD MODEL	WIDTH	DEPTH	HEIGHT	MOUNTING	MAX SASH HEIGHT	NO. OF VERTICAL PANELS	NO. OF HORIZONTAL PANELS	HORIZONTAL PANEL WIDTH	NO. OF HORIZONTAL TRACKS	DESIGN SASH OPENING	HOOD COLLAR	COMMENTS	
FH-1-6	6' FUME HOOD - 36" DEEP HWICW 1 CUP SINK	LABCONCO	11061000-SPECIAL	6'-0"	3'-0"	7'-4"	BENCH	29"	1	1	21"	2	18"	12"	COMBINATION SASH; CASWORK BELOW ALSO OFCI	
FH-1-6	6' FUME HOOD - 36" DEEP HWICW 1 CUP SINK	LABCONCO	11061000-SPECIAL	6'-0"	3'-0"	7'-4"	BENCH	29"	1	1	21"	2	18"	12"	COMBINATION SASH; CASWORK BELOW ALSO OFCI	

### FUME HOOD TYPE SYMBOL

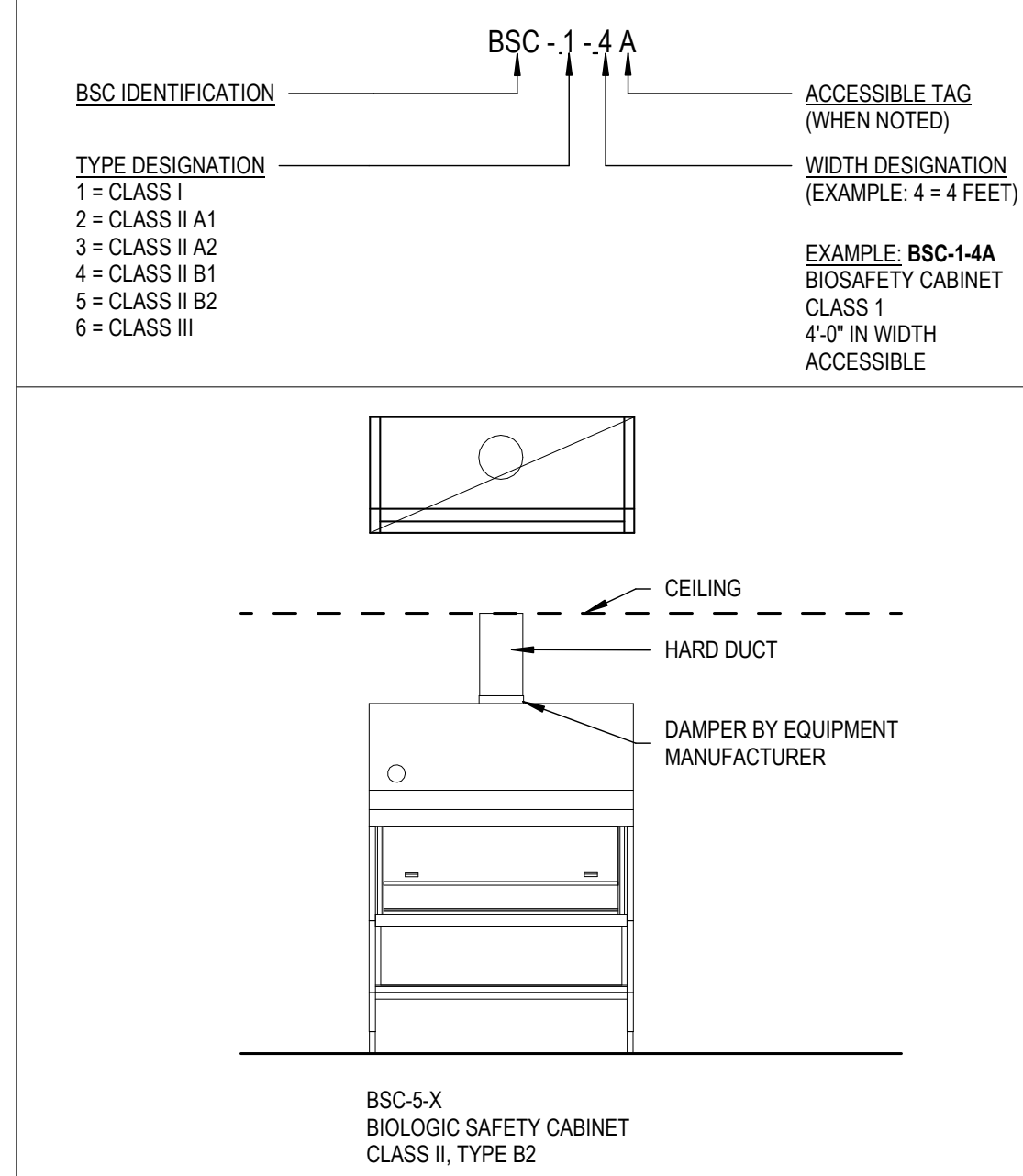


**SMITHGROUP**

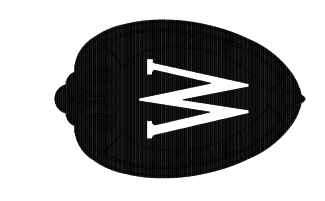
44 EAST MIFFLIN STREET  
SUITE 500  
MADISON, WI 53703  
608.251.1177  
smithgroup.com

BIOLOGICAL SAFETY CABINET SCHEDULE - (BSC-##) OFOI														
TAG	BOD Manufacturer	BOD Model	Width	Depth	Height	Voltage	Watts/Amps	DATA	STAND-BY POWER	PHASE	DEDICATED	ELECTRICAL NOTES	PLUMBING NOTES	COMMENTS
BSC-5-4	NUAIRE	NU-560-400 LABGARD ES ENERGY SAVER CLASS II, TYPE B2 LAMINAR FLOW BIOSAFETY CABINET	4'-5 1/2"	2'-7 1/2"	7'-10 1/2"	115 VAC, 60 Hz	8A		Yes	Single	Yes			
BSC-5-4	NUAIRE	NU-560-400 LABGARD ES ENERGY SAVER CLASS II, TYPE B2 LAMINAR FLOW BIOSAFETY CABINET	4'-5 1/2"	2'-7 1/2"	7'-10 1/2"	115 VAC, 60 Hz	8A		Yes	Single	Yes			
BSC-5-4	NUAIRE	NU-560-400 LABGARD ES ENERGY SAVER CLASS II, TYPE B2 LAMINAR FLOW BIOSAFETY CABINET	4'-5 1/2"	2'-7 1/2"	7'-10 1/2"	115 VAC, 60 Hz	8A		Yes	Single	Yes			
BSC-5-4	NUAIRE	NU-560-400 LABGARD ES ENERGY SAVER CLASS II, TYPE B2 LAMINAR FLOW BIOSAFETY CABINET	4'-5 1/2"	2'-7 1/2"	7'-10 1/2"	115 VAC, 60 Hz	8A		Yes	Single	Yes			

### BSC TYPE SYMBOL



The Board of Regents of the  
University of Wisconsin on behalf of  
the University of Wisconsin - Madison



260 NORTH MILLS STREET  
MADISON, WI 53706

MISCELLANEOUS LAB EQUIPMENT SCHEDULE - MQ.### - OFOI W/ CONTRACTOR ROUGH IN																					
SG E NUMBER	DESCRIPTION	W	D	H	MOUNTING	VOLTAGE	WATTS/AMPS	DATA	STAND-BY POWER	PHASE	DEDICATED	ELECTRICAL NOTES	COLD WATER	HOT WATER	COMPRESSED AIR	VACUUM	SPECIALTY GAS	DI	DRAIN	PLUMBING NOTES	COMMENTS
MQ.001	RO WATER POLISHER	1'-1"	1'-2"	1'-7 1/2"	WALL	120 VAC	2.5A			SINGLE								No			BUILDING ROUDI WATER TO BE PROVIDED TO THE POLISHER
MQ.002	RO WATER POLISHER	1'-1"	1'-2"	1'-7 1/2"	WALL	120 VAC	2.5A			SINGLE								No			BUILDING ROUDI WATER TO BE PROVIDED TO THE POLISHER

MSB 2ND FLOOR LAB RENOVATION  
MICROBIAL SCIENCES BUILDING  
UNIVERSITY OF WISCONSIN - MADISON  
MADISON, WISCONSIN

EQUIPMENT SCHEDULES

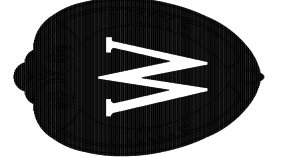
Revisions:		
No.	Date:	Description:
1	3/09/2023	ADDENDUM 01

Scale	As indicated
UWM #	0060-2213
UWSA #	A-22-010
Set Type	BID DOCUMENTS
Date Issued	2/28/2023
Sheet Number	<b>Q1.1</b>

**LAB EQUIPMENT SCHEDULE - EQ1 - OFOI**

SQ EQUIPMENT NUMBER	DESTINATION ROOM NAME	DESCRIPTION NAME	MANUFACTURER	MODEL NUMBER	CLIENT EQUIPMENT NUMBER	OFOI_Furnish Install	WIDTH	DEPTH	HEIGHT	WEIGHT	MOUNTING HEIGHT	OFOI_Power_Voltage	OFOI_Power_Amps	OFOI_Power_Phase	NEMA	STAND BY POWER	UPS	DATA	ELECTRICAL NOTES	SPECIALTY GASES	NATURAL GAS	AIR - LAB	VACUUM - LAB	COLD WATER	HOT WATER	PURE WATER	FLOOR DRAIN/ SINK	PLUMBING NOTES	DEDICATED EXHAUST	EXHAUST REQUIRED - CFM	EQUIPMENT COOLING WATER	MECHANICAL NOTES	COMMENTS			
LAB A																																				
EQ1-003	LAB A	REFRIGERATOR/FREEZER	KENMORE	61212 TOP-FREEZER FRIDGE (WHITE)	-	OFOI	2'-8"	2'-8"	5'-6"	254	0'-0"	115 VA	15 A	1	NEMA 5-15P	No		No	DEDICATED CIRCUIT NEEDED	No	No			No	No	No		No								
EQ1-003	LAB A	REFRIGERATOR/FREEZER	KENMORE	61212 TOP-FREEZER FRIDGE (WHITE)	-	OFOI	2'-8"	2'-8"	5'-6"	254	0'-0"	115 VA	15 A	1	NEMA 5-15P	No		No	DEDICATED CIRCUIT NEEDED	No	No			No	No	No		No								
EQ1-007	LAB A	-20' FREEZER	THERMO SCIENTIFIC	20LFEETS	-	OFOI	2'-9"	2'-7 1/2"	5'-7 1/2"	0	0'-0"	208 VA	5 A	0	-	Yes		No		No	No			No	No	No		No								
EQ1-007	LAB A	-20' FREEZER	THERMO SCIENTIFIC	20LFEETS	-	OFOI	2'-9"	2'-7 1/2"	5'-7 1/2"	0	0'-0"	208 VA	5 A	0	-	Yes		No		No	No			No	No	No		No								
EQ1-009	LAB A	-80' FREEZER	NEW BRUNSWICK SCIENTIFIC	U9400-002 U725-80" UPRIGHT ULTRA-LOW FREEZER	-	OFOI	3'-4 1/2"	2'-10"	6'-5"	694	0'-0"	208 VA	3 A	0	-	Yes		No		No	No			No	No	No		No								
EQ1-011	LAB A	FLOOR CENTRIFUGE	BECHMAN COULTER	AVANTI J.E FLOOR CENTRIFUGE	-	OFOI	3'-0"	3'-2"	3'-0"	589	0'-0"	208 VA	24 A	0	NEMA 6-30P	No		No		No	No			No	No	No		No								
EQ1-013	LAB A	BACTERIA PLATE INCUBATOR	HERAUES	B6200 INCUBATOR	-	OFOI	2'-11 1/2"	2'-9 1/2"	2'-8"	0	2'-6"	120 VA	2 A	1	-	No		No	540 WATTS	No	No			No	No	No		No								
LAB A																																				
EQ1-100	Lab A	Bacteria shaker incubator	New Brunswick Scientific	excolla E24	-	OFOI	1'-6"	2'-6"	2'-0"	0	2'-0"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-101	Lab A	Bacteria plate incubator	Heraeus	B6200	-	OFOI	0'-10"	1'-8"	1'-4"	0	1'-4"	0 VA	20 A	1		No		No		No	No			No	No	No		No								
EQ1-102	Lab A	Table top centrifuge	eppendorf	5810R	-	OFOI	2'-4"	2'-0"	1'-2"	0	1'-2"	0 VA	0 A	0		No		No		No	No			No	No	No		No								
EQ1-103	Lab A	PCR machine	Applied biosystems	proflex system	-	OFOI	1'-2"	2'-0"	1'-0"	0	1'-0"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-104	Lab A	electroporator	Biorad	gene pulser xcell	-	OFOI	1'-0"	1'-0"	0'-8"	0	0'-8"	0 VA	0 A	0		No		No		No	No			No	No	No		No								
EQ1-105	Lab A	chemdoc imaging system	Biorad	Chemdoc touch	-	OFOI	1'-8"	2'-0"	2'-2"	0	2'-2"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-106	Lab A	Absorbance plate reader	BMGlabtech	Fluostar Optima	-	OFOI	1'-6"	1'-8"	2'-2"	0	2'-2"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-107	Lab A	spectrophotometer	Amerham bioscience	ultraspec2100	-	OFOI	1'-10"	1'-4"	0'-8"	0	0'-8"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-108	Lab A	Benchtop centrifuge	eppendorf	5424	-	OFOI	0'-10"	1'-0"	0'-10"	0	0'-10"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-109	Lab A	Benchtop centrifuge	eppendorf	5424	-	OFOI	0'-10"	1'-0"	0'-10"	0	0'-10"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-111	Lab A	Real time PCR	Applied biosystems	QuantStudio 6 Flex	-	OFOI	1'-8"	2'-4"	2'-6"	0	2'-6"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
LAB B																																				
EQ1-004	LAB B	REFRIGERATOR/FREEZER	KENMORE	61212 TOP-FREEZER FRIDGE (WHITE)	-	OFOI	2'-8"	2'-8"	5'-6"	254	0'-0"	115 VA	15 A	1	NEMA 5-15P	No		No	DEDICATED CIRCUIT NEEDED	No	No			No	No	No		No								
EQ1-004	LAB B	REFRIGERATOR/FREEZER	KENMORE	61212 TOP-FREEZER FRIDGE (WHITE)	-	OFOI	2'-8"	2'-8"	5'-6"	254	0'-0"	115 VA	15 A	1	NEMA 5-15P	No		No	DEDICATED CIRCUIT NEEDED	No	No			No	No	No		No								
EQ1-008	LAB B	-20' FREEZER	THERMO SCIENTIFIC	20LFEETS	-	OFOI	2'-9"	2'-7 1/2"	5'-7 1/2"	0	0'-0"	208 VA	5 A	0	-	Yes		No		No	No			No	No	No		No								
EQ1-008	LAB B	-20' FREEZER	THERMO SCIENTIFIC	20LFEETS	-	OFOI	2'-9"	2'-7 1/2"	5'-7 1/2"	0	0'-0"	208 VA	5 A	0	-	Yes		No		No	No			No	No	No		No								
EQ1-010	LAB B	-80' FREEZER	NEW BRUNSWICK SCIENTIFIC	U9400-002 U725-80" UPRIGHT ULTRA-LOW FREEZER	-	OFOI	3'-4 1/2"	2'-10"	6'-5"	694	0'-0"	208 VA	3 A	0	-	Yes		No		No	No			No	No	No		No								
EQ1-012	LAB B	FLOOR CENTRIFUGE	BECHMAN COULTER	AVANTI J.E FLOOR CENTRIFUGE	-	OFOI	3'-0"	3'-2"	3'-0"	589	0'-0"	208 VA	24 A	0	NEMA 6-30P	No		No		No	No			No	No	No		No								
EQ1-014	LAB B	BACTERIA PLATE INCUBATOR	HERAUES	B6200 INCUBATOR	-	OFOI	2'-11 1/2"	2'-9 1/2"	2'-8"	0	2'-6"	120 VA	2 A	1	-	No		No	540 WATTS	No	No			No	No	No		No								
LAB B																																				
EQ1-112	Lab B	bacteria shaker incubator	New Brunswick scientific	excolla E24	-	OFOI	1'-6"	2'-6"	2'-0"	0	2'-0"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-113	Lab B	Table top centrifuge	eppendorf	5810R	-	OFOI	2'-4"	2'-0"	1'-2"	0	1'-2"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-114	Lab B	PCR machine	Applied biosystems	proflex system	-	OFOI	1'-2"	2'-0"	1'-0"	0	1'-0"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-115	Lab B	electroporator	Biorad	gene pulser xcell	-	OFOI	1'-0"	1'-0"	0'-8"	0	0'-8"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-116	Lab B	chemdoc imaging system	Biorad	Chemdoc touch	-	OFOI	1'-8"	2'-0"	2'-2"	0	2'-2"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-117	Lab B	Absorbance plate reader	BMGlabtech	Fluostar Optima	-	OFOI	1'-6"	1'-8"	2'-2"	0	2'-2"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-118	Lab B	Spectrophotometer	Amerham bioscience	ultraspec2100	-	OFOI	1'-10"	1'-4"	0'-8"	0	0'-8"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-119	Lab B	Benchtop centrifuge	eppendorf	5424	-	OFOI	0'-10"	1'-0"	0'-10"	0	0'-10"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-120	Lab B	Benchtop centrifuge	eppendorf	5424	-	OFOI	0'-10"	1'-0"	0'-10"	0	0'-10"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-121	Lab B	MIQ Advantage A10 water purification system	Milipore	MIQ A10	-	OFOI	1'-2"	1'-2"	1'-8"	0	1'-8"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
EQ1-122	Lab B	Real time PCR	Applied biosystems	QuantStudio 6 Flex	-	OFOI	1'-8"	2'-4"	2'-6"	0	2'-6"	120 VA	20 A	0		No		No		No	No			No	No	No		No								
TISSUE CULTURE A																																				
EQ1-002	TISSUE CULTURE A	TISSUE CULTURE INCUBATOR	THERMO FISHER	HERACELL 240 CO2 INCUBATOR (STACKABLE)	-	OFOI	2'-6 1/2"	2'-9"	3'-1"	155	3'-1"	120 VA	5 A	1	NEMA 5-15P	No		No	BOTH UNITS TO HAVE A DEDICATED CIRCUIT	Yes	No			No	No	No	CO2 TO BE CONNECTED TO BOTH UNITS	No								
EQ1-002	TISSUE CULTURE A	TISSUE CULTURE INCUBATOR	THERMO FISHER	HERACELL 240 CO2 INCUBATOR (STACKABLE)	-	OFOI	2'-6 1/2"	2'-9"	3'-1"	155	0'-0"	120 VA	5 A	1	NEMA 5-15P	No		No	BOTH UNITS TO HAVE A DEDICATED CIRCUIT	Yes	No			No	No	No	CO2 TO BE CONNECTED TO BOTH UNITS	No								
EQ1-005	TISSUE CULTURE A	REFRIGERATOR/FREEZER	KENMORE	61212 TOP-FREEZER FRIDGE (WHITE)	-	OFOI	2'-8"	2'-8"	5'-6"	254	0'-0"	115 VA	15 A	1	NEMA 5-15P	No		No	DEDICATED CIRCUIT NEEDED	No	No			No	No	No		No								
TISSUE CULTURE B																																				
EQ1-001	TISSUE CULTURE B	TISSUE CULTURE INCUBATOR	THERMO FISHER	HERACELL 240 CO2 INCUBATOR (STACKABLE)	-	OFOI	2'-6 1/2"	2'-9"	3'-1"	155	3'-1"	120 VA	5 A	1	NEMA 5-15P	No		No	BOTH UNITS TO HAVE A DEDICATED CIRCUIT	Yes	No			No	No	No	CO2 TO BE CONNECTED TO BOTH UNITS	No								
EQ1-001	TISSUE CULTURE B	TISSUE CULTURE INCUBATOR	THERMO FISHER	HERACELL 240 CO2 INCUBATOR (STACKABLE)	-	OFOI	2'-6 1/2"	2'-9"	3'-1"	155	0'-0"	120 VA	5 A	1	NEMA 5-15P	No		No	BOTH UNITS TO HAVE A DEDICATED CIRCUIT	Yes	No			No	No	No	CO2 TO BE CONNECTED TO BOTH UNITS	No								
EQ1-006	TISSUE CULTURE B	21 CU FT REFRIGERATOR-FREEZER	KENMORE	61212 TOP-FREEZER FRIDGE (WHITE)	-	OFOI	2'-8"	2'-8"	5'-6"	254	0'-0"	115 VA	15 A	1	NEMA 5-15P	No		No	DEDICATED CIRCUIT NEEDED	No	No			No	No	No		No							21 CUT FT REFRIGERATOR-FREEZER	

The Board of Regents of the  
University of Wisconsin on behalf of  
the University of Wisconsin - Madison



260 NORTH MILLS STREET  
MADISON, WI 53706

MSB 2ND FLOOR LAB RENOVATION  
MICROBIAL SCIENCES BUILDING  
UNIVERSITY OF WISCONSIN - MADISON  
MADISON, WISCONSIN

EQUIPMENT SCHEDULES

Sheet Title:

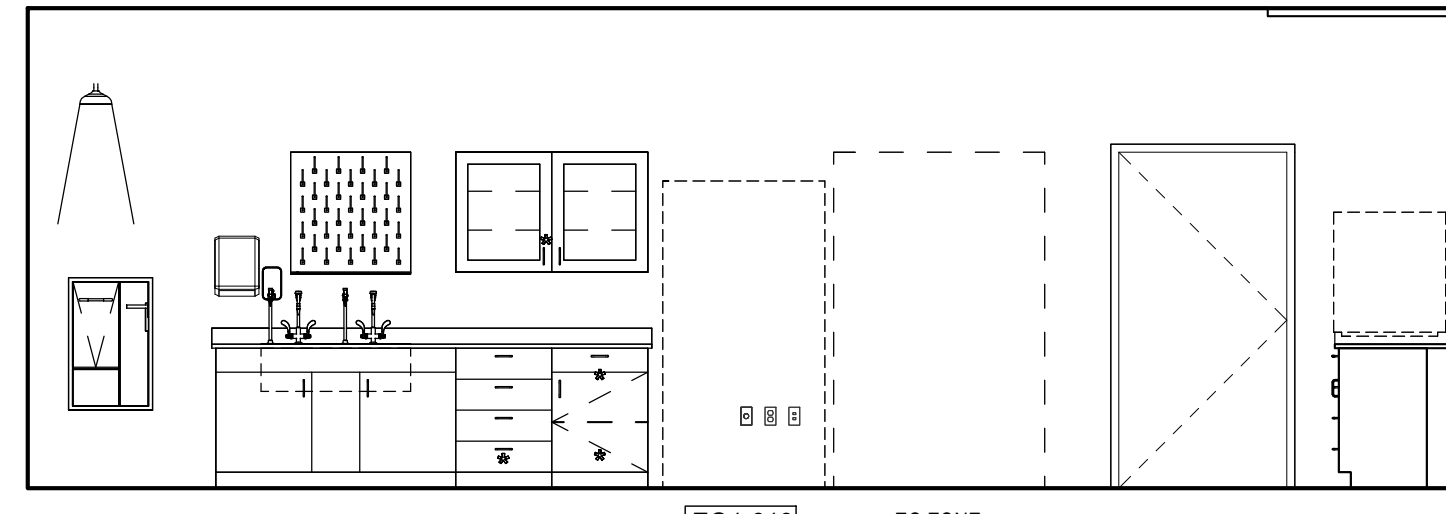
Revisions:		
No.	Date:	Description:
1	3/09/20	

GENERAL SHEET NOTES

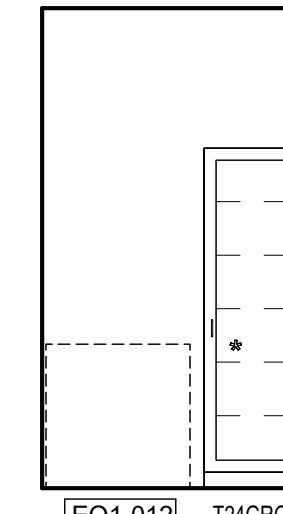
- REFER TO THE A 0X SERIES SHEETS FOR ARCHITECTURAL GENERAL NOTES, DRAWINGS, REFERENCE AND MATERIAL SYMBOLS, ABBREVIATIONS, AS WELL AS DIMENSIONING CONVENTIONS USED ON THIS SHEET.
- REFER TO THE A 0X SERIES SHEETS FOR TYPICAL MOUNTING HEIGHTS FOR DIMENSIONS NOT SHOWN ON THIS SHEET.
- REFER TO AND COORDINATE WITH MECHANICAL, PLUMBING, AND ELECTRICAL FOR ADDITIONAL INFORMATION NOT SHOWN ON THIS SHEET.
- FINAL EQUIPMENT LOCATIONS AND DIMENSIONS TO BE COORDINATED AND CONFIRMED BY MANUFACTURER.
- THE PURPOSE OF THE DRAWINGS ON THIS SHEET IS TO ILLUSTRATE THE OVERALL CONFIGURATION OF ALL ITEMS OF ALL TRADES OCCURRING ON THE INTERIOR ELEVATIONS. LOCATIONS OF ELEMENTS SHOWN ON ELECTRICAL, MECHANICAL, AND PLUMBING DRAWINGS ARE SCHEMATIC AND THE DIMENSIONS SHOWN HERE TAKE PRECEDENCE.
- REFER TO THE AF SERIES SHEETS FOR INTERIOR FINISH INFORMATION.
- ALL COUNTERTOPS ARE EPOXY UNLESS OTHERWISE NOTED.
- ALL CASEWORK TO BE METAL BOX WITH PLASTIC LAMINATE DOORS/ DRAWERS UNLESS OTHERWISE NOTED.
- ALL CASEWORK TO BE LOCKABLE UNLESS OTHERWISE NOTED. REFER TO SPECIFICATION SECTION 123553 FOR TYPE OF LOCK.
- MINIMUM 1" FILLER PANEL REQUIRED WHEN CASEWORK IS ADJACENT TO WALL. COORDINATE WITH COUNTERTOP LENGTH.
- CASEWORK NOT ADJACENT TO A WALL SHALL BE FINISHED ON THE EXPOSED END.

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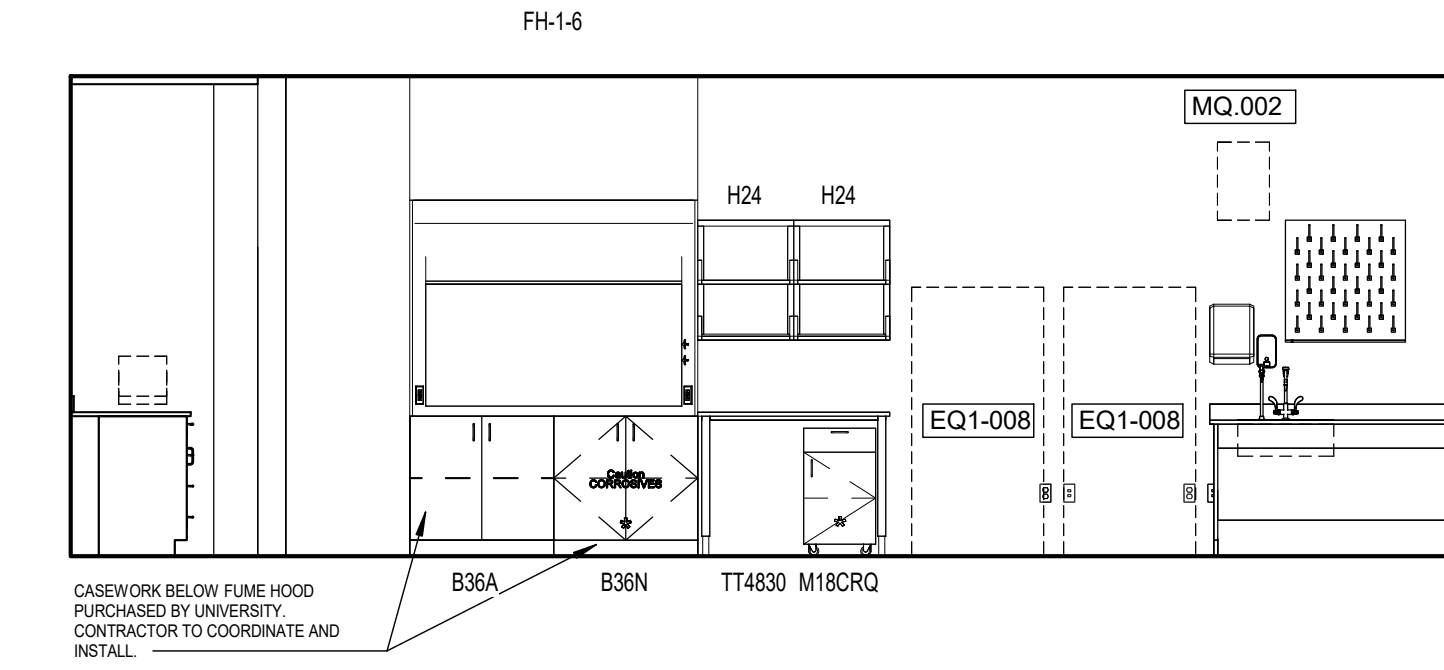
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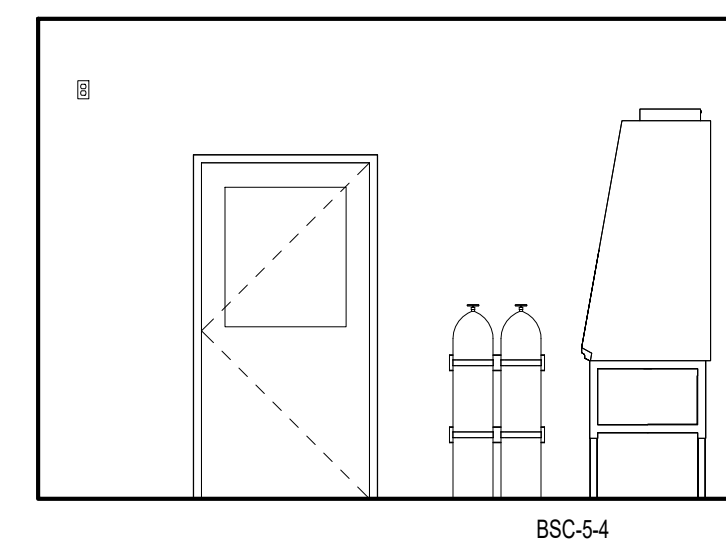
50 INTERIOR ELEVATION - LAB B WEST  
SCALE: 1/4" = 1'-0"



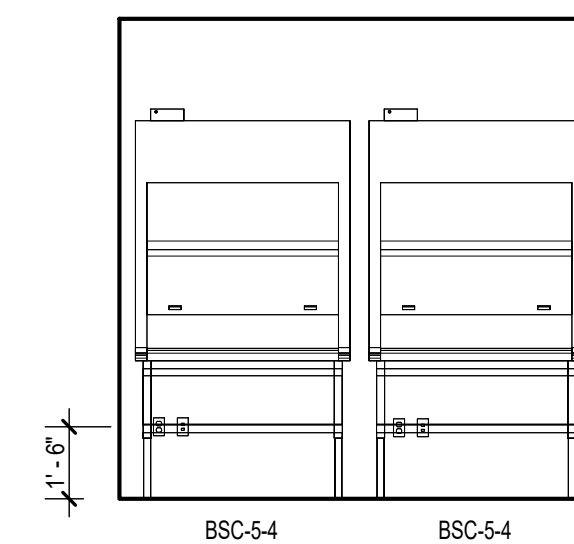
34 INTERIOR ELEVATION - LAB B SOUTH  
SCALE: 1/4" = 1'-0"



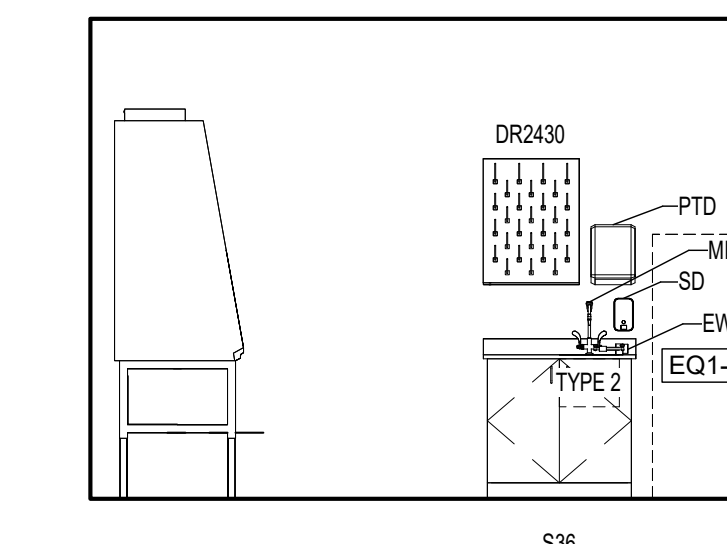
18 INTERIOR ELEVATION - LAB B EAST  
SCALE: 1/4" = 1'-0"



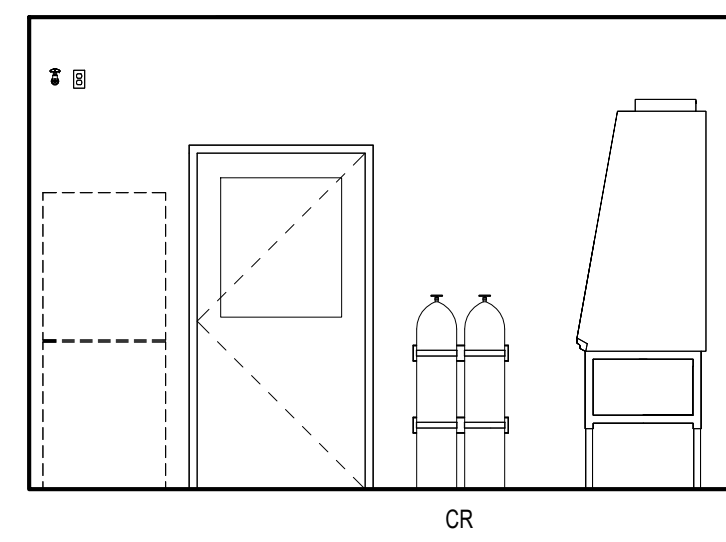
52 INTERIOR ELEVATION - TC B WEST  
SCALE: 1/4" = 1'-0"



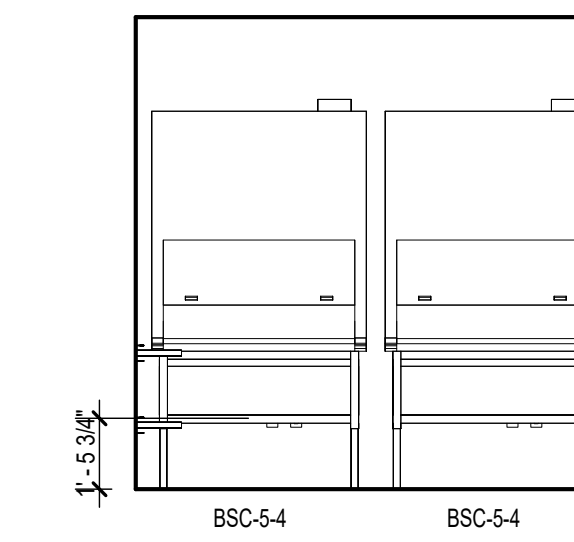
2 INTERIOR ELEVATION - TC A NORTH  
SCALE: 1/4" = 1'-0"



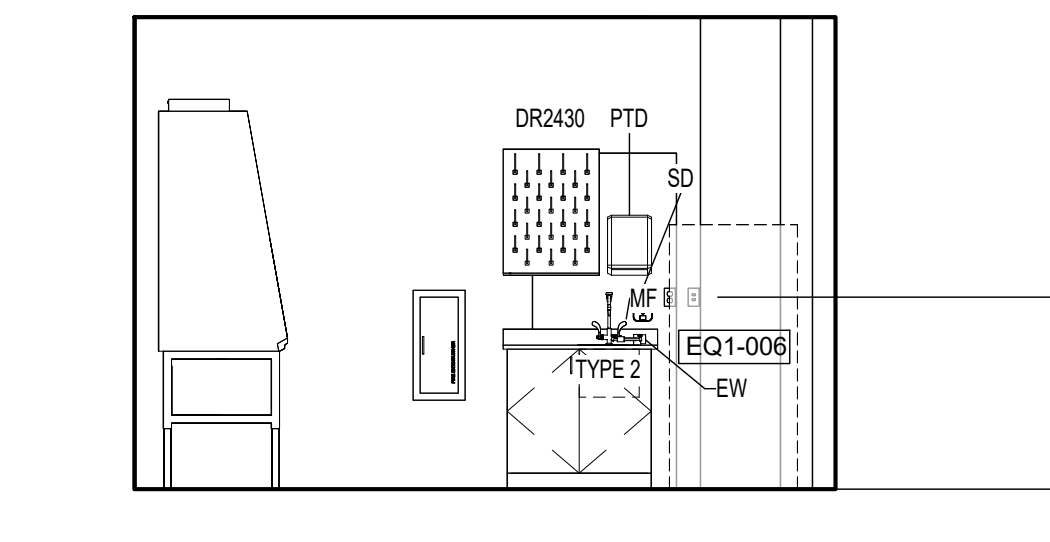
36 INTERIOR ELEVATION - TC A EAST  
SCALE: 1/4" = 1'-0"



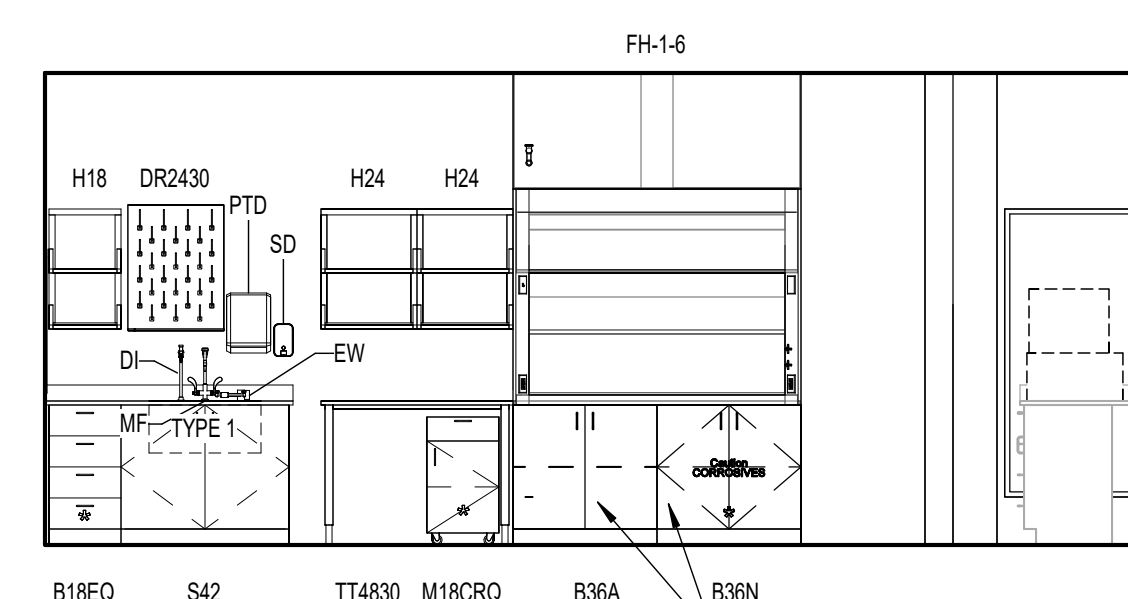
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SCALE: 1/4" = 1'-0"



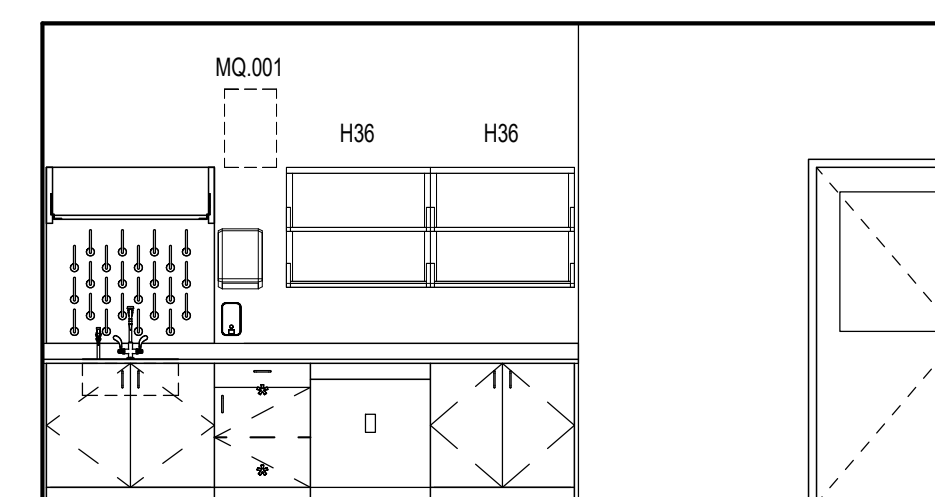
3 INTERIOR ELEVATION - TC B SOUTH  
SCALE: 1/4" = 1'-0"



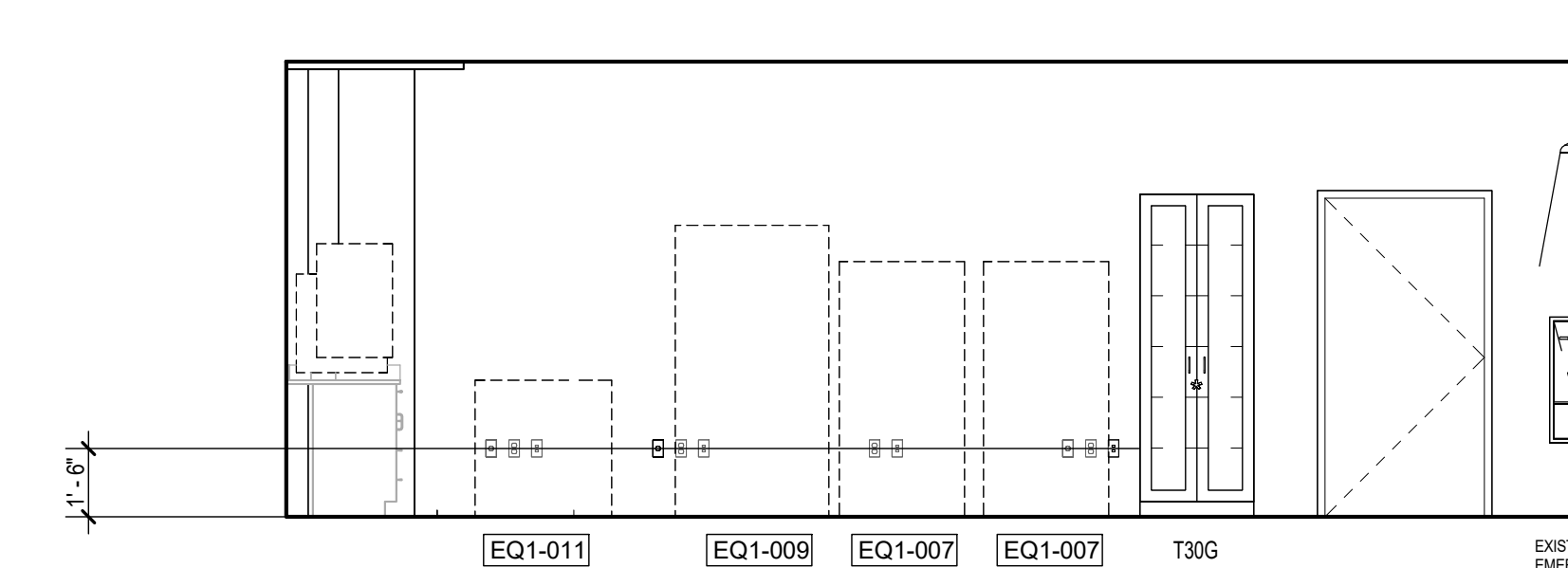
38 INTERIOR ELEVATION - TC B WEST  
SCALE: 1/4" = 1'-0"



56 INTERIOR ELEVATION - LAB A WEST  
SCALE: 1/4" = 1'-0"

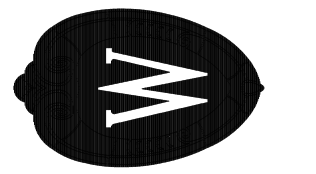


40 INTERIOR ELEVATION - LAB A SOUTH  
SCALE: 1/4" = 1'-0"



24 INTERIOR ELEVATION - LAB A EAST  
SCALE: 1/4" = 1'-0"

The Board of Regents of the  
University of Wisconsin on behalf of  
the University of Wisconsin - Madison



250 NORTH MILLS STREET  
MADISON, WI, 53706

MSB 2ND FLOOR LAB RENOVATION  
MICROBIAL SCIENCES BUILDING  
UNIVERSITY OF WISCONSIN - MADISON  
MADISON, WISCONSIN

UNIQUE CASEWORK ELEVATIONS

Sheet Title:

No.	Date:	Description:
1	3/09/2023	ADDENDUM 01

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

UWM # 0060-2213  
UWSA # A-22-010

Set Type BID DOCUMENTS

Date Issued 2/28/2023

Sheet Number **Q8.1**

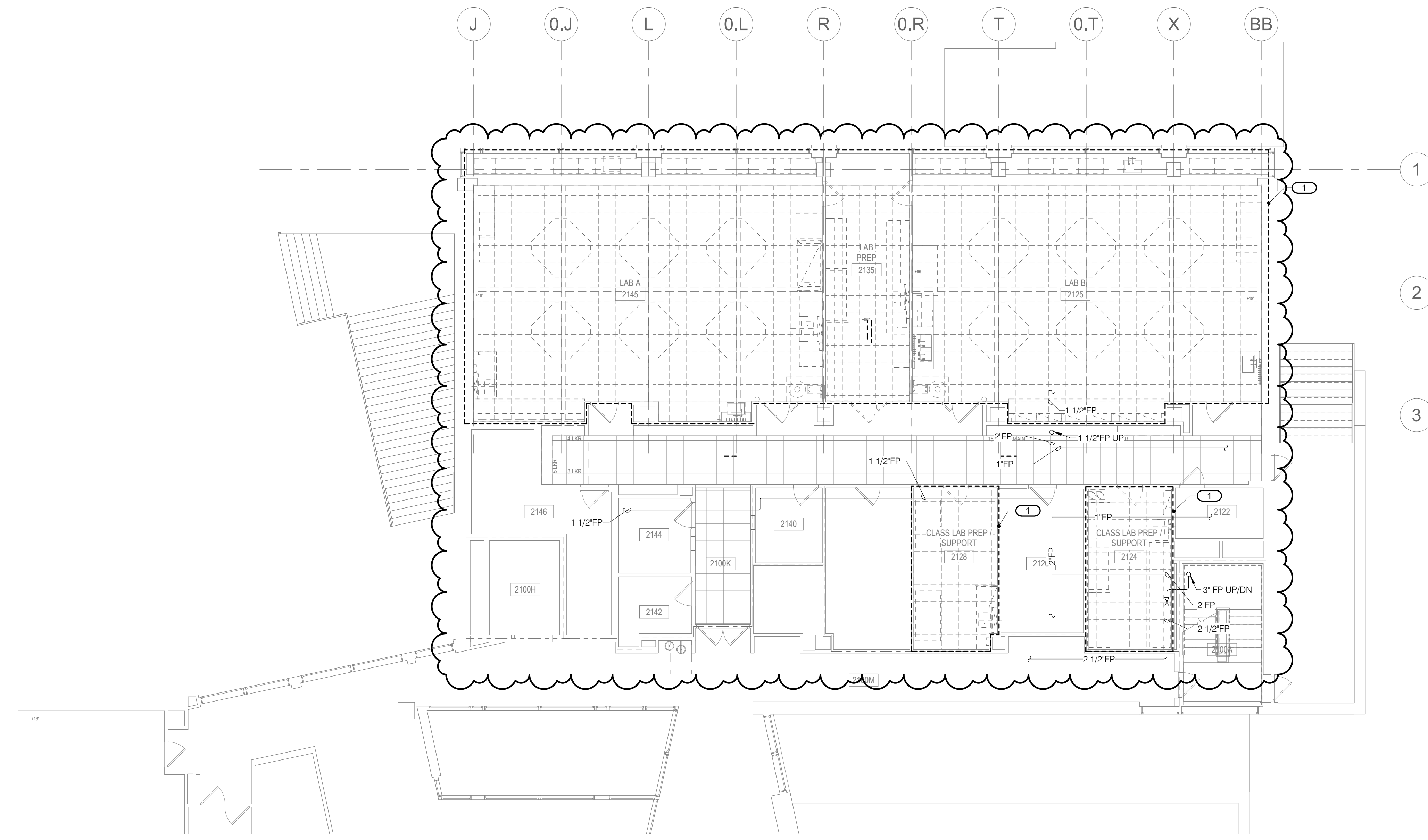


**GENERAL NOTES:**

- ANY PENETRATIONS, MADE BY A TRADE CONTRACTOR IN EXISTING NEW WALLS/PARTITIONS WILL NEED TO BE PATCHED AND THEN SEALED, WHERE ANNULAR SPACE OCCURS. BY THE TRADE MAKING THE PENETRATION IN A MANNER THAT IS CONSISTENT WITH THE WALL/PARTITIONS CONSTRUCTION WITH NO GAPS OR OPENINGS AROUND THE PENETRATION. WHEN VISIBLE TO THE ROOM, IT SHOULD BE FINISHED IN THE SAME MANNER AS THE ADJACENT WALL/PARTITION. REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.
- FOR DEMOLITION, WHERE EXISTING SYSTEMS HAVE BEEN REMOVED FROM EXISTING WALLS/PARTITIONS TRADES TO COORDINATE WITH THE GENERAL CONTRACTOR WHERE THOSE SYSTEMS HAVE BEEN REMOVED AND PATCHING AND SEALING NEEDS TO OCCUR. PLEASE REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.

**KEYNOTES: (#)**

- WITHIN THIS OUTLINED AREA, THE FIRE PROTECTION CONTRACTOR SHALL REMOVE SPRINKLER MAINS, BRANCH PIPING, AND HEADS, AND SHALL PREPARE TO REWORK/INSTALL NEW SPRINKLER MAINS, BRANCH PIPING, AND NEW HEADS, AS REQUIRED TO COORDINATE WITH NEW ARCHITECTURAL LAYOUT. NEW MECHANICAL/ELECTRICAL/PLUMBING SYSTEMS, NEW CEILING LAYOUT, AND OCCUPANCY REQUIREMENTS. CONTRACTOR SHALL PERFORM HYDRAULIC CALCULATIONS AND PROVIDE THE PROPER NUMBER OF SPRINKLER HEADS AND SPACING TO BE DESIGNED AND INSTALLED IN COMPLIANCE WITH NFPA AND ALL OTHER STATE AND LOCAL CODES. THE CONTRACTOR SHALL COORDINATE SYSTEM SHUT-DOWNS AND TEMPORARY SERVICES WITH THE OWNER, DURING CONSTRUCTION. CONTRACTOR SHALL TURN EXISTING HEADS UPRIGHT TO ENSURE REQUIRED COVERAGE AND PROTECT HEADS FROM DAMAGE. SPRINKLERS ARE A PART OF SPRINKLER WET ZONE 15.
- WITHIN THIS OUTLINED AREA, THE FIRE PROTECTION CONTRACTOR SHALL REWORK/PROVIDE AND INSTALL NEW SPRINKLER MAINS, BRANCH PIPING, AND NEW HEADS, AS REQUIRED TO COORDINATE WITH NEW ARCHITECTURAL LAYOUT, NEW MECHANICAL/ELECTRICAL/PLUMBING SYSTEMS, NEW CEILING LAYOUT, AND OCCUPANCY REQUIREMENTS. CONTRACTOR SHALL PERFORM HYDRAULIC CALCULATIONS AND PROVIDE THE PROPER NUMBER OF SPRINKLER HEADS AND SPACING TO BE DESIGNED AND INSTALLED IN COMPLIANCE WITH NFPA AND ALL OTHER STATE AND LOCAL CODES. THE CONTRACTOR SHALL COORDINATE SYSTEM SHUT-DOWNS AND TEMPORARY SERVICES WITH THE OWNER, DURING CONSTRUCTION. CONTRACTOR SHALL TURN EXISTING HEADS UPRIGHT TO ENSURE REQUIRED COVERAGE AND PROTECT HEADS FROM DAMAGE. SPRINKLERS ARE A PART OF SPRINKLER WET ZONE 15.

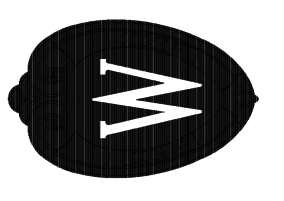


**2 2ND FLOOR DEMOLITION PLAN - FIRE PROTECTION**  
1/8" = 1'-0"



**1 2ND FLOOR PLAN - FIRE PROTECTION**  
1/8" = 1'-0"

The Board of Regents of the  
University of Wisconsin on behalf of  
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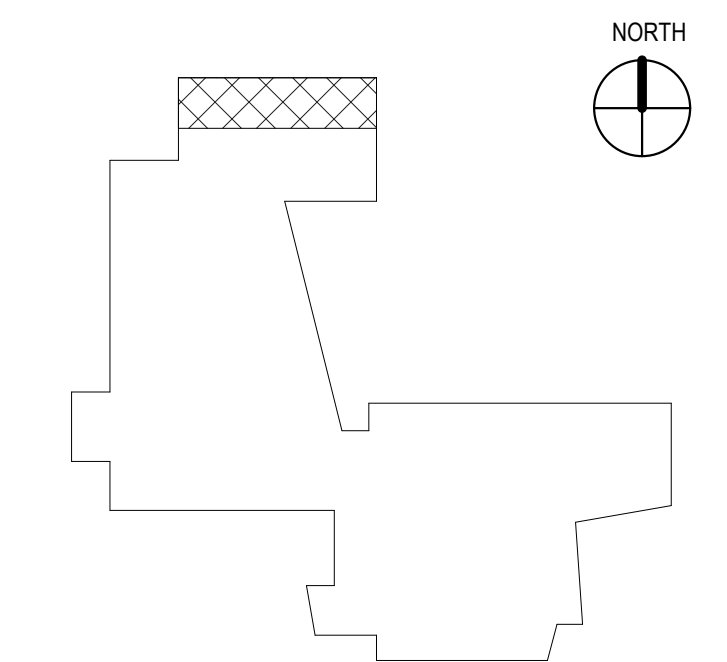
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2ND FLOOR PLAN - FIRE PROTECTION

Revisions:

No.	Date	Description
1	3/09/2023	ADDENDUM 01



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PROJECT #22054900.01

Scale	1/8" = 1'-0"
UWM #	0060-2201
UWSA #	A-22-010
Set Type	BID DOCUMENTS
Date Issued	2/21/2023
Sheet Number	<b>F2.1.1</b>



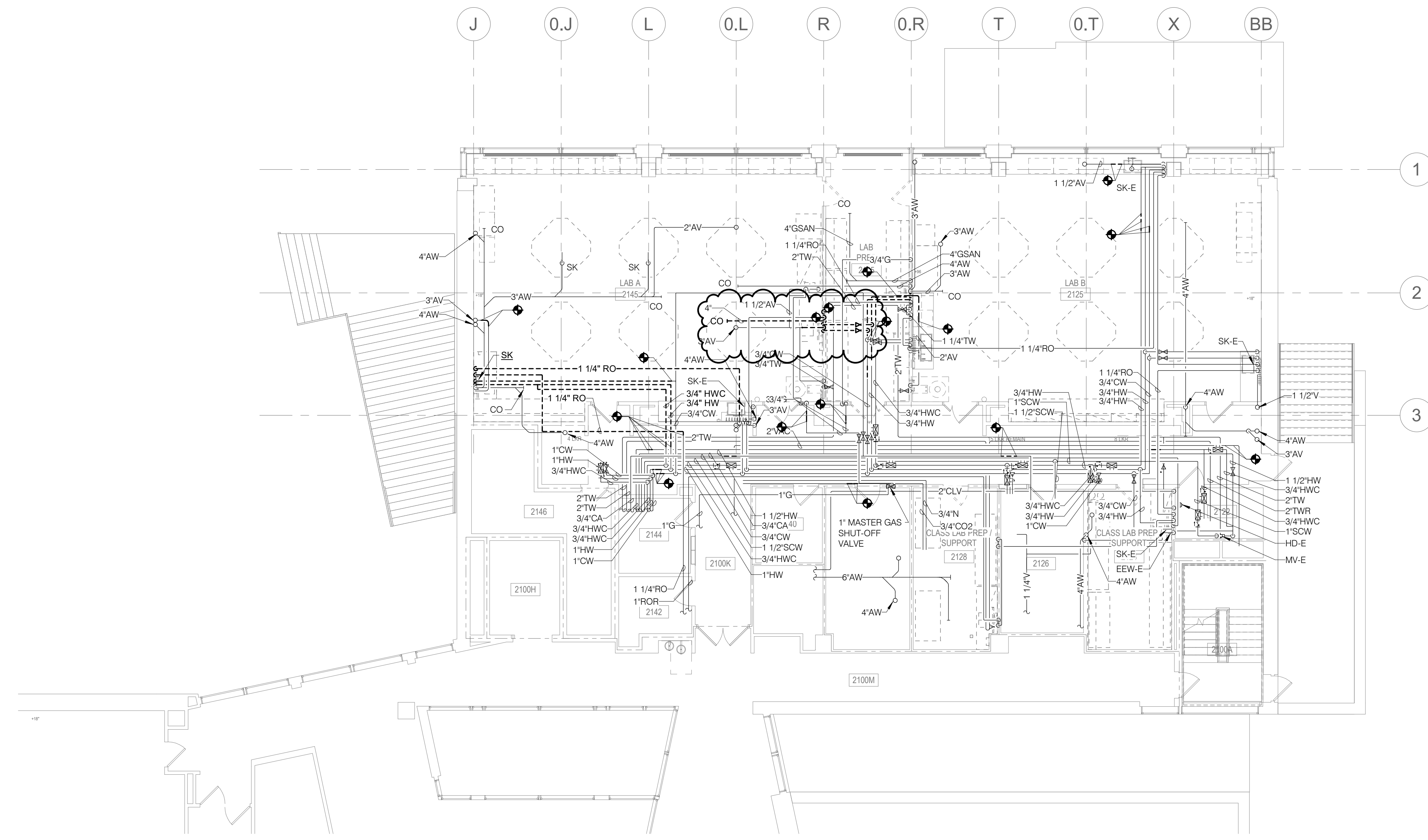


**GENERAL NOTES:**

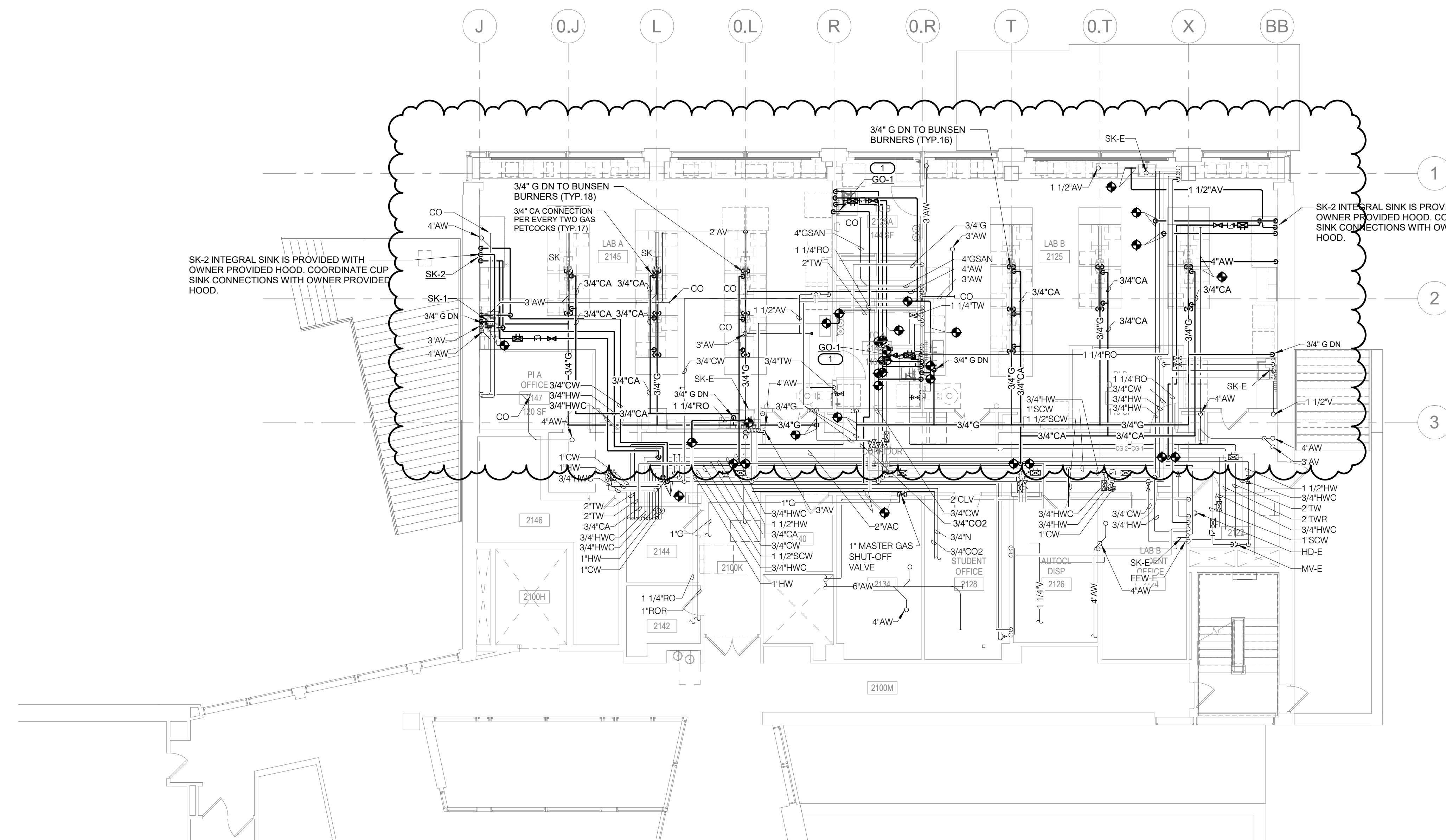
- ANY PENETRATIONS, MADE BY A TRADE CONTRACTOR IN EXISTING/NEW WALLS/PARTITIONS WILL NEED TO BE PATCHED AND THEN SEALED. WHERE ANNULAR SPACE OCCURS, BY THE TRADE MAKING THE PENETRATION IN A MANNER THAT IS CONSISTENT WITH THE WALLS/PARTITIONS CONSTRUCTION WITH NO GAPS OR OPENINGS AROUND THE PENETRATION. WHEN VISIBLE TO THE ROOM, IT SHOULD BE FINISHED IN THE SAME MANNER AS THE ADJACENT WALL/PARTITION. REFER TO ARCHITECTURAL SERIES A2.1X FOR FURTHER INFORMATION.
- FOR DEMOLITION, WHERE EXISTING SYSTEMS HAVE BEEN REMOVED FROM EXISTING WALLS/PARTITIONS TRADES TO COORDINATE WITH THE GENERAL CONTRACTOR WHERE THOSE SYSTEMS HAVE BEEN REMOVED AND PATCHING AND SEALING NEEDS TO OCCUR. PLEASE REFER TO ARCHITECTURAL SERIES A2.1X FOR FURTHER INFORMATION.
- COORDINATE ALL PIPING TO ROUTE OUT OF THE VAV BOX CONTROLLER SERVICE CLEARANCE ZONE OF 36"X30" IN FRONT OF EACH CONTROLLER. REFER TO M2.1.1 FOR VAV BOX AND CLEARANCE LOCATIONS.

**KEYNOTES:** (T)

- GAS OUTLETS ARE TO BE DECK MOUNTED IN THE SINK COUNTERTOPS. COORDINATE ROUTING AND LOCATION WITH COUNTERTOPS.

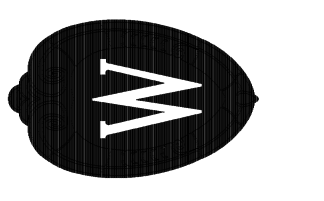


**2 2ND FLOOR DEMOLITION PLAN - PLUMBING**  
1/8" = 1'-0"



**1 2ND FLOOR PLAN - PLUMBING**  
1/8" = 1'-0"

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2ND FLOOR PLAN - PLUMBING

Revisions:

No.	Date	Description
1	3/09/2023	ADDENDUM 01

Scale	1/8" = 1'-0"
UWSM #	0060-2201
UWSA #	A-22-010
Set Type	BID DOCUMENTS
Date Issued	2/21/2023
Sheet Number	<b>P2.1.1</b>

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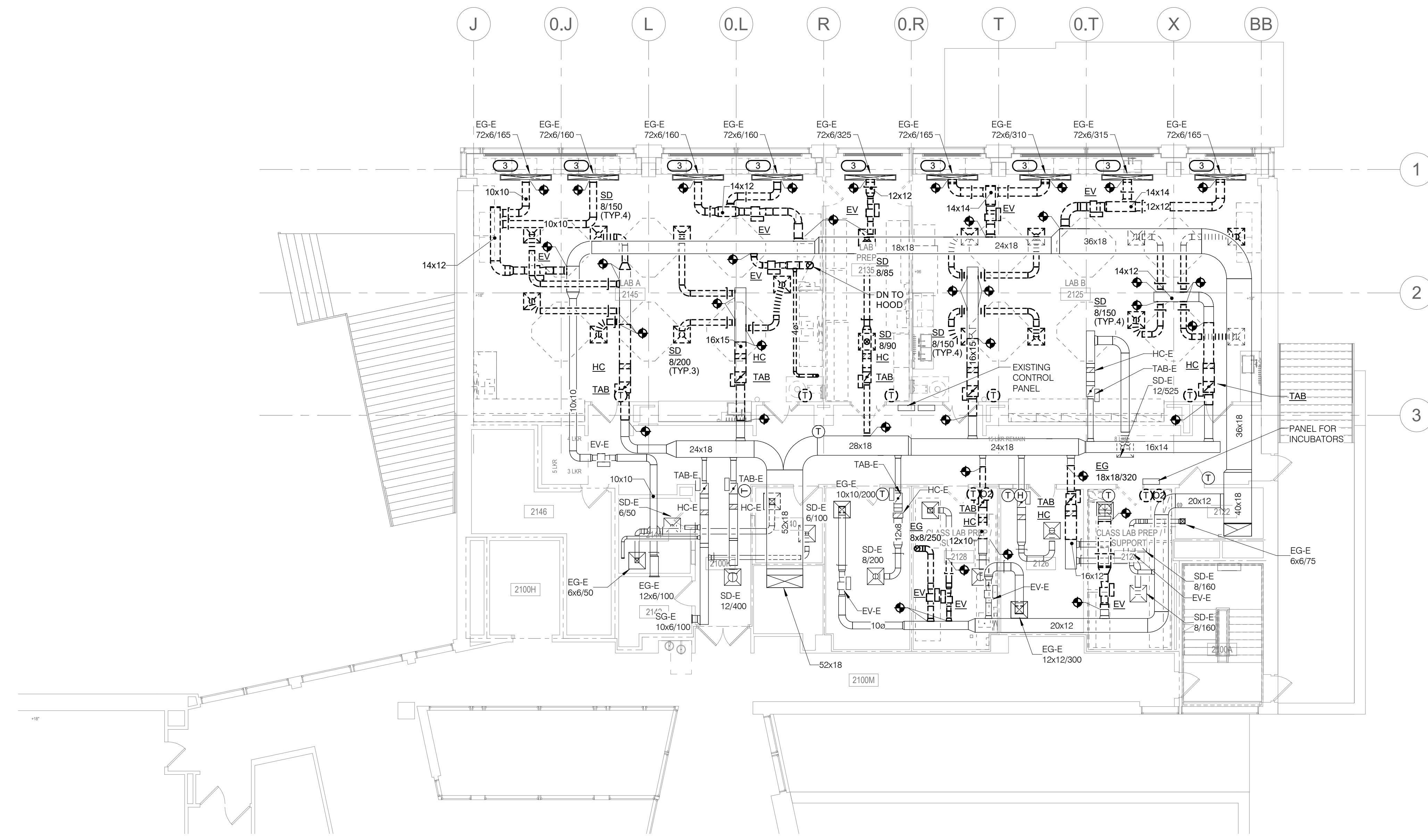
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MEP SCALE IN INCHES PROJECT #22054990.01

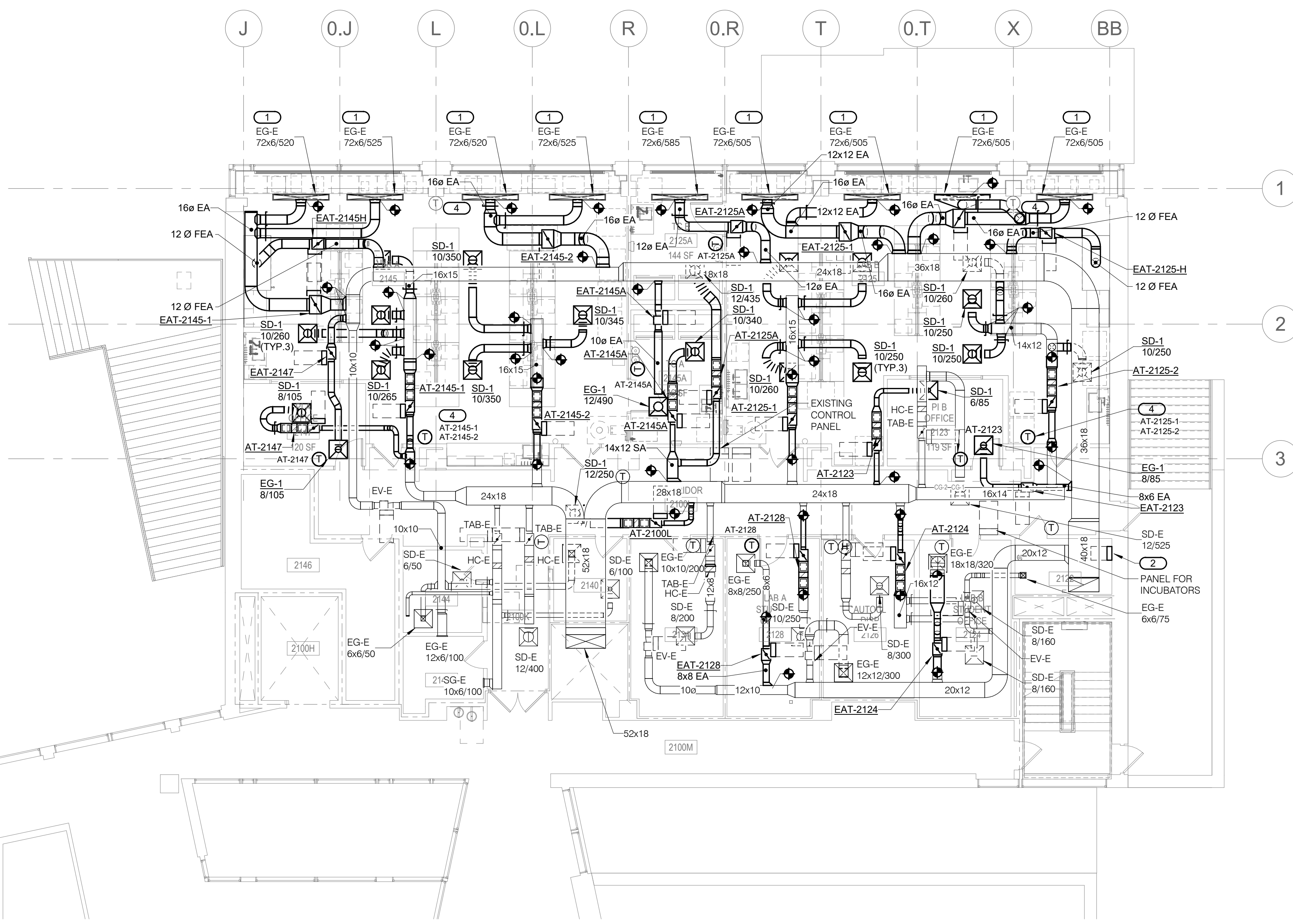
**GENERAL NOTES:**

1. ANY PENETRATIONS, MADE BY A TRADE CONTRACTOR IN EXISTING NEW WALLS/PARTITIONS WILL NEED TO BE PATCHED AND THEN SEALED, WHERE ANULAR SPACE OCCURS, BY THE TRADE MAKING THE PENETRATION IN A MANNER THAT IS CONSISTENT WITH THE WALL PARTITIONS CONSTRUCTION WITH NO GAPS OR OPENINGS AROUND THE PENETRATION, WHEN VISIBLE TO THE ROOM, IT SHOULD BE FINISHED IN THE SAME MANNER AS THE ADJACENT WALL/PARTITION. REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.
2. FOR DEMOLITION, WHERE EXISTING SYSTEMS HAVE BEEN REMOVED FROM EXISTING WALLS/PARTITIONS TRADES TO COORDINATE WITH THE GENERAL CONTRACTOR WHERE THOSE SYSTEMS HAVE BEEN REMOVED AND PATCHING AND SEALING NEEDS TO OCCUR. PLEASE REFER TO ARCHITECTURAL SERIES A.2.1.X FOR FURTHER INFORMATION.
3. THE AREA OF SCOPE IS SERVED BY AHU-13 FOR REFERENCE.
4. THE AREA OF SCOPE IS SERVED BY MANIFOLDED LEF-7, LEF-8, LEF-9, AND LEF-10 FOR EXHAUST.
5. REMOVE ALL EXISTING COMMUNICATION WIRING FROM SUPPLY/EXHAUST AIR VALVES IN AN ORDERLY FASHION FOR VALVES THAT ARE BEING REMOVED. NEW COMMUNICATIONS WIRING WILL NEED TO BE PROVIDED TO NEW CONTROLLERS THAT ARE COMPATIBLE WITH CURRENT CONTROLLERS.
6. MAINTAIN DUCT STATIC PRESSURE SENSOR FOR AHU-13. REMOVE ALL EXISTING COMMUNICATION WIRING FROM SUPPLY/EXHAUST AIR VALVES IN AN ORDERLY FASHION FOR VALVES THAT ARE BEING REMOVED. NEW COMMUNICATIONS WIRING WILL NEED TO BE PROVIDED TO NEW CONTROLLERS THAT ARE COMPATIBLE WITH CURRENT CONTROLLERS.
7. SUPPLY DIFFUSERS NOT TO BE LOCATED DIRECTLY ABOVE WORK STATIONS.

1. REBALANCE EXISTING EXHAUST TO NEW CFM SHOWN.
2. PROVIDE NEW SUPERVISORY ENGINE CONTROLLER FOR NEW VAV CONTROLLER WIRING.
3. EXISTING SOFFIT AND DIFFUSERS TO REMAIN. REMOVE DUCTWORK CONNECTED TO EXISTING DIFFUSERS AND PREPARE FOR NEW DUCTWORK CONNECTIONS. REFER TO M2.1.2 NEW ROUTING.
4. THERMOSTAT SERVES BOTH TERMINAL AIR BOXES IN THE LAB AREA.

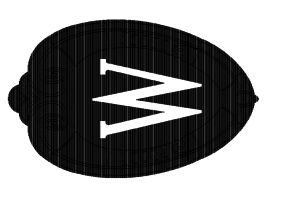


**1 2ND FLOOR DEMOLITION PLAN - VENTILATION**  
1/8" = 1'-0"



**2 2ND FLOOR PLAN - VENTILATION**  
1/8" = 1'-0"

The Board of Regents of the  
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the University of Wisconsin - Madison



250 NORTH MILLS STREET  
MADISON, WI 53706

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2ND FLOOR PLAN - VENTILATION

Revisions:

No.	Date	Description
1	3/09/2023	ADDENDUM 01

Scale	1/8" = 1'-0"
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UWSA #	A-22-010
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Date Issued	2/21/2023
Sheet Number	<b>M2.1.1</b>

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1" = 1'-0"  
REF. SCALE IN INCHES PROJECT #22040000.00



**AIR TERMINAL SCHEDULE**

- NOTES:  
 1. CONTRACTOR SHALL DETERMINE PROPER BORDER TYPE TO MATCH CEILING CONSTRUCTION.  
 2. REFER TO DRAWINGS FOR NECK SIZE. ALL BRANCH DUCTWORK TO AIR TERMINALS SHALL BE NECK SIZE UNLESS NOTED OTHERWISE.

TAG NAME	FACE SIZE (IN.) (NOTE 2)	TYPE	BORDER (NOTE 1)	MATERIAL	FINISH	VOLUME DAMPER REQUIRED	MANUFACTURER	MODEL	NOTES
SD-1	24x24	PERFORATED FACE	LAY-IN	STEEL	WHITE	NO	TITUS	PAS	STEEL PERFORATED DIFFUSER WITH FACE MOUNTED DEFLECTORS

**EXHAUST AIR VALVE SCHEDULE**

- NOTES:  
 1. NEITHER RADIATED NOR DISCHARGE SOUND LEVELS SHALL EXCEED NC 35 AT 1.5" INLET STATIC PRESSURE WHEN TESTED PER AHR1 STANDARD 885-2008 USING 5/8" 20-LB DENSITY MINERAL FIBER CEILING TILE.  
 2. REFER TO SPECIFICATION SECTIONS 23 09 93 AND 23 09 15.

TAG NAME	AREA SERVED	CFM	MIN.	PRESSURE DROP	EV SIZE MIN. INLET SIZE (IN.) DIA.	CONTROL TYPE (NOTE 2)	MANUFACTURER	MODEL	SYSTEM SERVED	NOTES
EAT-2123	PI B OFFICE	85	80	0.5	8"	SEQ 1	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2124	LAB B STUDENT OFFICE	320	80	0.5	8"	SEQ 1	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2125-1	LAB B	1,010	230	0.5	16"	SEQ 2	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2125-2	LAB B	1,010	230	0.5	16"	SEQ 2	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2125-H	FUME HOOD LAB B	600	600	0.5	12"	SEQ 2	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2125A	TC B	585	295	0.5	12"	SEQ 1	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2128	LAB A STUDENT OFFICE	250	80	0.5	8"	SEQ 1	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2145-1	LAB A	1,045	230	0.5	16"	SEQ 2	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2145-2	LAB A	1,045	230	0.5	16"	SEQ 2	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2145A	TC A	490	230	0.5	8"	SEQ 1	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2145H	FUME HOOD LAB A	600	600	0.5	12"	SEQ 2	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1
EAT-2147	PIA OFFICE	105	80	0.5	8"	SEQ 1	TITUS	DESV	LEF 7, 8, 9, 10	NOTE 1

**TERMINAL AIR BOX SCHEDULE - SINGLE DUCT**

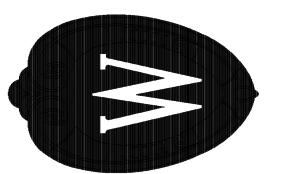
- NOTES:  
 1. NEITHER RADIATED NOR DISCHARGE SOUND LEVELS SHALL EXCEED NC 35 AT 1.5" INLET STATIC PRESSURE WHEN TESTED PER AHR1 STANDARD 885-2008 USING 5/8" 20-LB DENSITY MINERAL FIBER CEILING TILE.  
 2. TOTAL AIR PRESSURE DROP OF TAB AND REHEAT COIL SHALL NOT EXCEED 0.50" WC.  
 3. REFER TO CONTROL SPECIFICATIONS SECTIONS 23 09 15 AND 23 09 93 FOR DESCRIPTION OF CONTROL TYPE.  
 4. SENSOR TYPES: 1 - SENSOR ONLY, 2 - SENSOR WITH ADJUSTMENT, 3 - SENSOR WITH OVERRIDE, 4 - SENSOR WITH ADJUSTMENT AND OVERRIDE.  
 5. HEATING COIL IS BASED ON HEATING AIR FLOW. WATER PRESSURE DROP OF REHEAT COILS SHALL NOT EXCEED 5". PROVIDE REHEAT COILS SEPARATE FROM BOXES IF REQUIRED TO MEET WATER PRESSURE DROP REQUIREMENTS. WHEN LAT °F, EWT °F, AND GPM VALUES ARE BLANK, HEATING COIL IS NOT REQUIRED FOR TAB.  
 6. HEATING COIL SELECTION SHALL BE BASED ON A FIXED LEAVING AIR TEMPERATURE AND VARIABLE FLOW (GPM). PROVIDE FINAL MAXIMUM FLOW RATE (GPM) TO TEST & BALANCE TEMPERATURE CONTROLS CONTRACTORS.

TAG NAME	AREA SERVED	CFM		HEATING COIL (NOTES 5, 6)						MIN. INLET SIZE (IN.) DIA.	CONTROL TYPE (NOTE 3)	SENSOR TYPE (NOTE 4)	MANUFACTURER	MODEL (NOTES 1, 2)	SYSTEM SERVED	NOTES
		COOLING MAX.	HEATING MAX.	MIN.	EAT °F	LAT °F	EWT °F	LWT °F	MAX. GPM							
AT-2100L	CORRIDOR	250	250	80	55.0	85.0	180	150	0.4	6"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2123	PI B OFFICE	85	85	80	55.0	85.0	180	150	0.2	6"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2124	LAB B STUDENT OFFICE	320	300	80	55.0	85.0	180	150	0.6	6"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2125-1	LAB B	1010	305	230	55.0	95.0	180	150	0.9	10"	SEQ 2	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2125-2	LAB B	1010	305	230	55.0	95.0	180	150	0.9	10"	SEQ 2	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2125A	TC B	435	300	145	55.0	95.0	180	150	0.9	8"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2128	LAB A STUDENT OFFICE	250	250	80	55.0	85.0	180	150	0.4	6"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2145-1	LAB A	1045	315	230	55.0	95.0	180	150	0.9	10"	SEQ 2	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2145-2	LAB A	1045	315	230	55.0	95.0	180	150	0.9	10"	SEQ 2	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2145A	TC A	340	300	80	55.0	85.0	180	150	0.6	6"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6
AT-2147	PIA OFFICE	105	105	80	55.0	95.0	180	150	0.3	6"	SEQ 1	2	TITUS	DESV	AHU-13	NOTES 5, 6

**SMITHGROUP**

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The Board of Regents of the  
 University of Wisconsin on behalf of  
 the University of Wisconsin - Madison



250 NORTH MILLS STREET  
 MADISON, WI 53706

MSB 2ND FLOOR LAB RENOVATION  
 MICROBIAL SCIENCES BUILDING  
 UNIVERSITY OF WISCONSIN - MADISON  
 MADISON, WISCONSIN

MECHANICAL SCHEDULES

Sheet Title:

**SCHEDULE GENERAL NOTES:**

- A. DISCONNECT AND CONTROLLER STARTER FURNISHED AND INSTALLED BY:  
 MFR = MANUFACTURER  
 EC = ELECTRICAL CONTRACTOR  
 MC = FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR  
 MFR/EC = FURNISHED LOOSE BY MANUFACTURER INSTALLED BY ELECTRICAL CONTRACTOR...
- B. DISCONNECT TYPE:  
 F = FUSED  
 NF = NON-FUSED
- C. CONTROLLER STARTER TYPE:  
 FV = FULL VOLTAGE  
 WYE = WYE-DELTA  
 SS = SOLID STATE (SOFT START)  
 MS = MANUAL STARTER  
 VFD = VARIABLE FREQUENCY DRIVE  
 VFD/B = VARIABLE FREQUENCY DRIVE WITH BYPASS
- D. FAN RPM SHALL NOT EXCEED 110% OF SCHEDULED VALUE. WITH THE SCHEDULED WHEEL TYPE. SUBSTITUTION OF BI OR BIA FANS FOR FC IS ACCEPTABLE IF EFFICIENCY IS NOT LOWER.
- E. NO EQUIPMENT SHALL BE SELECTED ABOVE 90% OF MOTOR NAME PLATE RATING.
- F. MUST BE WITHIN +/- 10% OF SCHEDULED RPM.
- G. CURB TYPE:  
 MFR = STANDARD CURB BY MANUFACTURER  
 GC = BY GENERAL CONTRACTOR  
 SAC = SOUND ATTENUATOR CURB

Revisions:

No.	Date	Description
1	3/09/2023	ADDENDUM 01

Scale

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 UWSA # A-22-010

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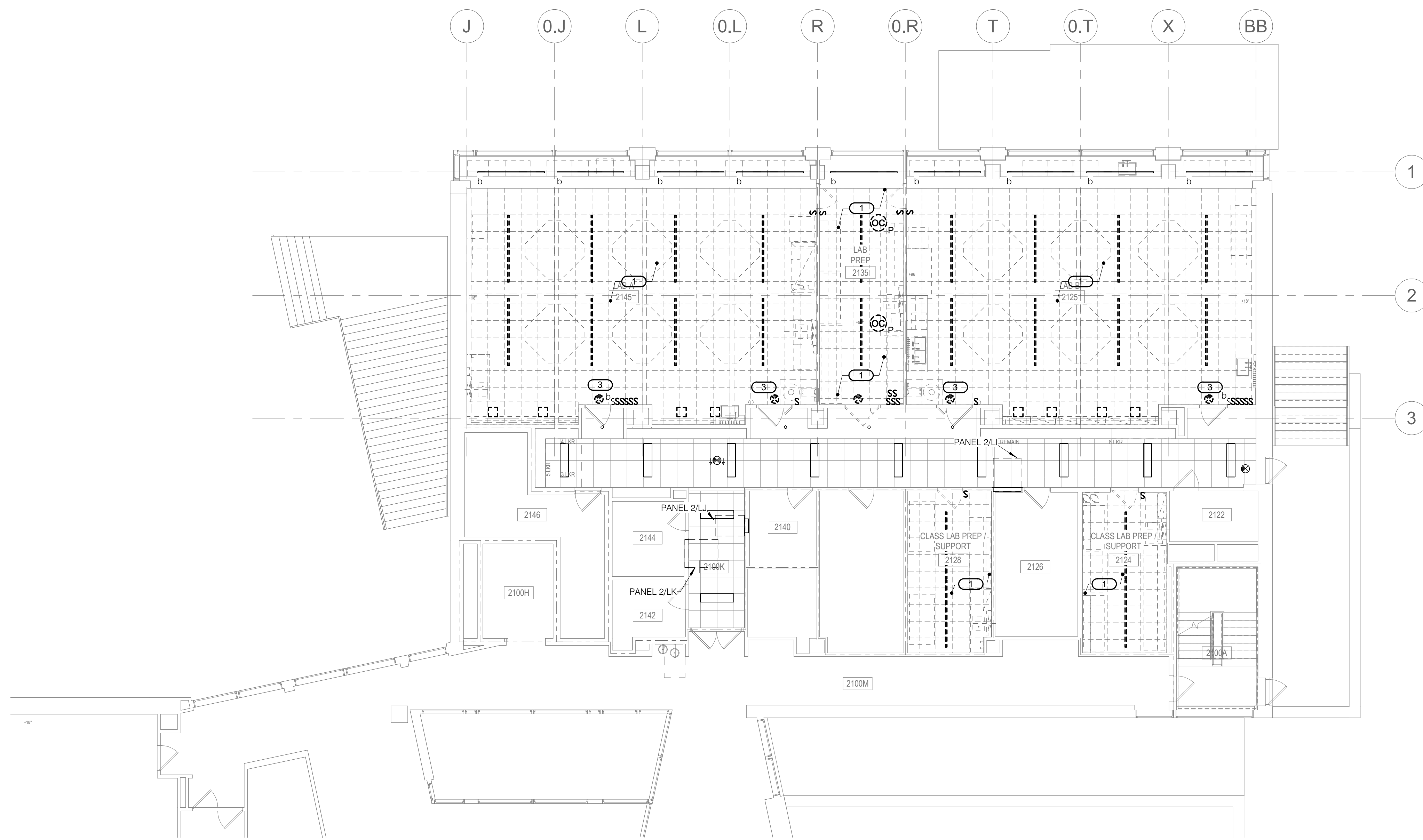
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Sheet Number **M6.0.0**

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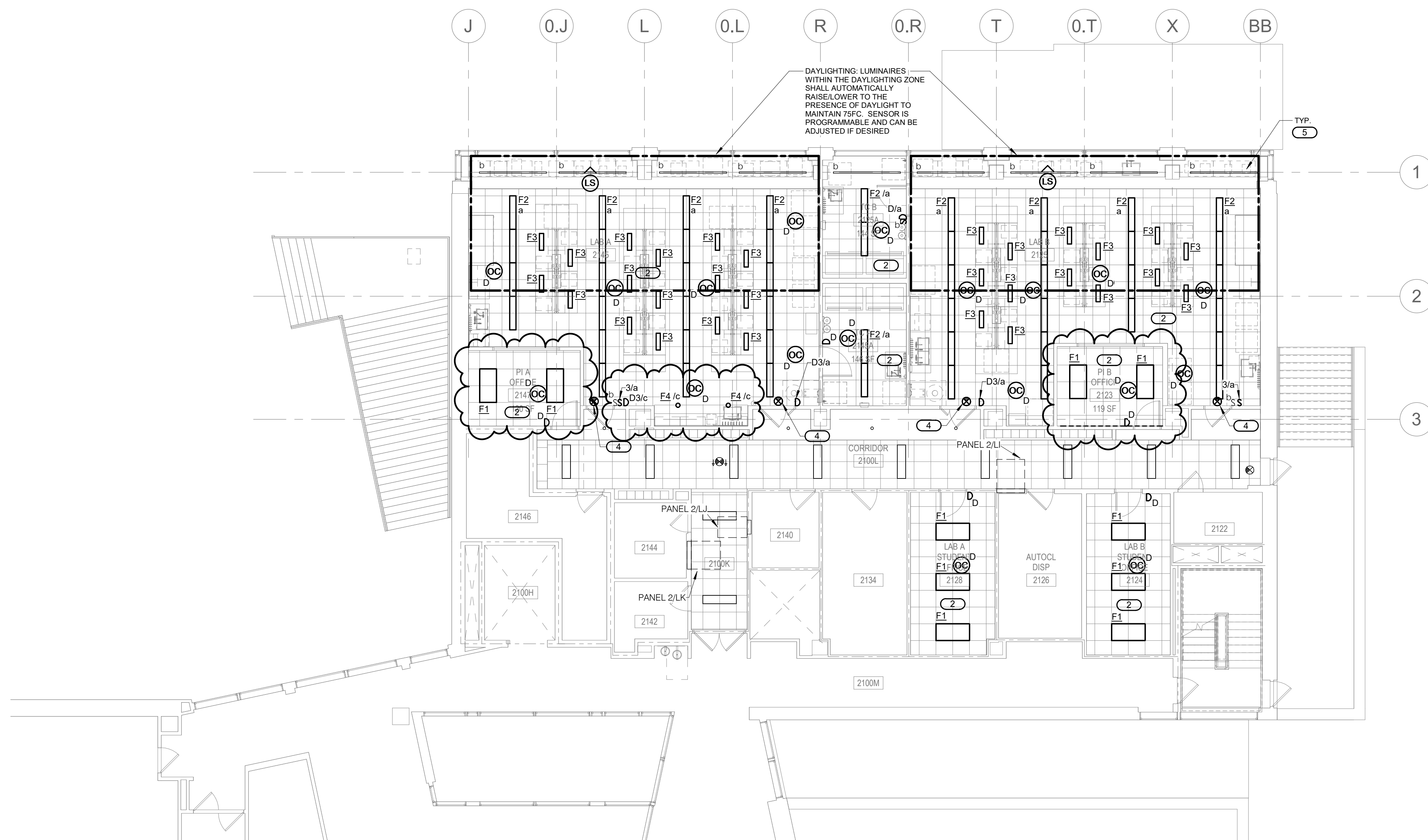
**2 2ND FLOOR DEMOLITION PLAN - LIGHTING**  
1/8" = 1'-0"

**GENERAL NOTES:**

1. ANY PENETRATIONS, MADE BY A TRADE CONTRACTOR IN EXISTING NEW WALLS/PARTITIONS WILL NEED TO BE PATCHED AND THEN SEALED. WHERE AN UNLAP SPACE OCCURS, BY THE TRADE MAKING THE PENETRATION IN A MANNER THAT IS CONSISTENT WITH THE WALL/PARTITIONS CONSTRUCTION WITH NO GAPS OR OPENINGS AROUND THE PENETRATION. WHEN VISIBLE TO THE ROOM, IT SHOULD BE FINISHED IN THE SAME MANNER AS THE ADJACENT WALL/PARTITION. REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.
2. FOR DEMOLITION, WHERE EXISTING SYSTEMS HAVE BEEN REMOVED FROM EXISTING WALLS/PARTITIONS TRADES TO COORDINATE WITH THE GENERAL CONTRACTOR WHERE THOSE SYSTEMS HAVE BEEN REMOVED AND PATCHING AND SEALING NEEDS TO OCCUR. PLEASE REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.
3. REFER TO E000 FOR SYMBOLS LIST, GENERAL NOTES, INSTALLATION NOTES, AND CONDUIT INSTALLATION SCHEDULE.
4. REFER TO E6.1.0 FOR ELECTRICAL SCHEDULES.
5. OCCUPANCY SENSORS SHALL BE SET TO MAXIMUM TIME DELAY.

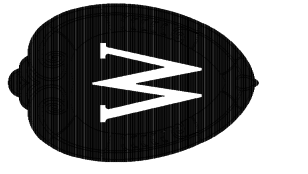
**KEYNOTES: ( # )**

1. DISCONNECT AND REMOVE LIGHTING. RETAIN CIRCUIT FOR RE-USE. REFER TO 1/2.1.1 FOR MORE INFORMATION.
2. CONNECT NEW LIGHTING AND CONTROLS TO EXISTING CIRCUIT SERVING SPACE USING 2#12 & #12 GND IN 3/4" C.
3. DISCONNECT AND RETAIN EXIT SIGN AND CIRCUIT FOR RE-USE. REFER TO 1/2.1.1 FOR MORE INFORMATION.
4. NEW LOCATION FOR EXIT SIGN RETAINED DURING DEMOLITION. RECONNECT TO LIGHTING CIRCUIT RETAINED DURING DEMOLITION.
5. RECESSED LUMINAIRES WITH SUBSCRIPT 'D' SHALL HAVE EXISTING FLUORESCENT LAMPS REPLACED WITH WITH NEW LED REPLACEMENT LAMPS MATCHING EXISTING COLOR TEMPERATURE AND EQUIVALENT LUMEN OUTPUT.



**1 2ND FLOOR PLAN - LIGHTING**  
1/8" = 1'-0"

The Board of Regents of the  
University of Wisconsin on behalf of  
the University of Wisconsin - Madison



250 NORTH MILLS STREET  
MADISON, WI 53706

**MSB 2ND FLOOR LAB RENOVATION**  
MICROBIAL SCIENCES BUILDING  
UNIVERSITY OF WISCONSIN - MADISON  
MADISON, WISCONSIN

2ND FLOOR PLAN - LIGHTING

Sheet Title:

Revisions:

No.	Date	Description
1	3/09/2023	ADDENDUM 01

Scale: 1/8" = 1'-0"

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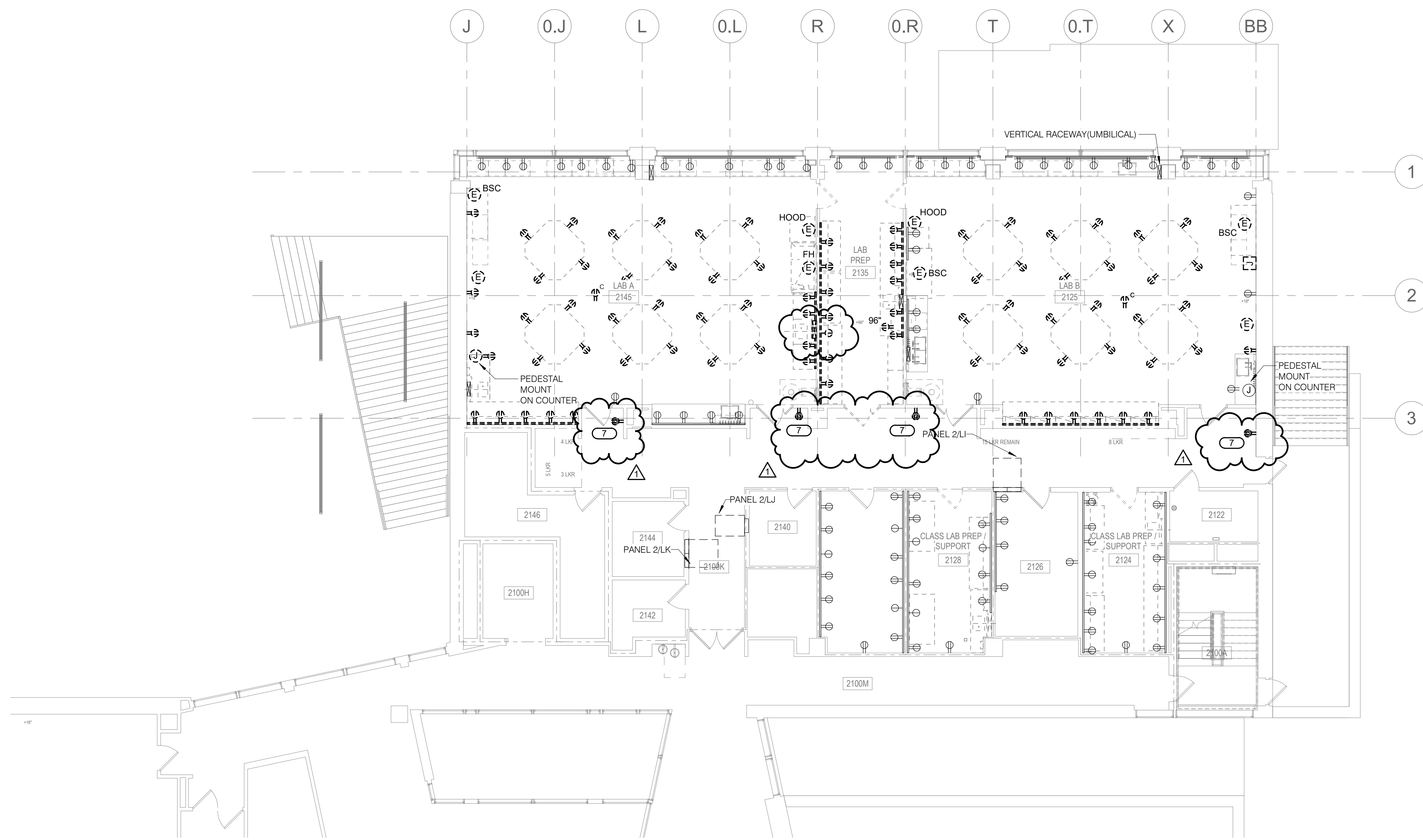
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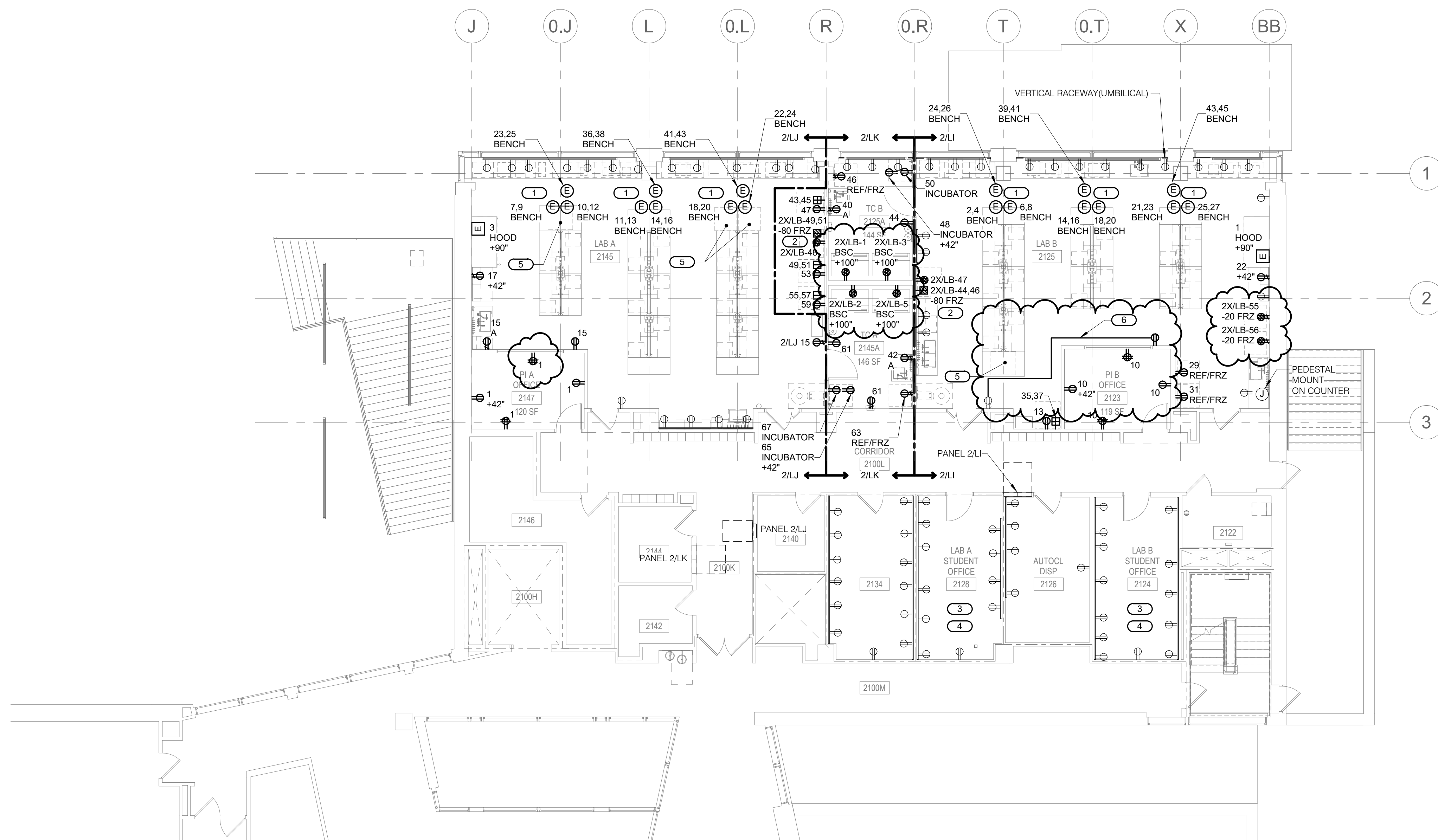
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REF. SCALE IN INCHES PROJECT #22054990.01



**2 2ND FLOOR DEMOLITION PLAN - POWER**  
1/8" = 1'-0"

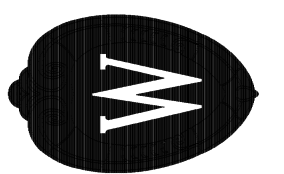
- GENERAL NOTES:**
1. ANY PENETRATIONS, MADE BY A TRADE CONTRACTOR IN EXISTING NEW WALLS/PARTITIONS WILL NEED TO BE PATCHED AND THEN SEALED, WHERE ANNULAR SPACE OCCURS, BY THE TRADE MAKING THE PENETRATION IN A MANNER THAT IS CONSISTENT WITH THE WALLS/PARTITIONS CONSTRUCTION WITH NO GAPS OR OPENINGS AROUND THE PENETRATION. WHEN VISIBLE TO THE ROOM, IT SHOULD BE FINISHED IN THE SAME MANNER AS THE ADJACENT WALL/PARTITION. REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.
  2. FOR DEMOLITION, WHERE EXISTING SYSTEMS HAVE BEEN REMOVED FROM EXISTING WALLS/PARTITIONS TRADES TO COORDINATE WITH THE GENERAL CONTRACTOR WHERE THOSE SYSTEMS HAVE BEEN REMOVED AND PATCHING AND SEALING NEEDS TO OCCUR. PLEASE REFER TO ARCHITECTURAL SERIES A2.1.X FOR FURTHER INFORMATION.
  3. REFER TO E000 FOR SYMBOLS LIST, GENERAL NOTES, INSTALLATION NOTES, AND CONDUIT INSTALLATION SCHEDULE.
  4. REFER TO E8.1.0 FOR ELECTRICAL SCHEDULES.
  5. SHADED DEVICES INDICATE CONNECTION TO EMERGENCY GENERATOR POWER.

- KEYNOTES: (#)**
1. E.C. TO PROVIDE POWER AND MAKE TERMINATIONS TO CEILING POWER PANEL PROVIDED BY LAB EQUIPMENT SUPPLIER.
  2. REFER TO E2.1.4 FOR EMERGENCY POWER PANEL LOCATION AND SUGGESTED CIRCUIT ROUTING.
  3. ALL BREAKERS SERVING POWER CIRCUITS IN THIS ROOM SHALL BE REPLACED WITH STANDARD NON-GFCI BREAKERS WITH MATCHING AMPERAGE.
  4. RECEPTACLES IN THIS SPACE ARE EXISTING TO REMAIN.
  5. LAB EQUIPMENT IN THIS LOCATION TO PLUG INTO RECEPTACLE MOUNTED WITH LAB BEYOND MANUFACTURE.
  6. CONNECT NEW RECEPTACLE TO EXISTING GENERAL RECEPTACLE CIRCUIT SERVING THIS LAB USING 2#12 & #12 GND IN 3/4" CONDUIT.
  7. RECEPTACLE SHALL BE REMOVED. RETAIN CIRCUIT FOR RE-USE. REFER TO 2/E2.1.2 FOR MORE INFORMATION.
  8. RE-USE CIRCUIT RETAINED DURING DEMOLITION AND FED FROM EXISTING PANEL 2X1.B.



**1 2ND FLOOR PLAN - POWER**  
1/8" = 1'-0"

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**MSB 2ND FLOOR LAB RENOVATION**  
MICROBIAL SCIENCES BUILDING  
UNIVERSITY OF WISCONSIN - MADISON  
MADISON, WISCONSIN

2ND FLOOR PLAN - POWER

Sheet Title:

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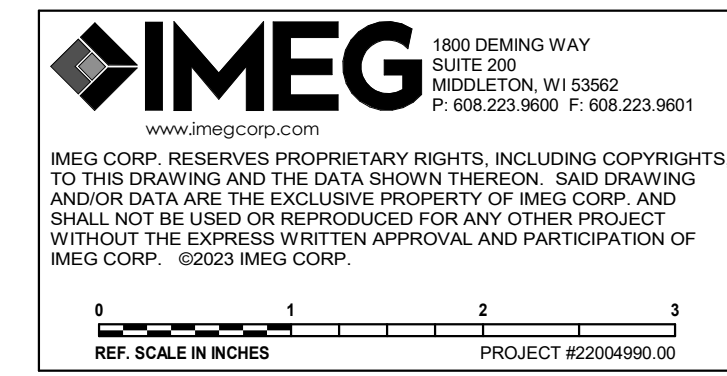
1 3/10/2023 ADDENDUM 01

Scale: UWS# 0060-2201 A-22-010

Set Type: BID DOCUMENTS

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PANEL 2X/LB MOUNTING: SURFACE ENCLOSURE: NEMA PB 1 FED FROM: 0 A/VP @ LOCATION: SOLID NEUTRAL GROUND BUS MAIN: 100 A MCB VOLTS: 120/208 Wye PHASE: 3 WIRE: 4 SCCR: 10 kA ISC UNKNOWN 0.00 kA

Table with columns: KEY, CKT NO., LOAD DESCRIPTION, OCPD, WIRE SIZE, A, B, C, WIRE SIZE, OCPD, LOAD DESCRIPTION, CKT NO., KEY. Includes load classification and summary table.

LOAD CLASSIFICATION, CONNECTED LOAD, DEMAND FACTOR, ESTIMATED DEMAND, TOTALS. Summary table for Panel 2X/LB.

PANEL 2/LK MOUNTING: RECESSED ENCLOSURE: NEMA PB 1 FED FROM: -- LOCATION: CORRIDOR 2100K SOLID NEUTRAL GROUND BUS MAIN: 150 A MCB VOLTS: 120/208 Wye PHASE: 3 WIRE: 4 SCCR: 10 kA ISC UNKNOWN 0.00 kA

Table with columns: KEY, CKT NO., LOAD DESCRIPTION, OCPD, WIRE SIZE, A, B, C, WIRE SIZE, OCPD, LOAD DESCRIPTION, CKT NO., KEY. Includes load classification and summary table.

LOAD CLASSIFICATION, CONNECTED LOAD, DEMAND FACTOR, ESTIMATED DEMAND, TOTALS. Summary table for Panel 2/LK.

PANEL 2/LJ MOUNTING: RECESSED ENCLOSURE: NEMA PB 1 FED FROM: -- LOCATION: CORRIDOR 2100K SOLID NEUTRAL GROUND BUS MAIN: 100 A MCB VOLTS: 120/208 Wye PHASE: 3 WIRE: 4 SCCR: 10 kA ISC UNKNOWN 0.00 kA

Table with columns: KEY, CKT NO., LOAD DESCRIPTION, OCPD, WIRE SIZE, A, B, C, WIRE SIZE, OCPD, LOAD DESCRIPTION, CKT NO., KEY. Includes load classification and summary table.

LOAD CLASSIFICATION, CONNECTED LOAD, DEMAND FACTOR, ESTIMATED DEMAND, TOTALS. Summary table for Panel 2/LJ.

PANEL 2/LI MOUNTING: RECESSED ENCLOSURE: NEMA PB 1 FED FROM: 0 A/VP @ LOCATION: CORRIDOR 2100L SOLID NEUTRAL GROUND BUS MAIN: 100 A MCB VOLTS: 120/208 Wye PHASE: 3 WIRE: 4 SCCR: 10 kA ISC UNKNOWN 0.00 kA

Table with columns: KEY, CKT NO., LOAD DESCRIPTION, OCPD, WIRE SIZE, A, B, C, WIRE SIZE, OCPD, LOAD DESCRIPTION, CKT NO., KEY. Includes load classification and summary table.

LOAD CLASSIFICATION, CONNECTED LOAD, DEMAND FACTOR, ESTIMATED DEMAND, TOTALS. Summary table for Panel 2/LI.

LED LUMINAIRE SCHEDULE (DESC) DOOR: FA - FLAT ALUMINUM, FS - FLAT STEEL, RA - REGRESSED ALUMINUM, RS - REGRESSED STEEL, FINISH: PAF - PAINT AFTER FABRICATION, CFSA - COLOR-FINISH SELECTION BY ARCHITECT (MTG) MOUNTING: DL - CEILING SURFACE, CV - COVE, FR - FLANGED RECESSED, P - PERIMETER, PL - POLE (TYPE) DRIVER: 0-10V - 0-10V DIMMING, DALI - DIGITAL ADDRESSABLE, DMX - DIGITAL MULTIPLEX, VERIFY AND COORDINATE ALL CEILING TYPES WITH LUMINAIRE MOUNTING AND TRIM REQUIREMENTS PRIOR TO THE RELEASE OF THE LUMINAIRE ORDER. CONFIRM ALL COLORS AND FINISHES OF ALL LUMINAIRE COMPONENTS WITH ARCHITECT AND INTERIOR DESIGNER PRIOR TO THE RELEASE OF THE LUMINAIRE ORDER. UNLESS INDICATED ON LIGHTING PLANS OR BELOW, REFER TO ARCHITECTURAL AND INTERIOR DESIGN ELEVATIONS, SECTIONS AND DETAILS FOR ALL SUSPENDED AND WALL MOUNTED LUMINAIRE MOUNTING HEIGHTS. REFER TO SPECIFICATION SECTIONS LED LISTING 26 51 19 FOR ADDITIONAL INFORMATION AND REQUIREMENTS. INTERIOR CORRELATED COLOR TEMPERATURE 4000K, COLOR RENDERING INDEX (CRI) AT OR ABOVE 80, UNLESS NOTED OTHERWISE.

Table with columns: ITEM, DESCRIPTION, L/L, MTG, L, W, H, DIA., ANSI WATTS, PER, TYPE, QTY, LED DELIVERED LUMENS (MIN), DRIVER VOLTS, TYPE, MANUFACTURER AND MODEL. Includes item details for F1, F2, F3, F4.

### VIEW KEY

NAME: LEVEL NAME, HEIGHT ABOVE PROJECT 0'-0"

INDICATES DIRECTION OF TRUE NORTH

INDICATES SIMILAR DETAIL REFERENCED IN MULTIPLE LOCATIONS

INDICATES NOTE USED TO DESCRIBE ADDITIONAL INFORMATION ABOUT WORK REQUIRED, SPECIFIC TO THE SHEET AND/OR DETAIL

INDICATES DEGREE OF TRUE NORTH

PLAN OR DETAIL NUMBER

PLAN OR DETAIL NAME

VIEW NAME

1/8" = 1'-0"

PLAN OR DETAIL SCALE

INDICATES SIMILAR DETAIL REFERENCED IN MULTIPLE LOCATIONS

DETAIL REFERRED TO BY SECTION CUT

SHEET DETAIL IS LOCATED ON

LINE TYPE AND TAG KEY:

NEW WORK BY THIS CONTRACTOR (WIDE LINE)

NEW

EXISTING TO BE REMOVED (SHORT DASHED PATTERN)

NEW UNDERFLOOR OR UNDERGROUND (LONG DASHED PATTERN)

EXISTING TO REMAIN OR WORK BY OTHERS (NARROW LINE)

EXISTING

EXISTING TO BE REMOVED BY OTHERS (SHORT DASHED PATTERN)

EXISTING UNDERFLOOR OR UNDERGROUND (LONG DASHED PATTERN)

HALFTONING DOES NOT MODIFY SCOPE.

TAG-E TAGS WITH DASH 'E' INDICATES THE REFERENCED OBJECT IS EXISTING

TAG UNDERLINED TAG INDICATES OBJECT IS IN-SCOPE. IF NEW, ADDITIONAL INFORMATION IS AVAILABLE IN A SCHEDULE, MATERIAL LIST, OR SYMBOL LIST

INDICATES AN EXISTING SYSTEM'S POINT OF CONNECTION/REMOVAL

### CONTRACTOR ABBREVIATION KEY

ABBR:	DESCRIPTION:
C.M.	CONSTRUCTION MANAGER
E.C.	ELECTRICAL CONTRACTOR
F.P.C.	FIRE PROTECTION CONTRACTOR
G.C.	GENERAL CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
T.C.	TECHNOLOGY CONTRACTOR

### TECHNOLOGY SYMBOL LIST

SYMBOL:	EQUIPMENT LIST ABBREV.:	DESCRIPTION:	NOTE:
CF	SC-IO-W	INFORMATION OUTLET (WALL)	1.
CF	N/A	INFORMATION OUTLET (WALL) EXISTING	2.
CF	SC-IO-G	INFORMATION OUTLET (CEILING)	1.
CF-WAP	SC-WAP-C	WIRELESS ACCESS POINT (CEILING)	1.
WIDTH X HEIGHT		CABLE TRAY, CHANNEL TRAY, BASKET TRAY	
WIDTH X HEIGHT		LADDER RACK	
DIAMETER @ C		CONDUIT	
		CONDUIT DOWN	
		CONDUIT UP OR UP/DOWN	
		CONDUIT SLEEVE	
		CONTINUATION	

**GENERAL NOTES:**

- ALL SYMBOLS AND ABBREVIATIONS LISTED MAY NOT BE APPLICABLE TO THIS PROJECT. REFER TO THE TECHNOLOGY EQUIPMENT SCHEDULE FOR MORE COMPLETE DESCRIPTION AND ITEMS.
- ALL SYMBOLS AND ABBREVIATIONS REFER TO TECHNOLOGY SHEETS ONLY AS DEFINED ON THE SHEET INDEX. REFER TO THE GENERAL TECHNOLOGY NOTES FOR ADDITIONAL INFORMATION.
- ALL SYMBOLS LISTED ABOVE ARE FOR REFERENCE ONLY. REFER TO PLANS AND LINE TYPE KEY FOR NEW, EXISTING TO REMAIN AND TO BE REMOVED ITEMS FOR ADDITIONAL INFORMATION.
- REFER TO RISERS ON SHEET(S) TS 1.0.

**TECHNOLOGY SYMBOL NOTES:**

- CF INDICATES INFORMATION OUTLET FACEPLATE CONFIGURATION. REFER TO INFORMATION OUTLET SCHEDULE ON TS 1.0 FOR ADDITIONAL INFORMATION.
- REFER TO LINE TYPE KEY FOR EXISTING TO REMAIN OR DEMO.

### TECHNOLOGY ABBREVIATION KEY

ABBR:	DESCRIPTION:
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
BFC	BELOW FINISHED CEILING
C	CONDUIT
DE	DELAYED EGRESS
DPDT	DOUBLE POLE DOUBLE THROW
FOV	FIELD OF VIEW
J-BOX	JUNCTION BOX
POE	POWER OVER ETHERNET
PTZ	PAN TILT ZOOM
SIM	SIMILAR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
+#	MOUNTING HEIGHT ABOVE FINISHED FLOOR
EF-#	ENTRANCE FACILITY
MC-#	MAIN CROSS-CONNECT
TR-#	TELECOMMUNICATIONS ROOM

### SUGGESTED MATRIX OF RESPONSIBILITY

ITEM:	SHOWN ON:	FURNISHED BY:	INSTALLED BY:	NOTES:
TECHNOLOGY ROUGH-INS REFER TO TECHNOLOGY EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR DEFINITION	T-SERIES	E.C.	E.C.	3, 4.
INFORMATION OUTLET FACEPLATES, JACKS, AND TERMINATIONS	T-SERIES	T.C.	T.C.	
CONDUIT SLEEVES (WHEN SHOWN ON DRAWINGS)	T-SERIES	E.C.	E.C.	
CONDUIT SLEEVES NOT SHOWN BUT REQUIRED FOR PROPER INSTALLATION OF SYSTEM	N/A	T.C.	T.C.	2, 4.
TELECOMMUNICATION SYSTEMS ROUGH-INS	T-SERIES	E.C.	E.C.	1.
TELECOMMUNICATION EQUIPMENT, CABLING, AND TERMINATIONS	T-SERIES	T.C.	T.C.	
CONNECTION OF TECHNOLOGY BONDING SYSTEM TO THE ELECTRICAL GROUND SYSTEM	T-SERIES	E.C.	E.C.	
LINE VOLTAGE POWER (+120V OR GREATER)	E-SERIES	E.C.	E.C.	
LINE VOLTAGE POWER (NOT SHOWN BUT REQUIRED FOR PROPER INSTALLATION OF SYSTEM)	N/A	T.C.	E.C.	2, 4.
LINE VOLTAGE POWER FOR DOOR HARDWARE POWER SUPPLIES	ARCH SPEC	E.C.	E.C.	
LOW VOLTAGE CABLING FOR TECHNOLOGY SYSTEMS	T-SERIES	T.C.	T.C.	
CABLE HANGERS AND SUPPORTS OR OTHER CABLE ROUTING METHODS (OTHER THAN CONDUIT AND CABLE TRAY)	T-SERIES	T.C.	T.C.	5.
FLOOR BOX (ROUGH-IN)	T & E SERIES	E.C.	E.C.	

**SUGGESTED MATRIX OF RESPONSIBILITY NOTES**

- LOCATIONS OF TELECOMMUNICATIONS ROUGH-INS SHALL BE INDICATED BY THE INFORMATION OUTLET SYMBOLS ON THE DRAWINGS. REFER TO THE TECHNOLOGY SYMBOL LIST FOR ADDITIONAL INFORMATION.
- BASED ON THE INHERENT DIFFERENCES IN PRODUCTS FROM VARIOUS MANUFACTURERS, ALL REQUIRED EQUIPMENT MAY NOT BE SHOWN ON THE DRAWINGS FOR ALL ACCEPTABLE MANUFACTURERS.
- INCLUDES BACKBOXES AND CONDUIT REQUIRED FOR THE TECHNOLOGY SYSTEMS INSTALLATION. THE E.C. SHALL BASE THE BID ON THE BASIS OF DESIGN SHOWN ON THE CONTRACT DOCUMENTS.
- ALL CHANGES TO THE SLEEVES, BACKBOXES, CONDUITS, AND POWER REQUIRED BECAUSE OF THE T.C.'S SELECTION OF AN ALTERNATE ACCEPTABLE MANUFACTURER OR FROM SYSTEM CONFIGURATIONS THAT ARE LEFT TO THE CHOICE OF THE CONTRACTOR SHALL BE INCLUDED IN THE T.C.'S BID. THIS BID SHALL INCLUDE INSTALLATION BY A LICENSED ELECTRICIAN.
- UNLESS TRADE RULES DICTATE OTHERWISE.

### TECHNOLOGY GENERAL NOTES:

- ###/###/### INDICATES TECHNOLOGY EQUIPMENT SCHEDULE ITEM LABELED AS "EQUIPMENT LIST ABBREVIATION"
- REFER TO TECHNOLOGY EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR FULL DESCRIPTIONS AND MANUFACTURERS OF ALL DEVICES.

TECHNOLOGY MOUNTING SUBSCRIPT KEY:

A MOUNT AT +6" TO CENTERLINE ABOVE COUNTER OR BACKSPLASH

H MOUNT ORIENTED HORIZONTALLY

L MOUNT IN CASEWORK

M MOUNT IN MODULAR FURNITURE

S MOUNT IN SURFACE RACEWAY

A SLASH IS USED BETWEEN TWO SUBSCRIPTS, E.G., AH.

### TECHNOLOGY INSTALLATION NOTES:

- THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE ADA STANDARDS FOR ACCESSIBLE DESIGN. REFER TO THE ADA GUIDELINES FOR ALL CONFIGURATION DETAILS ON THIS PAGE FOR ADDITIONAL INFORMATION.
- CANCEL ALL CONDUIT IN WALLS, PARTITIONS, ABOVE CEILING, IN FLOOR SLAB, ETC. UNLESS OTHERWISE INDICATED ON THE PLANS OR IN THE SPECIFICATIONS. CONDUIT IN MECHANICAL ROOMS AND STORAGE ROOMS WITHOUT CEILINGS MAY BE EXPOSED ON BUILDING STRUCTURE.
- BOXES LOCATED ON OPPOSITE SIDES OF NON-RATED WALLS SHALL BE OFFSET A MINIMUM OF 6" HORIZONTALLY. BOXES ON OPPOSITE SIDES OF FIRE RATED WALLS SHALL BE OFFSET A MINIMUM OF 24" HORIZONTALLY. "THRU-THE-WALL" BOXES SHALL NOT BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER.
- VERIFY ALL FURNITURE, MODULAR FURNITURE, AND EQUIPMENT LOCATIONS WITH ARCHITECTURAL PLANS, ELEVATIONS, AND REVIEWED SHOP DRAWINGS. PRIOR TO MAKING THE ACTUAL TELECOMMUNICATIONS INSTALLATION, ADJUST OUTLETS OR CONNECTION LOCATIONS TO ACCOMMODATE FURNITURE AND/OR EQUIPMENT.
- TELECOMMUNICATIONS EQUIPMENT SHALL BE MOUNTED TO ALLOW ACCESS TO ELECTRICAL AND MECHANICAL EQUIPMENT. ALL MOUNTING OF TELECOMMUNICATION DEVICES ON EQUIPMENT SUPPLIED BY ANOTHER CONTRACTOR SHALL BE APPROVED IN ADVANCE BY THE OTHER CONTRACTOR.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS. ALL OPENINGS SHALL BE REPAIRED TO MATCH EXISTING BY A QUALIFIED CONTRACTOR AT THE EXPENSE OF THIS CONTRACTOR. ALL CONDUITS THROUGH WALLS SHALL BE GROUTED OR SEALED INTO OPENINGS.
- ALL MATERIALS USED TO SEAL PENETRATIONS OF FIRE RATED WALLS AND FLOORS SHALL BE TESTED AND CERTIFIED AS A SYSTEM PER ASTM E814 STANDARDS FOR FIRE TESTS OF THROUGH-PENETRATION FIRESTOPS.
- THE TECHNOLOGY CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF THE CEILINGS, CEILING TILES, AND CEILING GRID ASSOCIATED WITH THE AREAS OF WORK BY ALL CONTRACTORS.
- FLUSH MOUNT ALL TELECOMMUNICATION OUTLETS AT +18" FROM FLOOR (CENTERLINE DIMENSION), EXCEPT WHERE OTHERWISE NOTED. OUTLETS MAY BE SURFACE MOUNTED WHEN CONDUIT IS SPECIFIED EXPOSED.
- EACH CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED BY THEIR ACTIONS TO THE WALLS, FLOORS, CEILINGS, AND ROOFS. THE CONTRACTOR WHOSE WORK CAUSES DAMAGE IS RESPONSIBLE FOR PATCHING TO MATCH ORIGINAL CONSTRUCTION, FIRE RATING, AND FINISH.

### TECHNOLOGY SHEET INDEX

T000	TECHNOLOGY COVERSHEET
T2.1.1	2ND FLOOR PLAN - TECHNOLOGY
T4.1.0	TECHNOLOGY DETAILS
T5.1.0	TECHNOLOGY SCHEDULES
GRAND TOTAL: 4	

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The Board of Regents of the  
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MICROBIAL SCIENCES BUILDING  
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