



Kane County

KC AD HOC Opioid Settlement Fund Committee

Agenda

Government Center
719 S. Batavia Ave., Bldg. A
Geneva, IL 60134

Thursday, May 1, 2025

10:00 AM

County Board Room

1. **Call To Order**
2. **Roll Call**
3. **Remote Attendance Requests**
4. **Approval Minutes: November 7, 2024**
5. **Public Comment**
6. **New and Unfinished Business**
 - A. **Resolution:** Approving Opioid Settlement Revenue Expenditures for Forensic Lab Expenses and Authorizing Budget Adjustment
 - B. **Resolution:** Authorizing Funding of the Kane County Forensics Lab Renovation Project in the Kane County Sheriff's Office and Budget Adjustment
 - C. **Resolution:** Approving Opioid Settlement Revenue Expenditures for Kane County Court Services Expenses and Authorizing Budget Adjustment (not attached)
7. **Executive Session (if needed)**
8. **Adjournment**

WHEREAS, the expenses (as described in the attached report) support efforts to prevent the misuse of opioids, as well as overdose deaths and other harms from opioid addiction, in Kane County by utilizing and expediting drug chemical testing, as part of a comprehensive program, to target the availability of illegal opioids, enhance supply-side enforcement efforts, expedite determinations of causes of death in suspected opioid overdoses, and generate actionable data that can be used by the Kane County Health Department, first responders, and/or other community partners for harm reduction opportunities by targeting areas substantially affected by illicit opioids.

NOW, THEREFORE, BE IT RESOLVED by the AD HOC Opioid Settlement Fund Committee that the designated administrators of the opioid settlement funds approve of using \$211,699.04 (Two Hundred Eleven Thousand, Six Hundred Ninety-Nine and 04/100 Dollars) for expenses of the Kane County Forensics Laboratory and authorizes a budget adjustment for the initial expenses of \$211,699.04 (Two Hundred Eleven Thousand, Six Hundred Ninety-Nine and 04/100 Dollars) incurred by the Sheriff's Office in establishing its new forensics lab from the Opioid Settlement Fund 349. The following budget adjustment of FY25 is required:

001.380.380.99349	Transfer to Fund 349	211,699.04
001.380.380.40000	Salaries and Wages	(112,943.40)
BENEFITS	Benefit Compensation	(30,982.38)
001.380.380.60010	Operating Supplies	(67,773.26)
349.580.000.39001	Transfer from Fund 001	211,699.04
349.580.750.40000	Salaries and Wages	112,943.40
BENEFITS	Benefit Compensation	30,982.38
349.580.750.60010	Operating Supplies	67,773.26

Line Item: See above.

Line Item Description: Opioid Settlement Fund

Was Personnel/Item/Service approved in original budget or a subsequent budget revision? No

Are funds currently available for this Personnel/Item/Service in the specific line item? Yes

If funds are not currently available in the specified line item, where are the funds available?

N/A

Passed by the Kane County AD HOC Opioid Settlement Fund Committee on May 1, 2025.

John A. Cunningham, MBA, JD, JD
Clerk, County Board
Kane County, Illinois

Michael Isaacson
Kane County Opioid Committee Chair
Kane County, Illinois

Vote:

FORENSIC LAB EXPENSES

KCSO

Expenses 001.380.380.60010
Salaries 001.380.380.400000

TOTAL

\$211,699.04

Date	GL	Ck of the month	Description	Amount
10/11/2024	001.380.380.40000	1	Timothy Ruppel October Salary	\$3,961.54
10/11/2024	001.380.380.40000	1	Sarah Ware October Salary	\$3,961.54
10/25/2024	001.380.380.40000	2	Timothy Ruppel October Salary	\$3,961.54
10/25/2024	001.380.380.40000	2	Sarah Ware October Salary	\$3,961.54
11/8/2024	001.380.380.40000	1	Timothy Ruppel November Salary	\$3,961.54
11/8/2024	001.380.380.40000	1	Sarah Ware November Salary	\$3,961.54
11/22/2024	001.380.380.40000	2	Timothy Ruppel November Salary	\$3,961.54
11/22/2024	001.380.380.40000	2	Sarah Ware November Salary	\$3,961.54
12/6/2024	001.380.380.40000	1	Timothy Ruppel December Salary	\$3,961.54
12/6/2024	001.380.380.40000	1	Sarah Ware December Salary	\$3,961.54
12/20/2024	001.380.380.40000	2	Timothy Ruppel December Salary	\$4,020.96
12/20/2024	001.380.380.40000	2	Sarah Ware December Salary	\$4,020.96
1/3/2025	001.380.380.40000	1	Timothy Ruppel January Salary	\$4,080.38
1/3/2025	001.380.380.40000	1	Sarah Ware January Salary	\$4,080.38
1/17/2025	001.380.380.40000	2	Timothy Ruppel January Salary	\$4,080.38
1/17/2025	001.380.380.40000	2	Sarah Ware January Salary	\$4,080.38
1/31/2025	001.380.380.40000	3	Timothy Ruppel January Salary	\$4,080.38
1/31/2025	001.380.380.40000	3	Sarah Ware January Salary	\$4,080.38
2/14/2025	001.380.380.40000	1	Timothy Ruppel February Salary	\$4,080.38
2/14/2025	001.380.380.40000	1	Sarah Ware February Salary	\$4,080.38
2/28/2025	001.380.380.40000	2	Timothy Ruppel February Salary	\$4,080.38
2/28/2025	001.380.380.40000	2	Sarah Ware February Salary	\$4,080.38
3/14/2025	001.380.380.40000	1	Timothy Ruppel March Salary	\$4,080.38
3/14/2025	001.380.380.40000	1	Sarah Ware March Salary	\$4,080.38
3/28/2025	001.380.380.40000	2	Timothy Ruppel March Salary	\$4,080.38
3/28/2025	001.380.380.40000	2	Sarah Ware March Salary	\$4,080.38
4/11/2025	001.380.380.40000	1	Timothy Ruppel April Salary	\$4,080.38
4/11/2025	001.380.380.40000	1	Sarah Ware April Salary	\$4,080.38
				\$112,943.40

Date	Transaction		Description	Amount
10/11/2024-04/11/2025	Benefits		Ruppel Benefits	\$15,866.59
10/11/2024-04/11/2025	Benefits		Ware Benefits	\$15,115.79
				\$30,982.38

Date	Transaction	Invoice Number	Description	Amount
10/1/2024	Expense	Pcard	Ruppel October 2024 Pcard	\$472.45
11/1/2024	Expense	Pcard	Ruppel November 2024 Pcard	\$4,428.57
12/1/2024	Expense	Pcard	Ruppel December 2024 Pcard	\$3,560.75
11/1/2023	Expense	Pcard	Ruppel January 2025 Pcard	\$3,246.38
11/30/2023	Expense	Pcard	Ruppel February 2025 Pcard	\$5,901.96
11/8/2023	Expense	Pcard	Ruppel March 2025 Pcard	\$8,774.11
1/15/2025	Expense	Inv# 25-1	Russell Solutions LLC	\$10,000.00
1/30/2025	Expense	Inv# 25-2	Russell Solutions LLC	\$10,000.00
2/27/2025	Expense	Inv# 25-3	Russell Solutions LLC	\$10,000.00
3/26/2025	Expense	Inv# 25-4	Russell Solutions LLC	\$10,000.00
10/7/2025	Expense	Conference	S. Ware/ ISHI 35 Conference Expenses	\$1,389.04
				\$67,773.26



RESOLUTION / ORDINANCE EXECUTIVE SUMMARY ADDENDUM

Title

Approving Opioid Settlement Revenue Expenditures for Forensic Lab Expenses and Authorizing Budget Adjustment

Committee Flow:

Opioid Settlement Fund Committee

Contact:

Elizabeth Richards, 630.208.2001

Budget Information:

Was this item budgeted? No	Appropriation Amount: \$211,699.04
If not budgeted, explain funding source: 349. See below	

Summary:

Request to authorize a budget adjustment to reimburse the Kane County Sheriff's Office for continued expenses incurred to establish a forensics lab, including salaries of two staff members and equipment and supplies for testing. The following budget adjustment of FY25 is required:

001.380.380.99349	Transfer to Fund 349	211,699.04
001.380.380.40000	Salaries and Wages	(112,943.40)
BENEFITS	Benefit Compensation	(30,982.38)
001.380.380.60010	Operating Supplies	(67,773.26)
349.580.000.39001	Transfer from Fund 001	211,699.04
349.580.750.40000	Salaries and Wages	112,943.40
BENEFITS	Benefit Compensation	30,982.38
349.580.750.60010	Operating Supplies	67,773.26

WHEREAS, the \$120,000.00 contingency will be held by the County; and

WHEREAS, the Kane County Sheriff's Office has retained Kluber Inc., 41 W. Benton Street, Aurora, IL 60506, to provide construction administration services for the project in the amount of \$22,900.00.

NOW, THEREFORE, BE IT RESOLVED that the Kane County Ad Hoc Opioid Settlement Fund Committee that the designated administrators of the opioid settlement funds approve of using and authorizes a budget adjustment for the initial expenses of and transfers amount from the Opioid Settlement Fund 349:

\$1,249,900	Transfer from Fund 349	001.380.380.99349
\$22,900	Project Administration Services	500.800.805.50000
\$1,227,000	Building Improvements	500.800.805.72010

NOW, THEREFORE, BE IT FURTHER RESOLVED by the Kane County Ad Hoc Opioid Settlement Fund Committee that the Chairman of the Kane County Board is authorized to execute a contract for the authorization of the Kane County Forensic Lab Renovation Project to Lite Construction, Inc. (LCI) of Montgomery, IL, for the bid amount of One Million, Two Hundred Twenty-Seven Thousand and 00/100 Dollars (\$1,227,000.00) which includes a One Hundred Twenty Thousand and 00/100 Dollar (\$120,000.00) project contingency and an additional cost of Twenty-Two Thousand Nine Hundred and 00/100 Dollars (\$22,900.00) for construction administration services for a total project cost of One Million, Two Hundred Forty-Nine Thousand, Nine Hundred and 00/100 Dollars (\$1,249,900.00).

Line Item: See above.

Line Item Description: See above.

Was Personnel/Item/Service approved in original budget or a subsequent budget revision? No

Are funds currently available for this Personnel/Item/Service in the specific line item? Yes

If funds are not currently available in the specified line item, where are the funds available?

See above.

Passed by the Kane County AD HOC Opioid Settlement Fund Committee on May 1, 2025.

John A. Cunningham, MBA, JD, JD
Clerk, County Board
Kane County, Illinois

Michael Isaacson
Kane County Opioid Committee Chair
Kane County, Illinois

Vote:



RESOLUTION / ORDINANCE EXECUTIVE SUMMARY ADDENDUM

Title

AUTHORIZING FUNDING OF THE KANE COUNTY FORENSICS LAB RENOVATION PROJECT AT THE KANE COUNTY SHERIFF'S OFFICE AND BUDGET ADJUSTMENT

Committee Flow:

Kane County AD HOC Opioid Settlement Fund Committee

Contact:

Elizabeth Richards, 630.208.2001

Budget Information:

Was this item budgeted? No	Appropriation Amount: \$1,249,900.00
If not budgeted, explain funding source: See below	

Summary:

This resolution is to authorize the Kane County Forensics Lab renovations project at the Kane County Sheriff's Office by Lite Construction, Inc. (LCI) of Montgomery, IL, along with authorizing a budget adjustment and transfers for the amounts from the Opioid Settlement Fund 349:

001.380.380.99349	Transfer from Fund 349	\$1,249,900
500.800.805.50000	Project Administration Services	\$22,900
500.800.805.72010	Building Improvements	\$1,227,000

County of Kane
PURCHASING DEPARTMENT
KANE COUNTY GOVERNMENT CENTER

719 S. Batavia Avenue, Bldg. A
Geneva, Illinois 60134

Telephone: (630) 208-3803
Fax: (630) 208-5107



March 5, 2025

PROCUREMENT SYNOPSIS

Requesting Department:	Kane County Building Management
Procurement Name:	Bid 25-008-TK Forensic Laboratories Renovation Project
Recommended Vendors:	Lite Construction, Inc
Awarded Amount:	\$1,227,000.00

NOTIFICATION AND RESPONSE

Public Notices: Bidnet Direct and The Daily Herald

Advertising Date:	February 6, 2025	Notices sent/Plan Holders: 40/40
Proposal Due Date:	February 28, 2025	Proposals Received: 8

PURPOSE

This bid seeks a qualified and experienced contractor for the complete construction and renovation of the Kane County Sheriff's Forensic Laboratories. This is a prevailing wage project and requires compliance with Kane County's Responsible Bidder Ordinance (RBO) for public work and the following bids were received:

Vendors	Total Project Cost
Lite Construction, Inc – Montgomery, IL	\$1,227,000.00
KWCC, Inc – Montgomery, IL	\$1,307,700.00
Ostrander Construction – Downers Grove, IL	\$1,321,065.00
Kandu Construction, Inc – Skokie, IL	\$1,362,000.00
Industria, Inc – Des Plaines, IL	\$1,386,300.00
Boller Construction Company, Inc. – Waukegan, IL	\$1,387,500.00
Paul Borg Construction – Chicago, IL	\$1,423,000.00
Forza Construction, LLC – Park Ridge, IL	\$1,581,007.00

*Reference the attached Kluber Architects & Engineer Bid scope review, result, and recommendation.

Kane County Sheriff's Office, Building Management Department, and Kluber Architects & Engineers, the architect of record, evaluated all bids per specifications and contract requirements and determined that Lite Construction, Inc. of Montgomery, IL is the lowest responsive, responsible vendor to provide the required services at the highest quality and value.

Kane County Sheriff's Office and Building Management Department with the support of the Purchasing Department recommends awarding this contract to Lite Construction, Inc. of Montgomery, IL pending approval by the Committee and full Kane County Board.

Submitted By:

Timothy Keovongsak,

Tim Keovongsak, CPPB
Director of Purchasing

cc: Building Management
Sheriff Office

March 3, 2025

Tim Keovongsak
Assistant Director of Purchasing
Kane County Purchasing Department
719 S. Batavia Ave. Building A
Geneva, IL 60134

RE: Bid Results
Kane County – Forensic Laboratories
Kluber Project No. 23-471-1507

Dear Mr. Keovongsak,

On February 28, 2025 bids were publicly opened and read aloud for the above referenced project. Eight contractors chose to submit bids for the project. The low base bid was submitted by Lite Construction, Inc. from Montgomery, IL in the amount of \$1,227,000.00. The second lowest base bid was submitted by KWCC from Montgomery, IL in the amount of \$1,307,700.00. See attached bid tabulation for details on bid results.

We conducted a Contractor Bid Scope Review with Lite Construction, Inc. and believe their bid to be responsive and complete.

Therefore, the county may wish to award a Contract to Lite Construction, Inc. in the amount of \$1,227,000.00

The information contained herein and in the attached bid tabulation and scope review is provided to you for reference and use in its decision to award the Contract. Thank you for the opportunity to be of service to the Kane County and we look forward to the successful completion of this project with you.

Sincerely,



Charli Johnsos
Project Manager
Kluber Architects + Engineers

Attachments: Bid Tabulation, Bid Scope Review
Cc: Edward Catich, Heidi Files

Project : Forensic Laboratories

02/28/2025

Owner: Kane County Sheriff

Time: 2:00 PM

	Plan Holder	Location	Addendum No. 1	Addendum No. 2	Base Bid	Comments
1	Lite Construction, Inc.	Montgomery, IL	Y	Y	\$1,227,000.00	
2	KWCC Inc.	Montgomery, IL	Y	Y	\$1,307,700.00	
3	Ostrander Construction	Downers Grove, IL	Y	Y	\$1,321,055.00	
4	Kandu Constuction, Inc	Skokie, IL	Y	Y	\$1,362,000.00	
5	Industria, Inc.	DesPlaines, IL	Y	Y	\$1,386,300.00	
6	Boller Construction Company, Inc.	Waukegan, IL	Y	Y	\$1,387,500.00	
7	Paul Borg Construction	Chicago, IL	Y	Y	\$1,423,000.00	
8	Forza Constuction	Park Ridge, IL	Y	Y	\$1,581,007.00	

Bid 25-08-TK Forensic Lab Renovation Project

Open: Friday, February 28 @ 2:00 p.m.

VENDOR	Total Base Bid	Bid Sig. and Bond	Add # 1	RBO	Apprenticeship Program	Contractor Statements
Boller Construction Co.	1,387,500 ⁰⁰	✓	✓	✓	✓	✓
FORZA CONSTRUCTION	1,581,007 ⁰⁰	✓	✓	✓	✓	✓
INDUSTRIA, INC.	1,386,300 ⁰⁰	✓	✓	✓	✓	✓
KANAU CONSTRUCTION, INC.	1,362,000 ⁰⁰	✓	✓	✓	✓	✓
KWEE INC.	1,307,700 ⁰⁰	✓	✓	✓	✓	✓
VITE CONSTRUCTION, INC.	1,227,000 ⁰⁰	✓	✓	✓	✓	✓
STRANDER CONSTRUCTION	1,321,055 ⁰⁰	✓	✓	✓	✓	✓
PAUL ROSS CONSTRUCTION	1,423,000 ⁰⁰	✓	✓	✓	✓	✓

"As Read"

Bid Opening Attendee 2/28/25 @ 2 pm

TIM KEOVONGSAK - Kc Purchasing

Tay Sun - Kc Purchasing

**BID SCOPE REVIEW
FORENSIC LABORATORIES
Kluber Project No. 23-471-1507**

Contractor: Lite Construction, Inc.

Contact: John Cambell

Base Bid Amount: \$1,227,000.00

Phone: 630-417-2832

Email: johnc@liteconstrcution.com

Date: March 3, 2025

All Addenda have been included in the bid. Yes

All pertinent Allowances are included in the bid. Yes

- Contingency: \$120,000
- Furniture: \$15,000
- Hardware: \$2400
- Technology: \$50,000

A bid bond was included in the bid package. Yes

Are there any qualifications to the bid? No

Are there any material deliveries which you feel could have a negative impact on the project schedule? No

Are you aware of any discrepancies and/or have any questions on the bid documents? No

SCOPE REVIEW:

Base Bid:

Project consists of renovation of existing space, to provide power, electrical and building exhaust to support a new forensic laboratory. The work includes but not limited to minor demolition, doors, frames and hardware, glazing, gypsum board partitions, acoustical ceilings, resilient floor tile, painting, fire protection specialties, scientific casework and equipment, plumbing, mechanical, electrical, and access controls.

1. Did you pick-up removal and reinstallation of grid for mechanical installation in corridors, rooms, etc. Yes
2. Does your bid include dehumidification for the Roof Top Unit. Yes.
3. Does your bid include relocation of the exercise equipment? Yes.
4. Does your bid include replacing the skylight and roof work? Yes.

References:

Kluber has recently completed projects or are in process of projects with Life with success. Including a project with the County.

The above constitutes Kluber, Inc. interpretation of the Bid Scope Review telephone call on March 3, 2025. Any changes or discrepancies shall be received by Kluber, Inc. in writing within five business days.



County of Kane
PURCHASING DEPARTMENT
KANE COUNTY GOVERNMENT CENTER

Tim Keovongsak, CPPB
Director of Purchasing



719 S. Batavia Avenue, Bldg. A.
Geneva, Illinois 60134
Telephone: (630) 208-3803
Fax: (630) 208-5107

INVITATION TO BID

BID NUMBER: 25-008-TK – Forensic Laboratories Renovation Project

DATE: February 6, 2025

The County of Kane is accepting competitive sealed bids from qualified and experienced vendors for the complete construction and renovation of the Kane County Sheriff's Forensic Laboratories. This is an all-inclusive project per specifications and drawings for the Kane County Building Management Department.

***Prevailing Wage Act* (820 ILCS 130/1-12) ☒ DOES APPLY**

***Kane County Responsible Bidder Ordinance No. 23-340* ☒ DOES APPLY**

The Project consists of the construction of renovation of existing space, to provide power, electrical, and building exhaust to support a new forensic laboratory. The work includes but not limited to minor demolition, doors, frames and hardware, glazing, gypsum board partitions, acoustical ceilings, resilient floor tile, painting, fire protection specialties, scientific casework and equipment, plumbing, mechanical, electrical, and access control. Please refer to the plans and specifications which provide additional information regarding the scope of work, material requirements, and construction guidelines. Contractors are expected to review these documents thoroughly to ensure compliance with all project requirements.

SUBMITTAL REQUIREMENTS:

An original Bid response (with all required submittal documents) must be submitted electronically, uploaded to [HTTPS://WWW.BIDNETDIRECT.COM/ILLINOIS/KANECOUNTY](https://www.bidnetdirect.com/illinois/kanecounty) before the submittal date and time. Please upload your complete response through Bidnet Direct as a PDF file (with no password/encrypted format). The following documents must be included with your submittal:

- ☐ ***Signed Offer to Contract Form*** (including specified Bid Form – Stipulated Sum and Separate Price Break-Out-Form)
- ☐ ***References***
- ☐ ***Proof of Certificate of Insurance (See Sample)***
- ☐ ***Bid Worksheet (if applicable)***
- ☐ ***5% Bid Bond (Copy)***
- ☐ ***Contractor Responsible Bidder Ordinance Documentation***

The following documents must be submitted upon notice of award:

- **100% PAYMENT AND PERFORMANCE BOND (UPON AWARD)**
- **NOTARIZED CONTRACTOR DISCLOSURE STATEMENT**
- **NOTARIZED FAMILIAL DISCLOSURE STATEMENT**
- **SUB-CONTRACTOR RESPONSIBLE BIDDER ORDINANCE DOCUMENTATION**

MANDATORY PRE-BID SITE MEETING: 2:00 p.m., Tuesday, February 18, 2025
KANE COUNTY BUILDING MANAGEMENT – MPB. 37W699 IL RT. 38 SUITE #C. ST. CHARLES, IL 60175. A SITE VISIT WILL IMMEDIATELY FOLLOW THE PRE-BID MEETING AT THE ADULT JUSTICE CENTER WHICH IS WITHIN WALKING DISTANCE OF THE PRE-BID MEETING SITE.

OFFICE LOCATION: Kane County Government Center - Purchasing Department
719 S. Batavia Ave., Bldg. A Rooms 211, 212 or 214 Geneva, Illinois 60134. 8:30 a.m. - 4:30 p.m. CST, Monday-Friday

SUBMISSION TIME & DATE: Friday, February 28, 2025 at 2:00 p.m. CST

Bids received after the submittal time will be rejected and returned unopened to the sender. This is an electronic bid submittal. Please upload your completed bid response through Bidnet Direct before the due date and time.

CONTACT PERSON: Tim Keovongsak, CPPB

DISCLAIMER: TO THE EXTENT THAT YOU HAVE OBTAINED THESE BID DOCUMENTS FROM A SOURCE OTHER THAN BIDNET DIRECT, PLEASE BE ADVISED THAT THESE BID DOCUMENTS MAY NOT INCLUDE ALL UPDATES, INCLUDING, BUT NOT LIMITED TO, ADDENDUMS, CLARIFICATIONS, AND DUE DATE EXTENSIONS. FOR ALL UPDATES TO BID DOCUMENTS, PLEASE VISIT [HTTPS://WWW.BIDNETDIRECT.COM/ILLINOIS/KANECOUNTY](https://www.bidnetdirect.com/illinois/kanecounty)

ALL QUESTIONS OR REQUESTS FOR INFORMATION PERTAINING TO THIS BID AND/OR THE SCOPE OF SERVICES SHOULD BE DIRECTED TO THE PURCHASING OFFICE AS LISTED ON THE COVER SHEET **NO LATER THAN, FEBRUARY 19, 2025, AT 1:00 P.M., FAX AND E-MAIL ACCEPTED. FAX to (630) 208-5107 or E-mail: purchasing@KaneCountyIL.gov**

ATTACHMENTS:

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PROJECT MANUAL, SPEC BOOK, & DRAWING (Project No. 23-471-1507, Date: 01/30/2025 - Kane County Sheriff's – Forensic Laboratories
KANE COUNTY - 37W755 IL-38 ST. CHARLES, ILLINOIS 60175

ARCHITECT / ENGINEER – KLUBER
41 W. Benton Street Aurora, IL 60506

**BIDS MUST BE SUBMITTED ELECTRONICALLY
AT**

[HTTPS://WWW.BIDNETDIRECT.COM/ILLINOIS/KANECOUNTY](https://www.bidnetdirect.com/illinois/kanecounty)

**INSTRUCTIONS TO BIDDERS
COUNTY OF KANE
COMPETITIVE SELECTION PROCEDURE - BID
TERMS AND CONDITIONS**

1. **AUTHORITY.** This Invitation for Bid is issued pursuant to applicable provisions of the Kane County Purchasing Ordinance.
2. **BID OPENING.** Sealed or electronic bids will be received at the Kane County Purchasing Department until the date and time specified at which time they shall be opened. Late bids shall be rejected and returned unopened to the sender. Kane County does not prescribe the method by which bids are to be transmitted; therefore, it cannot be held responsible for any delay, regardless of the reason, in transmission of the bids.
3. **BID PREPARATION.** Bids must be submitted on this form and all information and certifications called for must be furnished. Bids submitted in any other manner, or which fail to furnish all information or certificates required, may be summarily rejected. Bids may be modified or withdrawn prior to the time specified for the opening of bids. Bids shall be filled out legibly in ink or type-written with all erasures, strike overs and corrections initialed in ink by the person signing the bid. The bid shall include the legal name of the bidder, the complete mailing address, and be signed in ink by a person or persons legally authorized to bind the bidder to a contract. The name of person signing should be typed or printed below the signature.
4. **BID ENVELOPES.** Envelopes containing bids must be sealed and addressed to the County of Kane Purchasing Department. The name and address of the bidder and the Invitation Number must be shown in the upper left corner of the envelope.
5. **ERRORS IN BIDS.** Bidders are cautioned to verify their bids before submission. Negligence on the part of the bidder in preparing the bid confers no right for withdrawal or modification of the bid after it has been opened. In case of error in the extension of prices in the bid, the unit prices will govern.
6. **RESERVED RIGHTS.** The County of Kane reserves the right at any time and for any reason to cancel this Invitation for Bids, accept or reject any or all bids or any portion thereof, or accept an alternate bid. The County reserves the right to waive any immaterial defect in any bid. Unless otherwise specified by the bidder or the County, the County has one hundred twenty (120) days to accept. The County may seek clarification from any bidder at any time and failure to respond promptly is cause for rejection.

Kane County reserves the right to compare pricing submitted to any and all known national joint purchasing cooperatives in order to obtain the lowest pricing available in the current market place for this contract award. The list of joint purchasing cooperatives is not all inclusive and may include other joint purchasing cooperatives Kane County is not currently aware of at the present time. Kane County reserves the right to award a contract to the lowest responsive, responsible vendor for said product or service after reviewing all joint purchasing cooperative pricing available for Kane County to participate in their program.

State of Illinois Central Management Services (CMS)
Omnia Partners (formerly US Communities & National IPA)
Sourcewell, TIPS, and BuyBoard

7. **INCURRED COSTS.** The County will not be liable for any costs incurred by bidders in replying to this Invitation for Bids.

8. **AWARD.** It is the intent of the County to award multiple contract (s) to the lowest responsive responsible bidder(s) meeting specifications. The County reserves the right to determine the lowest responsive responsible bidder on the basis of an individual item, groups of items, or in any way determined to be in the best interests of the County. The Award will be based on the following factors (where applicable): (a) adherence to all conditions and requirements of the bid specifications; (b) price; (c) qualifications of the bidder, including past performance, financial responsibility, general reputation, experience, service capabilities, and facilities; (d) delivery or completion date; (e) product appearance, workmanship, finish, taste, feel, overall quality, and results of product testing; (f) maintenance costs and warranty provisions; and (g) repurchase or residual value.
9. **PAYMENT.** The County of Kane requests all payments being made to vendors be done as direct deposits through an Automated Clearing House (ACH). All vendors being awarded a contract shall complete an authorization agreement form prior to award. The ACH form and registration information on this program can be located on the County's Web site under County Forms and Templates for New Vendor Information on the Purchasing Department page - <http://web.kane/SitePages/purchasing.aspx>

10. **PAYMENT (MANDATORY INVOICE SUBMISSION GUIDELINES).** The successful bidder or bidders must conform to modified and mandatory invoice submission guidelines. Under **no** circumstances will vendor submitted invoices be cleared for payment that are not in full compliance with this invoice submission standard. Any invoice not meeting the explicit submission guidelines below will be returned to the vendor and will remain unpaid, until such time a new, conforming invoice is presented for review. **Under no circumstances will Kane County pay or be subject to any additional fees, penalties, or incurred costs as a result of vendor invoice submission failures.** Any and all submitted invoice packages **must** contain the following four (4) components to be considered eligible for payment:

1. Formal invoice with all rates (labor, materials, OT, DT) clearly listed. This invoice must show compliance with any and all agreed-upon rates.
2. Written quotation for all work being performed under this particular invoice. This "quote" must be dated within 120 days of the invoice submission, *properly submitted in arrears*.
3. Written authorization from the using department to commence this work. *Any and all work* must demonstrate that formal approval has been given for an invoice to be considered both payable and valid. No invoice can be paid without clear evidence of authorization, from an approved point of contact within the using department.
4. If the project under invoice requires materials, then we must also be given materials purchase orders, which demonstrate compliance with the contractual material mark-up rate. Vendors **without** materials on a particular invoice shall be required to include on company letterhead the following: "No materials were purchased for the completion of this work under this invoice". *This can be sent on either a blank invoice form, or via company letterhead.*

PLEASE NOTE: ALL SUBMITTED VENDOR PACKAGES ARE AND BECOME THE PROPERTY OF KANE COUNTY. These materials are subject to formal scheduled, announced, unannounced, compliance, inter-governmental, or random audits, and may be audited by Kane County *at any time* within the effective dates of this contract, with or without notification to the vendor, *at the discretion of Kane County*. All vendors should be aware that in the event of serious or ongoing invoicing irregularities, Kane County may, and can invoke contractual termination clauses either with, in addition to, or separate from a formal declared breach of contract.

We expect and require your active compliance in terms of invoice submission and adherence to these guidelines.

11. **PRICING.** The price quoted for each item is the full purchase price, including delivery to destination, and includes all transportation and handling charges, premiums on bonds, material or service costs, patent royalties and all other overhead charges of every kind and nature. Unless otherwise specified, prices shall remain firm for the contract period.
12. **DISCOUNTS.** Prices quoted must be net after deducting all trade and quantity discounts. Where cash discounts for prompt payment are offered, the discount period shall begin with the date of receipt of a correct invoice or receipt or final acceptance of goods, whichever is later.
13. **TAXES.** Kane County is not subject to Federal Excise Tax. Per certification provided by the State of Illinois Department of Revenue, Kane County is exempt from state and local taxes.
14. **SPECIFICATIONS.** Reference to brand names and numbers is descriptive, but not restrictive, unless otherwise specified. Bids on equivalent items will be considered, provided the bidder clearly states exactly what is proposed to be furnished, including complete specifications. Unless the bidder specified otherwise, it is understood the bidder is offering a referenced brand item as specified or is bidding as specified when no brand is referenced, and does not propose to furnish an "equal." The County reserves the right to determine whether a substitute offer is equivalent to and meets the standard of quality indicated by the brand name and number referenced.
15. **SAMPLES.** Samples of items, when called for, must be furnished free of expense and, if not destroyed in the evaluation process, will, upon request, be returned at the bidder's expense. Request for the return of samples must accompany the sample and include UPS Pickup Slip, postage or other acceptable mode of return. Individual samples must be labeled with bidder's name, invitation number, item reference, manufacturer's brand name and number.
16. **INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS.** Bidders shall promptly notify the County of any ambiguity, inconsistency of error which they may discover upon examination of the bidding documents. Interpretations, corrections and changes will be made by addendum. Each bidder shall ascertain prior to submitting a bid that all addenda have been received and acknowledged in the bid.
17. **VARIANCES.** State or list by reference on the reverse side of this form any variations to specifications, terms and/or conditions.
18. **INDEMNIFICATION.** The Vendor shall indemnify and hold harmless the County, its agents, officials, and employees, from and against all injuries, losses, claims, suits, costs and expenses which may accrue against the County as a consequence of granting the Contract.

Vendor agrees to save, hold harmless, defend and indemnify the County of Kane and its Officers, Agents, and Employees, from any and all liability or loss incurred by the County of Kane resulting from Vendor's noncompliance with any laws or regulations of any governmental authority having jurisdiction over Vendor's performance of this contract and Vendor's violation of any of the terms and conditions of this Agreement, and from the Vendor's negligence arising from, in any manner and in any way connected with, the terms and conditions of this Agreement and arising from the Vendor's performance thereunder.
19. **DEFAULT.** Time is of the essence of this contract and if delivery of acceptable items or rendering of services is not completed by the time promised, the County reserves the right, without liability, in addition to its other rights and remedies, to terminate the contract by notice effective when received

by Vendor, as to stated items not yet shipped or services not yet rendered and to purchase substitute items or services elsewhere and charge the Vendor with any or all losses incurred.

20. **INSPECTION.** Materials or equipment purchased are subject to inspection and approval at the County's destination. The County reserves the right to reject and refuse acceptance of items which are not in accordance with the instructions, specifications, drawings or data of Vendor's warranty (express or implied). Rejected materials or equipment shall be removed by, or at the expense of, the Vendor promptly after rejection.
21. **WARRANTY.** Vendor warrants that all goods and services furnished hereunder will conform in all respects to the terms of the solicitation, including any drawings, specifications or standards incorporated herein, and that they will be free from latent and patent defects in materials, workmanship and title, and will be free from such defects in design. In addition, Vendor warrants that said goods and services are suitable for, and will perform in accordance with, the purposes for which they are purchased, fabricated, manufactured and designed or for such other purposes as are expressly specified in this solicitation. The County may return any nonconforming or defective items to the Vendor or require correction or replacement of the item at the time the defect is discovered, all at the Vendor's risk and expense. Acceptance shall not relieve the Vendor of its responsibility.

Vendor expressly warrants that all goods and services (real property and all structures thereon) will conform to the drawings, materials, performance and any other specifications, samples or other description furnished by the County, and will be fit and sufficient for the purpose intended, merchantable, of good material and workmanship. Vendor agrees that these warranties shall run to Kane County, its successor, assigns, customers and users of the products or services and that these warranties shall survive acceptance of the goods or performance of the services.

Vendor shall reference to Special Provision for additional requirement.

22. **REGULATORY COMPLIANCE.** Vendor represents and warrants that the goods or services furnished hereunder (including all labels, packages and container for said good) comply with all applicable standards, rules and regulations in effect under the requirements of all Federal, State and local laws, rules and regulations as applicable, including the Occupational Safety and Health Act as amended, with respect to design, construction, manufacture or use for their intended purpose of said goods or services. Vendor shall furnish "Material Safety Data Sheet" in compliance with the Illinois Toxic Substances Disclosure to Employees Act.
23. **EQUAL EMPLOYMENT OPPORTUNITY.** The equal employment opportunity clause required by the Illinois Human Rights Act is hereby incorporated by reference in all contract made by the County of and in all bid specifications therefore furnished by the County to all Vendors, contractors and subcontractors.

The County of Kane, State of Illinois, represents that it and the employing agencies responsible to it, conform to the following:

We do not discriminate against any employee or applicant for employment because of race, creed, color, age, disability, religion, sex, national origin/ancestry, sexual orientation, marital status, veteran status, political affiliation, pregnancy, or any other legally protected status. We will take whatever action is necessary to ensure that applicants and employees are treated appropriately regarding all terms and conditions of employment. We will post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

We will, in all solicitations or advertisements for employees placed by or on behalf of the employing agencies, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, ancestry, age, sex, marital status, military status, sexual orientation, pregnancy or unfavorable discharge from military service. (Ordinance No. Res. No. 82-90, 6-10-80; Res. No. 81-79, 6-9-81; Res. No. 82-90, 6-8-82; Res. No. 05-303, 9-23-05). State law references—Illinois Human Rights Act, 775ILCS 5/1-101 et seq.

24. PREVAILING WAGE RATES

WHEREAS, it is the policy of the State of Illinois as declared in “An ACT regulating wages of laborers, mechanics and other workman employed in any public works by the State, County, City or any political subdivision or by any work under construction for public works” approved June 26, 1941, that a wage of no less than the general prevailing hourly rate as paid for work of a similar character in a locality in which work is performed, shall be paid to all laborers, workmen, and mechanics employed by and on behalf of any and all public body engaged in public works, exclusive of maintenance work. Responsive Bidders must include with their bid a separate sheet showing trades to be employed and wage rates to be paid.

The current Illinois Department of Labor Prevailing Wage Rates for the County of Kane are available at their website <http://www.state.il.us/agency/idol/> . Prevailing wage rates are subject to revision monthly. Copies of the current prevailing wage rates are also available at the Kane County Purchasing Department, 719 Batavia Avenue, Rooms 211, 212, 214, Geneva, IL 60134.

Not less than the prevailing rate of wages as determined by the Illinois Department of Labor shall be paid to all laborers, workers and mechanics performing work under this contract. State Statutes regarding Prevailing Wage and the current wage rates are available online at www.state.il.us/agency/idol/rates/rates. The Prevailing Wage rate applies to the other participating Counties where the work is to be performed. You must retain payroll records for 5 years and make those records available for inspection by the County or the Illinois Department of Labor. You must submit monthly certification of payroll records.

A determination by the Illinois Department of Labor of debarment for violation of the Prevailing Wage Act shall result in the Contractor being automatically deemed non-responsible for the period of debarment without further proceedings by the County.

This contract calls for the construction of a "public work," within the meaning of the Illinois Prevailing Wage Act, 820 ILCS 130/.01 et seq. ("the Act"). The Act requires contractors and subcontractors to pay laborers, workers and mechanics performing services on public works projects no less than the "prevailing rate of wages" (hourly cash wages plus the amount for fringe benefits) in the county where the work is performed. The Illinois Department of Labor publishes the prevailing wage rates on its website at: <http://www.state.il.us/agency/idol/rates/rates.HTM>. The Department revises the prevailing wage rates and the contractor/subcontractor has an obligation to check the Department's website for revisions to prevailing wage rates. For information regarding current prevailing wage rates, please refer to the Illinois Department of Labor's website.

All contractors and subcontractors rendering services under this contract must comply with all requirements of the Act, including but not limited to, all wage requirements and notice and recordkeeping duties.

CERTIFIED PAYROLL REQUIREMENTS ([Public Act 94-0515](#))

Effective August 10, 2005 contractors and subcontractors on public works projects must submit certified payroll records on a monthly basis to the public body in charge of the construction project, along with a statement affirming that such records are true and accurate, that the wages paid to each worker are not less than the required prevailing rate and that the contractor is aware that filing records he or she knows to be false is a Class B misdemeanor.

The certified payroll records must include for every worker employed on the public works project the name, address, telephone number, social security number, job classification, hourly wages paid in each pay period, number of hours worked each day, and starting and ending time of work each day. These certified payroll records are considered public records and public bodies must make these records available to the public under the Freedom of Information Act, with the exception of the employee's address, telephone number and social security number. Any contractor who fails to submit a certified payroll or knowingly files a false certified payroll is guilty of a Class B misdemeanor.

Effective September 1, 2020, the Illinois Department of Labor (IDOL) has activated an electronic database (Payroll Portal) capable of accepting and retaining certified payrolls submitted under the State of Illinois Prevailing Wage Act (830 ILCS/130/1). All contractors and subcontractors completing work for Kane County pursuant to the Act must submit all certified payroll through the IDOL Payroll Portal. In order to receive payment for work conducted for Kane County, contractors must provide the e-mail certification received from their IDOL submittal and any subcontractors working on the project with each of their pay requests.

The Employment of Public Workers on Public Works Act is active when there is excessive unemployment in Illinois and requires the employment of 90% of the employees on this project be Illinois residents 30 ILCS570/3.

25. **ROYALTIES AND PATENTS.** Vendor shall pay all royalties and license fees. Vendor shall defend all suits or claims for infringement of any patent or trademark rights and shall hold the County harmless from loss on account thereof.
26. **LAW GOVERNING.** This contract shall be governed by and construed according to the laws of the State of Illinois.
27. **ELIGIBILITY.** By signing this bid, the bidder hereby certifies that they are not barred from bidding on this contract as a result of a violation of Article 33E, Public Contracts of the Illinois Criminal Code of 1961, as amended (Illinois Compiled Statutes, 720 ILCS 5/33E-1).

DEBARMENT AND SUSPENSION. No contract may be awarded to parties listed on the federal government Excluded Parties List System in the System for Award Management (SAM), on the State of Illinois' list of sanctioned persons maintained by the

Agency's Office of Inspector General, or on the County's own list of parties suspended or debarred from doing business with the County.

Debarment is the process of determining that a contractor is ineligible to receive contract awards based upon a preponderance of evidence, usually a conviction. Debarment is usually three (3) years in length. The name of the debarred contractor may be published as ineligible on the System for Award Management (SAM), which is a website administered by the U.S. General Services Administration, or on the list of sanctioned providers maintained by the State of Illinois Office of Inspector General.

Suspension is the process of determining that a contractor is ineligible to receive contract awards based upon adequate evidence, usually an indictment. Suspension is a temporary measure having a 12-month limit. It is usually used pending completion of an investigation or legal proceedings. The name of the suspended contractor will be published as ineligible on the System for Award Management (SAM), which is a website administered by the U.S. General Services Administration, or on the list of sanctioned providers maintained by the State of Illinois Office of Inspector General.

28. CERTIFICATE OF INSURANCE REQUIRED BY KANE COUNTY

Contractor to furnish and deliver prior to commencement of work, a completed Certificate of Insurance satisfactory to the requirements of County of Kane containing:

- a) The Contractor and all Subcontractors shall provide a Certificate of Insurance naming the Owner (Kane County) as certificate holder and as additional insured. The certificate shall contain a 30-day notification provision to the owner (Kane County) prior to cancellation or modification of the policy.
- b) Commercial General Liability insurance including Products/Completed Operations, Owners and Contractor Protective Liability and Broad Form Contractual Liability. The exclusion pertaining to Explosion, Collapse and Underground Property Damage hazards eliminated. The limit of liability shall not be less than the following:

General Aggregate	\$2,000,000
Products and Completed Operations	\$2,000,000
Personal and Advertising Injury	\$1,000,000
Each Occurrence	\$1,000,000
Or – Combined Single Limit	\$1,000,000

- i) Products and Completed Operation coverage is to remain in force for a period of two years after the completion of project.
- c) Business Automotive Liability Insurance including owned, hired, and non-owned automobiles, and/or trailer and other equipment required to be licensed, with limits of not less than the following:

Each Person for Bodily Injury	\$1,000,000
Each Occurrence for Bodily Injury	\$1,000,000
Each Occurrence for Property Damage	\$1,000,000

Or - Combined Single Limit \$1,000,000

- d) Statutory Worker's Compensation insurance shall be in accordance with the provisions of the laws of the State of Illinois, including Occupational Disease Act provisions, for employees at the site of the project, and in case work is sublet, the Contractor shall require each Subcontractor similarly to provide this insurance. In case employees are engaged in work under this contract and are not protected under the Workers Compensation and Occupational Disease Act, the Contractor shall provide, and shall cause Subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise provided.

- e) Umbrella Liability:

Aggregate Limits \$5,000,000

Vendor to furnish a copy of the Endorsement showing Kane County and Kluber Architects and Engineer, as an additional insured on the General Liability, Auto, and Umbrella/Excess policies.

The Contractor shall cease operations on the project if the insurance is canceled or reduced below the required amount of coverage.

29. RESPONSIBLE BIDDER REQUIREMENTS

On August 8, 2023, the Kane County Board approved a Responsible Bidder Ordinance 23-340 which requires additional information and documentation from responders bidding on public works construction projects.

Included in this bid package is a Responsible Bidder Requirements Form. This document must be filled out and returned with the (bid/proposal). Failure to comply with all submission requirements set forth in Kane County Ordinance No. 23-340 is grounds for the County of Kane to determine that a submission is incomplete, which may result in a determination that Contractor is not a responsible bidder. In accordance with Kane County Ordinance No. 23-340, a Contractor that is actively classified as “pre-qualified” or “qualified” by the Purchasing Department is exempt from the comprehensive submission requirements and is not required to submit a Responsible Bidder Requirements Form.

30. CONTRACTOR DISCLOSURE

- A. Prior to award, every contractor or vendor who is seeking or who has obtained contracts or change orders to contracts or two (2) or more individual contracts with Kane County resulting in an amount greater than Fifteen Thousand Dollars (\$15,000) shall disclose to the Kane County Purchasing Department, in writing all cumulative campaign contributions, (which includes multiple candidates) made within the previous twelve (12) months of awarding of the contract made by that contractor, union, or vendor to any current officer or countywide elected officer whose office the contract to be awarded will benefit. Disclosure shall be updated annually during the term of a multi-year contract and prior to any change order or renewal requiring Board level approval. For purposes of this disclosure requirement, “contractor or vendor” shall include owners, officers, managers, insurance brokers, lobbyists, agents,

consultants, bond counsel and underwriters counsel, subcontractors' corporations, partnerships, associations, business trusts, estates, trustees, and/or beneficiaries under the control of the contracting person, and political action committees to which the contracting person has made contributions.

- B. All contractors and vendors who have obtained or are seeking contracts with Kane County must disclose the following information which shall be certified and attached to the application or document. Penalties for knowingly violating disclosure requirements will potentially result in immediate cancellation of the contract, and possible disbarment from future County contracts:
- (a) Name, address and percentage of ownership interest of each individual or entity having a legal or a beneficial interest of more than five percent (5%) in the applicant. Any entity required by law to file a statement providing substantially the information required by this paragraph with any other government agency may file a duplicate of such statement;
 - (b) Names and contact information of their lobbyists, agents and representatives and all individuals who are or will be having contact with County employees or officials in relation to the contract or bid. This information disclosure must be updated when any changes to the information occurs.
 - (c) Whenever any interest required to be disclosed in paragraph (a) above is held by an agent or agents, or a nominee or nominees, the principals for whom such agents or nominees hold such interest shall also be disclosed. The application of a spouse or any other party, if constructively controlled by another person, or legal entity as set forth above, shall state the name and address and percentage of beneficial interest of such person or entity possessing such constructive control and the relationship under which such control is being or may be exercised. Whenever a stock or beneficial interest is held by a corporation or other legal entity, such shareholder or beneficiary shall also make disclosure as required by paragraph (a) above.
 - (d) A statement under oath that the applicant has withheld no disclosures as to economic interests in the undertaking nor reserved any information, data or plan as to the intended use or purpose for which it seeks County Board or other county agency action.
- C. All disclosures and information shall be current as of the date upon which the application is presented and shall be maintained current until such time as Kane County shall take-action on the application. Furthermore, this information shall be maintained in a database by the Purchasing Department, and made available for public viewing.
- D. Notwithstanding any of the above provisions, the County Purchasing Department with respect to contracts awarded may require any such additional information from any applicant which is reasonably intended to achieve full disclosure relevant to the application for action by the County Board or any other County agency.

- E. Any failure to comply with the provisions of this section shall render any ordinance, ordinance amendment, County Board approval or other County action in behalf of the applicant failing to comply voidable at the option of the County Board or other County agency involved upon the recommendation of the County Board Chairman or the majority of the County Board.

31. COMMUNICATION DURING THE PROCUREMENT PROCESS

In an effort to create a more competitive and unbiased procurement process, the County desires to establish a single point of contact throughout the solicitation process. Therefore, from the issue date of any solicitation until the due date of the solicitation, all request for clarification or additional information regarding the solicitation, or contact with County personnel concerning this solicitation or the evaluation process must only be through the Purchasing Department staff. Inquiries will be collected by the Purchasing Department staff who will then submit the inquires to the Department Head responsible for the procurement. Responses by the Department Head to the inquires will be submitted to the Purchasing Department staff who will then distribute the responses to all vendors responding to the solicitation. In this way it will be assured that all vendors participating in the process will be receiving the same information. No contact regarding this solicitation with other County employees, agents of the County or elected officials is permitted unless expressly authorized by the Purchasing Director. A violation of this provision is cause for the County to reject the Bidder's proposal. If it is later discovered that a violation has occurred, the County may reject any proposal or terminate any contract awarded pursuant to this solicitation.

32. ILLINOIS NON-APPROPRIATION CLAUSE:

A forfeit clause is provided pursuant to the Illinois Non-Appropriation Clause of funds for government entities that if funds or budgets are not approved, service may be cancelled. No early cancellation penalties will be assessed, but the customer must be given 30-day notice of intent to cancel.

33. TERMINATION FOR CAUSE:

This Contract may be terminated by the County at any time upon thirty (30) days written notice, or by either party in the event of substantial failure to perform in accordance with the terms hereof by the other party through no fault of the terminating party. This Contract is also subject to termination by either party if either party is restrained by state or federal law of a court of competent jurisdiction from performing the provisions of this Agreement. Upon such termination, the liabilities of the parties to this Contract shall cease, but they shall not be relieved of the duty to perform their obligations up to the date of termination. Mailing of such notice, as and when above provided, shall be equivalent to personal notice and shall be deemed to have been given at the time of mailing.

If this Contract is terminated due to the County's substantial failure to perform, the Contractor shall be paid for labor and expenses incurred to date, subject to setoff for any damages, losses or claims against the County resulting from or relating to Contractor's performance or failure to perform under this agreement.

In the event of termination by the County upon notice and without cause, upon completion of any phase of the Basic Services, fees due the Contractor for services rendered through such phase shall constitute total payment for services. In the event of such termination by the County during any phase of the Basic Services, the Contractor will be paid for services rendered during the phase on the basis of the proportion of work completed on the phase as of the date of termination to the total work required for that phase.

In the event of any such termination, the Contractor also will be reimbursed for the charges of independent professional associates and contractors employed by the Contractor to render Basic Services, and paid for all unpaid Additional Services and Reimbursable Expenses not in dispute. Reimbursable expenses mean the actual expenses incurred by the Contractor or the Contractor's independent professional associates or contractors, directly or indirectly in connection with the Project.

34. LITIGATION:

Vendors are required to disclose if they have been a party to any lawsuits or arbitration proceedings involving their services within the last five years. Provide status or outcome of any such proceedings disclosed.

35. HOLIDAY SCHEDULE:

Kane County is closed for business on the following holidays: New Year's Day; Martin Luther King, Jr. Day; Lincoln's Birthday, Washington's Birthday, Spring Holiday, Memorial Day, Juneteenth, Independence Day; Labor Day, Columbus Day; Veteran's Day, Thanksgiving Day, Day following Thanksgiving Day, Christmas Day.

36. COMPLAINT AND DISPUTE RESOLUTIONS:

The vendor and/or his supervisor shall meet with County staff as needed to discuss any problems, complaints, needs, service adjustments, and/or mutual areas of concern.

The Vendor shall faithfully perform all work as set forth in these specifications for Kane County. If the Vendor fails to faithfully execute their work in accordance with the contract and/or a dispute arises as to the quality and/or quantity of work completed, Kane County reserves the right to withhold authorization for payment of completed work until such time that performance has been improved upon, or the dispute resolved. In instances where a dispute cannot be resolved by the Vendor and the Facilities Manager or other appointed designate, the dispute may be resolved by the Kane County Director of Purchasing.

37. BID DEPOSIT

BID SECURITY (ELECTRONIC)

When noted in the specifications, bids must be accompanied by a Bank Cashier's Check, Bank Draft, Certified Check, or Bid Bond for not less than Five Thousand Dollars (\$5,000.00) or five (5%) percent of the amount of the Bid, or according to the schedule as provided. A scanned copy should be submitted with the E-Bid response.

During the bid review process, the County may require a bidder to submit the original bid security to confirm authenticity.

38. EXECUTION OF A PERFORMANCE BOND, PAYMENT BOND & LABOR AND MATERIALS BOND

When noted in the specifications, the County reserves the right to require the successful bidder to supply a Performance Bond, Payment Bond, and a Labor and Materials Bond within ten (10) calendar days of acceptance of the Vendor's bid by the County. The bonds, unless otherwise specified by the Director of Purchasing, shall be 100% of the total contract price.

39. FAILURE TO FURNISH BOND

In the event that the Vendor fails to furnish the abovementioned bonds within ten (10) calendar days after acceptance of the bid by the County, then the bid deposit of the bidder shall be retained by the County as liquidated damages, it being now agreed that said sum is a fair estimate of the amount of damages that said County will sustain due to the Bidder's failure to furnish said bonds.

40. PROPRIETARY INFORMATION

Under the Illinois Freedom of Information Act, all records in the possession of Kane County are presumed to be open to inspection or copying, unless a specific exception applies. 5 ILCS 140/1.2 One exception is "[t]rade secrets and commercial or financial information obtained from a person or business where the trade secrets or commercial or financial information are furnished under a claim that they are proprietary, privileged or confidential, and that disclosure of the trade secrets or commercial or financial information would cause competitive harm to the person or business, and only insofar as the claim directly applies to the records requested." 5 ILCS 140/7(1)(g). The County will assume that all information provided to us in a bid or proposal is open to inspection or copying by the public unless clearly marked with the appropriate exception that applies under the Freedom of Information Act. Additionally, if providing documents that you believe fall under an exception to the Freedom of Information Act, please submit both an un-redacted copy along with a redacted copy which has all portions redacted that you deem to fall under a Freedom of Information Act exception

41. SECURITY (GENERAL): A portion of the work will be performed within secured areas.

- A. If requested, the Contractor shall submit to a Criminal History and Background Check for all their employees and subcontractor employees who may be working at the job-site for security reasons.
- B. The Contractor will provide the County with a complete list of all persons employed that might work at the specified securing buildings. Only those persons will be allowed to work within the secured areas. All personnel authorized to work within secured areas may be subject to fingerprinting, a criminal security check performed by the County, and/or Criminal Justice Level 4 Security Training and Certification. The County may issue temporary identification cards, which will be kept by County's security personnel and issued and collected on a daily basis.

- C. The County will require the Contractor to remove any worker who has been convicted of a felony, who is a family member of an inmate, or who violates any provision of this bid.
- D. Work being performed within certain areas may require an escort provided by the County. These areas shall not be entered into without a County escort. Work within these areas may be restricted to spaces that need to be observed by the County's escort.
- E. All tools and equipment taken into a secured area shall be listed in a manifest with copies provided to County's security personnel. All tools and equipment shall be accounted for at the close of each day. All changes to the inventory shall be addressed by changing the manifest. The Contractor is responsible for proper storage of tools and equipment when in a secured area. Report all broken tools and equipment to the County's security personnel.

SECURITY (ADULT JUSTICE CENTER):

General.

- F. The Contractor and the County understand that adequate security services are necessary for the safety of the agents, employees and subcontractors of the Contractor, as well as for the security of Inmates and Facility staff. The County will provide security services sufficient to enable the Contractor and its personnel safely to provide services called for hereunder.

List of All Persons Names Employed on Project.

- G. The County and the Sheriff shall receive a list of the names of all the people that will be employed by the Contractor on this project. Aside from the names, the contractor shall also supply the individuals' sex, race, date of birth, and driver's license number and driver's license state.
- H. The County and the Sheriff shall reserve the right to run complete criminal background history checks on all people assigned to the project and who will be working inside of the Adult Justice Center. The criminal background history checks shall include, but not be limited to the following:
 - I. Check of wants and warrants in Illinois
 - J. Check of wants and warrant through the National Computer System (NCIC)
 - K. Check of Computerized Criminal History (CCH)
 - L. If requested to do so, all employees of the contractor and subcontractor assigned to this project shall be requested to submit to supplying a complete set of fingerprints if requested by the County or the Sheriff. **Employees of the Contractor and Subcontractor assigned to this project may be requested to submit to a drug test if requested by the County or the Sheriff.**
- M. The County or the Sheriff reserves the rights not to allow employees of the Contractor or any Subcontractor onto the premises should a criminal background check reveal a positive response.

Transportation Off-Site.

- N. County and Sheriff will provide security as necessary and appropriate in connection with the transportation of any Inmate between the Facility and any other location for off-site services as contemplated herein.

CRIMINAL BACKGROUND HISTORY CHECKS.

- O. Contractors acknowledge that the “Adult Justice Center” is located in the public building and subject to security procedures and that the Adult Justice Center or other Kane County facility security takes precedence over the rights of the Contractors or Licensee.
- P. The County will be running criminal background history checks on all personnel assigned to this contract that will be or could be working inside any of the Kane County government buildings. The criminal background checks and all cost associated with the inquiries will be the sole responsibility of the County. Whenever a new employee is assigned to the County, a background check shall be run by the County before the employee may start work.
1. The criminal background history checks will include but are not limited to the following:
 - a. Check of wants and warrants in Illinois.
 - b. Check of wants and warrants through the National Computer System (NCIC).
 - c. Check of Computerized Criminal History (CCH).
 2. If requested to do so, any employee of the Contractors assigned to this project will submit to be finger printed by the County.
 3. The County of Kane reserves the right not to allow personnel of the Contractors onto any County premises if a criminal background check reveals a positive response.
 4. At no time will the Contractors be able to employ personnel to work in any County building, without prior approval from Kane County.

Joint Purchasing Program Initiative:

All public agencies as defined by the Illinois Governmental Joint Purchasing Act, as well as not-for-profit agencies that qualify under Section 45-35 of the Illinois Procurement Code, are eligible to participate in joint purchasing programs.

ILL COMP. STAT. ANN §220/2. Definitions for the purpose of this Act: The term “public agency” shall mean any unit of local government as defined in the Illinois constitution of 1970, any school district, any public community collet district, any public building commission, the State of Illinois, any agency of the state government of the United States, or of any other State, any political subdivision of another State, and any combination of the above pursuant to an intergovernmental agreement which includes provisions for a governing body of the agency created by the agreement.

Kane County wants to expand on the current benefits of intergovernmental cooperation on a regional basis. The goal of Kane County Purchasing is to combine the resources and purchasing power of governments and not-for-profit entities to negotiate the most favorable contract terms in order to obtain the best quality products and services at the lowest prices. By purchasing through Kane County Joint Purchasing Contracts, participants will save both time and money by not having to duplicate the formal bidding and request for proposal solicitation process.

Illinois statutes, 525/2 from Ch. 85, par. 1602 (Governmental Joint Purchasing Act), authorizes that any governmental unit may purchase personal property, supplies, and services jointly with one or more other governmental units. All such joint purchases shall be by competitive solicitation as provided in Section 4 of this Act.

**STATEMENT OF WORK
For
KANE COUNTY SHERIFF’S – FORENSIC LABORATORY
CONSTRUCTION & RENOVATION PROJECT**

I. OVERVIEW

The County of Kane is accepting competitive sealed bids from qualified and experienced vendors for the complete construction and renovation of the Kane County Sheriff’s Forensic Laboratories. This is an all-inclusive project per specifications and drawings for the Kane County Building Management Department. This is a Prevailing Wage Rate project and requires compliance with the Kane County Responsible Bidder Ordinance for public work.

The Project consists of the construction of renovation of existing space, to provide power, electrical, and building exhaust to support a new forensic laboratory. The work includes but not limited to minor demolition, doors, frames and hardware, glazing, gypsum board partitions, acoustical ceilings, resilient floor tile, painting, fire protection specialties, scientific casework and equipment, plumbing, mechanical, electrical, and access control. Please refer to the project manual and drawing which provide additional information regarding the scope of work, material requirements, plans, and construction guidelines. Contractors are expected to review these documents thoroughly to ensure compliance with all project requirements.

Intent of Specifications

It is the intent and purpose of these specifications that all labor, transportation, equipment, and materials necessary for the completion of all work are provided by the Contractor. The delivery and service shall be complete in all details, including all minor items and accessories or devices necessary for the completion of the project. This is an all-inclusive bid. Kane County and its authorized representative are the project manager and subject matter experts for this project.

Approved Equal:

Throughout the specifications, whenever reference is made to a specific make, model, brand name, catalog number, etc., it is only for the purpose of establishing a product’s grade or quality required. Since Kane County does not wish to rule out other competition, the phrase “or approved equal” is added. **An “approved equal” is equal to or superior in grade or quality.** Kane County will be the sole judge as to what is an “approved equal” and what is not.

II. SCOPE OF SERVICE & GENERAL INSTRUCTIONS

The work described below entails the complete construction and renovation project for the Kane County Sheriff’s Forensic Laboratory located in St. Charles, Illinois. The Vendors shall reference the attached Architectural Outline Specifications, Project Manual and Spec Book, Plans, and Drawings provision for a complete detailed description of

project specification, scope of service, additional bidding information, general submittal requirements, and additional acknowledgment.

The construction and project completion shall conform completely to all applicable Kane County building codes and all applicable requirements. The following specifications shall be regarded as the minimum requirements and standards for design and construction. The Contractors shall be responsible for the detailing, fabrication, delivery, and complete construction and renovation project as specified – **PROJECT MANUAL AND DRAWING (Kluber, Inc., Project No. 23-471-1507. Date: 01/30/2025).**

ALL QUESTIONS AND RFI PERTAINING TO THIS BID SHALL BE SUBMITTED TO THE PURCHASING DEPARTMENT IN WRITING VIA E-MAIL TO: PURCHASING@KANECOUNTYIL.GOV BEFORE THE DEADLINE FOR ALL QUESTIONS. THE COUNTY RESERVES THE RIGHT NOT TO RESPOND TO QUESTIONS AFTER THE DEADLINE AND ADDITIONAL REQUESTS FOR JOB SITE VISITS.

III. GENERAL CONDITIONS and SPECIFICATIONS

THE ADHERENCE TO ALL CONDITIONS, QUALIFICATIONS, TRADE REQUIREMENTS, AND STATEMENTS OF WORK OF THIS BID IS REQUIRED. THE VENDORS SHALL BE RESPONSIBLE FOR CONFIRMING THE ACCURACY OF ALL FIELD MEASUREMENTS AND DIMENSIONS AS STATED IN THE ATTACHED PROJECT MANUAL, ARCHITECTURAL OUTLINE SPECIFICATIONS, AND DRAWINGS. THE VENDORS SHALL IMMEDIATELY BRING TO THE ATTENTION OF THE OWNER IF ANY DISCREPANCIES ARE NOTED IN THE PROJECT MANUAL AND DRAWINGS.

List any and all exceptions to the specifications completely. Kane County will review each exception and will be the sole judge in determining which exceptions are acceptable and which ones are not.

The Architectural Outline Specifications, Project Manual, and Drawings Provision are available online to download at <https://www.bidnetdirect.com/illinois/kanecounty> and an Adobe PDF electronic file format of the project manual and drawing will be made available upon request via e-mail.

PROJECT MANUAL AND DRAWING (Kluber, Inc., Project No. 23-471-1507 dated 01/30/2025). *Copyright 2025 by KLUBER, INC.; All Rights Reserved.*

The Vendors shall visit the above link to obtain the Invitation to Bid, Architectural Outline Specifications, Project Manual and Spec Book, and Drawings document titled: ***Bid 25-008-TK-Forensic Laboratories Renovation Project*** for the complete detailed description of project specification, scope of service, and submittal requirements.

The Vendors are responsible for downloading and verifying all required bid documents and the attached project manual, architectural outline specifications, and drawings.

Special provisions: some of the construction will be performed outside of regular construction hours and will require prior approval and scheduling from Kane County Building Management. Regular construction hours shall be limited to 6 AM to 3:30 PM, Monday through Friday, Excluding Holidays.

IV. GENERAL CONDITIONS & REQUIREMENTS

The adherence to all conditions, qualifications, trade requirements, and statements of work of this bid is required. The Vendors shall be responsible for confirming the accuracy of all field measurements and dimensions as specified per specifications, instructions, and requirements. The Vendors shall immediately bring to the attention of the owner if any discrepancies are noted on this service project. This is a prevailing wage rates project and Contractors shall reference: [Current Prevailing Rates \(illinois.gov\)](http://www.illinois.gov) for the required current base rates, specific trades/titles, and benefits for Kane County.

List any and all exceptions to the specifications completely. Kane County will review each exception and will be the sole judge in determining which exceptions are acceptable and which ones are not.

The Vendors are responsible for downloading and verifying all required bid documents and the submittal requirements and acknowledging the following additional general requirements.

V. ADDITIONAL GENERAL REQUIREMENTS

A. Demolition and Disposal:

The Contractors shall provide all necessary labor, machinery, tools, apparatus, and equipment, and do all of the work necessary for the complete removal and disposal of all waste, rubbish, and debris from Kane County premises and shall meet all local and state regulations.

B. Permits and Fees:

The Contractor shall be responsible for securing all permits and licenses and shall pay all fees, which may be required by law or ordinance prior to commencing construction and necessary for the successful completion of this work including but not limited to: right of way or roadway access permits, overweight and other load permits, tickets for the use of water, etc.

C. Damages:

It shall be the responsibility and liability of the Contractors or Purchaser to protect all surrounding areas, surfaces, buildings, and other property. The Contractors shall promptly repair any damages responsible for before damage conditions, and any damages caused to adjacent facilities and utilities by removal or demolition operations at no cost to the County.

D. Clean Up:

Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition and removal operations, as directed by the County or governing authorities. Return adjacent areas to conditions existing prior to the start of work at no expense to the County.

E. Site Inspection:

It is understood that the Contractors before submitting a bid, have visited the site, and have inspected in detail the building described herein, and has examined the nature, location, character, and all of the local conditions affecting the renovation and remodeling project. No allowance will be made for not being familiar with the building, fixtures, and conditions affecting the renovation and remodeling work of this project.

F. Background Check:

The awarded vendor staff will need to provide a driver's license and pass a background check for work done in any secured areas.

VI. SPECIAL CONDITIONS & INSTRUCTIONS

A. Mandatory Pre-Bid Site Meeting:

A one-time mandatory pre-bid site meeting will be held at the Kane County Building Management – Multi-Purpose Building located at 37W699 IL Rt. 38 Suite #C., St. Charles, IL 60175 at **2:00 pm., CST, Tuesday, February 18, 2025.**

B. Bidder Minimum Qualifications:

The Bidders must demonstrate that they have the resources and capability to provide the materials and services as described herein. The adherence to all conditions, qualifications, trade requirements, and the statement of work of this bid is required.

C. Bid Pricing:

Bid pricing shall be all-inclusive and services will be paid based on as-measured field quantities. No additional cost will be paid by the County, which includes but is not limited to administrative charges, fuel charges, freight/shipping or handling charges, and any other costs associated with the completion of the project, product, and services unless specified directly on the Offer to Contract Form. This is a prevailing wage rates project.

D. Award:

It is the intention of Kane County to make a single award to the most responsive, responsible Vendor providing the lowest bid pricing per specification. Kane County reserves the right, in its sole discretion, to add additional services, products, and materials if it is in the best interest of the County to do so, and to compare, or accept pricing of all known cooperatives available to local government in Illinois.

E. Responsible Bidder Requirements:

On August 8, 2023, the Kane County Board approved a Responsible Bidder Ordinance 23-340 which requires additional information and documentation from responders bidding on public works construction projects.

Included in this bid package is a Responsible Bidder Requirements Form. This document must be filled out and returned with the (bid/proposal). Failure to comply with all submission requirements set forth in Kane County Ordinance No. 23-340 is grounds for the County of Kane to determine that a submission is incomplete, which may result in a determination that Contractor is not a responsible bidder. In accordance with Kane County Ordinance No. 23-340, a Contractor that is actively classified as "pre-qualified" or

“qualified” by the Purchasing Department is exempt from the comprehensive submission requirements and is not required to submit a Responsible Bidder Requirements Form.

F. Notification of Illinois General Assembly Public Act 96-0437:

This contract calls for the construction of a “public work,” within the meaning of the Illinois Prevailing Wage Act, 820 ILCS 130/.01 *et seq.* (“the Act”). The Act requires contractors and subcontractors to pay laborers, workers, and mechanics performing services on public works projects no less than the current “prevailing rate of wages” (hourly cash wages plus amount for fringe benefits) in the county where the work is performed. The Department publishes the prevailing wage rates on its website at <http://labor.illinois.gov/>. The Department revises the prevailing wage rates and the contractor/subcontractor has an obligation to check the Department’s website for revisions to prevailing wage rates. For information regarding current prevailing wage rates, please refer to the Illinois Department of Labor’s website. All contractors and subcontractors rendering services under this contract must comply with all requirements of the Act, *including but not limited to*, all wage requirements and notice and record-keeping duties.

Contractors shall acknowledge that a wage of no less than the general prevailing hourly rate as paid for work of a similar character in a locality in which work is performed shall be paid to all laborers, workmen, and mechanics employed by and on behalf of any and all public body engaged in public works, exclusive of maintenance work. The vendors shall indicate or include with their bid a separate sheet showing trades to be employed and wage rates to be paid.

G. Offer to Contract Form:

Vendors are required to use the Offer to Contract Form and provide a 5% bid bond to submit a response along with “Bid Stipulated Sum” under bidding requirements specified in the Project Manual and other bidding requirements as specified. This form must be signed and the bond must be included along with required references. The following are mandatory submittals if awarded the service contract which include; Performance and Payment Bond, Certificate of Insurance per Kane County requirements, Contractor Disclosure, and Familial Relationship Statements, please reference the attached samples (pages 40 – 41) within the bid document and comply with the Responsible Bidder Ordinance (RBO). The Contractor shall reference the attached form (pages 30 – 39) for submittal requirements.

H. Pre-Construction Meeting:

The Contractors awarded each part of this project shall submit to the County a tentative construction schedule showing the order of the work, the time for starting each portion, and the approximate time for construction of each portion. The rate of progress shall be as nearly uniform as practicable and shall be such that all work under this contract will be completed within the time stipulated.

VII. SPECIAL PROVISIONS

A. WARRANTY

Warranties are tied to Substantial Completion. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

B. CHANGE IN THE WORK

For adjustments to the Contract Sum based on other than the unit price method, overhead, profit, and general conditions combined shall be calculated at the following percentages of the cost attributable to the change in the work:

1. For the Contractor, for any Work performed by the Contractor's own forces: 10 percent of the cost.
2. For the Contractor, for Work performed by his Subcontractor: 5 percent of the amount due the Subcontractor.
3. For each Subcontractor or Sub-subcontractor involved, for any Work performed by the Subcontractor's own forces: 10 percent of the cost.
4. For each Subcontractor, for Work performed by his Sub-subcontractors: 5 percent of the amount due the Sub-subcontractor.
5. All proposals, except those less than \$200.00, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also. In no case will a change involving over \$200.00 be approved without such itemization."

C. TIME

In the event of a labor dispute resulting in a slow-down or in the cessation or suspension of work, the Contractor shall not be relieved of its obligations to provide labor or for timely progress and completion of the work. Instead, the Contractor shall be automatically deemed to be in default and to have committed a breach of contract unless said work stoppage or slow-down is remedied to the Owner's satisfaction in accordance with this Section. In the event of a work stoppage due to a labor dispute, the Contractor shall provide replacement labor within 24 hours of the commencement of the work stoppage. In the event of a slow-down of work due to a labor dispute, the Contractor shall provide as much supplemental labor as may be necessary to resume normal and customary progress and deadlines on the project in accordance with the time schedules established for the work. In the alternative, the Owner shall have the option to replace or supplement labor and shall be entitled to reduce the contract sum by an amount equal to the Owner's cost of replacing or supplementing labor. If the balance of the contract sum is not sufficient to cover such amounts, the contractor shall pay the difference to the Owner. The Owner may also pursue any other remedies it may have, including, but not limited to, remedies under the performance bond and payment bond. If any labor dispute necessitates legal action or legal intervention by the Owner, or in the event that the Owner otherwise takes legal action to enforce the terms of this section, the Contractor shall be responsible for the Owner's attorney's fees and court costs, without prejudice to any other remedies that the Owner may have.

D. PAYMENT & COMPLETION

1. Until substantial completion, the Owner shall pay 90 percent of the amount due to the Contractor on account of progress payments.
2. The contractor shall be permitted to make a written petition to the Owner requesting payment for 75% of the cost of materials and equipment suitably stored off the site at a location agreed upon in writing between the Owner and the Contractor. In order to receive such payment, title to the materials and/or equipment must pass to the Owner; the materials and/or equipment must be stored in a protected, insured facility agreed to by the Owner, with the Owner named as an additional insured; and all storage costs and costs associated with handling and transporting the materials and/or equipment to the Project site must be paid for by the Contractor.

E. ATTACHMENTS:

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**PROJECT MANUAL, SPEC BOOK, & DRAWING (Project No. 23-471-1507, Date: 01/30/2025 - Kane County Sheriff's – Forensic Laboratories
KANE COUNTY - 37W755 IL-38 ST. CHARLES, ILLINOIS 60175**

VIII. RESPONSE INSTRUCTIONS

THIS IS AN ELECTRONIC BID SUBMITTAL AND THE OPENING TABULATION WILL BE MADE AVAILABLE WITHIN 24 HOURS AFTER THE OPENING.

Bid Forms

Vendors are required to use only the Kane County Offer to Contract Form to submit a response and supporting documents, pages 24-42. Attach all required submittal documents and pertinent information as requested in this bid package. Vendors shall reference the above response or submittal instructions for more information.

An original bid response (with all required submittal documents) must be submitted electronically at: <https://www.bidnetdirect.com/illinois/kanecounty> prior to the submittal date and time. Please upload your bid response through Bidnet Direct, labeled as "**25-008-TK – Forensic Laboratories Renovation Project**" before the deadline on **Friday, February 28, 2025, at 2:00 p.m., CST.**

COUNTY OF KANE
Purchasing Department, Building (A), 2nd Flr., Room 211, 212 or 214
719 South Batavia Ave., Geneva, IL 60134
Hours: 8:30 a.m. – 4:30 p.m. CST Monday – Friday

QUESTIONS

ALL QUESTIONS PERTAINING TO THIS REQUEST AND/OR THE SCOPE OF SERVICES SHOULD BE DIRECTED TO THE PURCHASING OFFICE AS LISTED ON THE COVER SHEET, NO LATER THAN **FEBRUARY 19, 2025, AT 1:00 P.M., FAX AND E-MAILED ACCEPTED.** FAX questions to (630) 208-5107or PURCHASING@KANECOUNTYIL.GOV

**BIDS MUST BE SUBMITTED ELECTRONICALLY
AT
[HTTPS://WWW.BIDNETDIRECT.COM/ILLINOIS/KANECOUNTY](https://www.bidnetdirect.com/illinois/kanecounty)**

KANE COUNTY
OFFER TO CONTRACT FORM
For
24-008-TK
Kane County Sheriff's Forensic Laboratories Renovation Project

Bid Due Date & Time: 2:00 p.m., CST on Friday, February 28, 2025.

To: County of Kane (Purchasing Department)
Kane County Government Center, Building (A) Room 211, 212, or 214
719 S. Batavia Ave.
Geneva, IL 60134

The following offer is hereby made to the County of Kane, Illinois, hereafter called the Owner.

Submitted By: _____

- I. The undersigned Vendor proposes and agrees, after having examined the specifications, quantities, and other contract documents, to irrevocably offer to furnish the products, materials, equipment, and services in compliance with all terms, conditions, specifications, and amendments contained in this solicitation documents. The items in this Invitation to Bid, including, but not limited to, all required certificates, are fully incorporated herein as a material and necessary part of the contract.
 - A. *The Vendor shall also include with his bid any necessary literature, samples, etc., as required within the Invitation to Bid, Instructions to Bidders, and specifications.*
 1. *The vendor has examined the Responsible Bidder Ordinance (RBO – Section 28), Contractor Disclosure (Section 29), and Familial Relationship (attached Public Act 101-0544) of the Instruction to Bidders, and has included or provided a certified document list all cumulative campaign contributions made within the past twelve months, to any current or county-wide elected officer, and ownership interest in entity greater than five percent and compliance with Public Act 101-0544.*
 - B. For purposes of this offer, the terms Offerer, Bidder, Contractor, and Vendor are used interchangeably.
- II. In submitting this Offer, the Vendor acknowledges:
 - A. All bid documents have been examined: Instructions to Bidder, Statement of Work, and the following addenda: No._____, No. _____, No._____, No._____, No._____, No._____, No._____, No._____, No._____, No._____, (Contractor to acknowledge addenda here).
 - B. The site(s) and locality have been examined where the Service is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules, and regulations), and the conditions affecting the cost, progress, or performance of the Work and has made such independent investigations, as Contractor deems necessary.
 - C. To be prepared to execute a contract with the Owner within ten (10) calendar days after acceptance of the bid by the Owner.

- D. If a Prevailing Wage Act or Davis Bacon Act is required for the project, the responsive bidders must include with their bid a separate sheet showing trades to be employed and wage rates to be paid

III. **BASE BID**

The Undersigned agrees to furnish all labor, materials, and equipment necessary for the completion of the Kane County Sheriff's – Forensic Laboratories and other required services. This is an all-inclusive bid and prevailing wage rates apply to this project.

The vendor shall reference the Bidding Requirement and General Requirements sections of the Project Manual - **Project No. 23-471-1507**, and attach the **Bid Form - Stipulated Sum** including all required documents to this Offer to Contract Form.

Kane County reserves the right, in its sole discretion, and if it is in the best interest of the County to add additional services, products, and supplies per job site requirements on an as-needed basis. Kane County Building Management and the Sheriff's Office shall approve all additional products and services, scheduling, and project commencement and completion date.

ADDITIONAL COMMENTS:

By signing this Bid, the Offeror hereby certifies that they are not barred from bidding on this contract as a result of a violation of either Section 33E-3 or 33E-4 of the Illinois Criminal Code of 1961, as amended. The awarding of any contract resulting from this Bid will be based upon the funding available to Kane County, which may award all or part of this project. The terms of the Bid and the response shall be incorporated by this reference as though fully set forth into the Contract notwithstanding any language in the contract to the contrary. In the event of any conflict between the terms of the Contract and the terms of the Bid and the response, the terms of the Bid and the response shall govern. Every element or item of the Bid and the response shall be deemed a material and severable item or element of the contract. **AN AUTHORIZED REPRESENTATIVE OF THE COMPANY OR ENTITY RESPONDING TO THE BID AND THE RESPONSE SHALL SIGN THIS SECTION.**

Signature _____ Typed Signature _____
Company _____
Address/City/State _____
Phone # _____ Fax # _____
Federal I.D./Social Security # _____ Date _____

ACCEPTANCE

The Offer is hereby accepted for the **KANE COUNTY SHERIFF'S – FORENSIC LABORATORIES RENOVATION PROJECT**

The Vendor is bound to provide the services and materials listed by the attached contract and based upon the Invitation to Bid, including all terms, conditions, specifications, amendments, and the vendor's offer is accepted by the County of Kane.

This contract shall henceforth be referred to as Contract Number **25-008-TK**. The Vendor has been cautioned not to commence any billable work or to provide any supplies or services until said vendor receives a purchase order and or notice to proceed.

Corinne Pierog MA, MBA
Chairman, County Board
Kane County, Illinois

Date

BID SUBMITTALS CHECKLIST

The undersigned Vendor acknowledged and verified that all required documents, statements, and all certificates meeting the County's requirements are included in their bid response. The vendor shall check the following required submittal items checklist to assure completeness and in order for assembling of their bid response.

_____: SIGNED BID OFFER TO CONTRACT FORM with all supporting documents (pages 24-42), including the vendor bid form, as applicable.

_____: VENDOR DISCLOSURE STATEMENT (mandatory submittal if award of contract)

_____: VENDOR FAMILIAL RELATIONSHIP DISCLOSURE STATEMENT (mandatory submittal if award of contract)

_____: RESPONSIBLE BIDDER ORDINANCE FORM.

(See attached form, it is the sole responsibility of the bidders to comply with all the submission of the required supporting documents which must be submitted within seven (10) calendar days after receiving a written notice if not included in the response package)

_____: PROOF OF CURRENT CERTIFICATE OF INSURANCE (Submit current coverages with bid response). The actual certificate of insurance that meets the County's requirements including naming the County of Kane, as a certificate holder and additional name insured with required policy endorsements shall be submitted before issuing of award and contract execution. (See attached sample, a required submittal if award of contract)

_____: REFERENCES & CONTACT INFORMATION

_____: ONE (1) ORIGINAL BID, MUST BE SUBMITTED ELECTRONICALLY THROUGH BIDNET DIRECT.

_____: PREVAILING WAGE RATES (Submit a statement acknowledging that the vendor has reviewed and agrees to pay no less than the applicable prevailing wage rates per specification, listing trades to be employed, based wage rates to be paid, and will strictly comply with the Prevailing Wage Act).

_____: Bid Bond (5%) required with bid submittal. The awarded Vendor must furnish a Performance Bond if awarding the contract.

Vendor/Agency: _____

Address/City/State: _____

Phone # _____ Fax # _____

VENDOR CERTIFICATION

This information is collected for reporting purposes only and will not have any influence on vendor selection. It is required by the State of Illinois. Please check any of the following boxes that apply to the ownership of your firm.

- | | |
|---|--|
| <input type="checkbox"/> Minority-owned Business (MBE) | <input type="checkbox"/> Veteran-owned Business Enterprise (VBE) |
| <input type="checkbox"/> Woman-owned Business (WBE) | <input type="checkbox"/> Service-Disabled Veteran-owned Business Enterprise (SDVBE) |
| <input type="checkbox"/> Business Enterprise Program (BEP) | <input type="checkbox"/> Veteran-owned Small Business (VOSB) |
| <input type="checkbox"/> Small Disadvantaged Business (SDB) | <input type="checkbox"/> Persons with Disabilities-owned Business Enterprises (PDBE) |
| <input type="checkbox"/> Kane County Local Business | <input type="checkbox"/> N/A – These categories do not apply to my business |

Please Note: It is required that you check at least one box.

REFERENCES
FORENSIC LABORATORIES RENOVATION PROJECT
For
KANE COUNTY BOARD, Geneva, Illinois

List below businesses or other organizations for which you have provided comparable services within the last three years:

Offeror's Name: _____

1. Organization: _____
 Address: _____
 City, State, Zip Code: _____
 Telephone Number: _____
 Contact Person: _____
 Description of Project: _____ Date of Project _____
 E-mail Address: _____
2. Organization: _____
 Address: _____
 City, State, Zip Code: _____
 Telephone Number: _____
 Contact Person: _____
 Description of Project: _____ Date of Project _____
 E-Mail Address: _____
3. Organization: _____
 Address: _____
 City, State, Zip Code: _____
 Telephone Number: _____
 Contact Person: _____
 Description of Project: _____ Date of Project _____
 E-Mail Address: _____
4. Organization: _____
 Address: _____
 City, State, Zip Code: _____
 Telephone Number: _____
 Contact Person: _____
 Description of Project: _____ Date of Project _____
 E-Mail Address: _____

RESPONSIBLE BIDDER REQUIREMENTS FORM

To be completed by the Contractor/Subcontractor

Project Description: _____ **Contract Number:** _____

Business Name: _____

Business

Address: _____

Contact Person: _____

Phone: _____ **E-mail:** _____

Contractor and all subcontractors shall complete this Responsible Bidder Requirements Form ("Form") and submit supporting documentation as required pursuant to Kane County Ordinance No. 23-340. Contractor must submit this Form and all related evidence with its bid. Contractor shall be responsible for providing this Form to all subcontractors who will perform work on the project. All subcontractors' Forms and supporting documentation must be submitted no later than the date and time of the contract award. Failure to comply with all submission requirements set forth in Kane County Ordinance No. 23-340 is grounds for the County of Kane to determine that a submission is incomplete, which may result in a determination that Contractor is not a responsible bidder.

For the remainder of this Form, "Contractor" refers to the general contractor and all subcontractors. Each item must be answered. If the question is not applicable, answer "NA." If the answer is none, answer "none."

The certifications set forth in this Form and all documents attached hereto shall become a part of any contract awarded to the Contractor. Furthermore, Contractor shall comply with these certifications during the term and/or performance of the contract.

The undersigned _____, as _____ and
(Name) (Title)

on behalf of _____ having been duly sworn under
(Contractor)
oath certifies that:

Business Organization

The form of business organization of the Contractor is (check one):

☐ Sole Proprietor or Partnership

☐ LLC

☐ Corporation

☐ Independent Contractor (Individual)

If contractor/subcontractor is a corporation, indicate the state and the date of incorporation:

Authorized to do business in the State of Illinois:

Yes ☐ No ☐

Describe supporting documentation attached: _____

Registered with Illinois Department of Revenue: Yes ☐ No ☐

Describe supporting documentation attached (if "No," explain):

Registered with Illinois Department of Employment Security: Yes ☐ No ☐

Describe supporting documentation attached (if "No," explain):

Tax liens or tax delinquencies

Any federal, state or local tax liens or tax delinquencies against the Contractor or any officers of the Contractor in the last five (5) years: Yes ☐ No ☐

"No" means "not applicable." If "yes," describe lien/delinquencies and resolution: _____

Workers' Compensation

Contractor's employees who will perform work on the project are:

Covered under a current workers' compensation policy: Yes ☐ No ☐

Properly classified under such policy: Yes ☐ No ☐

Describe supporting documentation attached:

Prevailing Wage Compliance

Contractor has complied with all provisions of the Illinois Prevailing Wage Act and federal Davis-Bacon and related Acts, and all rules and regulations therein, for the past five (5) years:

Yes ☐ No ☐

Contractor has reviewed the applicable prevailing wage law, including the Illinois Prevailing Wage Act, and federal Davis-Bacon Act:

Yes ☐ No ☐

Contractor will pay the applicable prevailing wage rates:

Yes ☐ No ☐

Contractor will strictly comply with applicable prevailing wage laws:

Yes ☐ No ☐

Contractor has not been found by the Illinois Department of Labor to be in violation of the Illinois Prevailing Wage Act twice within the past three-year period.
("Yes" indicates compliance with the Act):

Yes ☐ No ☐

If the above answer is "No," list the date(s) of the Department's finding of a violation:

Substance Abuse

Contractor complies with the Substance Abuse Prevention on Public Works Projects Act by:

Attaching a written substance abuse program in effect for its employees that meets or exceeds the requirements of the Act; or:

Yes ☐ No ☐

Attaching applicable provision from a collective bargaining agreement in effect for its employees that deals with the subject matter of the Act.

Yes ☐ No ☐

Employee Classification

Contractor's employees that will perform work on the project are properly classified as an employee or independent contractor under all applicable state and federal laws and local ordinances:

N/A ☐ Yes ☐ No ☐

Professional or Trade Licenses

Contractor will possess all applicable professional and trade licenses required for performing the Contract work:

Yes [] No []

Describe supporting documentation of such licenses:

If any of the above license(s) have been revoked or suspended, state the date and reason for suspension/revocation:

Registered Apprenticeship Programs

Contractor participates in apprenticeship training programs approved by and registered with the United States Department of Labor applicable to each trade it will perform on the project:

Yes [] No []

Each program meets the requirement that a program has graduated at least five (5) apprentices in each of the past five (5) years :

Yes [] No []

Please attach documentation that evidences (i) Contractor's participation in applicable registered programs and (ii) that each program meets the graduation requirement.

Safety & Health Activities

Contractor confirms that is has OSHA cards on file showing 10-hour or greater safety programs completed for all employees performing construction on project and who face hazards on the job:

Yes [] No []

Subcontractors

Contractor has disclosed the name and address of each subcontractor for whom the contractor has accepted a bid and/or intends to hire on any part of the project (Form A):

Yes [] No []

Contractor provided a Form to all of the above-referenced subcontractors:

Yes [] No []

Documentation Attached (Contractor must initial next to each item):

- _____ **Table A:** Name and address of subcontractors from whom Contractor has accepted a bid or intends to hire to perform work on any part of the project.
NOTE: All subcontractors shall complete and submit an Affidavit of Compliance no later than the date the subcontractor commences work on the project.
- _____ **Table B:** Additional Information Required
- _____ **Certificate of Good Standing**
(or other evidence of compliance with laws pre-requisite to doing business in the state)
- _____ **Illinois Department of Revenue registration**
- _____ **Illinois Department of Employment Security registration**
- _____ **Evidence of participation in applicable registered apprenticeship programs**
- _____ **Evidence that each apprenticeship program meets RBO graduation requirement**
- _____ **Substance Abuse Prevention program (or applicable provision from CBA in effect)**
- _____ **Written Safety Policy Statement signed by company representative**
- _____ **OSHA cards evidencing 10-hour or greater safety program, if requested**
- _____ **Workers' Compensation Coverage**
- _____ **Professional or Trade Licenses**

Table A

Subcontractors who will Perform Work on the Project

Name	Address	Work to be Performed

Table B **Additional Information Required**

If required in the bid specifications, Contractor shall complete items I and/or II below:

I. Statement of past three (3) years' experience on public construction projects.

Public Body/ Project Name/Year	Reference Name/ Phone #	Original Price/ Final price	Subcontractors

- II. List any determinations by a court or governmental agency for violations of federal, state or local laws, including but not limited to violations of contracting or antitrust laws, tax or licensing laws, environmental laws, the Occupational Safety and Health Act (OSHA), the National Labor Relations Act (NLRA), or federal Davis-Bacon and related Acts.

Date	Law	Determination	Penalty

CONTRACTOR VERIFICATION

I certify that I am authorized to execute this Contractor Verification on behalf of the Contractor set forth on page one (1), that I have personal knowledge of all the information set forth herein, and that all statements, representations, information and documents provided in or with this Form and attachments hereto are true and accurate and are submitted in compliance with the requirements of Kane County Ordinance No. 23-340. Failure to comply with all submission requirements set forth in Kane County Ordinance No. 23-340 is grounds for the County of Kane to determine that a submission is incomplete, which may result in a determination that Contractor is not a responsible bidder.

The Contractor shall report any change in any of the facts stated in this Form within fourteen (14) days of the effective date of such change by completing and submitting a new Form. Failure to comply with this requirement is grounds for the Contractor to be deemed a non-responsible bidder.

Signature of Authorized Officer

Name of Authorized Officer (Print or Type)

Title

Telephone Number

Subscribed and sworn to
before me this _____ day of
_____, 20__.

Notary Public Signature & Seal

SUBCONTRACTOR VERIFICATION

I certify that I am authorized to execute this Subcontractor Verification on behalf of the Subcontractor set forth on page one (1), that I have personal knowledge of all the information set forth herein and that all statements, representations, information and documents provided in or with this Form and attachments hereto are true and accurate and are submitted in compliance with the requirements of Kane County Ordinance No. 23-340.

The Subcontractor shall report any change in any of the facts stated in this Form within fourteen (14) days of the effective date of such change by completing and submitting a new Affidavit. Failure to comply with this requirement is grounds for the project owner to withhold payment due for work performed.

Signature of Authorized Officer

Name of Authorized Officer (Print or Type)

Title

Telephone Number

Subscribed and sworn to
before me this _____ day of
_____, 20__.

Notary Public Signature & Seal



CONTRACTOR DISCLOSURE

As of (Today's Date), ABC Company, to the best of our knowledge the Owners, Officers or Executives have not made any political campaign contributions to any Kane County Elected Official countywide in the last 12-month period.

Below is a list of shareholders or owners, with at least 5% holdings in ABC Company:

Mr. John Smith 50%
456 Second Street
Geneva, IL 60134

Ms. Sue Jones 50%
456 Second Street
Geneva, IL 60134

Officer
Title

Date

Subscribed and Sworn this _____ day of _____, 2024

Notary Public



FAMILIAL RELATIONSHIP DISCLOSURE

As of (Today's Date), ABC Company, to the best of our knowledge the Owners, Officers or Executives do not have a familial relationship with any County Elected Official or County Department Director within the last 12 month period. "Familial Relationship" is defined in Public Act 101-0544.

The County may deny, suspend, or terminate the eligibility of a person, firm, corporation, association, agency, institution, or other legal entity to participate as a vendor for goods or services to the County, if the vendor, for contracts greater than \$30,000, fails to disclose to the County a familial relationship between a County Elected Official or County Department Director.

Officer
Title

Date

Subscribed and Sworn this _____ day of _____, 2024

Notary Public

NO-BID/RFP/RFQ RESPONSE

RFP 25-008-TK

FORENSIC LABORATORIES RENOVATION PROJECT

In the event that your organization chooses not to submit a response to this solicitation, the Kane County Purchasing Department is interested in the reasons why vendors/consultants have chosen not to submit a bid or proposal response in order to better serve the taxpayers of Kane County. Please indicate your reason(s) by checking all applicable items below and return this form to the address shown below.

- ☐ Could not meet the specifications.
- ☐ Items or materials requested not manufactured by us or not available to our company.
- ☐ Insurance requirements too restricting.
- ☐ Bond requirements too restricting.
- ☐ Scope of services not clearly understood or applicable (too vague, too rigid, etc.).
- ☐ Project not suited to our organization.
- ☐ Quantities too small.
- ☐ Insufficient time allowed for preparation of bid/proposal response.
- ☐ **COULD NOT MEET THE RESPONSIBLE BIDDER ORDINANCE REQUIREMENTS.**
- ☐ Other (please specify):

Vendor Name: _____

Contact Person: _____

Telephone: _____

Email: _____

Please send your response to: purchasing@KaneCountyIL.gov



AIA® Document G802® – 2017

Amendment to the Professional Services Agreement

PROJECT: <i>(name and address)</i> 1507 - Kane County Sheriff's Office Forensic Lab	AGREEMENT INFORMATION: Date: July 18, 2023	AMENDMENT INFORMATION: Amendment Number: 001R1 Date: January 31, 2025
OWNER: <i>(name and address)</i> Kane County Sheriff's Office 37W755 Route 38, Suite A St. Charles, Illinois 60175	ARCHITECT: <i>(name and address)</i> Kluber, Inc 41 W. Benton Street Aurora, Illinois 60506	

The Owner and Architect amend the Agreement as follows:

The Basic Services will be amended as follows:

To provide applicable Bidding/Negotiation Phase and Construction Administration Phase Basic Services, as follows:

Bidding Phase:

- Assist Owner in contacting potential bidders for Project.
- Prepare agenda and attend pre-bid meeting.
- Respond to contractor questions during bidding.
- Issue addenda (if required).
- Perform contractor bid review evaluations.
- Prepare and issue contractor bid results letter.

Re-package of Bid Package for Second Bidding & Negotiation Phase:

- Update of Construction Documents to include Addenda items from the previous bid package.
- Re-plotting of all documents based on new bid date information

Construction Administration Phase: (Assumption is 5 months of construction)

- Prepare agenda and attend pre-construction meeting.
- Respond to Contractor questions.
- Review progress pay requests if requested.
- Perform a maximum of two (2) site visits per month for progress meetings, to address contractor questions and to observe the work is proceeding in general conformance with the contract documents with a maximum of 10 visits.
- Perform up to two (2) reviews of each construction submittal.
- Perform one (1) site visit to confirm Substantial Completion and identify punch list items.
- Perform one (1) site visit to verify completion of punch list items and confirm Final Completion of the Work.

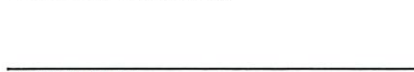
The Architect's compensation and schedule shall be adjusted as follows:

Compensation Adjustment:

Initial Bidding & Negotiation Phase:	\$ 2,100.00
Re-package of Bid Package for Second Bidding & Negotiation Phase:	\$ 1,200.00
Second Bidding & Negotiation Phase:	\$ 2,100.00
Construction Administration Phase:	\$17,500.00
Total:	\$22,900.00

Schedule Adjustment:

To be determined as mutually agreed. Assumption is Bidding Phase through award of contract is 2 months. Construction Administration Phase is assumed to be 5 months.

SIGNATURES:Kluber, Inc**ARCHITECT** *(Firm name)***SIGNATURE**Michael T. Kluber, President**PRINTED NAME AND TITLE**January 31, 2025**DATE**Kane County Sheriff's Office**OWNER** *(Firm name)***SIGNATURE**Ron Hain, Sheriff**PRINTED NAME AND TITLE****DATE**

**PROJECT MANUAL
FOR**

**KANE COUNTY SHERIFF'S FORENSIC LABORATORIES
ST. CHARLES, ILLINOIS**

OWNER

**KANE COUNTY
719 SOUTH BATAVIA AVENUE
GENEVA, ILLINOIS 60134**

ARCHITECT / ENGINEER

**KLUBER, INC.
41 W. BENTON STREET
AURORA, ILLINOIS 60506**



**SECTION 00 01 01
PROJECT TITLE PAGE**

PROJECT MANUAL

FOR

KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

37W777 IL-38

ST. CHARLES, ILLINOIS 60175

OWNER

KANE COUNTY

719 SOUTH BATAVIA AVENUE

GENEVA, ILLINOIS 60134

ARCHITECT / ENGINEER

KLUBER ARCHITECTS + ENGINEERS

41 W. BENTON STREET

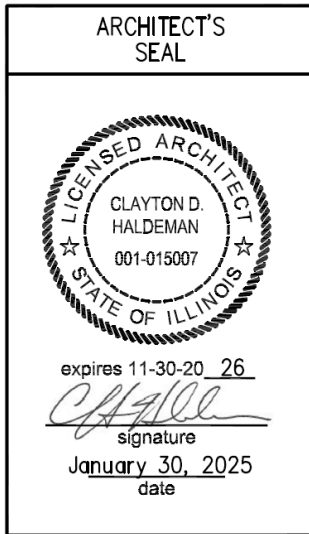
AURORA, ILLINOIS 60506

END OF DOCUMENT

SECTION 00 01 07
SEALS PAGE

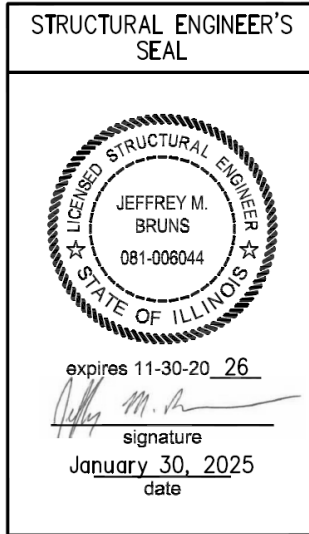
1.01 DESIGN PROFESSIONALS' SEALS

A. ARCHITECT



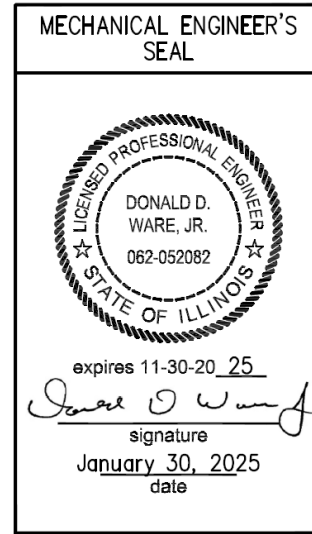
G100, G201, A200, A300,
A301, A800, A900, A901

B. STRUCTURAL
ENGINEER



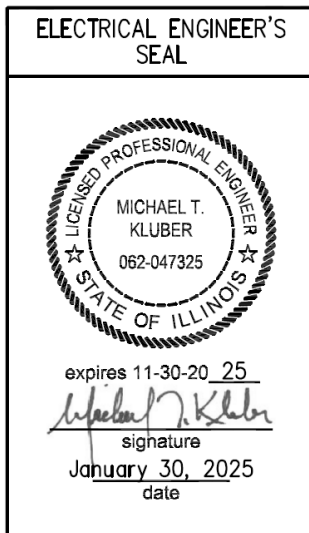
"G" SERIES, "S" SERIES

C. MECHANICAL
ENGINEER



"G" SERIES, "P" SERIES, "M"
SERIES

D. ELECTRICAL
ENGINEER



"G" SERIES, "E" SERIES

END OF DOCUMENT

SECTION 00 01 10		
TABLE OF CONTENTS		
PROCUREMENT AND CONTRACTING REQUIREMENTS		PAGES
INTRODUCTORY INFORMATION		
00 01 01	Project Title Page	00 01 01-1-1
00 01 07	Seals Page	00 01 07-1-1
00 01 10	Table of Contents	00 01 10-1-3
00 01 15	Drawing Index	00 01 15-1-2
BIDDING REQUIREMENTS		
00 31 13	Preliminary Schedule	00 31 13-1-1
00 41 13	Bid Form - Stipulated Sum	00 41 13-1-4
00 43 27	Separate Prices Break-Out Form	00 43 27-1-1
SPECIFICATIONS		PAGES
DIVISION 01 -- GENERAL REQUIREMENTS		
01 10 00	Summary	01 10 00-1-1
01 20 00	Price and Payment Procedures	01 20 00-1-5
01 21 00	Allowances	01 21 00-1-2
01 30 00	Administrative Requirements (1 page attachment)	01 30 00-1-10
01 40 00	Quality Requirements	01 40 00-1-3
01 41 00	Regulatory Requirements	01 41 00-1-2
01 42 00	References	01 42 00-1-5
01 50 00	Temporary Facilities and Controls	01 50 00-1-3
01 60 00	Product Requirements (1 page attachment)	01 60 00-1-5
01 61 16	Volatile Organic Compound (VOC) Content Restrictions	01 61 16-1-2
01 61 16.01	Accessory Material VOC Content Certification Form	01 61 16.01-1-1
01 70 00	Execution and Closeout Requirements	01 70 00-1-6
01 77 00	Closeout Procedures	01 77 00-1-2
01 78 00	Closeout Submittals	01 78 00-1-5
01 79 00	Demonstration and Training	01 79 00-1-3
DIVISION 02 -- EXISTING CONDITIONS		
02 41 00	Demolition	02 41 00-1-3
DIVISION 05 -- METALS		
05 12 00	Structural Steel Framing	05 12 00-1-3
05 31 00	Steel Decking	05 31 00-1-3
05 50 00	Metal Fabrications	05 50 00-1-3

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

06 10 00	Rough Carpentry	06 10 00-1-4
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DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

07 53 00	Elastomeric Membrane Roofing	07 53 00-1-7
----------	------------------------------	--------------

07 62 00	Sheet Metal Flashing and Trim	07 62 00-1-3
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07 71 00	Roof Specialties	07 71 00-1-2
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07 92 00	Joint Sealants	07 92 00-1-5
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DIVISION 08 -- OPENINGS

08 11 13	Hollow Metal Doors and Frames	08 11 13-1-4
----------	-------------------------------	--------------

08 71 00	Door Hardware	08 71 00-1-8
----------	---------------	--------------

08 80 00	Glazing	08 80 00-1-3
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DIVISION 09 -- FINISHES

09 05 61	Common Work Results for Flooring Preparation	09 05 61-1-6
----------	--	--------------

09 21 16	Gypsum Board Assemblies	09 21 16-1-6
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09 51 00	Acoustical Ceilings	09 51 00-1-4
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09 65 00	Resilient Flooring	09 65 00-1-5
----------	--------------------	--------------

09 90 00	Painting and Coating	09 90 00-1-5
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DIVISION 10 -- SPECIALTIES

10 14 23	Panel Signage	10 14 23-1-2
----------	---------------	--------------

10 44 00	Fire Protection Specialties	10 44 00-1-2
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10 51 13.01	Refrigerate Metal Evidence Lockers	10 51 13.01-1-2
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DIVISION 11 -- EQUIPMENT

11 53 13	Laboratory Fume Hoods	11 53 13-1-8
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DIVISION 12 -- FURNISHINGS

12 35 53.13	Metal Laboratory Casework	12 35 53.13-1-11
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DIVISION 21 -- FIRE SUPPRESSION

21 05 00	Common Work Results for Fire Suppression	21 05 00-1-5
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21 13 00	Fire-Suppression Sprinkler Systems	21 13 00-1-3
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DIVISION 22 -- PLUMBING

22 05 53	Identification for Plumbing Piping and Equipment	22 05 53-1-2
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22 07 19	Plumbing Piping Insulation	22 07 19-1-4
----------	----------------------------	--------------

22 10 05	Plumbing Piping	22 10 05-1-8
----------	-----------------	--------------

22 10 06	Plumbing Piping Specialties	22 10 06-1-3
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22 40 00	Plumbing Fixtures	22 40 00-1-3
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DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 05 53	Identification for HVAC Piping and Equipment	23 05 53-1-1
23 05 93	Testing, Adjusting, and Balancing for HVAC	23 05 93-1-6
23 07 13	Duct Insulation	23 07 13-1-4
23 09 13	Instrumentation and Control Devices for HVAC	23 09 13-1-7
23 09 23	Direct-Digital Control System for HVAC	23 09 23-1-14
23 31 00	HVAC Ducts and Casings	23 31 00-1-5
23 33 00	Air Duct Accessories	23 33 00-1-4
23 35 18	Laboratory Exhaust Systems	23 35 18-1-4
23 36 00	Air Terminal Units	23 36 00-1-4
23 37 00	Air Outlets and Inlets	23 37 00-1-2
23 74 33	Dedicated Outdoor Air Units	23 74 33-1-6

DIVISION 26 -- ELECTRICAL

26 05 00	Basic Electrical Requirements	26 05 00-1-7
26 05 33.23	Surface Raceways for Electrical Systems	26 05 33.23-1-3
26 05 83	Wiring Connections	26 05 83-1-2
26 22 00	Low-Voltage Transformers	26 22 00-1-3
26 24 16	Panelboards	26 24 16-1-6
26 27 26	Wiring Devices	26 27 26-1-6
26 28 16.16	Enclosed Switches	26 28 16.16-1-3

DIVISION 27 -- COMMUNICATIONS

27 05 28.29	Hangers and Supports for Communications Systems	27 05 28.29-1-3
27 05 53	Identification for Communications Systems	27 05 53-1-2
27 10 00	Structured Cabling	27 10 00-1-4

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

28 10 00	Access Control	28 10 00-1-5
28 46 00	Fire Detection and Alarm	28 46 00-1-7

END OF SECTION

**SECTION 00 01 15
DRAWING INDEX**

GENERAL

- G100 COVER SHEET, GENERAL NOTES, SYMBOLS & DRAWING INDEX
- G201 ACCESSIBILITY REQUIREMENTS

ARCHITECTURAL

- A200 ARCHITECTURAL DEMOLITION PLANS
- A300 ARCHITECTURAL PARTIAL FIRST FLOOR REFLECTED, SECOND FLOOR & REFLECTED CEILING PLAN
- A301 ARCHITECTURAL PARTIAL ROOF & MULTI-USE BUILDING PARTIAL MEZZANINE FLOOR PLAN
- A800 PLAN DETAILS, DOOR, FRAME & HARDWARE SCHEDULES
- A900 INTERIOR ELEVATIONS
- A901 LABORATORY EQUIPMENT AND CASEWORK SCHEDULE

STRUCTURAL

- S300 GENERAL NOTES, LOADING & TESTING, FRAMING PLAN AND SECTIONS

MECHANICAL

- M300 PARTIAL MECHANICAL FLOOR PLANS
- M301 PARTIAL MECHANICAL ROOF PLANS
- M400 TEMPERATURE CONTROLS
- M500 MECHANICAL SCHEDULES & DETAILS

PLUMBING

- P200 PLUMBING DEMOLITION FLOOR PLANS
- P300 PLUMBING FLOOR PLANS
- PF410 PLUMBING DETAILS AND SECOND FLOOR FIRE PROTECTION PLAN

ELECTRICAL

- E050 ELECTRICAL SYMBOLS LIST, ABBREVIATIONS & DETAILS
- E300 PARTIAL SECOND FLOOR ELECTRICAL PLANS
- E301 PARTIAL ROOF & MULTI-USE BUILDING PARTIAL MEZZANINE FLOOR ELECTRICAL
PLANS
- E600 PARTIAL ELECTRICAL RISER DIAGRAM AND SCHEDULES

END OF DOCUMENT

**SECTION 00 31 13
PRELIMINARY SCHEDULE**

1.01 GENERAL

- A. The following represents the preliminary construction schedule for the Work. This schedule is the current estimate of the Owner to be used for purposes of bidding. All Bidders shall include the costs of all overtime, double-shift, or so-called "premium" time that may be necessary to meet this milestone.

1.02 PRELIMINARY SCHEDULE

- | | |
|----------------------------------|---------------|
| A. Award of Contract: | May 1, 2025 |
| B. Commencement of Construction: | June 1, 2025 |
| C. Substantial Completion: | April 1, 2026 |

END OF DOCUMENT

**SECTION 00 41 13
BID FORM - STIPULATED SUM
SINGLE CONTRACT**

PROJECT: KANE COUNTY SHERIFF'S FORENSIC LABORATORIES
37W777 IL-38
ST. CHARLES, ILLINOIS 60175

BID TO: KANE COUNTY
719 SOUTH BATAVIA AVENUE
GENEVA, ILLINOIS 60134

BID FROM: CORPORATE _____
NAME: _____
ADDRESS: _____
CITY, STATE, ZIP: _____
TELEPHONE NO.: _____
FAX NO.: _____
EMAIL ADDRESS: _____
CONTACT _____
PERSON: _____

1.01 ACCEPTANCE

THE UNDERSIGNED BIDDER AGREES, IF THIS BID IS ACCEPTED, TO ENTER INTO AN AGREEMENT WITH THE OWNER, IN THE FORM INCLUDED IN THE BIDDING DOCUMENTS, TO PERFORM AND FURNISH THE WORK AS INDICATED IN THE BIDDING DOCUMENTS FOR THE BID PRICE AND WITHIN THE BID TIMES INDICATED IN THIS BID AND IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE CONTRACT DOCUMENTS.

1.02 ACKNOWLEDGMENTS

IN SUBMITTING THIS BID, THE BIDDER REPRESENTS THAT:

- A. This Bid will remain open for acceptance for a period of 120 days from the Bid opening date;
- B. The Owner has the right to reject this Bid;
- C. The Bidder accepts the provisions of the Instructions and Supplementary Instructions to Bidders regarding the disposition of the Bid;
- D. The Bidder agrees to sign and submit the Agreement and other documents required by the Bidding Requirements within 15 days after the Intent to Award;

- E. The Bidder has examined the complete set of Bidding Documents;
- F. The Bidder has visited the site and become familiar with the general, local, and site conditions;
- G. The Bidder is familiar with Federal, State and Local Laws and Regulations;
- H. The Bidder has correlated the information known to the Bidder; information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
- I. This Bid is genuine and not made in the interest of or on behalf of an undisclosed person, firm, or corporation and is not submitted in conformity with an Agreement or rules or group, association, organization, or corporation;
- J. The Bidder has not directly or indirectly induced or solicited another Bidder to submit a false or sham Bid; sought by collusion to obtain for itself an advantage over another Bidder or over the Owner;
- K. The Bidder is/has an ICC Certified Energy Efficiency Measures Installer to qualify for Utility Energy Incentives.
- L. The Bidder acknowledges that the Owner has determined that the services to be provided hereunder are subject to the Prevailing Wage Act, 820 ILCS 130/1-12.
- M. The Bidder acknowledges that the Owner is exempt from the payment of the Illinois Retailer's Occupation Tax.
- N. The Bidder has received the following Addenda, receipt of which is hereby acknowledged:

- 1. Addendum No. _____ Date _____
- 2. Addendum No. _____ Date _____
- 3. Addendum No. _____ Date _____
- 4. Addendum No. _____ Date _____
- 5. Addendum No. _____ Date _____

THE BIDDER UNDERSTANDS THAT, IN SUBMITTING THIS BID, HE WAIVES ALL RIGHT TO PLEAD ANY MISUNDERSTANDINGS REGARDING THE FOREGOING.

1.03 SINGLE CONTRACT - BASE BID PRICE:

- A. Refer to Section 01 10 00 - Summary.
- B. The Bidder will complete the Work of the Project in accordance with the Contract Documents for the following price:

Stipulated Sum Bid Price:

(Use Numerals)

(Use Words)

1.04 BID BOND

- A. The Bidder has to provide the required bid security in the form described by the OWNERS Documents.

1.05 ALLOWANCES

- A. The Bidder has included in the Bid the appropriate allowances as specified in Section 01 21 00 - Allowances.

1.06 CONTRACT TIME

- A. The Bidder agrees to begin and complete Work as indicated in Document 00 31 13 - Preliminary Schedule.

1.07 OTHER BID FORM SUPPLEMENTS

- A. The following additional Documents are attached to and made a condition of this Bid:
1. Document 00 43 27 - Separate Prices Break-Out Form.

1.08 SIGNATURES

Respectfully submitted this _____ day of _____, 20____.

Type of Firm: (check one)

_____ Individual

_____ Partnership

_____ Corporation

_____ Joint Venture

Corporate Seal: (SEAL)

Full name of firm: _____

Authorized Signing Officer: _____

Title: _____

Authorized Signing Officer: _____

Title: _____

END OF DOCUMENT

**SECTION 00 43 27
SEPARATE PRICES BREAK-OUT FORM**

PARTICULARS

THE FOLLOWING IS THE LIST OF SEPARATE PRICES REFERENCED IN THE BID SUBMITTED BY:

(BIDDER) _____

ITEM DESCRIPTIONS

ITEM # 1: MAU-1 - MAKE-UP AIR UNIT

Description: Material and labor to install the MAU-1.

Value: \$ _____

ITEM # 2: STEEL STRUCTURE

Description: Steel structure installed to support MAU-1 and close skylight opening.

Value: \$ _____

END OF DOCUMENT

SECTION 01 10 00 SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: KANE COUNTY SHERIFF'S FORENSIC LABORATORIES.
- B. Architect/Engineer's Name: Kluber Architects + Engineers.
- C. The Project consists of the construction of renovation of existing space, to provide power, electrical and building exhaust to support a new forensic laboratory. The work includes but not limited to minor demolition, doors, frames and hardware, glazing, gypsum board partitions, acoustical ceilings, resilient floor tile, painting, fire protection specialties, scientific casework and equipment, plumbing, mechanical, electrical, and access control.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price.

1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 41 00.
- B. Scope of alterations work is indicated on drawings.

1.04 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 01 21 00 - Allowances: Payment procedures relating to allowances.
- B. Section 01 78 00 - Closeout Submittals: Project record documents.
- C. Section 01 77 00 - Closeout Procedures: Final Payment.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect/Engineer for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values to the Architect/Engineer at earliest possible date, but no later than 14 days prior to first Pay Request Meeting.
 - 1. After review by the Architect/Engineer, revise and resubmit Schedule as directed.
- E. Format: Utilize the Table of Contents of this Project Manual as a format for the listing of the Work.
- F. Identify as separate line items on the Schedule the costs for the following items:
 - 1. Bonds.
 - 2. Insurance.
 - 3. Site Mobilization.
 - 4. Construction Submittals.
 - 5. General Conditions.
 - 6. Demonstration and Training.
 - 7. Closeout Submittals.
 - 8. Allowances (list each Allowance on a separate line; See Section 01 21 00).
 - 9. Contractor's overhead and profit.
- G. Submit Schedule of Values in sufficient detail for the Architect/Engineer to use in evaluation of Applications for Payment.
 - 1. Itemize the cost of the work of:

- a. Contractor's materials from stock.
- b. Contractor's own shop labor.
- c. Contractor's own field labor.
- d. Subcontractors' materials from stock.
- e. Subcontractors' shop labor.
- f. Subcontractors' field labor.
- g. Suppliers of products and equipment.

H. Revise Schedule of Values to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect/Engineer for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- I. Submit one pencil/draft copy of each Application for Payment to the Architect/Engineer at least 7 days prior to the due date for the submission of the Application.
- J. Contractor or Architect/Engineer may schedule a Pay Request Meeting to review the pencil/draft copy of the Application for agreement with the progress of the Work.
- K. After receipt of Architect/Engineer's review comments, submit three final copies, signed and notarized, of each Application for Payment.
- L. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 30 00.

2. Construction progress schedule, revised and current as specified in Section 01 30 00.
 3. Contractor's partial waiver of lien in the amount of the Application for Payment as well as trailing partial waivers of lien for subcontractors and suppliers who were included in the previous Application for Payment, to the extent of that payment.
 - a. When an Application shows completion of a subcontractor or supplier item, submit a final or full waiver for that item.
 - b. Waivers of lien shall be submitted on forms and executed in a manner acceptable to the Owner.
 4. Email confirmations and copies of certified transcripts of payroll records accompanying those confirmations from the Illinois Department of Labor for the Contractor and for all Subcontractors and Sub-subcontractors employed on the Project who performed work on the Project during the Payment Period.
 - a. Contractor shall assemble his and all subcontractor and sub-subcontractor records prior to submitting each Application for Payment.
 - b. Applications for Payment submitted without IDOL confirmation emails and transcripts or with missing IDOL confirmation emails or transcripts will result in payment being delayed until the Contractor complies fully with the requirements set forth in the preceding paragraphs.
 5. Affidavits attesting to products or equipment suitably stored off-site in a bonded warehouse. Payments for materials stored off-site shall be conditioned upon submission of bills of sale, applicable insurance, and any other documentation or procedures satisfactory to the Owner to establish the Owner's title to such materials, or otherwise protect the Owner's interest.
- M. When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect/Engineer will issue instructions directly to Contractor.
- C. For other required changes, Architect/Engineer will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect/Engineer will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within ten (10) days.

- E. Contractor may propose a change by submitting a request for change to Architect/Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect/Engineer for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect/Engineer.
 - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 - 4. For change ordered by Architect/Engineer without a quotation from Contractor, the amount will be determined by Architect/Engineer based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 70 00.
2. Additional closeout procedures specified in Section 01 77 00.

C. The submittal of Final Waiver of Lien and the acceptance of the final payment by the Contractor shall be held to be a waiver of any and all claims against the Owner arising from, out of, or in any connection with the Contract.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00 ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency allowance.
- C. Payment and modification procedures relating to allowances.

1.02 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts , less applicable taxes .
- B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing. These costs are to be borne by the Contractor and are to be included in the Base Bid .
- C. Differences in costs will be adjusted by Change Order.

1.03 CONTINGENCY ALLOWANCE

- A. Contractor's costs for products, delivery, installation, labor, payroll, taxes and equipment rental will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- B. Funds will be drawn from the Contingency Allowance only by Change Order.
- C. Bond, insurance, overhead and profit fees on Change Orders paid out of Contingency Allowances will not be permitted. The Contractor must carry in its Base Bid OH&P costs on Contingency Allowance funds expenditures.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.04 ALLOWANCES SCHEDULE

- A. Contingency Allowance: Include in the Base Bid the stipulated sum of \$100,000 for use upon Owner's instructions.
- B. Furniture Allowance: Include in the Base Bid the stipulated sum of \$15,000 for use upon Owner's instructions for furniture.
- C. Hardware Allowance: Include in the Base Bid the stipulated sum of \$2,400 for use to purchase keying cores.
- D. Technology Allowance: Include in the Base Bid the stipulated sum of \$50,000 for use upon Owner's instructions to purchase technology.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Architect/Engineer-provided CAD files.
- F. Requests for Information (RFI) procedures.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: General product requirements.
- B. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect/Engineer:
 - 1. Requests for Information (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Design data.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.

- B. Attendance required:
 - 1. Owner.
 - 2. Architect/Engineer.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties to Contract and Architect/Engineer.
 - 6. Procedures and processing of field decisions, Submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of a Geotechnical Engineer.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect/Engineer.
 - 4. Contractor's superintendent.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of Submittals schedule and status of Submittals.
 - 6. Maintenance of progress schedule.
 - 7. Corrective measures to regain projected schedules.
 - 8. Planned progress during succeeding work period.
 - 9. Maintenance of quality and work standards.
 - 10. Effect of proposed changes on progress schedule and coordination.
 - 11. Other business relating to work.
- D. Record minutes and distribute copies within 2 days after meeting to participants, with copies to Architect/Engineer, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. If preliminary schedule requires revision after review, submit revised schedule within 7 days.

3.04 ARCHITECT/ENGINEER-PROVIDED CAD FILES

- A. After the execution of the Contract, Architect/Engineer will provide, free of charge, upon receipt of a properly completed and signed request utilizing "Electronic Data Transfer Consent Form" at the end of this Specification Section, CAD files depicting graphic information for the project as follows:
 - 1. Architectural Floor Plans: Column grid, walls, floors, stairs, doors, windows, room numbers, ceiling grid, mechanical diffusers, plumbing fixtures, sprinkler heads (if depicted in Bid Documents) and lights.
- B. Contractor acknowledges and accepts that the Architectural Floor Plans do not contain structural, mechanical, electrical, plumbing, fire protection and other building systems information depicted in the Bidding Documents. Examples of information not contained in these files include, but are not limited to, title blocks, keynotes, schedules, mechanical ductwork and equipment, electrical device symbols, circuit numbers and home runs, plumbing equipment, piping runs and riser diagrams, and architectural/engineering text or details. No other CAD files, data or information will be provided.
- C. Only requests from Prime Contractors will be honored. Subcontractors must obtain the files from their respective Prime Contractors.
- D. In submitting a request, Contractor acknowledges that:
 - 1. Architect/Engineer bears no responsibility for the data or its transmission,
 - 2. Use of the data by the Contractor or his Subcontractors in no way relieves the Contractor of his obligations under the Contract,
 - 3. Contractor is solely liable for any and all claims arising from any and all products generated by the Contractor or its Subcontractors employing the data,
 - 4. Contractor and its Subcontractors have a limited, non-exclusive license to use the data solely in connection with the Work of the Project, and that
 - 5. Architect/Engineer retains all rights, including copyright, to the data.

3.05 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Prepare in a format and with content acceptable to Owner.

- a. Use AIA G716 - Request for Information .
- 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 - 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect/Engineer, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect/Engineer's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.

4. Highlight items for which a timely response has not been received to date.
 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect/Engineer will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 3:00 PM will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect/Engineer within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.06 SUBMITTAL SCHEDULE

- A. Submit to Architect/Engineer for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.07 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect/Engineer for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with Submittal PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.08 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Inspection reports.
 - 4. Manufacturer's instructions.
 - 5. Manufacturer's field reports.
 - 6. Other types indicated.
- B. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

3.09 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after Project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
 - 1. Submit via email in Adobe PDF electronic file format at native sheet size and right-side up. Architect/Engineer will return via email a reviewed copy in Adobe PDF electronic file format. Files not properly sized and rotated will be rejected. Illegible files will be rejected.
- B. Documents for Information: Submit via email in Adobe PDF electronic file format. Submitted documents are for Architect/Engineer's information and reference only, and will not be reviewed or returned.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect/Engineer.
 - 1. Submit original, physical samples. With each physical sample, submit Adobe PDF electronic copies of scanned physical original samples. Architect/Engineer will return via email a reviewed scanned copy in Adobe PDF electronic file format.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.11 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a single transmittal for related items.
2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
3. Transmit using approved form.
4. Number each submittal. Prefix the submittal number with the Specification Section number to which the submittal pertains. For revised submittals use original number and a sequential alphanumeric suffix. **Items submitted without a Specification Section number, or with an incorrect Specification Section number will delay the review process.**
5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number, article and paragraph, as appropriate on each copy.
6. Correlate submitted items with specified products; clearly indicate the specified product that corresponds to each submitted item. **Submitted items not clearly correlated with specified items will delay the review process.**
7. When options or optional features available for a Product are indicated in a Submittal, and selections for those options/features are indicated in the Contract Documents, identify on the Submittal the selection indicated in the Contract Documents. **Submittals that fail to identify specified options or optional features may be returned marked "Rejected" or "Revise and Resubmit".**
8. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's transmittal will not be acknowledged, reviewed, or returned.
9. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Deliver submittals to Architect/Engineer at business address.
10. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect/Engineer's consultants, Owner, or another affected party, allow an additional 7 days.
11. Clearly identify variations from the Contract Documents. Regardless of the type of variation, Contractor is solely responsible for errors in the field or performance issues that arise from Submittal variations from the requirements of the Contract Documents if those variations were not expressly noted to specifically identify for and describe to the reviewer the nature of the variation from the Contract Documents.
12. Provide space for Contractor's review stamp and a 4 inch x 3 inch clear space for Architect/Engineer's review stamp.
13. Promptly return submittals marked "Rejected" or "Revise and Resubmit" to originating subcontractor supplier, and faithfully ensure the prompt resubmittal of the correct or revised information.
14. When revised for resubmission, identify all changes made since previous submission. Use clouds, highlights or other means acceptable to Architect/Engineer. **Resubmittals that do not clearly identify all changes may be delayed and/or returned to the Contractor**

unreviewed.

15. Contractor is entitled to one (1) resubmittal of each Submittal For Review or Submittal For Project Closeout rejected by Architect/Engineer or returned by Architect/Engineer for further action. Thereafter, Contractor shall pay the cost of all further Architect/Engineer reviews of any Submittal For Review or Submittal for Project Closeout, at a rate of \$200.00/hour. Cost of such further reviews will be deducted from the Contract Sum by Change Order.
16. Promptly distribute and coordinate the requirements of reviewed submittals with affected parties. Instruct parties to promptly report inability to comply with requirements.
17. Where indicated on the Drawings or in respective product specification Sections, submit reviewed submittals to Authority Having Jurisdiction (AHJ).
18. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
19. Submittals not requested will be returned "Not Reviewed".

B. Product Data Procedures:

1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Use of reproductions of the Contract Documents in digital data form to create shop drawings is only permitted as defined above under Architect/Engineer-Provided CAD Files.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. When relevant, identify each item to allow review for applicability in relation to shop drawings showing installation locations.

E. Submittal reviews may be delayed and/or Submittals may be returned marked "Rejected" or "Revise and Resubmit" for any of the following reasons:

1. Submittals submitted outside the scheduled dates of the Submittal Schedule.
2. Submittals are incomplete or are missing information.
3. Submittals are not submitted in accordance with procedures outlined in this Section, including, but not limited to:
 - a. Specification Section number not indicated on submittal or transmittal.
 - b. Contractor's review stamp missing.
 - c. Submitted items not correlated with specified products.
 - d. Re-submitted items not clearly identifying changes.

3.12 SUBMITTAL REVIEW

- A. Submittals for Review:** Architect/Engineer will review each submittal, and approve, or take other appropriate action.

- B. Submittals for Information: Architect/Engineer will not acknowledge receipt, and take no other action.
- C. Architect/Engineer's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 - 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect/Engineer's and consultants' actions on items submitted for review:
 - 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "No Exception Taken", or language with same legal meaning.
 - 1) Resubmission is not required or requested.
 - 2) Resubmitted items will not be acknowledged.
 - b. "Make Corrections Noted", or language with same legal meaning.
 - 1) Resubmission is not required or requested.
 - 2) Resubmitted items may be returned marked "Not Requested, Not Reviewed".
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Clearly identify all revisions.
 - 3) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
 - c. "Submit Specified Item".
 - 1) Submit item complying with requirements of Contract Documents.

END OF SECTION

ELECTRONIC DATA TRANSFER CONSENT FORM

Project Name: KANE COUNTY SHERIFF'S FORENSIC LABORATORIES
37W777 IL-38
ST. CHARLES, ILLINOIS 60175

Project No.: 23-471-1507

Owner: KANE COUNTY

Your Work: _____

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Acknowledged by: _____
(Printed Name) (Signature)

Company: _____

Date: _____ Email: _____

Architectural Floor Plans are transmitted for the contractors' use as backgrounds for shop drawings and as-built drawings, and, as such, contain graphic information for column grid, walls, floors, stairs, doors, windows, room numbers, ceiling grid, lights, diffusers and sprinkler heads where indicated on Bid Documents. Plans do not contain title blocks, keynotes, schedules, mechanical ductwork and equipment, electrical device symbols, circuit numbers and home runs, plumbing equipment, piping runs and riser diagrams, and architectural/engineering text and details. Plans depict entire floors and are not formatted, partial plans as depicted in the Bidding Documents. Files are provided in R2013 .DWG format.)

**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. Sequencing and scheduling of the work with testing and inspections.
- D. Control of installation.
- E. Tolerances.
- F. Manufacturers' field services.
- G. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 01 41 00 - Regulatory Requirements.
- B. Section 01 42 00 - References.
- C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect/Engineer, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect/Engineer.
- C. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- B. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

1.05 REGULATORY REQUIREMENTS - SEE SECTION 01 41 00

1.06 REFERENCES AND STANDARDS - SEE SECTION 01 42 00

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 SCHEDULE OF TESTS AND INSPECTIONS:

- A. Structural Steel/Decking Testing and Inspection: Contractor's Testing Service.
 - 1. Section 05 12 00 - Structural Steel Framing:
 - a. Provide testing and verification of shop and field-bolted connections in accordance with AISC "Specification for Structural Joints using ASTM A 325 bolts".
 - b. Visually inspect all shop and field welds for placement and size.
 - 2. Section 05 31 00 - Steel Decking:
 - a. Visually inspect deck welds and sidalap fasteners.
 - b. Verify deck type and gauge.

3.04 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

**SECTION 01 41 00
REGULATORY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General.
- B. Definitions.
- C. Quality Assurance.
- D. Regulatory Requirements.

1.02 RELATED SECTIONS

- A. Section 01 10 00 - Summary.
- B. Section 01 42 00 - References.

1.03 GENERAL

- A. Comply with all applicable laws, rules, regulations, codes and ordinances.
- B. If the Contractor observes that the Contract Documents may be at variance with specified codes, notify the Architect/Engineer immediately. Architect/Engineer shall issue all changes in accordance with the General Conditions.
- C. It shall not be the Contractor's primary responsibility to make certain that the Contract Documents are in accordance with all applicable laws, rules and regulations, however, when the Contractor performs work knowing or having reason to know that the work in question is contrary to applicable laws, rules, and regulations, and fails to notify the Architect/Engineer, the Contractor shall pay all costs arising therefrom.

1.04 DEFINITIONS

- A. Definitions:
 - 1. Codes: Codes are statutory requirements, rules or regulations of governmental entities.
 - 2. Standards: Standards are requirements that have been established as accepted criteria, set general consent.

1.05 QUALITY ASSURANCE

- A. The Architect/Engineer has designed the project to applicable code requirements and has copies of said codes available for the Contractor's inspection.
- B. The Contractor shall:
 - 1. Ensure that copies of codes and standards referenced herein or specified in individual specifications sections are available to Contractor's personnel, agents, and Sub-Contractors.
 - 2. Ensure that Contractor's personnel, agents, and Sub-Contractors are familiar with the workmanship and requirements of applicable codes and standards.

1.06 REGULATORY REQUIREMENTS

- A. Source and Requirements: Verify amendments with local code officials.

1. Local code requirements:
 - a. ICC International Building Code, 2021 Edition.
 - b. ICC International Mechanical Code, 2021 Edition.
 - c. ICC International Fire Code, 2021 Edition.
 - d. ICC International Property Maintenance Code, 2021 Edition.
 - e. National Electrical Code, 2020 Edition.
2. State code requirements:
 - a. Capital Development Board (CDB):
 - 1) Illinois Accessibility Code, 2018 Edition.
 - 2) Illinois Energy Conservation Code (ICC International Energy Conservation Code, 2018 Edition, with State of Illinois modifications.
 - b. Illinois Department of Public Health (IDPH):
 - 1) Illinois Plumbing Code , 2014 Edition
 - c. Illinois Environmental Protection Agency (IEPA):
 - 1) Air-Pollution Standards.
 - 2) Noise Pollution Standards.
 - 3) Water Pollution Standards.
 - 4) Public Water Supplies
 - 5) Solid Waste Standards.
3. Information and Requirements for Utility Services: Local utility companies.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 42 00 REFERENCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Drawing symbols, abbreviations and acronyms.
- B. Definitions of terms used throughout the Contract Documents.
- C. Explanation of specification format and content.
- D. Requirements relating to referenced standards.
- E. Applicability of referenced standards.
- F. List of industry organizations and certain of their respective documents.

1.02 DRAWING SYMBOLS AND CONVENTIONS

- A. Abbreviations and graphic symbols are defined on the General Notes, Symbols & Abbreviations sheet of the drawings.
- B. Generally, symbols used on the mechanical and electrical drawings conform to those recommended by ASHRAE, though, where appropriate, these symbols are supplemented by more specific symbols as recommended by ASME, ASPE, or the IEEE.

1.03 DEFINITIONS

- A. Where the terms "indicated", "noted", "scheduled", "shown", or "specified" are used it is to help locate the reference; no limitation on location is intended except as specifically noted.
- B. Where the terms "directed", "requested", "authorized", "approved", are used as in "directed by the Architect/Engineer", no implied meaning shall be construed to extend the Architect/Engineer's responsibilities into the Contractor's purview of construction supervision.
- C. Where the term "approved" is used in conjunction with the Architect/Engineer's action on submittals, requests or applications it is limited to the duties of the Architect/Engineer as described in the Agreement, and the General and Supplemental Conditions of the Contract. Such use of the term "approval" shall not limit or release the Contractor from his responsibility to fulfill Contract requirements.
- D. Where the term "regulations" is used it means all applicable statutes, laws, ordinances, and orders issued by authorities having jurisdiction, as well as construction industry standards, rules, or conventions that address performance of the Work.
- E. The "Project Site" is the space available to the Contractor for performance of construction activities. The Project Site may be for the exclusive use of the Contractor and his activities or may be used in conjunction with others performing other construction or related activities on the Project. Unless the extent of the Project Site is indicated on the Drawings, means the limits of the area within the property line of the parcel on which the Project is located, subject to the limitations and restrictions of local ordinance and the discretion of the Owner.

- F. Where the term "furnish" is used it means supply, deliver to, and unload and store at the Project Site until the Work is ready for the item to be assembled and incorporated into the Work.
- G. Where the term "install" is used it is meant to describe operations at the Project Site to include uncrating, assembling, placing, anchoring, connecting to utilities, finishing, protecting, cleaning and all other similar operations required to fully incorporate an item into the Work.
- H. Where the term "provide" is used it means "furnish and install" as defined above.
- I. Where the term "refurbish" is used it means refinish, repair and otherwise restore to like-new condition.
- J. Where the terms "remove" or "demolish" are used they mean safely disconnect from existing utilities, permanently extract from the Work and the Project Site, and legally dispose of off-site.
- K. Where the terms "temporarily remove" or "salvage" are used they mean safely disconnect from existing utilities and carefully extract from the Work so as to prevent damage to the item and the Work.
 - 1. If the item is to be reinstalled or relocated as part of the Work, these terms also mean clean, adjust, lubricate and otherwise restore to best possible condition without repair or refinishing.
 - 2. Otherwise, these terms also mean clean item surfaces and turn over to the Owner for storage and possible future use.
- L. Where the term "reinstall" is used it means the same as "install", with respect to a temporarily removed, salvaged or relocated item.
- M. Where the term "relocate" is used it means temporarily remove and reinstall in a new location.
- N. Where the phrase "salvage in place" is used it means protect in place so as to prevent damage while adjacent elements are demolished, restore to best possible condition without repair or refinishing, and modify as necessary to properly incorporate and integrate with the Work.

1.04 SPECIFICATION FORMAT AND CONTENT

- A. These Specifications are based on the Construction Specification Institute's 49 Division format and numbering system.
- B. Language used in the Specifications and other Contract Documents is an abbreviated type. Implied words and meanings will appropriately interpreted.
- C. Requirements expressed in imperative and streamlined language are to be performed by the Contractor. At certain locations in the text, subjective language may be used to describe responsibilities that must be fulfilled indirectly by the Contractor or others.
 - 1. Whenever a colon (:) is used within a sentence or phrase, it shall be construed to mean the words "shall be".
- D. Use of certain terms such as "carpentry" is not intended to imply that certain activities must be performed by accredited or unionized individuals of a corresponding generic name. The Specifications do, however, require that certain construction activities shall be performed by specialists who are recognized experts in the operations to be performed. Specialists shall be used for said activities, however the final responsibility for fulfilling the requirements of the Contract remains the Contractor's.

1.05 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue specified in this section, except where a specific date is established by applicable code.
- C. Obtain copies of standards when required by the Contract Documents.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect/Engineer before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect/Engineer shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

1.06 APPLICABILITY OF INDUSTRY STANDARDS

- A. Construction industry standards shall have the same force and effect as if bound or copied directly in the Contract Documents, except where more stringent requirements are specified. All such applicable standards are made a part of the Contract Documents by reference.
 - 1. Where compliance with two or more standards are referenced and conflicting requirements for quality or quantities occur, comply with the more stringent requirements. Refer questions regarding apparently conflicting standards to the Architect/Engineer for a decision before proceeding.
 - 2. The standard of quality or quantity levels specified, shown, or referenced shall be the minimum to be provided or performed. Refer questions regarding standards of minimum quality or quantity to the Architect/Engineer before proceeding.

1.07 CONSTRUCTION INDUSTRY ORGANIZATIONS AND DOCUMENTS

AA -- ALUMINUM ASSOCIATION, INC.

AABC -- ASSOCIATED AIR BALANCE COUNCIL

AAMA -- AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION

ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE

ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

ASME -- THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASTM -- AMERICAN SOCIETY FOR TESTING AND MATERIALS

AWS -- AMERICAN WELDING SOCIETY

BHMA -- BUILDERS HARDWARE MANUFACTURERS ASSOCIATION

CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION
DHI -- DOOR AND HARDWARE INSTITUTE
FM -- FACTORY MUTUAL RESEARCH CORPORATION
ICC -- INTERNATIONAL CODE COUNCIL, INC.
IEEE -- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
ISO -- INTERNATIONAL STANDARDS ORGANIZATION
NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS
NEBB -- NATIONAL ENVIRONMENTAL BALANCING BUREAU
NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION
NRCA -- NATIONAL ROOFING CONTRACTORS ASSOCIATION
SGCC -- SAFETY GLAZING CERTIFICATION COUNCIL
SIGMA - SEALED INSULATING GLASS MANUFACTURERS ASSOCIATION (See IGMA)
SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.
SSPC -- THE SOCIETY FOR PROTECTIVE COATINGS
UL -- UNDERWRITERS LABORATORIES INC.
WWPA -- WESTERN WOOD PRODUCTS ASSOCIATION

1.08 UNITED STATES GOVERNMENT AND RELATED AGENCIES/DOCUMENTS

CFR -- CODE OF FEDERAL REGULATIONS
CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION
EPA -- ENVIRONMENTAL PROTECTION AGENCY
FS -- FEDERAL SPECIFICATIONS AND STANDARDS (General Services Administration)
GSA -- U.S. GENERAL SERVICES ADMINISTRATION
USGS -- UNITED STATES GEOLOGICAL SURVEY

1.09 STATE GOVERNMENT AND RELATED AGENCIES/DOCUMENTS

CDB -- ILLINOIS CAPITAL DEVELOPMENT BOARD
IDOL -- ILLINOIS DEPARTMENT OF LABOR
IDPH -- ILLINOIS DEPARTMENT OF PUBLIC HEALTH
IEPA -- ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
OSFM -- OFFICE OF THE ILLINOIS STATE FIRE MARSHAL

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

1.02 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. One (1) mobile cellular telephone for each of Contractor's and any Subcontractor's field personnel.

1.03 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.06 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.07 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. All on-site personnel of Contractor, Subcontractors and Suppliers must pass a background check, performed by the Owner or by an outside agency of the Owner's choosing.
 - 1. At least 7 days prior to a Contractor, Subcontractor or Supplier employee being present on the jobsite, provide Owner with employee's full name and date of birth, to allow the Owner to conduct a background check on the individual.

1.08 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.09 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Identification of Owner-supplied products.
- B. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.04 QUALITY ASSURANCE

- A. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
 - 1. Good: Product-specific; compliant with ISO 14044.
 - 2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Designed, manufactured, and tested in accordance with industry standards.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 61 16.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 4. Have longer documented life span under normal use.
 - 5. Result in less construction waste.
 - 6. Are made of recycled materials.
 - 7. Have a published Environmental Product Declaration (EPD).
 - 8. Have a published Health Product Declaration (HPD).
 - 9. Have a published Manufacturer's Inventory of Chemical Content.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.03 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location directed by Owner's representative; obtain Owner's signature on receipt for delivery prior to final payment. Submit signed receipts with Closeout Submittals.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. Substitutions Prior To Bid Opening: Architect/Engineer will consider a written request for substitution provided that such request is received at least seven (7) days prior to the Bid opening date. Requests received after that time will not be considered.
 - 1. Only Substitution Requests from Bidders will be considered.
 - 2. If a request is approved, the Architect/Engineer will issue an appropriate addendum not less than three (3) days prior to the Bid opening date.
- B. Document each request utilizing Substitution Request Form following this section with complete data substantiating compliance of proposed substitution with Contract Documents. Incomplete requests will not be considered. Submit a separate Substitution Request Form and accompanying

documentation for each proposed substitution.

- C. Provide the following minimum documentation with each Substitution Request Form:
 - 1. Product identification, manufacturer, product data including dimensions and weight, performance and installation instructions.
 - 2. Side-by-side itemized comparison of proposed substitution with specified product.
 - 3. Coordination information including other modifications required as a result of proposed substitution.
 - 4. Cost information including the effect of the proposed substitution on the Contract Sum.
- D. Sign and date the Substitution Request Form.
- E. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Agrees to reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction over the Project.
- F. Architect/Engineer will notify submitter in writing of decision to accept or reject request.
- G. Substitutions of products or product characteristics/components/options/accessories will not be considered when they are indicated or implied on Contractor's submittals, without separate written request, or when acceptance will require revision to the Contract Documents, whether rejection of said substitutions is expressly identified by Architect/Engineer on Contractor's submittals or not.

3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 01 10 00 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.
 - 5. Make final connections to Owner-provided equipment, and test equipment.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SUBSTITUTION REQUEST FORM

PROJECT: KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

SPECIFIED ITEM: _____

Specification Section	Page	Paragraph	Description
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The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

Attached data includes project description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents which the proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. The proposed substitution does not affect dimensions shown on drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

 Printed Name

 Signature

 Date

 Firm

 Telephone

 Email

Attachments (list): _____

For Use By The Architect/Engineer:

☐ Accepted ☐ Accepted As Noted

☐ Not Accepted ☐ Received Too Late

By: _____

Date: _____

Remarks: _____

SECTION 01 61 16
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.
- C. Requirement for installer certification that they did not use any non-compliant products.

1.02 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

1.03 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Other products when specifically stated in the specifications.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Other products when specifically stated in the specifications.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).
- C. BIFMA e3 - Furniture Sustainability Standard; Business and Institutional Furniture Manufacturers Association; 2019.
- D. GreenSeal GS-36 - Standard for Adhesives for Commercial Use; 2013.
- E. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- F. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
- C. Sustainable Design Reporting: Submit evidence of compliance along with Accessory Material VOC Content Certification Form following this Section.
- D. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

1.06 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
 - b. Published product data showing compliance with requirements.
 - c. Certification by manufacturer that product complies with requirements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Aerosol Adhesives: GreenSeal GS-36.
 - 3. Joint Sealants: SCAQMD 1168 Rule.
 - 4. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 61 16.01
ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM

4.01 PRODUCT CERTIFICATION

- A. I certify that the installation work of my firm on this project:
1. [HAS] [HAS NOT] required the use of any ADHESIVES.
 2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
 3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
 4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.
- B. Product data and MSDS sheets are attached.

5.01 CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)

- A. Firm Name: _____
- B. Print Name: _____
- C. Signature: _____
- D. Title: _____ (officer of company)
- E. Date: _____

END OF SECTION

**SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Cutting and patching.
- C. Cleaning and protection.
- D. Starting of systems and equipment.
- E. Demonstration and instruction of Owner personnel.
- F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- G. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- C. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- E. Section 01 79 00 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.04 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.05 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.

- 7. Remove samples of installed work for testing when requested.
- 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.06 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.07 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.08 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 79 00 - Demonstration and Training.

3.09 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

- A. See Section 01 77 00 for additional requirements.
- B. Make submittals that are required by governing or other authorities.

- C. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- D. Notify Architect/Engineer when work is considered ready for Architect/Engineer's Substantial Completion inspection.
- E. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect/Engineer's Substantial Completion inspection.
- F. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect/Engineer's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect/Engineer.
- G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- H. Notify Architect/Engineer when work is considered finally complete and ready for Architect/Engineer's Substantial Completion final inspection.
- I. Complete items of work determined by Architect/Engineer listed in executed Certificate of Substantial Completion.

3.12 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES:

- A. Substantial Completion Procedures.
- B. Final Completion Procedures.

1.02 RELATED REQUIREMENTS:

- A. Section 01 10 00 - Summary.
- B. Section 01 78 00 - Closeout Submittals.

1.03 SUBSTANTIAL COMPLETION PROCEDURES

- A. Substantial Completion Procedures will be in accordance with the General Conditions of the Contract for Construction, Article 9.8 and include the following:
 - 1. When the Work or a portion of the Work is considered to be substantially complete, the Contractor inspects the project and prepares a comprehensive list of outstanding items to be completed or corrected, Initial Punch List.
 - 2. Contractor submits notice of Substantial Completion.
 - 3. Contractor completes items on the Initial Punch List.
 - 4. Architect/Engineer inspects the project to verify substantial completion and prepares a Final Punch List.
 - 5. Architect/Engineer prepares Certificate of Substantial Completion, acceptance is required by Owner and Contractor.

1.04 FINAL COMPLETION PROCEDURES

- A. Final Completion Procedures will be in accordance with the General Conditions of the Contract for Construction, Article 9.10, and include the following:
 - 1. When items on Initial and Final Punch Lists are complete, submit notice of final completion and final application for payment.
 - 2. Submit Final Closeout Submittals as specified in Section 01 78 00.
 - 3. Architect will inspect project and verifies the Work is acceptable and conforms with the Contract Documents.
 - 4. Architect will process final application for payment and closeout submittals.

1.05 CORRECTION PERIOD

- A. Correction Period commences on the date of Substantial Completion and expires two years from that date.
- B. Owner: document non-conforming or defective work over course of Correction Period. Notify Contractor in writing of nonconforming or defective work. Copy Architect/Engineer.
 - 1. Life safety issues requiring immediate corrective work: Contact Contractor for action.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION - NOT USED.

END OF SECTION

**SECTION 01 78 00
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Warranties and bonds.
- B. Project record documents.
- C. Operation and maintenance data.
- D. Format, arrangement and organization of Operation and Maintenance Manual electronic file.

1.02 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.

1.03 SUBMITTALS

- A. Submit preliminary draft of proposed formats and outlines of contents of electronic Operation and Maintenance Manual, including warranties and bonds, record documents in Bookmarked Adobe PDF form before start of Work. Architect/Engineer will review draft and return with comments.
- B. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
- C. Project Record Documents: Submit documents to Architect/Engineer with claim for final Application for Payment.
- D. Operation and Maintenance Data:
 - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 2. Submit completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content as required prior to final submission.
- E. Submit revised final Operation and Maintenance Manual, incorporating warranties and bonds, record documents and operation and maintenance data, in final form in Adobe PDF electronic file format on USB flash drive form within 10 days after final inspection.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.
- F. Include color, 300 dpi resolution scans of each in Operation and Maintenance Manual PDF file, Bookmarked and indexed separately in Table of Contents.

3.02 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.

3.03 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.04 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.05 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include

summer, winter, and any special operating instructions.

- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports.
- O. Additional Requirements: As specified in individual product specification sections.

3.06 ASSEMBLY OF OPERATION AND MAINTENANCE MANUAL

- A. Assemble operation and maintenance data into a single electronic "manual" file in Adobe PDF file format for Owner's personnel use, with data arranged in the same sequence as, and bookmarked by, the specification sections.
 - 1. Media: USB flash drive of capacity sufficient to store entire PDF file, fragmented.
 - 2. Attach a tag or label flash drive with Project name, date, and the title "O&M Manual".
- B. Organization and Arrangement of Contents: Arrange the contents of the "manual" file in using the following hierarchical system and create a corresponding hierarchy of Bookmarks in the file:
 - 1. Project Title Page.
 - 2. Project Directory.
 - 3. Table of Contents:
 - 4. Project Warranties.
 - a. Division 01 - General
 - 1) General Contractor's Warranty.
 - b. Division 02
 - 1) [One Bookmark for each Specification section number and name where a warranty is required.]
 - 2) [Continue for each applicable Specification section.]
 - c. [Continue for each applicable Division.]
 - 5. Record Documents.
 - a. Record Drawings (marked-up version of A/E Drawings).
 - b. Record Specifications (marked up version of A/E Specifications).
 - c. [Continue for each Division.]
 - 6. Operation and Maintenance Data.

- a. Division 06
 - 1) [One Bookmark for each Specification section number and name where a O&M data is required.]
 - 2) [Continue for each applicable Specification section.]
- b. [Continue for each applicable Division.]
- C. Where systems involve more than one Specification Section, provide separate Bookmark and content for each Specification Section.
- D. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- E. Prepare data in the form of an instructional manual.
- F. Cover Page: Populate the first page of the PDF file with: printed title "OPERATION AND MAINTENANCE MANUAL; identify title of Project; identify subject matter of contents.
- G. Project Directory: Beginning on the second page of the PDF file, provide Title and address of Project. Provide, for Architect/Engineer, Consultants, Contractor, subcontractors and major suppliers: the business name, address, telephone number(s), email address(es), contact name(s) of responsible individual(s) knowledgeable about the Project, and a brief description of the responsibility or contribution of the business to the Project.
- H. Table of Contents: List every item using the same identification as in the title of the Bookmark, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item
- I. Bookmarks: Hierarchically under each Specification Section, further Bookmark each separate product and system; identify the contents in the title of the Bookmark; on the Bookmarked page provide a description of product and major component parts of equipment.
- J. Content: Manufacturer's printed data, legibly scanned, in color where applicable, at 300 dpi (minimum) resolution.
- K. Drawings: Legibly scanned, in color where applicable, at 300 dpi (minimum) resolution; PDF file page size to match native sheet size of original drawing.

END OF SECTION

**SECTION 01 79 00
DEMONSTRATION AND TRAINING**

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Electrical systems and equipment.
 - 4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

- A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.
- B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Architect/Engineer for transmittal to Owner.
 - 2. Submit not less than four weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Provide an overall schedule showing all training sessions.
 - 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
 - 1. Identification of each training session, date, time, and duration.

2. Sign-in sheet showing names and job titles of attendees.
3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

1.04 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 3. Typical uses of the O&M manuals.

- F. Product- and System-Specific Training:
1. Review the applicable O&M manuals.
 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 6. Discuss common troubleshooting problems and solutions.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 10. Review spare parts and tools required to be furnished by Contractor.
 11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 41 00 DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- E. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Site Plan: Indicate:
 - 1. Areas for temporary construction and field offices.
- C. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
 - 1. Indicate extent of demolition, removal sequencing, bracing and shoring, location and construction of barricades and fences, and routes through building for carting removal of materials.
 - 2. Summary of safety procedures.
 - 3. Demolition firm qualifications.
- D. Project Record Documents: Accurately record actual locations of capped and active building systems elements.

1.05 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Minimum of 3 years of documented experience.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 DEMOLITION

- A. Within area of new construction, remove foundation walls and footings to minimum 2 feet below finished grade.
- B. Outside area of new construction, remove foundation walls and footings to minimum 2 feet below finished grade.
- C. Remove concrete slabs on grade as indicated on drawings.
- D. Remove other items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with requirements in Section 01 70 00.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 5. Provide, erect, and maintain temporary barriers and security devices.
 - 6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 8. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
 - 9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
- C. Do not begin removal until receipt of notification to proceed from Owner.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements to remain in place and not removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent elements.
 - 3. Stop work immediately if adjacent elements appear to be in danger.
- F. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. Hazardous Materials:
 - 1. If hazardous materials are discovered during removal operations, stop work and notify Architect/Engineer and Owner; hazardous materials include regulated asbestos containing

materials, lead, PCBs, and mercury.

- H. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Dismantle existing construction and separate materials.
 - 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and building systems indicated on drawings are based on casual field observation and existing record documents only.
 - 1. Verify construction and building systems arrangements are as indicated.
 - 2. Report discrepancies to Architect/Engineer before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from areas that remain occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 .
- C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
- D. Remove existing work as indicated and required to accomplish new work.
 - 1. Remove items indicated on drawings.
- E. Building systems including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new systems, maintain existing systems in service until new systems are complete and ready for service.
 - 3. Verify that abandoned services serve only abandoned facilities before removal.
 - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure. Provide shoring and bracing as required.
 - 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
 - 4. Patch to match new work.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION:

- A. Section 05 50 00 - Metal Fabrications: Roof frames and miscellaneous deck support elements.

1.03 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements.
- B. Section 05 31 00 - Metal Decking.
- C. Section 05 50 00 - Metal Fabrications.

1.04 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2023.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.
- C. AISC 325-01 - LRFD Manual of Steel Construction; American Institute of Steel Construction, Inc; 2001, Third Edition.
- D. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- H. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- I. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use; 2014 (Reapproved 2020).
- J. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.
- K. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- N. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections not detailed.
 - 3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

1.06 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- C. Fabricator: Company holding the contract for the work of this Section must be a fabricator, not a broker, and must self-perform all the work of this Section.
- D. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- E. Welder Qualifications: Qualified within previous 12 months in accordance with AWS.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, medium carbon, galvanized, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

2.03 FINISH

- A. Prepare structural component surfaces in accordance with SSPC-SP2.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed or field welded.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing and all final connections are complete.
- C. Field weld components indicated on shop drawings.
- D. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
- E. Do not field cut or alter structural members without approval of Architect/Engineer.
- F. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 TOLERANCES

- A. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Provide free access to framing operations at project site and cooperate with the appointed firm.

END OF SECTION

SECTION 05 31 00 STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof deck.
- B. Bearing plates and angles.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements.
- B. Section 05 12 00 - Structural Steel.
- C. Section 05 50 00 - Metal Fabrications.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- E. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).
- F. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- G. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

1.05 QUALITY ASSURANCE

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 STEEL DECK

- A. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Ungalvanized Steel Sheet (typical at all roof deck unless noted otherwise) : ASTM A1008/A1008M, Designation SS, Grade 33, Type 1.
 - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 - 3. Structural Properties:
 - a. Span Design: Multiple: Minimum Triple Span.
 - 4. Minimum Metal Thickness, Excluding Finish: 22 gage as indicated on drawings.
 - 5. Profile: Fluted; SDI N.
 - 6. Side Joints: Lapped mechanically fastened.
 - 7. End Joints: Lapped, welded.

2.02 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel unfinished.
- B. Welding Materials: AWS D1.1/D1.1M.
- C. Fasteners: Galvanized hardened steel, self tapping (#10 TEK minimum).
- D. Shop and Touch-Up Primer: Manufacturer's standard, complying with VOC limitations of authorities having jurisdiction; compatible with scheduled painted finish, coating or fireproofing specified in related Sections.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction; compatible with scheduled painted finish, or coating specified in related Sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On steel supports provide minimum 3 inch bearing.
- C. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
 - 1. Welding: 5/8" Ø puddle welds as noted on drawings.

- D. Roof deck sidelaps to be as indicated on the drawings.
- E. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- H. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.03 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.
- B. Provide free access to framing operations at project site and cooperate with the appointed firm.

END OF SECTION

**SECTION 05 50 00
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel.
- B. Section 05 31 00 - Steel Decking: Bearing plates and angles for metal deck bearing, including anchorage.

1.03 REFERENCE STANDARDS

- A. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- B. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- C. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2022.
- D. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- F. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1.05 QUALITY ASSURANCE

- A. Fabricator: Company holding the contract for the work of this Section must be a fabricator, not a broker, and must self-perform all the work of this Section.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Angles and Plates: ASTM A36/A36M.

- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.02 FABRICATION

- A. Continuously seal joined members by continuous welds.

2.03 FABRICATED ITEMS

- A. Ledge Angles, Shelf Angles, and Plates Not Attached to Structural Framing: For support of metal decking; finish as scheduled below.

2.04 FINISHES - STEEL

- A. Prime paint all steel items unless scheduled otherwise at the end of this section.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components where required on drawings.
- D. Field weld components indicated on drawings and shop drawings.
- E. Perform field welding in accordance with AWS D1.1/D1.1M.

- F. Obtain approval prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed .

3.04 TOLERANCES

- A. Maximum Offset From True Alignment: 1/4 inch.
- B. Maximum Out-of-Position: 1/4 inch.

3.05 SCHEDULE

- A. Interior Locations (Non-Corrosive Environments)Finish
 - 1. Shelf angles and deck support angles: Primed
 - 2. Mechanical and electrical equipment rails and supports: Primed
 - 3. Miscellaneous angles, plates, clips and shims: Primed

END OF SECTION

**SECTION 06 10 00
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.
- D. PS 1 - Structural Plywood; 2023.
- E. PS 20 - American Softwood Lumber Standard; 2021.
- F. WWPA G-5 - Western Lumber Grading Rules; 2021.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise

indicated.

4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

- B. Provide sustainably harvested wood; see Section 01 60 00 - Product Requirements for requirements.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Western Wood Products Association; WWPA G-5.
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 1. Lumber: S4S, No. 2 or Standard Grade.
 2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

- A. Applications:
 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
 3. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards.
- B. Fire Retardant Treatment:
 1. Interior Type A: AWWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as scheduled.

- c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Pressure Treatment of Lumber Above Grade: AWP A U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - 1. Kiln dry lumber after treatment to maximum moisture content of 15 percent.
 - 2. Treat lumber in contact with flashing or waterproofing.
 - 3. Treat lumber in contact with masonry or concrete.
 - 4. Treat lumber less than 18 inches above grade.
 - 5. Preservative Pressure Treatment of Plywood Above Grade: AWP A U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 15 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
- D. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Toilet accessories.
 - 4. Wall-mounted door stops.
 - 5. Marker and tack boards.

- 6. Joints of rigid wall coverings that occur between studs.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at each roof opening except where prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

3.05 TOLERANCES

- A. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.06 CLEANING

- A. Waste Disposal:
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

3.07 SCHEDULE

- A. Roof Blocking: Pressure preservative treated.
- B. Blocking in Walls: Fire retardant treated.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Elastomeric roofing membrane, adhered conventional application.
- B. Insulation, flat and tapered.
- C. Vapor retarder.
- D. Roofing stack boots and walkway pads.

1.02 RELATED REQUIREMENTS

- A. Section 07 62 00 - Sheet Metal Flashing and Trim: Flashings and counterflashings.
- B. Section 07 71 00 - Roof Specialties: Pipe/stack boots and roof portals.

1.03 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-- Tension; 2016 (Reapproved 2021).
- D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2020).
- E. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2020.
- F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- G. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015, with Editorial Revision (2022).
- H. FM (AG) - FM Approval Guide; Current Edition.
- I. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2024).
- J. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2022).
- K. NRCA (RM) - The NRCA Roofing Manual; 2024.
- L. NRCA (WM) - The NRCA Waterproofing Manual; 2021.
- M. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of associated counterflashings installed under other sections.
- B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, mechanical fastener layout, and walkway pad layout.
- D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions, special procedures, and perimeter conditions requiring special attention.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- G. Installer's qualification statement.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum ten years documented experience, and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 95 degrees F.

- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle SynTec Systems; Sure-Seal EPDM: www.carlisle-syntec.com.
 - 2. Elevate; Low Slope Fire Retardant (LSFR) RubberGard EPDM Membrane: www.holcimelevate.com.
 - 3. GenFlex Roofing Systems, LLC: www.genflex.com.
 - 4. Versico Roofing Systems; VersiGard EPDM: www.versico.com.
 - 5. Substitutions: Not permitted.
- B. Insulation:
 - 1. Same manufacturer as EPDM Membrane Materials.

2.02 ROOFING

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Roofing Assembly Requirements:
 - 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
 - 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
 - 3. Securement of Roofing Components: As prescribed in FM DS 1-29 and ASCE 7.
- C. Acceptable Insulation Types - Constant Thickness Application:
 - 1. Minimum 2 layers of polyisocyanurate board.
- D. Acceptable Insulation Types - Tapered Application:
 - 1. Tapered polyisocyanurate or extruded polystyrene board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637.
 - 1. Thickness: 60 mil, 0.060 inch.
 - 2. Sheet Width: 120 inches, maximum; factory fabricate into widest possible sheets.
 - 3. Color: Black.
 - 4. Tensile Strength: 1,300 psi, minimum, measured in accordance with ASTM D412.

5. Ultimate Elongation: 300 percent, minimum, measured in accordance with ASTM D412.
6. Durometer Hardness, Type A: 65 +/-10, minimum, in accordance with ASTM D2240
7. Tear Strength: 150 lbf per inch, measured in accordance with ASTM D624.
8. Water Vapor Permeability: 2.0 perm inch, measured in accordance with ASTM E96/E96M.
9. Brittleness Temperature: -49 degrees F, measured in accordance with ASTM D746.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Vapor Retarder: SBS modified bitumen self-adhesive composite sheet ; compatible with roofing and insulation materials.

1. Products:

- a. VapAir Seal 725TR manufactured by Carlisle.
- b. V-Force Vapor Barrier Membrane manufactured by Elevate.

D. Flexible Flashing Material: Same material as membrane.

2.04 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.

1. Classifications:

- a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inches thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F. Total thickness and R-value as indicated on the Drawings.

2. Board Size:

- a. Fully Adhered Applications: 48 x 48 inches.

3. Board Thickness: As indicated on the Drawings.

4. Maximum Board Thickness: 3 inches.

5. Tapered Board: Slope as indicated on the Drawings; minimum thickness 1/2 inch; fabricate of fewest layers possible.

6. Board Edges: Square.

2.05 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Insulation Fasteners: Appropriate for purpose intended and approved by Factory Mutual and roofing manufacturer.

C. Membrane Adhesive: As recommended by membrane manufacturer.

D. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

E. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

- F. Vapor Retarder Adhesive/Primer: As recommended by manufacturer, to suit roof deck substrate material.
- G. Sealants: As recommended by membrane manufacturer.
- H. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 - 1. Size: 30 by 30 inches.
 - 2. Products:
 - a. Carlisle Roofing Systems, Inc.; Sure-Seal EPDM Pressure-Sensitive (PS) Molded Walkway Pads: www.carlisle-syntec.com.
 - b. Elevate QuickSeam Walkway Pad: www.firestonebpco.com.
 - c. Elevate X-Tred Walkway Pad: www.firestonebpco.com.
 - d. GenFlex Roofing Systems, LLC: www.genflex.com.
 - e. Versico Roofing Systems; VersiGard EPDM Black Quick-Applied (QA) Molded Walkway Pad: www.versico.com.
 - f. Substitutions: Not permitted.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips are in place.

3.02 INSTALLATION - VAPOR RETARDER AND INSULATION, UNDER MEMBRANE

- A. Apply vapor retarder to deck surface with adhesive/primer in accordance with manufacturer's instructions and recommendations for roof deck substrate type.
 - 1. Extend vapor retarder under perimeter blocking, past deck edge and up backside face of parapets to top of insulation. Seal top edge of vapor retarder to backside face of parapets.
 - 2. Extend vapor retarder up outside faces of roof curbs to level of top surface of roof insulation. Seal top edge of vapor retarder to roof curb surfaces.
 - 3. Where possible, install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
 - 4. Seal vapor retarder edges of existing vapor retarder and to roof deck penetrations.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Attachment of Insulation:
- D. Attachment of Insulation: Mechanically fasten each layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

- E. Lay subsequent layers of insulation with joints staggered minimum 6 inches from joints of preceding layer.
- F. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- G. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- H. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- I. Do not apply more insulation than can be covered with membrane in same day.

3.03 INSTALLATION - MEMBRANE

- A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Fully Adhered Application: Apply adhesive to substrate. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- E. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof.
- F. At intersections with vertical surfaces:
 - 1. Secure flexible flashing attachment strip to nailing strips at 4 inches on center.
 - 2. Extend membrane over flexible flashing and nailing strips and up a minimum of 12 inches onto vertical surfaces. Continue membrane past tops of curbs and lip membrane over tops of curbs so that membrane extends a minimum of 1 inch down past bottom of roof blocking on interior faces of curbs.
 - 3. Fully adhere membrane to flexible flashing attachment strip.
- G. Around roof penetrations, seal flanges and flashings with flexible flashing, or provide boot specified in Section 07 71 00.
 - 1. At piping locations, install in accordance with NRCA (RM) Construction Detail EPDM-19 or EPDM-19A.
 - 2. At hot vent locations, install in accordance with NRCA (RM) Construction Detail EPDM-18.
 - 3. At structural tubing locations, install in accordance with NRCA (RM) Construction Detail EPDM-11.
- H. Coordinate installation of associated counterflashings installed under other sections.

3.04 INSTALLATION - WALKWAY PADS

- A. Install walkway pads. Space pad joints to permit drainage.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Require site attendance of roofing material manufacturer at mobilization and upon completion of the Work.

3.06 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Remove bituminous markings from finished surfaces.
- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

- A. Section 07 71 23 - Manufactured Gutters and Downspouts.

1.03 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. CDA A4050 - Copper in Architecture - Handbook; current edition.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Manufacturer's standard limited warranty on painted finishes.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide manufacturer's standard twenty (20) year limited finish warranty against cracking, crazing, chipping, peeling, excessive chalking and excessive fading/color change.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Pre-Finished Aluminum: ASTM B209/B209M; 18 gauge, 0.040 inch thick; plain finish shop pre-coated with PVDF coating.
 - 1. Color: As selected by Architect/Engineer from manufacturer's full colors.
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, 0.0156 inch thick; smooth No. 4 - Brushed finish.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, minimum 3 inches wide, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.03 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer Type: Zinc chromate.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Concealed Sealants: Non-curing butyl sealant.
- E. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.03 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- C. Exterior Flashing Receivers: Install in accordance with manufacturer's recommendations, and in proper relationship with adjacent construction, and as follows:
 - 1. Secure receiver at perimeter of wall opening with adhesives or fasteners.
 - 2. Place flashing into receiver channel.
 - 3. Secure flashing with receiver clip.
- D. Seal metal joints watertight.

3.04 SCHEDULE

- A. Coping, Cap, Parapet, Sill and Ledge Flashings:
 - 1. Material: Pre-Finished Aluminum.
 - 2. Thickness: 0.040 inch.
 - 3. Finish: PVDF coating.
- B. Counterflashings at Roofing Terminations (over roofing base flashings):
 - 1. Material: Pre-Finished Aluminum.
 - 2. Thickness: 0.032 inch.
 - 3. Finish: PVDF coating.
- C. Counterflashings at Curb-Mounted Roof Items:
 - 1. Material: Pre-Finished Aluminum.
 - 2. Thickness: 0.032 inch.
 - 3. Finish: PVDF coating.
- D. Cleats: Continuous; provide 6" o.c. fasteners of type appropriate for substrates:
 - 1. Material, Thickness and Finish: Same as flashing material being retained by cleat.

END OF SECTION

**SECTION 07 71 00
ROOF SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured roof specialties, including pipe/stack boots and roof portals.

1.02 RELATED REQUIREMENTS

- A. Section 07 53 00 - Elastomeric Membrane Roofing.
- B. Section 07 92 00 - Joint Sealants.

1.03 REFERENCE STANDARDS

- A. NRCA (RM) - The NRCA Roofing Manual; 2024.
- B. NAAMM (MFM) - Metal Finishes Manual; National Association of Architectural Metal Manufacturers; 1988.
- C. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Pipe and Penetration Flashings:
 - 1. Conn-Fab Sales, Inc.: www.connfab.com.
 - 2. The Pate Company: www.patecurbs.com.
 - 3. Portals Plus, a Duravent Group brand: www.portalsplus.com.

2.02 COMPONENTS

- A. Pipe/Stack Boots: TPO material, conically stepped shape.
 - 1. Adapters: Manufacturer's standard molded TPO, appropriate to the size and shape of the penetration.
 - 2. Clamps: Stainless steel pipe clamping rings for securing cap(s) and adapters around penetration(s).
- B. Prefabricated Roof Portal Systems: Consisting of a circular metal base flashing and a rubber cap.

1. Base Flashing: Circular, unitized spun aluminum, with a double bead weatherseal at opening collar to accept manufacturer's standard molded rubber cap, forming a weatherproof seal without additional clamps or sealant.
 - a. Diameter: Suitable to penetration(s) to be flashed.
 - b. Height: Sufficient to maintain roofing system warranty.
2. Cap: Molded EPDM rubber sized to fit base flashing, with molded weatherseal grooves to fit weatherseal beads on base flashing collar. Provide manufacturer's standard cap(s) and adapter insert(s) of the appropriate size and shape to properly seal penetration(s).
3. Clamp(s): Stainless steel pipe clamping rings for securing cap(s) and adapters around penetration(s).

2.03 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Conform to drawing details included in NAAMM, NRCA and SMACNA manuals.
- D. Coordinate installation of components of this section with installation of stacks, vents, piping, conduits and other items penetrating roof membrane.
- E. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- F. Coordinate installation of sealants with work of this section to ensure water tightness.

END OF SECTION

SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.03 REFERENCE STANDARDS

- A. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
- F. SWRI (VAL) - SWR Institute Validated Products Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Backing material recommended by sealant manufacturer.
 - 4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 5. Substrates the product should not be used on.
 - 6. Substrates for which use of primer is required.
 - 7. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 8. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 9. Sample product warranty.
 - 10. Certification by manufacturer indicating that product complies with specification requirements.
 - 11. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect/Engineer and submit at least two physical samples for verification of color of each required sealant.
- F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- G. Installer's qualification statement.
- H. Executed warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least five years of documented experience.
- C. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 - 1. Adhesion Testing: In accordance with ASTM C794.
 - 2. Compatibility Testing: In accordance with ASTM C1087.
 - 3. Allow sufficient time for testing to avoid delaying the work.
 - 4. Deliver sufficient samples to manufacturer for testing.
 - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.
- C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Nonsag Sealants:
 - 1. Dow Corning Corporation: www.dowcorning.com/construction.
 - 2. Hilti, Inc: www.us.hilti.com.
 - 3. Master Builders Solutions by BASF: www.master-builders-solutions.basf.us/en-us.
 - 4. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.

5. Pecora Corporation: www.pecora.com.
6. Sika Corporation: www.usa-sika.com.
7. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com.
8. W.R. Meadows, Inc: www.wrmeadows.com.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
1. Interior Joints:
 - a. Seal open joints except specific open joints indicated on drawings as not sealed.
 2. Do Not Seal:
 - a. Intentional weep holes in masonry.
 - b. Weep holes in curtain wall, storefront and window systems.
 - c. Joints indicated to be covered with expansion joint cover assemblies.
 - d. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
 - e. Joints where sealant installation is specified in other sections.
 - f. Joints between suspended ceilings and walls.
- B. Interior Joints: Use non-sag acrylic-urethane sealant, unless otherwise indicated.
1. Joints between Fixtures in Wet Areas and Floors, Walls, Countertops, Cabinets and Ceilings: Mildew-resistant silicone sealant; clear.
- C. Interior Wet Areas: Lab areas; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.

2.03 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 61 16.

2.04 NONSAG JOINT SEALANTS

- A. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: Clear.
- B. Acrylic-Urethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; paintable; not expected to withstand continuous water immersion or traffic.
1. Products:
 - a. Sherwin-Williams Company; Shermax Urethanized Elastomeric Sealant: www.sherwin-williams.com.
 - b. Top Gun, a brand of PPG Architectural Coatings; Top Gun 400: www.ppgpaints.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

- A. Sealant Backing Rod, Closed-Cell Type:
1. Cylindrical flexible sealant backings complying with ASTM C1330 Type C.
 2. Size: 25 to 50 percent larger in diameter than joint width.
- B. Sealant Backing Rod, Bi-Cellular Type:

1. Cylindrical flexible sealant backings complying with ASTM C1330 Type B.
 2. Size: 25 to 50 percent larger in diameter than joint width.
- C. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- D. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- E. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- F. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2022.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- I. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- M. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.
- N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- O. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com.
 - 4. Steelcraft, an Allegion brand: www.allegion.com.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Door Edge Profile: Manufacturers standard for application indicated.
 - 4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
 - 5. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

6. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.

2.03 HOLLOW METAL DOORS

- A. Interior Doors, Non-Fire-Rated:
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush; Seamless for corrosive locations.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M for corrosive locations.
 2. Door Thickness: 1-3/4 inches, nominal.
 3. Door Face Sheets: Flush.
 4. Door Finish: Factory primed and field finished.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Interior Door Frames, Non-Fire Rated: Face welded type; non-welded joints filled for seamless appearance.
 1. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
 2. Frame Finish: Factory primed and field finished.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Glazing: As specified in Section 08 80 00, factory installed.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Install door hardware as specified in Section 08 71 00.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- D. Comply with glazing installation requirements of Section 08 80 00.
- E. Coordinate installation of electrical connections to electrical hardware items.
- F. Touch up damaged factory finishes.

3.03 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

- A. Refer to Door and Frame Schedule on the Drawings.

END OF SECTION

SECTION 08 71 00 DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for wood, aluminum, and hollow metal doors.
- B. Electrically operated and controlled hardware.
 - 1. Communications/control wiring and final communications/control wiring connections to electrically operated and controlled hardware components.
- C. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. BHMA (CPD) - Certified Products Directory; Current Edition.
- C. BHMA A156.1 - Standard for Butts and Hinges; 2021.
- D. BHMA A156.4 - Door Controls - Closers; 2019.
- E. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.
- F. BHMA A156.6 - Standard for Architectural Door Trim; 2021.
- G. BHMA A156.7 - Template Hinge Dimensions; 2016.
- H. BHMA A156.13 - Mortise Locks & Latches Series 1000; 2022.
- I. BHMA A156.16 - Standard for Auxiliary Hardware; 2023.
- J. BHMA A156.18 - Standard for Materials and Finishes; 2020.
- K. BHMA A156.22 - Standard for Gasketing; 2021.
- L. BHMA A156.31 - Electric Strikes and Frame Mounted Actuators; 2019.
- M. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- N. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.
- O. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- P. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Q. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; attendance is required by affected installers and the following:
 - 1. Architect/Engineer.
 - 2. Installer's Architectural Hardware Consultant (AHC).
 - 3. Hardware Installer.
 - 4. Owner's Security Consultant.
- D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- E. Keying Requirements Meeting:
 - 1. Schedule meeting at project site prior to Contractor occupancy.
 - 2. Attendance Required:
 - a. Contractor.
 - b. Owner.
 - c. Installer's Architectural Hardware Consultant (AHC).
 - d. Owner's Security Consultant.
 - 3. Agenda:
 - a. Establish keying requirements.
 - b. Verify locksets and locking hardware are functionally correct for project requirements.
 - c. Verify that keying and programming complies with project requirements.
 - d. Establish keying submittal schedule and update requirements.
 - 4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - a. Access control requirements.
 - b. Key control system requirements.
 - c. Schematic diagram of preliminary key system.
 - 5. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, participants, and those affected by decisions made.
 - 6. Deliver established keying requirements to manufacturers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.

1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
 3. List groups and suffixes in proper sequence.
 4. Provide complete description for each door listed.
 5. Provide manufacturer name, product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
 6. Include account of abbreviations and symbols used in schedule.
- D. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
 2. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
 3. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
1. Bitting List: List of combinations as furnished.
- G. Installer's qualification statement.
- H. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years of experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least five years of documented experience.
- C. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Provide manufacturers' warranties against defects in material and workmanship for period indicated, from Date of Substantial Completion.
1. Closers: Twenty-five years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
1. Applicable provisions of federal, state, and local codes.
 2. Accessibility: ADA Standards and ICC A117.1.
 3. Applicable provisions of NFPA 101.
 4. Listed and certified compliant with specified standards by BHMA (CPD).
 5. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 6. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- D. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
- E. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. See Door Hardware Schedule.
- F. Fasteners:
1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.
 3. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.

2.02 HINGES

- A. Hinges: Comply with BHMA A156.1, Grade 1 for heavy weight hinges, Grade 2 for standard weight hinges.
1. Provide hinges on every swinging door.
- B. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
1. Manufacturers:
 - a. Bommer Industries, Inc: www.bommer.com.
 - b. Hager Companies: www.hagerco.com.
 - c. Ives, a Lockmart company: www.iveshinges.com.
 - d. McKinney; an Assa Abloy Group company: www.assaabloydss.com.

- e. Stanley, a Lockmart company: www.stanleyhinges.com.
- f. Substitutions: Not permitted.
- 2. Imported or so-called "economical" or "contractor grade" hinges are not acceptable.
- 3. Size: Sufficient to clear trim and allow doors, otherwise free of obstruction, to open 180 degrees.
 - a. Door Leaves Up To 36 inches Wide and 1¾ inches Thick: 4½ x 4 ½ inch.
 - b. Door Leaves over 36 inches Wide And/Or Over 1¾ inches Thick: 5 x 5 inches.
- 4. Material:
 - a. Interior Door Leafs Up To 36 Inches Wide: Wrought or stainless steel, standard weight (0.134 inch).
- 5. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
- 6. Provide ball-bearing hinges at each door with closer.
- 7. Provide non-removable pins on exterior outswinging doors.
- 8. Provide following quantity of butt hinges for each door:
 - a. Doors From 60 inches High up to 90 inches High: Three hinges.

2.03 ELECTRIC STRIKES

- A. Manufacturers:
 - 1. Adams Rite, HES, or Securitron; an Assa Abloy Group company: www.assaabloydss.com/#sle.
- B. Electric Strikes: Comply with BHMA A156.31, Grade 1.
 - 1. Provide UL (DIR) listed burglary-resistant electric strike; style to suit locks.
 - 2. Provide non-handed 24 VDC electric strike suitable for door frame material and scheduled lock configuration.
 - 3. Provide field selectable Fail Safe/Fail Secure modes.
 - 4. Provide transformer and rectifier as necessary for complete installation.
 - 5. Connect electric strikes into fire alarm where non-rated doors are scheduled to release with fire or sprinkler alarm condition.

2.04 LOCK CYLINDERS

- A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 - 1. Provide full size interchangeable core (FSIC) type cylinder housings, Grade 1 in compliance with BHMA A156.5, to accommodate Owner-provided Schlage Primus high-security FSIC cores.
 - 2. Provide cams and/or tailpieces as required for locking devices.

2.05 MORTISE LOCKS

- A. Manufacturer: Match existing.
 - 1. Schlage, an Allegion brand; L Series: www.allegion.com/us.
 - 2. Substitutions: Not permitted.
- B. Mortise Locks: Comply with BHMA A156.13, Grade 1, Security, 1000 Series.
 - 1. Latchbolt Throw: ¾ inch, minimum.
 - 2. Deadbolt Throw: 1 inch, minimum.
 - 3. Backset: 2-¾ inch unless otherwise indicated.
 - 4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.

- a. Finish: To match lock or latch.

2.06 DOOR PULLS AND PUSH PLATES

A. Manufacturers:

1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Hiawatha, Inc, division of Activar Construction Products Group, Inc:
www.activarcpg.com/hiawatha.
4. Trimco: www.trimcohardware.com/.

B. Door Pulls and Push Plates: Comply with BHMA A156.6.

1. Pull Type: Straight, unless otherwise indicated.
2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
 - a. Edges: Beveled, unless otherwise indicated.
3. Material: Stainless steel, unless otherwise indicated.
4. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
5. On solid doors, provide matching door pull and push plate on opposite faces.

2.07 CLOSERS

A. Manufacturers; Surface Mounted:

1. LCN, an Allegion brand; 4040XP Series: www.allegion.com/us.
2. Substitutions: Not permitted.

B. Closers: Comply with BHMA A156.4, Grade 1.

1. Type: Surface mounted to door.
2. Provide door closer on each exterior door.
3. At corridor entry doors, mount closer on room side of door.

2.08 PROTECTION PLATES

A. Manufacturers:

1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Hiawatha, Inc, an Activar Construction Products Group company:
www.activarcpg.com/hiawatha.
4. Ives, an Allegion brand: www.allegion.com/us.
5. Trimco: www.trimcohardware.com.

B. Protection Plates: Comply with BHMA A156.6.

C. Metal Properties: Stainless steel material.

1. Metal, Standard Duty: Thickness 0.050 inch, minimum.

D. Edges: Beveled, on four sides unless otherwise indicated.

E. Fasteners: Countersunk screw fasteners.

F. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.

1. Size: 8 inch high by 2 inch less door width (LDW) on push side of door.

2.09 WALL STOPS

A. Manufacturers:

1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Hiawatha, Inc, division of Activar Construction Products Group, Inc:
www.activarcpg.com/hiawatha.
4. Trimco: www.trimcohardware.com.
5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.

1. Provide wall stops to prevent damage to wall surface upon opening door.
2. Type: Bumper, convex, wall stop.
3. Material: Stainless steel housing with rubber insert.

2.10 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:

1. National Guard Products, Inc: www.ngpinc.com.
2. Substitutions: Not permitted.

B. Weatherstripping and Gasketing: Comply with BHMA A156.22.

1. Head and Jamb Type: Adjustable.
2. Door Sweep Type: Encased in retainer.
3. Material: Aluminum.

2.11 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.

1. Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
2. Exceptions:
 - a. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.
 - b. Door Closer Covers and Arms: Color as selected by Architect/Engineer from manufacturer's standard colors unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Do not install surface mounted items until application of finishes to substrate are fully completed.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
 - 1. For Steel Doors and Frames: See Section 08 11 13.
 - 2. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inch.
 - b. Push/Pull Plates/ Plates: 42 inch.

3.03 ADJUSTING

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 08 80 00 GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glazing units.
- B. Glazing compounds.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- F. GANA (GM) - GANA Glazing Manual; 2022.
- G. GANA (SM) - GANA Sealant Manual; 2008.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Safety Glazing Certification Council (SGCC).

- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.

PART 2 PRODUCTS

2.01 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - a. Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - b. Complies with ANSI Z97.1 - Class A and 16 CFR 1201 - Category II criteria.
 4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.02 GLAZING UNITS

- A. Type FG1 - Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
 - a. Glazed lites in doors, except fire doors.
 - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
 - c. Other locations required by applicable federal, state, and local codes and regulations.
 - d. Other locations indicated on drawings.
 2. Glass Type: Fully tempered safety glass as specified.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal.

2.03 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- D. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

3.04 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.05 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

- A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
 - 1. Resilient tile and sheet.
- B. Removal of existing floor coverings.
- C. Preparation of existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
 - 1. Perform specified testing and remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- F. Patching compound.
- G. Remedial floor coatings.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Include in the Base Bid and list as a separate line item in the Contractor's Schedule of Values the cost of moisture and alkalinity testing of concrete slabs as specified in this Section.

1.04 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2018.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Visual Observation Report: For existing floor coverings to be removed.
- C. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and alkalinity (pH) limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- D. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 - 1. Manufacturer's qualification statement.
 - 2. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
 - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
 - 4. Manufacturer's installation instructions.
 - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- E. Testing Agency's Qualifications.
- F. Testing Agency's Report:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and alkalinity (pH) test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.
 - 6. Product data for recommended remedial coating.
 - 7. Certificate: Include certification of accuracy by authorized official of testing agency.
 - 8. Submit report to Architect/Engineer.
 - 9. Submit report not more than two business days after conclusion of testing.
- G. Adhesive Bond and Compatibility Test Report.
- H. Copy of RFCI (RWP).

1.07 QUALITY ASSURANCE

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.

- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
 - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
 - 1. Procure the testing agency and submit testing agency's qualifications for Owner and Architect/Engineer approval.
 - 2. Provide access for and cooperate with testing agency.
 - 3. Confirm date of start of testing at least 10 days prior to actual start.
 - 4. Allow at least 4 business days on site for testing agency activities.
 - 5. Achieve and maintain specified ambient conditions.
 - 6. Notify Owner and Architect/Engineer when specified ambient conditions have been achieved and when testing will start.
- E. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

1.09 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from

flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
 - 1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
 - 2. Use product recommended by testing agency.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

- A. Follow recommendations of testing agency.
- B. Perform following operations in the order indicated:
 - 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
 - 2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
 - a. Do not attempt to remove coating or penetrating material.
 - b. Do not abrade surface.
 - 3. Preliminary cleaning.
 - 4. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
 - 5. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 6. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 7. Specified remediation, if required.
 - 8. Patching, smoothing, and leveling, as required.
 - 9. Other preparation specified.
 - 10. Adhesive bond and compatibility test.
 - 11. Protection.
- C. Remediations:
 - 1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
 - 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
 - 3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor

area.

3.02 REMOVAL OF EXISTING FLOOR COVERINGS

- A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.03 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.04 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.05 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

F. Report: Report the information required by the test method.

3.06 ALKALINITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
 - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
 - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.07 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with recommendations of testing agency.
- C. Comply with requirements and recommendations of floor covering manufacturer.
- D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- E. Do not fill expansion joints, isolation joints, or other moving joints.

3.08 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.09 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

3.10 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Acoustic insulation.
- D. Cementitious backing board.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).
- B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).
- D. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2019.
- E. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- H. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- I. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- J. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
- K. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in

Thickness; 2022.

- L. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- N. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022, with Editorial Revision (2023).
- O. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- P. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- Q. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on metal framing, gypsum board, and accessories.
 - 2. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.
- B. Store metal products to prevent corrosion.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich Building Systems: www.clarkdietrich.com.
 - 2. MarinoWARE: www.marinoware.com.
 - 3. Steel Construction Systems: www.steelconsystems.com.
 - 4. The Steel Network, Inc: www.steelnetwork.com.
 - 5. Super Stud Building Products, Inc: www.buysuperstud.com.

6. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 1. Studs: C-shaped with ribbed webs, and flanges with rolled edge stiffeners.
 - a. Products:
 - 1) ClarkDietrich Building Systems; ProSTUD or TRAKLOC Drywall Framing Systems: www.clarkdietrich.com.
 - 2) Marino\WARE; ViperStud Drywall Framing System: www.marinoware.com.
 - 3) Steel Construction Systems; Supreme Framing System: www.steelconsystems.com.
 - 4) The Steel Network, Inc.; PrimeWall or PrimeWall EQ framing systems: www.steelnetwork.com.
 - 5) Super Stud Building Products, Inc.; The EDGE Steel Framing System: www.buysuperstud.com.
 - 6) Substitutions: See Section 01 60 00 - Product Requirements.
 2. Ceiling Channels: C-shaped.
 3. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
- D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
 3. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 1. American Gypsum Company: www.americangypsum.com.
 2. CertainTeed Corporation: www.certainteed.com.
 3. Georgia-Pacific Gypsum: www.gpgypsum.com.
 4. National Gypsum Company: www.nationalgypsum.com/.
 5. USG Corporation: www.usg.com.
 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold resistant board is required at all locations.
 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 5. Mold-Resistant, Paper-Faced Products:

- a. American Gypsum Company; M-Bloc Type X: www.americangypsum.com.
 - b. American Gypsum Company; M-Bloc Type C: www.americangypsum.com.
 - c. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com.
 - d. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: www.gpgypsum.com.
 - e. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com.
 - f. USG Corporation; USG Sheetrock Brand EcoSmart Panels Mold Tough Firecode X: www.usg.com.
 - g. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Backing Board For Vertical Tiled Surfaces:
- 1. Application: Surfaces behind tile in wet and non-wet areas, including, but not limited to, tub and shower surrounds, shower ceilings, and restrooms.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.

2.04 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 inch unless indicated otherwise on the Drawings.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- 1. Products:
 - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com.
 - b. Liquid Nails, a brand of PPG Architectural Coatings: www.liquidnails.com.
 - c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Finishing Accessories: ASTM C1047, paper-faced galvanized steel, unless noted otherwise.
- 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 - 3. Manufacturers: As for framing materials.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- 1. Tape: 2 inch wide, coated glass fiber tape or creased paper tape for joints and corners, except as otherwise indicated.
 - 2. Joint Compound: Drying type, vinyl-based, ready-mixed.
 - 3. Joint Compound: Setting type, field-mixed.
- E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

G. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C1007/AISI S220 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.

1. Level ceiling system to a tolerance of 1/1200.
2. Laterally brace entire suspension system.
3. Install bracing as required at exterior locations to resist wind uplift.

C. Studs: Space studs at 16 inches on center.

1. Extend partition framing to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Blocking: Install wood blocking for support of:

1. Framed openings.
2. Wall-mounted cabinets.
3. Wall-mounted door hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

1. Place continuous bead at perimeter of each layer of gypsum board.
2. Seal around all penetrations by conduit, pipe, ducts, rough-in boxes, and structural and supporting elements.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- D. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying or setting type joint compound and finish with drying or setting type joint compound, as appropriate to the application.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.08 PROTECTION

- A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

**SECTION 09 51 00
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED REQUIREMENTS

- A. Section 21 13 00 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
- B. Section 23 37 00-Air Outlets and Inlets: Air diffusion devices in ceiling.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples 6 x 6 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: 100 sq ft of each type and size.

1.06 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years experience.

1.07 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. CertainTeed Corporation: www.certainteed.com.
 - 2. Substitutions: Not permitted.
- B. Suspension Systems:
 - 1. CertainTeed Corporation: www.certainteed.com.
Rockfon, LLC; Chicago Metallic: www.rockfon.com.
 - 2. Substitutions: Not permitted.

2.02 ACOUSTICAL UNITS

- A. Acoustical Panels, Type C1: Mineral fiber with membrane-faced overlay, with the following characteristics:
 - 1. Classification: ASTM E1264 Type IV.
 - a. Form: 2, water felted.
 - b. Pattern: "E" - lightly textured.
 - 2. Size: 24 by 24 inches.
 - 3. Thickness: 3/4 inch.
 - 4. Light Reflectance: 90 percent, determined in accordance with ASTM E1264.
 - 5. NRC: 0.75, determined in accordance with ASTM E1264.
 - 6. Ceiling Attenuation Class (CAC): 38, determined in accordance with ASTM E1264.
 - 7. Panel Edge: Reveal.
 - 8. Suspension System: Exposed grid.
 - 9. Product: As indicated on Drawings.

2.03 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
 - 1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with steel cap.
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Profile: Tee; 15/16 inch face width.
 - 3. Finish: Baked enamel.
 - 4. Color: White.
 - 5. Product: As indicated on Drawings.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
 - 1. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M and ASTM E580/E580M and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
 - 2. Double cut and field paint exposed reveal edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 CLEANING

- A. Clean surfaces.
- B. Replace damaged or abraded components.

END OF SECTION

**SECTION 09 65 00
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.03 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- B. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2022.
- C. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2021).
- D. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect/Engineer's initial selection.
- E. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- F. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

- G. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- H. Warranty: Provide manufacturers' warranty data for resilient sheet and rubber tile.
- I. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 100 square feet of each type and color.
 - 3. Extra Wall Base: 100 linear feet of each type and color.
 - 4. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing specified flooring with minimum five years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect rolled sheet materials from damage by storing on end.
- E. Do not double stack pallets.

1.07 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.08 WARRANTY

- A. Manufacturer's limited 10-year warranty on resilient sheet products.
- B. Manufacturer's limited 5-year warranty on rubber tile products.

PART 2 PRODUCTS

2.01 SHEET FLOORING

- A. Vinyl Sheet Flooring - Type F1: Transparent or translucent vinyl wear layer over interlayer and backing.
 - 1. Manufacturer:
 - a. Mohawk Group: www.mohawkgroup.com
 - b. Substitutions: Not permitted.

2. Minimum Requirements: Comply with ASTM F1303, Type I, Class I, Grade A.
 3. Critical Radiant Flux (CRF): Class I, when tested in accordance with ASTM E 648 or NFPA 253.
 4. Wear Layer Thickness: 0.020 inch minimum.
 5. Surface Profile: Embossed.
 6. Total Thickness: 0.080 inch minimum.
 7. Sheet Width: 158 inch minimum.
 8. Static Load Resistance: 750 psi minimum, when tested as specified in ASTM F970.
 9. Seams: Heat welded.
 10. Product: As indicated on Drawings.
 11. Pattern: As indicated on Drawings.
 12. Color: As indicated on Drawings.
- B. Welding Rod: Solid bead in material compatible with flooring, produced by flooring manufacturer for heat welding seams, and in color matching field color.

2.02 TILE FLOORING

- A. Rubber Tile - Type F2: Heterogeneous, laminated construction.
1. Manufacturers:
 - a. Johnsonite, a Tarkett Company: www.johnsonite.com.
 2. Minimum Requirements: Comply with ASTM F1344, Type II, A - Solid, B - Mottled, Grade 2.
 3. Critical Radiant Flux (CRF): Class I, when tested in accordance with ASTM E 648 or NFPA 253.
 4. Size: 23 by 23 inch nominal.
 5. Thickness: 0.375 inch.
 6. Texture: Hammered.
 7. Product: As indicated on Drawings.
 8. Pattern: As indicated on Drawings.
 9. Color: As indicated on Drawings.

2.03 RESILIENT BASE

- A. Resilient Base - Type B1: ASTM F1861, Type TV, vinyl, thermoplastic; style as scheduled.
1. Manufacturers:
 - a. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - b. Substitutions: Not permitted.
 2. Height: 4 inches.
 3. Thickness: 0.125 inch.
 4. Finish: Satin.
 5. Length: Roll.
 6. Color: As indicated on drawings.

2.04 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

1. VOC Content Limits: As specified in Section 01 61 16.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.
- B. Where new flooring abuts existing flooring, "float" subfloor filler at least 12 inches out from edge of existing flooring so that surface of new flooring aligns with surface of existing flooring.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 1. Spread only enough adhesive to permit installation of materials before initial set.
 2. Fit joints and butt seams tightly.
 3. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Seal seams by heat welding where indicated.

3.05 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. Install square tile to basket weave pattern. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Install loose-laid tile, fit interlocking edges tightly.

3.06 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.07 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.08 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

**SECTION 09 90 00
PAINTING AND COATING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Interior painting and coating systems.
- C. Exterior painting and coating systems.
- D. Scope:
 - 1. Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - a. Exterior:
 - 1) Metal: Aluminum, galvanized.
 - 2) Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
 - b. Interior:
 - 1) Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
 - 2) Drywall: Walls, ceilings, gypsum board, and similar items.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

- A. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- B. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.
 - 3. Primer requirements and finish specification.
 - 4. Storage and handling requirements and recommendations.
 - 5. Application methods.
 - 6. Clean-up information.
- C. Samples: Submit four paper draw down samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.
- C. Paint Materials: Store at a minimum of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- D. Handling: Maintain a clean, dry storage area to prevent contamination or damage to materials.

1.07 FIELD CONDITIONS

- A. Do not apply materials when environmental conditions are outside the ranges required by manufacturer.
- B. Follow manufacturer's recommended procedures for producing the best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Products: Subject to compliance with requirements, provide Sherwin-Williams Company (The) products indicated; www.sherwin-williams.com.
- B. Comparable Products: Products of approved manufacturers will be considered in accordance with 01 60 00 - Product Requirements, and the following:
 - 1. Products that meet or exceed performance and physical characteristics of basis of design products.

2.02 PAINTINGS AND COATINGS

- A. General:
 - 1. Provide factory-mixed coatings unless otherwise indicated.
 - 2. Do not reduce, thin, or dilute coatings or add materials to coatings unless specifically indicated in manufacturer's instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.
- C. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Metal: Aluminum, galvanized.
 - 1. Alkyd Systems, Water Based:
 - a. Semi-Gloss Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com.
 - a) 5 mils wet, 2 mils dry per coat.

- 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: www.sherwin-williams.com.
 - a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.
- B. Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
1. Alkyd Systems, Water Based:
 - a. Semi-Gloss Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com.
 - a) 5 mils wet, 2 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: www.sherwin-williams.com.
 - a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.

2.04 PAINT SYSTEMS - INTERIOR

- A. Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
1. Alkyd Systems, Water Based:
 - a. Semi-Gloss Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com.
 - a) 5 mils wet, 2 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: www.sherwin-williams.com.
 - a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.
- B. Drywall: Walls, ceilings, gypsum board, and similar items.
1. Latex Systems:
 - a. Semi-Gloss Finish High Performance (HP):
 - 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600: www.sherwin-williams.com.
 - a) 4 mils wet, 1.5 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series: www.sherwin-williams.com.
 - a) 4 mils wet, 1.6 mils dry per coat.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove mildew from impervious surfaces by scrubbing with solution of water and bleach. Rinse with clean water and allow surface to dry.
- D. Masonry: Remove efflorescence and chalk.
- E. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- F. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Prime bare steel surfaces.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.
- G. Wood: Remove dust, grit, and foreign matter. Scrape, sand, and spot prime knots and pitch streaks. Fill nail holes and imperfections with wood filler and sand smooth.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness.
- D. Regardless of number of coats specified, apply additional coats until complete hide is achieved.

3.04 PRIMING

- A. Apply primer to all surfaces unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to top coat manufacturers.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

- A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 14 23 PANEL SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Panel signage.

1.02 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Panel Signage:
 - 1. Vista System LLC; Nova VN170: www.vistasystem.com.
 - 2. Substitutions: Not permitted.

2.02 REGULATORY REQUIREMENTS

- A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.03 PANEL SIGNAGE

- A. Panel Signage:
 - 1. Application: Room signs.
 - 2. Description: Curved signs with applied character panel media, tactile characters.
 - 3. Sign Size: As indicated on drawings.
 - 4. Total Thickness: Match existing dimensions.
 - 5. Color and Font, unless otherwise indicated:
 - a. Character Font: Helvetica, matching existing proportions and stroke width.
 - b. Character Case: Upper and lower case (title case).
 - c. Background Color: As scheduled.
 - d. Character Color: Contrasting color.
 - 6. Material: Acrylic plastic base with applied plastic letters and braille.
 - 7. Profile: Curved multi-piece extruded aluminum media holder securing curved, flexible sign media by lip on two sides; other two sides closed by end caps; concealed mounting attachment.
 - a. Frame Finish: Brushed aluminum, to match existing.
 - b. Sign Orientation: Curved in horizontal section.
 - 8. Tactile Letters: Raised 1/32 inch minimum.
 - 9. Braille: Grade II, ADA-compliant.
 - 10. One-Sided Wall Mounting: Tape adhesive.

2.04 SIGNAGE APPLICATIONS

A. Room Signs:

1. Identify with the room numbers indicated on drawings; provide "window" section for replaceable occupant name.

2.05 ACCESSORIES

- ### **A. Tape Adhesive:** Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

- #### **A.** Verify that substrate surfaces are ready to receive work.
- #### **B.** Notify Architect/Engineer if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

- #### **A.** Install in accordance with manufacturer's instructions.
- #### **B.** Install with horizontal edges level.
- #### **C.** Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- #### **D.** Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

**SECTION 10 44 00
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire blankets.
- C. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; Current Edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers and Accessories:
 - 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 - 2. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 3. Nystrom, Inc: www.nystrom.com.
 - 4. Potter-Roemer: www.potterroemer.com.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 10 pound.
 - 3. Finish: Baked polyester powder coat, red color.

2.03 ACCESSORIES

- A. Fire Blanket: Fire retardant treated wool; red, 62 x 84 inch size with arm loops.
 - 1. Cabinet: Surface mounted, roller-type. Factory painted enamel red.
- B. Extinguisher Brackets: Formed steel, chrome-plated.
- C. Graphic Identification: Provide wall-mounted triangular three-dimensional signage above each cabinet and extinguisher location..
- D. Inspection/Certification Tags: Acceptable to the authority having jurisdiction.
 - 1. Expiration Date: Not less than 12 months after date of Substantial Completion.
 - 2. Provide (1) for each fire extinguisher.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers on wall brackets.
- D. Attach Inspection/Certification tags to extinguishers.

END OF SECTION

SECTION 10 51 13.01
REFRIGERATED METAL EVIDENCE LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Refrigerated metal evidence locker units with hinged doors.
- B. Non-refrigerated evidence locker configuration over refrigerated units.

1.02 REFERENCE STANDARDS

- A. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip; 1999 (Updated 2017).

1.03 SUBMITTALS

- A. See Section 01 30 00-Administrative Requirements.
- B. Shop Drawings: Include dimensioned plans and elevations showing locker layout and relationship to adjacent construction.
- C. Product Data: Manufacturer's descriptive data.
- D. Manufacturer's warranty.

1.04 WARRANTY

- A. Manufacturer's 5-year warranty against defects in materials and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design:
 - 1. Tiffin Metal Products Company: www.tiffinmetal.com.
 - a. Contact: Ken Pahlke, Wolter, Inc., (630) 220-4216 (c), mrstorage@wolterinc.com.
- B. Substitutions: Not permitted.

2.02 MATERIALS

- A. Stainless Steel: ASTM A167, Type 304 and 430, rollable temper.

2.03 MANUFACTURED UNITS

- A. Pass-Thru Refrigerated Metal Evidence Lockers: Forced-air cooling; with temperature control, digital thermometer, condensation removal, automatic defrost and audible alarm.
 - 1. Refrigerated Unit:
 - a. Size: 24 inches wide x 24 inches deep x 42.5 inches high, nominal.
 - b. Insert Configuration: Manufacturer's 4 Door Irregular Insert.
 - 2. Non-Refrigerated Lockers:
 - a. Overall Locker Unit Size: 24 inches wide x 33.5 inches high, nominal.
 - b. Individual Locker Door Size: 10 3/16 inches wide x 11 3/4 inches high.
 - c. Locker Configuration: 3-tier by 2 lockers wide; 6 lockers total.

3. Product: Tiffen Metal Products Company; Refrigerated Evidence Pass Thru Locker #6AA-R-SPL (refrigerated unit below with 6 Style 'M' Non-Refrigerated Locker Doors above):
www.tiffinmetal.com.

2.04 FABRICATION

- A. Construction:
 1. Stainless steel interior and exterior construction.
 2. High density HFC and HCFC-free urethane foam insulation.
- B. Condenser Unit:
 1. Compressor: 1/3 HP, industrial grade, hermetically-sealed.
 2. Electrical Characteristics: 115 VAC, 60 Hz, dedicated 15 amp circuit.
- C. Doors:
 1. Louverless, self-closing, 180 degree opening main doors, 90 degree opening interior doors.
 2. Refrigerated Unit:
 - a. Customer Side: Main door unkeyed; interior doors keyed separately with key drop; furnish one key per lock.
 - b. Control Side: Main door unkeyed; no interior doors.
 3. Non-Refrigerated Lockers:
 - a. Customer Side: Individual doors, each with keyless lift latch.
 - b. Control side: One full height and width door, latched, unkeyed.
 4. Control locking mechanisms not accessible from customer side.
 5. Number Plates: For individual evidence locker doors on customer side; manufacturer's standard, sequentially numbered in accordance with Owner's desired numbering system.
- D. Finish: Satin stainless steel refrigerated unit, Non-refrigerated units are powder coated, painted color selected by manufacturer's full range.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings.
- B. Set plumb, level, and aligned.

3.02 ADJUSTING

- A. Adjust doors and latches to operate correctly.

END OF SECTION

**SECTION 11 53 13
LABORATORY FUME HOODS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Standard laboratory fume hoods.
- B. Work surfaces.
- C. Service fittings and outlets.
- D. Airflow indicators and alarms.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and nailers for anchoring fume hoods.
- B. Section 09 21 16 - Gypsum Board Assemblies: Reinforcements in metal-framed partitions for anchoring fume hoods.
- C. Section 12 35 53.13 - Metal Laboratory Casework: Additional requirements for base cabinets for fume hoods.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016, with Errata.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2023a.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- E. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.
- F. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
- G. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2023.
- H. ASTM D785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials; 2023.
- I. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K. SEFA 1 - Laboratory Fume Hoods; 2010.
- L. SEFA 2 - Installations; 2010.

- M. UL 1805 - Standard for Safety Laboratory Fume Hoods and Cabinets; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.
- B. Preinstallation Meeting: Conduct preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- C. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide fume hood exterior and interior dimensions and construction, utility and service requirements and locations.
- C. Shop Drawings: Indicate locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, clearances required, locations and types of service fittings.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements. Provide documentation of successful Factory Acceptance Testing.
- E. Manufacturer's Installation Instructions: Indicate special installation requirements.
- F. Operation Data: Include description of equipment operation and required adjusting and testing.
- G. Maintenance Data: Identify system maintenance requirements, servicing cycles, lubrication types required and local spare part sources.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- I. Project Record Documents: Record actual locations of concealed utility connections.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum five years of documented experience and approved by manufacturer.
- C. Preconstruction Testing: Factory-test each type of hood as per referenced standard.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 FIELD CONDITIONS

- A. Ambient Conditions: Maintain temperature and relative humidity at occupancy levels during and after installation of fume hoods.

1.09 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide one year manufacturer warranty for manufacturer's standard items (listed by part number in manufacturer's official publication).

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Laboratory Fume Hoods:
 - 1. Basis of Design: Kewaunee Scientific Corp; Supreme Air Venturi Fume Hood: www.kewaunee.com.
 - 2. Other Acceptable Manufacturer: Mott Manufacturing Ltd: www.mott.ca.
 - 3. Substitutions: Not permitted.

2.02 CONSTANT AIR VOLUME (CAV) FUME HOODS

- A. Bypass Fume Hoods:
 - 1. Include a built-in compensating bypass arrangement to maintain constant exhaust volume regardless of sash position.

2.03 PERFORMANCE REQUIREMENTS

- A. Fume hoods complying with the following when tested in accordance with ASHRAE Std 110:
 - 1. As-Manufactured (AM) Rating: AM 0.01 (0.01 ppm).
 - 2. As-Installed (AI) Rating: AI 0.10 (0.10 ppm).
 - 3. Average Face Velocity: 100 FPM (0.51 m/s) plus or minus 10 percent with sashes fully open.
 - 4. Face-Velocity Variation: Not more than 10 percent of average face velocity across the face opening with sash(es) fully open.
 - 5. Release Rate: 4.0 L/min.
 - 6. Static-Pressure Loss: Not more than 1/2-inch w.g. (124 Pa) at 100 FPM (0.51 m/s) face velocity with sash fully open when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

2.04 FUME HOODS

- A. General Requirements:
 - 1. Comply with SEFA 1.
 - a. Provide fume hoods UL listed and labeled for compliance with UL 1805.
- B. Type DT-10 , Fume Hood:
 - 1. Ventilation: Constant Air Volume (CAV).
 - 2. Configuration: Standing-height; bench mounted.
 - 3. Nominal Interior Height: 48 inches.

4. Sash Type: Vertical rising.
 - a. Configuration: As indicated on drawings.
 - b. Leak-free enclosure box, manufacturer's standard construction, for vertical rising sash.
 - c. Glazing: Fully tempered safety glass..
 - d. Sash Frame: Powder-coated steel; white color.
 - e. Sash Guides: Corrosion-resistant polyvinyl chloride (PVC) track.
 - f. Vertical Sash mechanism: Designed to prevent sash drop in case of mechanism failure.
 - 1) Cable: Minimum 3/32 inch (2 mm) thick stainless steel of construction standard with the manufacturer.
 - g. Vertical Sash Pull: Type 316 stainless steel, with No.4 finish.
5. Top Front Panel: Standard integral grille stamped into panel of same materials as fume hood exterior.
6. Exterior: Sheet steel.
7. Interior Lining: Epoxy resin.
8. Service Fittings and Fixtures: None.
9. Access Panels: Provide removable panels on both sides hood exterior and interior lining panels.
10. Work Surface:
 - a. Work Top for Fume Hoods Other Than Floor-mounted Type: Epoxy resin.
 - 1) Edge: Raised rim with beveled edges and corners.
- C. Fume Hood Base Cabinets:
 1. See Section 12 35 53.13 - Metal Laboratory Casework.
 2. Exterior construction: Metal cabinets and Type indicated on drawings.
 3. Material: Sheet steel.
 4. Color/Finish: As indicated on drawings.
- D. Light Fixtures: UL labeled, vaporproof, one-tube, T-5 fluorescent light fixtures. Number and length of fixtures as necessary for fume hood width. Mounted above sealed safety glass panel. White baked-enamel finish on fixture interior.
 1. Average Interior Illumination Level: 80 footcandles.
 2. Coordinate access to light fixture with ceiling extension configuration and construction.

2.05 FABRICATION

- A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations, or as necessary to permit movement through a 35 inches by 79 inches clear door opening.
- B. Steel Exterior: Fabricated from steel sheet, 0.048 inch thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Chemical-resistant finish applied to interior and exterior surfaces of component parts before assembly.
- C. Ends: Fabricated with double-wall end panels. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.

- D. Splayed top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.
- E. Front Posts: Pre-punched to accept up to five (5) plumbing fixtures per side; one (1) double duplex electrical receptacle per side; light switch; airflow indicator and alarm. Provide removable plug buttons for holes not used for indicated fittings.
- F. Lining Assembly: Unless otherwise indicated, assembled with stainless-steel fasteners or epoxy adhesive, concealed where possible. Joints sealed by filling with chemical-resistant sealant during assembly.
 - 1. Punched fume hood lining side panels for service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
- G. Rear Baffle: Same material as fume hood lining, unless otherwise indicated, at rear of hood with openings at top and bottom, with corrosion-resistant fasteners. Fabricated for removal to facilitate cleaning behind baffle.
- H. Exhaust Plenum: Full width of fume hood, sized and configured to provide uniform airflow, of same material as hood lining, and with duct stub for exhaust connection.
 - 1. Duct Collar Material: Stainless steel.
- I. Airfoil: At bottom of fume hood face opening, with 1 inch gap between bottom of airfoil and work top. Sash to close on top of airfoil. Designed to direct airflow across work.
 - 1. Fabricated from 14 gauge, 0.0781 inch stainless steel with No.4 finish.
- J. Ceiling Extensions: Filler panels matching fume hood exterior to enclose space above fume hoods at front and sides of fume hoods, and extending from tops of fume hoods to approximately 4 inches (102 mm) above ceiling. Flange, notch, and reinforce ceiling extensions as required for rigidity. Fabricate to form well-fitting closures, free from oil-canning.
 - 1. Provide bottom-hinged access panels within the front ceiling extension filler panel to facilitate access to light fixture and other fume hood components at top of hood not readily accessible by other means.
- K. Comply with requirements of other sections for factory installation of water and laboratory gas service fittings, piping, electrical devices, and wiring. Securely anchor fittings, piping, and conduit to fume hoods, unless otherwise indicated.

2.06 MATERIALS

- A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.
- B. Stainless-Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- C. Epoxy: Factory molded, modified epoxy-resin formulation with smooth, nonspecular finish.
 - 1. Physical Properties:
 - a. Flexural Strength: ASTM D790, not less than 15,000 pounds per square inch.
 - b. Compressive Strength: ASTM D695, not less than 30,000 pounds per square inch.
 - c. Hardness (Rockwell E): ASTM D785, not less than 100.
 - d. Water Absorption (24 Hours): ASTM D570, not more than 0.04 percent by weight.

- e. Flame-Spread Index: Self-extinguishing; 5 or less according to ASTM E84
- 2. Chemical Resistance: Weight change as indicated when tested with indicated reagents according to ASTM D543 at 77 degrees F.
 - a. Less than 0.1 percent:
 - 1) Acetic acid (glacial or 5 percent).
 - 2) Acetone.
 - 3) Ammonium hydroxide (28 percent).
 - 4) Benzene.
 - 5) Carbon tetrachloride.
 - 6) Dimethyl formamide.
 - 7) Ethyl acetate.
 - 8) Ethyl alcohol.
 - 9) Nitric acid (40 percent).
 - 10) Phenol (5 percent).
 - 11) Sulfuric acid (85 percent).
 - 12) Toluene.
 - b. Less than 1 percent:
 - 1) Chromic acid (40 percent).
 - 2) Nitric Acid (70 percent).
- 3. Color: Black.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 1. Provide (1) double duplex receptacle and associated cord port located at bottom of each fume hood post.
- E. Fasteners: Stainless-steel, where exposed to fumes.

2.07 ACCESSORIES

- A. Differential Pressure Gauge: Direct-reading aneroid gauge that measures the difference in static pressure between the laboratory space and the fume hood exhaust duct.
- B. Airflow Monitor/Indicator and Alarm: Provide each fume hood with a airflow monitor/indicator complete with an audible and visual alarm that activates when airflow sensor reading is outside of preset range.
 - 1. Source: Fume hood manufacturer.
 - 2. Airflow Monitor/Indicator Functionality:
 - a. Type: A sensor module that monitors fume hood face airflow velocity, and a display module that indicates whether velocity it is below normal, normal, or above normal by means of a backlit red/yellow/green display, with configurable ability to display hood face velocity in fpm.
 - 3. Airflow Alarm functionality: Audible (85 dB @ 4 inch distance), and visual alarm that activates when airflow sensor reading is outside of preset range.
 - a. Reset and test mode.
 - b. Programmable Switch: Designed to silence audible alarm and automatically reset when airflow returns to within preset range. Warning light to stay on when alarm is silenced.
 - c. Capability for integration with BAS (Building Automation System) via BACnet.
 - 4. Product: Kewaunee Air Alert 600: www.kewaunee.com.

- C. Sash Alarms: Audible and visual alarm that activates when sash is opened beyond preset position.
 - 1. Programmable silence and test switches.
 - 2. Sash Alarm integrated with Airflow Alarm.
- D. Sash Stops: Spring-loaded stops to limit hood opening to 18 inches height. Manually releasable to open sash fully, and to reset automatically when sash is lowered below set level.
- E. Exhaust Fan Control: On/Off using fan switch located on fume hood front post.

2.08 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Factory testing of each type of fume hood.
- C. Non-Complying Work: See Section 01 40 00.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Locate concealed framing, blocking, and reinforcements that support fume hoods by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- B. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install fume hoods according to manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- C. Comply with indicated requirements for installing water and laboratory gas service fittings, and electrical and telecommunications devices.
 - 1. Install fittings in accordance with shop drawings, installation requirements in SEFA 2, and manufacturer's written instructions.

3.03 FIELD QUALITY CONTROL

- A. Field test installed fume hoods in accordance with requirements of Section 23 05 93.
- B. Reporting Requirements: Comply with Section 5 of NEBB Fume Hood Testing (FHT) Standard, current edition. Organize and include, at a minimum, the following information:
 - 1. Report title.
 - 2. Report certification.
 - 3. Table of contents.

4. Report summary/ remarks.
5. Appropriate forms.
6. Instrument calibration.
7. List of abbreviations used.
8. A room layout drawing for each tested item. Identify: walls; doors; fume hood(s); other present environmental enclosures (e.g. biological safety cabinet(s), laminar flow hood(s), canopy hood(s), etc.); location and airflow pattern of all air supply, return, and exhaust grilles, registers and diffusers.

3.04 ADJUSTING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand only. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.

3.05 CLEANING

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

3.06 DEMONSTRATION

- A. Demonstrate proper operation of fume hoods and their accessories to Owner's designated representative.

END OF SECTION

SECTION 12 35 53.13
METAL LABORATORY CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Standard and custom metal cabinets and cabinet hardware.
- B. Mobile cabinets.
- C. Tables.
- D. Fixed- and adjustable-height workbenches.
- E. Adaptable laboratory furniture system.
- F. Solvent storage cabinets.
- G. Countertops.
- H. Laboratory sinks.
- I. Pegboards.
- J. Service fittings and outlets.

1.02 REFERENCE STANDARDS

- A. ABA Standards - ABA Accessibility Standards; 2004, with Amendments (2015).
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2020a.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- I. ASTM D522/D522M - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings; 2017 (Reapproved 2021).
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

- L. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- M. NFPA 30 - Flammable and Combustible Liquids Code; 2024.
- N. SEFA 2 - Installations; 2010.
- O. SEFA 3 - Laboratory Work Surfaces; 2020.
- P. SEFA 7 - Laboratory Fixtures; 2021.
- Q. SEFA 8M - Laboratory Grade Metal Casework; 2020.
- R. SEFA 10 - Adaptable Laboratory Furniture Systems; 2013.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of casework with related items.
 - 1. Service Fixtures: Coordinate location and characteristics of service connections.
 - 2. Equipment and Instruments: Coordinate installation of casework with equipment, scientific instruments, and fume hoods.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Details of materials, component dimensions and configurations, construction details, joint details, attachments; manufacturer's catalog literature on hardware and keying, accessories, and service fittings.
- C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements placement dimensions and tolerances, clearances required, and utility locations, if any. Include coordinated information for laboratory equipment specified in another section and/or furnished by Owner.
- D. Test Reports: Independent laboratory reports showing compliance with chemical and physical resistance requirements for casework finish.
- E. Manufacturer's Installation Instructions.
- F. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- G. Finish touch-up kit for each type and color of materials provided.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than five years of experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's 1-year warranty against defects. Complete forms in Owner's name and register with manufacturer. Covered defects include, but are not limited to:
 - 1. Ruptured, cracked, or stained finish coating.
 - 2. Discoloration, or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Weld or any other structural failure.
 - 5. Failure of hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Laboratory Casework:
 - 1. Kewaunee Scientific Corp: www.kewaunee.com.
 - 2. Substitutions: Not permitted.
- B. Countertops:
 - 1. Kewaunee Scientific Corp; Kemresin: www.kewaunee.com.
 - 2. Substitutions: Not permitted.
- C. Sinks:
 - 1. Kewaunee Scientific Corp; Kemresin: www.kewaunee.com.
 - 2. Substitutions: Not permitted.
- D. Water Service Fittings:
 - 1. Kewaunee Scientific Corp: www.kewaunee.com.
 - 2. Substitutions: Not permitted.

2.02 METAL LABORATORY CASEWORK

- A. Casework: Die-formed metal sheet; each unit self-contained and not dependent on adjacent units or building structure for rigidity; factory-fabricated, factory-assembled, and factory-finished.
 - 1. Primary Cabinet Material: Galvanized steel.
 - 2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide units of widths, depths and heights indicated on Drawings.
 - 3. Structural Performance: In addition to the requirements of SEFA 3, SEFA 7 and SEFA 8M, provide components that safely support minimum loads per SEFA 10 requirements, without deformation or damage.
 - 4. Corners and Joints: Without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.

5. Edges and Seams: Smooth. Form counter tops and shelves from continuous sheets.
 6. Shelf Edges: Turned down 3/4 inch on each side and returned 3/4 inch front and back.
 7. Ends: Close open ends with matching construction.
 8. Welding: Electric spot welded; joints ground smooth and flush.
 9. Drawers and Doors: Fabricate drawer and door fronts of sandwiched sheets of sheet steel welded together and reinforced for hardware.
 - a. Fill with sound-deadening core.
 10. Shelves: Adjustable and fixed shelves formed down 3/4 inch, returned back 7/8 inch, and up 1/4 inch into a channel shape, front and rear; formed down 3/4 inch at each end. Shelves over 42 inches long reinforced with a channel welded to underside of shelf.
 11. Glazing: Type and thickness standard with manufacturer.
 - a. Framed Doors: Tempered glass, with gaskets and removable stops; minimize rattling and vibration.
 12. Fittings and Fixture Locations: Cut and drill countertops, backs, and other casework components for service outlets and fixtures.
 13. Access Panels: Where indicated, for maintenance of utility service fixtures and fittings and mechanical and electrical components.
 14. Filler Panels: Flanged on both sides, of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
 15. Scribe Panels: Similar to filler panels, except flanges on one side and flat on the other, of matching construction and finish.
 16. Surface Finish on Sheet Steel: With chemical resistance equal to Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8M. Test applied finishes using procedures specified in ASTM D522/D522M.
 - a. Coating Type: Baked on epoxy; minimum two coats.
 - b. Color: As selected from manufacturer's standard selection.
 - c. Preparation: Degrease and phosphate etch, and prime.
 17. Separation: Use bituminous paint or non-conductive tape to coat metal surfaces in contact with cementitious materials, and to separate dissimilar metals.
- B. Mobile Cabinets: Same construction as fixed base cabinets, with modifications.
1. Toe kick space incorporates heavy duty casters.
 - a. Cabinet underside reinforced with 14 gauge, 0.0747 inch minimum steel channels to provide caster mounting points.
 - b. Two casters.
 2. For cabinets with drawers, include a counterweight to prevent the cabinet from tipping when one drawer is opened.
- C. Solvent (Flammable and Combustible Liquids) Storage Cabinets: Construction identical to other cabinets, with following exceptions:
1. Construct to NFPA 30 and applicable OSHA requirements.
 2. Fire Resistance: Maximum internal temperature of 325 degrees F at the center, and 1 inch from top of the cabinet when cabinet is subjected to a ten minute fire test that simulates fire exposure of a standard time-temperature curve specified in ASTM E119.
 3. Steel sheet, 18 gauge, 0.0478 inch minimum thickness, double panel construction with 1-1/2 inch space between panels and electrical grounding connection.
 4. Shelves: Full depth, adjustable sloped metal shelf.

5. Bottom Pan: 2 inches deep liquid-tight pan covering entire bottom of cabinet.
 6. Cabinet Hardware: UL-listed.
 - a. Hinges: Full-length stainless steel continuous (piano) hinges.
 - b. Manual-closing Doors: 180 degree opening. Three-point latch arrangement, self-latching when pushed closed.
 - c. Door Handles: Manufacturer's standard, with slip-resistant grip.
 - d. Grounding screw-lug.
 7. Vents: Provide venting capable of achieving at least ten air changes per hour.
 - a. Tie into building lab exhaust system.
 - b. Vent Connections: 1-1/2 inch minimum diameter, corrosion resistant piping having flame spread index of 25 or less, when tested in accordance with ASTM E84.
 - c. Provide minimum of two vents with fire arrestors for each cabinet.
 8. Signage: Provide manufacturer's standard signage reading "FLAMMABLE - KEEP FIRE AWAY" or similar message in bright red color.
- D. Tables: Include adjustable height units.
1. Adjustable Height Table Construction: Manufacturer's standard, with countertop worksurfaces, unless noted otherwise.
 - a. Cantilevered Base Frame: Each base equipped with a pair of glides.
 - b. Worksurface Support Frame: Telescoping from base frame.
 - c. Worksurface: Epoxy resin.
 - 1) Lift Capacity: 1,000 lb, evenly distributed on worksurface.
 - 2) Adjustability:
 - a) Total Range: 14 inches.
 - b) Manual Operation: Threaded fastener pins inserted into holes on 1 inch centers.
 - 3) Finish, Surface Color, and Texture: As indicated on drawings.
 2. Accessory Components: Manufacturer's standard.
 - a. Back Frame: Upright frame for mounting accessory components.
 - 1) Load Capacity: Compliant with SEFA 10 requirements.
 - 2) Mounting: Bolted to back of worksurface support frame.
 - 3) Divider Uprights: Flexible locations for subdividing the back frame into smaller sections.
 - 4) Electric Power Strip: Single receptacles at manufacturer's standard spacing with total current rating of 15 Amp.
 - b. Storage and Display Components: Sizes and configurations indicated on drawings.
 - 1) Cabinet Hardware: Manufacturer's standard types as required for drawers, doors, shelves, levelers, and similar items.
 - c. Computer Support Components: Sizes and configurations indicated on drawings.
 - 1) Tower dolly.
 - 2) Computer monitor arm.
 3. Primary Materials: Manufacturer's standard for each component.
 - a. Tubing: Hot-rolled steel, ASTM A513/A513M.
 - b. Sheet Metal: Cold-rolled steel, ASTM A1008/A1008M.

2.03 ADJUSTABLE WORKBENCHES

- A. Type: Adjustable-height unit.
- B. Lift Capacity: In accordance with SEFA 10 requirements.

- C. Primary Components: Manufacturer's standard; consisting of cantilevered base frame, worksurface support frame, and worksurface.
 - 1. Cantilevered Base Frame: Each base equipped with a pair of casters.
 - 2. Worksurface Support Frame: Telescoping from base frame.
 - 3. Worksurface: Manufacturer's standard material.
 - a. Adjustability:
 - 1) Total Range: 15 inches.
 - 2) Operation: Manual.
 - a) Manual Operation: Threaded fastener pins inserted into holes on 1 inch centers.
 - b. Finish, Surface Color, and Texture: As indicated on drawings.
- D. Accessory Components: Manufacturer's standard.
 - 1. Back Frame: Upright frame for mounting accessory components.
 - a. Load Capacity: In accordance with SEFA 10 requirements.
 - b. Mounting: Bolted to back of worksurface support frame.
 - c. Divider Uprights: Flexible locations for subdividing the back frame into smaller sections.
 - d. Electric Power Strip: Single receptacles at manufacturer's standard spacing with total current rating of 15 Amp.
 - 2. Storage and Display Components: Sizes and configurations indicated on drawings.
 - a. Cabinet Hardware: Manufacturer's standard types as required for drawers, doors, shelves, levelers, and similar items.
 - 3. Computer Support Components: Sizes and configurations indicated on drawings.
- E. Primary Materials: Manufacturer's standard for each component.
 - 1. Tubing: Hot-rolled steel, ASTM A513/A513M.
 - 2. Sheet Metal: Cold-rolled steel, ASTM A1008/A1008M.
- F. Products:
 - 1. Kewaunee Scientific Corp; BasikBench: www.kewaunee.com.
 - 2. Substitutions: Not permitted.

2.04 ADAPTABLE LABORATORY FURNITURE SYSTEM

- A. General: Modular component system incorporating and/or accommodating compatible metal laboratory casework items, including: cabinets, countertop frames, ledges and supporting structures.
- B. Comply with SEFA 10.
- C. SEFA System Classification: Class 8 - Mobile workstation.
- D. Structural Modules: Primary support structures for adjustable work surfaces, shelving, utility delivery systems, and casework. Slotted channel design to provide support for components on 1 inch vertical increments.
 - 1. Anchors and Brackets: For each structural support island, peninsula, and corner module; providing specified load-bearing capacity for the module, and resulting in a rigid, non-racking system. Height of module to permit anchorage to supplementary structural bracing above ceiling.
 - a. At Top: Mounting brackets or clip angles standard with the system manufacturer.

- E. Facing Panels: End and insert closure panels at locations indicated on drawings.
 - 1. Modular units, with tight fit to other system components. Panels to be removable and replaceable without use of special tools.
 - 2. Unless otherwise indicated, facing closure panels of the following types:
- F. Worksurface Frames and Countertops:
 - 1. C-Frames: Self-supporting frame capable of supporting the weights of the countertop and imposed loads, in addition to the weight of suspended base cabinets.
 - a. Frame Length(s): 60 inches.
 - b. Total Supportable Load: 600 pounds, maximum, per frame.
 - c. Provide channels for suspension of base cabinets at any point along their length.
 - 2. Core-based Frames: Shaped to allow cantilevering from structural modules and capable of supporting the weights of the countertop, suspended base cabinets, and imposed loads.
 - a. Frame Length(s): 60 inches.
 - b. Total Supportable Load: 600 pounds, maximum, per frame.
 - c. Provide channels for suspension of base cabinets at any point along their length.
 - 3. Countertops: Include type(s) specified below.
 - a. Material: Countertops made from epoxy resin.
 - b. Cantilevered Countertop Front-to-back Dimension: 24 inches.
- G. Shelving: Modular units with integral brackets formed from metal sheets, with additional stiffener/reinforcing for units over 48 inch long.
 - 1. Lengths: Coordinated with lengths of structural modules.
 - 2. Shelf Material: Standard metal.
 - 3. Provide end and back guards where shelves do not abut walls or other shelf units.
- H. Suspended Base Cabinets: Designed to be supported by continuous hook-shaped rails located at top front and rear of cabinet.
- I. Suspended Wall Cabinets: Cabinets designed to mount directly to support modules.
- J. Finishes:
 - 1. Metal components: Same as other casework specified in this section.
- K. Products:
 - 1. Kewaunee Scientific Corp; Alpha, Enterprise, and Evolution: www.kewaunee.com.
 - 2. Substitutions: Not permitted.

2.05 CABINET HARDWARE

- A. Manufacturer's standard styles, and as indicated below.
- B. Finish of exposed stainless steel components: No.4 finish.
- C. Swinging Doors:
 - 1. Hinges: Offset pin, number as required by referenced standards for width, height, and weight of door.
 - a. Butt Hinges for Inset Doors: five-knuckle, projecting barrel, minimum 2-1/2 inches long.
Stainless steel with No.4 finish.
 - 2. Catches: Magnetic.

3. Pulls: Aluminum rounded pulls. Manufacturer's pull style 1.

D. Drawers:

1. Pulls: Aluminum rounded pulls. Manufacturer's pull style 1.
2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.06 COUNTERTOPS

A. Countertops:

1. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - a. Flat Surface Thickness: 1 inch, nominal.
 - b. Surface Finish: Smooth, non-glare.
 - c. Color: Black.
 - d. Exposed Edge Shape: 1/8 inch bevel chamfer.
 - e. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of each exposed edge.
 - f. Back and End Splashes: Same material, same thickness; separate for field attachment.
 - g. Fabricate in accordance with manufacturer's standard requirements.

2.07 SINKS

A. Laboratory sinks.

1. General: Manufacturer's adjustable support system for undermount sink installation.
2. Sink types and sizes are indicated on drawings.

2.08 PEGBOARDS

- A. Stainless steel pegboards with pre-drilled or punched holes in a staggered pattern, designed to accept removable white polypropylene pegs. With each pegboard include a stainless steel drip-trough with drain outlet and matching diameter 36 inch long PVC drain hose.
1. Size: As indicated on drawings.
 2. Accessories: Drip trough.

2.09 SERVICE FITTINGS

- A. General: Comply with requirements of SEFA 7.

B. Water Service Fittings and Fixtures.

1. Water Fitting Type: DT-12:
 - a. Basis of Design: As indicated on Drawings.

C. Electrical Fittings and Fixtures:

1. Electrical Fittings, General: Types indicated, for mounting on laboratory casework, including, as appropriate, grounding screws, and mounting accessories and fasteners.
2. See Section 26 05 33.23 for surface raceway systems.

2.10 BALANCE TABLES

- A. Size: As scheduled on Drawings.

- B. Worksurface Material: Epoxy resin slab, 2 inch thick.
- C. Supports: Material matching worksurface material, reinforced with powder-coated steel bracing.

2.11 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, CS or FS Type B, with G90/Z275 coating; stretcher leveled.
- B. Solid Epoxy Resin: Modified epoxy resin and non-asbestos inert fillers cast into sheets.
- C. Glass: Fully tempered float; ASTM C1036, Type 1, Quality Q3; ASTM C1048, tempered using horizontal tempering and complying with ANSI Z97.1; 3/16 inch thick minimum; exposed edges ground, and cut or drilled to receive hardware; clear.
- D. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications, complying with Grade requirements, and standard with the manufacturer.
- E. Sealant For Use in Casework Construction: Manufacturer's recommended type.
- F. Sealant For Use in Casework Installation:
 - 1. Manufacturer's recommended type.

2.12 FINISHES

- A. Sheet Steel Finish: Having chemical resistance equal to Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8M. Test applied finishes using procedures specified in ASTM D522/D522M.
 - 1. Coating Type: Baked on epoxy; minimum two coats.
 - 2. Color: As indicated on Drawings.
 - 3. Preparation: Degrease and phosphate etch, and prime.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of support framing and anchors.
- B. Verify that service connections are correctly located and of proper characteristics.

3.02 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions and with SEFA 2.
- B. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- C. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- D. Set casework items plumb and square, securely anchored to building structure, with no distortion.
 - 1. Base Cabinets: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 3/4 inch leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the

- floor. Set and make level and plumb first cabinet in relation to this high point.
2. Wall Cabinets: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 - a. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 feet and 1/2 inch in 20 feet or more, and/or maximum variation from plumb exceeds 1/4 inch per story.
 - b. Maximum variation of finished gypsum board surface from true flatness exceeds 1/8 inch in 10 feet in any direction.
 - E. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
 - F. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
 2. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
 3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
 4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
 - G. Separate dissimilar metals to prevent galvanic action.
 - H. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 1. Where base cabinets are installed away from walls or service space framing, anchor to floor at toe space at not more than 24 inches on center, and at sides of cabinets with not less than two fasteners per side.
 - I. Wall Cabinets: Fasten to hanging strips, and/or wall substrates. Fasten each cabinet through back, near top, at not less than 16 inches on center.
 - J. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
 - K. Vented Cabinets: Install in strict compliance with manufacturer's written installation instructions.
 1. Install vent kits and connect to exhaust system.
 2. Use only rigid materials for venting. No flexible materials permitted.
 - L. Replace units that are damaged, including those that have damaged finishes.
 - M. Coordinate installation of work of this section with installation of fume hoods and laboratory equipment.
 - N. Countertops: Install countertops in one true plane, with ends abutting at hairline joints, and no raised edges.
 - O. Deliver sinks, cup sinks, and service fittings in properly marked boxes, accompanied with written instructions, for supervised installation by appropriate trade contractor(s).

3.03 ADJUSTING

- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.04 CLEANING

- A. Clean casework and other installed surfaces thoroughly.

3.05 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent installers from standing on or storing tools and materials on casework or countertops.
- C. Repair damage that occurs prior to Date of Substantial Completion, including finishes, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

SECTION 21 05 00
COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Above ground piping.
- B. Escutcheons.
- C. Mechanical couplings.
- D. Pipe hangers and supports.
- E. Pipe sleeves.

1.02 RELATED REQUIREMENTS

- A. Section 21 13 00 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

1.03 REFERENCE STANDARDS

- A. ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.
- B. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
- C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2020.
- D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- E. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2021.
- F. ASME B16.9 - Factory-Made Wrought Buttwelding Fittings; 2018.
- G. ASME B16.25 - Buttwelding Ends; 2022.
- H. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- I. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984, with Editorial Revision (2019).
- J. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2022a.
- K. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- L. AWWA C606 - Grooved and Shouldered Joints; 2022.
- M. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information. Indicate valve data and ratings.
- C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, and floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
- D. Project Record Documents: Record actual locations of components and tag numbering.
- E. Operation and Maintenance Data: Include installation instructions and spare parts lists.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
 - 1. Minimum three years experience.
- C. Conform to UL and FM requirements.
- D. Valves: Bear UL and FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- E. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.
- F. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Sprinkler-based System:
 - 1. Comply with NFPA 13.
 - 2. See Section 21 13 00.
- B. Welding Materials and Procedures: Comply with ASME BPVC-IX.
- C. Provide system pipes, fittings, sleeves, escutcheons, seals, and other related accessories.

2.02 ABOVE GROUND PIPING

- A. Steel Pipe: Schedule 40, black.
 - 1. Steel Fittings: ASME B16.9 wrought steel, butt welded or ASME B16.25 butt weld ends.
 - 2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.
 - 3. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.
 - 4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.
 - 5. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement onto pipe.

2.03 PIPE SLEEVES

- A. Plastic, Sheet Metal, or Moisture-Resistant Fiber: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- B. Clearances:
 - 1. Wall, Floor, Floor, Partitions, and Beam Flanges: 1 inch greater than external; pipe diameter.

2.04 ESCUTCHEONS

- A. Manufacturers:
 - 1. Fire Protection Products, Inc.
 - 2. Tyco Fire Protection Products.
 - 3. Viking Group Inc.
- B. Material:
 - 1. Fabricate from nonferrous metal.
 - 2. Chrome-plated.
 - 3. Metals and Finish: Comply with ASME A112.18.1.
- C. Construction:
 - 1. One-piece for mounting on chrome-plated tubing or pipe and one-piece or split-pattern type elsewhere.
 - 2. Internal spring tension devices or setscrews to maintain a fixed position against a surface.

2.05 PIPE HANGERS AND SUPPORTS

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
- C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

2.06 MECHANICAL COUPLINGS

- A. Manufacturers:
 - 1. Anvil International.
 - 2. Tyco Fire Protection Products.

3. Victaulic Company; FireLock Style 009H.
- B. Rigid Mechanical Couplings for Grooved Joints:
 1. Dimensions and Testing: Comply with AWWA C606.
 2. Minimum Working Pressure: 300 psig.
 3. Housing Material: Fabricate of ductile iron complying with ASTM A536.
 4. Housing Coating: Factory applied orange enamel.
 5. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F to 230 degrees F.
 6. Bolts and Nuts: Hot-dipped-galvanized or zinc-electroplated steel.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

- A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building space, to not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
 1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 2. Place hangers within 12 inches of each horizontal elbow.
 3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- H. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.

- I. Do not penetrate building structural members unless indicated.
- J. Provide sleeves when penetrating walls and partitions and seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.
 - 1. Aboveground Piping:
 - a. Pack solid using mineral fiber complying with ASTM C592.
 - b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
 - 2. All Rated Openings: Caulk tight with firestopping material complying with ASTM E814.
 - 3. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.
- K. Escutcheons:
 - 1. Install and firmly attach escutcheons at piping penetrations into finished spaces.
 - 2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
 - 3. Attach plates at the underside only of suspended ceilings.
 - 4. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.
- L. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.

3.03 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

END OF SECTION

SECTION 21 13 00
FIRE-SUPPRESSION SPRINKLER SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wet-pipe sprinkler system.
- B. System design, installation, and certification.

1.02 RELATED REQUIREMENTS

- A. Section 21 05 00 - Common Work Results for Fire Suppression: Pipe and fittings.

1.03 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; Current Edition.
- B. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Shop Drawings:
 - 1. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components, and accessories. Indicate system controls.
 - 2. Submit shop drawings to Authorities Having Jurisdiction for approval. Submit proof of approval to Architect/Engineer.
- D. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.
 - 2. Extra Sprinklers: Type and size matching those installed in quantity required by referenced NFPA design and installation standard.
 - 3. Sprinkler Wrenches: For each sprinkler type.
- F. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

1.05 QUALITY ASSURANCE

- A. Conform to FM (AG) requirements.
- B. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

Or a holder of a valid NICET level III or IV Sprinkler Technician.

- C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience approved by manufacturer.
- E. Equipment and Components: Provide products that bear FM (AG) label or marking.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

PART 2 PRODUCTS

2.01 SPRINKLER SYSTEM

- A. Sprinkler System: Provide coverage for building areas noted.
- B. Water Supply: Determine volume and pressure from water flow test data.
- C. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve.

2.02 SPRINKLERS

- A. Suspended Ceiling Type: Semi-recessed pendant type with matching push on escutcheon plate.
 - 1. Response Type: Quick.
 - 2. Coverage Type: Standard.
 - 3. Finish: Chrome plated.
 - 4. Escutcheon Plate Finish: Chrome plated.
 - 5. Fusible Link: Glass bulb type temperature rated for specific area hazard.

2.03 STAINLESS STEEL FLEXIBLE DROPS

- A. Manufacturers:
 - 1. Flex Head Industries, Inc.
 - 2. Aqua Flex.
 - 3. Victaulic Company.
- B. In lieu of rigid pipe offsets or return bends. Braided type 304 stainless steel flexible tube with male threaded pipe nipple for connection to branchline piping, and a zinc plated steel reducer with a 1/2" or 3/4" NPT female thread for connection to a sprinkler head. The hoses shall be factory-pressure tested to 400 psi.
- C. Flexible drop shall attach to the ceiling grid with open gate bracket and can be installed without the use of special tools.
- D. The braided drop shall be FM approved for sprinkler services to 200 psi.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with referenced NFPA design and installation standard.
- B. Install equipment in accordance with manufacturer's instructions.
- C. Place pipe runs to minimize obstruction to other work.
- D. Place piping in concealed spaces above finished ceilings.
- E. Center sprinklers in two directions in ceiling tile and provide piping offsets as required.
- F. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- G. Hydrostatically test entire system.
- H. Require test be witnessed by Authority Having Jurisdiction.

3.02 INTERFACE WITH OTHER PRODUCTS

- A. Ensure required devices are installed and connected as required to fire alarm system.

3.03 SCHEDULES

- A. System Hazard Areas:
 - 1. Offices: Light Hazard.
 - 2. Laboratories: Ordinary Hazard, Group 2.
 - 3. Equipment and Storage Rooms: Ordinary Hazard, Group 2.
 - 4. Other Areas: In accordance with NFPA 13.

END OF SECTION

SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tags.
- B. Pipe markers.

1.02 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Schedules:
 - 1. Submit plumbing component identification schedule listing equipment, piping, and valves.
 - 2. Valve Data Format: Include id-number, location, function, and model number.
- C. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

- A. Tags:
 - 1. Piping: 3/4 inch diameter and smaller.
 - 2. Manual operated and automated control valves.
- B. Pipe Markers: 3/4 inch diameter and higher.

2.02 TAGS

- A. Manufacturers:
 - 1. Brimar Industries, Inc..
 - 2. Craftmark Pipe Markers.
 - 3. Kolbi Pipe Marker Co..
 - 4. Seton Identification Products.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- C. Valve Tag Chart: Typewritten 12-point letter size list in anodized aluminum frame.

2.03 PIPE MARKERS

- A. Manufacturers:
 - 1. Brimar Industries, Inc.
 - 2. Craftmark Pipe Markers.
 - 3. Kolbi Pipe Marker Co..
 - 4. Seton Identification Products.

- B. Comply with ASME A13.1.
- C. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- D. Identification Scheme, ASME A13.1:
 - 1. Primary: External Pipe Diameter, Uninsulated or Insulated.
 - a. 3/4 to 1-1/4 inches: Use 8 inch field-length with 1/2 inch text height.
 - b. 1-1/2 to 2 inches: Use 8 inch field-length with 3/4 inch text height.
 - c. 2-1/2 to 6 inches: Use 12 inch field-length with 1-1/4 inch text height.
 - 2. Secondary: Color scheme per fluid service.
 - a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.
 - 3. Tertiary: Other Details.
 - a. Directional flow arrow.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive identification products.

3.02 INSTALLATION

- A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags in clear view and align with axis of piping
- C. Install plastic tape pipe marker around pipe in accordance with manufacturer's instructions.
- D. Apply ASME A13.1 Pipe Marking Rules:
 - 1. Place pipe marker adjacent to changes in direction.
 - 2. Place pipe marker adjacent each valve port and flange end.
 - 3. Place pipe marker at both sides of floor and wall penetrations.
 - 4. Place pipe marker every 25 to 50 feet interval of straight run.

END OF SECTION

SECTION 22 07 19
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass fiber insulation.
- B. Jacketing and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 22 10 05 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience.
- B. Comply with the Midwest Insulation Contractors Association "National Commercial and Industrial Insulation Standards".

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.02 GLASS FIBER INSULATION

- A. Manufacturers:
 - 1. CertainTeed Corporation.
 - 2. Johns Manville Corporation.
 - 3. Knauf Insulation.
 - 4. Owens Corning Corporation.
- B. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
 - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 650 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm.
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.
- E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

2.03 JACKETING AND ACCESSORIES

- A. PVC Plastic Jacket:
 - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F.
 - b. Maximum Service Temperature: 150 degrees F.
 - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil, 0.010 inch.
 - e. Connections: Brush on welding adhesive.
 - 2. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints. All hangers, supports, anchors and other projections that are in contact to cold surfaces shall be insulated and vapor sealed to prevent condensation.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
 - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. Glass fiber insulated pipes conveying fluids above ambient temperature:
 - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- H. Inserts and Shields:
 - 1. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
- I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.
- J. Apply insulation at pipe hangers and supports according to National Commercial and Industrial Standards Plate Numbers 5, 6 and 7.

3.03 SCHEDULES

- A. Plumbing Systems:
 - 1. Domestic Hot Water Supply:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: Up to and including 1-1/4 inch.
 - a) Thickness: 1 inch.
 - 2. Domestic Hot Water Recirculation:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: Up to and including 1-1/4 inch.
 - a) Thickness: 1 inch.

- 3. Domestic Cold Water:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: All sizes.
 - a) Thickness: 1 inch.

END OF SECTION

SECTION 22 10 05 PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sanitary waste piping, above grade.
- B. Domestic water piping, above grade.
- C. Natural gas piping, above grade.
- D. Pipe flanges, unions, and couplings.
- E. Pipe hangers and supports.
- F. Valves
 - 1. Ball valves.

1.02 RELATED REQUIREMENTS

- A. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
- B. Section 22 07 19 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS

- A. ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators; 2019.
- B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- E. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV; 2021.
- F. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings—DWV; 2022.
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- H. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2021.
- I. ASTM B32 - Standard Specification for Solder Metal; 2020.
- J. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV); 2020.
- K. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- L. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.
- M. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.

- N. ASTM C1277 - Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings; 2020.
- O. ASTM C1540 - Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings; 2020.
- P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- Q. AWWA C651 - Disinfecting Water Mains; 2014, with Addendum (2020).
- R. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
- S. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.
- T. FM 1680 - Approval Standard for Couplings Used in Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems Above and Below Ground, Industrial/ Commercial and Residential; 1989.
- U. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- V. NSF 61 - Drinking Water System Components - Health Effects; 2022, with Errata.
- W. NSF 372 - Drinking Water System Components - Lead Content; 2022.
- X. Safe Drinking Water Act, Section 1417 - Lead Free: Refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$, Amended January 4, 2011.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Project Record Documents: Record actual locations of valves.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Valves: Manufacturer's name and pressure rating marked on valve body. Manufacturers lead free marking on valve body.
- C. Perform Work in accordance with City plumbing ordinances.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Plenum-Installed Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.02 SANITARY WASTE PIPING, ABOVE GRADE

- A. Cast Iron Pipe: ASTM A74, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. Copper Tube: ASTM B306, DWV.
 - 1. Fittings: ASME B16.29, wrought copper, or ASME B16.23, solvent.
 - 2. Joints: ASTM B32, alloy Sn50 solder.

2.03 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder for 2" and under.
 - 3. Joints: AWS A5.8M/A5.8, BCuP copper/silver braze for 2-1/2" and over.
 - 4. Mechanical Press Sealed Fittings: Double pressed type, NSF 61 approved or certified, utilizing EPDM, non toxic synthetic rubber sealing elements. Sealing elements shall be factory installed by fitting manufacturer. Press ends shall have means to indicate non-pressed fitting during pressure testing.
 - a. Manufacturers:
 - 1) Viega LLC.
 - 2) Nibco.

2.04 NATURAL GAS PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
 - 2. Joints: Threaded or welded to ASME B31.1.
- B. Painting - Exterior Pipe, valves and specialties, except components with factory-applied paint or coating;
 - 1. Alkyd System - MPI EXT 5.1D.
 - a. Prime coat - Alkyd anticorrosive metal primer.
 - b. Intermediate coat - Exterior alkyd enamel matching topcoat.

- c. Topcoat - Exterior alkyd enamel flat, color = yellow.

2.05 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 inch and Under:
 - 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
 - 2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Sizes Over 1 inch:
 - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 - 2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. No-Hub Couplings:
 - 1. Testing: In accordance with ASTM C1277 and CISPI 310.
 - 2. Gasket Material: Neoprene complying with ASTM C564.
 - 3. Band Material: Stainless steel.
 - 4. Eyelet Material: Stainless steel.
- D. Shielded, Heavy Duty No-Hub Couplings:
 - 1. Testing: In accordance with ASTM C1540 and FM 1680.
 - 2. Gasket Material: Neoprene complying with ASTM C564.
 - 3. Band Material: Stainless steel.
 - 4. Eyelet Material: Stainless steel.
- E. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.06 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
 - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
 - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
- B. Plumbing Piping - Drain, Waste, and Vent:
 - 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 - 2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 - 3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
 - 4. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.
 - 5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- C. Plumbing Piping - Water:
 - 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 - 2. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
 - 3. Strut mounted pipe shall have clamps with insert for pipe support to allow for continuous insulation at clamp. Manufacturer; Klo-Shure insulation couplings

2.07 BALL VALVES

- A. Manufacturers:

1. Nibco, Inc; T/S-585-66-LF.
 2. Apollo Valves.
 3. Watts.
- B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze body, 304 stainless steel ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder, threaded, or grooved ends.

2.08 NATURAL GAS APPLIANCE REGULATORS

- A. Compliance Requirements:
1. Appliance Regulator: ANSI Z21.18/CSA 6.3.
- B. Materials in Contact With Gas:
1. Housing: Aluminum, steel (free of non-ferrous metals).
 2. Seals and Diaphragms: NBR-based rubber.
- C. Maximum Inlet Operating Pressure: 5 psi.
1. Appliance Regulator: 2 psi.
- D. Maximum Body Pressure: 10 psi.
- E. Output Pressure Range: 1 inch wc to 80 inch wc.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed.
- I. Prepare exposed, unfinished pipe, fittings, supports, and accessories for finish painting.
- J. Install bell and spigot pipe with bell end upstream.
- K. Install valves with stems upright or horizontal, not inverted.
- L. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- M. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- N. Sleeve pipes passing through partitions, walls, and floors.
- O. Pipe Hangers and Supports:
 - 1. Support horizontal piping as indicated.
 - 2. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 3. Place hangers within 12 inches of each horizontal elbow.
 - 4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 6. Provide copper plated hangers and supports for copper piping.
 - 7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
 - 8. Support cast iron drainage piping at every joint.

3.04 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Provide plug valves or U.L. Listed ball valves for gas service in natural gas systems for shut-off service.

3.05 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/8 inch per foot slope.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.06 FIELD TESTS AND INSPECTIONS

- A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.
- B. Domestic Water Systems:
 - 1. Perform hydrostatic testing for leakage prior to system disinfection.
 - 2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
 - 3. General:
 - a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.
- C. Gas Distribution Systems:
 - 1. Test Preparation: Close each appliance valve or disconnect and cap each connected appliance.
 - 2. General Systems:
 - a. Inject a minimum of 10 psi of compressed air into the piping system for a duration of 15 minutes and verify with a gauge that no perceptible pressure drop is measured.
 - b. Ensure test pressure gauge has a range of twice the specific pressure rate selected with an accuracy of 1/10 of 1 pound.
 - 3. Welded Pipes or Systems with Service Pressures Above 14 in-wc:
 - a. Inject a minimum of 60 psi of compressed air into the piping system for a duration of 30 minutes and verify with a gauge that no perceptible pressure drop is measured.
 - b. Ensure test pressure gauge has a range of twice the specific pressure rate selected with an accuracy of 1/10 of 1 pound with 1 psi increments.
- D. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.07 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed, and clean.
- B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.08 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:
 - a. Pipe Size: 1/2 inch to 1-1/4 inch:
 - 1) Maximum Hanger Spacing: 6.5 ft.
 - 2) Hanger Rod Diameter: 3/8 inches.
 - b. Pipe Size: 1-1/2 inch to 2 inch:
 - 1) Maximum Hanger Spacing: 10 ft.
 - 2) Hanger Rod Diameter: 3/8 inch.
 - c. Pipe Size: 2-1/2 inch to 3 inch:
 - 1) Maximum Hanger Spacing: 10 ft.
 - 2) Hanger Rod Diameter: 1/2 inch.
 - d. Pipe Size: 4 inch to 6 inch:
 - 1) Maximum Hanger Spacing: 10 ft.
 - 2) Hanger Rod Diameter: 5/8 inch.

END OF SECTION

**SECTION 22 10 06
PLUMBING PIPING SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Water hammer arrestors.

1.02 RELATED REQUIREMENTS

- A. Section 22 10 05 - Plumbing Piping.
- B. Section 22 40 00 - Plumbing Fixtures.

1.03 REFERENCE STANDARDS

- A. ASME A112.6.3 - Floor and Trench Drains; 2019.
- B. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent; 2021.
- C. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies; 2021.
- D. ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance; 2011 (Reaffirmed 2016).
- E. NSF 61 - Drinking Water System Components - Health Effects; 2022, with Errata.
- F. NSF 372 - Drinking Water System Components - Lead Content; 2022.
- G. PDI-WH 201 - Water Hammer Arresters; 2017.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- D. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.
 - 2. Extra Loose Keys for Outside Hose Bibbs: One.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS

- A. Manufacturers:
 - 1. Jay R. Smith Manufacturing Company.
 - 2. Zurn Industries, Inc.
 - 3. MIFAB.
- B. Floor Drain FD:
 - 1. ASME A112.6.3; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and 9 inch round, adjustable nickel-bronze strainer.
 - 2. J.R. Smith Model 2005-A06NB.

2.03 CLEANOUTS

- A. Manufacturers:
 - 1. Jay R. Smith Manufacturing Company.
 - 2. Zurn Industries, Inc.
 - 3. MIFAB.
- B. Cleanouts at Interior Finished Floor Areas FCO:
 - 1. Lacquered cast iron body with anchor flange, threaded scoriated secured stainless steel top, and ABS gasketed plug.
 - 2. J.R. Smith Model 4020-SS.
- C. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.
 - 1. J.R. Smith Model 4510.

2.04 WATER HAMMER ARRESTORS

- A. Manufacturers:
 - 1. Jay R. Smith Manufacturing Company.
 - 2. Souix Chief.
 - 3. Watts Regulator Company.
 - 4. MIFAB.
- B. Water Hammer Arrestors:
 - 1. Copper construction, piston type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.
 - 2. J.R. Smith; Model 5000 Series.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.
- D. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to plumbing fixtures.

END OF SECTION

**SECTION 22 40 00
PLUMBING FIXTURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sinks.
- B. Emergency showers.

1.02 RELATED REQUIREMENTS

- A. Section 22 10 05 - Plumbing Piping.

1.03 REFERENCE STANDARDS

- A. NSF 61 - Drinking Water System Components - Health Effects; 2022, with Errata.
- B. NSF 372 - Drinking Water System Components - Lead Content; 2022.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on-site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

- B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.

2.03 SINK (SK-1)

- A. Laboratory Basin:
 - 1. Provided under Division 12.
- B. Trim:
 - 1. Faucet provide under Division 12.
- C. Accessories:
 - 1. Waste piping P-trap and arm with escutcheon.
 - 2. Mc Guire-H2167CC Handwheel stops.
 - 3. Rigid supplies.

2.04 SINK (SK-2)

- A. Laboratory Basin:
 - 1. Provided under Division 12.
- B. Trim:
 - 1. Faucet provide under Division 12.
- C. Accessories:
 - 1. Waste piping P-trap and arm with escutcheon.
 - 2. Mc Guire-H2167CC Handwheel stops.
 - 3. Rigid supplies.

2.05 EMERGENCY SAFETY STATION (ES-1)

- A. Manufacturers:
 - 1. Guardian; Model GBF2150
 - 2. Haws Corporation
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. ANSI Z358.1; fully recessed, stainless steel, emergency safety station with pull down eye wash and shower activation lever and stay-open, full flow brass ball valves and 1-1/2 inch brass drain tailpiece and p-trap. Shower includes deluge shower head, eyewash includes steam control and filter. Provide with ANSI compliant identification sign.
- C. Thermostatic Mixing Valve: Thermostatic mixing valve (factory set to 85°F) for emergency safety station with shower and eye/face wash. Unit shall include a built-in cold water bypass, rough bronze finish, solid bimetal thermostat, locking temperature regulator with high temperature limit stop factory set for 90°F, integral check stops, and dial thermometer. Unit shall have a flow capacity of 34 gpm @ 15 psi . Unit shall be certified to ASSE 1071. Provide with recessed mounted power coated steel cabinet. Guardian Model G6043

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome-plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
- C. Install components level and plumb.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.05 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

- A. Clean plumbing fixtures and equipment.

END OF SECTION

SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.

1.02 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Control Panels: Nameplates.

2.02 NAMEPLATES

- A. Manufacturers:
 - 1. Brimar Industries, Inc.
 - 2. Kolbi Pipe Marker Co..
 - 3. Seton Identification Products.
 - 4. Letter Color: White.
 - 5. Letter Height: 1/4 inch.
 - 6. Background Color: Black.
 - 7. Plastic: Comply with ASTM D709.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.

1.02 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016, with Errata.
- C. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).
- D. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems; 2019.
- E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Field Quality-control Testing of Laboratory Fume Hoods:
 - 1. Product Data sheets for all equipment proposed for use in on-site as-installed testing.
 - 2. Sample Test Report.
 - 3. Test data demonstrating that each type of fume hood provided for the project has been successfully tested in the factory as per requirements of Section 11 53 13.
- C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.
 - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
 - 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect/Engineer.
 - g. Project Contractor.
 - h. Report date.

D. Project Record Documents: Record actual locations of flow measuring stations.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 - 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 - 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 - 3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
 - 4. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
 - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 - 2. Having minimum of three years documented experience.
 - 3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
 - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.

- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.04 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.05 FUME HOOD TESTING (ON SITE)

- A. General: Test fume hoods as installed to assess airflow velocity and level of containment. Perform tests with static mode (set sash position) conditions. Conduct testing as outlined below for 100% of the hoods provided in the Project.
- B. Testing to be performed by firm certified by National Environmental Balancing Bureau - NEBB (FHT).
- C. Preparation: Visit the project site to confirm that construction activities related to the fume hood system(s) and equipment are complete. Review design documents and Contractor's submittals. Verify that mechanical ventilation systems serving the space are functioning and operating in the normal mode. Notify Owner in writing, if conditions exist which preclude proper fume hood testing. Starting of testing constitutes acceptance of site conditions.
- D. Testing Requirements:
 - 1. Perform the following tests, in order:
 - a. Airflow Velocity Test.
 - b. Tracer Gas Containment Test.
 - 2. If more than one test procedure is selected, proceed to the next test only if any unsafe condition discovered during current test has been successfully rectified.
 - 3. Airflow Velocity Test: Comply with Section 9 of NEBB (FHT) Fume Hood Testing Standard - current edition.

4. Reporting Requirements: Comply with Section 5 of NEBB (FHT) Fume Hood Testing Standard - current edition. Organize and include, at a minimum, the following information:
 - a. Report Title.
 - b. Report Certification.
 - c. Table of Contents.
 - d. Report Summary/ Remarks.
 - e. Appropriate Forms.
 - f. Instrument Calibration.
 - g. List of Abbreviations Used.
 - h. A room layout drawing for each tested item. Identify: walls; doors; fume hood(s); other present environmental enclosures (e.g. biological safety cabinet(s), laminar flow hood(s), canopy hood(s), etc.); location and airflow pattern of all air supply, return, and exhaust grilles, registers and diffusers.

3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- I. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

- L. For variable air volume system powered units set volume controller to air flow setting indicated.
Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.07 SCOPE

- A. Test, adjust, and balance the following:
 - 1. Packaged Roof Top Heating/Cooling Units.
 - 2. Fans.
 - 3. Air Terminal Units.
 - 4. Air Inlets and Outlets.
 - 5. Fume Hoods

3.08 MINIMUM DATA TO BE REPORTED

- A. Air Moving Equipment:
 - 1. Location.
 - 2. Manufacturer.
 - 3. Model number.
 - 4. Serial number.
 - 5. Arrangement/Class/Discharge.
 - 6. Air flow, specified and actual.
 - 7. Return air flow, specified and actual.
 - 8. Outside air flow, specified and actual.
 - 9. Total static pressure (total external), specified and actual.
 - 10. Inlet pressure.
 - 11. Discharge pressure.
 - 12. Sheave Make/Size/Bore.
 - 13. Number of Belts/Make/Size.
 - 14. Fan RPM.
- B. Exhaust Fans:
 - 1. Location.
 - 2. Manufacturer.
 - 3. Model number.
 - 4. Serial number.
 - 5. Air flow, specified and actual.
 - 6. Total static pressure (total external), specified and actual.
 - 7. Inlet pressure.
 - 8. Discharge pressure.
 - 9. Sheave Make/Size/Bore.
 - 10. Number of Belts/Make/Size.
 - 11. Fan RPM.
- C. Duct Traverses:
 - 1. System zone/branch.
 - 2. Duct size.
 - 3. Area.

4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

D. Terminal Unit Data:

1. Manufacturer.
2. Type, constant, variable, single, dual duct.
3. Identification/number.
4. Location.
5. Model number.
6. Size.
7. Minimum static pressure.
8. Minimum design air flow.
9. Maximum design air flow.
10. Maximum actual air flow.
11. Inlet static pressure.

E. Air Distribution Tests:

1. Air terminal number.
2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Design velocity.
6. Design air flow.
7. Test (final) velocity.
8. Test (final) air flow.
9. Percent of design air flow.

END OF SECTION

SECTION 23 07 13 DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.

1.02 RELATED REQUIREMENTS

- A. Section 23 31 00 - HVAC Ducts and Casings: Pre-insulated exterior ductwork.

1.03 REFERENCE STANDARDS

- A. ASTM C411 - Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- D. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.
- E. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- I. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.07 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.
- B. Insulation minimum thickness shall meet or exceed requirements as listed in International Energy Conservation Code, 2018.

2.02 GLASS FIBER, FLEXIBLE

- A. Manufacturers:
 - 1. CertainTeed Corporation.
 - 2. Johns Manville Corporation.
 - 3. Knauf Insulation.
 - 4. Owens Corning Corp.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. K value: 0.25 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Installed R-value: 6.0.
 - 3. Maximum Service Temperature: 450 degrees F.
 - 4. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure-sensitive tape.
- D. Vapor Barrier Tape:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.
- E. Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter.

2.03 DUCT LINER

- A. Manufacturers:

1. CertainTeed Corporation.
 2. Johns Manville Corporation.
 3. Owens Corning Corporation.
- B. Glass Fiber Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.
1. Fungal Resistance: No growth when tested according to ASTM G21.
 2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
 3. Service Temperature: Up to 250 degrees F.
 4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
 5. Minimum Noise Reduction Coefficients:
 - a. 1/2 inch Thickness: 0.30.
 - b. 1 inch Thickness: 0.45.
- C. Adhesive: Waterproof, fire-retardant type, ASTM C916.
- D. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
 1. Provide insulation with vapor barrier jackets.
 2. Finish with tape and vapor barrier jacket.
 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated Ducts Conveying Air Above Ambient Temperature:
 1. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. External Duct Insulation Application:
 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 2. Secure insulation without vapor barrier with staples, tape, or wires.
 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

F. Duct Liner Application:

1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.03 SCHEDULES

A. Exhaust Ducts Within 10 ft of Exterior Openings:

1. Flexible Glass Fiber Duct Insulation: 2 inches thick.

B. Outside Air Intake Ducts:

1. Flexible Glass Fiber Duct Insulation: 2 inches thick.

C. Supply Ducts:

1. Flexible Glass Fiber Duct Insulation: 2 inches thick.

D. Return Ducts with sound requirement:

1. Duct Liner: 1/2 inches thick.

END OF SECTION

SECTION 23 09 13
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Control panels.
- B. Damper Operators:
 - 1. Electric operators.
- C. Humidistats:
 - 1. Room humidistats.
- D. HVAC&R Sensors:
 - 1. Temperature sensors.
 - 2. Humidity sensors.
 - 3. Static pressure (air pressure) sensors.
 - 4. Current sensors.
- E. Room pressure monitors/controllers.
- F. Sensors with transmitters:
 - 1. Building static pressure transmitters.
 - 2. Pressure transmitters.
 - 3. Air pressure transmitters.
 - 4. Temperature transmitters.
- G. Variable Frequency Drives

1.02 RELATED REQUIREMENTS

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.
- B. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- D. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

- E. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience approved by manufacturer.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL PANELS

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. NEMA 250, general purpose utility enclosures with enameled finished face panel.
- C. Provide common keying for all panels.

2.03 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
 - 1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 - 2. Provide one operator for maximum 36 sq ft damper section.
- B. Electric Operators:
 - 1. Manufacturers:
 - a. Belimo.
 - b. Johnson Controls.
 - c. Siemens.
 - 2. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.04 HUMIDISTATS

A. Room Humidistats:

1. Wall mounted, proportioning type.
2. Throttling Range: Adjustable 2 percent relative humidity.
3. Operating Range: 30 to 80 percent.
4. Maximum Temperature: 110 degrees F.

2.05 HVAC&R SENSORS

A. Temperature Sensors:

1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
2. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F.
3. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
4. Temperature Sensing Device: Compatible with project DDC controllers.
5. Performance Characteristics:
 - a. RTD:
 - 1) Room Sensor Accuracy: Plus/minus 0.50 degrees F minimum.
 - 2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F minimum.
 - 3) All Other Accuracy: Plus/minus 0.75 degrees F minimum.
 - 4) Range: Minus 40 degrees F through 220 degrees F minimum.
 - b. Thermistor:
 - 1) Accuracy (All): Plus/minus 0.36 degrees F minimum.
 - 2) Range: Minus 25 degrees F through 122 degrees F minimum.
 - 3) Heat Dissipation Constant: 2.7 mW per degree C.
 - c. Temperature Transmitter:
 - 1) Accuracy: 0.10 degree F minimum or plus/minus 0.20 percent of span.
 - 2) Output: 4 to 20 mA.
 - d. Sensing Range:
 - 1) Provide limited range sensors if required to sense the range expected for a respective point.
 - 2) Use RTD type sensors for extended ranges beyond minus 30 to 230 degrees F.
 - 3) Use temperature transmitters in conjunction with RTD's when RTD's are incompatible with DDC controller direct temperature input.
 - e. Wire Resistance:
 - 1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F or use temperature transmitter when offset is greater than 1.0 degree F due to wire resistance.
 - 2) Compensate for wire resistance in software input definition when feature is available in the DDC controller.
 - f. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
 - g. Immersion Temperature Sensors: A sensor encased in a corrosion-resistant probe with an indoor junction box service entry body.
 - h. Room Temperature Sensors with Integral Digital Display:
 - 1) Provide a four button keypad with the following capabilities:

- a) Indication of space temperature and setpoint.
 - b) Setpoint adjustment to accommodate room setpoint.
 - c) Manual occupancy override and indication of occupancy status.
 - d) Password enabled setpoint and override modes.
 - i. Temperature Averaging Elements:
 - 1) Use on duct sensors for ductwork 10 sq ft or larger.
 - 2) Use averaging elements where prone to stratification with sensor length 8 ft or 16 ft.
 - 3) Provide for all mixed air and heating coil discharge sensors regardless of duct size.
 - j. Insertion Elements:
 - 1) Use in ducts not affected by temperature stratification or smaller than 11 sq inches.
- B. Humidity Sensors:
- 1. Duct Mounted Sensor: Voltage type encased in a die-cast metal, weather-proof housing.
 - a. Input Power, Voltage Type: Class 2; 12-30 VDC/24 VAC, 15mA max.
 - b. Input Power, mA Type: Class 2; Loop powered 12-30 VDC only, 30 mA max.
 - c. Output Voltage Type: 3-wire observed polarity.
 - d. Output mA Type: 2-wire, not polarity sensitive (clipped and capped).
 - e. Humidity:
 - 1) HS Element: Digitally profiled thin-film capacitive.
 - 2) Accuracy: 1 percent at 10 to 80 percent relative humidity at 77 degrees F, multi-point calibration, NIST traceable.
 - a) Plus/minus 1 percent at 20 to 40 percent RH in mA output mode; (multi-point calibration, NIST traceable).
 - 3) Scaling: 0 to 100 percent RH.
 - f. Temperature Effect:
 - 1) Duct Mounted: Plus/minus 0.18 percent per degree F.
 - 2) Outdoor Mounted: 4 to 20mA version: $(0.0013 \times \text{percent RH} \times (\text{Tdegree C} - 25))$.
 - g. Hysteresis: 1.5 percent typical.
 - h. Linearity: Included in accuracy specification.
 - i. Reset Rate: 24 hours.
 - j. Stability: Plus/minus 1 percent at 68 degrees F (20 degrees C) annually, for two years.
 - 2. Wall Mounted Sensor: Voltage type encased in a plastic housing.
- C. Static Pressure (Air Pressure) Sensors:
- 1. Unidirectional with ranges not exceeding 150 percent of maximum expected input.
 - 2. Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F.
 - 3. Accuracy: One percent of full scale with repeatability 0.3 percent.
 - 4. Output: 0 to 5 vdc with power at 12 to 28 vdc.
- D. Current Sensors:
- 1. Status Inputs for Electric Motors: Current sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

2.06 PRESSURE MONITORS/CONTROLLERS

- A. Manufacturers:
- 1. Antec Controls; Model LUME 11.

2. Substitutions: See Section 01 60 00 - Product Requirements
- B. Room pressure monitor and controller: 4.3 inch flush-mounted color touchscreen, sensor accuracy within +/- 0.00001 IN. WC., BAS interface via BACnet, digital interface module with audible and visual alarms. Input power 24 VAC, 15-40 VDF, 5 watts maximum.
- C. Four universal inputs, 2 binary outputs, 1 analog output.
- D. Bi-directional through the wall sensor: range -0.20000 to +0.20000 IN. WC..
- E. Provide with door contact switch, flush mount.
- F. Provide with SDPT differential pressure sensor and two stainless steel sensor plates.

2.07 SENSORS WITH TRANSMITTERS

- A. Building Static Pressure Transmitters:
 1. One pipe, direct acting, double bell, scale range 0.01 to 6.0 in-wc positive or negative, and sensitivity of 0.0005 in-wc. Transmit electronic signal to receiver with matching scale range.
- B. Pressure Transmitters:
 1. One pipe direct acting for gas, liquid, or steam service, range suitable for system, proportional electronic output.
- C. Air Pressure Transmitters:
 1. General: Provide dry media differential pressure transducers to monitor duct and room pressure.
 - a. Media Compatibility: Dry air.
 - b. Input Power: Class 2; 12 to 30 VDC; 2-wire: 20 mA max.
 - c. Output: Field selectable, 2-wire, loop-powered 4 to 20 mA (DC only, clipped and capped).
 - d. Pressure Ranges: 4 and 7, field selectable.
 - e. Response Time:
 - 1) Standard: T95 in 20 seconds.
 - 2) Fast: T95 in 2 seconds.
 - 3) Switch selectable.
 - f. Mode: Switch selectable, unidirectional.
 - g. Accuracy: Plus/minus 1 percent f.s. (full scale) of selected range (combined linearity & hysteresis).
 - h. Zero Drift (1-year) (per transmitter size):
 - 1) 1 in-wc: 2 percent maximum.
 - 2) 10 in-wc: 0.05 percent maximum.
 - i. Zero adjust: Pushbutton auto-zero and digital input (2-pos terminal block).
 - j. Operating Environment:
 - 1) 32 to 140 degrees F.
 - 2) 0 to 90 percent RH, noncondensing.
- D. Temperature Transmitters:
 1. One pipe, directly proportional output signal to measured variable, linearity within plus or minus 1/2 percent of range for 200 degrees F span and plus or minus 1 percent for 50 degrees F span, with 50 degrees F. temperature range, compensated bulb, averaging capillary, or rod and tube operation on 20 psig input pressure and 3 to 15 psig output.

2.08 VARIABLE FREQUENCY DRIVES

- A. Manufacturers:
 - 1. Danfoss VLT.
 - 2. ABB.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Rated input voltage: See schedules.
- C. Variable torque horsepower: See schedules.
- D. Enclosure: Power electronics and control electronics housed in NEMA 1 enclosure.
- E. Electro-mechanical construction:
- F. Input voltage +/- 10 percent.
- G. Output current overload rating of 125 percent of motor FLA for 1 minute.
- H. Voltage source design using PWM inverter technology.
- I. Microprocessor based control circuit generating sine coded PWM output current waveform.
- J. Non-volatile memory (NV RAM); all programming is maintained when disconnected from power.
- K. Corrects displacement power factor to 98 percent throughout the motor speed range and eliminates power line notching, through the use of diode bridge input section or power factor correction capacitors and isolation transformer.
- L. Input phase insensitive, sequencing of the 3 phase input lines is not required.
- M. Fused DC bus with capacitive filtering.
- N. Insulated Gate Bipolar Transistors (IGBT) output, allowing motor noise, at 60 HZ, less than 2 dB (@ 1 meter) above that resulting from across the line operation.
- O. Three current transformers detect the output current to provide: Electronic thermal overload protection, Three phase current limit, Ground fault protection, Short circuit protection and Speed search capability.
- P. Digital operator keypad and display.
- Q. Power electronics provides efficiency of 97 percent (minimum).
- R. Materials of construction UL 94-VO rated.
- S. Non-Fused disconnect provided for motor service.
- T. Rated input voltage: See schedules.
- U. Variable torque horsepower: See schedules.
- V. Enclosure: Power electronics and control electronics housed in NEMA 1 enclosure.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 48 inches above floor. Align with lighting switches and humidistats.
- C. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.
- D. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
- E. Provide conduit and electrical wiring in accordance with Section 26 05 83. Electrical material and installation shall be in accordance with appropriate requirements.

END OF SECTION

SECTION 23 09 23
DIRECT-DIGITAL CONTROL SYSTEM TRIDIUM JCI FX

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. System description.
- B. Controllers.
- C. Power supplies and line filtering.
- D. System software.
- E. Controller software.
- F. HVAC control programs.

1.02 RELATED REQUIREMENTS

- A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks; 2020, with Errata (2023).
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Expand building control system to interface with new equipment and perform the sequence of operation specified. Modify automation system graphics to delete removed equipment and add new equipment.
- B. Provide a color graphical representation of all systems. The graphical display shall include all points indicated in the pints list and any others required to achieve the sequences of operation. The graphical user interface shall consist of the following as a minimum;
 - 1. Menu bar navigation via windows-like bars.
 - 2. Navigation will also be available via an image of the building profile from which the user clicks on floors to bring up individual floor plans.
 - 3. The individual floor plan zones shall change color based upon the difference between the actual zone temperature and zone set point so that the operator can tell at a glance if zones are in, above or below acceptable ranges. A minimum of five (5) colors are required: Color 1 = within acceptable range of set point, Color 2 = warning - zone is above acceptable range of set point and approaching high temperature alarm; Color 3 = zone is in high temperature alarm; Color 4 = warning - zone is below acceptable range of set point and approaching low temperature alarm; Color 5 = zone is in low temperature alarm.
 - 4. Clicking on a floor plan zone shall bring up a dynamic color graphic of the mechanical equipment that serves that zone.

5. Each major piece of mechanical equipment (terminal unit, AHU, boiler, chillers, cooling towers, etc.) shall have a pictorial dynamic color graphic. The central plant equipment may be combined as appropriate on one or more graphic page.
6. Text-based (non-pictorial) summary screens will also be provided so that the operator may view critical information on multiple units at once. Summary screens will be provided for terminal units and air handling units. Summary screens for VAV/FPVAV boxes will contain as a minimum room temperature, room temperature set point, occ/unocc status and CFM for each box. Summary screens for AHUs will contain as a minimum space temperature (CV units) or discharge temperature (VAV units) and the corresponding set point, static pressure (VAV units), OA damper position, mixed air temperature, fan status and occ/unocc status.
7. Clicking on a unit on any summary screen shall bring up the complete graphic for that unit.
8. Outside air temperature shall be displayed on each graphic screen.

1.05 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURES

- A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system with the capability to integrate both the ANSI/ASHRAE Standard 135-1995 BACnet and LonWorks technology communication protocols in one open, interoperable system.
- B. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. In addition, adherence to industry standards including ANSI/ASHRAE Standard 135-1995, BACnet and LonMark to assure interoperability between all system components is required. For each LonWorks device that does not have LonMark certification, the device supplier must provide a XIF file for the device. For each BACnet device, the device supplier must provide a PICS document showing the installed device = s-compliance level. Minimum compliance is Level 3; with the ability to support data read and write functionality. Physical connection of BACnet devices shall be via Ethernet.
- C. All components and controllers supplied under this contract shall be true peer-to-peer communicating devices. Components or controllers requiring polling by a host to pass data shall not be acceptable.
- D. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open Database Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required for all system database parameter storage. This data shall reside on a supplier-installed server for all database access. Systems requiring proprietary database and user interface programs shall not be acceptable.
- E. The installed system shall provide secure password access to all features, functions and data contained in the overall Building Management Control System (BMCS). Secure Socket Layer (SSL) encryption shall be an available option for remote access.
- F. The installed system must be totally scalable to allow for future expansion with the addition of controllers and/or input/output devices. It shall not be necessary to remove equipment supplied under this contract to expand the system.
- G. The failure of any single component or network shall not interrupt the control functions of non-affected devices. A single network failure shall only affect shared communications or shared data; individual application controllers and network controllers shall continue normal operation minus

only the data from a remote device from the affected network. Automatic default values for all network transported data shall be provide to allow continued operation until the network is restored.

- H. The BMCS shall provide support for ODBC or SQL. An embedded database must be an ODBC-compliant database or must provide an ODBC data access mechanism to read and write dated stored within it. A minimum offering would be the documentation of database schemes to allow users to read/write data into other applications using appropriate ODBS syntax.
- I. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data.
 - 1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
 - 2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

1.06 WEB BROWSER CLIENTS

- A. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacturer-specific browsers shall not be acceptable.
- B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the BMCS shall not be acceptable.
- C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface (GUI). Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.
- D. The Web browser client shall support at a minimum, the following functions;
 - 1. User log-in identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
 - 2. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.
 - 3. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
 - 4. Storage of the graphical screens shall be in the Network Area Controller (NAC) without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.

1.07 SUBMITTALS

- A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for

materials, and installation and startup instructions for each type of product indicated.

1. DDC System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.
 - a. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications.
 2. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
 2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
 3. Wiring Diagrams: Power, signal, and control wiring.
 4. Details of control panel faces, including controls, instruments, and labeling.
 5. Written description of sequence of operation.
 6. Schedule of dampers including size, leakage, and flow characteristics.
 7. Schedule of valves including flow characteristics.
 8. DDC System Hardware:
 - a. Wiring diagrams for control units with termination numbers.
 - b. Schematic diagrams and floor plans for field sensors and control hardware.
 - c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.
 9. Control System Software: List of color graphics indicating monitored systems, data (connected and calculated) point addresses, output schedule, and operator notations.
 10. Controlled Systems:
 - a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
 - b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
 - c. Written description of sequence of operation including schematic diagram.
 - d. Points list.
- C. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.
- D. Software and Firmware Operational Documentation: Include the following:
1. Software operating and upgrade manuals.
 2. Program Software Backup: On a magnetic media or compact disc, complete with data files and points tables.
 3. Device address list.
 4. Printout of software application and graphic screens.
 5. Software license required by and installed for DDC workstations and control systems.
- E. Software Upgrade Kit: For Owner to use in modifying software to suit future systems revisions or monitoring and control revisions.

- F. Qualification Data: For installer.
- G. Field quality-control test reports: Provide standard commissioning report for all systems.
- H. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Maintenance instructions and lists of spare parts for each type of control device and compressed-air station.
 - 2. Interconnection wiring diagrams with identified and numbered system components and devices.
 - 3. Keyboard illustrations and step-by-step procedures indexed for each operator function.
 - 4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
 - 5. Calibration records and list of set points.
- I. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: Automatic control system manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. All technician's labor shall be by Tridium N4 certified and factory trained employees with 5 or more years of experience on the new and existing systems. Subcontracting of technician's labor is unacceptable. All electrical installation shall be by Building Automation specialty electrical contractors directly employed and managed by the BAS contractor.
- D. All line voltage devices shall be UL or ETL listed
- E. Comply with ASHRAE 135 for DDC system components.
 - 1. All new devices shall be BACnet MSTP
 - 2. All new devices must BTL listed. No exception or substitutions

1.09 WARRANTY

- A. Warranty: Provide 2 Year Parts and Labor Factory Authorized Warranty Service for all new components and all labor provided on the project. Update all software to latest version available during warranty period at no additional cost to owner.

1.10 PROTECTION OF SOFTWARE RIGHTS

- A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:
 - 1. Limiting use of software to equipment provided under these specifications.
 - 2. Limiting copying.
 - 3. Preserving confidentiality.

- 4. Prohibiting transfer to a third party.
- B. Provide Owner administrative rights after warranty period expires.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.
- B. System Software: Update to latest version of software at Project completion.

1.12 COORDINATION

- A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.
- B. Coordinate equipment with Division 23 Sections for compatibility. Control contractor to provide all necessary devices for a complete and fully operational system for all equipment.
- C. Coordinate supply of conditioned electrical branch circuits for control units and operator workstation.
- D. Coordinate equipment with Division 26 achieve compatibility of communication interfaces.
- E. Coordinate equipment with Division 26 to achieve compatibility with starter coils and annunciation devices.
- F. Coordinate equipment with Division 26 to achieve compatibility with motor starters and annunciation devices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Controllers:
 - 1. Manufacturers:
 - a. Johnson - FX-PC series, BTL Listed, BACnet MSTP devices. Proprietary controllers (Metasys) will not be allowed.
 - 2. Software required to program the supervisory & field level controllers shall be made available to the Owner, and left on the BAS Server at project completion by the BAS Contractor.
 - 3. Controllers to have 10% spare IO for future use.
- B. End Devices
 - 1. All end devices shall be by manufacturers as specified below.

2.02 SYSTEM DESCRIPTION

- A. Control System
 - 1. Manufacturers:
 - a. Johnson Facility Explorer (Tridium Niagara 4) BACnet Open Protocol Web Based System with server (N4 Supervisor). Proprietary systems (Metasys) will not be allowed.
 - 2. Installers:
 - a. F.E. Moran. Contact Tom Rogers: 224-545-1774.

3. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multiuser, multitasking environment to provide a complete and fully operational system of controls for all new and existing equipment shown on the plans and described in the specifications.
 4. All graphics shall be web based using HTML5 over TCP/IP. Provide a free Android or iPhone APP with custom scaled graphics for all equipment. App shall be free with no user subscription fees and have scaled custom graphics for all HVAC systems & associated features.
- B. Install a new controller for each existing piece of equipment communicating to the web server over BACnet MSTP protocol using RS485 wiring
 - C. Non-critical equipment (exhaust fans, unit heaters, etc.) may be connected to nearby controllers or grouped logically into a dedicated controller for multiple units.
 - D. Install all new sensors and actuators for all equipment, wired to new controllers. Include all necessary relays, transformers and enclosures for a complete and fully operational system.
 - E. Install all field wiring per NEC and install all wiring in conduit if it is in an exposed area or mechanical space.
 - F. Provide stand-alone wiring and interlocks for all equipment and controls as necessary for a complete and fully operational system.
 - G. Provide spring return actuators for all dampers or valves that could be subject to freezing or create an unsafe condition.
 - H. System shall include controls and programming to meet energy code including demand control ventilation and critical zone reset of fan speed for VAV systems.
 - I. The owner shall provide VPN access for service to provide ongoing user support, warranty and maintenance.
 - J. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

2.03 GRAPHICS DISPLAY

- A. Operator's workstation shall display all data associated with project as called out on drawings and/or object type list supplied. Graphic files shall be created using digital, full color photographs of system installation, AutoCAD, GraphICS or Visio drawing files of field installation drawings and wiring diagrams from as-built drawings. Operator's workstation shall display all data using three-dimensional graphic representations of all mechanical equipment. System shall be capable of displaying graphic file, text, and dynamic object data together on each display and shall include animation. Information shall be labeled with descriptors and shall be shown with the appropriate engineering units. All information on any display shall be dynamically updated without any action by the user. Workstation shall allow user to change all field-resident EMCS functions associated with the project, such as setpoints, weekly schedules, exception schedules, etc. from any screen no matter if that screen shows all text or a complete graphic display. This shall be done without any reference to object addresses or other numeric/mnemonic indications.
- B. Provide complete and easy to use color graphics user interface, including:

1. A unique graphical representation of all equipment with adjustable setpoints and alarms
 2. 3D Floor Plans with zones identified and color coding of alarm conditions (flood fill red for above setpoint, blue for below setpoint).
 3. Provide room numbers and equipment tags for all equipment on plans.
 4. Navigation tree for access to all equipment and plans.
 5. Clicking on any floor plan equipment tag will navigate to unique equipment graphic.
 6. All setpoints shall have user adjustable alarm ranges.
 7. Time of day scheduling for all equipment easily adjustable by the user.
 8. Adjustable Alarm ranges and alarm history page.
- C. Binary objects shall be displayed as ACTIVE/INACTIVE/NULL or with customized text. Text shall be justified left, right or center as selected by the user. Also, allow binary objects to be displayed as individual change-of-state graphic objects on the display screen such that they overlay the system graphic. Each binary object displayed in this manner shall be assigned up to three graphic files for display when the point is ON, OFF or in alarm. For binary outputs, toggle the object's commanded status when the graphic item is selected with the system mouse. Similarly, allow the workstation operator to toggle the binary object's status by selecting with the mouse a graphic of a switch or light, for example, which then displays a different graphic (such as an "ON" switch or lighted lamp). Additionally, allow binary objects to be displayed as an animated graphic. Animated graphic objects shall be displayed as a sequence of multiple graphics to simulate motion. For example: when a pump is in the OFF condition, display a stationary graphic of the pump. When the operator selects the pump graphic with the mouse, the represented object's status is toggled and the graphic of the pump's impeller rotates in a time-based animation. The operator shall be able to click on an animated graphical object or switch it from the OFF position to ON, or ON to OFF. Allow operator to change graphic file assignment and also create new and original graphics online. System shall be supplied with a library of standard graphics, which may be used unaltered or modified by the operator. Systems that do not allow customization or creation of new graphic objects by the operator (or with third-party software) shall not be allowed.
- D. Analog objects shall be displayed with operator modifiable units. Analog input objects may also be displayed as individual graphic items on the display screen as an overlay to the system graphic. Each analog input object may be assigned a minimum of five graphic files, each with high/low limits for automatic selection and display of these graphics. As an example, a graphic representation of a thermometer would rise and fall in response to either the room temperature or its deviation from the controlling setpoint. Analog output objects, when selected with the mouse, shall be displayed as a prompted dialog (text only) box. Selection for display type shall be individual for each object. Analog object values may be changed by selecting either the "increase" or "decrease" arrow in the analog object spinner box without using the keypad. Pressing the button on the right side of the analog object spinner box allows direct entry of an analog value and accesses various menus where the analog value may be used, such as trend logs.
- E. Analog objects may also be assigned to an area of a system graphic, where the color of the defined area changes based on the analog object's value. For example, an area of a floor-plan graphic served by a single control zone would change color with respect to the temperature of the zone or its deviation from setpoint. All editing and area assignment shall be created or modified online using simple icon tools.

- F. A customized menu label (push-button) shall be used for display selection. Menu items on a display shall allow penetration to lower level displays or additional menus. Dynamic point information and menu label push buttons may be mixed on the same display to allow sub-displays to exist for each item. Each display may be protected from viewing unless operator has appropriate security level. A security level may be assigned to each display and system object. The menu label shall not appear on the graphic if the operator does not have the appropriate security level.
- G. G. A mouse shall be used to move the pointer arrow to the desired item for selection of new display or to allow the operator to make changes to object data.

2.04 WEB INTERFACE

A. General

- 1. BAS supplier shall provide web-based access to the system as part of standard installation. User shall be able to access all displays of real-time data that are part of the BAS via a standard Web browser. Web browser shall tie into the network via owner-supplied Ethernet network connection. The web-page software shall not require a per user licensing fee or annual fees. The web-page host must be able to support on average 50 simultaneous users with the ability to expand the system to accommodate an unlimited number of users.

B. Browser Technology

- 1. Browser shall be standard version of Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox. No special vendor-supplied software shall be needed on computers running browser. All displays shall be viewable and the Web-page host shall directly access real-time data from the BAS BACnet network. Data shall be displayed in real time and update automatically without user interaction. User shall be able to change data on displays if logged in with the appropriate user name and password.

C. Communications

- 1. Web-page host shall include two Ethernet network connections. One network connection shall be dedicated to BAS BACnet network and shall be used to gather real-time data from all the BACnet devices that form the BAS. This network shall communicate via BACnet, allowing the Web-page host to gather data directly from units on the local LAN or from other projects connected over a WAN. This network shall also provide the connection to the BAS server for Web page generation.
- 2. The second Ethernet connection shall provide the physical connection to the Internet or an IP-based WAN. It shall be the port that is used for the browser to receive Web pages and data from the Web-page host. The Web-page host shall act as a physical barrier between the BAS network and the WAN or Internet connection that allows the browser to receive web pages and data. The two separate network connections provide for a physical barrier to prevent raw BACnet traffic being exposed on the IP network.
- 3. The Web-page host shall provide for complete isolation of the IP and BACnet networks by not routing networking packets between the two networks.
- 4. BAS BACnet Ethernet network shall be provided and installed by the BAS supplier. Owner shall provide and incur any monthly charges of WAN/Internet connection.

D. Display of Data

1. Web page graphics shown on browser shall be replicas of the BAS displays. User shall need no additional training to understand information presented on Web pages when compared to what is shown on BAS displays. Web page displays shall include animation just as BAS displays. Fans shall turn, pilot lights shall blink, coils shall change colors, and so on.
2. Real-time data shall be shown on all browser Web pages. This data must be directly gathered via the BACnet network and automatically updated on browser Web page displays without any user action. Data on the browser shall automatically refresh as changes are detected without re-drawing the complete display.
3. It shall be possible for user from browser Web page to change data if the user is logged on with the appropriate password. Clicking on a button or typing in a new value shall change digital data. Using pull-down menus or typing in a new value shall change analog data.
4. Data displays shall be navigated using pushbuttons on the displays that are simply clicked on with the mouse to select a new display. Alternatively, the standard back and forward buttons of the browser can be used for display navigation.

E. Time Schedule Adjustment

1. Web access shall allow user to view and edit all schedules in the system. This includes standard, holiday and event schedules as described in BAS specification. Display of schedules shall show interaction of all schedules on a single display so user sees an overview of how all work together. User shall be able to edit schedules from this display.
2. Display of all 3 schedules must show all ON times for standard, holiday and event schedules in different colors on a given day. In addition, OFF times for each must also be shown in additional colors. User shall be able to select from standard calendar what days are to be scheduled and same display shall show all points and zones affected. User shall be able to set time for one day and select all days of the week that shall be affected as a recurrence of that same schedule for that given day.
3. Schedule list shall show all schedules currently defined. This list shall include all standard, holiday and event schedules. In addition, user shall be able to select a list that shows all scheduled points and zones.

F. Logging of Information

1. User shall use standard browser technology to view all trend logs in system. User shall be able to view logged data in tabular form or graphical format. User shall be able to adjust time interval of logged data viewed and shall be able to adjust y axis of data viewed in graphical format. User shall also be able to down-load data through the web interface to local computer. Data shall be in CSV format.

G. Alarm Handling

1. Web interface shall display alarms as they occur. User shall be able to acknowledge alarms using browser technology. In addition, user shall be able to view history of alarm occurrence over a user selected time frame. In addition, those alarms may be filtered for viewing per user selected options. A single selection shall display all alarms that have not been acknowledged.

H. Web Page Generation

1. Web pages shall be generated automatically from the BAS displays that reside on the BAS server. User shall access Web-page host via the network and shall initiate a web page generation utility that automatically takes the BAS displays and turns them into Web pages. The Web pages generated are automatically installed on the Web page host for access via any

computer's standard browser.

I. Password Security and Activity Log

1. Access via Web browser shall utilize the same hierarchical security scheme as BAS system. User shall be asked to log in once the browser makes connection to Web-page host. Once the user logs in, any and all changes that are made shall be tracked by the BAS system. The user shall be able to change only those items that the user has authority to change. A user activity report shall show any and all activity of the users that have logged in to the system regardless of whether those changes were made using a browser or via the BAS workstation.

J. BACnet Communication

1. Web server shall directly communicate to all devices on the BAS network using BACnet protocol. No intermediate devices shall be necessary for BACnet communication.

2.05 UNITARY CONTROLLERS

- A. Unitized, capable of stand-alone operation with sufficient memory to support its operating system, database, and programming requirements, and with sufficient I/O capacity for the application.
1. Configuration: Local keypad and display; diagnostic LEDs for power, communication, and processor; wiring termination to terminal strip or card connected with ribbon cable; memory with bios; and 72-hour battery backup.
 2. Operating System: Manage I/O communication to allow distributed controllers to share real and virtual object information and allow central monitoring and alarms. Perform automatic system diagnostics; monitor system and report failures.
 3. ASHRAE 135 Compliance: Communicate using read (execute and initiate) and write (execute and initiate) property services defined in ASHRAE 135. Reside on network using MS/TP datalink/physical layer protocol and have service communication port for connection to diagnostic terminal unit.
 4. Enclosure: Dustproof rated for operation at 32 to 120 deg F.
 5. Enclosure: Waterproof rated for operation at 40 to 150 deg F.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.02 INSTALLATION

- A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
- B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.
- C. Provide conduit and electrical wiring in accordance with division 26. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

1. Provide conduit for all control wiring exposed to view. This includes but is not limited to all storage rooms, mechanical rooms, and similar spaces.
 2. Provide conduit for all control wiring concealed in inaccessible spaces. This includes but is not limited to wiring above/behind drywall and plaster ("hard") ceilings or soffits, and wiring within vertical chase spaces, regardless of whether access doors are provided or not.
 3. Control wiring that is concealed above readily accessible ceilings such as acoustical lay-in ceilings, need not be run in conduit.
- D. All exposed conduit wiring that is not located above an accessible ceiling shall be installed in conduit. This includes all storage room, mechanical rooms, etc.

3.03 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
 2. Test and adjust controls and safeties.
 3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 4. Pressure test control air piping at 30 psig or 1.5 times the operating pressure for 24 hours, with maximum 5-psig loss.
 5. Pressure test high-pressure control air piping at 150 psig and low-pressure control air piping at 30 psig for 2 hours, with maximum 1-psig loss.
 6. Test calibration of electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
 7. Test each point through its full operating range to verify that safety and operating control set points are as required.
 8. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
 9. Test each system for compliance with sequence of operation.
 10. Test software and hardware interlocks.
- C. DDC Verification:
1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
 2. Check instruments for proper location and accessibility.
 3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
 4. Check instrument tubing for proper fittings, slope, material, and support.
 5. Check installation of air supply for each instrument.
 6. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
 7. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
 8. Check temperature instruments and material and length of sensing elements.

9. Check control valves. Verify that they are in correct direction.
10. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.
11. Check DDC system as follows:
 - a. Verify that DDC controller power supply is from emergency power supply, if applicable.
 - b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
 - c. Verify that spare I/O capacity has been provided.
 - d. Verify that DDC controllers are protected from power supply surges.
- D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.04 ADJUSTING

- A. Calibrating and Adjusting:
 1. Calibrate instruments.
 2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
 3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
 4. Control System Inputs and Outputs:
 - a. Check analog inputs at 0, 50, and 100 percent of span.
 - b. Check analog outputs using milliamper meter at 0, 50, and 100 percent output.
 - c. Check digital inputs using jumper wire.
 - d. Check digital outputs using ohmmeter to test for contact making or breaking.
 - e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
 5. Flow:
 - a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
 - b. Manually operate flow switches to verify that they make or break contact.
 6. Pressure:
 - a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
 - b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.
 7. Temperature:
 - a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
 - b. Calibrate temperature switches to make or break contacts.
 8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
 9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
 10. Provide diagnostic and test instruments for calibration and adjustment of system.
 11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.

B. Adjust initial temperature and humidity set points.

3.05 MANUFACTURER'S FIELD SERVICES

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

B. Provide service engineer to instruct Owner's representative in operation of systems plant and equipment for 1/2 day period.

C. Provide basic operator training for unlimited persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include a minimum of 4 hours dedicated instructor time. Provide training on site.

3.06 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate complete and operating system to Owner.

END OF SECTION

**SECTION 23 31 00
HVAC DUCTS AND CASINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal ducts.
- B. Flexible ducts.
- C. Ducts for laboratory and industrial-grade applications.

1.02 RELATED REQUIREMENTS

- A. Section 23 07 13 - Duct Insulation: External insulation and duct liner.
- B. Section 23 33 00 - Air Duct Accessories.
- C. Section 23 36 00 - Air Terminal Units.
- D. Section 23 37 00 - Air Outlets and Inlets: Fabric air distribution devices.

1.03 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- E. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- G. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.
- C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.06 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A standards.

1.07 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Duct Shape and Material in accordance with Allowed Static Pressure Range:
 - 1. Round: Plus or minus 2 in-wc of galvanized steel.
 - 2. Rectangular: Plus or minus 2 in-wc of galvanized steel.
- C. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Supply Air: 2 in-wc pressure class, galvanized steel.
 - b. General Exhaust Air: 1 in-wc pressure class, galvanized steel.
 - c. Transfer-air and Sound Booths: 1/2 in-wc pressure class, fibrous glass.
 - 2. Low Pressure Service: Up to 2 in-wc:
 - a. Seal: Class C, apply to seal off transverse joints.
 - b. Leakage:
 - 1) Rectangular: Class 24 or 24 cfm/100 sq ft.
 - 2) Round: Class 12 or 12 cfm/100 sq ft.
 - 3. Low Pressure Service: From 2 in-wc to 3 in-wc:
 - a. Seal: Class B, apply sealing of transverse joints and longitudinal seams.
 - b. Leakage:
 - 1) Rectangular: Class 12 or 12 cfm/100 sq ft.
 - 2) Round: Class 6 or 6 cfm/100 sq ft.
- D. Duct Fabrication Requirements:
 - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 2. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
 - 3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
 - 4. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil

- turning vanes of perforated metal with glass fiber insulation.
5. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
 6. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
 7. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.

2.02 METAL DUCTS

A. Material Requirements:

1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B. Metal Duct Coating Requirements:

1. PVC Coating for Steel Duct: 4 mils polyvinyl chloride plastic on both sides.

C. Connectors, Fittings, Sealants, and Miscellaneous:

1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - b. VOC Content: Not more than 250 g/L, excluding water.
 - c. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 - d. For Use with Flexible Ducts: UL labeled.
4. Gasket Tape:
 - a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.

2.03 FLEXIBLE DUCTS

A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form a spiral helix.

1. Insulation: R6 insulation with aluminized vapor barrier film.
2. Pressure Rating: 10 in-wc positive and 5 in-wc negative.
3. Maximum Velocity: 5500 fpm.
4. Temperature Range: Minus 20 degrees F to 250 degrees F.
5. Manufacturers:
 - a. Flexmaster USA, a brand of Masterduct, Inc; Type 1.

B. Acoustic Flexible Ducts: UL 181, Class 1, spun-bond nylon, mechanically fastened and rolled using galvanized steel to form a spiral helix.

1. Insulation: R6 insulation with aluminized vapor barrier film.
2. Pressure Rating: 6 in-wc positive and 5 in-wc negative.

3. Maximum Velocity: 4000 fpm.
 4. Temperature Range: Minus 20 degrees F to 250 degrees F.
 5. Accessories;
 - a. Flex Duct kit. Maximum length 5 feet.
 6. Manufacturers:
 - a. Flexmaster USA, a brand of Masterduct, Inc; Type 6.
 - b. Substitutions: Not permitted.
- C. Medium Pressure Flexible Ducts: UL 181, Class 1, aluminized laminate, mechanically fastened and rolled using galvanized steel to form a spiral helix.
1. Insulation: R6 insulation with aluminized vapor barrier film.
 2. Inner Core: Tri-laminate of polyester, fiberglass, and aluminum foil.
 3. Pressure Rating: 15 in-wc positive and 5 in-wc negative.
 4. Maximum Velocity: 5500 fpm.
 5. Temperature Range: Minus 20 degrees F to 250 degrees F.
 6. Manufacturers:
 - a. Flexmaster USA, a brand of Masterduct, Inc; Type 5.
 - b. Thermaflex; Model MKC.
- D. High Pressure Flexible Ducts: UL 181, Class 1, aluminized tri-laminate, mechanically fastened and rolled using galvanized steel to form a spiral helix.
1. Insulation: Fiberglass insulation with metallic vapor barrier.
 2. Inner Core: Tri-laminate of polyester, fiberglass, and aluminum foil.
 3. Pressure Rating: 20 in-wc positive and 5 in-wc negative.
 4. Maximum Velocity: 5500 fpm.
 5. Temperature Range: Minus 20 degrees F to 250 degrees F.
 6. Manufacturers:
 - a. Flexmaster USA, a brand of Masterduct, Inc; Type 3.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install products following the manufacturer's instructions.
- C. Comply with safety standards NFPA 90A and NFPA 90B.
- D. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- F. PVC Coated Metal Ductwork: Tape with PVC tape.
- G. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.

- H. Duct sizes indicated shall be of sizes indicated. However, necessary changes in shape offsets or crossovers to clear piping, lighting, building construction obstructions, etc. shall be made without additional cost.
- I. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.
- J. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- K. Use double nuts and lock washers on threaded rod supports.
- L. Connect terminal units to supply ducts directly or with 1 foot maximum length of flexible duct. Do not use flexible duct to change direction.
- M. Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

END OF SECTION

**SECTION 23 33 00
AIR DUCT ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Duct access doors.
- D. Duct test holes.
- E. Fire dampers.
- F. Flexible duct connectors.
- G. Flexible duct forming brace.
- H. Volume control dampers.
- I. Miscellaneous Products:
 - 1. Duct opening closure film.
- J. Indoor air quality equipment.

1.02 RELATED REQUIREMENTS

- A. Section 23 31 00 - HVAC Ducts and Casings.
- B. Section 23 36 00 - Air Terminal Units: Pressure regulating damper assemblies.

1.03 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide for shop-fabricated assemblies including volume control dampers and duct test holes. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
- D. Manufacturer's Installation Instructions: Provide instructions for fire dampers.
- E. Project Record Drawings: Record actual locations of access doors and test holes.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 DUCT ACCESS DOORS

- A. Manufacturers:
 - 1. Acudor Products Inc.
 - 2. Ruskin Company.
 - 3. Vent Products.
 - 4. Pottorff
- B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick-fastening locking devices. For insulated ducts, install minimum 1-inch thick insulation with sheet metal cover.
 - 1. Larger Sizes: Provide an additional hinge.
- C. Access doors with sheet metal screw fasteners are not acceptable.

2.03 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.04 FLEXIBLE DUCT CONNECTORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.

2.05 FLEXIBLE DUCTS FORMING BRACE

- A. Manufacturers:
 - 1. Titus; Model FlexRight.
 - 2. Thermaflex; Model FlexFlow Elbow.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. UL Listed. Radius forming brace to hold flexible duct into a 90 degree elbow. Fits flexible duct sizes and diffuser inlets from 4 inches to 16 inches in diameter. Manufactured from copolymer polypropylene.

2.06 VOLUME CONTROL DAMPERS

- A. Manufacturers:
 - 1. Ruskin Company.
 - 2. Pottorff.
 - 3. Greenheck.

- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Single Blade Dampers:
 - 1. Fabricate for duct sizes up to 6 by 30 inch.
 - 2. Blade: 24 gauge, 0.0239 inch, minimum.
- D. Multi-Blade Damper: Fabricate consisting of opposed blades with maximum blade sizes 8 by 72 inches. Assemble center- and edge-crimped blades in prime-coated or galvanized-channel frame with suitable hardware.
 - 1. Blade: 18 gauge, 0.0478 inch, minimum.
- E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
- F. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

2.07 MISCELLANEOUS PRODUCTS

- A. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
 - 1. Thickness: 2 mils.
 - 2. High tack water based adhesive.
 - 3. UV stable light blue color.
 - 4. Elongation Before Break: 325 percent, minimum.

2.08 INDOOR AIR QUALITY EQUIPMENT

- A. Manufacturers:
 - 1. Atmos Aire; Model Matterhorn 1002.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Bipolar ionization intended to be mounted in the supply duct or air handling system. Aiflow capacity up to 5,000 CFM, 6 watt power consumption, UL 867 tested and UL 2998 certified for zero ozone production.
- C. Certifications/Approvals: CE, UKCA and Intertek ETL to UL Standards: 2998, 1995, 867, 867A; CSA 22.2; Zero Ozone Emissions, Heating & Cooling Equipment, Electrostatic Air Cleaners, Commercial/Industrial Indoor Air Quality.
- D. Provide with air proving switch and mounting bracket.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 31 00 for duct construction and pressure class.

- B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 by 8 inch size access door for hand and shoulder access, or as indicated on drawings. Provide minimum 4 by 4 inch size access door for balancing dampers only. Review locations prior to fabrication.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.
- G. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 35 18
LABORATORY EXHAUST SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tubular centrifugal fans.

1.02 RELATED REQUIREMENTS

- A. Section 26 05 83 - Wiring Connections.

1.03 REFERENCE STANDARDS

- A. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc.; 2010.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; 2007 (ANSI/AMCA 210, same as ANSI/ASHRAE 51).
- C. AMCA 260 - Laboratory Methods of Testing Induced Flow Fans for Rating.
- D. AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program; Air Movement and Control Association International, Inc.; <http://www.amca.org/licenses/search.aspx>.
- E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; Air Movement and Control Association International, Inc.; 2008.
- F. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2009, Revision 1 - 2010.
- G. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.
- H. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC; National Electrical Manufacturers Association; 2000 (R2005).
- I. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices; National Electrical Manufacturers Association; 2000.
- J. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2001 (R2006).

1.04 PERFORMANCE REQUIREMENTS

- A. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.
- B. Fabrication: Conform to AMCA 99.
- C. Performance Base: Sea level conditions.
- D. Static and Dynamic Balance: Eliminate vibration or noise transmission to occupied areas.

- E. Fan shall be listed by Underwriters Laboratories (UL/cUL 705) for US and Canada. (if disconnects are supplied by fan manufacturer). Fan shall bear the AMCA certified ratings seal for air and sound performance.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Fan Belts: One set for each individual fan.
- E. QUALITY ASSURANCE
 - 1. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
 - 2. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors, shafts, and bearings from weather and construction dust.

1.07 FIELD CONDITIONS

- A. Permanent fans may not be used for ventilation during construction.

PART 2 PRODUCTS

2.01 TUBULAR CENTRIGUFAL INLINE FANS

- A. Manufacturers:
 - 1. Loren Cook.
 - 2. Greenheck.
 - 3. Twin City Fan.
- B. General:
 - 1. Fan performance data shall follow AMCA Standard Conditions of 0 Ft elevation and 70 Deg F. (Air Density shall be 0.075 lb/ft)
 - 2. Fans selected shall allow for +/- 15% variation of scheduled static pressure and airflow.
 - 3. Fan shall be AMCA Arrangement 9, Belt Drive, Upblast Inline Centrifugal Blower as dictated on the plans and specifications.
 - 4. Fan systems shall incorporate integral lifting lugs for ease of installation.
- C. Fan Housing and Construction:
 - 1. Fan housing shall be a minimum 12 gauge steel construction.
 - 2. Adjustable motor plate, where applicable shall utilize threaded studs for positive belt tensioning.

3. Fan shall be constructed with an integral housing drain to alleviate rainwater.
4. Fan shall contain a bolted and gasketed access door. Access door shall allow for the removal of wheel, shaft and bearings without the removal of the fan from the laboratory exhaust system.
5. Belt driven fan shafts shall be stainless steel and accurately turned, ground and polished. Shafting shall be sized for a critical speed of at least 125% of maximum fan RPM.
6. Unit fasteners exposed to corrosive airstream shall be of stainless steel construction.
7. Unit components fabricated of steel shall be coated with an electrostatically applied, high performance, baked phenolic epoxy powder coating with an ultraviolet protective topcoat. Finish color shall be light gray. Coating thickness shall be 5.0 mils.
8. Coating shall be salt spray tested per ASTM B117 for in excess of 1000 hours without failure, humidity resistance tested per ASTM D2247 for in excess of 1000 hours without failure, and impact resistance tested per ASTM D2794 and shall pass a minimum of 100 in lbs.
9. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure, and maximum fan RPM.
10. Units specified as Spark Resistant Construction shall be constructed to the AMCA Spark Resistant Construction level as dictated on the plans and specifications.
11. Unit shall be shipped in ISTA Certified Transit Tested Packaging.

D. High Plume Discharge Nozzle:

1. Fans shall incorporate a conical discharge nozzle supplied by the fan manufacturer.
2. Discharge nozzle shall be constructed and designed to efficiently handle up to 6000 feet per minute outlet velocity. Nozzle shall not utilize a stack cap nor hinged cover and shall be matched to project specific requirements as noted on the contract drawings.

E. Centrifugal Fan Impeller:

1. Fan impeller shall be nonoverloading, steel centrifugal, backward inclined, flatblade type. Blades shall be continuously welded to the backplate and deep spun inlet wheel shroud.
2. Fan impeller hub shall be keyed and securely attached to the fan shaft.
3. Fan impeller shall be statically and dynamically balanced in accordance with AMCA Standard 20496, "Balance Quality and Vibration Levels for Fans."
4. Fan impeller shall be coated with a finish to match the fan housing.
5. Fan impeller shall be balanced utilizing weights which are welded and coated with chemical resistant coating. Balancing by means of bolts and washers shall not be acceptable.
6. Belt driven fan bearings shall be designed and tested specifically for use in air handling applications. Construction shall be heavy duty regreaseable ball or roller type in a cast iron pillow block housing utilizing concentric mounting locking collars.
7. Belt driven fan bearings shall be selected for a minimum L10 life of not less than 200,000 hours.
8. Belt driven fan units shall have stainless steel lube lines installed from the fan bearings with Zerk fittings to allow for easy lubrication.

F. Fan Motors and Drives:

1. Fan motors shall be premium efficiency, NEMA frame, nominal 1800 or 3600 RPM Totally Enclosed Fan Cooled (TEFC) with a 1.15 service factor.
2. Belt driven fan drive belts shall be oil and heat resistant, non static type. Fixed drives shall be sized for a minimum 1.5 service factor (150% of the motor horsepower) and shall be readily and easily accessible for service, if required.
3. Belt driven fans shall utilize precision machined cast iron type sheaves, keyed and securely attached to the wheel and motor shafts.

G. Accessories:

1. Disconnect Switch - Prewired NEMA 3R.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install fans with resilient mountings and flexible electrical leads.

END OF SECTION

SECTION 23 36 00
AIR TERMINAL UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single-duct terminal units.
 - 1. Variable-volume units.

1.02 RELATED REQUIREMENTS

- A. Section 23 09 13 - Instrumentation and Control Devices for HVAC: Thermostats and actuators.
- B. Section 23 09 23 - Direct-Digital Control System for HVAC.
- C. Section 23 31 00 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

- A. AHRI 880 (I-P) - Performance Rating of Air Terminals; 2017 (Reaffirmed 2023).
- B. ASHRAE Std 130 - Laboratory Methods of Testing Air Terminal Units; 2016.
- C. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- G. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate airflow, static pressure, and NC designation. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
 - 1. Include schedules listing discharge and radiated sound power level for each of the second through sixth-octave bands at inlet static pressures of 1 to 4 in-wc.
- D. Project Record Documents: Record actual locations of units and controls components and locations of access doors required for access of valving.
- E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 SINGLE-DUCT, VARIABLE-VOLUME UNITS

- A. Manufacturers:
1. Titus.
 2. Price Industries, Inc.
 3. Nailor.
 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. General:
1. Factory-assembled, AHRI 880 (I-P) rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.
 2. Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.
- C. Unit Casing:
1. Minimum 22 gauge, 0.0299 inch galvanized steel.
 - a. Assembled with longitudinal lock seam construction.
 - b. Casing leakage to meet ASHRAE Std 130.
 2. Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
 3. Unit Discharge: Rectangular, with slip-and-drive connections.
 4. Acceptable Liners:
 - a. 1/2 inch thick, coated, fibrous-glass complying with ASTM C1071.
 - 1) Secure with adhesive.
 - 2) Coat edges exposed to airstream with NFPA 90A approved sealant.
 - 3) Cover liner with non-porous foil.
 - b. Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.
- D. Damper Assembly:
1. Heavy-gauge, galvanized steel, or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
 2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
 3. Incorporate low leak damper blades for tight airflow shutoff.
- E. Electric Heating Coil:
1. Listed and provided by the terminal unit manufacturer.
 2. Coil Casing: 20 gauge, 0.0359 inch galvanized steel.
 3. Heating Elements: Nickel chrome, supported by ceramic insulators.
 4. Integral Control Panel: NEMA 250, Type 2 enclosure with hinged access door for access to all controls and safety devices.

5. Furnish a primary automatic reset thermal cutout and differential pressure airflow switch for proof of airflow.
 6. Provide the following additional components, mounted and/or wired within the control enclosure:
 - a. Fused or non-fused door interlocking disconnect switch.
 - b. Mercury contactors.
 - c. Fuse block.
 7. Factory wired, including all limit switches and steps of control as indicated on the equipment schedule, with the SSR (solid-state relay) proportional heat control.
 8. Provide SCR (Silicon Controlled Rectifier) controller.
- F. Electrical Requirements:
1. Single-point power connection.
 2. Equipment wiring to comply with requirements of NFPA 70.
- G. Controls:
1. DDC (Direct-Digital Controls):
 - a. Include a factory-installed, unit-mounted, direct-digital controller.
 - b. Bi-directional Damper Actuator: 24 volt, powered closed, spring return open.
 - c. Microprocessor-Based Controller: Air volume controller, pressure-independent with electronic airflow transducers, factory-calibrated maximum and minimum CFMs.
 - 1) Occupied and unoccupied operating mode.
 - 2) Remote reset of temperature or CFM set points.
 - 3) Proportional, plus integral control of room temperature.
 - 4) Monitoring and adjusting with portable terminal.
 - d. See Section 23 09 23.
 2. Airflow Sensor: Differential pressure airflow device measuring total, static, and wake pressures.
 - a. Signal accuracy: Plus/minus five percent throughout terminal operating range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that conditions are suitable for installation.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install the inlets of air terminal units and air flow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.
- C. See drawings for the size(s) and duct location(s) of the air terminal units.
- D. Provide ceiling access doors or locate units above easily removable ceiling components.
- E. Do not support from ductwork.
- F. Connect to ductwork in accordance with Section 23 31 00.
- G. Check and verify location of thermostats with plans and room details before installation. Locate 48 inches above floor. Align with lighting switches.

3.03 ADJUSTING

- A. Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to scheduled percent full flow. Set units with heating coils for minimum scheduled percent full flow.

3.04 CLEANING

- A. Vacuum clean coils and inside of units.

END OF SECTION

**SECTION 23 37 00
AIR OUTLETS AND INLETS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Diffusers:
 - 1. Critical environment diffusers.
- B. Registers/grilles:
 - 1. Wall-mounted, exhaust and return register/grilles.

1.02 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- B. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 SQUARE CEILING DIFFUSERS

- A. Manufacturers:
 - 1. Titus; Model TMS.
 - 2. Price Industries; Model SCD.
 - 3. Nailor Industries; Model RNS3.
- B. Type: Provide square, stamped, multi-core diffuser to discharge air in four way pattern..
- C. Connections: Round.
- D. Frame: Provide inverted T-bar type.
- E. Fabrication: Steel with baked enamel finish.
- F. Color: As selected by Architect/Engineer from manufacturer's standard range.
- G. Accessories: Provide radial opposed blade volume control damper; removable core with damper adjustable from diffuser face.

2.02 WALL EXHAUST AND RETURN REGISTERS/GRILLES

- A. Manufacturers:

1. Titus; Model 350RL.
 2. Nailor Industries; Model 6145H-O.
- B. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, vertical face.
- C. Frame: 1-1/4 inch margin with lay-in panel mounting.
- D. Fabrication: Steel frames and blades, with factory baked enamel finish.
- E. Color: To be selected by Architect/Engineer from manufacturer's standard range.

2.03 CRITICAL ENVIRONMENTS DIFFUSERS

- A. Manufacturers:
1. Titus; Model TriTec.
 2. Price.
 3. Nailor.
- B. Diffusers shall be constructed using a maximum 6 inches tall backpan designed for optimum performance with the diffuser. The backpan shall be divided into two chambers: upper and lower. The backpan shall have integral hanger tabs for securing the unit to the overhead structure. The upper velocity dampening chamber shall be separated from the lower air dampening chamber by a pressure induction plate. All pattern controllers shall be internal to the unit and shall be located in the lower air dampening chamber.
- C. The face of the diffuser shall be 51 percent free area perforated steel with 3/16-inch diameter holes on 1/4-inch staggered centers, and shall match the appearance of industry standard perforated diffusers. The face shall not hang below the ceiling more than 5/8 inches and shall have 6 clips securing it in place. Quarter-turn fasteners on the face are not acceptable. The face, lower air chamber, directional blades, and the pressure induction plate shall be one assembly that can be removed from the face of the unit for sanitizing in an autoclave. The face shall be provided with two retainer cables.
- D. The backpan shall be manufactured of 22-gauge steel. The diffuser must be available for full radial air diffusion (two-way) and/or 1/2 radial air diffusion (one-way).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.
- C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- D. Install diffusers to ductwork with air tight connection.
- E. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

END OF SECTION

SECTION 23 74 33
DEDICATED OUTDOOR AIR UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof-mounted DOAS.

1.02 RELATED REQUIREMENTS

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.
- B. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.
- C. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.
- B. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data with dimensions, duct and service connections, accessories, controls, electrical nameplate data, and wiring diagrams.
- C. Shop Drawings: Indicate dimensions, duct and service connections, accessories, controls, electrical nameplate data, and wiring diagrams.
- D. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.
- E. Operation And Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of documented experience and approved by manufacturer.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturers warranty for refrigerant compressors.
- C. Provide 25 year stainless steel gas heat exchanger warranty.

PART 2 PRODUCTS

2.01 ROOF-MOUNTED DOAS

- A. Manufacturers:
 - 1. Valent.
 - 2. Trane.
 - 3. York.
 - 4. Daikin.
- B. Manufactured Units:
 - 1. Unit shall be fully assembled at the factory and consist of an insulated metal cabinet, downturn outdoor air intake with 2" aluminum mesh filter assembly, evaporator coil, hot gas reheat coil, indirect gas-fired furnace, packaged DX system, phase and brownout protection, motorized dampers, curb assembly, filter assembly intake air, supply air blower assembly, UV lights, and an electrical control center. All specified components and internal accessories factory installed are tested and prepared for single-point high voltage connection.
- C. Cabinet:
 - 1. Materials: Formed, double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
 - a. Unit's exterior shall be supplied from the manufacturer using G60 galvaneal steel with proprietary pre-painted material in the following finish color; Concrete Gray-RAL 7023. This has been subjected to a salt spray test per ASTM-B117 and evaluated using ASTM-D714 and ASTM-D610 showing no observable signs of rust or blistering until reaching 2,500 hours. Uncoated galvanized steel exterior is not acceptable.
 - b. Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.
 - 2. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.
 - a. Materials: Rigid urethane injected foam. Foam board not acceptable.
 - b. Thickness: 2-inch
 - c. Thermal Resistance R-13
 - d. Thermally broken
 - e. Meets UL94HF-1 flame requirements.
 - f. Location and application: Full coverage of entire cabinet exterior to include walls, roof of unit, unit base, and doors.
 - 3. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.
 - a. Thickness: 2-inch
 - b. Thermal Resistance R-8

- c. Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
- d. Location and application: Divider panels between outdoor air and return air/exhaust air streams.
- 4. Roof Insulation: 2-inch fiberglass located above the 1-inch foam panel.
- 5. Access panels / doors: Unit shall be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components. Doors and access panels shall be fabricated of 18 gauge galvanized G90 steel or painted galvanized steel.
- 6. Supply Air blower assemblies: Blower assembly shall consist of an electric motor and direct-drive fans. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motors shall be capable of continuous speed modulation and controlled by a VFD.
- 7. Evaporator Coil: Evaporator coil shall be (silver) soldered or brazed into the compressed refrigerant system. Coil shall be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a galvanized steel frame. If two compressors are used as components of the unit, then the evaporator coil shall be of "interlaced" configuration, permitting independent operation of either compressor without conflict with the other compressor.
- 8. Control panel / connections: Units shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections. RTU shall be equipped with a Unit Non-fused Disconnect Switch.
- 9. Condensate drain pan: Drain Pan shall be an integral part of the unit whenever a cooling option is included. Pan shall be formed of welded austenitic stainless steel sheet material and provided with a welded stainless steel drain connection at the front for connection to a P trap. Drain pan shall be sloped in two directions to provide positive draining and drain connector shall be sealed at penetration through cabinet wall.
- 10. P trap: Contractor shall provide, or fabricate, and install an appropriate P trap, in accordance with all local and area codes and Best Practices.
- 11. Reheat coil with factory installed modulating hot gas reheat valve.
- 12. Indirect gas furnace
 - a. Shall be ETL Certified as a component of the unit.
 - b. Shall have an integral combustion gas blower.
 - c. Shall be ETL Certified for installation downstream of a cooling coil.
 - d. Shall have fault sensors to provide fault conditions to optional digital controller or building controls.
 - e. Shall have 4-pass tubular heat exchangers, constructed of type 409 stainless steel. Heat exchanger tubes shall be installed on the vest plate by means of swaged assembly, welded connections are not acceptable. Heat exchanger tubes shall be supported by a minimum of two fabricated assemblies that support the tubes and also permit expansion and contraction of the tubes.
 - f. Heat exchanger shall have a 25 year extended warranty.
 - g. Furnace control shall be HighTurndown 12:1 Modulating.
 - h. Shall be encased in a weather-tight metal housing with intake air vents. Large, metal lift-off door shall provide easy access to the enclosed vest plate, control circuitry, gas train, burner assembly and exhaust blower.
 - i. Shall have solid state controls permitting stand-alone operation or control by building controllers.

13. Packaged DX System: Unit shall have an integral compressor(s) and evaporator coil located within the weather-tight unit housing. Condenser coils shall be all-aluminum micro channel design appurtenant condenser fan assemblies shall be factory installed as integral subassemblies of the unit and mounted on the unit's exterior. All condenser fan(s) will have an electronically commutated (EC) motor that will modulate to maintain a head pressure set point.] Motors shall be UL Recognized and CSA Certified. The lead refrigerant compressor shall be inverter hermetic scroll-type. Additional compressor shall be single stage hermetic scroll-type paired in tandem with lead inverter compressor. Compressors shall be equipped with liquid line filter drier, electronic expansion valves (EEV) or thermostatic expansion valves (TXV) on non-inverter compressor circuits, manual reset high pressure and low pressure cutouts and all appurtenant sensors, service ports, leak detection sensors and safety devices. Compressed refrigerant system shall be fully charged with R-454B refrigerant. Compressors shall be mounted within an insulated access compartment and on a raised cabinet shelf to reduce sound and vibration. Each compressor shall be factory-equipped with an electric crankcase heater to boil off liquid refrigerant from the oil.
14. Condenser Fans: Fan blades must be constructed of aluminum or a composite material and have a geometry designed and documented to reduce sound and energy when compared to a traditional rectangular blade fan. Traditional rectangular blade fans are not allowed due to increased noise generated and increase power utilized. Condenser fan motors shall be three phase, external rotor, type 56 frame, open air over and shaft up. Each condenser fan motor shall have a vented frame, rated for continuous duty and be equipped with an automatic reset thermal protector. All condenser fan(s) will have an electronically commutated (EC) motor that will modulate to maintain a head pressure set point. Motors shall be UL Recognized and CSA Certified. Single condenser fan running at max RPM and design static pressure shall not exceed an A-weighted sound power level of 75 db at free inlet/outlet test conditions.
15. Packaged DX Control and Diagnostics: The Packaged DX system shall be controlled by an onboard digital controller (DDC) that indicates both owner-supplied settings and fault conditions that may occur. The DDC shall be programmed to indicate the following faults:
- a. Global alarm condition (active when there is at least one alarm)
 - b. Supply Air Proving alarm
 - c. Dirty Filter Alarm
 - d. Compressor Trip alarm
 - e. Compressor Locked Out alarm
 - f. Supply Air Temperature Low Limit alarm
 - 1) Sensor #1 Out of Range (outside air temperature)
 - 2) Sensor #2 Out of Range (supply air temperature)
 - 3) Sensor #3 Out of Range (cold coil leaving air temperature)
16. Phase and brownout protection: Unit shall have a factory-installed phase monitor to detect electric supply phase loss and voltage brown-out conditions. Upon detection of a fault, the monitor shall disconnect supply voltage to all motors.
17. Motorized dampers / Intake Air, Motorized dampers of ultra low leakage type shall be factory installed.
18. Curb Assembly: A curb assembly made of 14 gauge galvanized steel shall be provided by the factory for assembly and installation as part of this division. The curb assembly shall provide perimeter support of the entire unit and shall have duct adapter(s) for supply air. Curb assembly shall enclose the underside of the unit and shall be sized to fit into a recess in the bottom of the

unit. Contractor shall be responsible for coordinating with roofing contractor to ensure curb unit is properly flashed to provide protection against weather/moisture penetration. Contractor shall provide and install appropriate insulation for the curb assembly. The curb shall be the height of 14 in. Horizontal connections through unit only. Plenum curb for horizontal connections is not acceptable.

19. Service receptacle: 120 VAC GFCI service outlet shall be factory-installed and wired. Unit contains a 120 VAC transformer to provide power to service outlet.
20. Hail Guards: Protects the condensing unit from damage due to extreme weather conditions such as hail and flying debris.

D. Blower:

1. Blower section construction, Supply Air: direct drive motor and blower shall be assembled on a 14 gauge galvanized steel platform and shall be equipped with 1.125 inch thick neoprene vibration isolation devices.
2. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.
3. Fan: Direct drive, airfoil plenum fan with aluminum wheel statically and dynamically balanced. Prop or belt-drive fan not acceptable due to low static capabilities.
4. Blades: Welded aluminum blades only.
5. Blower section motor source quality control: Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating".

E. Motors:

1. General: Blower motors greater than 1/2 horsepower shall be "NEMA Premium" unless otherwise indicated. Compliance with EPA's minimum energy-efficiency standards for single speed ODP and TE enclosures is not acceptable. Motors shall be heavy-duty, permanently lubricated type to match the fan load and furnished at the specified voltage, phase and enclosure.
2. Motors shall be 60 cycle, 3 phase 460 volts.

F. Unit Controls:

1. The unit shall be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and sensors or it can be operated as a heating and cooling system controlled by a Building Management System (BMS). This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors.
2. Unit shall incorporate a DDC controller with integral LCD screen that provides text readouts of status. DDC controller shall have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software. DDC controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable. Owner-specified ventilating conditions can be input by means of pushbuttons.
3. Unit supply fan shall be configured for variable air volume.
4. Outside Air / Return Air damper control shall be configured for network control.
5. Temperature control shall be configured for discharge air control.
6. Hot gas reheat control shall be configured for outside air dewpoint control and space relative humidity control.

7. Operating protocol: The DDC shall be factory-programmed for BACNet/IP or BACNet MS/TP.
8. Variable Frequency Drive (VFD): unit shall have factory installed variable frequency drive for modulation of the supply air blower assembly. The VFD shall be factory-programmed for unit-specific requirements and shall not require additional field programming to operate.
9. Airflow monitoring required in the supply airstreams.
10. Unit shall be provided with a space thermostat measuring temperature and relative humidity. Thermostat shall have an LCD display and push buttons allowing for setpoint adjustments.
11. Controller shall auto trend 7 days of operating points for trouble shooting purposes.
12. Embedded web page with complete web user interface to allow full remote control and monitoring of unit.
13. Alarm Recording: Controller shall store all alarm events for download.
14. Alarm Operating Snapshot: Controller shall store operating inputs and outputs at time of alarm.

G. Filters

1. Unit shall have permanent 2 inch (50.8 mm) aluminum filters located in the outdoor air intake and shall be accessible from the exterior of the unit. MERV 8 and MERV 13 disposable pleated filters shall be provided in the supply final air stream.
2. A dirty filter alarm shall be included with the unit.

H. Electrical: 480 VAC, 3-phase, 60 Hz, single point to factory-mounted nonfused disconnect switch internally wired into motors and compressors, and other powered components including system safeties.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide flexible duct connections on inlet and outlet from unit; see Section 23 33 00.
- C. Provide p-trap on condensate drain outlets and pipe to nearest roof drain.

3.02 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A / E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.03 START-UP SERVICE

- A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, install clean filters. Measure and record electrical values for voltage and amperage.

END OF SECTION

SECTION 26 05 00
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

- A. Basic Electrical Requirements and materials specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements. Section includes:
 - 1. Electrical Identification.
 - 2. Minor Demolition.
 - 3. Conductors and Devices.
 - 4. Raceways and Boxes.
 - 5. Supporting Devices.

1.03 REGULATORY REQUIREMENTS

- A. Conform to NFPA 70 - National Electrical Code, latest edition with amendments as adopted by the City of St. Charles, IL.
- B. Install electrical Work in accordance with the NECA Standard of Installation.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store and protect all materials as specified under the provisions of Section 01 60 00 and as specified herein.
- B. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- C. Ship products to the job site in their original packaging. Receive and store products in a suitable manner to prevent damage or deterioration. Keep equipment upright at all times.
- D. Investigate the spaces through which equipment must pass to reach its final destination. Coordinate with the manufacturer to arrange delivery at the proper stage of construction and to provide shipping splits where necessary.

1.05 PROJECT/SITE CONDITIONS

- A. Install work in locations shown on Drawings, unless prevented by Project conditions. Drawings have omitted certain branch circuitry in areas for ease of reading. All branch circuitry is to be provided by Contractor.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from Architect/Engineer before proceeding as specified under modification procedures.

1.06 QUALITY ASSURANCE

- A. Provide Work as required for a complete and operational electrical installation.

- B. All products shall be designed, manufactured, and tested in accordance with industry standards. Standards, organizations, and their abbreviations as used hereafter, include the following:
 - 1. American National Standards Institute, Inc (ANSI).
 - 2. American Society for Testing and Materials (ASTM).
 - 3. National Electrical Manufacturers Association (NEMA).
 - 4. Underwriters Laboratories, Inc. (UL).
- C. Install all Work in accordance with the NECA Standard of Installation.

1.07 SUBMITTALS

- A. Submit all requested items in Division 26 Sections under provisions of Section 01 30 00.

1.08 SUBSTITUTIONS

- A. Substitutions will be considered only as allowed within the provisions of Section 01 60 00.

1.09 PROJECT RECORD DOCUMENTS

- A. Cooperate and assist in the preparation of project record documents under the provisions of Section 01 78 00.

1.10 TEMPORARY UTILITIES

- A. Arrange with utility company and provide temporary lighting and power necessary for building construction and temporary structures. Perform work in accordance with Section 01 51 00 requirements.

1.11 PROJECT MANAGEMENT AND COORDINATION

- A. Proper project management and coordination is critical for a successful project. Manage and coordinate the Work with all other trades in accordance with Section 01 30 00 requirements. Reliance on the Drawings and Specifications only for exact project requirements is insufficient for proper coordination.

PART 2 PRODUCTS

2.01 WIRING METHODS

- A. All locations: Building wire in raceway.
- B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
 - 1. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet. Use minimum #10 AWG conductor wire in all the following locations:
 - a. All programmable panel branch circuits (larger where indicated).
 - b. All emergency lighting and exit branch circuits.

2.02 WIRE AND CABLE

- A. Manufacturers:
 - 1. Okonite.
 - 2. Southwire.
 - 3. Collyer.

B. Building Wire:

1. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation.
2. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, stranded conductor (solid for device terminations).
3. Control Circuits: Copper, stranded conductor, 600 volt insulation.
4. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
5. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.
6. Use conductor not smaller than 12 AWG for power and lighting circuits.
7. Use conductor not smaller than 16 AWG for control circuits.

C. Locations:

1. Concealed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
2. Exposed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
3. Above Accessible Ceilings: Use only building wire with Type THHN insulation in raceway.
4. Wet or Damp Interior Locations: Use only building wire with Type THWN insulation in raceway.
5. Exterior Locations: Use only building wire with Type XHHW insulation in raceway.
6. Underground Installations: Use only building wire with Type XHHW insulation in raceway.

2.03 RACEWAY REQUIREMENTS

A. Use only specified raceway in the following locations:

1. Branch Circuits and Feeders:
 - a. Concealed Dry Interior Locations: Electrical metallic tubing.
 - b. Exposed Dry Interior Finished Locations: Electrical metallic tubing.
 - c. All other locations: Galvanized Rigid Metallic Conduit.

B. Size raceways for conductor type installed.

1. Minimum Size Conduit Homerun to Panelboard: 3/4-inch.

2.04 METALLIC CONDUIT AND FITTINGS

A. Conduit:

1. Rigid Steel Conduit: ANSI C80.1.
2. Electrical metallic tubing: ANSI C80.3.
3. Flexible Conduit: UL 1, zinc-coated steel.
 - a. Liquidtight Flexible Conduit: UL360. Fittings shall be specifically approved for use with this raceway.

B. Conduit Fittings:

1. Metal Fittings and Conduit Bodies: NEMA FB 1.
 - a. EMT fittings: Use set-screw indentor-type fittings.

2.05 CONDUIT HANGERS

A. Manufacturers:

1. Minerrallac Electric Company.
2. Substitutions: Or Approved Equal.

B. Description:

1. Standard conduit hanger, zinc-plated steel with bolts.
2. Threaded rod and hardware: Plated finish, size and length as required for loading and conditions.

2.06 BEAM CLAMPS

A. Manufacturers:

1. Appleton.
2. Midwest.
3. Racor.

B. Description: Malleable beam clamp, zinc plated steel.

2.07 ELECTRICAL BOXES

A. Manufacturers:

1. Racor.
2. Steel City.
3. Appleton.
4. Substitutions: Or Approved Equal.

B. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel, suitable for installation in masonry:

C. Equipment Support Boxes: Rated for weight of equipment supported; include 2 inch male fixture studs where required.

D. Wet Location Outlet Boxes: Cast aluminum: Cast alloy, deep type, gasket cover, threaded hubs.

2.08 PENETRATION SEALANTS

A. Fire-rated assemblies: Provide firestopping of all penetrations made by Work under this Contract.

B. Thermal and Moisture Protection: Provide thermal and moisture protection made by Work under this Contract of all exterior wall, floor and roof penetrations.

2.09 MOTION SENSORS

A. Manufacturers:

1. Leviton
2. Hubbell
3. Approved Equal

B. Ceiling Mounted.

1. Dual technology (passive infrared and ultrasonic), 24VDC sensor with unobtrusive appearance and 360 degrees of coverage.
 - a. Provide type/quantity of motion sensors to meet square foot coverage requirements.
2. Provide power pack for 24VDC controls and switching of 120/277V circuits. Minimum quantity of sensors per power pack: 2.
3. Sensor shall continuously monitor space to identify usage patterns. Unit shall automatically adjust time delay and sensitivity settings for optimal performance and energy efficiency.
4. Time delay settings: Auto, fixed (5,10,15,20 or 30 minutes).
5. Sensitivity settings: Auto, reduced sensitivity (passive infrared) variable (ultrasonic).

6. (1) N/O and (1) N/C output.

2.10 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
 1. Each electrical distribution and control equipment enclosure.
- C. Letter Size:
 1. Use 1/8 inch letters for identifying individual equipment and loads.
 2. Use 1/4 inch letters for identifying grouped equipment and loads.
- D. Labels: Embossed adhesive tape, with 3/16 inch white letters on a black background. Use only for identification of individual wall switches and receptacles and control device stations.

2.11 WIRE AND CABLE MARKERS

- A. Manufacturers:
 1. Brady Model PCPS.
 2. Panduit Model PCM.
 3. T & B Model WM.
- B. Description: Cloth type wire markers.
- C. Locations: Each conductor at panelboard gutters, pull boxes, and each load connection.
- D. Legend:
 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2.12 CONDUIT MARKERS

- A. Location: Furnish markers for each conduit longer than 6 feet.
- B. Spacing: 20 feet on center.
- C. Color:
 1. 480 Volt System: Orange
 2. 208 Volt System: Black
 3. Fire Alarm System: Red.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Demolition Drawings are based on casual field observation and are intended to identify the limits of the construction site. Remove all electrical systems in their entirety in proper sequence with the Work.
- B. Disconnect electrical systems in walls, floors, and ceilings for removal.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

- D. Existing Electrical Service and Emergency Electrical Service: Maintain existing system in service. Disable system only to make switchovers and connections. Obtain permission from Owner and Architect at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- E. Beginning of demolition means installer accepts existing conditions.
- F. Verify that supporting surfaces are ready to receive work.
- G. Electrical boxes are shown on Drawings, in approximate locations, unless dimensioned.
 - 1. Obtain verification from Architect/Engineer for locations of outlets throughout prior to rough-in.
- H. Degrease and clean surfaces to receive wire markers.
- I. Verify that interior of building is physically protected from weather.
- J. Verify that mechanical work which is likely to injure conductors has been completed.
- K. Completely and thoroughly swab raceway system before installing conductors.

3.02 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove all existing electrical installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Relocate existing fire alarm devices affected by wall, ceiling and floor demolition.
- E. Repair adjacent construction and finishes damaged during demolition and extension work.
- F. Properly dispose of all ballast to approved ballast recycler. Do not land fill ballasts.

3.03 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using screws.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.
- E. Neatly train and secure wiring inside boxes, equipment, and panelboards.
- F. Use wire pulling lubricant for pulling 4 AWG and larger wires.
- G. Route wire and cable as required to meet project conditions.
 - 1. Wire and cable routing indicated is approximate unless dimensioned.
 - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- H. Pull all conductors into raceway at same time.

- I. Protect exposed cable from damage.
- J. Neatly train and lace wiring inside boxes, equipment and panelboards.
- K. Support cables above accessible ceilings to keep them from resting on ceiling tiles.
- L. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.
- M. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- N. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- O. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- P. Do not use powder-actuated anchors.
- Q. Do not drill or cut structural members.
- R. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- S. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- T. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
- U. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- V. Terminate spare conductors with electrical tape.
- W. Do not share neutral conductor on load side of dimmers.

END OF SECTION

SECTION 26 05 33.23
SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface raceway systems.

1.02 RELATED REQUIREMENTS

- A. Section 26 27 26 - Wiring Devices: Receptacles.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate rough-in locations of outlet boxes and conduit as required for installation of raceways provided under this section.
 - 3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
 - 4. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install raceways until final surface finishes and painting are complete.
 - 2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
 - 1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 RACEWAY REQUIREMENTS

- A. Provide all components, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.02 SURFACE RACEWAY SYSTEMS

- A. Manufacturers:
 - 1. Wiremold, a brand of Legrand North America, Inc; ALA4800 SERIES: www.legrand.us/.
 - 2. Hubbell Incorporated: www.hubbell.com/.
 - 3. Panduit, Inc: www.Panduit.com/.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Surface Metal Raceways: Listed and labeled as complying with UL 5.
- C. Surface Raceway System:
 - 1. Raceway Type: Two channel, anodized aluminum.
 - 2. Size: 6 by 2 inches nominal.
 - 3. Length: As indicated on the drawings.
 - 4. Accessories: Transition fittings, divider plates, device mounting straps, couplings, combination power/data cover plates, end plates and all other accessories necessary for a complete system in locations indicated on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.
- C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install raceways plumb and level.

D. Secure and support raceways at intervals complying with NFPA 70 and manufacturer's requirements.

E. Close unused raceway openings.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect raceways for damage and defects.

C. Correct wiring deficiencies and replace damaged or defective raceways.

3.04 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION

SECTION 26 05 83
WIRING CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical connections to equipment and devices not and integral part of the electrical distribution system.

1.02 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Provide conduit rough-in and electrical connection to powered equipment and devices identified in the Project Manual and on the Drawings. Refer specifically, but not limited to, these Specification Sections for further information:
 - 1. Section 01 10 00 - Summary: Furniture and equipment furnished or provided by Owner or by others under separate contract.
 - 2. Section 08 71 00 - Door Hardware: Components electrically operated and/or controlled.
 - 3. Section 11 53 00 - Laboratory Equipment: Motorized or electrified equipment.
 - 4. Section 23 09 13 - Instrumentation and Control Devices for HVAC.
 - 5. Section 23 09 23 - Direct-Digital Control System for HVAC.
 - 6. Section 23 35 18 - Laboratory Exhaust Systems.
 - 7. Section 23 36 00 - Air Terminal Units.
 - 8. Section 23 74 33 - Dedicated Outdoor Air Units.
- B. Coordination: Determine connection locations and requirements for furniture, equipment and devices furnished or provided under other sections.
 - 1. Do not rely solely on the Drawings and Project Manual for execution of the Work of this Section.
 - 2. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions.
 - 3. Include necessary field evaluation time to inspect connection requirements.
 - 4. Coordinate with other trades to determine exact rough-in requirements.
- C. Sequencing:
 - 1. Install rough-in of electrical connections before installation of furniture and equipment is required.
 - 2. Make electrical connections before required start-up of equipment.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 22 00
LOW-VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Installation of Owner furnished transformer.

1.02 RELATED REQUIREMENTS

- A. Section 26 24 16 - Panelboards.

1.03 REFERENCE STANDARDS

- A. IEEE C57.94 - IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type Distribution and Power Transformers; 2015.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 409 - Standard for Installing and Maintaining Dry-Type Transformers; 2015.
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 1561 - Standard for Dry-Type General Purpose and Power Transformers; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with placement of supports, anchors, etc. required for mounting.
 - 4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 5. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 STORAGE AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that suitable support frames and anchors are installed where required and that mounting surfaces are ready to receive transformers.
- C. Perform pre-installation tests and inspections on transformers per manufacturer's instructions and as specified in NECA 409. Correct deficiencies prior to installation.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install transformers in accordance with NECA 409 and IEEE C57.94.
- D. Use flexible conduit, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.
- E. Arrange equipment to provide minimum clearances as specified on transformer nameplate and in accordance with manufacturer's instructions and NFPA 70.
- F. Install transformers plumb and level.
- G. Transformer Support:
 - 1. Provide required support and attachment26 05 29, where not furnished by transformer manufacturer.
 - 2. Use integral transformer flanges, accessory brackets furnished by manufacturer, or field-fabricated supports to support wall-mounted transformers.
 - 3. Use trapeze hangers assembled from threaded rods and metal channel (strut) to support suspended transformers. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- H. Provide grounding and bonding.
- I. Remove shipping braces and adjust bolts that attach the core and coil mounting bracket to the enclosure according to manufacturer's recommendations in order to reduce audible noise transmission.
- J. Where not factory-installed, install lugs sized as required for termination of conductors as indicated.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS Sections 7.2.1.1 and 7.2.1.2. Tests and inspections listed as optional are not required.

3.04 ADJUSTING

- A. Measure primary and secondary voltages and make appropriate tap adjustments.
- B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

- A. Clean dirt and debris from transformer components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 24 16 PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Lighting and appliance panelboards.
- B. Overcurrent protective devices for panelboards.

1.02 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendment (2017).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- E. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
- F. NEMA PB 1 - Panelboards; 2011.
- G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
- H. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- L. UL 67 - Panelboards; Current Edition, Including All Revisions.
- M. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.

4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
 1. Include characteristic trip curves for each type and rating of overcurrent protective device upon request.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- F. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.07 WARRANTY

- A. Remote Power Switching System at Programmable Panelboards:
 1. Provide five years manufacturer's warranty.

2. Warranty: Include coverage of microprocessor, breakers, and interface module.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of design: Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Siemens Industry, Inc: www.usa.siemens.com/#sle.
- D. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating as indicated on the drawings.
 - 2. Listed series ratings are acceptable, except where not permitted by motor contribution according to NFPA 70.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 - 2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 - c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.
 - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.

- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- J. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.
- K. Load centers are not acceptable.
- L. Provide terminals rated and U.L. listed for use with 75 degrees C temperature rated conductors.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Copper suitable for terminating copper conductors only.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
 - 2. Phase and Neutral Bus Material: Copper.
 - 3. Ground Bus Material: Copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
 - 1. UL listed for intended branch circuits:
 - a. Lighting SWD.
 - b. Heating, Ventilating and Air Conditioning: HACR rated.
 - c. Shunt Trip Device: 120 volts, AC.
 - d. Undervoltage Trip Device: 120 volts, AC.
 - e. Auxiliary Switch: 120 volts, AC.
 - f. Alarm Switch: 120 volts, AC.
 - g. Electrical Operator: 120 volts, AC.
 - h. Handle Lock: Include provisions for sealing.
 - i. Provide mechanical trip device.
 - j. Provide insulated ground lug in each enclosure.
 - k. Provide products suitable for use as service entrance equipment where so applied.
- E. Enclosures:
 - 1. Provide surface-mounted or flush-mounted enclosures as indicated.
 - 2. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 - 2. Interrupting Capacity:

- a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
- b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
- c. Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.
- 3. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
- 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
- 5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment.
- F. Install panelboards plumb.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.
- J. Install all field-installed branch devices, components, and accessories.
- K. Provide filler plates to cover unused spaces in panelboards.
- L. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

- M. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- N. Provide engraved plastic nameplates.
- O. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as SPARE.
 - 1. Minimum spare conduits: 5 empty 3/4 inch.
- P. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.
- Q.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1. Tests listed as optional are not required.
- D. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.05 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 27 26 WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.
- D. Motion Sensors.

1.02 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h, with Amendments (2017).
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification); 2014g, with Amendment (2017).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
 - 3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 - 4. Notify Architect/Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.
- B. Sequencing:
 - 1. Do not install wiring devices until final surface finishes and painting are complete.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Operation and Maintenance Data:
 - 1. GFCI Receptacles: Include information on status indicators.
- E. Project Record Documents: Record actual installed locations of wiring devices.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
- D. Provide tamper resistant receptacles for receptacles installed in dwelling units.
- E. Provide GFCI protection for receptacles installed within 6 feet of sinks.
- F. Provide GFCI protection for receptacles installed in kitchens.
- G. Provide GFCI protection for receptacles serving electric drinking fountains.
- H. Unless noted otherwise, do not use combination switch/receptacle devices.

2.02 ALL WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- B. Finishes:

1. All Wiring Devices: Ivory with ivory aluminum wall plate unless otherwise indicated.
2. Wiring Devices Installed in Finished Spaces: Ivory with ivory aluminum wall plate unless otherwise indicated.

2.03 WALL SWITCHES

- A. Manufacturers:
 1. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 2. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.04 RECEPTACLES

- A. Manufacturers:
 1. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 2. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
 3. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
 1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.

2.05 WALL PLATES

- A. Manufacturers:
 1. Hubbell Incorporated: www.hubbell-wiring.com/#sle.
 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 3. Lutron Electronics Company, Inc: www.lutron.com/#sle.

4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Wall Plates: Comply with UL 514D.
 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 2. Size: Standard.
 3. Screws: Metal with slotted heads finished to match wall plate finish.
 4. Paintable metallic.

2.06 MOTION SENSORS

- A. Manufacturers:
 1. Leviton
 2. Hubbell
 3. Lutron
 4. Approved Equal
- B. Ceiling Mounted.
 1. Dual technology (passive infrared and ultrasonic), 24VDC sensor with unobtrusive appearance and 360 degrees of coverage.
 - a. Provide type/quantity of motion sensors to meet square foot coverage requirements.
 2. Provide power pack for 24VDC controls and switching of 120/277V circuits. Minimum quantity of sensors per power pack: 2.
 3. Sensor shall continuously monitor space to identify usage patterns. Unit shall automatically adjust time delay and sensitivity settings for optimal performance and energy efficiency.
 4. Time delay settings: Auto, fixed (5,10,15,20 or 30 minutes).
 5. Sensitivity settings: Auto, reduced sensitivity (passive infrared) variable (ultrasonic).
 6. (1) N/O and (1) N/C output.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes as required for installation of wiring devices provided under this section.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.
- I. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- J. Install wall switches with OFF position down.
- K. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- L. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- M. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- N. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- O. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch and wall dimmer with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.

- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.05 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust presets for wall dimmers according to manufacturer's instructions as directed by Architect/Engineer.

3.06 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

**SECTION 26 28 16.16
ENCLOSED SWITCHES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed safety switches.

1.02 REFERENCE STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- B. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
- C. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.
- C. Project Record Documents: Record actual locations of enclosed switches.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com/#sle.
- B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- C. Siemens Industry, Inc: www.usa.siemens.com/#sle.
- D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- J. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
- K. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- L. Heavy Duty Switches:
 - 1. Comply with NEMA KS 1.
 - 2. Conductor Terminations:
 - a. Lug Material: Copper suitable for terminating copper conductors only.
 - 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

- M. Nonfusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch, horse power rated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Install enclosed switches plumb.
- E. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- F. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.04 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 27 05 28.29
HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Cable Hangers.
 - 2. Ladder Rack.
 - 3. Support Hardware.

1.02 REFERENCES

- A. NECA - National Contractors Association.
- B. ANSI/NFPA 70 - National Electrical Code.
- C. EIA/TIA 569: Commercial building Standard for Pathways and Spaces.
- D. NEMA VE1 - Metallic Cable Tray Systems.
- E. NEMA VE2 - Metal Cable Tray Installation Guidelines.

1.03 SUBMITTALS

- A. Shop Drawings: Provide shop drawings for riser cable hanger (multi-tier tray system). Indicate all construction details with cross section of all proposed systems indicated.
 - 1. Design Requirements: Provide conductor fill requirements for cable tray fill after all low voltage system shop drawings have been prepared.
- B. Product Literature: Provide product literature for all system components.

PART 2 PRODUCTS

2.01 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Provide adequate corrosion resistance.
- B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
- C. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Use expansion anchors.
 - 2. Steel Structural Elements: Use beam clamps.
 - 3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.
 - 5. Solid Masonry Walls: Use expansion anchors and preset inserts.
 - 6. Sheet Metal: Use sheet metal screws.
 - 7. Wood Elements: Use wood screws.

2.02 LADDER RACK

- A. Manufacturers:
 - 1. Square D.

2. B-Line.

B. Description: NEMA VE-1 Class 8A, ladder cable tray, aluminum, 6" rung spacing, 18" width.

1. Accessories: Grounding clamp, ladder drop-out bushing, cable ties, conduit to tray adapter.

2. Support: Wall-bracket and trapeze with threaded rod and clamps.

2.03 CABLE HANGERS - HORIZONTAL CABLING

A. Manufacturers:

1. Caddy.

2. Panduit.

3. Saunder.

B. Description: EIA/TIA 569-A compliant, wall-mount, j-hook type fastener. Size per intended cable installation plus 50% spare capacity.

2.04 CABLE HANGERS - RISER CABLING

A. Manufacturers:

1. B-Line Multi-Tier Half Track System or equal.

B. Description:

1. Load Depth: 3 (three) inches

2. Material: Aluminum.

3. Rung Spacing: 18 (eighteen) inches.

4. Rung Width:

a. Top Two Rungs: 3 (three) inches.

b. Bottom Two Rungs: 9 (nine) inches.

5. Type: Four tier.

6. Length: Continuous for length of corridor, as indicated.

7. Mounting: Wall mount, expansion anchor.

8. Accessories: Cable Drop Outs, plastic rail end caps, couplings. Blind end plates, horizontal barriers with clips (between systems).

2.05 BEAM CLAMPS

A. Manufacturers:

1. Appleton.

2. Midwest.

3. Raco.

B. Description: Malleable beam clamp, zinc plated steel.

2.06 BACKBOARDS

A. Material: Plywood.

B. Description: 4'x8'x3/4" AC fire rated plywood. Cut to fit.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions and in compliance with EIA/TIA-569 requirements.
- B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- D. Do not use powder-actuated anchors.
- E. Do not drill or cut structural members.
- F. Install ladder rack in accordance with EIA/TIA 569 and NEMA VE2 standards.
- G. Route cables in concealed and accessible locations.

END OF SECTION

SECTION 27 05 53
IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Labels.
 - 2. Color Coding.
 - 3. Nomenclature.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. EIA/TIA 606 - The Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings.

PART 2 PRODUCTS

2.01 COLOR CODING

- A. Wire and Cable shall be factory color-coded by integral pigmentation with a separate color as scheduled hereafter.
- B. Color Coding Schedule:
 - 1. Horizontal Data Cable and Jacks (UTP): Blue.
 - 2. Backbone Data Cable (UTP): White.
 - 3. Backbone Fiber Optic Cable: Orange
 - 4. Horizontal Phone Cable and Jacks: Beige/Brown.
 - 5. Backbone Phone Cable: Grey.

2.02 LABELS

- A. Manufacturers:
 - 1. Panduit.
 - 2. Leviton.
 - 3. Siecor
- B. Cable and patch panel labels: Self-laminating adhesive polyester laser printer label. White background with black lettering. Nomenclature as specified hereafter.
- C. Cable Bundles: Non adhesive polyester laser labels with cable ties. White background with black lettering. Nomenclature as specified hereafter.
- D. Punch Down Blocks: Non-adhesive laser printer label. White background with black lettering.

2.03 NOMENCLATURE

- A. Outlets: Arrangement and inscriptions as specified herein and indicated on Drawings.
 - 1. Faceplate Label: Room Number-Outlet Tag (e.g. 202S1)
 - 2. Jack: Jack type- above (e.g. "Data", "Phone", "Video"), Port designation-below (e.g. "A").

- B. Horizontal Cable: IDF Closet-Room Number-Outlet Tag-Port Designation (e.g. "M-202-S1-A")
 - 1. Cable bundles: IDF Closet-Room Numbers (e.g. M-202,6,8,12,14,18)
- C. Rack: Sequentially by number (e.g. "1")
- D. Rack Ports and Punch Down Blocks: Room Number-Outlet Tag-Port Designation (e.g. "202-S1-A").
- E. Backbone and Fiber Optic Cable: DF Closet(from)-IDF Closet(to)-pair number (e.g. M-1-1).

2.04 WARNING LABELS

- A. Manufacturers:
 - 1. Panduit.
 - 2. Brady.
 - 3. Siecor.
- B. Fiber Optic Cable: Vinyl, black lettering with yellow background label as "FIBER OPTIC".
- C. Fiber Optic Cable Terminations: Polyester, red and black lettering, silver background danger label conforming with TIA/EIA Section 6.2.4.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.02 APPLICATION

- A. Install labels parallel to equipment lines.
- B. Locate labels at each cable end and bundle. Locate additional label at midpoint of each cable bundle and each cable pull location.
- C. Pre-print all labels at minimum 600 dpi resolution .
- D. Replace illegible or missing labels (for any reason) at contractor's sole expense up to final payment.
- E. Label all components in conformance with EIA/TIA 606 standard.
- F. Locate fiber optic warning label at twenty foot intervals along the length of the cable run.
 - 1. Locate fiber optic danger labels at each termination hardware location.

END OF SECTION

**SECTION 27 10 00
STRUCTURED CABLING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Communications system design requirements.
- B. Copper cable and terminations.
- C. Communications equipment room fittings.
- D. Communications outlets.
- E. Communications identification.

1.02 RELATED REQUIREMENTS

- A. Section 26 05 00 - Basic Electrical Requirements.

1.03 REFERENCE STANDARDS

- A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.
- B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; 2005e.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2020.
- E. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2018d, with Addenda (2020).
- F. TIA-569 - Telecommunications Pathways and Spaces; 2019e.
- G. TIA-568-C.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2009, with Addendum (2016).
- H. TIA-569-D - Telecommunications Pathways and Spaces; 2015d, with Addendum (2016).
- I. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2021d.
- J. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d.
- K. TIA-607-C - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2015c, with Addendum (2017).
- L. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- M. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- N. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- C. Field Test Reports.

PART 2 PRODUCTS

2.01 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 - 1. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
 - 2. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 - 3. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.02 COPPER CABLE AND TERMINATIONS

- A. Manufacturers:
 - 1. CommScope: www.commscope.com/#sle.
 - 2. General Cable Technologies Corporation: www.generalcable.com/#sle.
 - 3. Siemon Company: www.siemon.com/#sle.
 - 4. Hubbell Premise Wiring : www.Hubbell.com.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Copper Horizontal Cable:
 - 1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
 - 2. Cable Type - Voice and Data: TIA-568.2 Category 6 UTP (unshielded twisted pair); 23 AWG.
 - 3. Cable Capacity: 4-pair.

4. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
5. Cable Jacket Color - Voice and Data Cable: Blue.
6. Product(s):
 - a. CommScope; SYSTIMAX Twisted Pair Cables; GigaSPEED XL Category 6 U/UTP Cable: www.commscope.com/#sle.
 - b. General Cable Technologies Corporation; GenSPEED Cables: www.generalcable.com/#sle.
 - c. Hubbell Premise Wiring; NEXTSPEED Link 6 UTP Cables: www.hubbell.com.
- C. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- D. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
 1. Performance: 500 mating cycles.
 2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.
 3. Product(s):
 - a. Hubbell Premise Wiring; Xcelerator Category 6 Jack: www.hubbell.com.

2.03 COMMUNICATIONS OUTLETS

- A. Manufacturers:
 1. Hubbell Premise Wiring: www.hubbell.com.
- B. Outlet Boxes: Comply with Section 26 05 00 - Basic Electrical Requirements.
 1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
- C. Wall Plates:
 1. Comply with system design standards and UL 514C.
 2. Accepts modular jacks/inserts.
 3. Capacity:
 - a. Data or Combination Voice/Data Outlets: 2 ports.
 4. Wall Plate Material/Finish - Flush-Mounted Outlets: High impact thermoplastic, color to be selected.
 5. Product(s):
 - a. Hubbell Premise Wiring; netSELECT Wallplates: www.hubbell.com.

2.04 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. Comply with Communication Service Provider requirements.

3.02 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
 - 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 - 2. Do not over-cinch or crush cables.
 - 3. Do not exceed manufacturer's recommended cable pull tension.
 - 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
 - 1. At Distribution Frames: 120 inches.
 - 2. At Outlets - Copper: 12 inches.
- C. Copper Cabling:
 - 1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
 - 2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
 - 3. Use T568B wiring configuration.
- D. Identification:
 - 1. Use wire and cable markers to identify cables at each end.
 - 2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.
 - 3. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Comply with inspection and testing requirements of specified installation standards.
- C. Visual Inspection:
 - 1. Inspect cable jackets for certification markings.
 - 2. Inspect cable terminations for color coded labels of proper type.
 - 3. Inspect outlet plates and patch panels for complete labels.
- D. Testing - Copper Cabling and Associated Equipment:
 - 1. Test backbone cables after termination but before cross-connection.
 - 2. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
 - 3. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.
- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

SECTION 28 10 00 ACCESS CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Access control system requirements.
- B. Security Management System (SMS).
- C. Security field controllers.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 71 00 - Door Hardware: Electrically operated door hardware, for interface with access control system.
- C. Section 23 09 23 - Direct-Digital Control System for HVAC: Building automation system.
- D. Section 26 05 83 - Wiring Connections

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 294 - Access Control System Units; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other installers to provide suitable door hardware as required for both access control functionality and code compliance.
 - 2. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 3. Coordinate the work with other installers to provide power for equipment at required locations.
 - 4. Notify Architect/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Preinstallation Meetings:
 - 1. Conduct meeting with facility representative to review reader and equipment locations.
 - 2. Conduct meeting with facility representative and other related equipment manufacturers to discuss access control system interface requirements.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for

interface with other systems.

- C. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.
- D. Test Reports: Indicate satisfactory completion of required tests and inspections.
- E. Certification: The installer shall Furnish, in writing, proof of compliance with system manufacturer's service and installation certification programs.
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of system.
- G. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.
- H. Operation Data: Operating instructions.
- I. Maintenance Data: Maintenance and repair procedures.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. One (1) credential (key card or fob as directed by Owner) per authorized employee plus 50 additional credentials, preprogrammed to be fully functional within the SMS.
 - a. Deliver blank credentials to Owner as directed.

1.06 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70.
 - 2. The requirements of the local authorities having jurisdiction.
 - 3. Applicable TIA/EIA standards.
- B. Conform to requirements of NFPA 70.
- C. Manufacturer Qualifications: Firms with a minimum of 5 years experience in manufacturing equipment of the type and capacities indicated that have a record of successful in-service performance. The prime system manufacturer shall maintain a service center capable of providing training, parts, and emergency maintenance and repairs for the overall system.
- D. Manufacturer's Field Representative: Factory representative to be fully certified for all system components and possess minimum 2 years document system design / application experience.
- E. Installer Qualifications: Factory authorized sales and service representative for the system submitted. Installer must be capable of providing emergency maintenance and repairs of the overall system at the project site within 24 hours maximum response time. The installer shall have a local office staffed with factory trained technicians, fully capable of supervising installation, system start-up, providing training and servicing of both hardware and software for systems of similar complexity and function as the system described in this specification.
 - 1. Installing contractor shall be licensed in the State of Illinois to provide the service and equipment described herein. Proof of license(s) must be submitted to the architect prior to

award of contract.

- F. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.
- G. Within six (6) months of substantial completion, provide optional maintenance contract for ongoing service and maintenance of SMS to Owner. Contract acceptance shall be at the sole discretion of the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Access Control Units - Basis of design: [HONEYWELL PROWATCH 3000 SYSTEM].
- B. Readers and Keypads - Basis of Design: [HID Global].
- C. Basis of Design:
 - 1. NovusEdge; www.novusedge.com.
- D. Other Acceptable Manufacturers:
 - 1. S2 Security Corporation; www.s2sys.com.
 - 2. FX Asset Protection.

2.02 ACCESS CONTROL SYSTEM REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 1. Access Control Units and Readers: Listed and labeled as complying with UL 294.

2.03 ACCESS CONTROL POINT PERIPHERALS

- A. Door Locking Devices (Electric Strikes and Magnetic Locks): Comply with Section 08 71 00.

2.04 COMPONENTS (BASIS OF DESIGN)

- A. Products: Provide products listed and classified by Underwriters Laboratories Inc. (UL 294) as suitable for purpose specified and indicated.
- B. Encoded Readers:
 - 1. Manufacturer: HID Global: www.hidglobal.com.
 - 2. Product: iCLASS SE R40.
 - a. Provide manufacturer's standard kit for glazed side lite mounting applications where indicated on drawings.
 - b. Provide R for mullion mount applications where indicated on drawings.
- C. Encoded Controllers:
 - 1. Product: HONEYWELL PROWATCH PW5K1R2 PW-5000 SERIES DUAL READER MODULES.
- D. Electric Strikes:
 - 1. As specified in Section 08 71 00.
- E. Door Contacts: Concealed type, unless noted otherwise.
 - 1. Manufacturer: General Electric Company: www.gesecurity.com.
 - 2. Product: Sentrol 1078 Series.

- a. Manufacturer's standard finish matched as closely as possible to final frame color.
- 3. Provide Sentrol Series 2300 for overhead doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive system components.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 COORDINATION OF TRADES

- A. Coordinate system installation with related trades including, but not limited to, electrical contractor and carpentry contractor.
 - 1. Coordinate installation of electrified door hardware.
 - 2. Coordinate acquisition of electrical installation instructions with carpentry contractor and electrical contractor.
- B. SMS contractor to be in attendance at project meetings to arrange coordination of related trades prior to construction of masonry walls.
- C. Prior to construction of masonry walls, coordinate location of conduit stubs and related electrical rough-in components for SMS installed by electrical contractor.
- D. Obtain electrical instructions and related electrical door hardware components to ensure coordination of electrified door hardware with electrical systems.
- E. Act as liaison between trades performing work in Related Section to ensure all documents and accessories related to the SMS are provided in such a manner as to ensure smooth installation and commissioning of the SMS.

3.03 INSTALLATION

- A. Install access control system in accordance with NECA 1 (general workmanship).
- B. Install components and commission system in accordance with manufacturer's specifications, recommendations and instructions.
- C. Wiring Method: Unless otherwise indicated, use cables (not in conduit).
 - 1. Use suitable listed cables in wet locations, including underground raceways.
 - 2. Use suitable listed cables for vertical riser applications.
 - 3. Use listed plenum rated cables in spaces used for environmental air.
 - 4. Conceal cables unless specifically indicated to be exposed.
 - 5. Route exposed cables parallel or perpendicular to building structural members and surfaces.
 - 6. Do not exceed manufacturer's recommended maximum cable length between components.

- D. Install low voltage wire and make low voltage wiring connections to electrified door hardware devices.
 - 1. Conduit within doors to be provided by door manufacturer.
- E. Provide wire sized according to component manufacturer's requirements and recommendations, including those for electrified locking hardware.
- F. Install power supplies for electrified door hardware.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Manufacturer Services: Furnish services of technician to supervise installation, adjustments, final connections, system testing and commissioning, and to train Owner personnel.
- C. Prepare and start system in accordance with manufacturer's instructions.
- D. Program system parameters according to requirements of Owner.
- E. Test for proper interface with other systems.

3.05 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

END OF SECTION

**SECTION 28 46 00
FIRE DETECTION AND ALARM**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Modifications to existing fire alarm system, including all components, wiring, and conduit.
- B. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

1.02 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware: Electrically operated locks and door holder devices to be monitored and released by fire alarm system.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Evidence of designer qualifications.
- C. Shop Drawings: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
 - 1. Shop drawing submitted to Architect/Engineer shall be approved and signed by the authority having jurisdiction.
 - 2. Submit point-to-point and single line wiring diagrams showing the point of connection and terminals used for all field connections.
 - 3. Submit diagrams showing all connections from field devices to control panel.
 - a. Include a detailed description of the control panel as it shall operate for this specific installation.
 - 4. Submit field wiring color-coding legend.
 - 5. Submit control panel interior wiring diagram.
 - 6. Indicate existing wiring arrangements and locations of devices and wiring routing.
 - 7. Copy (if any) of list of data required by authority having jurisdiction.
 - 8. NFPA 72 "Record of Completion", filled out to the extent known at the time.
 - 9. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
 - 10. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, circuit length limitations, dimensions, ratings, layouts and complete catalog numbers.
 - a. Submit UL listings with cross-listing substantiation for each system component clearly marked.
 - 11. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.

12. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
 13. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.
 14. Certification by Contractor that the system design complies with Contract Documents.
 15. Do not show existing components to be removed.
- D. Evidence of installer qualifications.
- E. Evidence of instructor qualifications; training lesson plan outline.
- F. Evidence of maintenance contractor qualifications, if different from installer.
- G. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
 2. Submit documentation of satisfactory inspections and tests.
 3. Submit NFPA 72 "Inspection and Test Form," filled out.
- H. Project Record Documents: See Section 01 78 00 for additional requirements; have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
 2. "As installed" wiring and schematic diagrams, with final terminal identifications.
 3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.
- I. Closeout Documents:
1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
 2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.05 QUALITY ASSURANCE

- A. Designer: Qualified employee of fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.
1. Delegated Engineering Responsibility: Provide design services necessary to modify initiating device circuits, notification circuits and affected control panels and power supplies. Provide all necessary drawings and specification to local authority having jurisdiction for approval to modify this existing system as intended.
- B. Manufacturer: Qualified company specializing in smoke detection and fire alarm systems with five years documented experience.
- C. Installer: Qualified firm with minimum 5 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
 2. Installer Personnel: At least 2 years of experience installing fire alarm systems.

- 3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
- D. Maintenance Contractor: Same entity as installer or different entity with specified qualifications.
- E. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.
- F. Qualified personnel includes those persons that are:
 - 1. Factory trained and certified; OR
 - 2. NICET Level III or IV (3 or 4) Fire Alarm certified; OR
 - 3. International Municipal Signal Association Fire Alarm certified; OR
 - 4. Certified by state (Illinois Department of Professional Regulation); OR
 - 5. Trained, qualified, and employed by an organization listed by a national testing laboratory.

1.06 WARRANTY

- A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.
- B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.
- C. Contractor shall, as condition precedent to final payment, execute a written guaranty to the Owner. Materials and equipment furnished by him under this Contract shall remain in satisfactory operating condition for a period of one year from the date of the final acceptance of the Work by the Owner. The guaranty shall also include prompt emergency service. All defects or damages due to faulty materials or workmanship shall be repaired or replaced without delay to the Owner's satisfaction and at the Contractor's expense.

1.07 MAINTENANCE

- A. Submit Under Provisions of Section 01 78 00.
- B. Include operating instructions, and maintenance and repair procedures.
- C. Provide a one year full maintenance and inspection service from date of Final Acceptance. Conform to maintenance and inspection service requirements of NFPA 72.
- D. Provide a one year supervising station monitoring service from date of Final Acceptance.

1.08 EXISTING CONDITIONS

- A. The existing fire alarm system control panel is a SimplexGrinell 4100U Addressable System.
 - 1. The existing control panel will be modified and expanded to feed new devices as shown on the floor plans.
 - 2. Provide new equipment compatible with existing devices and system at site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Initiating Devices and Notification Appliances:
 - 1. Same manufacturer as control units.

2. Provide initiating devices and notification appliances made by the same manufacturer, where possible.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE ALARM SYSTEM

- A. Fire Alarm System: Provide modifications and extensions to the existing automatic fire detection and alarm system:
1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
 2. Protected Premises: Areas denoted on the drawings.
 3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
 - a. ADA Standards.
 - b. The requirements of the local authority having jurisdiction which is Elburn and Countryside Fire Protection District.
 - c. Applicable local codes.
 - d. Contract Documents (drawings and specifications).
 - e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
 4. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.
 5. Zoning: Point addressable system with initiating devices being individually zoned.
 6. Existing Control Panel: Make modifications to the existing panel:
 - a. Additional Power Supplies: Adequate to serve control panel modules, remote detectors, keypads, door holders, relays and alarm signaling devices. Include battery-operated emergency power supply with capacity for operating system in standby mode for 60 hours followed by alarm mode for 5 minutes.
- B. Supervising Stations and Fire Department Connections:
1. Existing connections to remain.
- C. Circuits:
1. Initiating Device Circuits (IDC): Class B, Style A.
 2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
 3. Notification Appliance Circuits (NAC): Class B, Style W.
 4. All cabling shall be plenum rated.
- D. Spare Capacity:
1. Initiating Device Circuits: Minimum 25 percent spare capacity.
 2. Notification Appliance Circuits: Minimum 25 percent spare capacity.
 3. Fire Alarm Control Units: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.
- E. Power Sources:
1. Primary: Dedicated branch circuits of the facility power distribution system.
 2. Secondary: Storage batteries.
 3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.

2.03 EXISTING COMPONENTS

- A. Clearly label components that are "Not In Service."
- B. Remove unused existing components and materials from site and dispose of properly.

2.04 FIRE SAFETY SYSTEMS INTERFACES

- A. HVAC:
 - 1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

2.05 COMPONENTS

- A. General:
 - 1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
 - 2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
- B. Fire Alarm Power Supplies, Initiating Devices, and Notification Appliances: Analog, addressable type; listed by Underwriters Laboratories as suitable for the purpose intended.
- C. Notification Appliances:
 - 1. Combination Horn/Strobes: NFPA 72 and UL 1971; electronic horn rated 90 dBA average at 10 feet. Provide integral 110 candela strobe lamp and flasher. Provide red trim ring for semi-flush mounting. Synchronize strobes within site of each other. Compatible with control panel.
 - 2. Strobes: NFPA 72 and UL 1971; Provide integral 110 candela strobe lamp and flasher. Provide red trim ring for semi-flush mounting. Synchronize strobes within site of each other. Compatible with control panel.
- D. Zone Module Interface:
 - 1. Single zone interface module shall provide an addressable input interface to the control panel for monitoring normally open contact devices. Mount inside NEMA 1 enclosure within 10 feet of first monitored device of zone. Compatible with control panel.
- E. Control Relay Module:
 - 1. Programmable control relay shall be located within 10' of device to be controlled. Temporal sound pattern. Audio shall be synchronized.
- F. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Field inspect existing fire alarm system installation to determine all required interface components necessary for fire alarm system replacement and relocation.
- B. Perform repair work on existing system to eliminate trouble conditions.

3.02 INSTALLATION

- A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.
- B. Install fire alarm system in accordance with manufacturer's instructions.

1. Install manual station with operating handle 4 feet above floor. Install horn strobe units 7.5 feet above floor.
- C. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.
- D. Obtain Owner's approval of locations of devices, before installation.
- E. Install instruction cards and labels.

3.03 INSPECTION AND TESTING FOR COMPLETION

- A. Perform field inspection and testing of fire alarm system in accordance with Section 01 78 00.
- B. Notify Owner 7 days prior to beginning completion inspections and tests.
- C. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- D. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.
- E. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.
- F. Provide all tools, software, and supplies required to accomplish inspection and testing.
- G. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.
 1. Include description of testing and results in test report.
 2. Perform 100 percent acceptance test to NFPA 72 standards on system.
- H. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.04 MANUFACTURER'S FIELD SERVICES

- A. Include services of technician to supervise installation, adjustments, final connections, and system testing.

3.05 CLOSEOUT

- A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
 1. Be prepared to conduct any of the required tests.
 2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
 3. Have authorized technical representative of control unit manufacturer present during demonstration.
 4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
 5. Repeat demonstration until successful.
- B. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:
 1. Approved operating and maintenance data has been delivered.
 2. Spare parts, extra materials, and tools have been delivered.

3. All aspects of operation have been demonstrated to Owner.
 4. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
- C. Perform post-occupancy instruction within 3 months after Substantial Completion.

END OF SECTION

DRAFTING SYMBOLS AND MATERIALS LEGEND



**PROJECT KANE COUNTY SHERIFF'S
FORENSIC LABORATORIES
37W777 IL-38
ST. CHARLES, ILLINOIS 60175**

OWNER **KANE COUNTY**
719 SOUTH BATAVIA AVENUE
GENEVA, ILLINOIS 60134

**ARCHITECT/
ENGINEER**

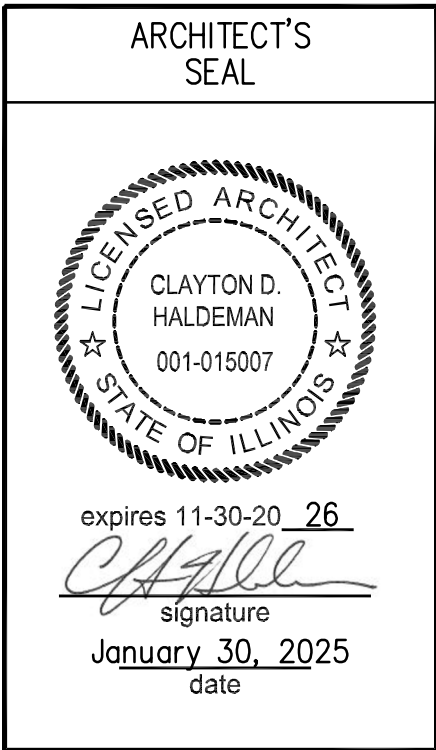
**KLUBER ARCHITECTS + ENGINEERS
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FAX (630) 406-9472
www.kluberinc.com**

REQUIRED CODE COMPLIANCE INFORMATION	APPLICABLE CODES
<p style="text-align: center;">REQUIRED PLAN COVER SHEET INFORMATION FOR REVIEW UNDER 2021 INTERNATIONAL CODES, STATE OF ILLINOIS ACCESSIBILITY CODE, AND THE STATE OF ILLINOIS PLUMBING CODE CODE REVIEW DATA</p> <p><u>GENERAL STATEMENT OF OVERALL PROJECT SCOPE AND INTENT:</u></p> <p>PROJECT CONSISTS OF INTERIOR ALTERATIONS AND REMODELING TO AN EXISTING MULTI-STORY SHERIFF'S OFFICE BUILDING. BUILDING COMPONENTS AND SYSTEMS MODIFIED OR REPLACED AS PART OF THE WORK OF THIS PROJECT HAVE BEEN BROUGHT UP TO MEET THE REQUIREMENTS OF THE APPLICABLE CURRENT CODES.</p> <p>THE AREAS ALTERED FOR LABORATORY USE ARE CLASSIFIED AS GROUP B.</p> <p>A. USE AND OCCUPANCY GROUP(S) CLASSIFICATION: B.</p> <p>B. TYPE OF CONSTRUCTION: IIB</p> <p>SQUARE FOOTAGE OF BUILDING: NOT APPLICABLE; RENOVATED AREAS SQUARE FOOTAGE IS 1,244.</p> <p>ALLOWABLE SQUARE FOOTAGE: NOT APPLICABLE; NO CHANGE OF USE.</p> <p>FULLY SPRINKLERED; ALARMED</p> <p>C. OCCUPANT LOAD BASED ON INTERNATIONAL BUILDING CODE: NOT APPLICABLE; CHANGES OF SPACE USE WOULD ACTUALLY REDUCE TOTAL OCCUPANT LOAD.</p> <p>D. OCCUPANT LOAD BASED ON ILLINOIS PLUMBING CODE: NOT APPLICABLE; NO CHANGE OF USE; NO CHANGE OF REQUIRED FIXTURE QUANTITIES.</p> <p>E. DESIGNED LIVE LOADS: NOT APPLICABLE; THIS IS AN EXISTING BUILDING, TO WHICH NO MODIFICATIONS ARE BEING MADE TO STRUCTURAL COMPONENTS.</p> <p>F. THE DESIGN PROFESSIONALS IN RESPONSIBLE CHARGE ARE IDENTIFIED IN THE SEALS AND CERTIFICATES AREA, BELOW.</p>	<p>2021 INTERNATIONAL BUILDING CODE 2021 INTERNATIONAL MECHANICAL CODE 2021 INTERNATIONAL FUEL GAS CODE 2021 INTERNATIONAL EXISTING BUILDING CODE 2021 INTERNATIONAL FIRE CODE 2020 NATIONAL ELECTRICAL CODE LOCAL AMENDMENTS TO THE ABOVE CODES</p> <p>2014 ILLINOIS PLUMBING CODE 2021 ILLINOIS ENERGY CONSERVATION CODE (2021 INTERNATIONAL ENERGY CONSERVATION CODE W/STATE AMENDMENTS) 2018 ILLINOIS ACCESSIBILITY CODE</p>

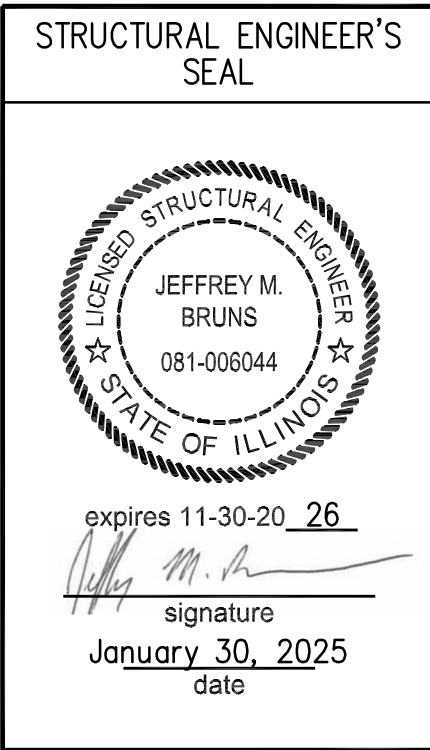
SEALS & CERTIFICATIONS

I HAVE PREPARED, OR CAUSED TO BE PREPARED UNDER MY DIRECT SUPERVISION, THE ATTACHED PLANS AND SPECIFICATIONS AND STATE THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND TO THE EXTENT OF MY CONTRACTUAL OBLIGATION, THEY ARE IN COMPLIANCE WITH IBC 2021 EDITION, THE ENVIRONMENTAL BARRIERS ACT AND THE ILLINOIS ACCESSIBILITY CODE.

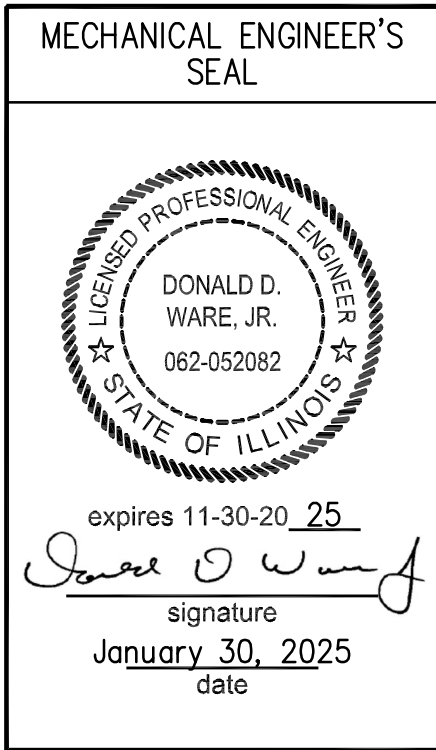
KLUBER, INC. ILLINOIS PROFESSIONAL
DESIGN FIRM LICENSE #184-001284



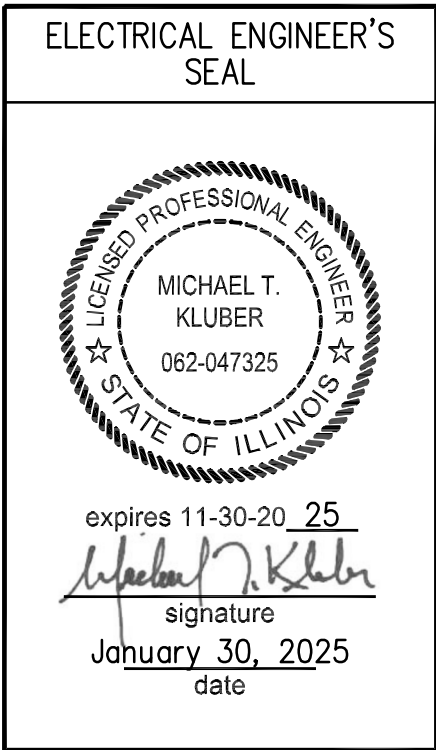
G100, G201, A200, A300,
A301, A800, A900, A901



"G" SERIES, "S" SERIES



"G" SERIES, "P" SERIES, "M"
SERIES



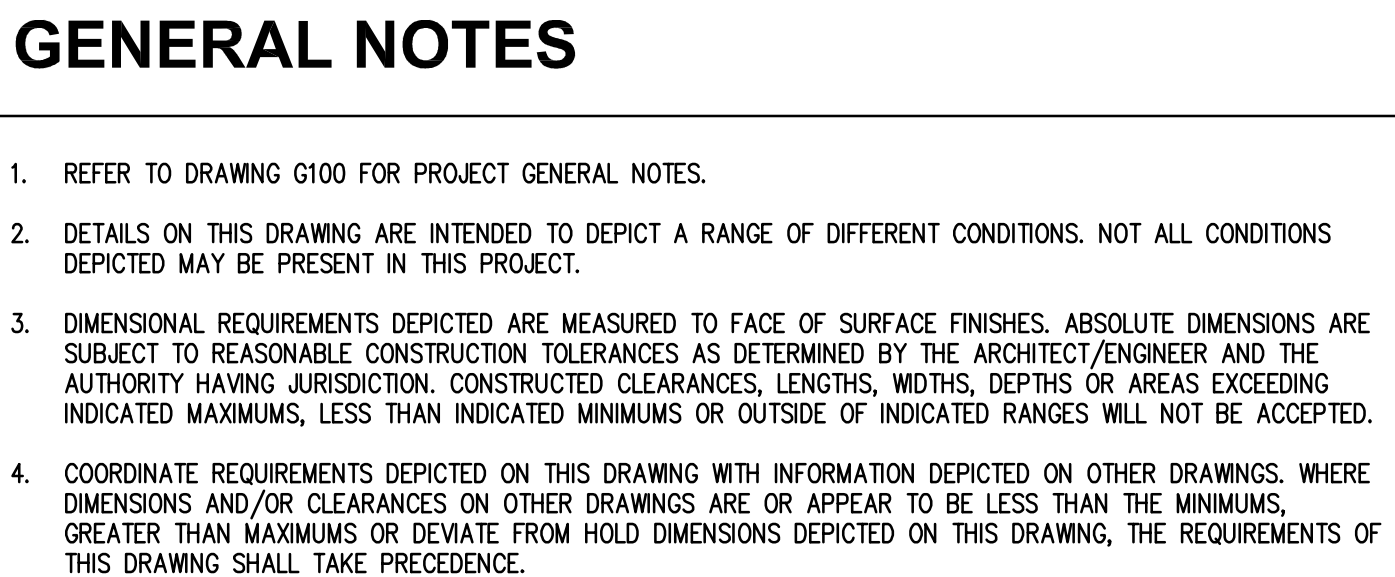
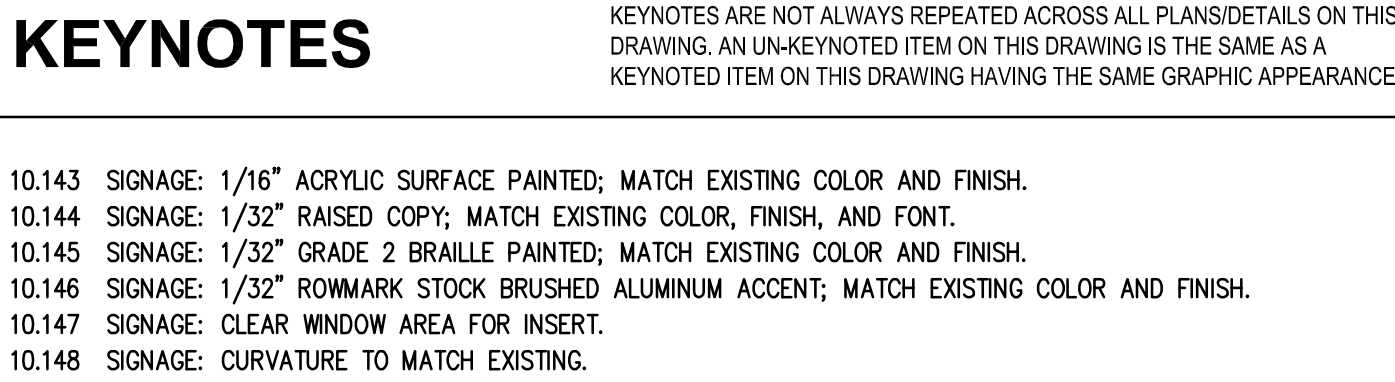
"G" SERIES, "E" SERIES

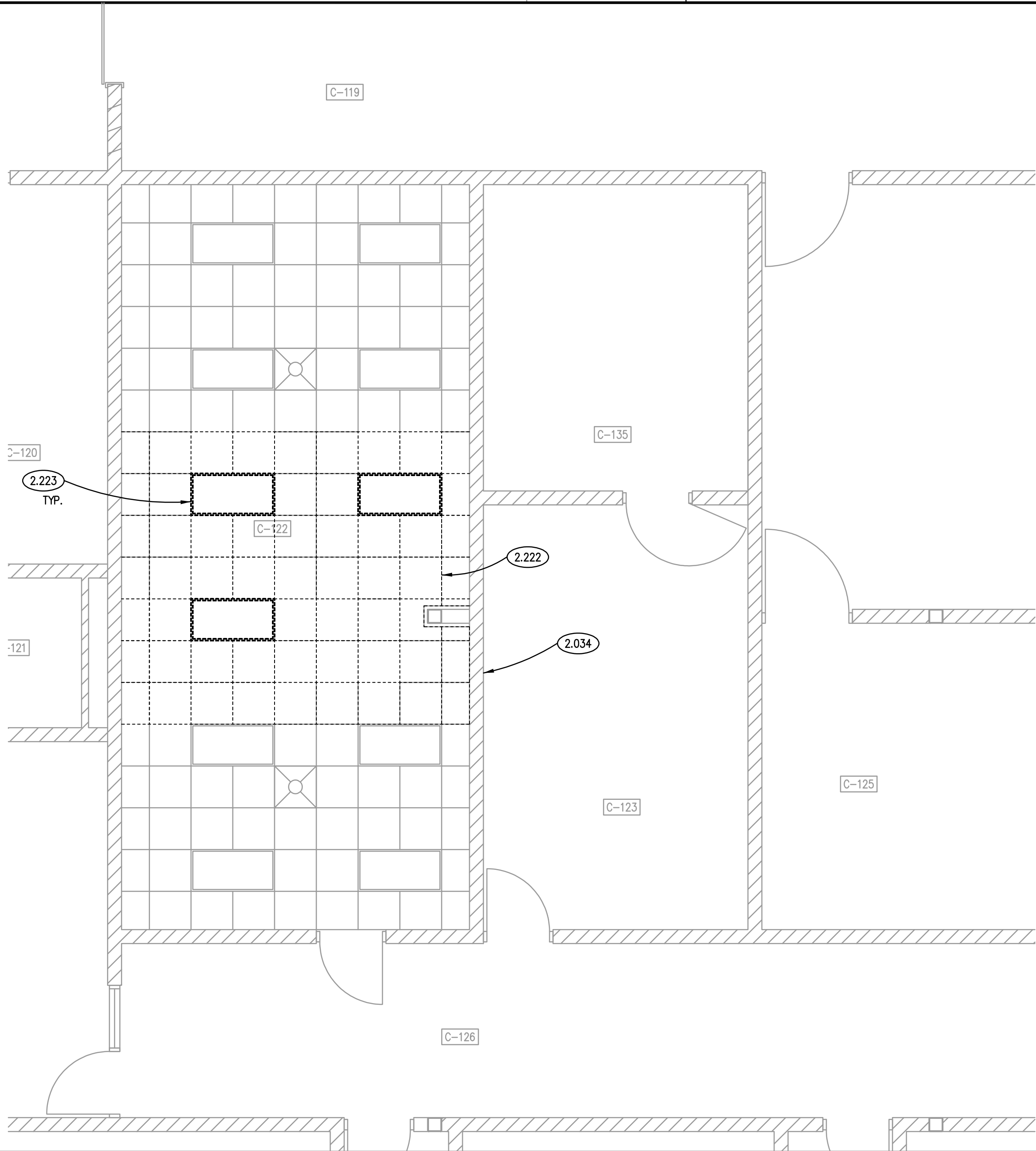
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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

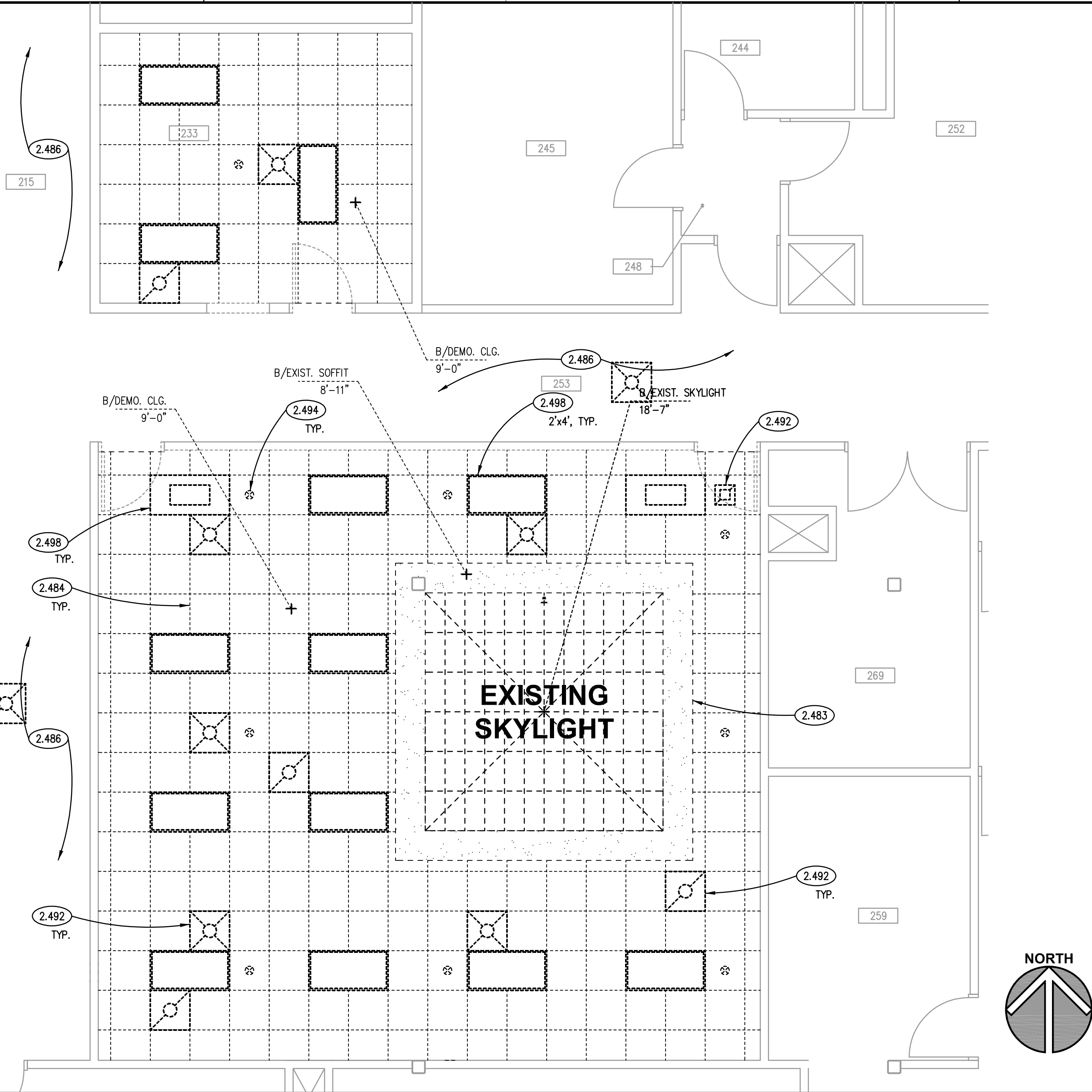
 37W777 IL-38
 ST. CHARLES, ILLINOIS 60175

JOB NO.	23-471-1507
DRAWN	NCO
CHECKED	CDJ
APPROVED	CDH
SHEET TITLE	
COVER SHEET, GENERAL NOTES, SYMBOLS AND DRAWING INDEX	
SHEET NUMBER	
G100	

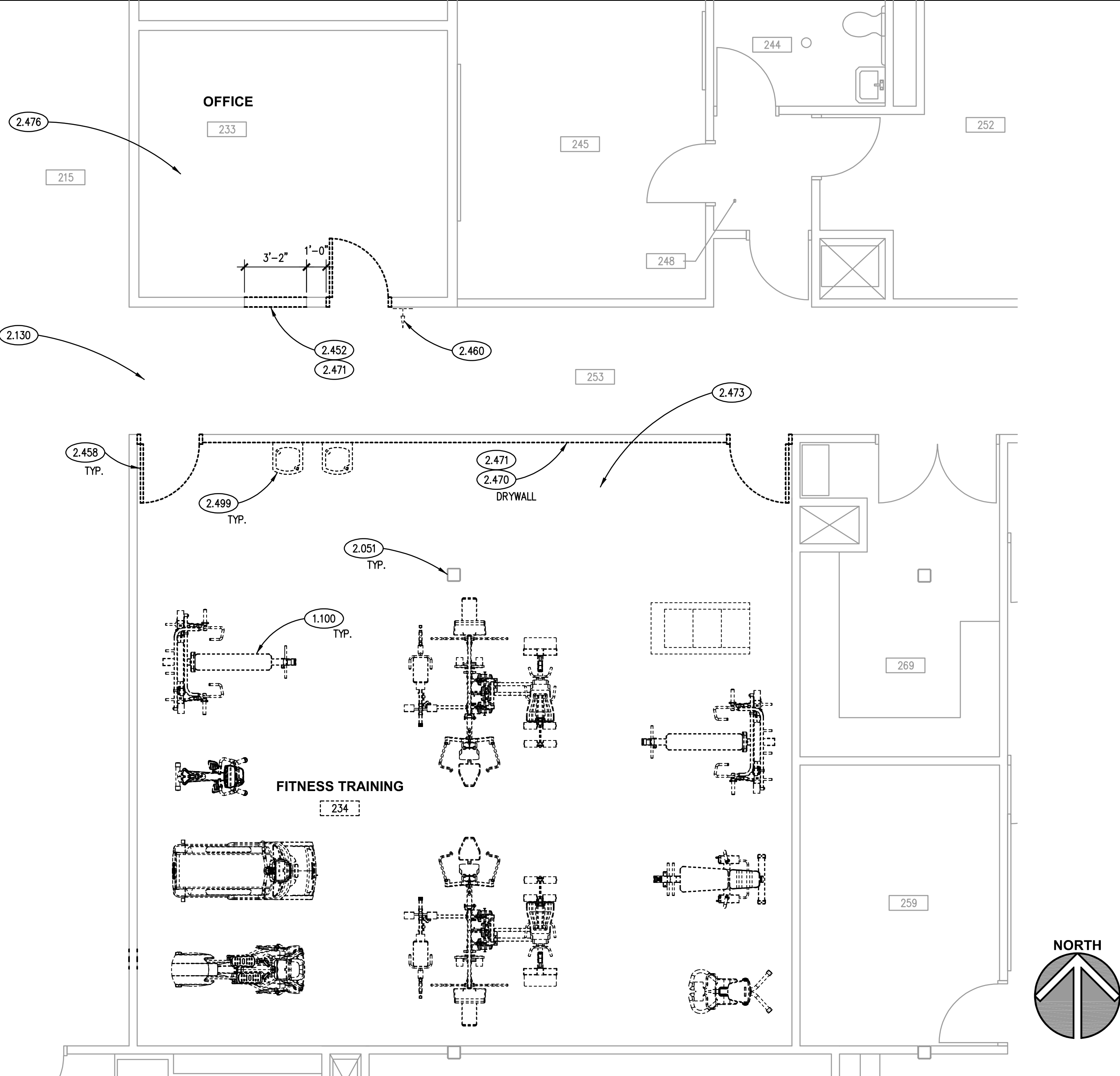
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PARTIAL FIRST FLOOR REFLECTED CEILING DEMOLITION PLAN
SCALE: 1/4" = 1'-0" 3



PARTIAL SECOND FLOOR REFLECTED CEILING DEMOLITION PLAN
SCALE: 1/4" = 1'-0" 2



PARTIAL SECOND FLOOR DEMOLITION PLAN
SCALE: 1/4" = 1'-0" 1

KEYNOTES

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL. AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

- 1.00 OWNER-FURNISHED ITEM TO BE REMOVED AND RELOCATED BY CONTRACTOR: FITNESS EQUIPMENT.
- 2.034 EXISTING CONCRETE MASONRY BLOCK WALL.
- 2.051 EXISTING STRUCTURAL STEEL COLUMN.
- 2.130 EXISTING INTERIOR FLOOR FINISH: VINYL COMPOSITE FLOORING.
- 2.222 EXISTING CEILING FINISH: ACOUSTICAL PANELS; TEMPORARILY REMOVE FOR CONSTRUCTION AND REINSTALL; TEMPORARILY REMOVE AND REINSTALL GRID AS REQUIRED.
- 2.223 EXISTING LAY-IN FIXTURES: TEMPORARILY REMOVE FOR CONSTRUCTION AND REINSTALL.
- 2.452 REMOVE EXISTING INTERIOR WALL CONSTRUCTION: DRYWALL PARTITION.
- 2.458 REMOVE EXISTING INTERIOR DOOR AND FRAME.
- 2.460 TEMPORARILY REMOVE AND RELOCATE EXISTING INTERIOR SPECIALTY: ROOM SIGNAGE.
- 2.470 REMOVE EXISTING INTERIOR WALL FINISH: VINYL COVE BASE AS INDICATED.
- 2.471 TEMPORARILY REMOVE AND RE-INSTALL EXISTING INTERIOR WALL FINISH: VINYL COVE BASE AS NECESSARY.
- 2.473 REMOVE EXISTING INTERIOR WALL BASE AND FLOOR FINISH: VINYL BASE COVE; RUBBER TILE FLOORING.
- 2.476 REMOVE EXISTING INTERIOR WALL BASE AND FLOOR FINISH: VINYL BASE COVE; RESILIENT SHEET/TILE FLOORING.
- 2.483 REMOVE EXISTING INTERIOR CEILING FINISH: DRYWALL SOFFIT AND FRAMING.
- 2.484 REMOVE EXISTING INTERIOR CEILING FINISH: ACOUSTICAL PANELS AND SUSPENDED GRID.
- 2.486 TEMPORARILY REMOVE EXISTING INTERIOR CEILING FINISH: ACOUSTICAL PANELS; SALVAGE SUSPENDED GRID IN PLACE AS REQUIRED TO PERFORM ABOVE-CEILING WORK IN THIS SPACE; REINSTALL SALVAGED ACOUSTICAL PANELS AFTER ABOVE-CEILING WORK IS COMPLETE; PROVIDE MATCHING ACOUSTICAL PANELS TO REPLACE PANELS DAMAGED DURING SALVAGING, STORAGE OR REINSTALLATION OPERATIONS.
- 2.492 REMOVE EXISTING MECHANICAL SYSTEM COMPONENT: CEILING DIFFUSER/GRILLE.
- 2.494 REMOVE EXISTING FIRE PROTECTION SYSTEM COMPONENT: SPRINKLER HEAD.
- 2.498 REMOVE EXISTING LIGHT FIXTURE.
- 2.499 REMOVE EXISTING WATER FOUNTAIN.

ROOM SCHEDULE

RM. NO.	ROOM NAME	RM. NO.	ROOM NAME
233	OFFICE		
234	FITNESS TRAINING		

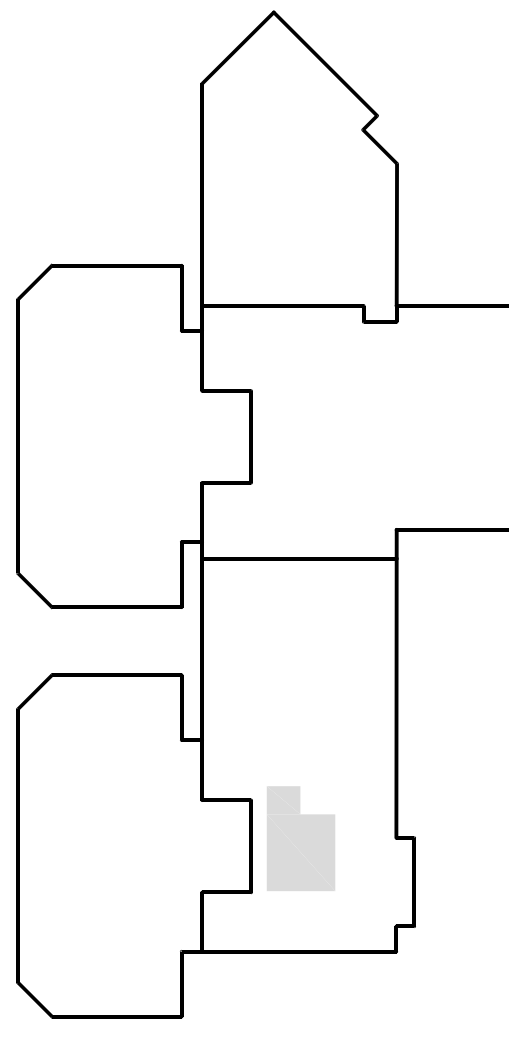
CEILING SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GYPSUM BOARD		MECHANICAL DIFFUSER: SUPPLY
	ACOUSTICAL CEILING TILE: 2' X 2'		MECHANICAL DIFFUSER: RETURN
	SPRINKLER HEADS: A - PENDANT; B - UPRIGHT; C - CONCEALED; D - SIDEWALL		MECHANICAL DIFFUSER: EXHAUST
			LIGHT FIXTURE: 2' X 4'

GENERAL NOTES

1. REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
2. UNLESS NOTED OTHERWISE, WHERE EXISTING FLOOR, WALL AND CEILING SURFACES ARE SCHEDULED TO RECEIVE FINISHES, DEMOLISH EXISTING FINISH MATERIALS EXCEPT PROPERLY ADHERED PAINT; AND SALVAGE SURFACE-MOUNTED ITEMS; PROPERLY PREPARE SURFACES TO RECEIVE NEW FINISHES; REINSTALL SURFACE-MOUNTED ITEMS AT NEW LOCATIONS DETERMINED BY OWNER UNLESS SPECIFIC LOCATIONS ARE INDICATED ON DRAWINGS.
3. STORE SALVAGED ITEMS AS DIRECTED BY OWNER.
4. REMOVE SALVAGED ITEMS THAT WILL NOT BE RE-USED TO OWNER'S DESIGNATED PERMANENT STORAGE LOCATION ON CAMPUS.
5. REMOVE SALVAGED ITEMS THAT WILL ULTIMATELY BE RE-USED ON THIS PROJECT TO OWNER'S DESIGNATED TEMPORARY STAGING AREA ON SITE.
6. PROTECT SALVAGED ITEMS FROM DAMAGE UNTIL INCORPORATED INTO THE WORK OR UNTIL MOVED TO OWNER'S PERMANENT STORAGE.
7. ADDITIONAL DEMOLITION/ RECONSTRUCTION AND REMOVAL/REPLACEMENT OF ARCHITECTURAL ELEMENTS IS REQUIRED TO COMPLETE THE WORK OF THIS PROJECT. COORDINATE WITH ARCHITECTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS, AND PROVIDE DEMOLITION/RECONSTRUCTION AND REMOVAL/REPLACEMENT OF ARCHITECTURAL ELEMENTS AS REQUIRED TO COMPLETE THE WORK SHOWN ON THOSE DRAWINGS.
8. PERFORM ABOVE CEILING WORK IN ROOMS AND CORRIDORS IN SURROUNDING SPACES SHOWN ON THIS DRAWING. REFER TO MECHANICAL DRAWING M300 FOR WORK IN SURROUNDING REQUIRED SPACES.

KEY PLAN



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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

37W777 IL-38

ST. CHARLES, ILLINOIS 60175

ISSUED
01/10/2025 BID AND PERMIT SET

JOB NO. 23-471-1507
DRAWN NCO
CHECKED CDJ
APPROVED CDH

SHEET TITLE

ARCHITECTURAL
DEMOLITION PLANS

SHEET NUMBER

A200

KEYNOTES

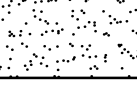

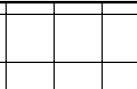


KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL. AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

- 1.110 OWNER-PROVIDED ITEM (N.I.C.): LABORATORY EQUIPMENT; 43" TV MONITOR.
2.051 EXISTING STRUCTURAL STEEL COLUMN.
2.222 EXISTING CEILING FINISH: ACOUSTICAL PANELS; TEMPORARILY REMOVE FOR CONSTRUCTION AND REINSTALL; TEMPORARILY REMOVE AND REINSTALL GRID AS REQUIRED.
2.223 EXISTING LAY-IN FIXTURES: TEMPORARILY REMOVE FOR CONSTRUCTION AND REINSTALL.
2.460 TEMPORARILY REMOVE AND RELOCATE EXISTING INTERIOR SPECIALTY: ROOM SIGNAGE.
9.220 PATCH OPENING IN WALL ABOVE: AT REMOVED MECHANICAL UNIT OR DUCTWORK; PATCH EXISTING STEEL STUD FRAMED GYPSUM WALL CONSTRUCTION; REFER TO MECHANICAL DRAWING M300 FOR ADDITIONAL ARCHITECTURAL WORK IN SURROUNDING REQUIRED SPACES NOT SHOWN ON THIS DRAWING.
10.141 SIGNAGE: REFER TO DRAWING A800 FOR SIGNAGE SCHEDULE.
26.001 LIGHT FIXTURE: FLAT PANEL; REFER TO SPECIFICATIONS.

ROOM SCHEDULE

RM. NO.	ROOM NAME	RM. NO.	ROOM NAME
233	EVIDENCE	253	EXISTING HALLWAY
234A	PREP	234B	EXTRACTION
234C	DRUGS AND TOXICOLOGY	234D	AMPLIFICATION

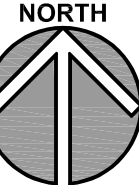
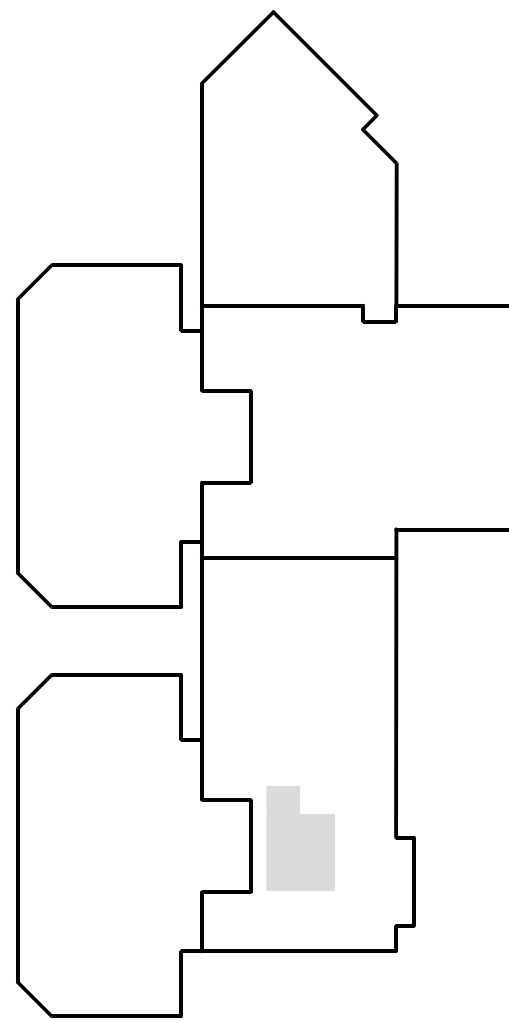
CEILING SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GYPSUM BOARD		MECHANICAL DIFFUSER: SUPPLY
	ACOUSTICAL CEILING TILE: 2' X 2'		MECHANICAL DIFFUSER: EXHAUST
			LIGHT FIXTURES: 2' X 2'

GENERAL NOTES

1. REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
2. GYPSUM WALLS ARE WALL TYPE G3e UNLESS TAGGED OTHERWISE.
3. SPOT ELEVATIONS ARE DESIGNATED NOMINAL HEIGHTS ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. COORDINATE FINAL HEIGHTS OF CEILING ELEMENTS WITH INFORMATION CONTAINED ON MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS.
4. PROVIDE GYPSUM BOARD HEADERS TO FORM VERTICAL SOFFITS AT CHANGES OF ACOUSTICAL CEILING HEIGHTS UNLESS NOTED OR DETAILED OTHERWISE.
5. REFER TO DRAWING A801 FOR LABORATORY EQUIPMENT AND CASEWORK SCHEDULE.
6. SEAL AROUND MECHANICAL DUCT WORK PENETRATING NEW AND EXISTING WALLS.
7. SEAL UNDERSIDE OF METAL DECKING WHERE PARTITION WALLS MEET.

KEY PLAN



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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

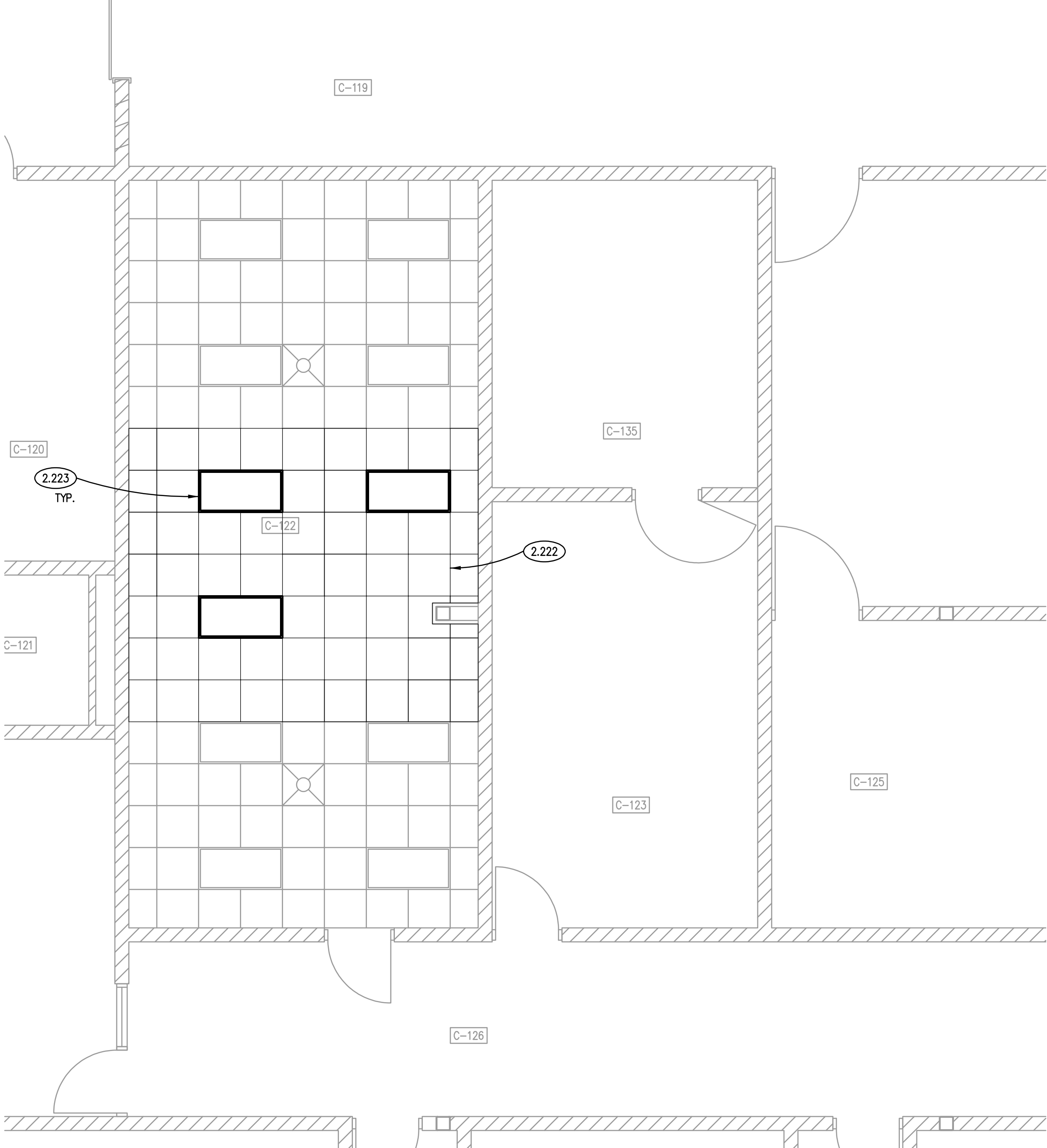
37W777 IL-38
ST. CHARLES, ILLINOIS 60175

ISSUED	
01/10/22	BID AND PERMIT SET
JOB NO.	23-471-1507
DRAWN	NCO
CHECKED	CDJ
APPROVED	CDH

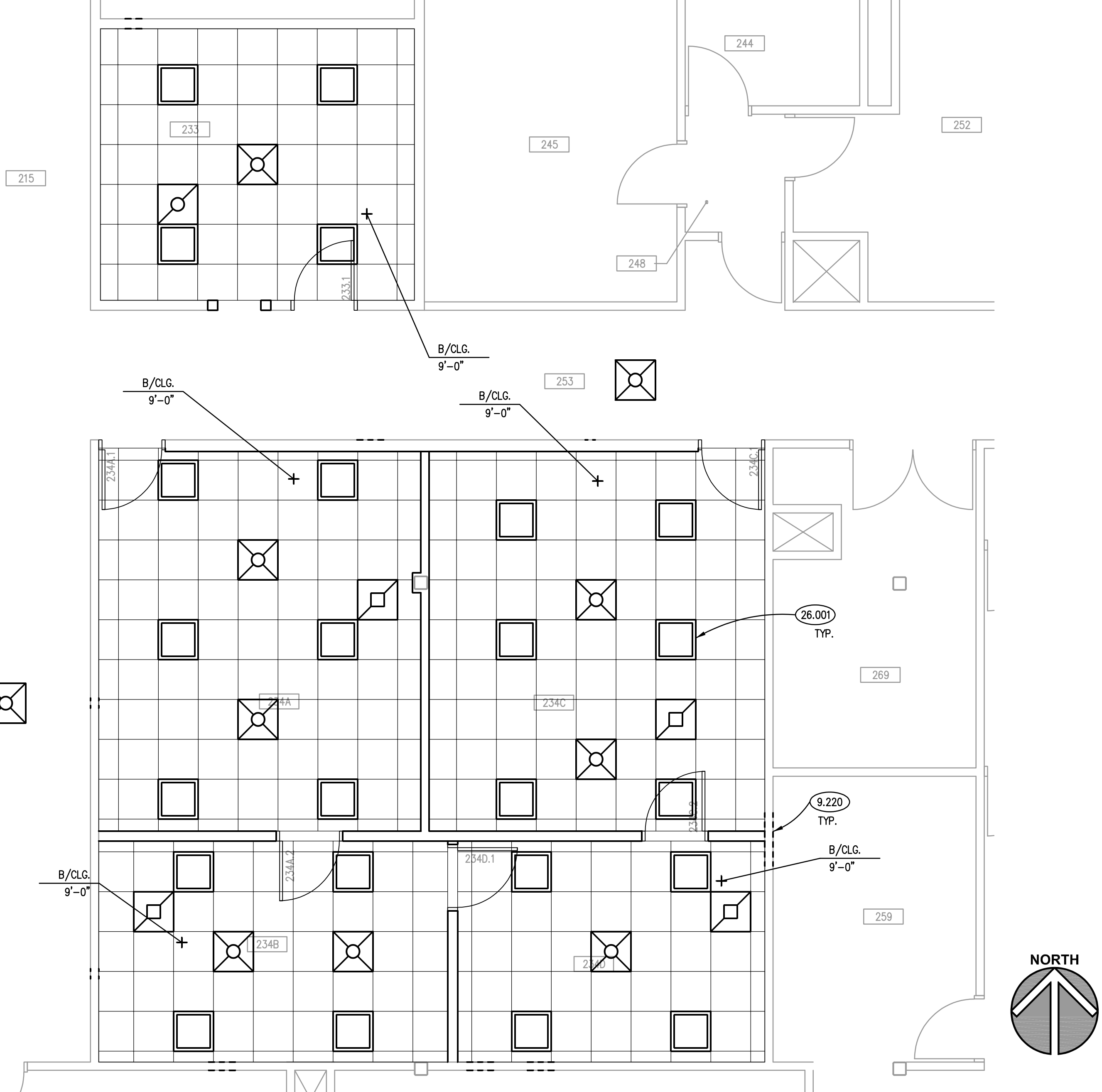
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ARCHITECTURAL
PARTIAL FIRST
FLOOR REFLECTED,
SECOND FLOOR &
REFLECTED CEILING
PLAN

SHEET NUMBER

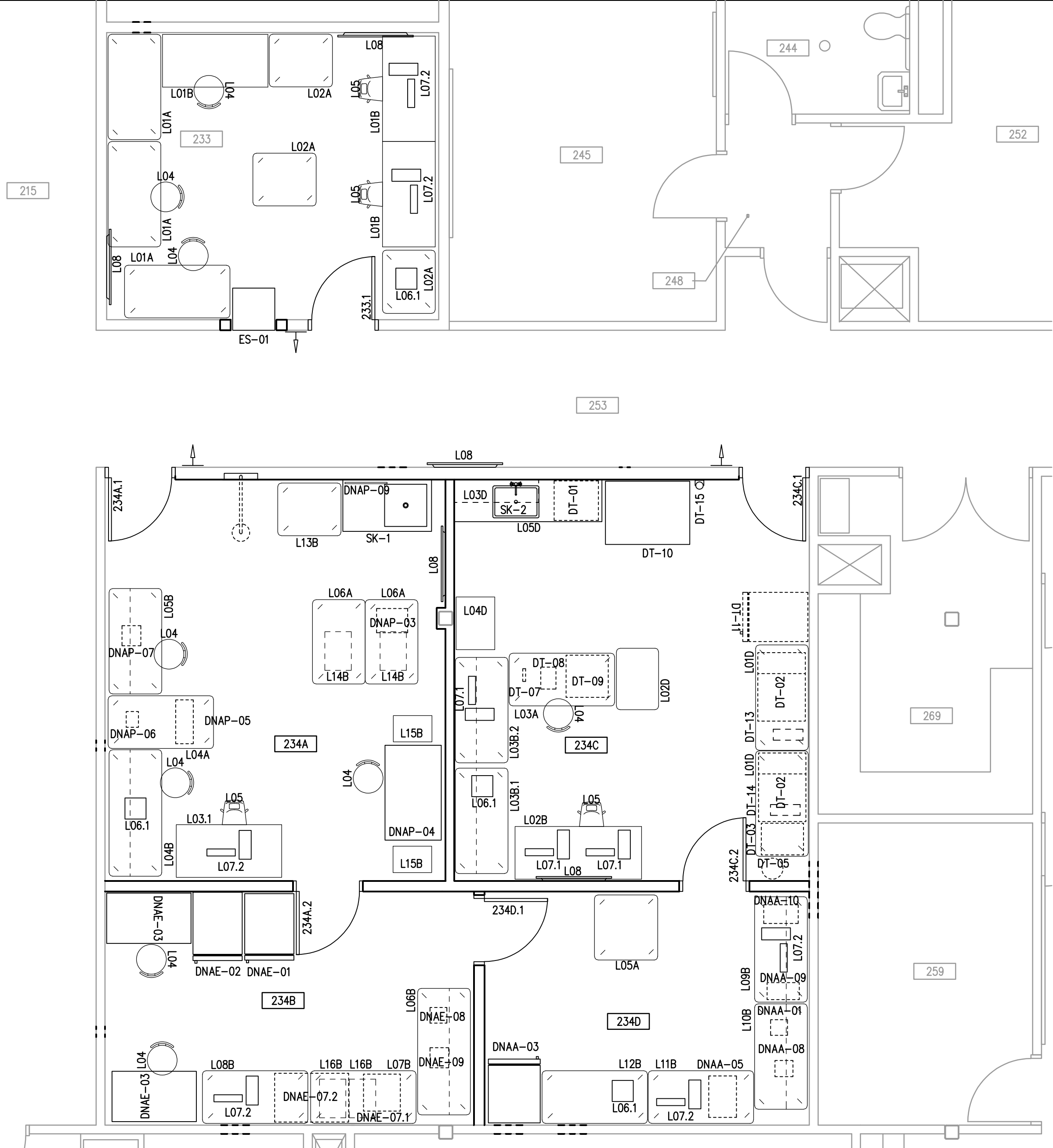
A300



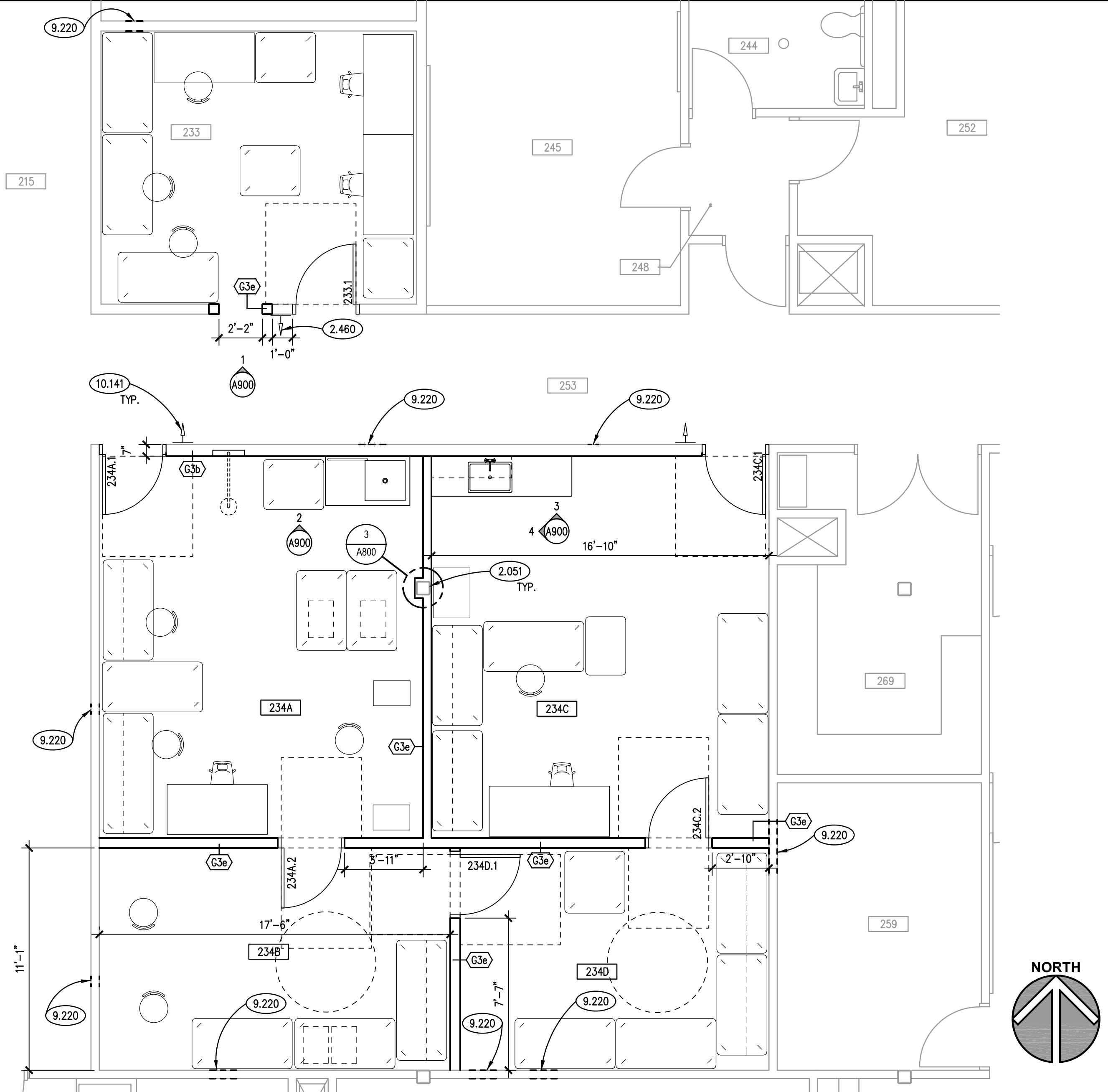
PARTIAL FIRST FLOOR REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0" 4



PARTIAL SECOND FLOOR REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0" 2



PARTIAL SECOND FLOOR EQUIPMENT PLAN
SCALE: 1/4" = 1'-0" 3



PARTIAL SECOND FLOOR DIMENSION PLAN
SCALE: 1/4" = 1'-0" 1



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

3



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

2



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

1

1. REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
2. EXISTING ROOFING SYSTEM IS SINGLE-PLY BLACK EPDM. PERFORM ROOFING WORK IN ACCORDANCE WITH EXISTING ROOFING SYSTEM MANUFACTURER'S REQUIREMENTS.
3. GENERAL TRADES CONTRACTOR PROVIDE CARPENTER-BUILT CURBS AND RAILS FOR MECHANICAL UNITS AND DUCTWORK SHOWN ON THIS DRAWING AND ON MECHANICAL DRAWINGS EXCEPT WHERE MECHANICAL UNITS ARE PROVIDED WITH PREFABRICATED ROOF CURBS BY MECHANICAL UNIT MANUFACTURER.
4. ROOFING CONTRACTOR PROVIDE BOOTED ROOF PORTALS FOR ELECTRICAL CONDUIT, REFRIGERATION PIPING, GAS PIPING, CONDENSATE PIPING, AND HYDRONIC PIPING OUTSIDE ROOF CURBS TO MECHANICAL UNITS AND REMOTE CONDENSER UNITS. COORDINATE WITH MECHANICAL DRAWINGS AND OTHER EQUIPMENT DRAWINGS.
5. ROOFING CONTRACTOR PROVIDE STACK BOOTCS ON MECHANICAL AND PLUMBING VENTS.
6. REFER TO KEY PLAN ON DRAWING A301 FOR THE MULTI-JOY BUILDING PARTIAL MEZZANINE FLOOR PLAN.
7. REFER TO KEY PLAN ON DRAWING A300 FOR THE PARTIAL SHERIFFS OFFICE DEMOLITION AND ROOF PLAN.

NORTH

SHEET NUMBER

A301

2.131 EXISTING INTERIOR WALL FINISH: VINYL COVE BASE.
2.460 TEMPORARILY REMOVE AND RELOCATE EXISTING INTERIOR SPECIALTY: ROOM SIGNAGE.
2.471 TEMPORARILY REMOVE AND RE-INSTALL EXISTING INTERIOR WALL FINISH: VINYL COVE BASE AS NECESSARY.

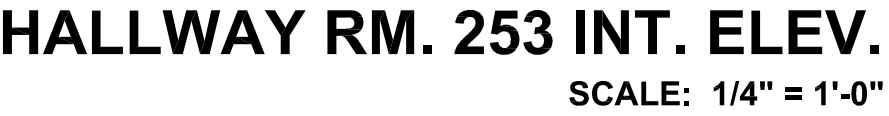
8.111 STEEL DOOR AND FRAME: PAINT TO MATCH EXISTING HALLWAY; REFER TO DOOR AND FRAME SCHEDULE.
8.112 STEEL DOOR AND FRAME: REFER TO DOOR AND FRAME SCHEDULE FOR PAINT COLOR.

9.690 VINYL WALL BASE: REFER TO A800 SERIES FINISH SCHEDULE.

11.530 LABORATORY EQUIPMENT: REFRIGERATED EVAPORATOR.
11.531 LABORATORY EQUIPMENT: FUME HOOD; SOLVENT CABINET.
11.533 LABORATORY EQUIPMENT: OVEN.
11.534 LABORATORY EQUIPMENT: SINK; REFER TO DRAWING A901 FOR LABORATORY EQUIPMENT SCHEDULE.

12.112 METAL LABORATORY CASEWORK: REFER TO DRAWING A901 FOR LABORATORY CASEWORK SCHEDULE.
12.360 WORKSURFACE TOP AND CURB: BLACK KEMRESIN; REFER TO DRAWING A901 LABORATORY CASEWORK SCHEDULE.

22.402 PLUMBING FIXTURE: SAFETY SHOWER UNIT; REFER TO PLUMBING DRAWINGS.



1. REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
2. REFER TO A300 SERIES REFLECTED CEILING PLAN DRAWINGS FOR CEILING HEIGHTS.
3. COORDINATE CEILING HEIGHTS WITH SECTIONS AND DETAILS.
4. COORDINATE LOCATIONS OF WALL-MOUNTED ELECTRICAL ITEMS WITH ARCHITECTURAL ITEMS TO ENSURE NO OVERLAP.
5. REFER TO DRAWING A901 FOR LABORATORY EQUIPMENT AND CASEWORK SCHEDULE.

[illegible]

JOB NO.	23-471-1507
DRAWN	NCO
CHECKED	CDJ
APPROVED	CDH

SHEET TITLE
INTERIOR ELEVATIONS
SHEET NUMBER

A900

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GENERAL NOTES

1. BEFORE PROCEEDING WITH ANY WORK WITHIN AND ADJACENT TO THE EXISTING FACILITY, THE CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE EXISTING STRUCTURAL AND OTHER CONDITIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL NECESSARY BRACING, SHORING AND OTHER SAFEGUARDS TO MAINTAIN ALL PARTS OF THE EXISTING WORK IN A SAFE CONDITION DURING THE PROCESS OF DEMOLITION AND CONSTRUCTION AND TO PROTECT FROM DAMAGE THOSE PORTIONS OF THE EXISTING WORK WHICH ARE TO REMAIN.
2. THE CONTRACTOR SHALL FIELD VERIFY THE DIMENSIONS, ELEVATIONS, ETC. NECESSARY FOR THE PROPER CONSTRUCTION AND ALIGNMENT OF THE NEW PORTIONS OF THE WORK TO THE EXISTING WORK. THE CONTRACTOR SHALL MAKE ALL MEASUREMENTS NECESSARY FOR FABRICATION AND ERECTION OF STRUCTURAL MEMBERS. ANY DISCREPANCY SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER.
3. ALL EXISTING INFORMATION WAS EXTRACTED FROM THE EXISTING DRAWINGS DATED 05/05/06 AS PREPARED BY LARSON ENGINEERING OF ILLINOIS.
4. CONTRACTOR SHALL COORDINATE ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL, M.E.P., AND VENDOR PREPARED SHOP DRAWINGS AND EXISTING CONDITIONS.
5. ALL ARCHITECTURAL AND M.E.P. EQUIPMENT EITHER HUNG OR BEARING UPON FRAMING FOLLOWING INDUSTRY STANDARD, ENGINEERING APPROVED SYSTEMS. THE INDIVIDUAL TRADE CONTRACTOR IS TO PROVIDE ALL SUPPLEMENTAL FRAMING TO CREATE ADDITIONAL PANEL POINTS AS DEFINED ON THE DETAILS NOTED ON SHEET S010. LOCATION AND MAGNITUDE OF THE APPLIED LOADS ARE TO BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL.
6. ANY JOIST BRIDGING THAT IS REMOVED TO FACILITATE THE INSTALLATION OF M.E.P. ITEMS SHALL BE REPLACED BY THE TRADE CONTRACTOR WHICH REMOVED THE BRIDGING.
7. DO NOT CUT THROUGH STRUCTURAL ELEMENTS WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK, PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETROFIT REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY AND INTEGRITY OF THE DAMAGED ELEMENTS.
8. THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ALL CONTRACT DRAWINGS, VENDOR DRAWINGS AND THE SPECIFICATIONS. THE CONTRACTOR SHALL VERIFY THE REQUIREMENTS OF OTHER TRADES FOR LOCATIONS OF SLEEVES, CHASES, HANGERS, INSERTS, ANCHORS, HOLES AND OTHER ITEMS TO BE PLACED OR SET IN THE STRUCTURAL WORK.
9. THE STRUCTURAL DRAWINGS REPRESENT THE FINISHED STRUCTURE. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY GUYING AND BRACING REQUIRED TO ERECT AND HOLD THE STRUCTURE IN ALIGNMENT UNTIL ALL STRUCTURAL WORK AND CONNECTIONS HAVE BEEN COMPLETED. THE INVESTIGATION, DESIGN, SAFETY, ADEQUACY AND INSPECTION OF SUCH GUYING/BRACING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION, WHERE CONDITIONS ARE NOT SPECIFICALLY TAGGED OR SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO THE APPROVAL OF THE ENGINEER.
11. ALL ROOFTOP EQUIPMENT (ARCHITECTURAL, MECHANICAL, ELECTRICAL, ETC.) AND THEIR CORRESPONDING CURBS TO BE ATTACHED TO THE STRUCTURAL FRAMING AS REQUIRED TO RESIST THE WIND AND SEISMIC FORCES IDENTIFIED ON THIS SHEET. ANCHORAGE TO METAL DECKING NOT ACCEPTABLE. CONTRACTOR / MANUFACTURER TO CONSULT AN INDEPENDENT STRUCTURAL ENGINEER TO REVIEW, DESIGN AND DETAIL THE REQUIRED CONNECTIONS.

TESTING AND INSPECTION

GENERAL

1. THE APPROVED TESTING AGENCY SHALL BE RETAINED BY THE CONTRACTOR.
2. THE APPROVED TESTING AGENCY SHALL BE THE "SPECIAL INSPECTOR" REFERRED TO IN 6.01 OF THE INTERNATIONAL BUILDING CODE (IBC) CHAPTER 17 "STRUCTURAL TESTS AND SPECIAL INSPECTIONS."
3. REFER TO CHAPTER 17 OF THE 2021 INTERNATIONAL BUILDING CODE FOR DEFINITION OF TERMS.
4. THE TESTING AGENCY SHALL SUBMIT TO THE ENGINEER OF RECORD ONE (1) COPIES OF WEEKLY REPORTS OF THE TEST AND INSPECTIONS CONDUCTED DURING THE WEEK. THE REPORTS SHALL STATE IF THE TESTS AND INSPECTIONS MET THE PROJECT REQUIREMENTS AND, IF NOT, WHAT FOLLOW-UP TESTS OR INSPECTIONS WILL BE MADE.
4. THE TESTING AGENCY SHALL NOTIFY GENERAL CONTRACTOR IMMEDIATELY IF ANY OF THE SCHEDULED TESTS FAIL IN ORDER TO AVOID PROJECT DELAYS.
5. AT THE END OF THE PROJECT, THE TESTING AGENCY SHALL SUBMIT TWO (2) COPIES OF A SUMMARY REPORT OF ALL TESTS AND INSPECTIONS MADE TO THE ENGINEER OF RECORD AND ONE COPY OF ALL TESTS AND INSPECTIONS MADE TO THE BUILDING OFFICIAL AND THE OWNER. THE SUMMARY REPORT SHALL STATE THAT THE TESTS AND INSPECTIONS MET THE PROJECT REQUIREMENTS. ANY TEST OR INSPECTIONS THAT FAILED TO MEET PROJECT REQUIREMENTS SHALL BE NOTED. SUBMIT COPIES OF CORRESPONDENCE SHOWING ACCEPTANCE OR REJECTION OF THE MATERIAL OR WORKMANSHIP THAT FAILED TESTS OR INSPECTIONS.
6. SEE SPECIFICATION SECTION 1400 "QUALITY REQUIREMENTS" FOR ADDITIONAL INFORMATION.

STRUCTURAL STEEL CONSTRUCTION

1. THE TESTING AGENCY SHALL PERFORM QUALITY ASSURANCE INSPECTIONS AND NONDESTRUCTIVE TESTING AS SPECIFIED IN AISC 360-10, CHAPTER N.
2. WELDING INSPECTIONS PER AISC 360-10, CHAPTER N5, TABLES N5.4-1, N5.4-2, N5.4-3 INCLUDING (BUT NOT LIMITED TO) THE FOLLOWING:
 - A. SIZE, LENGTH AND LOCATION OF ALL WELDS.
 - B. VISUAL INSPECTIONS OF ALL WELDS FOR CRACK PROHIBITION, WELD/BASE METAL FUSION, CRATER CROSS SECTION, WELD PROFILES, WELD SIZE, UNDERCUT, POROSITY.
3. BOLTING INSPECTIONS PER AISC 360-10, CHAPTER N5, TABLES N5.6-1, N5.6-2, N5.6-3 INCLUDING (BUT NOT LIMITED TO) THE FOLLOWING:
 - A. FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS.
 - B. PROPER FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE EXCLUDED FROM SHEAR PLANE).
 - C. PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL.
 - D. CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE PAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS.
 - E. FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES.
4. NON-DESTRUCTIVE TESTING OF WELDED JOINTS:

STEEL DECK INSPECTION

1. PROVIDE INSPECTION OF STEEL DECKING FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS OF THE FOLLOWING:
 - A. VERIFY MATERIAL IDENTIFICATION MARKINGS CONFORM TO ASTM STANDARDS SPECIFIED IN THE CONTRACT DOCUMENTS. VERIFY CERTIFIED MANUFACTURER'S TEST REPORTS CORRESPOND TO MATERIAL ON SITE.
 - B. VERIFY MEMBER LOCATIONS.
 - C. VERIFY CONNECTION DETAILS AND MISCELLANEOUS ACCESSORIES.
 - D. PROVIDE PERIODIC INSPECTIONS FOR PLUG WELDS. CONFIRM WELDS ARE IN ACCORDANCE WITH AWS D1.3.
 - E. PROVIDE VISUAL INSPECTION OF WELDS AND SIDE-LAP FASTENER LAYOUT.
 - F. INSPECT FIELD WELDED SHEAR CONNECTORS AS INDICATED IN THE PROJECT SPECIFICATIONS.

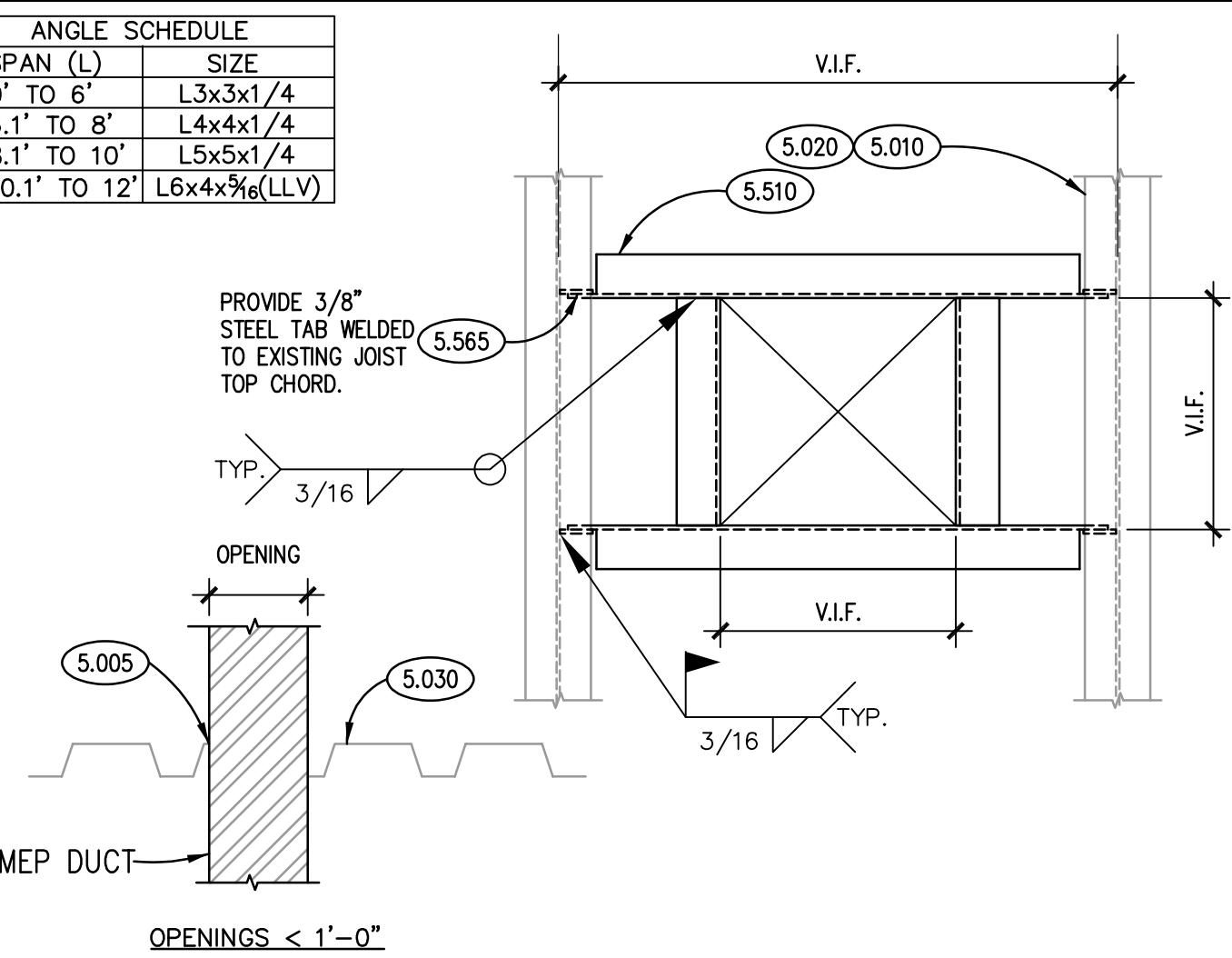
STEEL FRAMING NOTES

- S1. ALL STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITIONS OF AISC'S "STEEL CONSTRUCTION MANUAL" AND "CODE OF STANDARD PRACTICE FOR STEEL BUILDING AND BRIDGES".
- S2. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 USING E70XX ELECTRODES. UNLESS OTHERWISE NOTED, PROVIDE CONT. MIN. SIZED FILLET WELDS PER AISC REQUIREMENTS.
- S3. STRUCTURAL STEEL ERECTION TO COMPLY WITH OSHA REQUIREMENTS.
- S4. STEEL PROPERTIES:
- A. W & WT SHAPES = A992 (Fy = 50 KSI)
 - B. ANGLES, PLATES, CHANNELS & THREADED RODS = A36 (Fy = 36 KSI)
 - C. STRUCTURAL BOLTS = 3/4"Ø A325N
 - D. WELDING ELECTRODES = E70XX
- S5. FINISH REQUIREMENTS:
- A. TYPICAL CLEANING = SSPC-SP2 OR SSPC-SP3
 - B. PAINT = FABRICATOR'S STANDARD. SEE SPECIFICATIONS FOR ADDITIONAL PAINTING REQUIREMENTS.
 - C. TOUCH-UP PRIMER = FABRICATOR'S STANDARD.
- S5. REQUIREMENTS FOR HANGING ARCH. AND M.E.P. COMPONENTS FROM METAL ROOF DECK:
- A. PIPING THAT WILL CONTAIN LIQUIDS (INCLUDES STORM PIPING) IS NOT PERMITTED TO BE HUNG FROM METAL ROOF DECK.
 - B. MAXIMUM PERMITTED LOAD AT EACH HANGER = 30 LBS.
 - C. SPACING OF HANGERS TO BE A MINIMUM OF 24" O.C. IN ALL DIRECTIONS.
 - D. ALL EQUIPMENT UNITS, ETC. IS NOT PERMITTED TO BE HUNG FROM METAL ROOF DECK.
 - E. M.E.P. AND ARCHITECTURAL COMPONENTS WHICH DO NOT ADHERE TO THE REQUIREMENTS LISTED ABOVE ARE NOT PERMITTED TO BE HUNG FROM THE METAL ROOF DECK.
- CONTRACTOR IS TO PROVIDE SUPPLEMENTAL FRAMING SYSTEM (ENGINEERED BY OTHERS) WHICH IS TO SPAN BETWEEN AND CONNECT TO STRUCTURAL ROOF FRAMING MEMBERS.
- S6. ALL ARCHITECTURAL AND M.E.P. EQUIPMENT EITHER HUNG OR BEARING UPON JOISTS ARE TO OCCUR AT JOIST PANEL POINTS. WHEN THIS CONDITION IS NOT FEASIBLE, THE INDIVIDUAL TRADE CONTRACTOR IS TO PROVIDE ALL SUPPLEMENTAL FRAMING TO CREATE ADDITIONAL PANEL POINTS AS DEFINED ON THE DETAILS NOTED ON S010. LOCATION AND MAGNITUDE OF THE APPLIED LOADS ARE TO BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL.
- S7. ANY JOIST BRIDGING THAT IS REMOVED TO FACILITATE THE INSTALLATION OF M.E.P. ITEMS SHALL BE REPLACED BY THE TRADE CONTRACTOR WHICH REMOVED THE BRIDGING.
- S8. CONTRACTOR SHALL NOT CUT OR MODIFY ANY PORTION OF THE JOIST IN FIELD WITHOUT THE WRITTEN APPROVAL FROM THE JOIST MANUFACTURER AND THE ENGINEER OF RECORD. THIS INCLUDES BUT NOT LIMITED TO WEB MEMBERS, CHORD MEMBERS, JOIST SEATS, ETC.

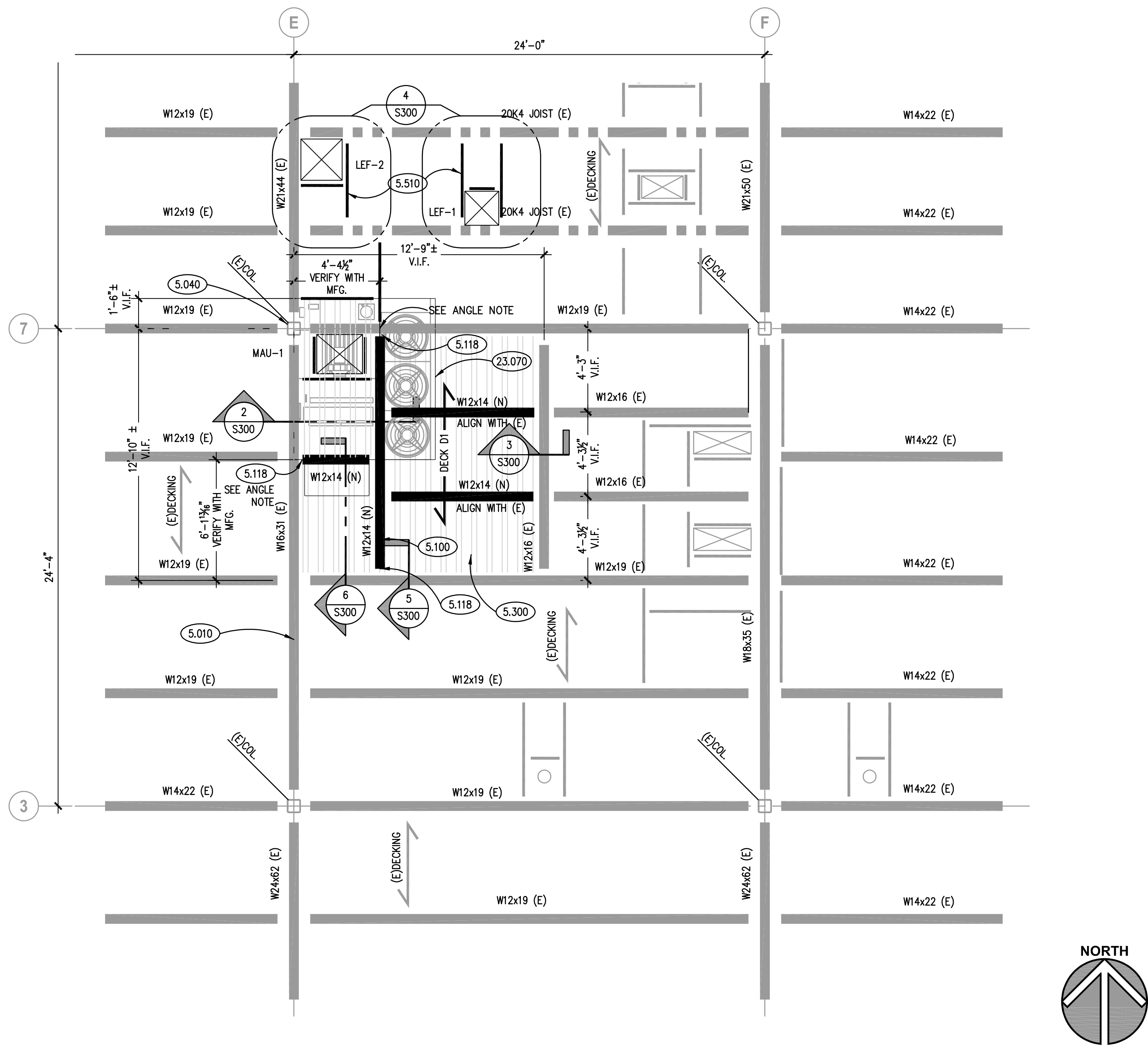
CODE AND LOADING

- DESIGN REQUIREMENTS AND STRUCTURAL LOADS ARE TO BE IN ACCORDANCE WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE 2021 EDITION AND ANY CITY/VILLAGE AMENDMENTS.
- B. LOADING CRITERIA:**
1. OCCUPANCY GROUP: B
 2. RISK CATEGORY: IV
 3. ROOF LOADS: (NOT IMPACTED BY PROPOSED RENOVATIONS)
 - a. GROUND SNOW LOAD (P_g) = 25 PSF
 - b. FLAT-ROOF SNOW LOAD (P_f) = 25 PSF + DRIFTING SURCHARGE
 - c. SNOW EXPOSURE SURCHARGE (C_e) = 1.0
 - d. SNOW IMPORTANCE FACTOR (I_s) = 1.1
 - e. THERMAL FACTOR (C_t) = 1.0
 - f. LIVE LOAD = 30 PSF (TO MATCH EXISTING DESIGN)
 5. WIND LOADS: (NOT IMPACTED BY PROPOSED RENOVATIONS)
 - a. ULTIMATE DESIGN WIND SPEED (V_{ult}) = 115 MPH
 - b. NOMINAL DESIGN WIND SPEED (V_{base}) = 90 MPH
 - c. WIND IMPORTANCE FACTOR (I_w) = 1.15
 - d. EXPOSURE CATEGORY = C
 - e. ENCLOSURE CLASSIFICATION = ENCLOSED
 - f. COMPONENTS AND CLADDING = 28.2 PSF
 - g. ROOFTOP STRUCTURES & EQUIPMENT = 35 PSF
 6. 6. SEISMIC LOADS: (NOT IMPACTED BY PROPOSED RENOVATIONS)
 - a. IMPORTANCE FACTOR (I) = 1.25
 - b. MAPPED SPECTRAL RESPONSE (S_s & S_1) = 0.188 & 0.062
 - c. SPECTRAL RESPONSE COEF. (S_{DS} & S_{D1}) = 0.149 & 0.070
 - d. DESIGN CATEGORY = B
 - e. SITE CLASS = C
 - f. BASIC RESISTING SYSTEM= CONCRETE & MASONRY SHEAR WALLS
 - g. RESPONSE COEFFICIENT (C_s) = CONC.0.046, MAS.0.087
 - h. ANALYSIS PROCEDURE = EQUIVALENT LATERAL FORCE
 7. STRUCTURAL SUPPORTED EQUIPMENT:
 - a. MAU-1 = 2,900 LBS
 - a. LEF-1 = 850 LBS
 - a. LEF-2 = 850 LBS

ANGLE SCHEDULE	
SPAN (L)	SIZE
0' TO 6'	L3x3x1/4
6.1' TO 8'	L4x4x1/4
8.1' TO 10'	L5x5x1/4
10.1' TO 12'	L6x4x $\frac{3}{8}$ (LLV)



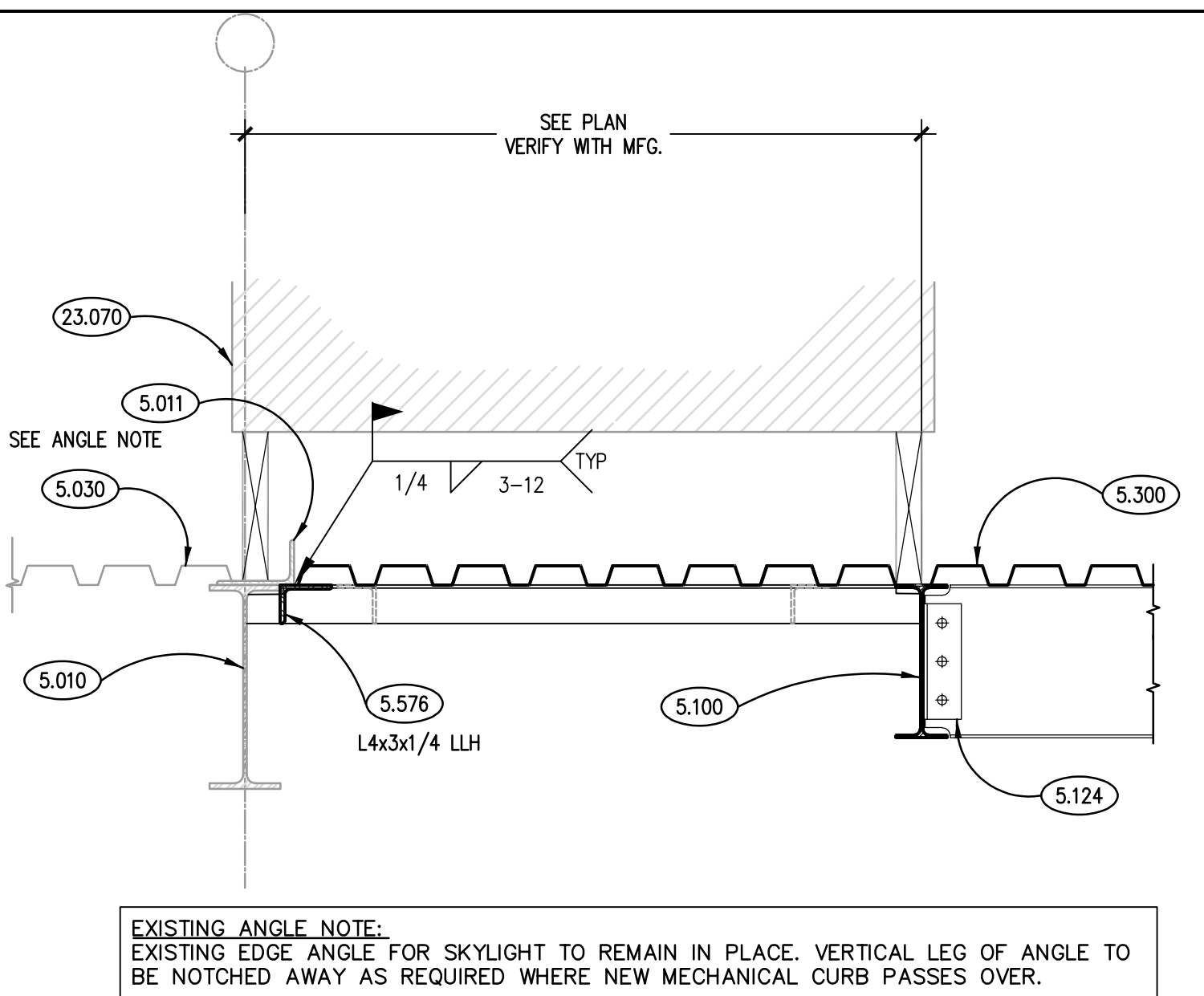
TYP. ROOF OPENING FRAMING DETAIL (@ EXISTING) **4**
SCALE: N.T.S.



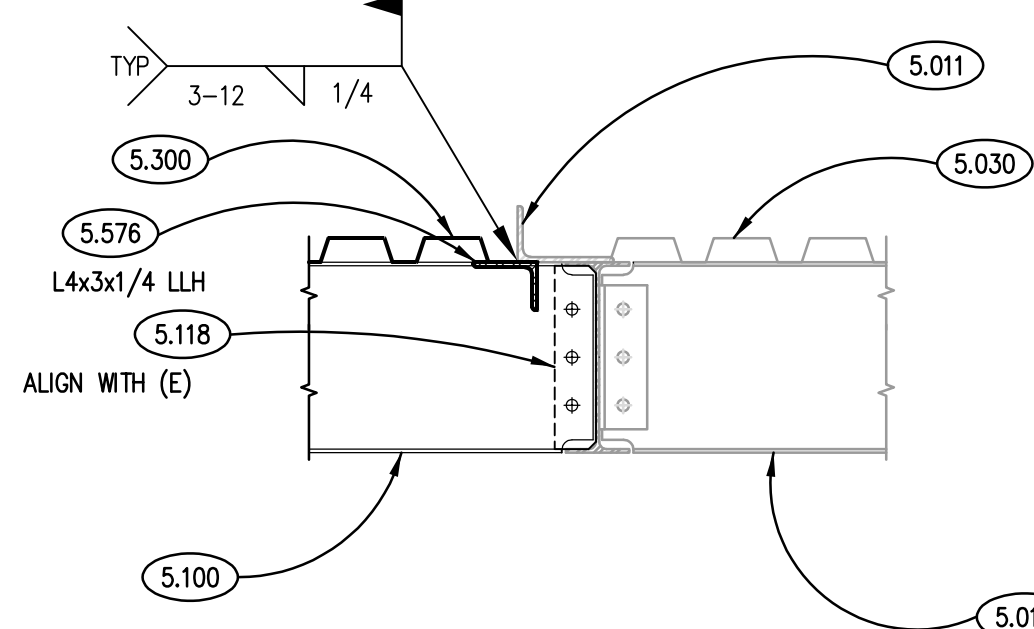
PARTIAL ROOF FRAMING PLAN

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

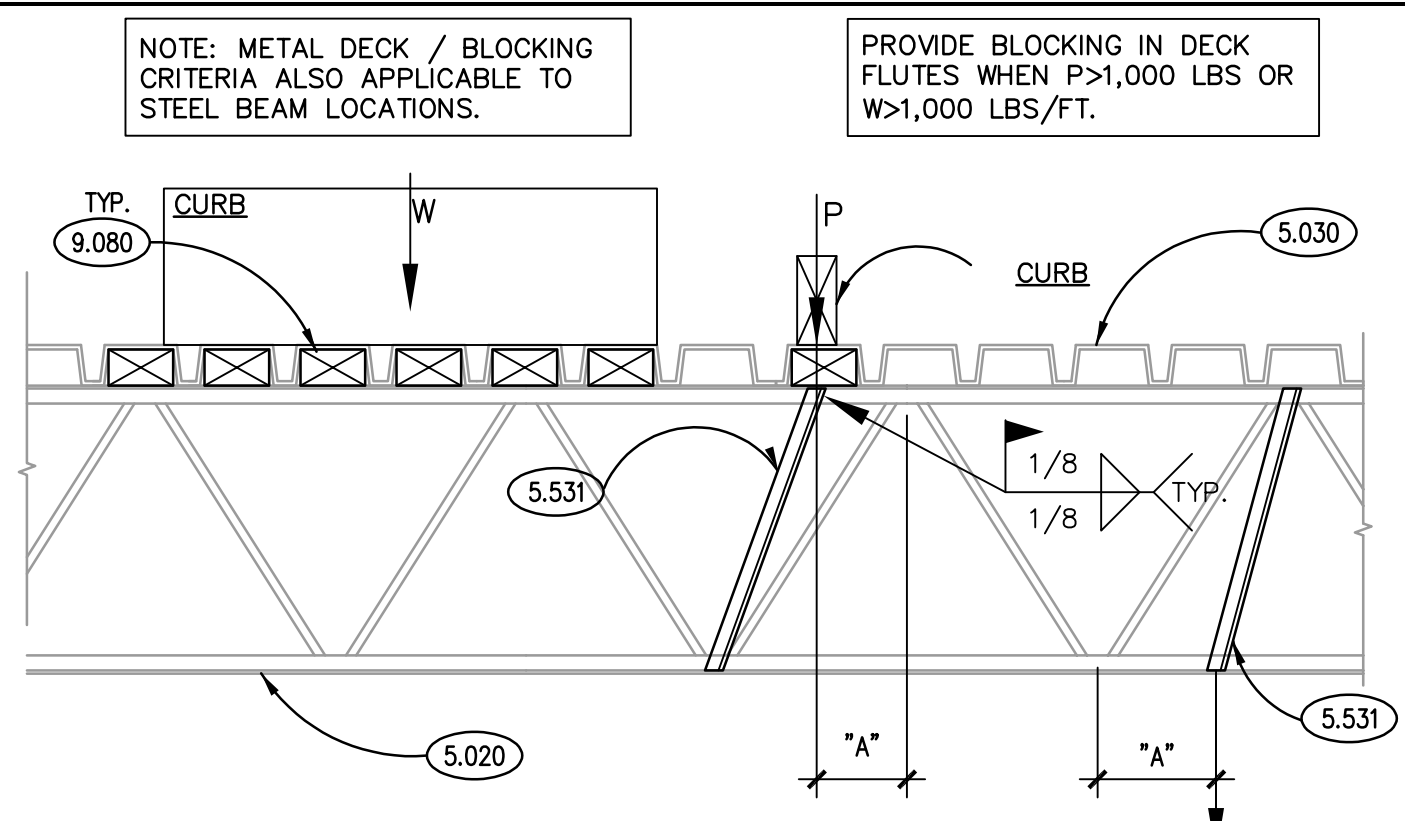
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SECTION 2
SCALE: 1" = 1'-0"

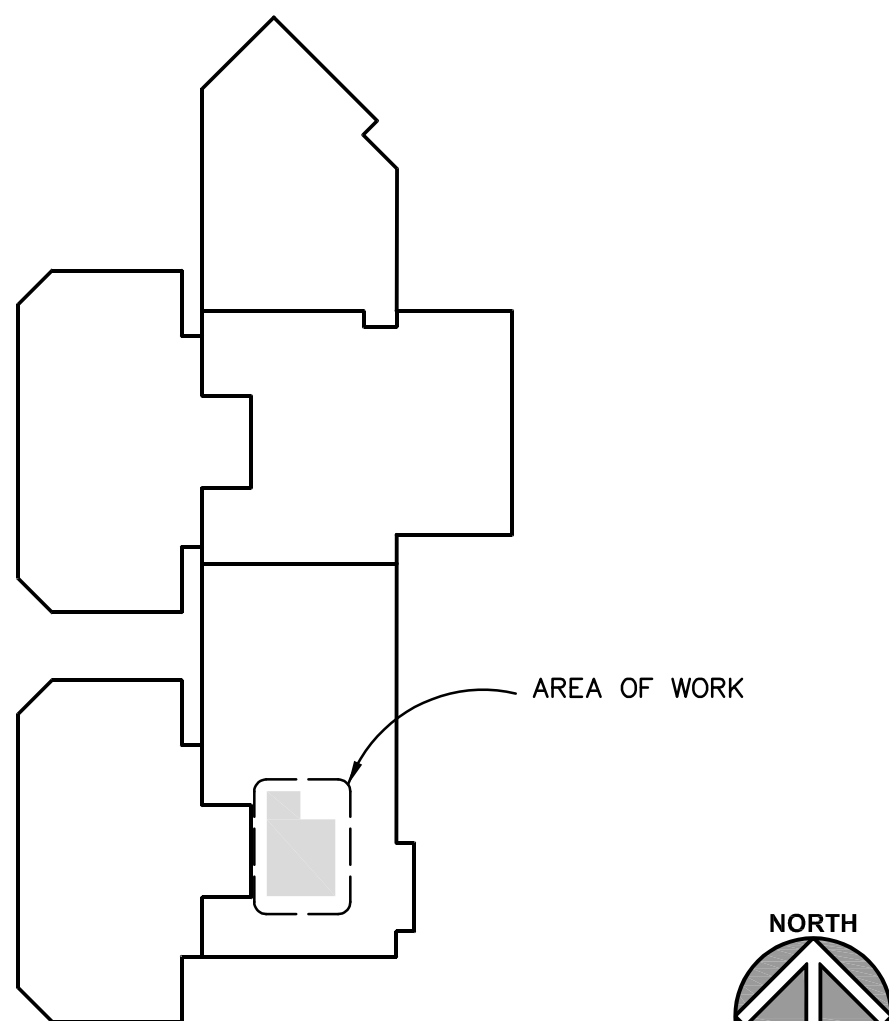


SECTION 3
SCALE: 1" = 1'-0"



TYP. JOIST REINFORCEMENT DETAIL **(A)**
SCALE: N.T.S.

KEY PLAN



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

KEYNOTES

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL.
AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED
ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

- | | |
|-------|---|
| 0.005 | METAL FABRICATION: LOCATE OPENING WITHIN UPPER DECK FLUTE. IF OPENING CUTS THROUGH MORE THAN 1 LOWER FLUTE THEN PROVIDE FRAMING PER STANDARD DETAIL. |
| 0.010 | METAL FABRICATION: EXISTING STEEL BEAM. |
| 0.020 | METAL FABRICATION: EXISTING CONTINUOUS STEEL ANGLE TO REMAIN. |
| 0.030 | METAL FABRICATION: EXISTING STEEL JOIST. |
| 0.040 | METAL FABRICATION: EXISTING STEEL COLUMN. |
| 0.050 | STRUCTURAL STEEL: STEEL BEAM: REFER TO PLAN. |
| 0.118 | STRUCTURAL STEEL: 3/8" SHEAR TABS WITH 3/4" A325 BOLTS. FIELD WELD INTO BEAM W/FLANGES WITH 3/16" FILLET ALL AROUND TYP. |
| 0.124 | STRUCTURAL STEEL: STANDARD DOUBLE CLIP ANGLE CONNECTION WITH 3/4" A325N BOLTS U.N.O. |
| 0.300 | STEEL DECKING: METAL DECKING. REFER TO PLAN AND SCHEDULES. |
| 0.510 | METAL FABRICATION: ANGLE FRAME AS REQUIRED TO ACCOMMODATE ARCHITECTURAL AND M.E.P. OPENINGS. SEE DRAWING LEGEND ON SHEET 5010 FOR FRAME TYPE DEPICTED. FRAMES REQUIRED FOR ALL OPENINGS 1'-0" AND LARGER, AND WHEN MULTIPLE PENETRATIONS IN CLOSE PROXIMITY TO EACH OTHER CAUSE DECK TO BE UNSTABLE. TYPICAL APPLICATIONS INCLUDE, BUT NOT LIMITED TO FLOOR DRAINS, DOWNSPOUTS, PIPING, ROOF DRAINS, SKYLIGHTS, DUCT PENETRATIONS AND CURBS OF MECHANICAL EQUIPMENT. COORDINATE SIZE, LOCATION AND QUANTITY WITH ARCHITECTURAL DRAWINGS, M.E.P. DRAWINGS AND CONTRACTORS. ANGLE SIZES AS NOTED. |
| 0.531 | METAL FABRICATION: STEEL JOIST SUPPLEMENTAL REINFORCING ANGLE TO BE ADDED BY THE RESPECTIVE TRADE CONTRACTOR WHEREVER M.E.P. AND ARCHITECTURAL ITEMS BEAR ON OR HANG FROM STEEL CHORDS WHICH >100 POUNDS (OR COMBINED TOTAL OF CONCENTRATED LOADS WITHIN A PANEL EXCEEDS 100 LBS) AND "A" SIZE. ANGLE SIZE TO BE L1 1/2x1 1/2x3/16 U.N.O. |
| 0.565 | METAL FABRICATION: MISCELLANEOUS STEEL ELEMENTS AS NOTED. CONNECT TO SUPPORTING ELEMENTS AS DEPICTED. |
| 0.576 | METAL FABRICATION: CONTINUOUS DECK FRAMING SUPPORT ANGLE AS NOTED; FIELD WELD TO EXISTING DECK ANGLE AS DEPICTED. ANGLE TO BE DISCONTINUOUS AT SUPPORT BEAMS/ANGLES. |
| 0.080 | BLOCKING: PROVIDE SLOD NON-COMBUSTIBLE BLOCKING (CONCRETE CEMENT BOARD OR EQ.) AS REQUIRED FOR LOADING. |
| 0.030 | MECHANICAL EQUIPMENT: REFER TO MECHANICAL DRAWINGS. |

METAL DECK SCHEDULE AND NOTES

MARK	TYPE & GAUGE		TOTAL SLAB DEPTH (h)	FINISH	DECK FASTENING			SPECIAL COMMENTS
	TYPE	GAUGE			FIELD WELDS	EDGE WELDS	SIDELAP SCREWS	
D1	1.5B	22	N.A.	PAINTED	24/4	8"	1/4 P.TS.	TYPICAL ROOF U.N.O.

NOTES:

1. SEE PLAN FOR DECK LOCATIONS.
2. ALL WELDS TO BE 5/8"Ø PUDDLE WELDS U.N.O.
3. ALL SIDELAP FASTENERS TO BE #10 TEK SCREWS EQUALLY SPACED BETWEEN SUPPORTS U.N.O. BUTTON PUNCH SIDELAPS FOR FLOOR DECKS ACCEPTABLE.
4. METAL DECK MANUFACTURER FOR BASIS OF DESIGN IS VULCRATOR (TYPE AND GAUGE AS NOTED IN SCHEDULE). IF THE USE OF AN ALTERNATE DECK MANUFACTURER IS DESIRED, CONTRACTOR IS TO SUBMIT ALL PRODUCT DATA TO E.O.R. FOR REVIEW.
5. MINIMUM BEARING LENGTHS TO BE PER SDI RECOMMENDATIONS.
6. ROOF DECKS TO HAVE LAPPED DECK ENDS.

KEYNOTES

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL. AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

- 2.486 TEMPORARILY REMOVE EXISTING INTERIOR CEILING FINISH: ACOUSTICAL PANELS, SALVAGE SUSPENDED GRID IN PLACE AS REQUIRED TO PERFORM ABOVE-CEILING WORK IN THIS SPACE; REINSTALL SALVAGED ACOUSTICAL PANELS AFTER ABOVE-CEILING WORK IS COMPLETE; PROVIDE MATCHING ACOUSTICAL PANELS TO REPLACE PANELS DAMAGED DURING SALVAGING, STORAGE OR REINSTALLATION OPERATIONS.
- 9.219 PROVIDE OPENING FOR MECHANICAL DUCTWORK IN EXISTING STEEL STUD FRAMED GYPSUM WALL CONSTRUCTION.
- 23.100 REMOVE AIR TRANSFER DUCT IN ITS ENTIRETY. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF WALL.
- 23.101 REMOVE RETURN DUCT BACK TO MAIN AND PROVIDE SCREEN OVER OPENING IN RETURN DUCT.
- 23.102 REMOVE SUPPLY DIFFUSERS, SUPPLY DUCTWORK AND VAV BOXES. REMOVE DUCT BACK TO MAIN AND PROVIDE PERMANENT INSULATED CAP ON DUCT.
- 23.103 REMOVE EXISTING DUCT MAIN BACK TO TRANSITION AS SHOWN. PROVIDE TEMPORARY CAP FOR NEW CONNECTION.
- 23.104 REMOVE SUPPLY DIFFUSER. REMOVE DUCT BACK TO WALL AS SHOWN AND PROVIDE PERMANENT AND INSULATED CAP AT WALL.
- 23.150 TEMPORARILY DISCONNECT AND PROTECT EXISTING DDC TEMPERATURE CONTROL PANEL TO BE RELOCATED. PANEL IS CURRENTLY LOCATED ABOVE LAY-IN-NC CEILING. REFER TO NEW WORK PLANS FOR NEW LOCATION. COORDINATE WORK SEQUENCING WITH OWNER. PROVIDE TEMPORARY CONTROLS TO ENSURE UNIT CAN REMAIN OPERATIONAL DURING RELOCATION OF PANEL. COORDINATE ANY SHUTDOWNS OF EQUIPMENT WITH OWNER.
- 23.151 REMOVE ALL POINTS, SEQUENCES AND GRAPHICS ASSOCIATED WITH VAV BOX BEING REMOVED FROM BUILDING AUTOMATION SYSTEM.
- 23.152 REMOVE THERMOSTAT AND ASSOCIATED WIRING IN ITS ENTIRETY.
- 23.200 PROPOSED LOCATION FOR EXHAUST FANS VARIABLE FREQUENCY DRIVES. CONFIRM FINAL LOCATION IN FIELD WITH OWNER.
- 23.201 PROVIDE CONNECTION BETWEEN FUME HOOD AND EXHAUST FAN ON ROOF. PROVIDE PVC LINED DUCTWORK FOR FUME HOOD EXHAUST. REFER TO SPECIFICATIONS.
- 23.203 PROVIDE ROOM DIFFERENTIAL PRESSURE MONITOR/CONTROLLER AT EACH ENTRANCE TO ROOM C-254D. PROVIDE PRESSURE MONITOR WITH DUAL SWITCH. INSTALL LED DISPLAY FOR PRESSURE MONITOR OUTSIDE OF EACH ENTRANCE TO ROOM C-254D AS SHOWN. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- 23.204 PROVIDE DUCT STATIC PRESSURE SENSOR AT LOCATION AS SHOWN.
- 23.205 PROVIDE SCREEN OVER OPENING IN RETURN DUCT.
- 23.250 PROVIDE ALL MATERIALS AND LABOR TO RELOCATE EXISTING TEMPERATURE CONTROL PANEL TO LOCATION AS SHOWN. MOUNT NEW PANEL AT 48-INCHES A.F.F.. EXTEND ALL WIRING AS REQUIRED TO ENSURE A COMPLETE AND OPERATIONAL SYSTEM.
- 23.251 INTERFACE ALL NEW EQUIPMENT INTO EXISTING JOHNSON CONTROLS FACILITY EXPLORER BUILDING AUTOMATION SYSTEM.
- 23.252 PROVIDE UPS BATTERY BACKUP FOR RELOCATED TEMPERATURE CONTROL PANEL. PROVIDE SCHNEIDER ELECTRIC, MODEL BE600M1, 600VA POWER RATING, 3300W, 120V UPS WITH FUNCTIONAL DEVICES. MODEL PSM2RB10 UPS POWER CONTROL CENTER. MOUNT UPS IN PANEL. INSTALL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
- 23.253 PROPOSED LOCATION FOR NEW TEMPERATURE CONTROL PANEL SERVING NEW EQUIPMENT. PROVIDE NEW PANEL WITH UPS BATTERY BACKUP. UPS SHALL BE SCHNEIDER ELECTRIC, MODEL BE600M1, 600VA POWER RATING, 3300W, 120V UPS WITH FUNCTIONAL DEVICES. MODEL PSM2RB10 UPS POWER CONTROL CENTER. MOUNT UPS IN PANEL. INSTALL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
- 23.254 PROVIDE TURNING VANES IN DUCT ELBOW.
- 23.255 PROVIDE INSULATED STEAM AND CONDENSATE PIPING BETWEEN HUMIDIFIER AND DUCT MOUNTED DISPERSION TUBES. PIPING SHALL BE SIZED AND CONFIGURED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
- 23.256 PROVIDE A THREE-FOOT SECTION OF STAINLESS STEEL DUCTWORK DOWNSTREAM OF HUMIDIFIER DISTRIBUTION MANIFOLD. PROVIDE DOUBLE SLOPE DRAIN IN BOTTOM OF DUCTWORK. PROVIDE TRAPPED CONDENSATE LINE AND DISCHARGE TO FLOOR DRAIN. PROVIDE ACCESS DOOR IN DUCT FOR INSPECTION AND CLEANING OF STEAM DISTRIBUTION MANIFOLD.
- 23.257 PROVIDE HUMIDIFIER AND WATER SOFTENER. INSTALL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

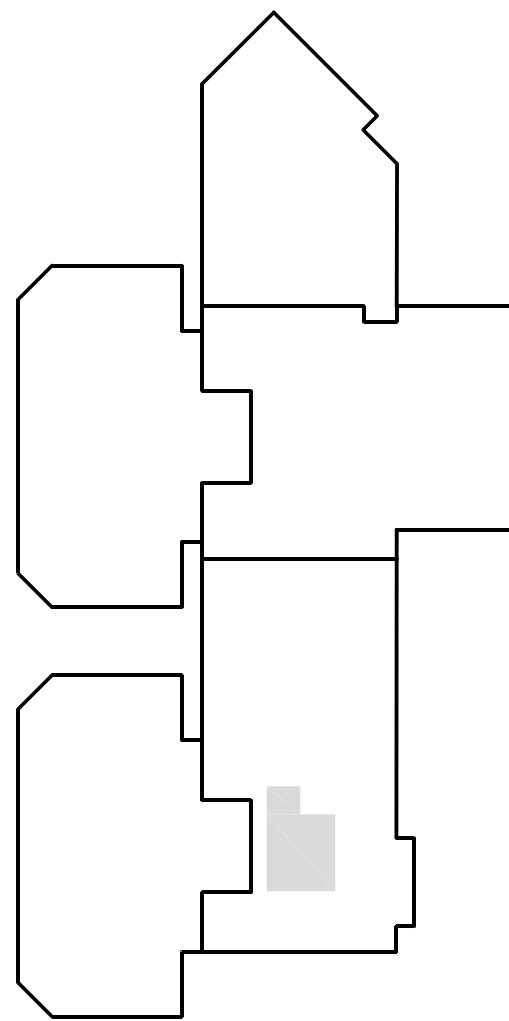
ROOM SCHEDULE

RM. NO.	ROOM NAME	RM. NO.	ROOM NAME
		233	EVIDENCE
		233	EXISTING HALLWAY
		234A	PREP
		234B	EXTRACTION
		234C	DRUGS AND TOXICOLOGY
		234D	AMPLIFICATION

GENERAL NOTES

1. REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
2. ALL PIPING, DUCTWORK AND RACEWAYS ARE SHOWN DIAGMATICALLY AND DO NOT SHOW ALL REQUIRED FITTINGS, OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM. COORDINATE WITH OTHER TRADES FOR SPACE AVAILABLE AND RELATIVE LOCATIONS OF EQUIPMENT, PIPING, DUCTWORK, ETC.
3. EXISTING PIPING, DUCTWORK AND RACEWAYS INDICATED ON THESE PLANS SHALL BE FIELD VERIFIED FOR EXACT LOCATIONS, QUANTITY AND SIZES.
4. ALL TAPES AND MASTICS USED TO SEAL DUCTWORK LISTED AND LABELED IN ACCORDANCE WITH UL 181A SHALL BE MARKED ACCORDINGLY. ALL TAPES AND MASTICS USED TO SEAL FLEXIBLE DUCTS AND AIR CONNECTORS SHALL COMPLY WITH UL 181B AND MARKED ACCORDINGLY.
5. THERMOSTATIC CONTROLS OF EQUIPMENT SHALL HAVE A 5' F DEADBAND.
6. HEATING AND COOLING DESIGN LOADS FOR THE BUILDING HAVE BEEN CALCULATED WITH ELITE SOFTWARE, COMMERCIAL HVAC LOADS PROGRAM, VERSION 8.02.84, IN ACCORDANCE WITH ASHRAE STANDARDS.
7. SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER MECHANICAL COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.
8. DO NOT CUT THROUGH THE STRUCTURAL ELEMENTS WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK, PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED ELEMENTS.
9. ALL ROOFTOP EQUIPMENT (ARCHITECTURAL, MECHANICAL, ELECTRICAL, ETC.) AND THEIR CORRESPONDING CURBS TO BE ATTACHED TO THE STRUCTURAL FRAMING AS REQUIRED TO RESIST THE WIND AND SEISMIC FORCES IDENTIFIED ON SHEET S010. ANCHORAGE TO METAL DECKING IS NOT ACCEPTABLE. CONTRACTOR/MANUFACTURER TO CONSULT AN INDEPENDENT STRUCTURAL ENGINEER TO REVIEW, DESIGN AND DETAIL THE REQUIRED CONNECTIONS.
10. OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND ALL INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.

KEY PLAN



MECHANICAL DEMOLITION PLAN

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

2

MECHANICAL PLAN

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

1

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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

37W777 IL-38

ST. CHARLES, ILLINOIS 60175

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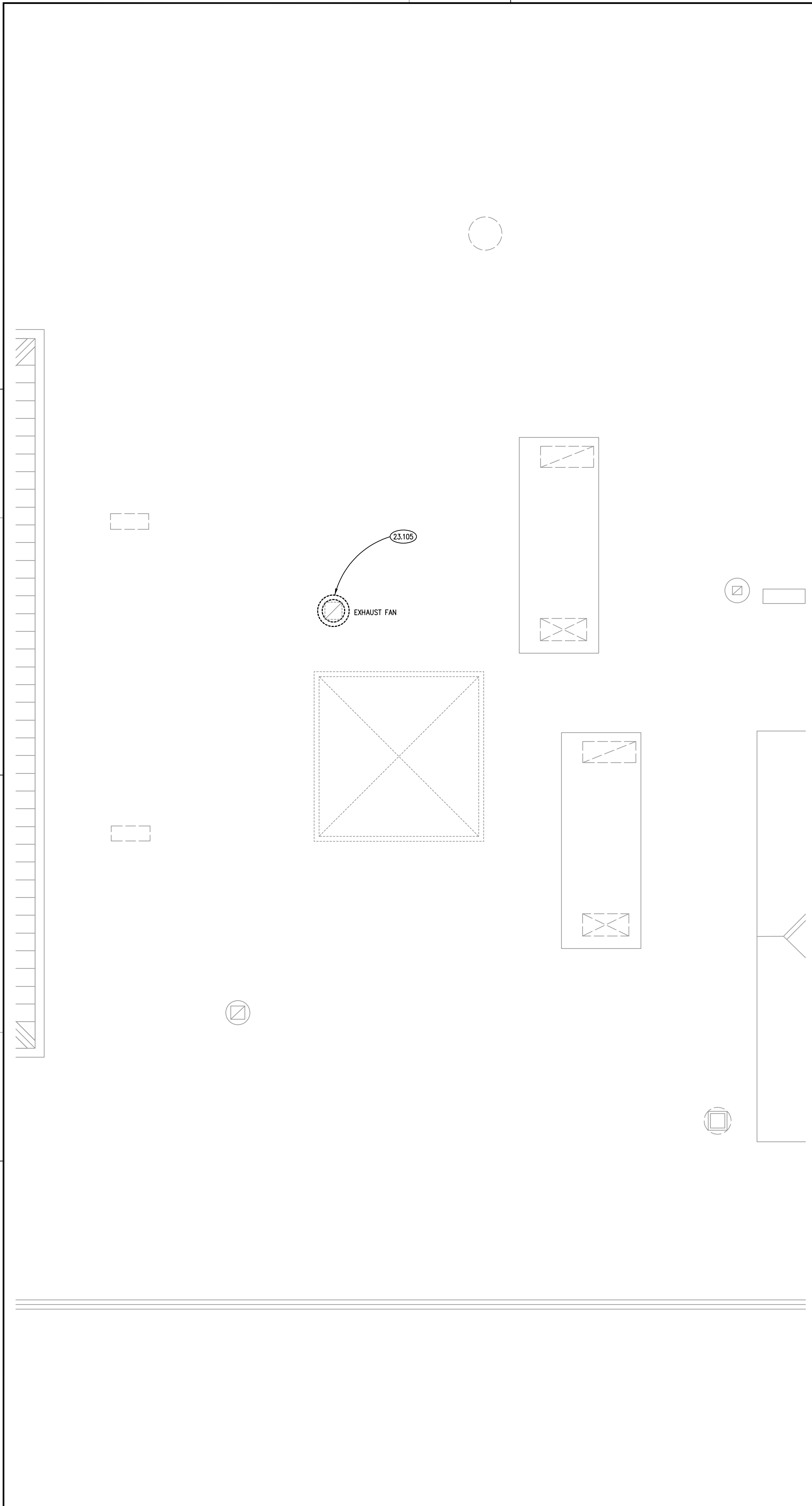
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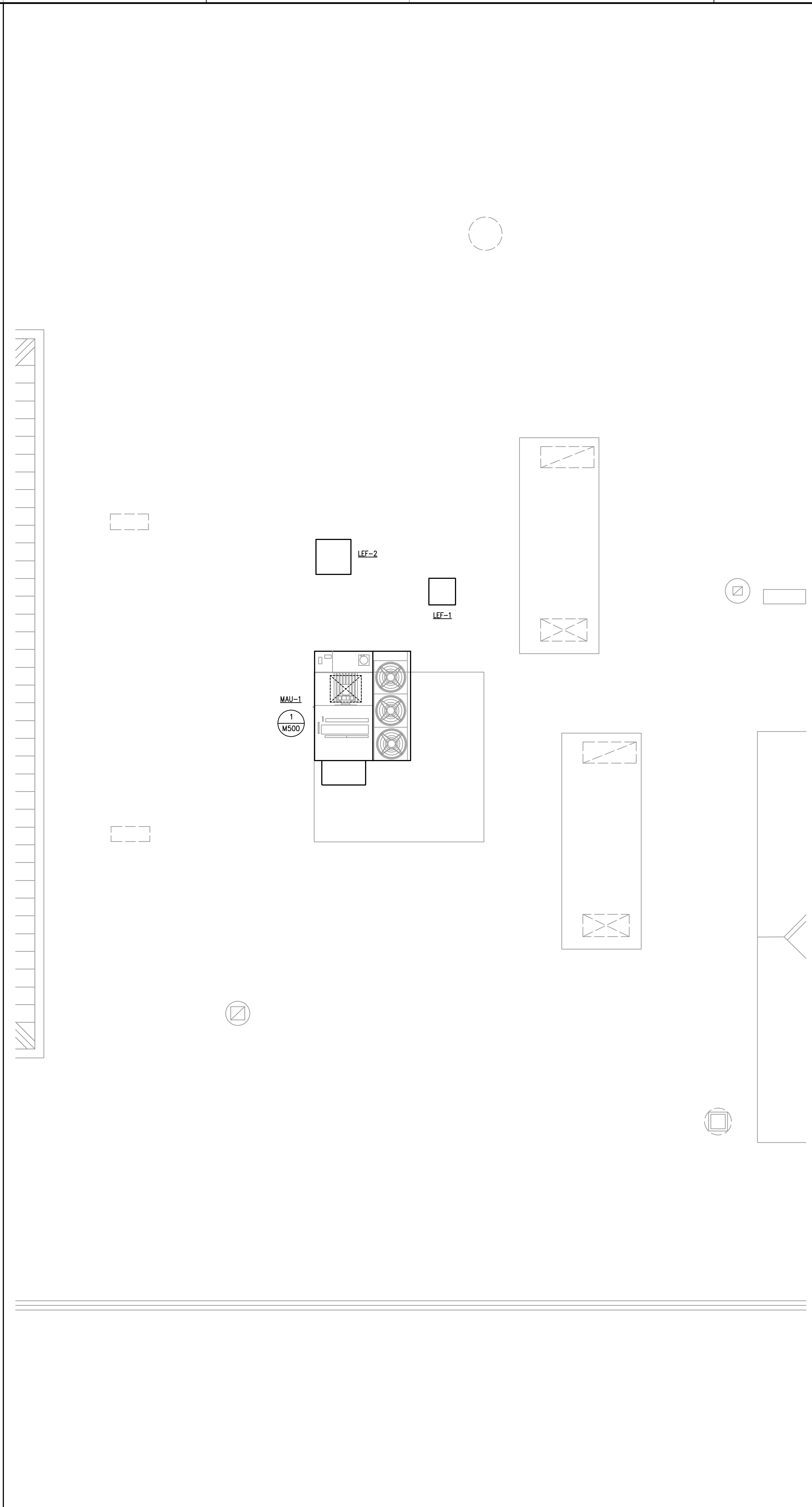
PARTIAL
MECHANICAL FLOOR
PLANS

SHEET NUMBER

M300



PARTIAL MECHANICAL DEMOLITION ROOF PLAN (2)
SCALE: 1/4" = 1'-0"



PARTIAL MECHANICAL ROOF PLAN **1**
SCALE: 1/4" = 1'-0"

KEYNOTES

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL. AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

23.105 REMOVE EXHAUST FAN IN ITS ENTIRETY

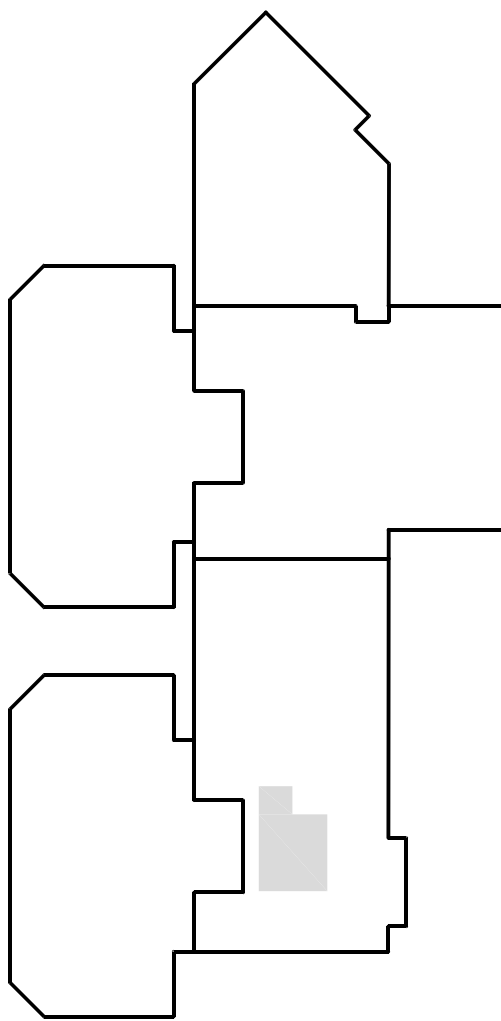
ROOM SCHEDULE

RM. NO.	ROOM NAME	RM. NO.	ROOM NAME

GENERAL NOTES

2. REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
3. ALL PILING, DUCTWORK AND RACEWAYS ARE SHOWN DIMENSIONALIZED AND DO NOT SHOW ALL REQUIRED FITTINGS, OFFSETS, DROPS AND RISERS. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM. COORDINATE WITH OTHER TRADES FOR SPACE AVAILABLE AND RELATIVE LOCATIONS OF EQUIPMENT: PILING, DUCTWORK, ETC.
4. EXISTING PILING, DUCTWORK AND RACEWAYS INDICATED ON THESE PLANS SHALL BE FIELD VERIFIED FOR EXACT LOCATIONS, QUANTITY AND SIZES.
5. ALL TAPES AND MASTICS USED TO SEAL DUCTWORK USED AND LABELED IN ACCORDANCE WITH UL 181A SHALL BE MARKED ACCORDINGLY. ALL TAPES AND MASTICS USED TO SEAL FLEXIBLE DUCTS AND AIR CONNECTORS SHALL COMPLY WITH UL 181B AND MARKED ACCORDINGLY.
6. THERMOSTATIC CONTROLS OF EQUIPMENT SHALL HAVE A 5' F DEADBAND.
7. HEATING AND COOLING DESIGN LOADS FOR THE BUILDING HAVE BEEN CALCULATED WITH ELITE SOFTWARE, COMMERCIAL HVAC LOADS PROGRAM, VERSION 8.0.2.4, IN ACCORDANCE WITH ASHRAE STANDARDS.
8. SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER MECHANICAL COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND APPROVED.
9. DO NOT CUT THROUGH THE STRUCTURAL ELEMENTS WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK. IF A CONDITION OR OTHER OBSTACLE PREVENTS CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO RENATE THE CONTINUITY OF THE DISRUPTED ELEMENTS.
10. ALL ROOFTOP EQUIPMENT (ARCHITECTURAL, MECHANICAL, ELECTRICAL, ETC.) AND THEIR CORRESPONDING CURBS TO BE ATTACHED TO THE STRUCTURAL FRAMING AS REQUIRED TO RESIST THE WIND AND SEISMIC FORCES IDENTIFIED ON THE SOFT ANALYSIS. THE CONTRACTOR SHALL BE RESPONSIBLE TO APPROPRIATELY CONTRACTOR/MANUFACTURER TO CONSULT AN INDEPENDENT STRUCTURAL ENGINEER TO REVIEW, DESIGN AND DETAIL THE REQUIRED CONNECTIONS.
11. OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND ALL INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.

KEY PLAN



01/30/25	BID AND PERMIT SET	ISSUED
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JOB NO. 23-471-150
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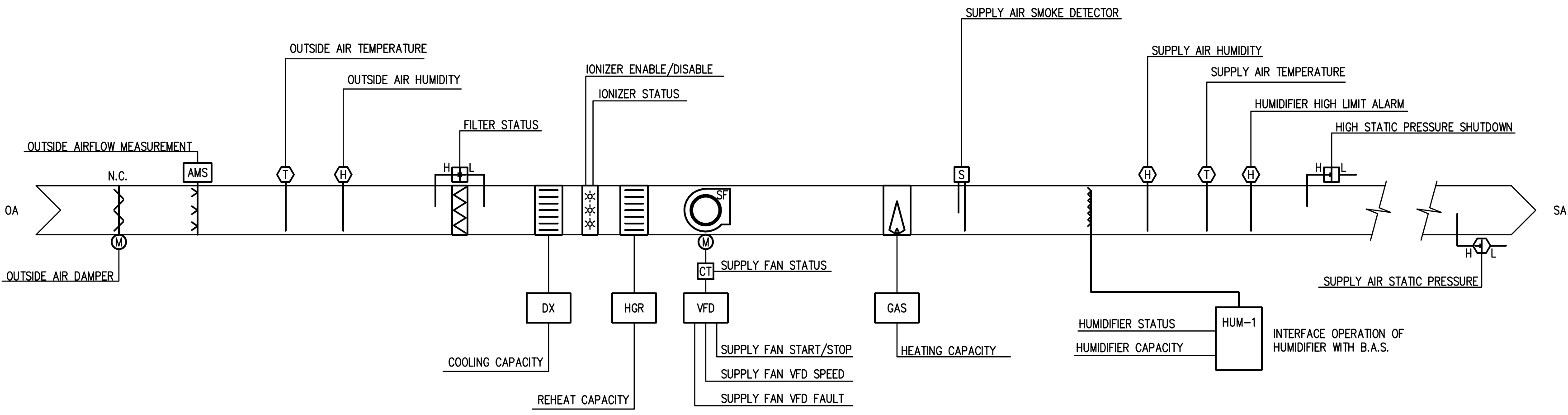
SHEET TITLE

**PARTIAL
MECHANICAL ROOM
PLANS**

SHEET NUMBER

M301

MAU-1 TEMPERATURE CONTROL SCHEMATIC



- NOTES:
- COMPONENTS AND INTERCONNECTIONS SHOWN ARE SCHEMATIC ONLY.
 - CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPONENTS, SENSORS, RELAYS, ETC, TO ENSURE A COMPLETE OPERATING SYSTEM.
 - SMOKE DETECTORS SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

POINTS LIST

MAKE-UP AIR UNIT (MAU-1)	HARDWARE				SOFTWARE			
	AI	AO	DI	DO	SCHED	TREND	ALARM	GRAPHIC
SUPPLY FAN START/STOP			X	X			X	X
SUPPLY FAN STATUS			X				X	X
SUPPLY FAN VFD FAULT			X				X	X
SUPPLY FAN VFD SPEED			X				X	X
SUPPLY DUCT STATIC PRESSURE	X	X				X	X	X
DUCT STATIC PRESSURE SETPOINT		X					X	X
SUPPLY AIR TEMPERATURE	X					X	X	X
OUTSIDE AIR TEMPERATURE	X					X	X	X
OUTSIDE AIR HUMIDITY	X					X	X	X
OUTSIDE AIR DAMPER		X	X			X	X	X
COOLING CAPACITY		X				X	X	X
HOT GAS REHEAT STATUS		X	X			X	X	X
HOT GAS REHEAT CAPACITY		X				X	X	X
HEATING CAPACITY	X	X				X	X	X
OUTSIDE AIR FLOW	X	X				X	X	X
FILTER STATUS			X				X	X
IONIZER STATUS			X				X	X
IONIZER ENABLE / DISABLE			X				X	X
SUPPLY AIR TEMPERATURE SETPOINT	X					X	X	X
SMOKE DETECTOR STATUS		X				X	X	X
HIGH STATIC SHUTDOWN		X				X	X	X
HUMIDIFIER STATUS		X	X				X	X
HUMIDIFIER CAPACITY		X					X	X
SUPPLY AIR HUMIDITY	X	X				X	X	X

- NOTES:
- ANY ADDITIONAL POINTS AVAILABLE FROM ROOF TOP UNIT AND HUMIDIFIER CONTROLLER SHALL BE INTERFACED IN A TABLE FORMAT.

SEQUENCE OF OPERATIONS

ROOF TOP UNIT (MAU-1): VARIABLE AIR VOLUME

THE OCCUPIED/UNOCCUPIED MODE SCHEDULING SHALL BE MADE AT THE BUILDING AUTOMATION SYSTEM. PROVISIONS SHALL BE MADE FOR MANUAL SHUTDOWN OF EQUIPMENT. INITIAL SETUP OF EQUIPMENT SHALL BE TO RUN IN OCCUPIED MODE 24-HOURS PER DAY. ALL SETPOINTS SHALL BE ADJUSTABLE.

SUPPLY FAN – THE SUPPLY FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED MODE AND INTERMITTENTLY DURING UNOCCUPIED MODE. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL MODULATE THE SPEED OF THE FAN TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. IF AIRFLOW IS NOT DETECTED WITHIN TWO MINUTES AFTER A START COMMAND THE FAN MOTOR SHALL BE DE-ENERGIZED AND AN AUDIBLE ALARM SHALL BE ACTIVATED. IF A HIGH STATIC PRESSURE IS SENSED IN THE SUPPLY AIR THE SUPPLY FAN SHALL BE DE-ENERGIZED AND SIGNAL AN ALARM CONDITION.

STATIC PRESSURE AND DISCHARGE AIR TEMPERATURE RESET – THE SUPPLY FAN VFDs SHALL MODULATE THE FANS TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE BAS SHALL CONTROL SUPPLY FAN SPEED TO CONTROL AND MAINTAIN THE CRITICAL STATIC PRESSURE SETPOINT. THE SETPOINT SHALL RESET TO OPTIMIZE FAN SPEED AS FOLLOWS:

- THE BUILDING AUTOMATION SYSTEM SHALL MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS AND DETERMINE THE CRITICAL ZONE (CZ), WHICH IS THE VAV TERMINAL UNIT THAT IS MOST OPEN.
- WHEN THE CZ IS LESS THAN 90% OPEN, THE SUPPLY FAN DISCHARGE STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD 10% OF THE PREVIOUS SETPOINT AT A FREQUENCY OF 10 MINUTES UNTIL THE CZ IS 95% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM SETTING.
- IF THE OUTSIDE AIR TEMPERATURE IS BELOW 55°F AND THE CZ IS LESS THAN 90% OPEN AND THE STATIC PRESSURE SETPOINT IS AT THE MINIMUM SETTING, THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET UPWARD IN INCREMENTS OF 0.5°F AT A FREQUENCY OF 10 MINUTES AND THE STATIC PRESSURE SETPOINT HELD CONSTANT UNTIL THE CZ IS MORE THAN 95% OPEN OR THE DISCHARGE AIR TEMPERATURE IS RESET TO ITS MAXIMUM SETTING OF 10°F ABOVE THE DISCHARGE AIR TEMPERATURE SETPOINT.
- THE REVERSE CONTROL SEQUENCE SHALL OCCUR WHEN THE CZ IS 95% OPEN UNTIL THE DISCHARGE AIR TEMPERATURE AND STATIC TEMPERATURE SETPOINTS ARE A THEIR DESIGN SETPOINT.

SMOKE DETECTORS – UPON DETECTION OF SMOKE THE SUPPLY FAN SHALL BE DE-ENERGIZED, CLOSE OUTSIDE AIR DAMPER, AND SIGNAL ALARM LOCALLY AND AT FIRE ALARM PANEL.

OUTSIDE AIR DAMPER – THE OUTSIDE AIR DAMPER SHALL OPEN WHENEVER THE UNIT IS ENERGIZED AND SHALL CLOSE WHENEVER THE UNIT IS OFF.

COOLING MODE – THE AIR COOLED CONDENSING UNIT COMPRESSORS SHALL MODULATE AND STAGE AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT OF 55 DEGREES F

DEHUMIDIFICATION MODE – THE UNITS HOT GAS REHEAT COIL SHALL BE ENABLED AS REQUIRED TO MAINTAIN THE SPACE RELATIVE HUMIDITY SETPOINT OF 50% RH (ADJ.).

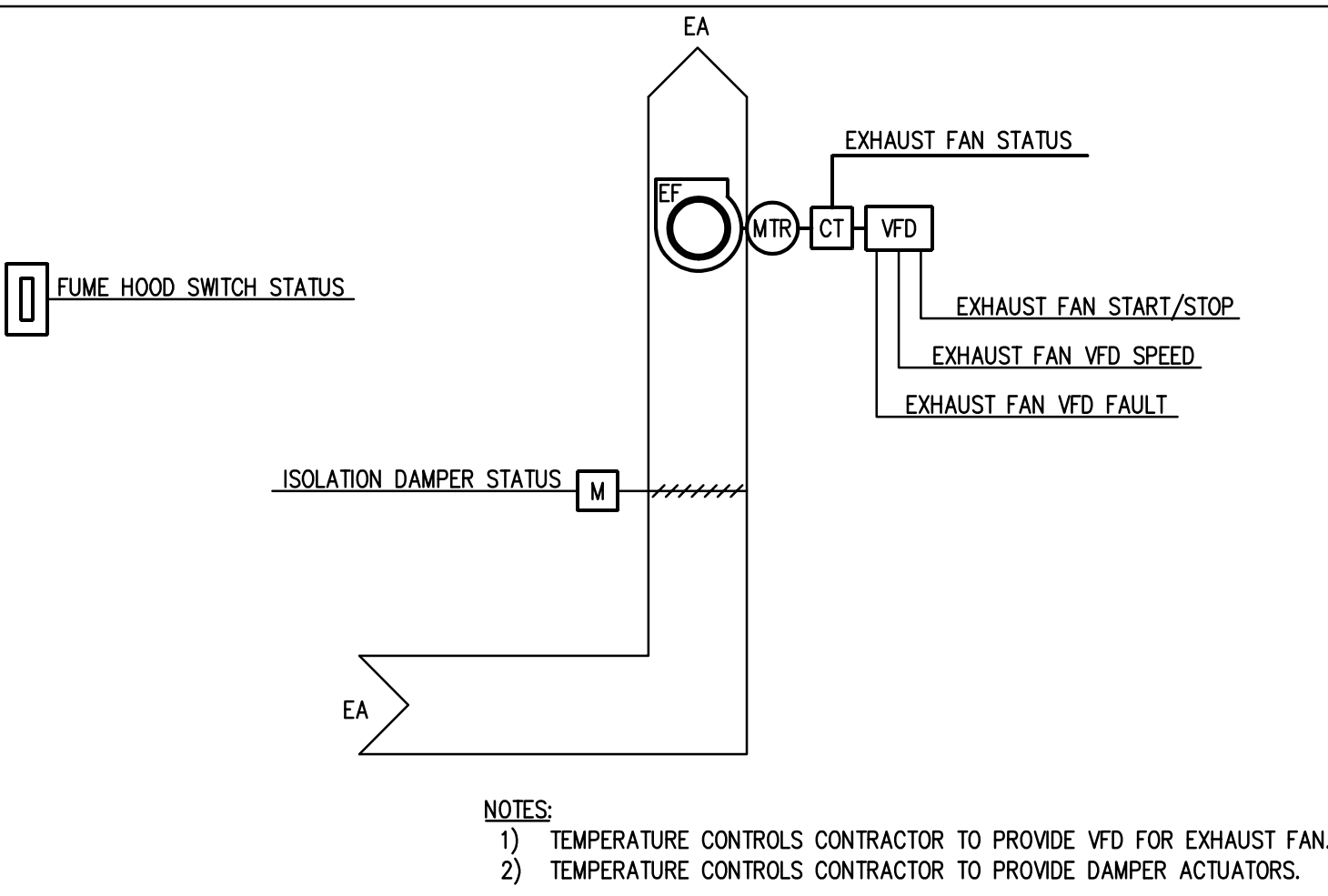
HEATING MODE – A MODULATING GAS HEAT EXCHANGER SHALL BE ENERGIZED AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT.

UNOCCUPIED MODE – THE BUILDING AUTOMATION SYSTEM SHALL MONITOR THE ZONE TEMPERATURES. IF ONE OF THE ZONE TEMPERATURES IS OUTSIDE OF THEIR UNOCCUPIED SETPOINT RANGE, THE ROOF TOP UNIT FAN SHALL BE ENERGIZED. THE UNIT SHALL OPERATE IN HEATING OR COOLING AS REQUIRED TO MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINT.

IONIZER CONTROL – THE IONIZER SHALL BE ENERGIZED WHENEVER THE SUPPLY FAN IS ON. THE BUILDING AUTOMATION SYSTEM SHALL HAVE THE CAPABILITY TO ENABLE/DISABLE THE IONIZER AND MONITOR THE STATUS OF THE IONIZER. IF THE IONIZER FAILS, AN ALARM SHALL BE GENERATED AT THE BUILDING AUTOMATION SYSTEM.

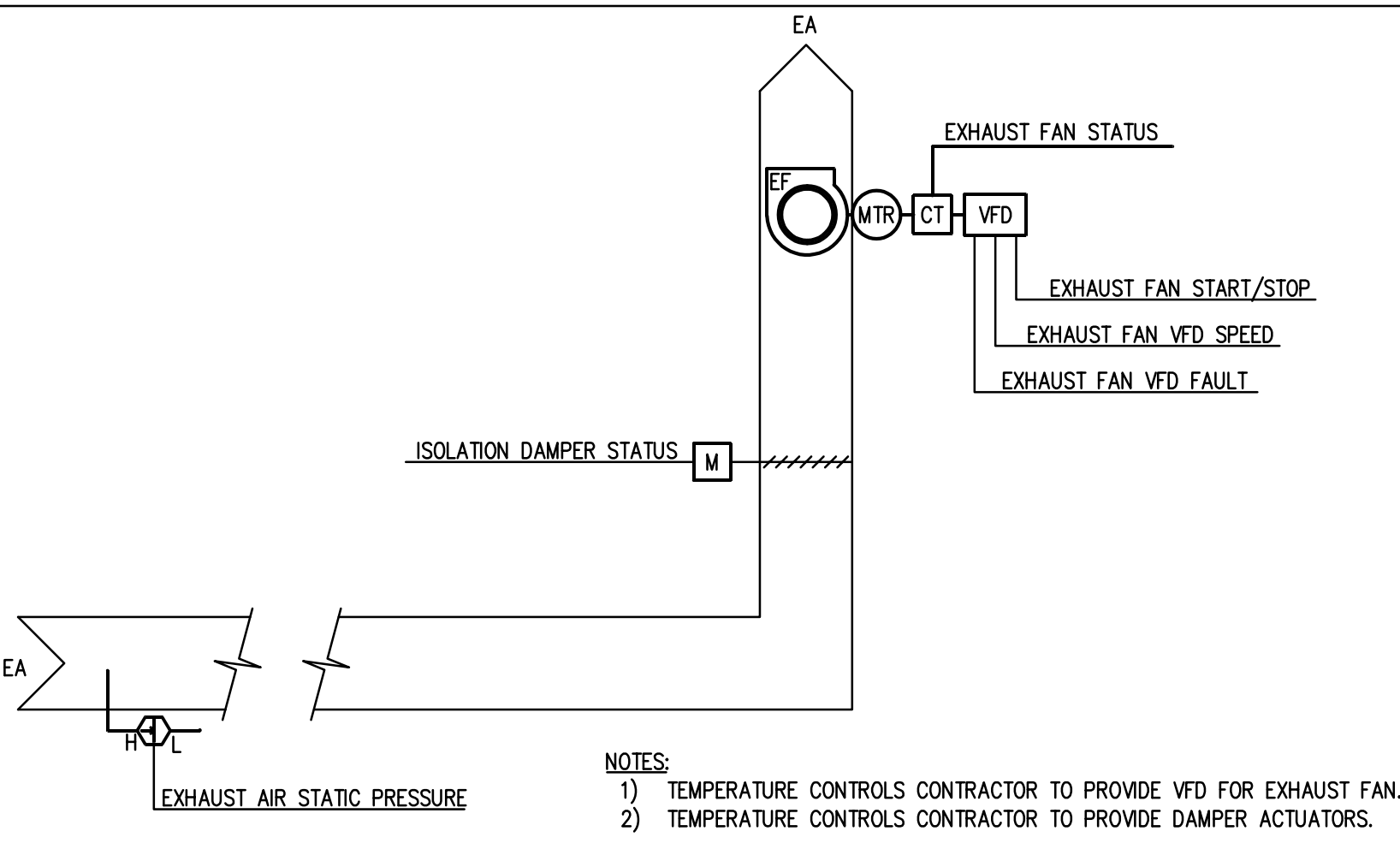
HUMIDIFIER (HUM-1) – THE HUMIDIFIER SHALL MODULATE TO MAINTAIN A SPACE AIR HUMIDITY OF 40% (ADJ.). THE HUMIDIFIER SHALL BE ENABLED WHENEVER THE AIR FLOW PROVING SWITCH STATUS IS ON. AN ALARM SHALL BE GENERATED IF THE SUPPLY AIR HUMIDITY FALLS BELOW 30% (ADJ.). THE HUMIDIFIER SHALL BE DE-ENERGIZED WHENEVER THE SUPPLY AIR HUMIDITY RISES ABOVE 90% RH (ADJ.) OR ON A LOSS OF AIRFLOW.

LEF-1 CONTROL SCHEMATIC



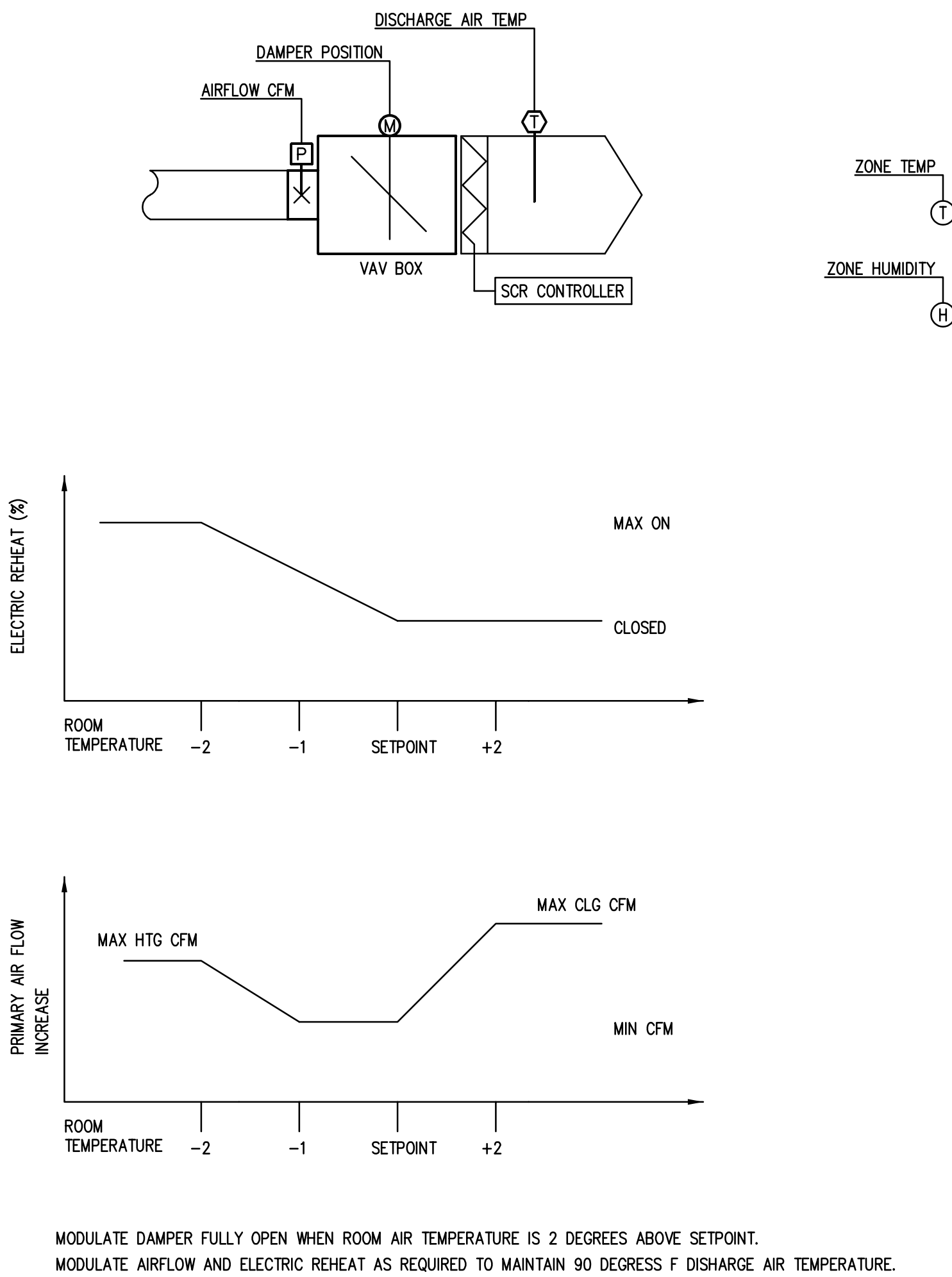
- NOTES:
- TEMPERATURE CONTROLS CONTRACTOR TO PROVIDE VFD FOR EXHAUST FAN.
 - TEMPERATURE CONTROLS CONTRACTOR TO PROVIDE DAMPER ACTUATORS.

LEF-2 CONTROL SCHEMATIC



- NOTES:
- TEMPERATURE CONTROLS CONTRACTOR TO PROVIDE VFD FOR EXHAUST FAN.
 - TEMPERATURE CONTROLS CONTRACTOR TO PROVIDE DAMPER ACTUATORS.

VARIABLE AIR VOLUME BOX CONTROL SCHEMATIC



SEQUENCE OF OPERATIONS

PRESSURE INDEPENDENT AIR TERMINAL SHALL MAINTAIN ZONE TEMPERATURE HEAT/COOL SETPOINTS OF 70/74 DEGREES F (ADJ) AND UNOCCUPIED COOL/HEAT SETPOINTS OF 80/65 DEGREES F. ALL SETPOINTS SHALL BE ADJUSTABLE.

OCCUPIED MODE:

COOLING – THE TERMINAL UNIT DAMPER SHALL MODULATE TO MAINTAIN THE ZONE COOLING TEMPERATURE SETPOINT BY MODULATING SUPPLY AIR FLOW. WHEN THE ZONE TEMPERATURE IS ABOVE SETPOINT THE DAMPER SHALL MODULATE TO THE MAXIMUM CFM POSITION. WHEN THE ZONE TEMPERATURE IS BELOW SETPOINT THE DAMPER SHALL MODULATE TO THE MINIMUM CFM POSITION.

HEATING – WHEN THE TERMINAL UNIT DAMPER HAS REACHED THE MINIMUM CFM POSITION AND THE ZONE TEMPERATURE IS BELOW SETPOINT THE ELECTRIC REHEAT SHALL BE ENERGIZED AND MODULATED AS REQUIRED TO PROVIDE A DISCHARGE AIR TEMPERATURE OF 80 DEGREES F. IF THE ZONE CONTINUES TO REMAIN BELOW SETPOINT THE TERMINAL UNIT DAMPER SHALL MODULATE OPEN TO THE MAXIMUM AIRFLOW CFM. THE ELECTRIC REHEAT SHALL MODULATE IN UNISON WITH THE DAMPER TO MAINTAIN A 80°F DISCHARGE AIR TEMPERATURE. AS THE ZONE TEMPERATURE INCREASES THE DAMPER AND ELECTRIC REHEAT SHALL REACT IN A REVERSE MANNER.

EXHAUST VAV BOXES (VAV-1E, -2E, -4E):

THE TERMINAL UNIT DAMPER SHALL MODULATE IN UNISON WITH THE ASSOCIATED ZONE SUPPLY VAV BOX TO MAINTAIN A FIXED OFFSET IN SUPPLY VS EXHAUST AIRFLOW AS REQUIRED TO MAINTAIN ROOM PRESSURE. THE EXHAUST AIR TERMINAL UNITS AIRFLOW SHALL BE CALCULATED AS THE FOLLOWING:

VAV-1E AIRFLOW = VAV-1S AIRFLOW + 30 CFM
VAV-2E AIRFLOW = VAV-2S AIRFLOW + 25 CFM
VAV-4E AIRFLOW = VAV-4S AIRFLOW + 100 CFM

VAV-3S AND VAV-3E:

WHEN THE FUME HOOD IS OFF, THE SUPPLY AIR TERMINAL UNIT SHALL OPERATE AS DESCRIBED ABOVE. THE EXHAUST VAV BOX SHALL MODULATE ITS DAMPER AS REQUIRED BASED ON THE FOLLOWING CALCULATION:

VAV-3E AIRFLOW = VAV-3S AIRFLOW + 25 CFM

ONCE THE FUME HOOD IS SWITCHED ON, THE SUPPLY AIR TERMINAL UNIT (VAV-3S) SHALL MODULATE ITS DAMPER TO MAINTAIN THE MAXIMUM AIRFLOW SETPOINT. THE EXHAUST VAV BOX (VAV-3E) SHALL MODULATE ITS DAMPER TO MAINTAIN ITS MINIMUM AIRFLOW SETPOINT.

POINTS LIST

VARIABLE AIR VOLUME BOX	HARDWARE				SOFTWARE			
	AI	AO	BI	BO	SCHED	TREND	ALARM	GRAPHIC
DISCHARGE AIR TEMPERATURE	X					X	X	X
ZONE AIR TEMPERATURE	X					X	X	X
ZONE AIR HUMIDITY	X					X	X	X
HEATING SETPOINT		X					X	X
COOLING SETPOINT		X					X	X
DAMPER POSITION		X					X	X
AIRFLOW CFM	X					X	X	X
MINIMUM AIRFLOW SETPOINT		X					X	X
MAXIMUM AIRFLOW SETPOINT		X					X	X
ZONE HIGH TEMPERATURE ALARM		X					X	X
ZONE LOW TEMPERATURE ALARM		X					X	X
ELECTRIC REHEAT COIL CAPACITY		X				X	X	X

DUCT BLANKET INSULATION DETAILS
SCALE: NTS

BUTT-JOINT METHOD

STAPLE-STITCHING METHOD

NOTES

- RECTANGULAR DUCT
- BLANKET INSULATION (SHOWN WITH FACTORY-APPLIED VAPOR JACKET)
- FACTORY LAP (SEALED WITH ADHESIVE AND/OR STAPLES OR VAPOR-RETARDER TAPE)
- MECHANICAL FASTENERS SUPPORTING INSULATION ON THE UNDERSIDE OF DUCTS OVER 24" WIDE AND ON VERTICAL DUCTWORK AS NEEDED.
- VAPOR-RETARDER TAPE OVER TEARS AND PENETRATIONS OF THE VAPOR-RETARDER JACKET.
- ALTERNATE METHOD OF LAP SEAL—LONGITUDINAL JOINT LAPPED AND FOLDED, THEN STAPLED SECURELY IN PLACE

HANGER/SUPPORT DETAILS - DUCTWORK (2"-10" WG)
SCALE: NTS

SINGLE RECTANGULAR DUCT

MULTIPLE DUCT RUNS ON TRAPEZOIDAL HANGERS

ROUND DUCT

NOTES: DUCTS SHALL BE SUPPORTED AT NOT LESS THAN 10FT O.C.

HANGER/SUPPORT DETAILS - DUCTWORK (<2" WG)
SCALE: NTS

SINGLE RECTANGULAR DUCT

MULTIPLE DUCT RUNS ON TRAPEZOIDAL HANGERS

ROUND DUCT

NOTES: DUCTS SHALL BE SUPPORTED AT NOT LESS THAN 10FT O.C.

FLEXIBLE DUCT SUPPORT DETAILS
SCALE: NTS

RETURN AIR GRILLE BOOT DETAIL
SCALE: NTS

AIR TRANSFER DUCT DETAIL
SCALE: NTS

ROUND DUCTWORK HANGER DETAILS
SCALE: NTS

MINIMUM HANGER SIZE FOR ROUND DUCTWORK

DUCTWORK DIAMETER (INCHES)	12' MAXIMUM SPACING		
	WIRE	ROD	STRAP
UP TO 10	(1) 12 GAGE	1/4"	1" X 22 GAGE
11 - 18	(2) 12 GAGE	1/4"	1" X 22 GAGE
19 - 24	(2) 10 GAGE	1/4"	1" X 22 GAGE
25 - 36	(2) 8 GAGE	3/8"	1" X 20 GAGE
37 - 50	-	(2) 3/8"	(2) 1" X 20 GAGE
51 - 60	-	(2) 3/8"	(2) 1" X 18 GAGE

DEDICATED OUTDOOR AIR SYSTEM SCHEDULE

MARK	AIR FLOW (CFM)	MINIMUM OA (CFM)	COOLING				REHEAT COIL		HEATING		SUPPLY FAN (HP)	EXTERNAL STATIC PRESS (IN WG)	ELECTRICAL		MAXIMUM OPERATING WEIGHT (LBS)	MODEL	NOTES							
			ENT AIR TEMP (db / wb °F)	LVG AIR TEMP (db / wb °F)	REFRIGERANT TYPE	COOLING CA TEMP (db °F)	SENS CAP (MBH)	TOTAL CAP (MBH)	EFFICIENCY ISMRE	EFFICIENCY ISMR2			TOTAL CAP (MBH)	LAT (°F)				GAS INPUT (MBH)	GAS OUTPUT (MBH)	STAGES	TURNDOWN	V/PHHZ	MCA	MOP
MAU-1	2,450	2,450	95.0 / 75.0	50.2 / 50.2	R-545B	95	109.4	188.4	-	8.5	85.9	84.7	300.0	243.0	MODULATING	12:1	2	1.5	460/3/60	44.5	60.0	2,500	VX-112-15J	1, 2, 3, 4, 5

NOTES

- MODEL BASED ON VALENT.
- PROVIDE WITH VARIABLE SPEED COMPRESSOR WITH MODULATING HOT GAS REHEAT COIL, EC CONDENSER FANS.
- PROVIDE WITH ATMOS AIR, MATTERHORN 1002 B-POLAR IONIZATION INSTALLED IN THE UNIT.
- PROVIDE WITH 2-INCH MERV 8 AND 4-INCH MERV 13 FILTER RACK. PROVIDE ADDITIONAL 0.5" W.G. DIRTY FILTER ALLOWANCE.
- PROVIDE WITH FACTORY INSTALLED R-454B REFRIGERANT LEAK DETECTORS IN THE AIR TUNNEL AND COMPRESSOR/FURNACE SECTION OF THE UNIT.

LABORATORY EXHAUST FAN SCHEDULE

MARK	AIR FLOW RATE (CFM)	TOTAL S.P. (IN WG)	DRIVE TYPE	DISCHARGE	EFFECTIVE PLUME HT (FT)	MOTOR (HP)	ELECTRICAL (V/PHHZ)	FAN ENERGY INDEX (FEI)	AREA SERVED	LOCATION	MODEL	NOTES
LEF-1	510	1.0	BELT	UPBLAST	15.7	1	460/3/60	1.16	FUME HOOD	ROOF	TCNHLE	1, 2, 3, 4
LEF-2	2,630	1.25	BELT	UPBLAST	21.4	3	460/3/60	1.03	GENERAL EXH	ROOF	TCNHLE	1, 2, 3, 4

NOTES

- MODEL BASED ON LOREN COOK.
- PROVIDE WITH MOTORIZED INLET ISOLATION DAMPER.
- PROVIDE WITH AMCA TYPE "B" SPARK RESISTANCE.
- PROVIDE WITH PRE-WIRED NEMA 3R DISCONNECT SWITCH.

VARIABLE AIR VOLUME BOX SCHEDULE

MARK	MAXIMUM AIR FLOW (CFM)	MINIMUM AIR FLOW (CFM)	INLET SIZE (IN)	REHEAT COIL				MODEL	AREA SERVED	NOTES
				AIR FLOW (CFM)	EAT / LAT (°F)	STEPS OF CONTROL	CAPACITY (KW)			
VAV-1S	470	370	8	470	55 / 82.5	SCR	4.0	DESV	C-254A	1, 2
VAV-2S	640	235	8	640	55 / 80.2	SCR	5.0	DESV	C-254B	1, 2
VAV-3S	1000	490	10	1000	55 / 80.8	SCR	8.0	DESV	C-254C	1, 2
VAV-4S	330	200	8	330	55 / 84.4	SCR	3.0	DESV	C-254D	1, 2
VAV-5S	550	275	8	550	55 / 81.4	SCR	4.5	DESV	C-243	1, 2
VAV-1E	500	400	8	-	-	-	-	DESV	C-254A	1
VAV-2E	665	260	8	-	-	-	-	DESV	C-254B	1
VAV-3E	1025	515	10	-	-	-	-	DESV	C-254C	1
VAV-4E	430	300	8	-	-	-	-	DESV	C-254D	1

NOTES

- MODEL BASED ON TITUS.
- PROVIDE WITH DOOR INTERLOCKING DISCONNECT SWITCH.
- EXISTING TITUS VAV BOX FOR REFERENCE ONLY.
- EXISTING TITUS VAV BOX TO BE REBALANCED.

DIFFUSERS, REGISTERS AND GRILLES SCHEDULE

MARK	MODEL	SIZE	NECK	DAMPER	MATERIAL	REMARKS
S-1	TRITEC	24 X 24	8"ø	-	ST	1, 3
S-2	TRITEC	24 X 24	10"ø	-	ST	1, 3
S-3	TMS	24 X 24	8"ø	OBD	ST	1
S-4	TMS	24 X 24	10"ø	OBD	ST	1
R-1	350RL	24 X 24	22 X 22	-	ST	1, 4
E-1	350RL	24 X 24	22 X 22	-	ST	1, 2, 4
E-2	350RL	24 X 24	22 X 22	-	ST	1, 2, 4

NOTES

- MODEL BASED ON TITUS.
- PROVIDE WITH SQUARE TO ROUND ADAPTER.
- TWO-WAY AIRFLOW PATTERN.
- PROVIDE WITH LAY-IN BORDER FOR 24X24 CEILING GRID.

HUMIDIFIER SCHEDULE

MARK	MODEL	TYPE	AIRFLOW (CFM)	DUCT SIZE (W X H)	ABSORPTION DIST. (IN)	AIR TEMP (°F)	STEAM CAPACITY (LBS/HR)	HEATERS (QTY/STAGES)	ELECTRICAL (V/PHHZ)	FLA	NOTES
HUM-1	RTS RX-75-1	STEAM	2,450	24 X 14	11	55	66.2	MODULATING	460/3/60	32.5	1

NOTES

- MODEL BASED ON DRISTEEM.
- PROVIDE WITH SHORT ABSORPTION DUCT MOUNTED STEAM DISTRIBUTION MANIFOLD.
- PROVIDE WITH EXTERNAL DRAIN WATER COOLER AND BACNET INTERFACE.
- PROVIDE WITH AIRFLOW PROVING SWITCH, DUCT MOUNTED ELECTRIC MODULATING HIGH LIMIT HUMIDISTAT, AND WALL MOUNTED HUMIDITY TRANSMITTER.
- PROVIDE WITH 5-MICRON WATER FILTER, WALL MOUNTED DECHLORINATOR, MODEL DC-CB, AND WATER SOFTENER (WS-1), MODEL WS-844.

COOLING COIL CONDENSATE TRAP DETAILS
SCALE: NTS

NOTES

- CONDENSATE DRAINS SHALL BE PIPED TO NEAREST ROOF DRAIN.

HUMIDIFIER DETAIL
SCALE: NTS

NOTES

- STEAM LINE SHALL HAVE MINIMUM 10' UPSLOPE / 2" DOWNSLOPE WITH A STEAM TRAP AT THE LOWEST POINT. STEAM TRAPS ARE REQUIRED EVERY 15 FT FOR LONG RUNS.
- CONDENSATE LINE SHALL HAVE A CONSTANT DOWNSLOPE OF 1/2" AND A MINIMUM TRAP HEIGHT OF 8-INCHES. THE TRAP SHALL BE LOCATED MINIMUM 12-INCHES BELOW STEAM DISTRIBUTOR.
- REFER TO MANUFACTURER'S INSTALLATION MANUAL FOR ADDITIONAL INFORMATION.

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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

37W777 IL-38
ST. CHARLES, ILLINOIS 60175

M500

ISSUED
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MECHANICAL SCHEDULES & DETAILS

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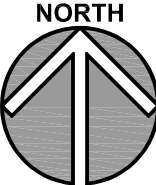
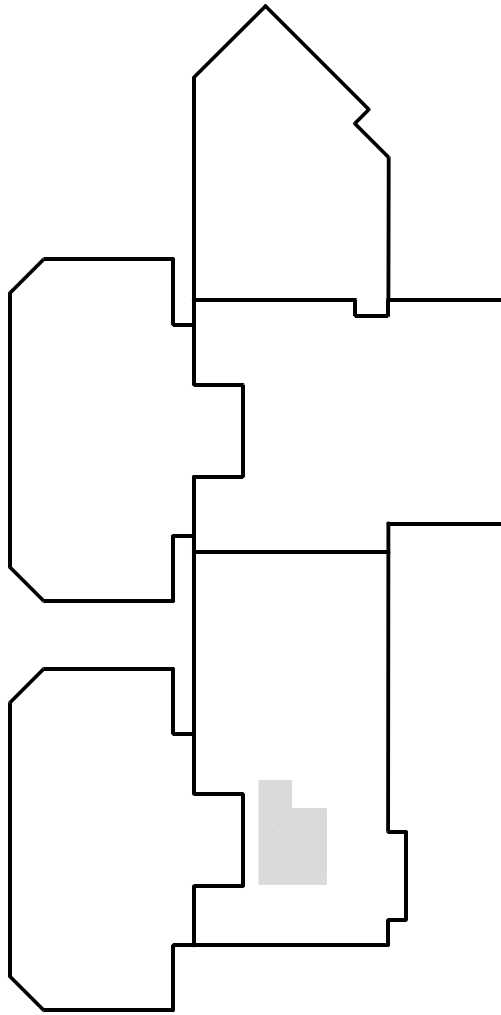
KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL. AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

- 22.100 REMOVE EWCs WASTE PIPE BACK TO LOCATION SHOWN AND PROVIDE TEMPORARY CAP FOR NEW CONNECTION.
22.101 REMOVE EWCs AND ALL ASSOCIATED WASTE, VENT AND WATER PIPES.
22.102 REMOVE COLD WATER PIPE BACK TO WITHIN 24 INCHES OF NEXT ACTIVE BRANCH LOCATED APPROXIMATELY 35 FEET NORTH AND CAP.

GENERAL NOTES

- REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
- ALL SANITARY, WASTE AND STORM PIPES UP TO AND INCLUDING 3 INCHES SHALL SLOPE AT 1/4 INCH PER FOOT, 4 INCHES AND LARGER SHALL SLOPE AT 1/8 INCH PER FOOT. UNLESS OTHERWISE NOTED.
- ALL PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM.
- OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.
- EXISTING PIPING INDICATED ON THESE PLANS SHALL BE FIELD VERIFIED FOR EXACT LOCATIONS, QUANTITY AND PIPE SIZES.
- DO NOT CUT THROUGH STRUCTURAL ELEMENTS WHEN INSTALLING OPENINGS REQUIRED FOR ALL PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED ELEMENTS.
- SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER PLUMBING COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.
- COORDINATE ROUGH-INS FOR AND INSTALLATION OF PLUMBING FIXTURES WITH ACCESSIBILITY AND MOUNTING INFORMATION CONTAINED ON ARCHITECTURAL DRAWINGS.
- COORDINATE LOCATIONS OF ROUGH-INS FOR SINKS WITH CASEWORK ELEVATIONS CONTAINED ON ARCHITECTURAL DRAWINGS.
- DRAINAGE AND VENT SYSTEM SHALL BE PRESSURE TESTED WITH WATER OR AIR.
- ALL COFFEE MAKERS, HUMIDIFIERS, ICE MACHINES OR SIMILAR EQUIPMENT/FIXTURES WITH A POTABLE WATER SUPPLY LINE SHALL HAVE AN APPROVED DUAL CHECK VALVE DEVICE INSTALLED IN-LINE.

KEY PLAN



ISSUED
01/10/2025 BID AND PERMIT SET

JOB NO. 23-471-1507
DRAWN DDW
CHECKED DDW
APPROVED DDW

SHEET TITLE
PLUMBING
DEMOLITION FLOOR
PLANS

SHEET NUMBER

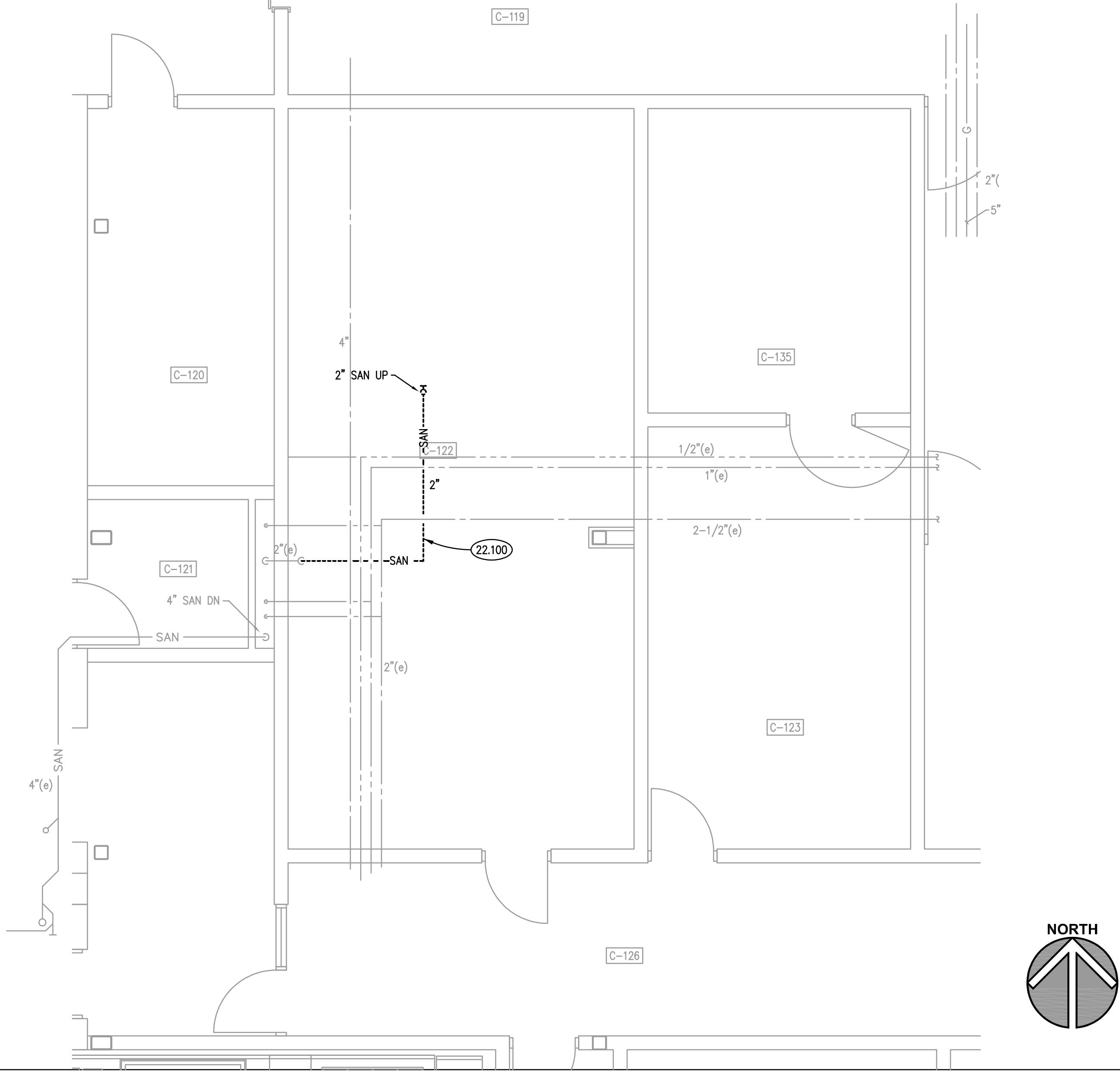
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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

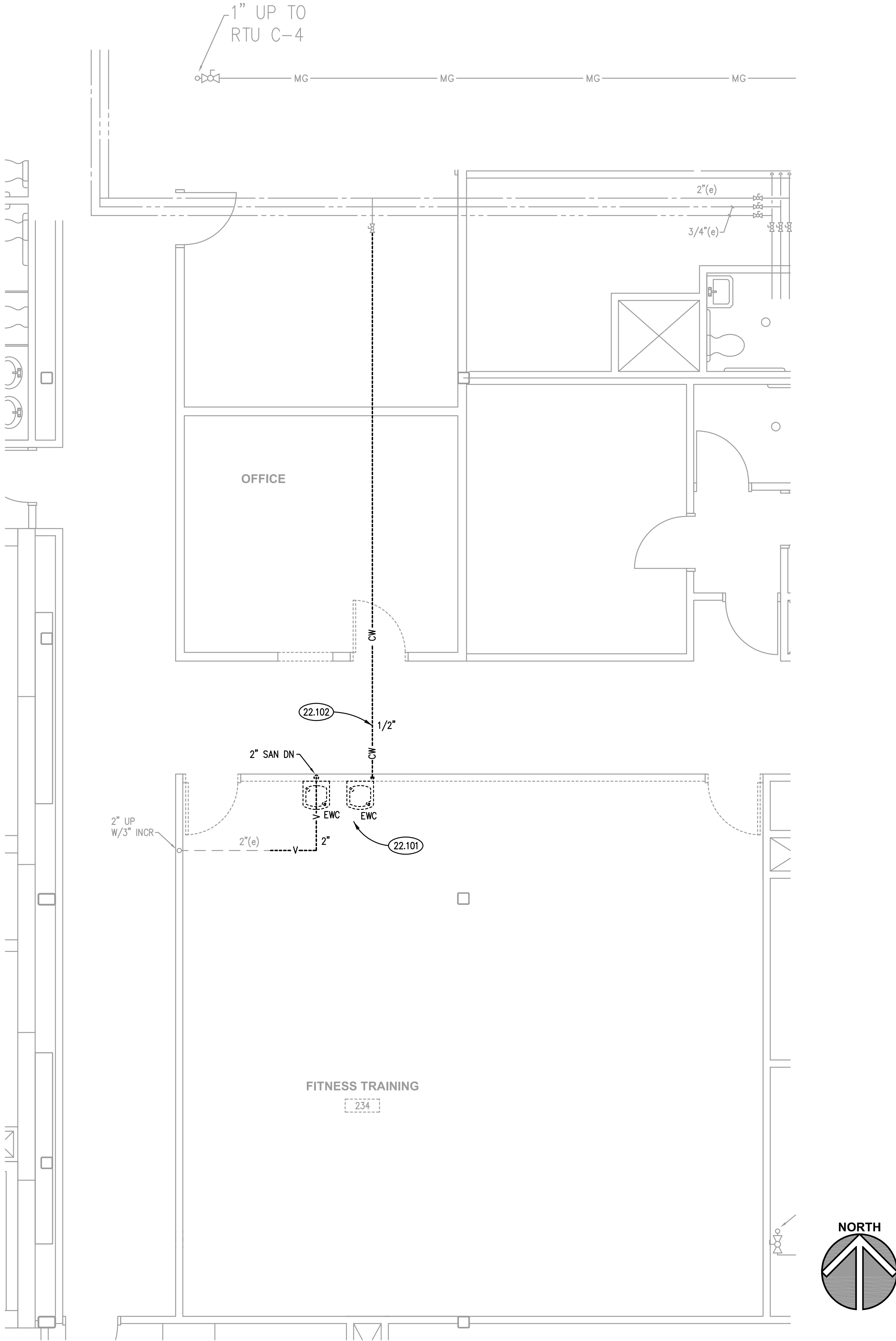
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FIRST FLOOR PLUMBING DEMOLITION PLAN 3
SCALE: 1/4" = 1'-0"



KEYNOTES

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- 22.200 PROVIDE FINAL WASTE AND WATER CONNECTIONS TO SINK PROVIDED UNDER DIVISION 12.
- 22.201 PROVIDE FINAL GAS CONNECTION TO MECHANICAL EQUIPMENT. PROVIDE REQUIRED PRESSURE REGULATOR AND SHUTOFF VALVE. PROVIDE SHUT OFF VALVE WITH PRESSURE TEST PORT UPSTREAM AND DOWNSTREAM OF PRESSURE REGULATOR. OUTSIDE REGULATORS SHALL BE PROVIDED WITH MANUFACTURER OUTSIDE VENT PROTECTORS. PROVIDE DIRT LEG UPSTREAM OF PRESSURE REGULATOR.
- 22.202 PROVIDE WATER CONNECTION TO HUMIDIFIER, WATER SOFTENER, AND EXTERNAL DRAIN WATER COOLER AS DETAILED. INSTALL PIPING IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS. WATER SOFTENER TO BE FURNISHED BY HUMIDIFIER MANUFACTURER.
- 22.203 INSTALL ALL PLUMBING PIPING IN ELECTRICAL ROOM SUCH THAT IT IS NOT LOCATED ABOVE ELECTRICAL EQUIPMENT'S DEDICATED SPACE.
- 22.204 PROVIDE HUB DRAIN FOR HUMIDIFIER AND WATER SOFTENER. PROVIDE WITH P-TRAP ON FLOOR BELOW. MINIMUM HEIGHT OF RECEPTOR ABOVE THE TRAP SHALL BE 14-INCHES.

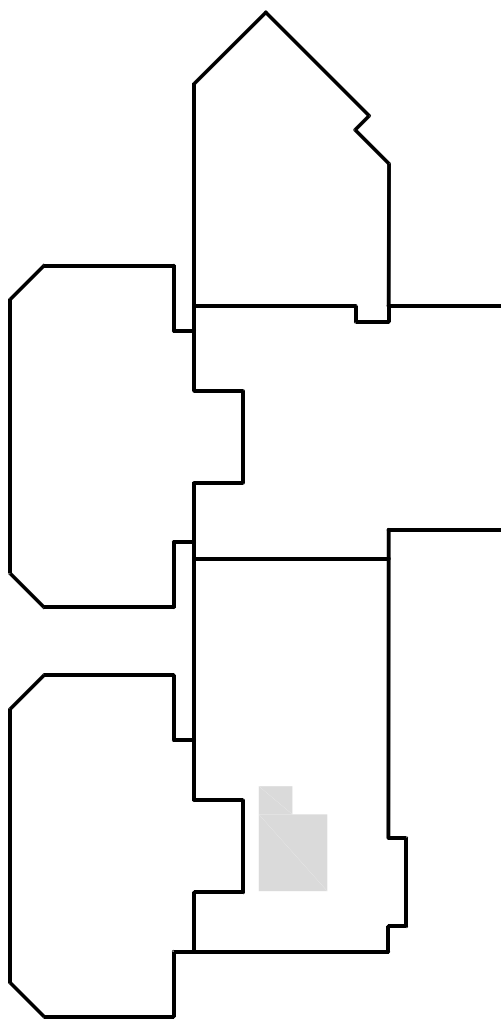
ROOM SCHEDULE

RM. NO.	ROOM NAME	RM. NO.	ROOM NAME
		233	EVIDENCE
		253	EXISTING HALLWAY
		234A	PREP
		234B	EXTRACTION
		234C	CRUISS AND TOXICOLOGY
		234D	AMPLIFICATION

GENERAL NOTES

- REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
- ALL SANITARY, WASTE AND STORM PIPES UP TO AND INCLUDING 3 INCHES SHALL SLOPE AT 1/4 INCH PER FOOT, 4 INCHES AND LARGER SHALL SLOPE AT 1/8 INCH PER FOOT. UNLESS OTHERWISE NOTED.
- ALL PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM.
- OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.
- EXISTING PIPING INDICATED ON THESE PLANS SHALL BE FIELD VERIFIED FOR EXACT LOCATIONS, QUANTITY AND PIPE SIZES.
- DO NOT CUT THROUGH STRUCTURAL ELEMENTS WHEN INSTALLING OPENINGS REQUIRED FOR ALL PIPING, CONDUTS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED ELEMENTS.
- SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER PLUMBING COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.
- COORDINATE ROUGH-INS FOR AND INSTALLATION OF PLUMBING FIXTURES WITH ACCESSIBILITY AND MOUNTING INFORMATION CONTAINED ON ARCHITECTURAL DRAWINGS.
- COORDINATE LOCATIONS OF ROUGH-INS FOR SINKS WITH CASEWORK ELEVATIONS CONTAINED ON ARCHITECTURAL DRAWINGS.
- DRAINAGE AND VENT SYSTEM SHALL BE PRESSURE TESTED WITH WATER OR AIR.
- ALL COFFEE MAKERS, HUMIDIFIERS, ICE MACHINES OR SIMILAR EQUIPMENT/FIXTURES WITH A POTABLE WATER SUPPLY LINE SHALL HAVE AN APPROVED DUAL CHECK VALVE DEVICE INSTALLED IN-LINE.

KEY PLAN



ISSUED
01/30/25 BID AND PERMIT SET

JOB NO. 23-471-1507
DRAWN DDW
CHECKED DDW
APPROVED DDW

SHEET TITLE

PLUMBING FLOOR PLANS

SHEET NUMBER

P300

KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

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ROOF PLUMBING PLAN

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

2

FIRST FLOOR PLUMBING PLAN

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

1

SECOND FLOOR PLUMBING PLAN

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

2

KEYNOTES

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21.100 REMOVE SPRINKLER HEADS AND PIPING AS REQUIRED FOR MODIFICATIONS IN AREA SHOWN. PROVIDE PERMANENT CAP ON BRANCH TAKE-OFFS NOT TO BE REUSED.

21.200 PROVIDE NEW SPRINKLER HEADS, MATERIAL AND LABOR TO PROVIDE FIRE PROTECTION OF OUTLINED AREA TO ACCOMMODATE NEW CEILING AND ROOM CONFIGURATIONS.

21.201 OUTLINED AREA WAS CLASSIFIED AS LIGHT HAZARD, NEW CLASSIFICATION IS ORDINARY HAZARD, GROUP 2.

ROOM SCHEDULE

RM. NO.	ROOM NAME	RM. NO.	ROOM NAME
233	EVIDENCE	233	EXISTING HALLWAY
234	PREP	234A	EXTRACTION
234B	DRUGS AND TOXICOLOGY	234C	AMPLIFICATION
234D		234D	

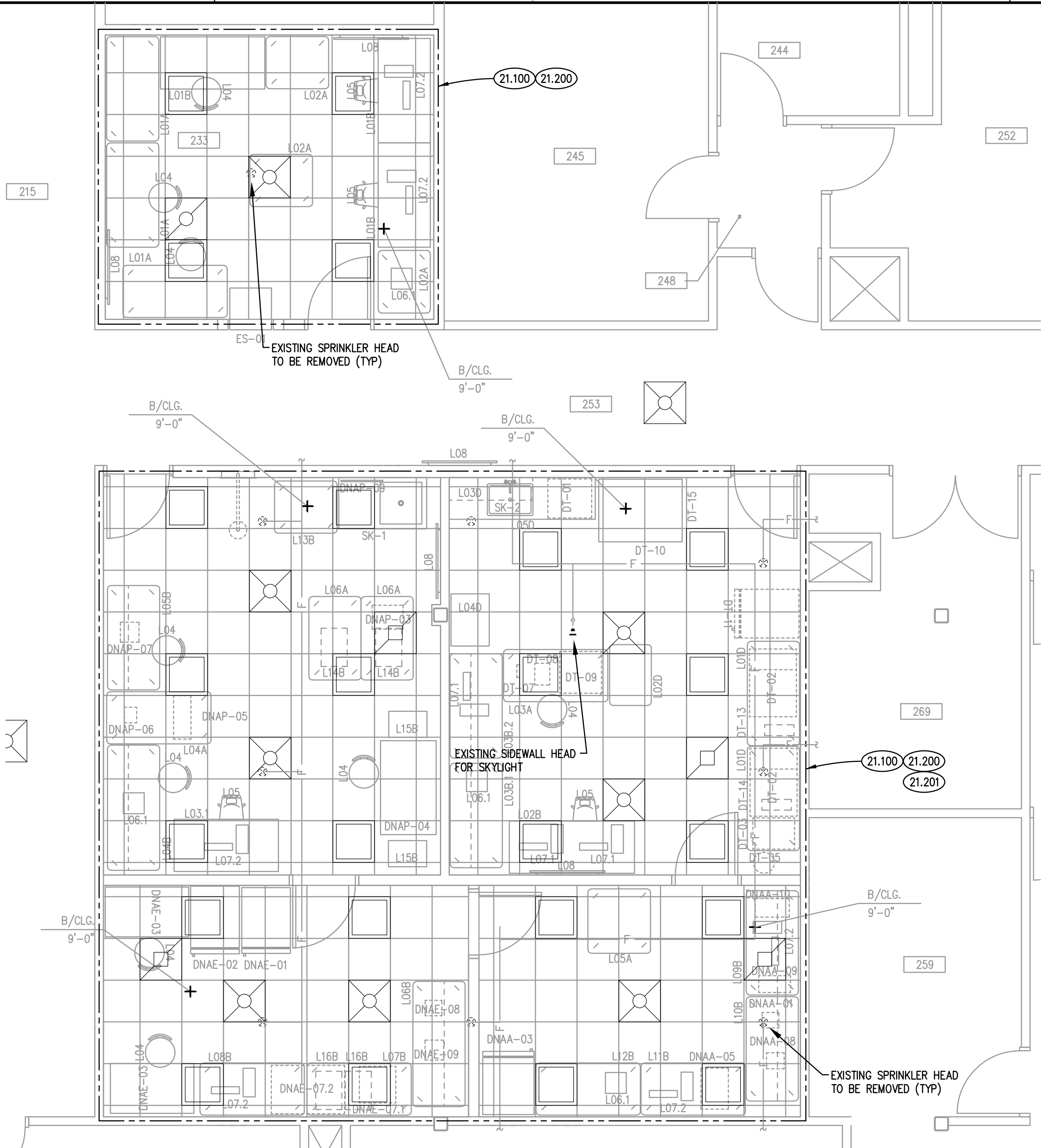
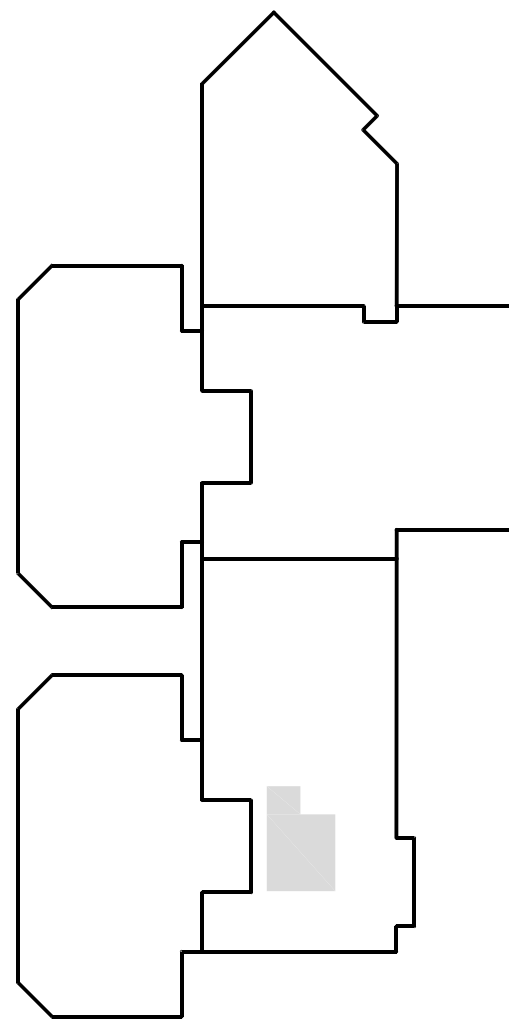
CEILING SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GYPSUM BOARD		MECHANICAL DIFFUSER: SUPPLY
			MECHANICAL DIFFUSER: EXHAUST
	ACOUSTICAL CEILING TILE: 2' X 2'		LIGHT FIXTURES: 2' X 2'

GENERAL NOTES

- REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.
- SPRINKLER SYSTEM SHOWN ARE CONCEPT DRAWINGS AND ARE SCHEMATIC FOR BIDDING PURPOSES ONLY. CONCEPT DRAWINGS ARE INTENDED TO ILLUSTRATE THE SCOPE OF WORK. THE CONTRACTOR SHALL VERIFY ALL INFORMATION CONTAINED ON THESE DRAWINGS.
- ALL PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS, AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE SPRINKLER SYSTEM. THE DESIGN SHALL BE ACCOMPLISHED UNDER THE DIRECT SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER OR NICET LEVEL III/IV. SHOP DRAWINGS AND HYDRAULIC CALCULATIONS SHALL BEAR THE LICENSED PROFESSIONAL'S STAMP.
- FIRE PROTECTION SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NFPA 13.
- PIPING 2 INCHES AND SMALLER SHALL BE SCHEDULE 40 BLACK STEEL PIPING WITH THREADED COUPLINGS AND FITTINGS. PIPING 2-1/2" AND LARGER SHALL BE SCHEDULE 10 BLACK STEEL PIPING WITH ROLL-GROOVED FITTINGS AND COUPLINGS.
- HYDRAULIC CALCULATIONS FOR: LIGHT HAZARD - 0.10 GPM/SF OVER 1500 SQUARE FEET; ORDINARY HAZARD - GROUP 1, 0.15 GPM/SF OVER 1500 SQUARE FEET; ORDINARY HAZARD - GROUP 2, 0.20 GPM/SF OVER 1500 SQUARE FEET.
- ALL SPRINKLER HEADS IN LAY-IN CEILING TILES SHALL BE CENTERED ON 2'x2' END AREA OF TILE.
- HYDRANT TEST DATA WAS NOT AVAILABLE. COORDINATE WITH AUTHORITY HAVING JURISDICTION FOR HYDRANT FLOW TEST INFORMATION.
- THE CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES.
- OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.

KEY PLAN



SECOND FLOOR FIRE PROTECTION PLAN

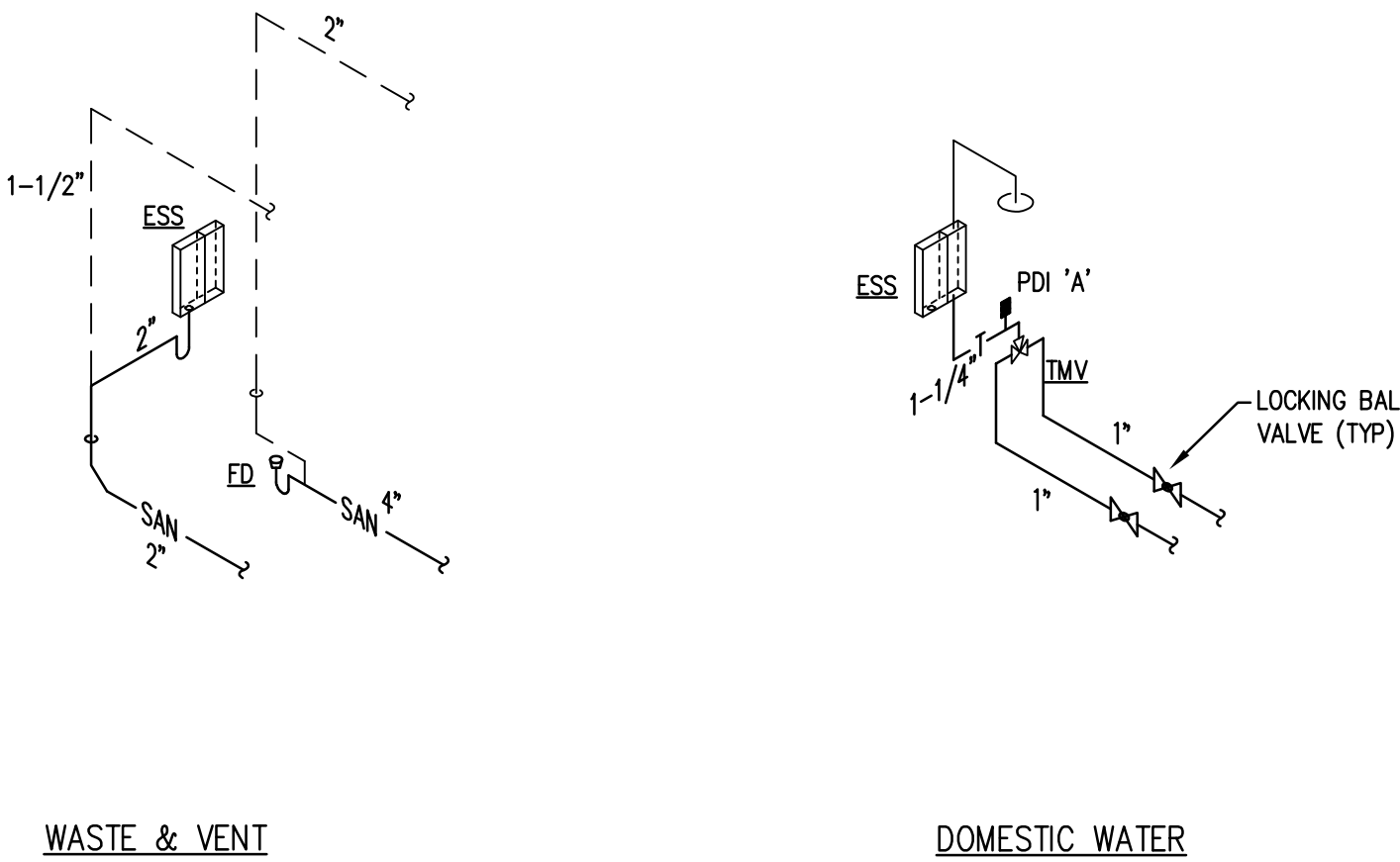
SCALE: 1/4" = 1'-0"

1

PLUMBING FIXTURE SCHEDULE

TAG	DESCRIPTION	COLD	HOT	WASTE	VENT	REMARKS
SK-1	SINK-PROVIDED IN DIVISION 12	1/2"	1/2"	1-1/2"	1-1/4"	
SK-2	SINK-PROVIDED IN DIVISION 12	1/2"	1/2"	1-1/2"	1-1/4"	
ESS	EMERGENCY SAFETY STATION	-	1-1/4"	2"	1-1/2"	AADAQ COMPLIANT, TEMPERED HOT WATER FROM TMV

- ALL PLUMBING MATERIALS AND INSTALLATIONS SHALL BE IN STRICT ACCORDANCE WITH ALL STATE AND LOCAL PLUMBING RULES AND REGULATIONS CURRENTLY IN EFFECT, GOVERNED BY THE ADMINISTRATIVE AUTHORITY HAVING JURISDICTION.
- THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF ALL TRAPS AND CLEANOUTS AS NECESSARY OF THE LOCALITY.
- THE OPENINGS IN WALLS FOR THE PASSAGE OF PIPES SHALL BE TOTALLY FIRE SEALED TO THE SATISFACTION OF THE PLUMBING INSPECTOR AND/OR THE AUTHORITY HAVING JURISDICTION.



RISER DIAGRAM

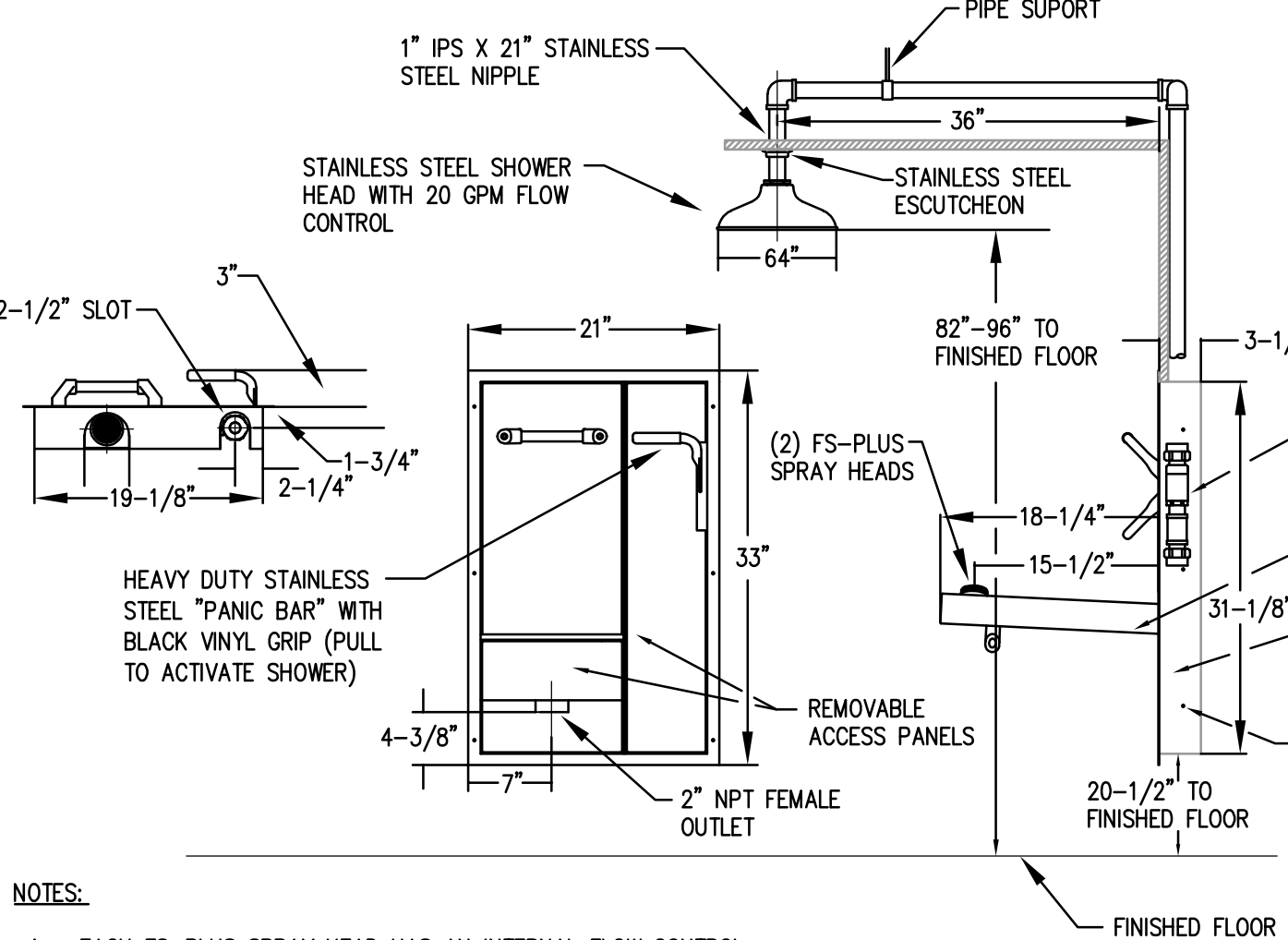
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RISER DIAGRAM

SCALE: NTS

2



NOTES:

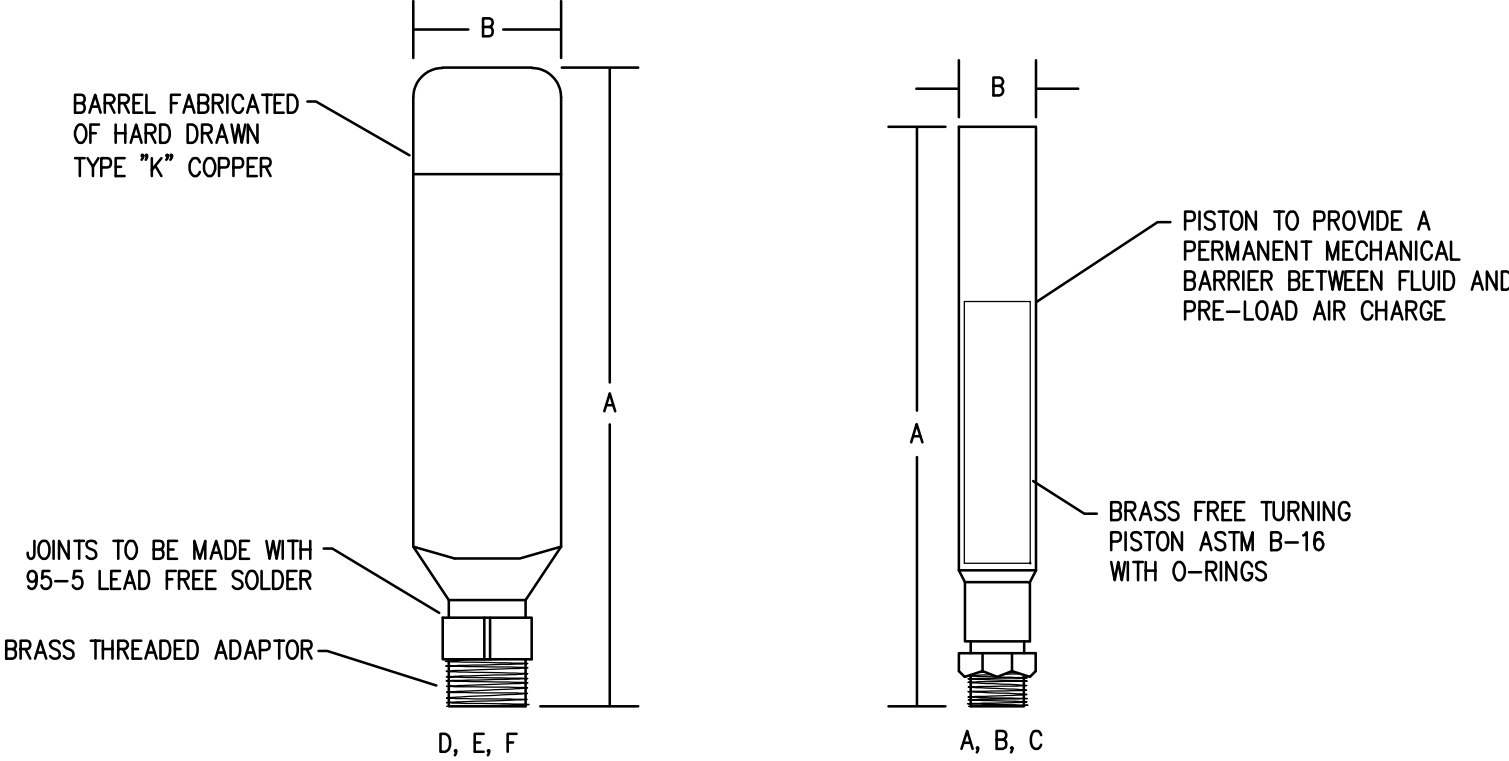
- EACH FS-PLUS SPRAY HEAD HAS AN INTERNAL FLOW CONTROL AND FILTER TO REMOVE IMPURITIES FROM THE WATER FLOW.
- UNIT IS FURNISHED WITH IN-LINE STRAINER TO PROTECT SPRAY HEADS AND VALVE COMPONENTS FROM DEBRIS IN WATER LINE.

EMERGENCY SHOWER / EYE-WASH RECESSED DETAIL

SCALE: NTS

3

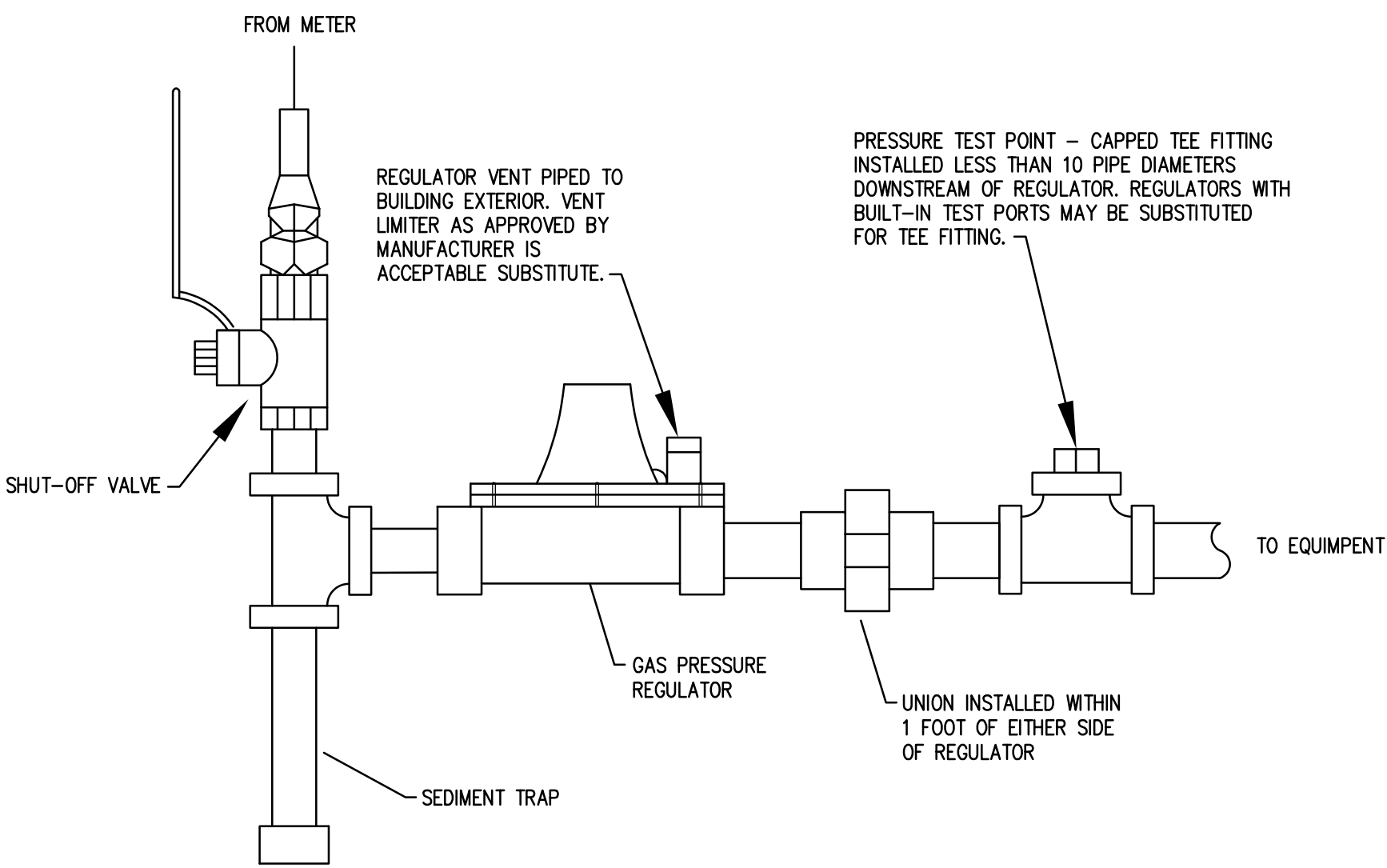
PDI SIZE	MNPT THREAD	DIMENSIONS (approximate)		FIXTURE UNIT CAPACITY
		A in.	B in.	
A	1/2	6-1/4	7/8	1 - 11
B	3/4	7-5/16	7/8	12 - 32
C	1	9-1/4	1-1/8	33 - 60
D	1	9-5/16	1-3/4	61 - 113
E	1	10-1/4	2-1/2	114 - 154
F	1	10-7/8	2-7/8	155 - 330



WATER HAMMER ARRESTER DETAIL

SCALE: NTS

4



GAS PRESSURE REGULATOR DETAIL

SCALE: NTS

5

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JOB NO. 23-471-1507
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CHECKED DDW
APPROVED DDW

SHEET TITLE
PLUMBING DETAILS
AND SECOND FLOOR
FIRE PROTECTION
FLOOR PLAN

SHEET NUMBER

PF410

ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A		I		P	
AMP	AMPS	IDF	INTERMEDIATE DISTRIBUTION FRAME	PB	PUSH BUTTON
AC	ABOVE COUNTER	IG	ISOLATED GROUND	PC	PLUMBING CONTRACTOR
AF	AMPERE FRAME/AMPERE FUSE	INC	INCANDESCENT	PDU	POWER DISTRIBUTION UNIT
AFF	ABOVE FINISHED FLOOR	INT	INTEGRAL	PH	PHASE
AHU	AIR HANDLING UNIT	IR	IN ROOM	PNL	PANEL
AIC	AMPERE INTERRUPTING CURRENT	IU	IN UNIT	PROVIDE	FURNISHED, INSTALLED, WIRED AND CONNECTED COMPLETE BY CONTRACTOR
AT	AMPERE TRIP			PVC	POLYVINYL CONDUIT
ATS	AUTOMATIC TRANSFER SWITCH	J		PW	PRE-WIRED
AWG	AMERICAN WIRE GAGE	JB	JUNCTION BOX		
B		K		Q	
BKR	BREAKER	Kcmil	1000 CIRCULAR MILS	QTY.	QUANTITY
BOL	BUILT-IN OVERLOAD	KV	KILOVOLT	R	
BWE	BAKED WHITE ENAMEL	KVA	KILOVOLT-AMPS	REQ'D	REQUIRED
BTU	BRITISH THERMAL UNIT	KVAR	KILOVOLT-AMPS REACTIVE	RTU	ROOF TOP UNIT
C		KW	KILOWATT	S	
C	CONDUIT	KWH	KILOWATT-HOUR	SC	SEPARATE CIRCUIT
CATV	CABLE TELEVISION SYSTEM	L		SD	SMOKE DETECTOR
C/B	CIRCUIT BREAKER	LP	LOW PRESSURE	SF	SQUARE FEET
CCTV	CLOSED CIRCUIT TELEVISION	LVT	LOW-VOLTAGE THERMOSTAT	SPDT	SINGLE-POLE, DOUBLE-THROW
CKT	CIRCUIT	M		SPST	SINGLE-POLE, SINGLE-THROW
CU	COPPER	MAG	MAGNETIC MOTOR STARTER	SS	STAINLESS STEEL
D		MAN	MANUAL MOTOR STARTER	SW	SWITCH
DPDT	DOUBLE-POLE, DOUBLE-THROW		W/THERMAL OVERLOAD PROTECTION	SWBD	SWITCHBOARD
DPST	DOUBLE-POLE, SINGLE-THROW	MC	MECHANICAL CONTRACTOR	T	
DS	DOWNSPOUT	MCA	MAXIMUM CURRENT AMPACITY	T	THERMOSTAT
E		MCB	MAIN CIRCUIT BREAKER	TELE	TELEPHONE
EBH	ELECTRIC BASEBOARD HEATER	MCC	MOTOR CONTROL CENTER	TC	TIME CLOCK
EC, E.C.	ELECTRICAL CONTRACTOR	MD	MOTORIZED DAMPER	TCP	TEMPERATURE CONTROL PANEL
ECH	ELECTRIC CABINET HEATER	MDF	MAIN DISTRIBUTION FRAME	TS	TOGGLE SWITCH
EF	EXHAUST FAN	MDP	MAIN DISTRIBUTION PANEL	TB	TELEPHONE TERMINAL BOARD
EM	EMERGENCY	MFR	MANUFACTURER	TTC	TELEPHONE TERMINAL CABINET
EMT	ELECTRICAL METALLIC TUBING	MH	METAL HALIDE	TWJ	THRU WALL AIR CONDITIONING UNIT
EWC	ELECTRIC WATER COOLER	MLO	MAIN LUG ONLY	TYP.	TYPICAL
EWH	ELECTRIC WATER HEATER	MNS	MASS NOTIFICATION SYSTEM	U	
F		MOC	MINIMUM OVERCURRENT PROTECTION	UG	UNDERGROUND
F	FUSED	MS	MANUAL SWITCH	UH	UNIT HEATER
FAAP	FIRE ALARM ANNUNCIATOR PANEL	MSBD	MAIN SWITCH BOARD	UL	UNDERWRITERS LABORATORIES, INC.
FACP	FIRE ALARM CONTROL PANEL	MTD	MOUNTED	U.N.O.	UNLESS NOTED OTHERWISE
FC	FUSE CLIP SIZE	MUA	MAKE-UP AIR UNIT	UM	UNIT MANUFACTURER
FBP	FAN POWERED BOX	N		UPS	UNINTERRUPTIBLE POWER SUPPLY
FBO	FURNISHED BY OTHERS	N/A	NOT APPLICABLE	V	
FLA	FULL LOAD AMPS	N.C.	NORMALLY CLOSED	V	VOLT
FLR	FLOOR	NF	NON-FUSED	VA	VOLT-AMPERES
FPC	FIRE PROTECTION CONTRACTOR	N.I.C.	NOT IN CONTRACT	VAC	VOLT ALTERNATING CURRENT
FS	FLOAT SWITCH	NL	NIGHT LIGHT	VAV	VARIABLE AIR VOLUME
FVNR	FULL-VOLTAGE, NON-REVERSING	N.O.	NORMALLY OPEN	VFD	VARIABLE FREQUENCY DRIVE
G		N.T.S., NTS	NOT TO SCALE	W	
GC	GENERAL CONTRACTOR	NU	NEAR UNIT	W	WATT
GFI	GROUND FAULT CIRCUIT INTERRUPTER	O		W/	WITH
GRD	GROUND	O.H.	OVERHEAD	W/O	WITHOUT
GRS	GALVANIZED RIGID STEEL	OU	ON UNIT	WG	WIRE GUARD
H		OCPD	OVERCURRENT PROTECTION DEVICE	WP	WEATHER PROOF
HOA	HAND-OFF-AUTOMATIC			X	
HP	HORSEPOWER			X	EXISTING EQUIPMENT
HPS	HIGH PRESSURE SODIUM			XFMR	TRANSFORMER
HVAC	HEATING AND VENTILATING CONTRACTOR			XP	EXPLOSION-PROOF
HWGC	HEAVY WALL GALVANIZED CONDUIT				

ELECTRICAL SYMBOLS LIST

SYMBOL			DESCRIPTION
CEILING	WALL	FLOOR	
			2X4 RECESSED TROFFER FIXTURE TYPE. SEE LIGHTING FIXTURE SCHEDULE.
			SHADOW-NIGHT LIGHT
			DOWN LIGHT FIXTURE TYPE. SEE LIGHTING FIXTURE SCHEDULE.
			SINGLE POLE TOGGLE SWITCH. 15A OR 20A AS REQUIRED. 120/277V S=SWITCHING CONTROL, P=PILOT LIGHT, K=KEYED SW., LV=LOW VOLTAGE
			3-WAY TOGGLE SWITCH. 15A OR 20A AS REQUIRED. 120/277V 3D=3 WAY DIMMER
			DUPLEX RECEPTACLE. 20A 125V 2P 3W GRD. NEMA5-20R. Ø1Ø" AFF D=DEDICATED CIRCUIT. 1" =MTD. Ø4Ø" AFF. OR Ø6" ABOVE COUNTER.
			DOUBLE DUPLEX RECEPTACLE. Ø1Ø" AFF 20A 125V 2P 3W GRD. NEMA5-20R. PO=POP UP RECEPTACLE
			COMMUNICATIONS OUTLET Ø1Ø" AFF. REFER TO COMMUNICATION OUTLET DETAIL. B = BLANK JACK, AV= AUDIO/VISUAL JACK, MIC= MICROPHONE JACK. ▽ = 6" ABOVE COUNTER, AUX = AUX. CONNECT. PO=POP UP LOW VOLTAGE SECTION. PD=PEDESTAL MOUNTED
			JUNCTION BOX TS = TOMBSTONE TYPE
			WIRING IN CONDUIT CONCEALED ABOVE CEILING, IN WALL AND UNDER FLOOR OR UNDERGROUND.
			WIRING IN CONDUIT EXPOSED ON CEILING OR WALL.
			BRANCH CIRCUIT WIRING IN CONDUIT HOMERUN TO PANEL. ONE ARROW PER HOMERUN. SLASHES INDICATE NUMBER OF CONDUCTORS.
			INDICATES GROUND CONDUCTOR.
			INDICATES ISOLATED GROUND CONDUCTOR.
			FIRE ALARM HORN/STROBE COMBINATION. Ø8Ø" AFF NUMBER INDICATES CANDELA LEVEL (110cd UNLESS NOTED OTHERWISE) MOTOR: HP= HORSE-POWER RATING.
			PANEL 240V & BELOW.
			PANEL ABOVE 240V.
			PROXIMITY READER
			WALL MOUNTED SURFACE RACEWAY
MOUNTING HEIGHT			
FIRE ALARM PULL STATION			48"
STROBES			80"
FIRE ALARM BELLS(EXTERIOR)			12'-0"
FACP & FAAP			48"
EXIT SIGNS(BOTTOM)			80"
TV OUTLET			18"
INTERCOM			48"
PHOTOCELL			12'-0"
RECEPTACLE(CENTERLINE)			18"
RECEPTACLE(EXTERIOR)			24"
RECEPTACLE(WAREHOUSE)			30"
TELEPHONE OUTLET(PUBLIC)			54"
TELEPHONE OUTLET			18"
SWITCH			48"
SAFETY SWITCHES			48"
PANELS(TOP)			72"
CLOCK(CENTERLINE)			96"
VIDEO OUTLET			96"
MISCELLANEOUS			
			HVAC EQUIPMENT IDENTIFICATION
			KEYNOTE IDENTIFICATION
			DETAIL IDENTIFICATION

TYPICAL WALL PENETRATION

NOTES:

- NEATLY CORE ALL MASONRY AND BLOCK WALLS.
- RIGIDLY SUPPORT ALL RACEWAYS.
- PROVIDE FIRE BARRIER CAULK AT FLOOR, CORRIDOR AND FIRE SEPARATION WALLS.

TYP. WALL PENETRATION DETAIL

SCALE: N.TS.

TYPICAL FLOOR PENETRATION

NOTES:

- NEATLY CORE ALL MASONRY AND BLOCK WALLS.
- RIGIDLY SUPPORT ALL RACEWAYS.
- PROVIDE FIRE BARRIER CAULK AT FLOOR, CORRIDOR AND FIRE SEPARATION WALLS.

TYP. FLOOR PENETRATION DETAIL

SCALE: N.TS.

01/30/25

ISSUED

BID AND PERMIT SET

JOB NO.

23-471-1507

DRAWN

JWK

CHECKED

ATR

APPROVED

MTK

SHEET TITLE

ELECTRICAL SYMBOLS LIST, ABBREVIATIONS & DETAILS

SHEET NUMBER

E050

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KEYNOTES

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- 26.200 DEMOLISH EXISTING LIGHTING FIXTURE AND ASSOCIATED AIR PURIFIER SYSTEM LOCATED ABOVE EXISTING LIGHT FIXTURE.
- 26.201 DEMOLISH EXISTING EXIT SIGN AND RELOCATE TO THE NEW GRID IN FRONT OF THE EGRESS DOORS. COORDINATE FINAL LOCATION OF EXIT SIGN WITH OWNER.
- 26.300 ON ALL WALLS, PROVIDE NEW COUNTERTOP HEIGHT ALUMINUM SURFACE RACEWAY FOR ALL NEW RECEPTACLES AND DATA PORTS. COORDINATE FINAL LOCATIONS WITH ARCHITECT.
- 26.301 NEW PANEL SL5A. PROVIDE NEW 100A BREAKER IN MSSBD. REFER TO PANEL SCHEDULE & RISER DIAGRAM ON SHEET E600 FOR MORE INFORMATION.
- 26.303 PROVIDE LOCAL PHYSICAL DATA CONNECTION BETWEEN EQUIPMENT 'DT-02' & 'L07.1' AS INDICATED. CONNECTION WILL BE MADE IN THE WALL AND WILL NOT UTILIZE THE SURFACE RACEWAY.
- 26.304 FOR NEW TV MONITORS, PROVIDE NEW VERTICAL SURFACE RACEWAY GOING UP FROM EXISTING TO A HEIGHT OF ~60". COORDINATE FINAL HEIGHT OF TV MONITORS WITH OWNER.
- 26.305 OWNER SUPPLIED TRANSFORMER. REFER TO THE PARTIAL SINGLE LINE DIAGRAM FOR MORE INFORMATION. COORDINATE FINAL LOCATION WITH OWNER.
- 26.306 PROVIDE NEW LOCAL 100A DISCONNECT SWITCH FOR THE PRIMARY SIDE OF THE TRANSFORMER. COORDINATE FINAL LOCATION WITH OWNER.
- 26.301 EXTEND NEAREST AVAILABLE NAC CIRCUIT TO NEW FIRE ALARM DEVICES.
- 26.302 INTEGRATE ELECTRIC STRIKE, PROXIMITY READER AND DOOR CONTACT INTO ACCESS CONTROL SYSTEM.

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KANE COUNTY SHERIFF'S FORENSIC LABORATORIES

37W777 IL-38

ST. CHARLES, ILLINOIS 60175

PARTIAL SECOND FLOOR ELECTRICAL LIGHTING PLAN

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

4

PARTIAL SECOND FLOOR ELECTRICAL POWER PLAN

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

2

PARTIAL SECOND FLOOR ELECTRICAL LIGHTING DEMOLITION PLAN

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

3

PARTIAL SECOND FLOOR ELECTRICAL POWER DEMOLITION PLAN

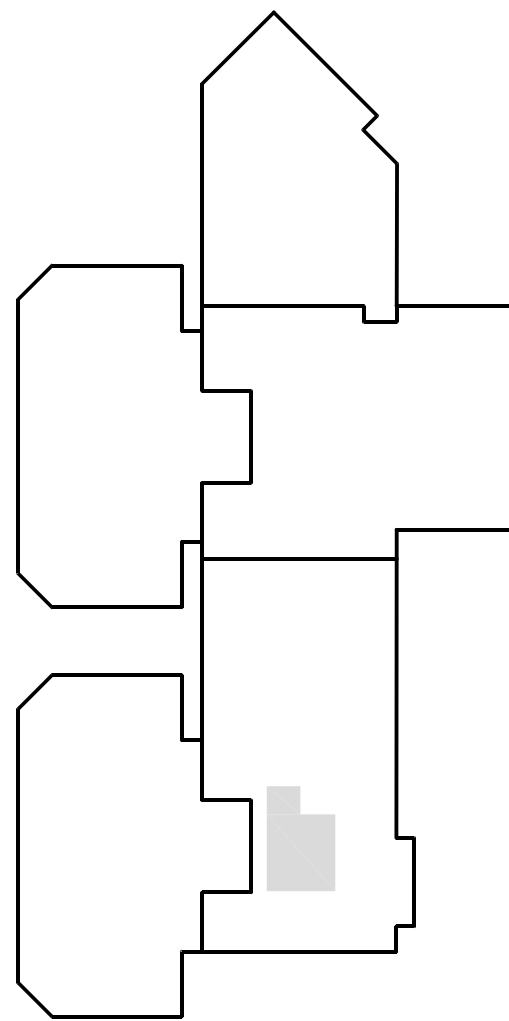
SCALE: 1/4" = 1'-0"

1

ELECTRICAL DEMOLITION NOTATION

N	NEW DEVICE OR EQUIPMENT.
D	EXISTING ELECTRICAL OUTLET OR EQUIPMENT TO BE DEMOLISHED COMPLETE INCLUDING BRANCH CIRCUITRY TO SOURCE.
X	EXISTING ELECTRICAL OUTLET OR EQUIPMENT TO REMAIN. (CIRCUIT # = REROUTE EXISTING CIRCUIT TO NEW CIRCUIT NUMBER) (NEW LOCATION)
R	EXISTING ELECTRICAL OUTLET OR EQUIPMENT RELOCATED. (NEW LOCATION)
XR	EXISTING ELECTRICAL OUTLET OR EQUIPMENT TO BE REMOVED & RELOCATED(OLD LOCATION).

KEY PLAN



ISSUED
01/10/2025
BID AND PERMIT SET

JOB NO. 23-471-1507
DRAWN JWK
CHECKED ATR
APPROVED MTK

SHEET TITLE
PARTIAL SECOND FLOOR ELECTRICAL PLANS

SHEET NUMBER

E300

KEYNOTES

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- 26.201 DEMOLISH EXISTING EXHAUST FAN AND ALL CONDUIT AND WIRING ASSOCIATED WITH EXISTING EXHAUST FAN BACK TO SOURCE. REPURPOSE EXISTING BREAKER AS A SPARE.
- 26.302 UTILIZE LOCAL PANEL LP2 LOCATED IN IDF ROOM S149 LOCATED TO THE WEST OF THE MEZZANINE ON THE FLOOR BELOW.
- 28.300 PROVIDE NEW DUCT DETECTOR IN THE SUPPLY OF NEW MAU-1. INTERCEPT AND EXTEND EXISTING FIRE ALARM CIRCUIT TO NEW DUCT DETECTOR.

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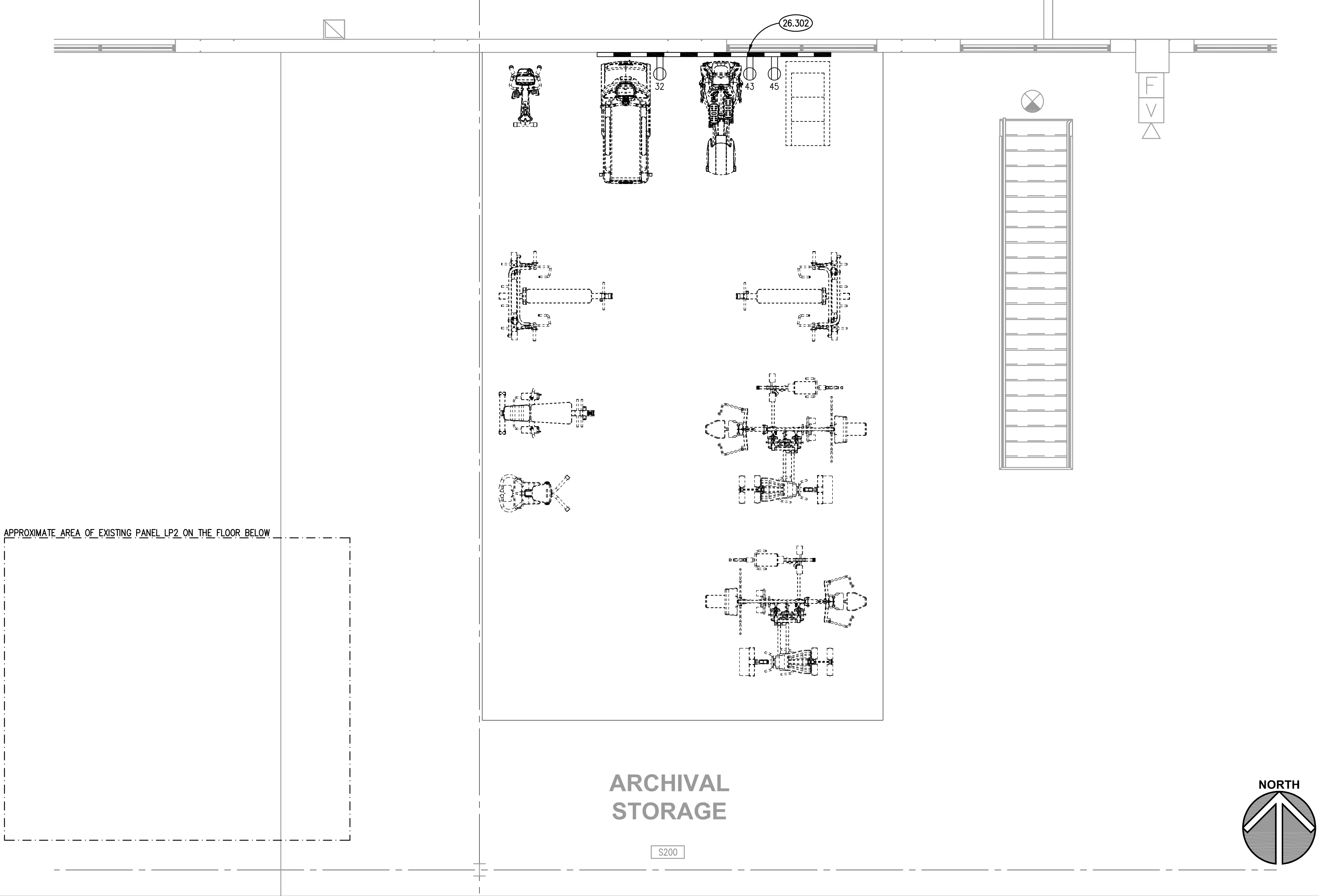
ISSUED	
BID AND PERMIT SET	
01/30/25	

JOB NO.	23-471-1507
DRAWN	JWK
CHECKED	ATR
APPROVED	MTK

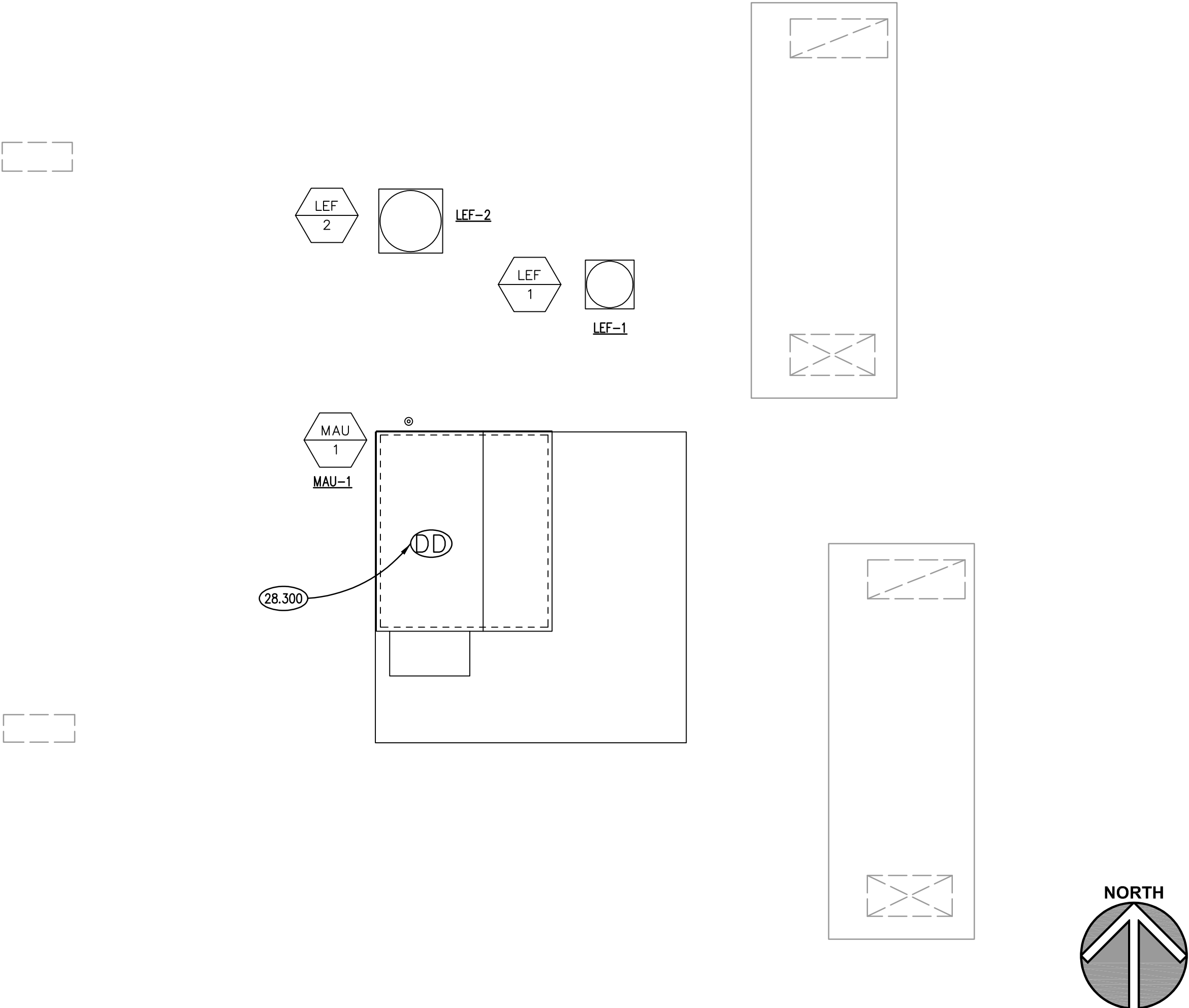
SHEET TITLE
PARTIAL ROOF & MULTI-USE BUILDING
PARTIAL MEZZANINE
FLOOR ELECTRICAL
PLANS

SHEET NUMBER

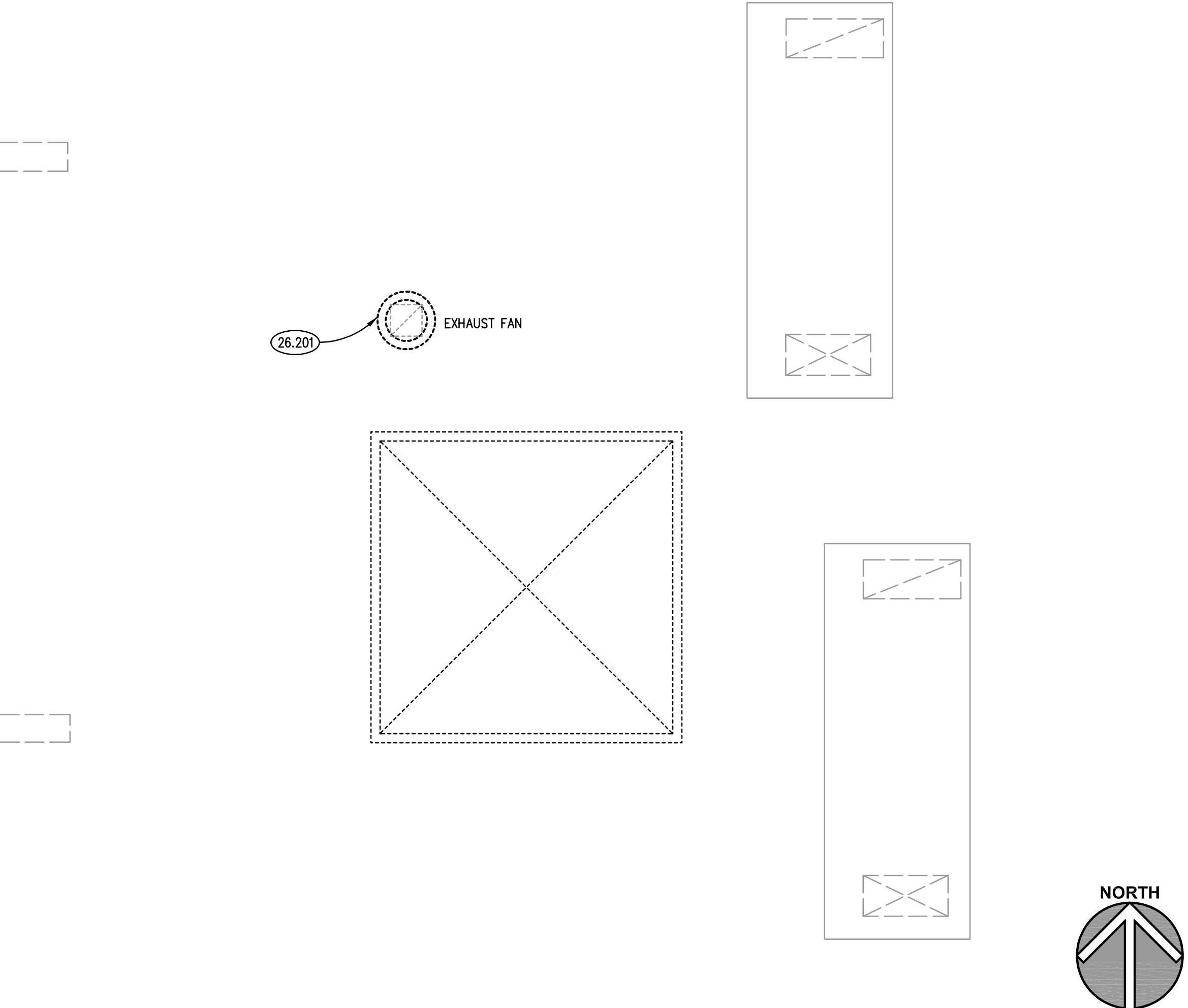
E301



MULT-USE BUILDING PARTIAL MEZZANINE FLOOR PLAN 3
SCALE: 1/4" = 1'-0"

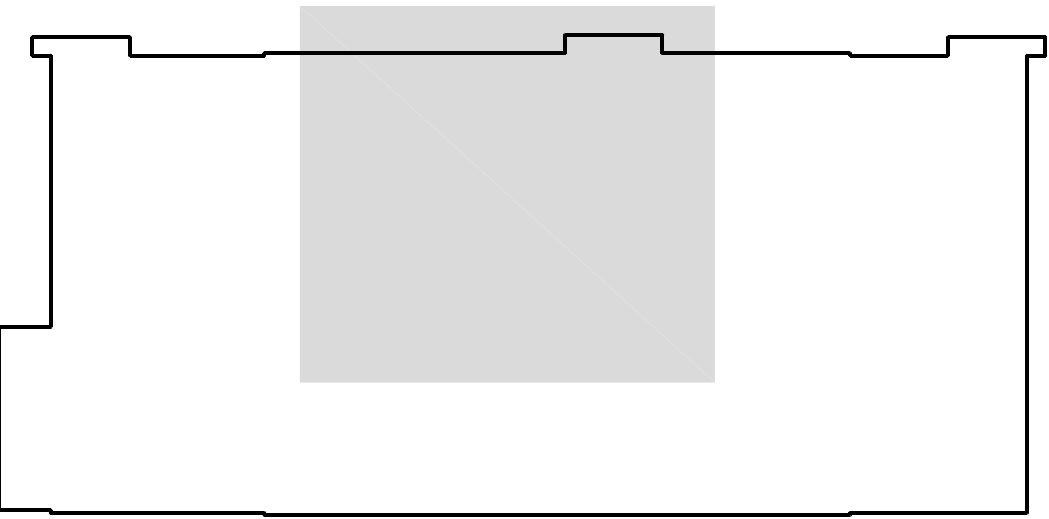


SHERIFF'S OFFICE PARTIAL ROOF PLAN 2
SCALE: 1/4" = 1'-0"



SHERIFF'S OFFICE ROOF PARTIAL DEMOLITION PLAN 1
SCALE: 1/4" = 1'-0"

KEY PLAN



NORTH

TYPE	SPECIFICATIONS	DESCRIPTION	MFR.	CATALOG NUMBER	VOLTAGE	FINISH	MOUNTING	NOTE
A	4000K, 0-10V DIMMING, 7000LM NOMINAL, 55W	LED 2x2 RECESSED TROFFER	LITHONIA	28RTL-G-L24-7000LM-QAW-AFL-MVOLT-GZ1-50K-90CRI	UNV (120-277)	WHITE	RECESSED (GRID)	
			LIFE SHIELD	OBX-C-22-G-O-S-PCH/PCD-DA-1C-950-L080-ED-U				
			FAIL-SAFE	22AID-70-CFR2-CA125-GL-L850-A3/8-4/18GDIM				
			LC DOANE	RWR22-2W/T0-50/90-CW-VAR-DM-13000-SH				
			NEWSTAR	SCR22-HC/OC-L4401C-A-UN				
			LITHONIA LIGHTING	ELM2L-SDRT SERIES				
EM	LED, 5W, EM WALLPACK	EM WALLPACK	DUAL LITE	EZ2L-I SERIES	UNV (120-277)	WHITE	SURFACE (WALL)	
			CHLORIDE	CLR-2-W SERIES				
EX	LED 5W EM EXT SIGN	EM EXT SIGN	LITHONIA LIGHTING	TCE RS EL	UNV (120-277)	WHITE	RECESSED (GRID)	
			DUAL LITE	EVE-U-R-W-E				
			CHLORIDE	RQLO-LEDXR				
Notes:								



STATE OF ILLINOIS)
COUNTY OF KANE) SS.

RESOLUTION NO. TMP-25-529

**APPROVING OPIOID SETTLEMENT REVENUE EXPENDITURES FOR KANE
COUNTY COURT SERVICES EXPENSES AND AUTHORIZING BUDGET
ADJUSTMENT (NOT ATTACHED)**