

Addendum 02

DOCUMENT 00 91 00

DATE: March 24, 2026

PROJECT: Clermont County Facilities Phase 2 Management Building
State Route 222
Batavia, OH 45103

PROJECT #: 22001.00

OWNER: Clermont County Commissioners
Contact: Ralph Linne
101 E. Main Street, Suite 329
Batavia, OH 45103

ARCHITECT: Garmann Miller
38 South Lincoln Drive
P.O. Box 71
Minster, Ohio 45865

TO: Prospective Bidders

This addendum form is a part of the Contract Documents and modifies the Construction Documents dated February 19, 2026, with amendments and additions noted below.

Acknowledge receipt of this Addendum on the Bid Form. Failure to do so may disqualify the Bidder.

This addendum consists of 3 pages, 12 specification sections, and 11 re-issued drawing sheets.

FOR INFORMATION ONLY

1. Contractors shall refer to the geotechnical report for the under slab compacted fill requirements and coordinate with the rammed aggregate pier designer.

CHANGES TO THE PROJECT MANUAL

1. Section 00 11 00 Request for Bid Packet: Bid Cost Sheet – Add section for unit prices.
2. Section 00 31 26 Existing Hazardous Material Information: Include asbestos inspection report.
3. Section 01 21 00 Allowances: Add \$30,000 Aid to Construction allowance.
4. Section 04 21 00 Clay Unit Masonry: Added Bowerston Brick color – Old English.



5. Section 07 61 00 Sheet Metal Roofing, Paragraph 2.01: Sheffield Metals 2.0" Mechanical Seam has been added as an approved manufacturer and product. Gutters and downspouts modified to 22 Gauge.
6. Section 08 5113 Aluminum Windows, changed frame color to Clear anodized aluminum, removed hinged interior access panel section, and modified basis of design model to 4250i XLT.
7. Section 10 14 26 Post and Panel Signage: Remove section in its entirety.
8. Section 10 22 39 Folding Panel Partitions, Paragraph 2.01: Corflex Series 5500 Paired Panel has been added as an approved manufacturer and product.
9. Section 10 44 00 Fire Protection Specialties: Update FE type to be ABC 10 lbs.
10. Section 12 24 00 Window Shades: Removed/edited verbiage regarding motorized roller shades and blackout curtains. Shades to be manually operated with 3% openness.
11. Section 23 07 19 HVAC Piping Insulation: Paragraph 3.03, added heating and cooling systems to the insulation schedule.
12. Section 23 21 14 Hydronic Specialties: Paragraph 2.08 LinkOne One Guard Premix has been added as an approved manufacturer and product.
13. Section 23 64 23 Scroll Water Chiller: Dunham Bush has been added as an approved manufacturer and product.
14. Section 28 31 01 Fire Alarm Detection System: Remove any reference to voice evacuation fire alarm system.
15. Section 31 66 13 Rammed Aggregate Piers: Allow additional licensed and certified Rammed Aggregate Pier design and install companies.

CHANGES TO THE DRAWINGS

1. Drawing Sheet A6.2: Updated the aluminum window details as indicated on the drawings.
2. Drawing Sheet A8.1 First Floor Equipment Plan & Casework Elevations: Updated equipment schedule to reflect changes in owner provided appliances.
3. Drawing Sheet S5.0: Added Typical Stud Wall Bracing details.
4. Drawing Sheet P2.1 Plumbing Plan: Changed location of drainage box for condensate drainage. Refer to revised sheet for additional information.
5. Drawing Sheet M2.1 First Floor Mechanical Plan: Deleted air transfers and relocated mini-split systems. Changed supply duct and diffusers. Added return grille, duct, and smoke damper.
6. Drawing Sheet M6.1 First Floor Temperature Control Plan Units A & B: Relocated mini-split indoor units, thermostats, and temperature sensor.
7. Drawing Sheet E1.3 Electrical Details: Detail 5/E1.3 has been added.
8. Drawing Sheet E3.1 Systems Plan: Smoke and heat detectors have been added in rooms A132 and B122.
9. Drawing Sheet E3.1 Systems Plan: Smoke detectors have been added in rooms A105 and B109. Horn strobe fire alarm devices have been added in rooms A107, A110, A111, A115, A121, A126, A131, B103, B105, B108, B112, B124, and B125.
10. Drawing Sheet E5.1 Power Plan: 120V connection for smoke damper has been added to room A105.
11. Drawing Sheet E5.2 Enlarged Power Plans: Power for mini splits SSCU-1A and SSCU-2A have moved to north wall in room A105.



12. Drawing Sheet E6.2 Panel Schedules: Circuit AL2-50 is no longer a spare breaker and will power the smoke damper in room A105.

ATTACHMENTS

The following attachments are included and are part of this addendum:

Specification Sections – 00 11 00, 00 31 26, 01 21 00, 04 21 00, 07 61 00, 08 51 13, 10 44 00, 12 24 00, 23 07 19, 23 21 14, 23 64 23, 31 66 13

Drawing Sheets – A6.2, A8.1, S5.0, P2.1, M2.1, M6.1, E1.3, E3.1, E5.1, E5.2, E6.2

END OF ADDENDUM



ARTICLE 8
Bid Detail Cost Sheet

BID COST SHEET

Contractor Name: _____

Contractor Address: _____

Contact Person: _____

Phone Number - Contact Person: _____

Fax Number - Contact Person: _____

Base Bid Contract A \$ _____

Base Bid in Written Number _____

ALTERNATES:

ALT 1 \$ _____

Grand Total (Total Base Bid + Alternates 1) \$ _____

Grand Total in Written Number _____

The following are Unit Prices for specific portions of the Work as listed:

Contaminated Soils:

\$ _____ Per Cubic Yard

Unsuitable Soils:

Excavated Material:

\$ _____ Per Cubic Yard

Lean Concrete Fill:

\$ _____ Per Cubic Yard

Gravel Fill:

\$ _____ Per Cubic Yard

Controlled Density Fill

\$ _____ Per Cubic Yard

Lime Kiln Stabilization:

\$ _____ Per Cubic Yard

Fabric Geogrid:

\$ _____ Per Square Yard

Acknowledgement of Addenda: _____

(include numerical list of addenda)

Signature - Authorized Representative

Date

Title

BID DETAIL COST SHEET

Contractor Name: _____

For Owner's information and evaluation, provide the following detail breakdown of base bid costs:

General Requirements	\$ _____.
Site Construction	\$ _____.
Concrete	\$ _____.
Masonry	\$ _____.
Metals	\$ _____.
Wood and Plastics	\$ _____.
Thermal and Moisture Protection	\$ _____.
Doors and Windows	\$ _____.
Finishes Base Bid	\$ _____.
Carpet/Flooring	\$ _____.
Specialties	\$ _____.
Equipment	\$ _____.
Mechanical	\$ _____.
Plumbing	\$ _____.
Fire Suppression	\$ _____.
Electrical	\$ _____.
Voice/Data	\$ _____.
Landscaping	\$ _____.

The Owner may negotiate scopes of work to be self-performed or performed under State Contract.



March 13, 2026

Mr. Ronnie Ross

Clermont County Facilities Management

101 East Main Street

Batavia, Ohio 45103

(513)615-5493

Re: Pre-Demolition NESHAP Asbestos Inspection of Phase 2 Filager Road Buildings 2 – 9 in Batavia, Ohio 45103

Pinnacle PN: 26-0017

Dear Mr. Ross;

On February 9, 10 and 11, 2026, Mr. Steve Brenner of Pinnacle Environmental Consultants, Inc. (see Attachment 1 for certifications) visited the Phase 2 structures 2 – 9 (see Site Plan in Attachment 2) located on Filager Road in Batavia, Ohio 45103, per your request. The purpose of these visits was to collect bulk samples of suspect asbestos-containing materials (ACM) prior to planned demolition of the structures, as required for compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAP). Specifically, thirty-seven (37) bulk samples were collected from fifteen (15) homogeneous areas throughout the structures. Analysis results show that no (0) homogeneous areas were identified with greater than one percent (>1%) asbestos content. Please reference the *PLM Bulk Sample Data Summary Table and Sample Location Floor Plans* in Attachment 3 for complete sample location, description and analysis information.

Asbestos Bulk Sampling Methods

For friable Surfacing Materials, three (3) bulk samples were collected for each homogeneous area less than or equal to 1,000 square feet. If the homogeneous area was greater than 1,000 square feet but less than 5,000 square feet, five (5) bulk samples were collected. For homogeneous areas that were greater than 5,000 square feet, seven (7) bulk samples were collected. Random sample locations for each homogeneous area of suspect friable surfacing materials were determined by Pinnacle's inspector in the field. Miscellaneous Material and non-friable suspected ACBM were sampled "in a manner sufficient to determine" whether the material in question contained asbestos.

Mr. Ronnie Ross

March 13, 2026

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To avoid disturbing the material more than necessary and potentially cause the release of asbestos fibers, Pinnacle performed bulk sampling of suspect materials in accordance with generally accepted procedures outlined in the Asbestos Hazard Emergency Response Act (AHERA). Each sample was collected and placed in a clean, sealable container and labeled with a unique sample identification number. This sample number was recorded on a Bulk Sample Log Sheet, the sample vial, and at the sample location to permit easy identification of the sampled materials in the future. Supplemental information was also recorded on the Bulk Sample Log Sheet, including date of inspection, name of Pinnacle's inspector, the building name (or number), a brief description and location of the sample, and type of material sampled (e.g. drywall, ceiling tile, etc.).

Analysis of Bulk Samples

The bulk samples were submitted to Pinnacle Consultants, LLC (see Attachment 4 for a copy of laboratory NVLAP accreditation) and analyzed for asbestos content by PLM and dispersion staining (Method Reference: EPA-600/R-93/116) sample analysis. This analytical method is used for qualitative identification of six morphologically different types of asbestos fibers: chrysotile, amosite, crocidolite, anthophyllite, tremolite and actinolite asbestos. The method specifies that the asbestos content in a bulk sample will be estimated and reported as a finite percentage (rounded to the nearest percentage) within the range of 0 to 100.

The results of the bulk sample analysis are reported in a standard written laboratory report. This report includes Pinnacle's project number, the laboratory identification number and the field number assigned to the bulk sample upon collection at the site. If a bulk sample contains more than one distinct layer of material, each layer is analyzed separately. The composition of the bulk sample is reported in percentages of asbestos (i.e., chrysotile, amosite or other) and non-asbestos (i.e., cellulose, fiberglass or other) components.

If a bulk sample of friable material has less than ten percent (<10%) asbestos content, the Ohio EPA recommends the sample be analyzed by the point count method reference PLM, EPA 600/R-93/116. This analytical method is a more accurate way of determining the actual asbestos percentage. For this project, no (0) samples were analyzed using point count methods. The laboratory report and sample chain-of-custody for PLM analysis can be found in Attachment 5.

Results and Conclusions

The pre-demolition NESHAP asbestos inspection did not identify any materials known or assumed to contain >1% asbestos for the structures that require removal prior to traditional demolition. Please note that the materials sampled and included in the pre-demolition asbestos inspection are limited to those which are required to be removed prior to initiation of traditional demolition activities. Category I

Mr. Ronnie Ross
March 13, 2026
Page 3

non-friable ACM, such as resilient flooring materials, roofing materials, mastics, etc. may remain in a building during demolition activities; therefore, these materials have not been sampled or included in this report but must be assumed to be ACM unless proven otherwise through additional sampling.

According to the Ohio EPA guidance document, "Demolition Practices Under the Asbestos NESHAP", indicates that waste reduction activities where Category I non-friable asbestos-containing materials are present raises a concern related to the handling and disposal of these materials. According to the Ohio EPA guidance document, repeatedly running over waste with tracked vehicles to consolidate the waste is considered grinding, which causes Category I non-friable ACMs to become friable. If this condition exists, the waste must be kept wet at all times following demolition and during handling and it must be properly containerized in accordance with applicable Ohio EPA regulations and transported for disposal a site or facility that operates in accordance with NESHAP 61.154 or 61.155. This information should be communicated to all demolition contractors being considered for the demolition of these buildings.

Pinnacle did not conduct a destructive survey (i.e. opening of walls and/or ceilings) to identify concealed materials known or suspected to contain asbestos. During demolition activities, if additional suspect ACM is discovered, work should stop and suspect material should be sampled. Any additional inspection and/or bulk sampling should be conducted by a professional consultant certified by the EPA as an Asbestos Hazard Evaluation Specialist. Analysis of all bulk samples collected should be performed by a NVLAP or the American Industrial Hygiene Association accredited laboratory.

All Universal Waste such as, but not limited to, paint, solvent, fuel cans, thermostats, fluorescent light bulbs and ballasts, energy saver bulbs, dusk to dawn mercury vapor bulbs, household chemicals, etc. present at the property must be properly handled, packaged and recycled or disposed of prior to demolition of the structure.

Pinnacle greatly appreciates the opportunity to offer our services and expertise to Clermont County Facilities Management for this most important project. Should you have any questions or require additional information, please feel free to contact me at your earliest convenience.

Sincerely,

Pinnacle Environmental Consultants, Inc.

Christopher A. Belcher

Christopher A. Belcher, AHES #ES31712

President

Attachments (5)

Attachment 1

PINNACLE'S PERSONNEL CERTIFICATIONS



**Environmental
Protection
Agency**

EPA.Ohio.gov

Mike DeWine, Governor Jim Tressel, Lt. Governor John Logue, Director

10/3/2025

Steven Brenner
Pinnacle Environmental Consultants, Inc.
486 Old State Route 74
Cincinnati, OH 45244

RE: Evaluation Specialist
 Certification Number: ES33856
 Expiration Date: 11/9/2026

Dear Steven Brenner:

This letter and enclosed certification card approves your request to be certified as an asbestos Evaluation Specialist. You must present your card upon request at any project site while performing duties. Copies of cards are not acceptable as proof of certification.

This certification may be revoked by the Director of the Ohio Environmental Protection Agency (EPA) for violation of any of the requirements of 3745-22 or 3745-20 of the Ohio Administrative Code.

If you have any questions, please contact the Asbestos Program at 614-644-0226 or by email at asbestoslicensing@epa.ohio.gov.

Sincerely,

Brandon M. Schwendeman

Brandon Schwendeman
Manager, Business Operations Support Section
Ohio EPA - Division of Air Pollution Control

State of Ohio
Environmental Protection Agency
Asbestos Program

Asbestos Hazard Evaluation Specialist

Steven Brenner

 **Ohio Environmental Protection Agency**

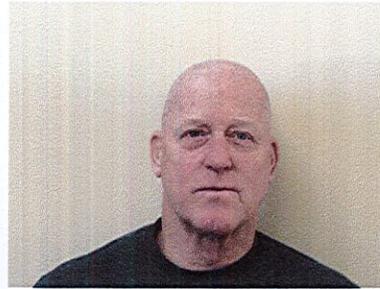
Pinnacle Environmental Consultants, Inc.
486 Old State Route 74
Cincinnati OH 45244



Certification Number	Expiration Date	DOB: 9/29/61
ES33856	11/9/26	Card not Valid if Altered

The InService Training Network

Asbestos Building Inspector and Management Planner Refresher Courses

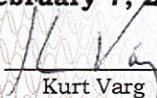


Steven Brenner

has successfully completed the Asbestos Building Inspector and Management Planner Refresher Courses and passed by at least 70% the course examinations for accreditation under Section 206 of the Toxic Substance Control Act, Title II, and Indiana 326 IAC 18-2
Provided by: The InService Training Network, Inc., 705D Lakeview Plaza Blvd, Worthington, OH 43085 (614) 436-0980

Course Dates: February 7, 2026

Examination Date: February 7, 2026

Course Director: 

Kurt Varg

Course Location: Cincinnati, Ohio

Expiration Date: February 7, 2027

Certificate Numbers: ITNIR7897 & ITNMPR7897

ITN

ITN

Attachment 2
SITE PLAN

Maps

Search Bing Maps

Directions

Sign in



United States • OH • Clermont Co. • Batavia

50 ft

10 m

© 2025 TomTom, © OpenStreetMap, © Vexcel Imaging



Attachment 3

PLM BULK SAMPLE DATA SUMMARY TABLE AND SAMPLE LOCATION FLOOR PLANS

PLM BULK SAMPLE DATA SUMMARY TABLE
CLERMONT COUNTY FACILITIES - FILAGER ROAD PHASE 2 BUILDINGS 2 - 9
BATAVIA, OHIO 45103

<i>Sample Location</i>	<i>Sample Description</i>	<i>Sample ID No.</i>	<i>Lab ID No.</i>	<i>Asbestos Content</i>	<i>* Homo-geneous Area #</i>	<i>Friable/ Nonfriable</i>
<i>The following samples were collected from Building 2:</i>						
North corner office 1 ceiling	2' x 4' White facing ceiling tile with parallel fissures	26SB-301	26B-03190	None detected	1	Friable
North corner office 1 ceiling	2' x 4' White facing ceiling tile with parallel fissures	26SB-302	26B-03191	None detected	1	Friable
North corner office 1 wall	Drywall	26SB-303	26B-03192	None detected	2	Nonfriable
North corner office 1 wall	Joint compound	26SB-304	26B-03193	None detected	3	Nonfriable
North corner office 1 wall	Drywall and joint compound (composite)	26SB-305	26B-03194	None detected	2, 3	Nonfriable
North corner office 1 northeast window	Interior window glazing	26SB-309	26B-03198	None detected	4	Friable
Office 5 southwest wall by window	Drywall	26SB-306	26B-03195	None detected	2	Nonfriable
Office 5 southwest wall by window	Joint compound	26SB-307	26B-03196	None detected	3	Nonfriable
Office 5 southwest wall by window	Drywall and joint compound (composite)	26SB-308	26B-03197	None detected	2, 3	Nonfriable
Office 5 ceiling	2' x 4' White facing ceiling tile with rough surface and random pin holes	26SB-316	26B-03205	None detected	7	Friable
Garage 6 window	Interior window glazing	26SB-310	26B-03199	None detected	4	Friable
Office 2 ceiling	2' x 2' White facing ceiling tile with random pin holes and recessed edges	26SB-311	26B-03200	None detected	5	Friable
Office 2 ceiling	2' x 2' White facing ceiling tile with random pin holes and recessed edges	26SB-312	26B-03201	None detected	5	Friable
Utility room and corridor 3 southeast wall	Brown fiberboard wall paneling	26SB-313	26B-03202	None detected	6	Nonfriable
Garage storage room 7 southeast wall	Brown fiberboard wall paneling	26SB-314	26B-03203	None detected	6	Nonfriable
Office 4 ceiling	2' x 4' White facing ceiling tile with rough surface and random pin holes	26SB-315	26B-03204	None detected	7	Friable
<i>The following samples were collected from Building 3:</i>						
Office 2 ceiling	Textured plaster	26SB-321	26B-03210	None detected	10	Nonfriable
Front room 4 ceiling	Textured plaster	26SB-322	26B-03211	None detected	10	Nonfriable
Front room 4 ceiling	Textured plaster	26SB-323	26B-03212	None detected	10	Nonfriable

PLM BULK SAMPLE DATA SUMMARY TABLE
CLERMONT COUNTY FACILITIES - FILAGER ROAD PHASE 2 BUILDINGS 2 - 9
BATAVIA, OHIO 45103

<i>Sample Location</i>	<i>Sample Description</i>	<i>Sample ID No.</i>	<i>Lab ID No.</i>	<i>Asbestos Content</i>	<i>* Homo-geneous Area #</i>	<i>Friable/ Nonfriable</i>
<i>Building 3 continued:</i>						
Front room 4 southwest wall by doorway	Drywall	26SB-326	26B-03215	None detected	11	Nonfriable
Front room 4 southwest wall by doorway	Joint compound	26SB-327	26B-03216	None detected	12	Nonfriable
Front room 4 southwest wall by doorway	Drywall and joint compound (composite)	26SB-328	26B-03217	None detected	11, 12	Nonfriable
Office 1 ceiling	Textured plaster	26SB-324	26B-03213	None detected	10	Nonfriable
Small office 5 ceiling	Textured plaster	26SB-325	26B-03214	None detected	10	Nonfriable
Office meeting room 10 northeast wall	Drywall	26SB-329	26B-03218	None detected	11	Nonfriable
Office meeting room 10 northeast wall	Joint compound	26SB-330	26B-03219	None detected	12	Nonfriable
Office meeting room 10 northeast wall	Drywall and joint compound (composite)	26SB-331	26B-03220	None detected	11, 12	Nonfriable
Reception office 6 ceiling	2' x 2' White facing ceiling tile with very rough texture and recessed edges	26SB-332	26B-03221	None detected	13	Friable
Reception office 6 above ceiling tile	Yellow fiberboard painted white	26SB-334	26B-03223	None detected	14	Nonfriable
Reception office 6 above ceiling tile	Yellow fiberboard painted white	26SB-335	26B-03224	None detected	14	Nonfriable
Restroom 9 ceiling	2' x 2' White facing ceiling tile with very rough texture and recessed edges	26SB-333	26B-03222	None detected	13	Friable
Work room 11 ceiling	2' x 4' White facing ceiling tile with random pin holes	26SB-336	26B-03225	None detected	15	Friable
Work room 11 ceiling	2' x 4' White facing ceiling tile with random pin holes	26SB-337	26B-03226	None detected	15	Friable
<i>The following samples were collected from Building 7:</i>						
Northeast wall	4' x 8' Brown fiberboard paneling	26SB-317	26B-03206	None detected	8	Nonfriable
Southwest wall	4' x 8' Brown fiberboard paneling	26SB-318	26B-03207	None detected	8	Nonfriable
Exterior window northeast wall	Exterior window glazing	26SB-319	26B-03208	None detected	9	Nonfriable

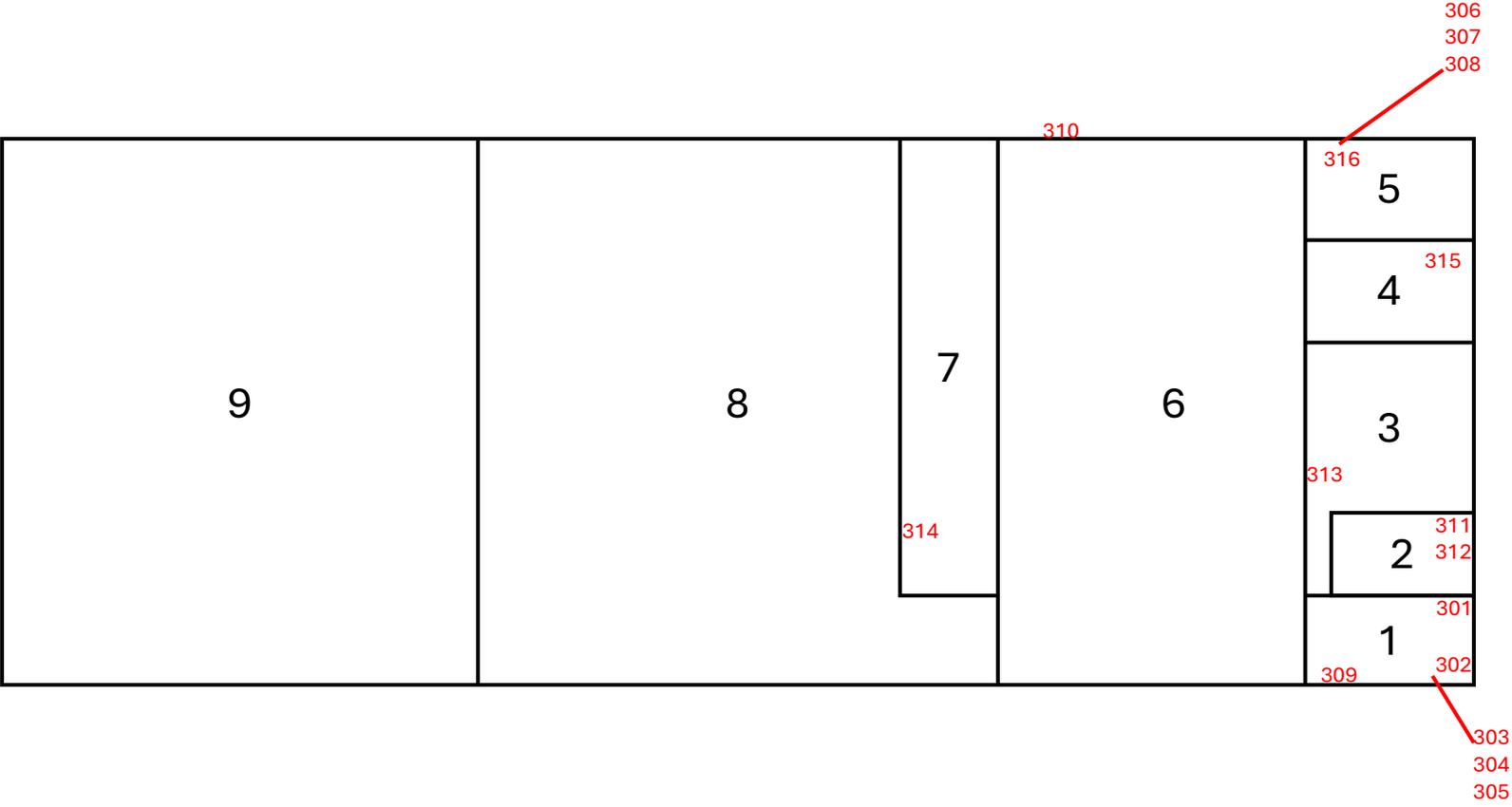
**PLM BULK SAMPLE DATA SUMMARY TABLE
CLERMONT COUNTY FACILITIES - FILAGER ROAD PHASE 2 BUILDINGS 2 - 9
BATAVIA, OHIO 45103**

<i>Sample Location</i>	<i>Sample Description</i>	<i>Sample ID No.</i>	<i>Lab ID No.</i>	<i>Asbestos Content</i>	<i>* Homo-geneous Area #</i>	<i>Friable/ Nonfriable</i>
<i>Building 7 continued:</i>						
Exterior window southwest wall	Exterior window glazing	26SB-320	26B-03209	None detected	9	Nonfriable

**** Homogeneous area number descriptions (bold type indicates asbestos-containing material)***

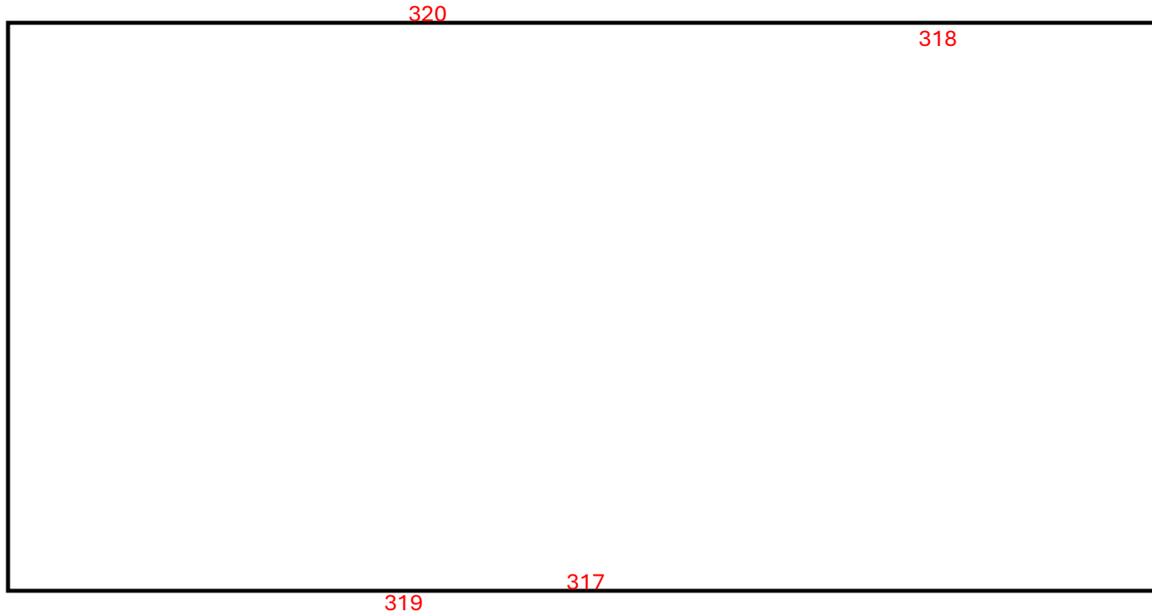
- 1 - 2' x 4' White facing ceiling tile with parallel fissures
- 2 - Drywall
- 3 - Joint compound
- 4 - Interior window glazing
- 5 - 2' x 2' White facing ceiling tile with random pin holes and recessed edges
- 6 - Brown fiberboard wall paneling
- 7 - 2' x 4' White facing ceiling tile with rough surface and random pin holes
- 8 - 4' x 8' Brown fiberboard paneling
- 9 - Exterior window glazing
- 10 - Textured plaster
- 11 - Drywall
- 12 - Joint compound
- 13 - 2' x 2' White facing ceiling tile with very rough texture and recessed edges
- 14 - Yellow fiberboard painted white
- 15 - 2' x 4' White facing ceiling tile with random pin holes

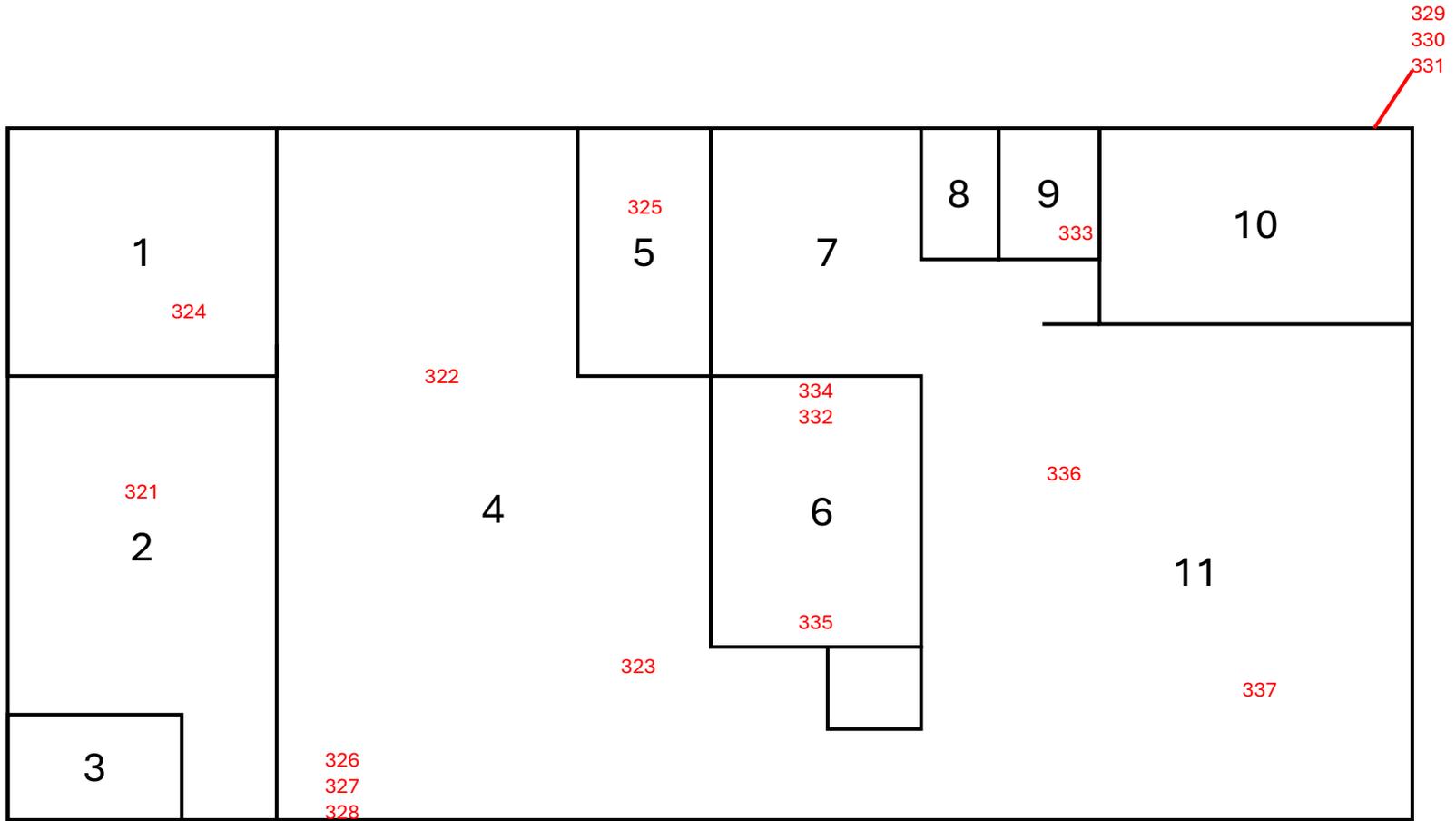
Building 2



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Building 7

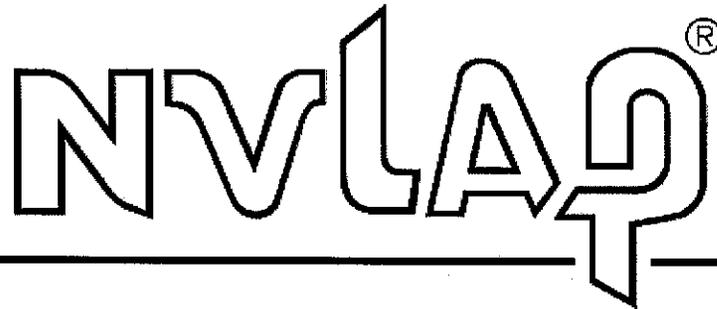




Attachment 4

ANALYTICAL LABORATORY NVLAP ACCREDITATION CERTIFICATE

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200718-0

Pinnacle Consultants, LLC
Nitro, WV

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Asbestos Fiber Analysis

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique on ISO/IEC 17025).*

2025-07-01 through 2026-06-30

Effective Dates



A handwritten signature in black ink, appearing to read "Robert Krueh".

For the National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Pinnacle Consultants, LLC
10 Independent Avenue
Nitro, WV 25143
Ms. Miranda Reedy
Phone: 304-757-5204 Fax: 304-757-5205
Email: miranda.reedy@pinnaclecorp.net
<http://www.pinnaclecorp.net>

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 200718-0

Bulk Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials



For the National Voluntary Laboratory Accreditation Program

Attachment 5

LABORATORY REPORT AND SAMPLE CHAIN-OF-CUSTODY



ASBESTOS IDENTIFICATION BY POLARIZED LIGHT MICROSCOPY ANALYSIS

Attn: **Chris Belcher**
Pinnacle Environmental Consultants, Inc.
486 Old State Route 74
Cincinnati, OH 45244

Client Project/PO#: 26-0017
PC Project #:
Received Date: 2/12/2026
Analysis Date: 2/16/2026

Project Location: Clermont County - Filager Rd DEMO Phase 2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-301	26B-03190		Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 45 % Fiber Glass: 0% Others: 0% Filler/Binder: 55 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-302	26B-03191		Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 55 % Fiber Glass: 0% Others: 0% Filler/Binder: 45 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-303	26B-03192		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 30 % Fiber Glass: 0% Others: 0% Filler/Binder: 70 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-304	26B-03193		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-305	26B-03194		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 25 % Fiber Glass: 0% Others: 0% Filler/Binder: 75 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-306	26B-03195		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 33 % Fiber Glass: 0% Others: 0% Filler/Binder: 67 %			

Project Location: Clermont County - Filager Rd DEMO Phase 2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-307	26B-03196		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-308	26B-03197		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 35 % Fiber Glass: 0% Others: 0% Filler/Binder: 65%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-309	26B-03198		Brown/White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 12 % Fiber Glass: 0% Others: 0% Filler/Binder: 88%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-310	26B-03199		Brown/White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 10 % Fiber Glass: 0% Others: 0% Filler/Binder: 90%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-311	26B-03200		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 67 % Fiber Glass: 0% Others: 0% Filler/Binder: 33%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-312	26B-03201		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 75 % Fiber Glass: 0% Others: 0% Filler/Binder: 25%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-313	26B-03202		Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 90 % Fiber Glass: 0% Others: 0% Filler/Binder: 10%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-314	26B-03203		Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 85 % Fiber Glass: 0% Others: 0% Filler/Binder: 15%			

Project Location: Clermont County - Filager Rd DEMO Phase 2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-315	26B-03204		White/Silver
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 30% Others: 0% Filler/Binder: 70 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-316	26B-03205		White/Silver
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 35% Others: 0% Filler/Binder: 65 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-317	26B-03206		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 50 % Fiber Glass: 0% Others: 0% Filler/Binder: 50 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-318	26B-03207		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 50 % Fiber Glass: 0% Others: 0% Filler/Binder: 50 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-319	26B-03208		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 3% Filler/Binder: 97 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-320	26B-03209		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 2% Filler/Binder: 98 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-321	26B-03210		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-322	26B-03211		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

Project Location: Clermont County - Filager Rd DEMO Phase 2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-323	26B-03212		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-324	26B-03213		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-325	26B-03214		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-326	26B-03215		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 20 % Fiber Glass: 0% Others: 0% Filler/Binder: 80 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-327	26B-03216		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-328	26B-03217		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 18 % Fiber Glass: 0% Others: 0% Filler/Binder: 82 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-329	26B-03218		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 25 % Fiber Glass: 0% Others: 0% Filler/Binder: 75 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-330	26B-03219		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 0% Others: 0% Filler/Binder: 100%			

Project Location: Clermont County - Filager Rd DEMO Phase 2

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-331	26B-03220		White/Brown
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 30 % Fiber Glass: 0% Others: 0% Filler/Binder: 70 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-332	26B-03221		White/Silver
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 40% Others: 0% Filler/Binder: 60 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-333	26B-03222		White/Silver
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 0 % Fiber Glass: 45% Others: 0% Filler/Binder: 55 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-334	26B-03223		Brown/White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 80 % Fiber Glass: 0% Others: 0% Filler/Binder: 20 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-335	26B-03224		Brown/White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 85 % Fiber Glass: 0% Others: 0% Filler/Binder: 15 %			

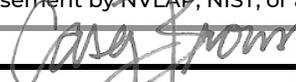
CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-336	26B-03225		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 55 % Fiber Glass: 0% Others: 0% Filler/Binder: 45 %			

CLIENT ID #:	LAB ID #:	LOCATION:	COLOR:
26SB-337	26B-03226		White
Texture/Description: Solid/			
Chrysotile: 0 % Tremolite: 0% Anthophyllite: 0%			
TOTAL ASBESTOS: 0 %			
Amosite: 0% Actinolite: 0% Crocidolite: 0%			
Cellulose: 60 % Fiber Glass: 0% Others: 0% Filler/Binder: 40 %			

Project Location: Clermont County - Filager Rd DEMO Phase 2

Analytical Method: Polarized light microscopy using dispersion staining (App. E to Sub. E of 40 CFR Part 763 and EPA/600/R-93/116). PLM should not be used to demonstrate the absence of asbestos in floor tiles. All samples will be held for thirty (30) days unless otherwise requested. This report relates only to items tested and makes no statement as to the contents of surrounding materials and apply to the sample as received. Multi-layered material which have distinct and separable layers shall be reported separately. This report shall not be reproduced, except in full, without written permission. The results of this report should not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Analyzed by: _____


Casey Brown



10 Independent Avenue
 Nitro, West Virginia 25143
 Tel: 304-757-5204
 Fax: 304-757-5205
 Web: www.pinnaclecorp.net

Company Name: Pinnacle Environmental Consultants, Inc.	TURNAROUND TIME REQUESTED Same Day <input type="checkbox"/> 3-Day <input type="checkbox"/> 1-Day <input type="checkbox"/> 4-Day <input type="checkbox"/> 2-Day <input checked="" type="checkbox"/> 5-Day <input type="checkbox"/> Special Request:
Contact Name: Steve Brenner	
Address: 486 Old State Route 74	
City State Zip: Cincinnati, OH 45244	
Phone: 513.533.1823	
Email: sbrenner@pinnacleinc.biz	

TYPE OF ANALYSIS REQUESTED			
ASBESTOS PCM (Air Samples) <input type="checkbox"/> PLM (Bulk Samples) <input checked="" type="checkbox"/> TEM Analysis <input type="checkbox"/> Point Count (If Applicable) <input type="checkbox"/> Analyze to Positive <input checked="" type="checkbox"/>	FUNGAL SPORE Spore Trap (Air) <input type="checkbox"/> Direct Exam (Tape/Swab/Wipe) <input type="checkbox"/>	LEAD XRF <input type="checkbox"/> Soil <input type="checkbox"/> Wipe <input type="checkbox"/> Chips <input type="checkbox"/>	
Bill To If Different: Address: City State Zip: Alt. Email:	Comments/Instructions: <u>STOP AT FIRST POSITIVE - SEE BELOW.</u>		

PAID BY: Cash Card Check

Project ID: <u>26-5017</u>	PO Number: _____
Sampling Date/Time: <u>2/9-10/26</u>	Sampled By: <u>STEVE BRENNER</u>
Project Description/Location: <u>CLERMONT COUNTY FLAGLER RD DEMO PHASE 2</u>	

Sample ID	Description	Comments	Lab ID
26SB-301 → 337			26B-03190
	* STOP AT FIRST >1% ON THE FOLLOWING:		
	• 301-302		
	• 309-310		
	• 311-312		
	• 313-314		
	• 315-316		
	• 317-318		
	• 319-320		
	• 321-325		
	• 332-333		
	• 334-335		
	• 336-337		

Relinquished By: Steve Brenner Date: 2/4/20 Laboratory Use: **RECEIVED**

Received By: *CASEY* Date: _____ Time: _____ **FEB 12 2026**

**SECTION 01 21 00
ALLOWANCES**

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

- A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 CONTINGENCY ALLOWANCE

- A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
 - 1. All overhead and profit contemplated for the Work performed under each Allowance is to be included in the Base Bid.
- B. Funds will be drawn from the Contingency Allowance by Change Order.
- C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.04 ALLOWANCES SCHEDULE

- A. Contingency Allowance: General Contract - A; Include the stipulated sum/price of \$540,500.00 for use upon Owner's instructions.
- B. Aid to Construction Allowance: Include the stipulated sum/price of \$30,000 for use upon Owner's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 04 21 00
CLAY UNIT MASONRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clay facing brick.
- B. Mortar and grout.

1.02 RELATED REQUIREMENTS

- A. Section 04 05 13 - Masonry Mortaring
- B. Section 04 05 16 - Masonry Grouting
- C. Section 04 05 19 - Masonry Anchorage & Reinforcing
- D. Section 04 05 23 - Masonry Accessories
- E. Section 04 20 00 - Unit Masonry
- F. Section 04 72 00 - Cast Stone Masonry
- G. Section 05 50 00 - Metal Fabrications: Loose steel lintels.
- H. Section 06 10 00 - Rough Carpentry: Nailing strips built into masonry.
- I. Section 07 21 13 - Board Insulation: Insulation for cavity spaces.
- J. Section 07 84 00 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- K. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM A580/A580M - Standard Specification for Stainless Steel Wire; 2023.
- C. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.
- D. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- F. ASTM C126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units; 2015.
- G. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2014.
- H. ASTM C476 - Standard Specification for Grout for Masonry; 2010.
- I. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- J. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.
- K. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting two weeks before starting work of this section; require attendance by all relevant installers, architect and structural engineer.

1.05 SUBMITTALS

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

Filager Campus Improvement

Phase 2

Construction Documents

Addendum #02

Clay Unit Masonry

04 21 00- 1

March 24, 2026

- B. Shop Drawings: Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
 - 1. Provide elevations of shear wall reinforcing.
- C. Samples: Submit four samples of facing brick, ceramic glazed facing brick, and ceramic glazed structural clay facing tile units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where one wythe of multi wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Hot Weather Requirements: Comply with IMIAWC (HW).

PART 2 PRODUCTS

2.01 BRICK UNITS

- A. Manufacturers:
 - 1. Belden Brick: www.beldenbrick.com/#sle.
 - 2. Bowerston Shale Company, www.bowerstonshale.com
 - 3. Glen Gery, www.glengery.com
 - 4. Substitutions: See section 01 60 00 - Product Requirements.
- B. Manufacturers:
 - 1. Brick to be supplied by one of the following groupings.
- C. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Efflorescence: ASTM C67, "non effloresced"
 - 2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 - 3. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.
- D. Group A
 - 1. Brick Type 1:
 - a. Belden Brick Company, Canton, Ohio
 - b. Size: Modular
 - c. Color & Texture: Modular Belcrest 560
- E. Group B
 - 1. Brick Type 1:
 - a. Bowerston Shale Company
 - b. Size: Modular
 - c. Color & Texture: Harbour Collection Old English

2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Mortaring, refer to Section 04 05 13
- B. Masonry Grouting, refer to Section 04 05 16

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Clean reinforcement of loose rust
- C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

- A. Cold Weather Construction: Comply with whichever is the more stringent:
 - 1. The cold weather construction provisions of TMS 602/ACI 530.1/ASCE 6, Article 1.8 C, shall be implemented when the ambient temperature falls below 40 degrees F (4 degrees C)
 - 2. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
 - 3. Frozen Materials and Work:
 - a. Do not use frozen materials mixed or coated with ice or frost.
 - b. Do not build on frozen work.
 - c. Remove and replace masonry work damaged by frost or freezing.
- B. Hot Weather Construction: Comply with whichever is the more stringent:
 - 1. Hot Weather Construction: The cold weather construction provisions of TMS 602/ACI 530.1/ASCE 6, Article 1.8 C, shall be implemented when the ambient temperature exceeds 100 degrees F (37.8 degrees C), or 90 degrees F (32.2 degrees C) with a wind velocity greater than 8 mph (3.58 m/s).
 - 2. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.04 INSTALLATION GENERAL

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns, and offsets.
 - 1. Avoid the use of less than half size units at corners, jambs, returns, offsets and where ever possible.
- B. Thickness: Build masonry walls to the full thickness shown except single width walls to be nominal unit thickness.
- C. Cut masonry units with motor driven saw designed to cut masonry with clean sharp unchipped edges.

3.05 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 12 inches.

- 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Brick Type 1: Field Brick
 - a. Bond: 1/3 Running.
 - b. Coursing: Three units and three mortar joints to equal 8 inches.
 - c. Mortar Joints: Concave.

3.06 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
 - 1. Cut masonry units with a motor -driven saw designed to cut masonry.
- H. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, or cavity insulation vapor barrier adhesive is applied.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.07 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.08 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

3.09 CONTROL AND EXPANSION JOINTS

- A. Install control and expansion joints
 - 1. Where shown on the drawings
 - 2. In accordance with the Brick Industry Association (BIA) recommendations.
 - 3. In accordance with the National Concrete Masonry Association (NCMA) recommendations.
- B. Do not continue horizontal joint reinforcement through control or expansion joints.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- D. Size control joints as indicated on drawings; if not shown, 3/8 inch wide and deep.
- E. Column Isolation from Masonry: Continuously wrap steel columns or structural supports within masonry walls with expansion joint filler sheets (column isolation). Secure sheets with light gauge wire.

3.10 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Fill cores in hollow concrete masonry units with grout 3 course (24 inches) under bearing plates beams posts and similar items, unless otherwise indicated.
- E. Do not build into masonry construction organic materials that are subject to deterioration.

3.11 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- C. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- D. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

3.12 CUTTING AND FITTING

- A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 SOURCE QUALITY CONTROL

- A. Masonry Contractor shall water test cavity to verify all water is draining to the exterior through the weeps before continuing with exterior wythe before capping wall.
 - 1. Contractor shall perform tests in the presence of, A/E, testing lab representative, and General Contractor.
 - a. Do not proceed more than 3 veneer courses above flashing without testing, observation, and picture documentation by testing lab representative.
 - 2. Contractor shall hold water hose and with standard water pressure force water into the cavity at a cell vent so water can be observed coming out adjacent weeps for a period of at least 5 minutes. Contractor shall continue down the wall to the next cell vent where a weep did not indicate water wicking out and continue this process until the entire length of flashing is tested.
 - 3. Where water is observed inside the building or outside the building away from the weeps, masonry units shall be removed and flashing re-inspected and repaired.
 - 4. Water test shall be re-performed where flashing was repaired.

3.14 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 43 00 - Quality Assurance.
 - 1. The owner is to engage and compensate the on site testing agency.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Masonry Inspection
 - 1. Provide masonry inspection of concrete or brick masonry walls as required to insure that masonry construction is in conformance with the Contract Documents.
 - 2. The masonry inspector shall prepare a written report or reports for each day of inspection. Masonry Inspection report that follows Section 01 4000 shall be used for the reports.
 - 3. The masonry inspector shall be present and observe all grouting operations in wall requiring inspection. The masonry inspector shall be present at the project site with in sufficient time, in advance of grouting operations, to inspect the construction to insure its conformance to the Contract Documents and that grouting may proceed. Periodically the masonry inspector shall be present during the placement of masonry units and reinforcement.

4. No grouting shall be permitted unless the masonry inspector is present and has indicated that the masonry construction is properly prepared for grouting operation.

3.15 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.16 PROTECTION

- A. Protect installed units from splashing, stains, mortar, and other damage.
- B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

**SECTION 07 61 00
SHEET METAL ROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Complete preformed, roof system, including all materials, associated flashings, trim, closures, fasteners, framing, supports, sealants and underlayment required.
- B. Roof curbs & jacks
- C. Snow guards.
- D. Vapor Barrier
- E. Underlayment
- F. Eave Protection
- G. Sealants for joints within sheet metal fabrications.
- H. Soffits

1.02 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry
- B. Section 05 31 00 - Steel Decking
- C. Section 09 90 00 - Painting and Coatings: Paint downspout shoe
- D. Section 07 72 00 - Roof Accessories: Manufactured accessories.

1.03 ALTERNATIVES

- A. See Section 01 23 00 - Alternates, for product alternatives affecting this section.

1.04 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; 2020.
- B. ASTM B32 - Standard Specification for Solder Metal; 2020.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM E 1646 - Standard Specification for Water Infiltration.
- E. ASTM E 1680 - Standard Specification for Air Infiltration
- F. AISC Category MB Certification
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene two weeks before starting work of this section.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Engineered Drawings: Manufacturer of the roofing system, shall provide engineer stamped drawings certifying that the roof system is designed specifically for this project and will meet all State of Ohio Building Codes. Engineer shall be certified in the State of Ohio.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- E. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- G. Product Data: Provide data on metal types, finishes, characteristics .
 - 1. Flashing materials
 - 2. Insulation
 - 3. Fasteners
 - 4. Pre-manufactured pipe flashing
 - 5. Accessories
- H. Installation Samples: Submit two samples illustrating metal roofing mounted on plywood backing illustrating typical seam.
- I. Submit three samples illustrating metal finish color.
- J. Color Samples: Submit two samples illustrating metal finish color.

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise noted.
- B. Manufacturer's Qualifications: Roof system manufacturer has been engaged in the fabrication of metal roof systems for at least ten years.
 - 1. The Manufacturer shall be a member of the Metal Building Manufacturer's Association (MBNA).
 - 2. The American Institute of Steel Construction (AISC) currently certifies the Manufacturer for Category MB.
 - 3. The Manufacturer maintains a certified installer program for its products and maintains an up to date authorized roofing contractor list.
 - 4. The Manufacturer has a written warranty covering durability, color and weather tightness of its roof system.
 - 5. Manufacturer shall produce the metal roof panels on fixed equipment operated by the manufacturer. Portable roll forming shall not be permitted except for special applications and shall be licensed and operated by the Manufacturer in a permanent manufacturing facility.
 - 6. Manufacturing facilities shall be currently under inspection by Underwriters Laboratory personal to verify compliance that the products fabricated are in accordance with the specifications of the products which were originally tested
 - 7. Manufacturer's Field Services: Manufactures Technical Representative Inspection: Minimum of three visits to the jobsite to inspect and monitor the installation of the metal roof system. After each inspection provide the installer with a detailed written report communicating issues and progress of the roof inspection. All inspections must be performed by a technical field representative. A copy of the report shall be forwarded to the Architect for information purposes.
 - a. Should the roofing system not be approved by the manufacturer's technician, correcting the defective work shall be done by the contractor until the roofing system satisfactorily meets all the specifications and manufacturer's requirements.
- C. Installer Qualifications: Company specializing in performing sheet metal roof installations with minimum 10 years of experience on projects of similar size and scope.
 - 1. Roofing Contractor shall be certified by the Manufacturer to install Manufacturer's roof system.
 - 2. Roofing Contractor shall follow the Manufacturer's installation details without exception unless written authorization from the manufacturer and architect are provided on an installation detail revision.

3. Roofing Contractor shall have no viable claims pending regarding negligent acts or defective workmanship on previously performed or current projects.
4. Roofing Contractor shall have not filed for protection from creditors under any state or federal insolvency or debtor relief status or codes.
5. Roofing Contractor shall execute 100% of the roof system installation, utilizing full time employees of the Roofing Contractor. Second and third tier sub-contractors for the installation work in this section are not permitted.

1.08 MOCK-UP

- A. See Section 01 43 00 Quality Assurance
- B. Mockup: Install roof system mock up to demonstrate aesthetic effects and set quality standards for materials, execution, and workmanship.
 1. Build mockup of a typical roof system as shown on the drawings a minimum of 12 panels wide including vapor barrier, insulation, underlayment, flashings, gutters, fascias, pipe flashings and associated attachments.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roof system components to the project site in Manufacturer's unopened original containers.
- B. Protect roof system components during shipment, storage, handling and erection from mechanical abuse, stains, discoloration and corrosion.
- C. Provide strippable plastic film on all painted surfaces between contact areas to prevent abrasion during shipping, storage, and handling.
- D. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Store materials off the ground, under protective cover. Slope metal sheets to ensure drainage.
- E. Prevent contact with materials that could cause discoloration or staining.
- F. Damaged materials will be rejected and removed from the site.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents
- C. Standard Manufacturer Roof Warranty: Provide a written warranty, with no monetary limitation, signed by roofing manufacturer agreeing to promptly repair leaks resulting from defects in materials or workmanship for the following warranty period:
 1. Warranty Period: 20 Years from the date of Substantial Completion
- D. Weathertightness Warranty: Provide manufacturer's written weathertightness warranty for a minimum of 20 years against leaks in roof panel arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions. Warranty shall be signed by both the roofing system manufacturer and the roofing system contractor.
- E. Finish Warranty: Furnish panel manufacturer's written warranty for twenty (20) years covering the finish of exposed coated metal surfaces including but not limited to roof panels, counterflashings, gutters, downspouts, fascias and trim flashings against blistering, peeling, cracking, flaking, checking, chipping, rusting, and chalking and color change during the warranty period.

- F. Roofing Contractor Warranty: The roofing contractor will guarantee, from the date of Substantial Completion, at his cost and expense make or cause to make such repairs to the roof resulting from faults or defects in material or workmanship as necessary to maintain the roof in a watertight condition. Guarantee shall include, but is not limited, roof panels, flashing, roof insulation, fasteners, valleys, fascia, gutters, downspouts, trim flashings and roof joints. (Copy of the Warranty is included at the end of this Section.)
1. Guarantee shall include, but is not limited, roof membrane, flashing, roof insulation, fasteners, walkways, and roof expansion joints.
 2. Warranty Period: 2 Years from the date of Substantial Completion
 3. Repairs required, either permanent or temporary, to the roofing or roof flashing under this guarantee shall be made within 3 days after notice of the need for repair. Should the contractor fail to make such repairs within the time period, the Owner may have the repairs made and the cost paid by the Contractor.
 4. Copy of the warranty is include at the end of this section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Dimensional Metal Inc, 58 Kelma Drive, Reynoldsburg, Ohio 43068
1. Roof Panel: Span-Lock SL2016, Smooth with pencil ribs.
 2. Soffit: FP1012 Vented-1 High Bead and FP1012 Non-Vented-1 High Bead
- B. Centria
1. Roof Panel: SDP 200, Smooth with pencil ribs.
 2. Soffit: IW-14A Vented and Un-Vented
- C. AEP Span:
1. Roof Panel: Span-Lok hp, Smooth with pencil ribs.
 2. Soffit: Prestige-Vented and Un-Vented.
- D. Peterson Pac-Clad
1. Roof Panel: Tite-Loc, Smooth with pencil ribs
 2. Soffit: Pac 750 Soffit series Vented and Un-Vented
- E. Merchant & Evans Inc.
1. Roof Panel: 2 Inch Zib-Lock with pencil ribs
 2. Soffit: Flush Lock series Vented and Un-Vented
- F. Elevate
1. Roof panel: Una-Clad UC-6, Smooth with Pencil Ribs
 2. Soffit: Una-Clad UC-500, Vented and Un-Vented
- G. Exceptional Metals
1. Roof panel: EM BattenLok HS, Smooth with Pencil Ribs
 2. Soffit: EM Artisan Metal Wall Panel, Vented and Un-Vented
- H. Sheffield Metals, Inc.
1. Roof panel: SMI 2.0
 2. Soffit: SMI 1.0 FWP
- I. Substitutions: No substitutions permitted without express written approval.

2.02 ROOF SYSTEM

- A. Roof panel 16 inch wide x 2 inch high standing seam with factory applied mastic (in female leg), striations (pencil ribs), smooth texture, concealed fastener, continuous mechanically seamed.
- B. Sheet Materials
1. Roof panels: 22 gauge (.027"), 50 ksi steel sheet Galvalume Aluminum-Zinc Alloy Coated Steel Grade C meeting ASTM A792
 - a. Prepainted by the coil coating process to comply with ASTM A755

2. Trim, Gutters, Downspouts etc: 22 gauge, 50 ksi steel sheet Galvalume Aluminum-Zinc Alloy Coated Steel Grade C meeting ASTM A792
 - a. Prepainted by the coil coating process to comply with ASTM A755
3. Panel continuous length without seam except where noted on the drawings.
4. Texture:
 - a. Roof panels smooth with pencil ribs.
 - b. Trim, gutters, downspouts etc: Smooth.
5. Finish: Premium fluoropolymer coating - Kynar 500 or Hylar 5000
 - a. 2-coat fluoropolymer, 70 percent PDVF resin.
6. Color: Selected from metal roof systems standard offering.

2.03 SOFFIT SYSTEM

- A. Soffit panel to be nominal 12 inches wide perforated to allow 7.5% free air with V groove in the middle, conceal fastener leg with concealed fasteners
- B. Sheet Materials: Soffit and related soffit flashing and trim metal
 1. Aluminum Sheet: ASTM B 209 (ASTM B 290M) 0.032 inch thick
 2. Panel continuous length.
 3. Texture: Smooth and striated
 4. Finish: Premium fluorocarbon coating - Kynar 500 or Hylar 5000
 5. Color: Selected from metal roof systems standard offering.

2.04 ACCESSORIES

- A. General: Provide trim/flashing, fascias, ridge, valley, closures, gutters, gutter hangers and other related required items to provide a complete system
- B. Clip: One piece floating clip with 3 1/2" x 6" x 18 ga. bearing plates screwed into metal deck at 32 inches on center of per roof manufacturer's requirements.
- C. Fasteners:
 1. Use long life fasteners for all interior and exterior applications
 2. Provide fasteners with a factory applied coating in a color to match metal roof system.
 3. Provide neoprene washers under heads of exposed fasteners.
- D. Fascia:
 1. Formed to size and configuration as indicated on drawings.
 2. Fascia shall be 20 gauge or heavier and same finish as roof panel.
- E. Vapor Barrier:
 1. ASTM C 1136-06
 2. Maximum permeance rating of 0.13 perm.
 3. Manufacturers:
 - a. Griffolyn Type-65; Reef Industries, Houston, Texas
 - b. DURA-SKRIM 6WW; Raven Industries, Sioux Falls, South Dakota
 - c. WMP-VR; Lamtec Corporation, Mount Bethel, Pennsylvania
- F. Roof Jacks, Crickets and Flashings: Provide roof jacks, crickets and flashings for all roof penetrations - See Section 07 72 00 Roof Accessories
 1. Curbs shall be constructed using minimum .080, 3003H14 aluminum, or heavier as required to support the load of the equipment, with fully mitered and heli-arc welded corners, integral base plates, with water diverter cricket.
 2. Minimum height of Curb shall be 12" above finished roof.
 3. Curbs shall be constructed to match slope of roof and provide a level top surface for mounting of equipment.
 4. Curb flange shall be constructed to match configuration of roof panel. Side flange shall extend to the next natural seam in the roof panels and conform to seam configurations.
 5. Color: Surfaces exposed to view are to match the color of the roof panels

6. Manufacturers:
 - a. LM Curbs, Longview TX
 - b. ThyBar, Addiston IL
 - c. RPS Accessories, Bensenville IL
 - d. Substitutions: See Section 01 60 00 - Products Requirements
- G. Soffit Framing
 1. Framing System Components: Meeting requirements of ASTM C 645-08; C-channel, roll-formed from hot dipped galvanized steel; complying with ASTM A 1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
 2. Studs: C shaped with flat or formed webs.
 3. Furring: Hat-shaped sections, minimum depth of 7/8 inch or as noted on drawings.
- H. Vented Soffit Trim:
 1. General: Provide trim/flushing, fascias, ridge, valley, closures, gutters, gutter hangers and other related required items to provide a complete system
 2. Color: Surfaces exposed to view to match the color of the soffit.
- I. Pipe flashing: Provide EPDM rubber flashings for vent penetrations.
- J. Snow Guard
 1. S-5! ColorGard Snow Guards by Metal Roof Innovations, Ltd. Colorado Spring, CO 80908 with SnoClip: www.s-5.com
 2. Acceptable Manufacturers:
 - a. Metal Roof Innovations, Ltd. Colorado Springs, CO
 - b. Berger Building Products, Feasterville, Pennsylvania
 - c. Colorbar; www.snobar.com
 - d. Sno-Gem Inc
 - e. Zaleski Snow Guards
 - f. Alpine Snow Guards - SnowMax
 - g. Substitutions: See Section 01 60 00 - Products Requirements
 3. Furnish and install where indicated on plans assembly for snow retention as follows: S-5! clamps are to be spaced at every panel seam. Clamps should be on or as near as possible to the hold down clip location without interfering with the ability of the roof to float. All clamps are to be installed true-to-line. Stainless steel fasteners are to be tightened using a tool with a rating of 115 inch-pounds. This tension shall be periodically verified during installation. In no event shall the clamp spacing exceed 24 inches.
 4. The snow guard is to be furnished and installed on each S-5-U clamp with 3/8" x 3/4" stainless steel bolt and washer furnished by manufacturer. The snow guard shall be pre punched on 4" centers. Adjacent sections of snow guard are to be joined using a splice plate provided by manufacturer.
 5. SnoClip: Aluminum component with integrated rubber foot to retard the migration of snow and ice beneath the cross member. Rubber foot to prevent abrasion to the roof panel finish.
 6. The color strip, which is 2" wide x 8' long, that is inserted into the snow guard system shall be furnished with the system. Color shall match the roof panels.
- K. Soffit Framing:
 1. Framing System Components: Meeting requirements of ASTM C 645-08; C-channel, roll-formed from hot dipped galvanized steel; complying with ASTM A 1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
 - a. Studs: C shaped with flat or formed webs.
 - b. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
- L. Fasteners: Galvanized steel, with soft neoprene washers.
- M. Protective Backing Paint: Zinc molybdate alkyd.

- N. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- O. Sealant to be Exposed in Completed Work: elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- P. Underlayment (Eave Protection Sheet): Rubberized asphalt bonded to sheet polyethylene, 40 mil total thickness, with strippable treated release paper.
 - 1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
 - 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
 - 3. Manufacturer:
 - a. W.R. Grace Construction Products, Ultra
 - b. Protecto Wrap, Safe Seal 6640
 - c. Dimensional Metal Inc, Dynaclad Ultra HT
 - d. Substitutions: See Section 01 60 00 - Products Requirements
- Q. Solder: Sn50 (50/50) type.

2.05 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, thickness to match roofing sheet, interlockable with sheet.
- C. Fabricate starter strips, interlockable with sheet.
- D. Form pieces in longest practical lengths.
- E. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- F. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS:

- A. Install roofing and flashing in accordance with approved shop drawings and manufacturer's product data, within specified tolerances.
- B. Isolate dissimilar metals, masonry and concrete from metal roof system with bituminous coating.
- C. Anchorage shall allow for thermal expansion and contraction without stress or elongation of panels, clips or anchors.
- D. Coordinate flashing and sheet metal work to provide watertight conditions at roof terminations. Fabricate and install in accordance with standards set forth in the SMACNA Manual using continuous cleats at all exposed edges.

3.02 EXAMINATION

- A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
- B. Verify deck is dry and free of snow or ice.
- C. Verify correct placement of wood nailers and insulation positioning between nailers.
- D. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- E. Verify roofing termination and base flashings are in place, sealed, and secure.

3.03 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels; seal top of reglets with sealant.
- C. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.
- D. Place eave edge and gable edge metal flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 16 inches OC.

3.04 INSTALLATION - ROOFING

- A. Install Vapor Retarder
 - 1. At acoustical metal deck, install acoustical insulation in roof deck flutes.
 - 2. Loosely lay vapor retarder over entire roof area extending to roof edges and to adjacent walls
 - 3. Side and end laps of each sheet a minimum of 6 inches
 - 4. Seal laps with continuous strip of tape recommended by the vapor retarder manufacturer.
 - 5. Seal at penetrations and at roof edges with manufacturer recommended butyl tape or sealant
 - 6. Vapor retarder shall be positively sealed at all edges, penetrations and wall utilizing manufacturers' vapor retarder accessories
- B. Install Roof Insulation
 - 1. Install in single layer laid perpendicular to slope
 - 2. Install second layer lapping all joints a minimum of 6 inches.
 - 3. At all valley and ridge locations miter edges.
- C. Apply underlayment over entire roof area.
 - 1. Apply in single layer laid perpendicular to slope; weather lap edges 4 inches
- D. Install metal roof system in accordance to manufacturer's instructions and shop drawings.
 - 1. Install metal roof system so that it is weather tight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.
 - 2. Provide concealed anchors at all panel attachment locations
 - 3. Install panels plumb, level and straight with seams and parallel, conforming to design indicated.
- E. Flash around roof mounted equipment. This will become part of the roofing warranty
- F. Install pipe flashing at all pipe penetrations.
- G. Cleat and seam all joints.
- H. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.
- I. Provide gutters, downspouts, and fascias.
- J. Install snow guards, per manufacturer's recommendation, up slope from eaves and valleys.
- K. Install snow guards:
 - 1. Furnish and stall where indicated on drawings for snow retention as follows: S-5-U clamps are to be spaced at every panel seam. Clamps should be on or as near as possible to the hold down clip location without interfering with the ability of the roof to float. All clamps are to be installed true-to-line. Stainless steel fasteners are to be tightened using a tool with a rating of 115 inch-pounds. This tension shall be periodically verified during installation. In no event shall the clamp spacing exceed 24 inches.

3.05 INSTALLATION - GUTTERS AND DOWNSPOUTS

- A. Comply with SMACNA (ASMM) details.
- B. Install gutter brackets at 32 inches on center.

- C. Seal gutters watertight, and seal joint of gutter to drain.
 - 1. Lap gutter joints a minimum of 4 inches with two rows of butyl tape between gutter pieces and rivet between rows of sealant.
- D. Connect downspouts to downspout boots at 10 inches above grade, and grout connection watertight.
- E. Cut the storm piping to the correct length, Secure downspout boot to site storm piping and building foundation with top of boot at 6 inches above finished grade. Seal connection weathertight.

3.06 INSTALLATION - FLASHINGS

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by roof panel manufacturer's recommendations and details.
- B. Comply with SMACNA (ASMM) details.
- C. Insert flashings into reglets to form tight fit.
 - 1. Seal flashings into reglets with sealant.
- D. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- E. Cleat and seam all joints.
- F. Apply plastic cement compound between metal flashings and felt flashings.
- G. Fit flashings tight in place, and make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- H. Seal metal joints watertight.

3.07 INSTALLATION - SOFFIT

- A. Inspect soffit framing to verify the framing is smooth, free of waves and projections.
- B. Verify soffit openings, lights, louvers and other recessed equipment are in place.
- C. Install starter, edge strips and molds around perimeter before starting installation.
- D. Start panel installation at one end and continue to the other end of soffit.
- E. Push panel into adjacent panel and fasten through the flange at 24 inches on center (maximum)
- F. Panels to be installed perpendicular to the exterior building wall
- G. Align panel joints at intersections.

3.08 FIELD QUALITY CONTROL

- A. See Section 01 43 00 - Quality Assurance, for general requirements for field quality control and inspection.
- B. Inspection: Roofing manufacturer's technical representative and roofing contractor shall conduct all required inspections. Submit all required drawings, details, and completed questionnaires to the roofing manufacturer before obtaining the specified warranty. After an authorized Technical Representative has inspected the roof for determining acceptability for warranty issuance, any deficiencies on the final inspection report shall be corrected by the contractor/applicator and made ready for reinspection within five (5) working days.
- C. Warranty: Upon receipt of required materials, certifying inspection, and acceptance of the roofing system by the roofing manufacturer, the warranty shall be duly executed and issued to the Owner. Date of Warranty will be the date of Substantial Completion.

3.09 PROTECTION

A. Do not permit traffic over unprotected roof surface.

END OF SECTION

**SECTION 08 51 13
ALUMINUM WINDOWS**

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Exterior windows furnished and installed as shown on drawings.
 - 2. Labor, materials, tools, equipment and services needed to furnish and install windows.
 - 3. Components furnished with installed windows.
 - 4. Installation accessories furnished and installed.

1.02 RELATED SECTIONS

- A. Section 01 60 00 - Product Requirements
- B. Section 05 5000 - Metal Fabrications: Steel lintels.
- C. Section 06 1000 - Rough Carpentry: Rough openings.
- D. Section 07 9200 - Joint Sealers: Perimeter sealant and back-up materials.
- E. Section 08 8000 - Glazing.

1.03 REFERENCES

- A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.; 2003.
- B. AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; American Architectural Manufacturers Association; 1997 with revisions contained in "reprinting" of 1999.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 1998.
- D. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2004.
- E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2005.
- F. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2004.
- G. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2005a.
- H. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
- I. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.
- J. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.
- K. ASTM E 1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2000.
- L. ASTM F 588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2004.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. AAMA/NWWDA 101/I.S.2 HC 80
- B. Air, Water and Structural Performance Requirements
 - 1. When tested in accordance with cited test procedures, windows shall meet or exceed the following performance criteria, as well as those indicated in AAMA 101 and 101/I.S.-2 for Architectural AW Performance Class windows, Performance Grade 70 (AW70) unless otherwise noted herein.
 - 2. Air Test Performance Requirements
 - a. Air infiltration maximum 0.1 cfm per square foot at 6.24 psf pressure differential when tested in accord with ASTM E283.
 - 3. Water Test Performance Requirements
 - a. No uncontrolled water leakage at 12.00 psf static pressure differential, with water application rate of 5 gallons/hr/sq ft when tested in accord with ASTM E331.
 - 4. Structural Test Performance Requirements
 - a. Uniform Load Deflection Test
 - 1) No deflection of any unsupported span L of test unit (framing rails, muntins, mullions, etc.) in excess of L/175 at both a positive and negative load of 70 psf (design test pressure) when tested in accord with ASTM E330.
 - 2) Uniform Load Structural Test
 - (a) Unit to be tested at 1.5 x design test pressure, both positive and negative, acting normal to plane of wall in accord with ASTM E330.
 - (b) No glass breakage; permanent damage to fasteners, hardware parts, or anchors; damage to make windows inoperable; or permanent deformation of any main frame or ventilator member in excess of 0.2% of its clear span.
 - 5. Life Cycle Testing:
 - a. When tested in accordance with AAMA 910-93, there is to be no damage to fasteners, hardware parts, support arms, activating mechanisms or any other damage that would cause the window to be inoperable at the conclusion of testing. Air infiltration and water resistance tests shall meet the primary performance requirements specified.
 - 6. Condensation Resistance and Thermal Transmittance Performance Requirements
 - a. Perform thermal tests in accordance with AAMA 1503.1 procedure, or provide finite element computer thermal modeling per THERM 5.2 and WINDOW 5.2 on the configuration specified in AAMA 1503.1.
 - 1) Thermal Transmittance ("U" Factor) shall not exceed 0.50 BTU/hr/sf/deg F at 15 mph exterior wind.
 - 2) Condensation Resistance Factor (CRF) requirements: CRF minimum 54 (Frame) and CRF minimum 59 (Glass).

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. General Requirements
 - 1. Provide all submittals in a timely manner to meet the required construction completion schedule.
- C. Shop drawings must be prepared wholly by the window manufacturer.
- D. Product Data: Provide component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
- E. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations and installation requirements.

- F. Samples: Submit two samples, 12 x 12 inch in size illustrating typical corner construction, accessories, and finishes.
- G. Finish: Submit color samples for Architect's approval as requested.
- H. Certificates: Certify that windows meet or exceed specified requirements.
- I. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of AAMA 101 Designation heavy commercial grade.
- B. Manufacturer and Installer: Company specializing in fabrication of commercial aluminum windows of types required, with not fewer than three years of experience.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Materials will be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.09 WARRANTY

- A. Aluminum Window Warranty
 - 1. Products: Submit a written warranty, executed by the window manufacturer, for a period of ten (10) years from the date of owners acceptance, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements and industry standards, which results in premature failure of the windows, finish, factory-glazed glass, or parts, outside of normal wear.
 - a. In the event that windows or components are found defective, manufacturer will repair or provide replacements without charge at manufacturer's option.
 - b. Warranty for all components must be direct from the manufacturer (non pass-through) and non pro-rated for the entire term. Warranty must be assignable to the non-residential owner, and transferable to subsequent owners though its length.
 - 2. Installation: Submit a written warranty, executed by the window installer, for a period of 2 years from the date of substantial completion, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements, which result in premature failure.
 - a. In the event that installation of windows or components is found to be defective, installer will repair or provide replacements without charge at the installer's option.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer Basis of Design:
 - 1. Wausau Window and Wall Systems - INvent 4250i XLT. Operable as shown on the drawings.
 - 2. Acceptable Manufacturers:
 - a. EFCO Corporation
 - b. Peerless Products, Inc: www.peerlessproducts.com.
 - c. TRACO: www.traco.com.
 - d. Capitol Aluminum & Glass Corporation

- e. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WINDOWS

- A. Windows: Single thickness aluminum sections, factory fabricated, factory finished, thermally broken, vision glass, related flashings, anchorage and attachment devices.
- B. Fixed:
 - 1. Construction: Thermally broken.
 - 2. Glazing:
 - a. 1 Inch insulated
 - 3. Exterior Finish: Class I natural anodized.
 - 4. Interior Finish: Class I natural anodized.
 - 5. Color: Clear Anodized
- C. Outswing Casement Type:
 - 1. Construction: Thermally Broken
 - 2. Glazing:
 - a. 1 Inch insulated
 - 3. Exterior Finish: Class I natural anodized.
 - 4. Interior Finish: Class I natural anodized.
 - 5. Color: Clear Anodized

2.03 MATERIALS

- A. Aluminum Members
 - 1. Extruded aluminum prime billet 6063-T5 or T6 alloy for primary components; 6063-T5 or T6, 6005-T5, 6105-T5 or 6061-T6 for structural components; all meeting the requirements of ASTM B221.
 - 2. Aluminum sheet alloy 5005 H 32 (for anodic finish), meeting the requirements of ASTM B209 or alloy 3003 H 14 (for painted or unfinished sheet).

2.04 MANUFACTURED UNITS

- A. Materials
 - 1. Principal window frame members will be a minimum 0.125" in thickness at glazing legs, hardware mounting webs and section flanges.
 - 2. Extruded or formed trim components will be a minimum 0.060" in thickness.
- B. Fabrication
 - 1. Frame depth 4 1/2 inch minimum.
 - 2. Sash ventilator sections must be tubular, and close flush with adjoining frame surfaces at interior and exterior.

2.05 COMPONENTS

- A. Hardware
 - 1. All steel components including attachment fasteners to be 300 Series stainless steel except as noted.
 - 2. Extruded aluminum components 6063-T5 or -T6.
 - 3. Locking handles, cases and strikes to be die cast or stainless steel.
 - 4. Thermoplastic or thermo-set plastic caps, housings and other components to be injection-molded nylon, extruded PVC, or other suitable compound.
 - 5. Hardware to be occupant-operated and include: Dual arm operator, concealed butt hinges, friction arms, concealed limited opening devices.)
- B. Glazing
 - 1. Provide in general accordance with Section 08 8000.
 - 2. Glazing method shall be in general accordance with the FGMA Glazing Manual for specified glass type, or as approved by the glass fabricator.

- C. Glazing Materials
 - 1. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by FGMA Glazing Manual.
 - 2. Back-bedding tapes, expanded cellular glazing tapes, toe beads, heel beads and cap beads shall meet the requirements of applicable specifications cited in AAMA 800.
 - 3. Glazing gaskets shall be non-shrinking, weather-resistant, and compatible with all materials in contact.
 - 4. Structural silicone sealant where used shall meet the requirements of ASTM C 1184.
 - 5. Spacer tape in continuous contact with structural silicone shall be tested for compatibility and approved by the sealant manufacturer for the intended application. Gaskets in continuous contact with structural silicone shall be extruded silicone or compatible material.
- D. Steel Components
 - 1. Provide steel reinforcements as necessary to meet the performance requirements of 1.02.
 - 2. Concealed steel anchors and reinforcing shall be factory painted after fabrication with rust-inhibitive primer complying with Federal Specification TT-P-645.
- E. Receptors:
 - 1. Provide extruded aluminum receptors to receive windows, as shown on architectural drawings.
 - 2. Finish to match window frames.
- F. Sill Starter: One piece extended exterior sill shall be fabricated out of the same material and have the same finish as the rest of the aluminum window.

2.06 FABRICATION

- A. General:
 - 1. Finish, fabricate and shop assemble frame and sash ventilator members into complete windows under the responsibility of one manufacturer.
 - 2. No bolts, screws or fastenings to bridge thermal barrier or impair independent frame movement.
 - 3. Fabricate to allow for thermal movement of materials when subjected to a temperature differential from -30 degrees F to +180 degrees F.
- B. Frames:
 - 1. Cope and mechanically fasten each corner, or miter and weld each corner; then seal weather tight.
- C. Hardware:
 - 1. Dual Glazed Access Panel:
 - a. Hinged access panel will be constructed with mitered corners, mechanically staked over a solid aluminum corner block leaving hairline joinery.
 - b. Provide Allen-keyed locks for custodial operation.
- D. Thermal Break Construction:
 - 1. Continuous extruded polyamide with 25 percent glass fiber reinforcing, mechanically crimped into cross-knurled cavities.
 - 2. Minimum thermal barrier width shall be 24 mm.
 - 3. Quality assurance records must be maintained and available as requested.
- E. Weather-stripping:
 - 1. Dual durometer PVC, neoprene, EPDM or other suitable material as tested and approved by the window manufacturer.
 - 2. Bulb- or fin-type at exterior vent member; fin-type at interior.
 - 3. Securely stake and join at corners. Provide drainage to exterior as necessary.
 - 4. Weather-stripping shall provide an effective pressure-equalization seal at the interior face of the sash ventilator.

2.07 FINISHES

- A. Finish of Aluminum Components
 - 1. Finish of all exposed areas of aluminum windows and components shall be done in accord with the appropriate AAMA Voluntary Guide Specification.
 - a. AAM10C22A41, Clear-Class I, AAMA 611,
 - 1) Finish: Dark Bronze

2.08 ACCESSORIES

- A. Closed-cell polyurethane spray foam insulation:
 - 1. Foam Sealant is a one-component, minimal expanding, low pressure-build, flexible polyurethane foam formulated to air seal the gap around a window or door frame and the rough opening. The foam is expanded to generate an effective seal, and will not to distort or bow window and door frames.
 - 2. Foam insulation required between all windows and doors at head, jamb, and sill
- B. Frame Anchor: Nominal 3/16 inch thick heavy duty slide in anchor. Provide anchors around the perimeter of window (head, jamb, and sill)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

3.02 INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Install window assembly in accordance with AAMA 101.
- C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- E. Install sill and flashings.
- F. Provide thermal isolation where components penetrate or disrupt building insulation.
- G. Install foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.
- I. Install operating hardware not pre-installed by manufacturer.
- J. Install perimeter sealant in accordance with requirements specified in Section 07 9005.

3.03 ERECTION TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 FIELD QUALITY CONTROL

- A. Test installed windows for compliance with performance requirements for water penetration, in accordance with ASTM E 1105 using uniform pressure and the same pressure difference as specified for laboratory testing.
 - 1. The right is reserved by the Owner/Architect to have the windows tested. The cost of this test is at the Owner's expense.
 - 2. If any window fails, test additional windows at Contractor's expense.
- B. Replace windows that have failed field testing and retest until performance is satisfactory.

3.05 ADJUSTING AND CLEANING

- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

3.06 SCHEDULE

- A. As shown and noted on drawings.

END OF SECTION

**SECTION 10 44 00
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Exterior fire extinguisher cabinets.
- D. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.
- B. 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. Product Data: Provide extinguisher operational features.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination 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:
 - 1. JL Industries, Inc: www.jlindustries.com.
 - 2. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 3. Potter-Roemer: www.potterroemer.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. JL Industries, Inc: www.jlindustries.com.
 - 2. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
 - 3. Potter-Roemer: www.potterroemer.com/#sle.
 - 4. 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. Cartridge Operated: Spun shell.
 - 2. Stored Pressure Operated: Deep Drawn.
 - 3. Class: A:B:C type.

4. Size: 10 pound.
5. Finish: Baked polyester powder coat red color.
6. Temperature range: -65 degrees F to 120 degrees F.
7. Location: All locations unless otherwise indicated

2.03 FIRE EXTINGUISHER CABINETS

- A. Fire Extinguisher Cabinet, Product 2409-R6 Larsen Manufacturing Co., Architectural Series, Steel cabinet, Semi Recessed with 2 1/2 inch projection, Vertical Duo Panel with frame door with tempered glass.
- B. Accessibility: Cabinet, door and accessories to ADA compliant.
- C. Metal: Formed steel.
- D. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- E. Finish of Cabinet Exterior Trim and Door: Baked enamel, White color.
- F. Finish of Cabinet Interior: White colored enamel.

2.04 EXTERIOR FIRE EXTINGUISHER CABINET

- A. Fire Extinguisher Cabinet, Product FB Series Fiberglass Fire Extinguisher Cabinet, JL Industries.
- B. Tub and door are constructed of fiberglass with full rubber-gasketed door, 6" x 9" acrylic view window with rubber gasket seal, corrosion-resistant aluminum handle, a full-length stainless steel hinge attached by rivets, and (2) stainless steel snap latches.
- C. Finish: UV-resistant, high-visibility red finish with 5" x 9" Fire Extinguisher Lettering.

2.05 ACCESSORIES

- A. Cabinet Signage: "Fire Extinguisher" decal in black letters.
 1. Provide signage on front of cabinet
 2. Provide signage on side of cabinet (semi recessed and surface mounted) with a cabinet exposure of 2 1/2 inches or greater.

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. Install brackets on walls. Reference drawings for mounting heights and also coordinate with requirements on authorities having jurisdiction.
- C. Install cabinets plumb and level in wall openings. Reference details on drawings and coordinate with requirements of authorities having jurisdiction to confirm mounting heights and cabinet locations.
- D. Secure rigidly in place.
- E. Place extinguishers in cabinets and on wall brackets.

3.03 ADJUSTMENT

- A. Adjust cabinet doors to achieve smooth operation.

3.04 CLEANING

- A. Clean all surfaces.
- B. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.05 PROTECTION

A. Protect installed products from damage during construction in accordance.

END OF SECTION

**SECTION 12 24 00
WINDOW SHADES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Window shades and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry
- B. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.
- C. Section 09 21 16 - Gypsum Board Assemblies: Substrate for window shade systems.
- D. Section 09 51 00 - Acoustical Ceilings: Shade Pockets, pocket closures and accessories.
- E. Section 27 41 20 Inotactive Audio-Visual Equipment: Audio-video systems, for interface with motorized window shades.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 23 00 - Alternates, for product alternatives affecting this section.

1.04 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene two weeks prior to commencing work related to products of this section; require attendance of all affected installers.
- B. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.06 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 materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.
- E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- F. Selection Samples: Include fabric samples in full range of available colors and patterns.
- G. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- H. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- I. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.

- J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- K. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum 5 years of documented experience.
 - 1. Factory training and demonstrated experience.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.09 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Aluminum and Steel Coatings: 5 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manually Operated Roller Shades:
 - 1. Draper, Inc; Clutch Operated FlexShade: www.draperinc.com/#sle.
 - 2. Lutron Electronics Co., Inc: www.lutron.com/#sle.
 - 3. Hunter Douglas Architectural; RB500 Manual Roller Shades: www.hunterdouglasarchitectural.com/#sle.
 - 4. Levolor: www.levolor.com/commercial/#sle.
 - 5. SWFcontract, a division of Springs Window Fashions, LLC.: www.swfcontract.com/#sle.
 - 6. Mechoshade Systems, Ind.: www.mechoshade.com
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 WINDOW SHADE APPLICATIONS

- A. Interior Roller Shades RS1: 3% Openness
 - 1. Type: Roller shades.
 - 2. Fabric: Refer to drawings. See Finish Material Schedule on Sheet A9.0.

2.03 ROLLER SHADES

- A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories.
 - 1. Size: As indicated on drawings.
- B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Flammability: Pass NFPA 701 large and small tests.
- C. Roller Tubes: As required for type of operation.

1. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
 - a. Roller tubes to be 2.55 inches (64.77 mm) for motorized shades.
 2. Provide for positive mechanical engagement with drive / brake mechanism.
- D. Shade band and Shade Roller Attachment:
1. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
- E. Hembars: Designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.
1. Thermally sealed fabric pocket covering rectangular aluminum hembar.
 2. Hem weights shall be of appropriate size and weight for shade band.
 3. Hem weight shall be continuous inside a sealed hem pocket.
 4. Hem pocket construction and hem weights shall be similar, for all shades within one room.
- F. Shade Hardware and Shade Brackets:
1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
 2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
- G. Manual Operation for Interior Shades: Clutch operated continuous loop; beaded ball chain.
1. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator. Connectors shall be offset to assure alignment from the first to the last shade band.
 2. Provide positive mechanical engagement of drive mechanism to shade roller tube.
 3. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
 4. Drive Bracket / Brake Assembly:
 - a. Drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
 - b. Brake shall be an over running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
 - c. Braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated.
 - d. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
 5. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength.

2.04 ACCESSORIES

- A. Fascias: Size as required to conceal shade mounting.
 1. Style: As selected by Architect from shade manufacturer's full selection.
 2. Material and Color: Match
- B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.
- C. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.05 FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Fabricate shades to fit openings within specified tolerances.
 - 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 - 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
- C. Dimensional Tolerances: As recommended in writing by manufacturer.
- D. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Installation Tolerances:
 - 1. Inside Mounting: Maximum space between shade and jamb when closed of 1/16 inch.
 - 2. Maximum Offset From Level: 1/16 inch.
- C. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.
- C. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

3.05 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.
- D. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.06 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 23 07 19
HVAC PIPING INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.
- C. Section 23 21 13-Hydronic Piping: Pre-insulated underground piping.

1.03 REFERENCE STANDARDS

- A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2020a.
- B. ASHRAE Standard 90.1 - Energy Standard for Buildings Except Low Rise Residential Buildings.

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. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product property performance, and thickness.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. Knauf Insulation
 - 2. Johns Manville Corporation
 - 3. Owens Corning Corp
 - 4. CertainTeed Corporation
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation: ASTM C547 ; rigid molded, noncombustible.
 - 1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum service temperature: 850 degrees F.
 - 3. Maximum moisture absorption: 5 percent by weight.

- 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-inches.
- D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- E. All joints to be sealed with factory-applied, self-seal lap and butt strips.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturer:
 - 1. Aeroflex USA, Inc; Aerocell
 - 2. Armacell LLC
 - 3. K-Flex USA LLC
 - 4. Nomaco
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation material shall be an EPDM rubber, flexible, closed-cell elastomeric insulation in tubular or sheet form. The product will be tested for and meet or exceed the requirements defined in ASTM C 534.
- C. EPDM elastomeric insulation material shall be manufactured without the use of CFC's, HFC's or HCFC's.
- D. EPDM elastomeric insulation shall have a flame-spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E 84, for all products through 2" thickness. Product to be suitable for use from -297F to 300F continuous service temperature, per ASTM C 411.
- E. EPDM elastomeric insulation shall have a maximum thermal conductivity of 0.245 Btu-in./h-ft² F at a 75 F mean temperature when tested in accordance with ASTM C 177 or ASTM C 518.
- F. EPDM elastomeric insulation shall have a maximum water vapor transmission of 0.03 perm-inches when tested in accordance with ASTM E 96, Procedure A, latest revision.
- G. Product must exhibit long-term UV resistance, when unfinished in outdoor installations, per ASTM G 7 and ASTM G 90.
- H. EPDM elastomeric insulation must not contribute to external stress corrosion cracking as when tested by ASTM C 692.
- I. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
Accessories and adhesives shall not detract from any of the system ratings as specified above.

2.04 JACKETS

- A. PVC Plastic.
 - 1. Manufacturers:
 - a. Knauf
 - b. Owens Corning Corp
 - c. Johns Manville International, Inc:
 - d. Certainteed Corp
 - e. Zeston 2000.
 - f. PROTO PVC Corp.
 - g. VentureClad.
 - h. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Jacket: One or two 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: 30 mil.

- e. Connections: Brush on welding adhesive.
- B. Aluminum Jacket: ASTM B209 (ASTM B209M) formed aluminum sheet.
 - 1. Thickness: 0.016 inch sheet.
 - 2. Finish: Smooth.
 - 3. Joining: Longitudinal slip joints and 2 inch laps.
 - 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 - 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

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 the Midwest Insulation Contractors Association (MICA), National Commercial and Insulation Standard.
- C. All insulation shall be applied so that there is no fiberglass exposed to the return air plenum. All fiberglass insulation, including all exposed edges, shall be coated, or mylar or other suitable material shall be provided between fiberglass and the air stream.
- D. Exposed Piping: Locate insulation and cover seams in least visible locations.
- E. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
- F. 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.
- G. 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.
- H. For hot piping conveying fluids over 110 degrees F, insulate flanges and unions at equipment.
- I. 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.
- J. Inserts and Shields:
 - 1. Application: Piping 1 inches diameter or larger.
 - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 - 3. Insert location: Between support shield and piping and under the finish jacket.
 - 4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 - 5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- K. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

- L. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.
- M. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with PVC or aluminum jacket with seams located on bottom side of horizontal piping.
- N. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.

3.03 SCHEDULE

- A. Heating Systems:
 - 1. Heating Water Supply & Return:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: 1 1/4 inch or less
 - (a) Thickness: 1 inch
 - 2) Pipe Size Range: 1 1/2 inches and larger:
 - (a) Thickness: 1-1/2 inch
 - 2. Flexible Elastomeric Foam Insulation:
 - a. Pipe Size Range: 1 inch or less
 - 1) Thickness: 3/4 inch
 - b. Do not use on piping 1 1/4 inch or above.
- B. Cooling Systems:
 - 1. Chilled Water Supply & Return:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: 1 1/4 inch or less
 - (a) Thickness: 1 inch
 - 2) Pipe Size Range: 1 1/2 inch and larger:
 - (a) Thickness: 1-1/2 inch.
 - b. Flexible Elastomeric Foam Insulation:
 - 1) Pipe Size Range: 1 inch or less
 - (a) Thickness: 3/4 inch
 - 2) Do not use on piping 1 1/4 inch or above.
 - 2. Condensate Drains from Cooling Coils:
 - a. Flexible Elastomeric Foam Insulation:
 - 1) Pipe Size Range: All Sizes
 - (a) Thickness: 1/2 inch
 - 3. Refrigerant Piping:
 - a. Flexible Elastomeric Insulation:
 - 1) Pipe Size Range: All Sizes
 - (a) Thickness: 1/2 inch.

END OF SECTION

**SECTION 23 21 14
HYDRONIC SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion tanks.
- B. Air vents.
- C. Air and dirt separators.
- D. Strainers.
- E. Suction diffusers.
- F. Combination pump discharge valves.
- G. Pressure-temperature test plugs.
- H. Flow meters.
- I. Relief valves.
- J. Pressure reducing valves.
- K. Glycol system.
- L. Solids Strainer / Cooling Tower Packaged Filtration Unit

1.02 RELATED REQUIREMENTS

- A. Commissioning
 - 1. Section 01 9113 - General Commissioning Requirements
 - 2. Section 01 9114 - Commissioning Authority Responsibility
- B. Section 23 0593 - Testing, Adjusting, and Balancing.
- C. Section 23 21 13 - Hydronic Piping.
- D. Section 23 2114 - Hydronic Pumps.
- E. Section 23 25 00 - HVAC Water Treatment: Pipe cleaning.

1.03 REFERENCE STANDARDS

- A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2021.
- B. ASME (BPV VIII, 1) - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers; 2007.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.
- C. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- D. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

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 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.

1.07 MAINTENANCE SERVICE

- A. Furnish service and maintenance of glycol system for one year from date of substantial completion.
- B. Perform quarterly visits to make glycol fluid concentration analysis on site with refractive index measurement instrument. Detail findings with maintenance personnel in writing of corrective actions needed including analysis and amounts of glycol or water added.

PART 2 PRODUCTS

2.01 EXPANSION TANKS

- A. Manufacturers:
 - 1. Armstrong International, Inc; Model AX-V
 - 2. Amtrol Inc; Model Extrol
 - 3. Xylem / Bell & Gossett; Model Rolairtrol
 - 4. Grundfos; Model GNTA
 - 5. Taco, Inc; Model CBX
 - 6. Wessels; Model NTA
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psi, with flexible EPDM diaphragm or bladder sealed into tank, and steel support stand.
- C. Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psi.
- D. Automatic Cold Water Fill Assembly: Pressure reducing valve, test cocks, strainer, vacuum breaker, and valved by-pass.

2.02 AIR AND DIRT SEPARATOR

- A. Manufacturers:
 - 1. Spirotherm; Model VDT or VHT
 - 2. Xylem / Bell & Gosset; Model CRS.
 - 3. Armstrong; Model DAS
 - 4. Thrush; Aar-o-Vent Model SVR/HVR
 - 5. Grundfos; Model GSV/HV
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Construction: Fabricated steel, rated for 150 psig working pressure, internal Spirotube bundle filling the entire vessel to suppress turbulence and provide high efficiency. The bundle shall consist of a copper tube with continuous wound copper medium permanently affixed to the core. A separate copper medium is to be wound completely around and permanently affixed to the internal element. Each eliminator shall have a separate venting chamber to prevent system contaminants from harming the float and venting valve operation. At the top of the venting chamber shall be an integral full port float actuated brass venting mechanism. Units shall include a manual valved side tap to flush floating dirt or liquids and for quick bleeding of large amounts of air during system fill or refill. Separator shall have the vessel extended below the pipe connections an equal distance for dirt separation.

- C. Performance: Remove 100% of the free air, 100% of the entrained air, up to 99.6% of entrained air in the system fluid. Dirt separation shall be at least 80% of all particles 30 micron and larger within 100 passes.

2.03 STRAINERS

- A. Manufacturers:
 - 1. Armstrong International, Inc
 - 2. Xylem / Bell & Gossett
 - 3. Mueller Steam Specialty.
 - 4. Metraflex.
 - 5. Hoffman.
 - 6. Kitz Co.
 - 7. Nibco, Inc.
 - 8. Apollo Valves
 - 9. Victaulic Company of America
 - 10. ANVIL Gruvlok
 - 11. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Size 2 inch and Under:
 - 1. Screwed bronze or iron body for 200 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
- C. Size 2-1/2 inch diameter:
 - 1. Flanged or grooved iron body for 200 psi working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- D. Size 3 inch and larger:
 - 1. Flanged or grooved iron body for 175 psi working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

2.04 SUCTION DIFFUSERS

- A. Manufacturers:
 - 1. Armstrong International, Inc
 - 2. Xylem / Bell & Gossett
 - 3. Patterson Pump Company.
 - 4. Taco, Inc
 - 5. Victaulic Company of America
 - 6. ANVIL Gruvlok
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. The pump suction diffuser shall be a combination suction diffuser, reducing elbow and strainer. Cast iron ASTM A126-B with permanent perforated 304 stainless steel screen, blow-out tapping flanged or grooved ends, straightening vanes, 175 psig working pressure, and adjustable foot support.

2.05 PRESSURE-TEMPERATURE TEST PLUGS

- A. Manufacturers:
 - 1. Peterson Equipment Company Inc: www.petesplug.com/#sle.
 - 2. Sisco Manufacturing Company Inc: www.siscomfg.com/#sle.
 - 3. Ferguson Enterprises Inc: www.fnw.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F.
- C. Application: Use extended length plugs to clear insulated piping.

2.06 RELIEF VALVES

- A. Manufacturers:
 - 1. Armstrong International, Inc
 - 2. Xylem / Bell & Gossett
 - 3. Watts
 - 4. Amtrol
 - 5. Taco, Inc.
 - 6. Conbraco Industries, Inc
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

2.07 PRESSURE REDUCING VALVES

- A. Manufacturers:
 - 1. Armstrong International, Inc
 - 2. Xylem / Bell & Gossett
 - 3. Taco, Inc
 - 4. Watts
 - 5. Amtrol
 - 6. Conbraco Industries, Inc.
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Operation: Automatically feeds make-up water to the hydronic system whenever pressure in the system drops below the pressure setting of the valve. Refer to Section 23 21 13.
- C. Materials of Construction:
 - 1. Valve Body: Constructed of bronze, cast iron, brass, iron, or _____.
 - 2. Internal Components: Construct of stainless steel, brass, or _____ and engineered plastics, composition material, or _____.
- D. Provide integral check valve and strainer.
- E. Maximum Inlet Pressure: 100 psi.
- F. Maximum Fluid Temperature: 180 degrees F.
- G. Operating Pressure Range: Between 10 psi and 25 psi.

2.08 GLYCOL FEED SYSTEM

- A. Glycol Solution:
 - 1. Manufacturers:
 - a. Dow Chemical Co.; Fluid Type Dowtherm SR-1
 - b. Union Carbide Corp; Fluid Type Ucartherm - IBS-30
 - c. Interstate; Fluid Type Intercool NFE
 - d. Protocol HTF's; Fluid Type LT-100.
 - e. Covalent laboratories; Fluid Type ColdFlow-HTP
 - f. KostUSA: Fluid Type KOSTChill
 - g. Houghton; Chemical Corp: Wintrex
 - h. Rhomar Water: RhoTherm Ultra
 - i. Thermal Fluids, Inc.: ThermalCool
 - j. LinkOne: OneGuard Premix
 - k. Substitutions: Refer to Section 01 6000: Product Requirements
 - 2. The heat transfer fluid shall be a factory mixed inhibited ethylene glycol-based industrial heat transfer fluid specifically formulated for use in HVAC systems. The fluid must contain corrosion inhibitors and buffers and an antifoam agent, necessary for long fluid and system life.

3. The 30 percent solution of heat transfer fluid and deionized water, premixed by the chemical manufacturer, shall have a freezing point of 10.0 degrees F, a burst point of -8 degrees F, a pH between 8.0 and 9.0, a reserve alkalinity of 6.6ml HCl/10ml, a specific gravity of 1.047 at 20/20 degrees C, no flash point, no silicates, and fluorescent color.
 4. The weight per gallon of premixed fluid shall be 8.71 lbs./gal. at 68 degrees F. The specific heat shall be 0.858 BTU/lb. degrees F at 25 degrees F and 0.875 BTU/lb. degrees F at 68 degrees F.
 5. Field or distributor mixed fluid, automotive antifreeze, uninhibited glycol, or field or distributor inhibited glycol is not acceptable.
- B. Glycol Feed System:
1. Manufacturers:
 - a. Armstrong; Model GLA
 - b. Wessels; Model GPM
 - c. Xylem / Bell & Gossett; Model GMU
 - d. Neptune; Model G-50-1A
 - e. Axiom; Model SF-100
 - f. Substitutions: Refer to Section 01 6000: Product Requirments
 2. Glycol feed system shall include (1) 50 gallon Polyethylene dilution tank with tank level markings in 5 gallon increments, welded tank support frame, tank drain fitting, low level alarm switch, removable Polyethylene cover, pre-piped discharge piping with shut-off valve, check valve, pressure switch, system tee, pressure relief valve, pressure relief tubing return to the dilution tank, and suction tubing with strainer.
 3. Provide a NEMA 1 rated Control panel complete with 0-30 psig pressure gauge, alarm circuit, temperature control system interlock for low liquid level, visual low level alarm light, automatic start/stop switch activated by pressure switch, Hand-off-auto selector switch, and suitable for power connection through a standard 115V, 1 phase receptacle. Control panel shall be factory mounted on the dilution tank support frame. Low level alarm shall notify temperature control system through dry contacts, light the visual alarm on the panel, and shut down the feed pump. System shall be designed to maintain a consistent operating pressure in the closed loop and automatically feed a glycol/water mixture to the system expansion tank as required by the system demand.
 4. Provide a rotary gear type direct drive glycol feed pump with flexible coupler. Pump construction shall consist of bronze body, stainless steel shaft, positive spring loaded lip seal with temperature rating of 250 degree Fahrenheit, self lubricating carbon bearings and built-in relief valve. Pump shall be self priming from a dry start and shall be capable 20' w.g. on the suction side with a capacity of 1.5 GPM at 100 psi discharge pressure. Motor shall be open dripproof 115 volt, single phase of horsepower as denoted on the drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.
- B. Where large air quantities can accumulate, provide enlarged air collection standpipes.
- C. Provide manual air vents at system high points and as indicated.
- D. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- E. Provide air separator and expansion tank as shown on drawings.
- F. Provide valved drain and hose connection on strainer blow down connection.
- G. Provide pump suction fitting on suction side of centrifugal pumps . Remove temporary strainers after cleaning systems.

- H. Provide combination pump discharge valve on discharge side of centrifugal pumps .
- I. Support pump fittings with floor mounted pipe and flange supports.
- J. Provide relief valves on pressure tanks, low pressure side of reducing valves, expansion tanks as noted on drawings.
- K. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- L. Pipe relief valve outlet to nearest floor drain.
- M. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.
- N. Clean and flush glycol system before adding glycol solution. Refer to Section 23 25 00.
- O. Feed glycol solution to system through make-up line with pressure regulator, venting system high points.
- P. Perform tests determining strength of glycol and water solution and submit written test results.

3.02 MAINTENANCE

- A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.
- B. Provide service and maintenance of glycol system for one year from date of Substantial Completion at no extra charge to Owner.
- C. Perform quarterly visit to make glycol fluid concentration analysis on site with refractive index measurement instrument. Report findings in detail in writing, including analysis and amounts of glycol or water added.
- D. Explain corrective actions to Owner's maintenance personnel in person.

END OF SECTION

**SECTION 23 64 23
SCROLL WATER CHILLERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Factory-assembled packaged chiller.
- B. Charge of refrigerant and oil.
- C. Controls and control connections.
- D. Chilled water connections.
- E. Electrical power connections.

1.02 RELATED REQUIREMENTS

- A. Commissioning
 - 1. Section 01 9113 - General Commissioning Requirements
 - 2. Section 01 9114 - Commissioning Authority Responsibility
- B. Section 03 30 00 - Cast-in-Place Concrete: Concrete housekeeping pads.
- C. Section 23 05 48 - Vibration and Seismic Controls.
- D. Section 23 05 53 - HVAC Identification.
- E. Section 23 05 93 - Testing, Adjusting, and Balancing.
- F. Section 23 08 00 - Commissioning of HVAC.
- G. Section 23 0913 - Instrumentation / Control Devices
- H. Section 23 09 93 - Sequence of Operations.
- I. Section 23 21 13 - Hydronic Piping.
- J. Section 23 21 14 - Hydronic Specialties.
- K. Section 23 2123 - Hydronic Pumps.
- L. Section 26 05 83 - EQUIPMENT WIRING.

1.03 REFERENCE STANDARDS

- A. AHRI 550/590 (I-P) - Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle; 2020.
- B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2019, with All Amendments and Errata.
- C. 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.
- D. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2021.
- E. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- F. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.
- G. ASHRAE Standard 135-1995 BACnet Protocol

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide rated capacities, weights, specialties and accessories, electrical requirements and wiring diagrams.

- C. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Indicate equipment, piping and connections, valves, strainers, and thermostatic valves required for complete system.
- D. Manufacturer's Instructions: Submit manufacturer's complete installation instructions.
- E. Operation and Maintenance Data: Include start-up instructions, maintenance data, parts lists, controls, and accessories; include trouble-shooting guide.
- F. Warranty: Submit manufacturer's 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 products specified in this section with minimum three years of documented experience.
- B. Provide certification of inspection for conformance to requirements of authority having jurisdiction.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- D. All controls, control logic, and control wiring shall be factory installed and programmed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's written installation instructions for rigging, unloading, and transporting units.
- B. Deliver units to the job site completely assembled and charged with refrigerant and oil by manufacturer.
- C. Drain plugs shall be removed from equipment where the possibility of freeze damage may exist.
- D. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's Warranty: Provide minimum five year warranty to include coverage for materials and labor for compressor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Trane Inc
- B. Carrier Corporation
- C. Johnson Controls, Inc <>
- D. Daikin McQuay
- E. Dunham Bush
- F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 CHILLERS

- A. Chillers: Factory assemble and test chiller consisting of compressor(s), compressor motor(s), evaporator, condenser, enclosure, refrigeration circuits(s) and specialties, interconnecting piping, starters, and microprocessor-based controls.
 1. Rating: AHRI 550/590 (I-P).
 2. Safety: UL 1995 and ASHRAE Std 15.
 3. Construction & Testing: ASME BPVC-VIII-1 as applicable for construction type.

4. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., testing firm acceptable to the Authority Having Jurisdiction, or _____ as suitable for the purpose specified and indicated.
5. Energy Efficiency: ASHRAE Std 90.1.
6. Enclosures:
 - a. Frame:
 - 1) Heavy-gage steel.
 - 2) Factory apply hot-dipped galvanized or air-dried paint finish.
 - b. Steel Chiller Cabinets:
 - 1) Factory apply baked on enamel or baked on powder paint finish.
 - c. Electrical Equipment: NEMA EN 10250 or UL 1995 as applicable.

2.03 COMPRESSORS AND EVAPORATOR

- A. Compressors: Hermetic scroll type.
 1. Unit: Fully hermetic type with multiple, direct drive compressors with discharge and suction service valves.
 2. Vibration Control: Factory installed internal isolators or field installed external isolators.
 3. Oil Lubrication System: Initial oil charge, oil sump, heater, oil level, and sight glass.
 4. Capacity Reduction System: Compressor staging with control down to 12 percent of full load without the activation of hot gas by-pass.
 5. Motor: 3600 or 3500 rpm, suction gas-cooled, with thermal or current overload protection.
- B. Evaporator: Provide shell and tube or brazed plate type.
 1. Shell and tube type.
 - a. Shell, removable heads and tube support sheets constructed of carbon steel.
 - b. Tubes: Mechanically expand and fasten, seamless, externally or internally enhanced, copper tubes into intermediate tube support sheets along the length of shell to avoid contact and relative motion between tubes.
 - c. Refrigerant Working-Side Pressure Rating: 400 psig minimum.
 - d. Water Working-Side Pressure Rating: 150 psig minimum.
 - e. Provide with flanged or grooved connections.
 - f. Insulation for all cold surfaces.
 - 1) Insulation is factory or field installed on shell, connections, and suction piping.
 - 2) 0.75 inches minimum thick, closed cell, expanded polyvinyl chloride, polyurethane, or vinyl nitrate polymer insulation with a maximum k value of 0.28.
 - g. Provide factory or field installed vents and water drain connections on evaporator or piping.
 - h. Provide factory or field installed fittings for temperature control sensors on evaporator or piping.
 - i. Freeze Protection for Outdoor Locations: Provide thermostatically controlled electric heater to protect from freezing at ambient temperatures down to minus 20 degrees F.
 2. Brazed plate type.
 - a. Plate Material: 316 stainless steel.
 - b. Refrigerant Working-Side Pressure Rating: 430 psig minimum.
 - c. Water Working-Side Pressure Rating: 150 psig minimum.
 - d. Provide with flanged or grooved connections.
 - e. Insulation for all cold surfaces.
 - 1) Insulation is factory or field installed on evaporator, connections, and suction piping.
 - 2) 0.75 inches minimum thick, closed cell, expanded polyvinyl chloride, polyurethane, or Armaflex II insulation with a maximum k value of 0.28.
 - f. Provide factory or field installed vents and water drain connections on evaporator or piping.

- g. Provide factory or field installed fittings for temperature control sensors on evaporator or piping.
- h. Freeze Protection for Outdoor Locations: Provide thermostatically controlled electric heater to protect from freezing at ambient temperatures down to minus 20 degrees F.
- 3. Design, test, and stamp refrigerant side for 225 psig working pressure and water side for 150 psig working pressure, in accordance with ASME (BPV VIII, 1).
- 4. Provide water drain connection and thermometer wells for temperature controller and low water temperature cutout.

2.04 AIR-COOLED CONDENSER AND FANS

- A. Provide finned-tube or brazed one-piece type.
 - 1. Finned-tube type.
 - a. Mechanically bond aluminum fins to copper tubing and protect with corrosion resistant materials or coatings.
 - b. Clean, dehydrate and test.
 - c. Leak Test: 650 psig minimum.
- B. Coil Guards: Provide corrosion proof, louvered panels, heavy gage wire panels, or grilles, factory installed. Provide coil protection for shipping by enclosing entire condenser coil with heavy plastic to prevent coil damage during shipping or rigging.
- C. Fans and Motors:
 - 1. Fans: Dynamically balance propeller, shrouded-axial, or airfoil type fans of reinforced polymer or glass fiber reinforced composite corrosion resistant construction equipped with sealed, permanently lubricated ball bearings.
 - 2. Discharge Fan Guards: Corrosion resistant, heavy gage, steel wire.
 - 3. Discharge Direction: Vertical.
 - 4. Motors: Direct drive, totally enclosed for outdoor use with current overload protection.

2.05 CHILLER ENCLOSURES

- A. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.
- B. Mount starters in NEMA ICS 6 weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.
- C. Electrical Service:
 - 1. Single point power connection
 - 2. Power supply shall be to a high short-circuit current rated panel with a single point high interrupting capacity unit disconnect switch breakers for each circuit.
 - a. High SCCR > 64,000 A
 - b. Standard SCCR > 10,000 A
- D. Electrical Service:
 - 1. Sin
 - 2. Power supply sh
 - a.
 - b. Power supply shall be to a high short-circuit current rated panel with a single point high interrupting capacity unit disconnect switch breakers for each circuit.
- E. Provide power disconnect switch on face of chiller panel.

2.06 REFRIGERATION CIRCUITS

- A. Provide multiple independent refrigeration circuit(s) with multiple compressor(s) per circuit.
- B. Provide liquid line sight glass and moisture indicator charging valve insulated suction line discharge line check valve and service valves, liquid line sight glass and moisture indicator charging valve insulated suction line discharge line check valve and service valves, liquid

line sight glass and moisture indicator charging valve insulated suction line discharge line check valve and service valves, liquid line sight glass and moisture indicator charging valve insulated suction line discharge line check valve and service valves, and liquid line sight glass and moisture indicator charging valve insulated suction line discharge line check valve and service valves for each independent circuit.

C. Refrigerant: R410a.

2.07 INTEGRATED MICROPROCESSOR BASED DDC CONTROLS PACKAGE

- A. Locate on chiller, mount NEMA 3R/12 (IP 55) weatherproof, steel control panel, containing starters, power and control wiring, [<>] factory wired with single point power connection and disconnect on face of chiller panel.
- B. Provide an unit mounted and prewired flow switch.
- C. For each compressor, provide part winding starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection.
- D. Provide devices on control panel face:
1. Compressor run lights.
 2. System start-stop switch.
 3. Control power fuse of circuit breaker.
 4. Compressor lead-lag switch.
 5. Demand limit switch.
- E. Provide safety controls with indicating lights arranged so any one will shut down machine and require manual reset:
1. Low chilled water temperature switch.
 2. High discharge pressure switch for each compressor.
 3. Low suction pressure switch for each compressor.
 4. Oil pressure switch.
 5. Flow switch in chilled water line.
 6. Flow switch in condenser water line.
 7. Relay for remote mounted emergency shut-down.
- F. Provide operating controls:
1. Multi-step chilled water temperature controller that conforms to EIA 709.1. BACnet Protocol shall be provided. Controller shall provide interface to the BAS system with a BACnet profile. Controller shall cycle compressor and activates capacity controls , with remote thermostat. Manufacturer shall coordinate protocol required with successful Temperature Control Contractor. [<>]
 - a. At a minimum, the following points shall be available to the BAS:
 - 1) Outputs:
 - (a) Chilled Water Setpoint
 - (b) Current Limit Setpoint
 - (c) Chiller Auto Stop command
 - (d) Remote Diagnostics Reset Command
 - 2) Inputs:
 - (a) Active setpoint temperature
 - (b) Active current limit setpoint
 - (c) Actual running capacity
 - (d) Unit Power consumption
 - (e) Running Mode
 - (f) Operating Mode
 - (g) MP Communication Status
 - (h) Run Enable

- (i) Alarm Present
 - (j) Shutdown Alarm Present
 - (k) Last Diagnostic
2. Controller shall be capable of receiving a 4-20ma signal from the Building Automation System to demand limit the chiller to a capacity as determined from energy analysis.
 3. Five minute off timer prevents compressor from short cycling.
 4. Part winding start timer.
 5. Periodic pump-out timer to pump down on chilled water flow and high evaporator refrigerant pressure.
 6. Solenoid valve between heat recovery condenser and receiver to limit refrigerant level in condenser.
 7. Load limit thermostat to limit compressor loading on high return water temperature.
 8. Three phase monitor to protect unit by stopping compressor on phase loss, phase reversal, phase unbalance, or under voltage.
 9. Hot gas bypass sized for minimum compressor loading [\leq], bypasses hot refrigerant gas to evaporator.
 10. Cycle counter and operating hour meter.
 11. Crankcase Heaters: Compressor crankcase heaters to provide extra protection against liquid migration.
- G. Provide pre-piped gage board or digital display with pressure gages for suction and discharge refrigerant pressures, and oil pressures for each compressor.
- H. Provide alarm package with test button and indicating lights that indicate control circuit is energized and compressor is running and that sounds an audible alarm and indicating light upon detection of compressor malfunction, low chilled water temperature, or evaporator water flow failure.
- I. Pre-wire, assemble, factory mount, and test operating and safety control system consisting of a digital display or gages, on-auto-off switch, motor starters, disconnect switches, power and control wiring. Provide controls, monitoring, programmable set-points, alarms, and BAS as defined below:
1. Automatic Adjustable Operating Controls:
 - a. Temperature of chilled water leaving chiller.
 - b. Chiller system capacity control based on set-points and system load.
 - c. Compressor short-cycling prevention.
 - d. Lead/lag for multiple compressors.
 - e. Automatic reset on power source failure.
 - f. Load limiting.
 2. Normal Operation Monitoring and Open Cover-less Displays:
 - a. Hours of operation.
 - b. Suction and discharge refrigerant pressures.
 - c. Automatic diagnostics.
 - d. Number of starts.
 - e. On/off compressor status.
 - f. Entering and leaving chilled water temperatures.
 - g. Status of operation.
 - h. Weekly purge cycle totalization if applicable.
 - i. Oil pressure.
 3. Set-Points:
 - a. Leaving chilled water temperature.
 - b. Date/time.
 4. Automatic Chiller Shut-Down Safety Controls and Alarm:
 - a. Automatic Reset:

- 1) Chilled water flow interlock.
- 2) Voltage protection (over/under).
- 3) Phase reversal protection.
- b. Manual Reset:
 - 1) Evaporator low pressure.
 - 2) High motor winding temperature.
 - 3) Low chilled water temperature.
 - 4) Low chilled water flow.
 - 5) High condenser refrigerant discharge pressure.
 - 6) Motor current overload and phase loss.
 - 7) Low oil flow.
- c. Remote Alarm: Activate remote, audible bell upon safety shutdown of chiller.
5. Building Automation System (BAS) Communications via Shielded Cable:
 - a. Minimum Data Transmission to BAS:
 - 1) All system operating conditions.
 - 2) Capacity control information.
 - 3) Safety shutdown conditions.
 - b. Minimum Operating Commands from BAS:
 - 1) Remote unit start/stop.
 - 2) Remote chilled water reset.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Align chiller package on steel or concrete foundations.
- C. Install units on vibration isolators.
- D. Connect to electrical service.
- E. Connect to chilled water piping.
- F. Arrange piping for easy dismantling to permit tube cleaning and removal.

3.02 SYSTEM STARTUP

- A. Supply service of factory trained representative to supervise testing, dehydration and charging of machine, and start-up of system.
- B. Supply initial charge of refrigerant and oil.
- C. Demonstrate system operations and verify specified performance.

3.03 CLOSEOUT ACTIVITIES

- A. Training: Train Owner's personnel on operation and maintenance of system.
 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. All training shall be video-taped by the Temperature Control Contractor. Two copies shall be turned over to the owner's maintenance staff.

END OF SECTION

**SECTION 31 66 13
RAMMED AGGREGATE PIERS**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work shall consist of designing, furnishing and installing Rammed Aggregate Pier foundations to the lines and grades designated on the project foundation plan and as specified herein. The aggregate piers shall be constructed by either augering a cavity or driving a hollow mandrel to the design depth and vertically ramming lifts of aggregate using the specially designed tamper head and high-energy impact densification equipment to create the compacted aggregate pier. The Rammed Aggregate Pier elements shall be in a columnar-type configuration and shall be used to produce an intermediate foundation system for support of foundation loads.
1. Provision of all equipment, material, labor, and supervision to design and install Rammed Aggregate Pier elements. Design shall rely on subsurface information presented in the project geotechnical report. Layout of Rammed Aggregate Pier elements, spoil removal (as required), footing excavations, and subgrade preparation following aggregate pier installation is not included.
 2. The Rammed Aggregate Pier design and installation shall adhere to all methods and standards described in this Specification.
 3. Drawings and General Provisions of the Contract, including General and Supplemental Conditions, and Division 1 Specifications, apply to the work in this specification.

1.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design:
1. Design Calculations - The Installer shall submit detailed design calculations and construction drawings prepared by the Rammed Aggregate Pier Designer (the Designer) for review and approval by the Owner or Owner's Engineer. All plans shall be sealed by a Professional Engineer in the State in which the project is constructed.
 2. Professional Liability Insurance - The Rammed Aggregate Pier Designer shall have Errors and Omissions design insurance for the work. The insurance policy should provide a minimum coverage of \$3 million per occurrence.
- B. Performance Criteria:
1. The design of the Rammed Aggregate Pier system shall be based on the service load bearing pressure and the allowable total and differential settlement criteria of all footings indicated by the design team for support by the Rammed Aggregate Pier system. The Rammed Aggregate Pier system shall be designed in accordance with generally-accepted engineering practice and the methods described in Section 1 of these Specifications. The design life of the structure shall be 100 years.
 2. The design shall meet the following criteria.
 - a. Maximum Allowable Bearing Pressure for Footings supported by Rammed Aggregate Pier Reinforced Soils: 5000 psf
 - b. Estimated Total Long-Term Settlement for Footings: = 1-inch
 - c. Estimated Long-Term Differential Settlement of Adjacent Footings: = ½-inch
 3. The Rammed Aggregate Pier elements shall be designed using a Rammed Aggregate Pier stiffness modulus to be verified by the results of the modulus test described in Section 3.3, D of these specifications.

1.03 SUBMITTALS

- A. The Installer shall submit detailed design calculations, construction drawings, and shop drawings, (the Design Submittal), for approval at least 3 weeks prior to the beginning of construction. A detailed explanation of the design parameters for settlement calculations shall be included in the Design Submittal. Additionally, the quality control test program for Aggregate

Pier system, meeting these design requirements, shall be submitted. All computer-generated calculations and drawings shall be prepared and sealed by a Professional Engineer, licensed in the State of Ohio, where the piers will be built.

- B. Modulus Test Reports - A modulus test(s) is performed on a non-production Rammed Aggregate Pier element as required by the Rammed Aggregate Pier Designer to verify the design assumptions. The Installer shall furnish the General Contractor a description of the installation equipment, installation records, complete test data, analysis of the test data and verification of the design parameter values based on the modulus test results. The report shall be prepared under direction of a Registered Professional Engineer.
- C. Daily Rammed Aggregate Pier Progress Reports - The Installer shall furnish a complete and accurate record of Rammed Aggregate Pier installation to the General Contractor. The record shall indicate the pier location, length, volume of aggregate used or number of lifts, densification forces during installation, and final elevations or depths of the base and top of piers. The record shall also indicate the type and size of the installation equipment used, and the type of aggregate used. The Installer shall immediately report any unusual conditions encountered during installation to the General Contractor, to the Designer and to the Testing Agency.

1.04 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. Design:
 - a. "Control of Settlement and Uplift of Structures Using Short Aggregate Piers," by Evert Lawton (Assoc. Prof., Dept. of Civil Eng., Univ. of Utah), Nathaniel S. Fox (President, Geopier Foundation Co., Inc.), and Richard L. Handy (Distinguished Prof. Emeritus, Iowa State Univ., Dept. of Civil Eng.), reprinted from IN-SITU DEEP SOIL IMPROVEMENT, Proceedings of sessions sponsored by the Geotechnical Engineering Division/ASCE in conjunction with the ASCE National Convention held October 9-13, 1994, Atlanta, Georgia.
 - b. "Settlement of Structures Supported on Marginal or Inadequate Soils Stiffened with Short Aggregate Piers," by Evert C. Lawton and Nathaniel S. Fox. Geotechnical Special Publication No. 40: Vertical and Horizontal Deformations of Foundations and Embankments, ASCE, 2, 962-974.
 - c. "Behavior of Geopier®-Supported Foundation Systems during Seismic Events," by Kord Wissmann, Evert C. Lawton, and Tom Farrell. Geopier Foundation Company, Inc. Blacksburg, VA ©1999.
 - 2. Modulus Testing :
 - a. ASTM D 1143 - Pile Load Test Procedures
 - b. ASTM D 1194 - Spread Footing Load Test
 - 3. Materials and Inspection:
 - a. ASTM D 1241 - Aggregate Quality
 - b. ASTM D 422 -Gradation of Soils
- B. Approved Installers:
 - 1. The Rammed Aggregate Pier Installer (the Installer) shall be approved by the Owner's Engineer.
 - 2. Installers of Rammed Aggregate Pier foundation systems shall have a minimum of 5 years of experience with the installation of Rammed Aggregate Pier systems and shall have completed at least 50 projects.
 - 3. Installers licensed by the Geopier Foundation Company, Inc. (www.geopier.com) will be accepted as approved installer.
 - 4. Contractors currently approved to complete this work:
 - a. Geopier Foundation Company, Jim Bullard.
 - 1) Cell# 317-407-0290

- 2) Jbullard@geopier.com
- b. Other Accpetable Installers
 - 1) Licensed and certified Rammed Aggregate Pier System design and installers that meet requirements of this section.
- C. Source Limitations:
 - 1. All aggregate shall come from a single location to maintain uniformity of aggregate and pier design.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aggregate used by the Rammed Aggregate Pier Installer for pier construction shall be pre-approved by the Designer and shall demonstrate suitable performance during modulus testing. Typical aggregate consists of Type 1 Grade B in accordance with ASTM D 1241-68, No. 57 stone, recycled concrete or other graded aggregate approved by the Designer.
- B. For aggregate used for rammed aggregate piers constructed below the water table, the gradation shall be the same as Type I Gradation B, except that particles passing the No. 40 sieve shall be eliminated. Alternatively, No.57 stone or other stone selected by the Rammed Aggregate Pier Installer may be used. Dynamic penetration resistance testing is inappropriate for this material
- C. Potable water or other suitable source shall be used to increase aggregate moisture content where required. The General Contractor shall provide such water to the Installer.

2.02 DESIGN REQUIREMENTS

- A. The Rammed Aggregate Pier elements shall be designed for an Aggregate Pier stiffness modulus of 175 pci. The stiffness modulus value shall be verified by the results of the Aggregate Pier modulus test, described in this specification.
- B. Rammed Aggregate piers shall be designed in accordance with generally-accepted engineering practice and the methods described in Section 1 of these Specifications. The design shall meet the following criteria.
- C. Maximum Allowable Bearing Pressure for Rammed Aggregate Pier Reinforced Soils 2000
- D. Estimated Total Long-Term Settlement for Footings: ≤1-inch
- E. Minimum Rammed Aggregate Pier Area Coverage for square Spread Footings 30%
- F. The design submitted by the Installer shall consider the bearing capacity and settlement of all footings supported by rammed aggregate piers, and shall be in accordance with acceptable engineering practice and these specifications. Total and differential settlement shall be considered. The design life of the structure shall be 50 years.
- G. Estimated Long-Term Differential Settlement of Adjacent Footings: ≤ 1/2-inch
- H. The Rammed Aggregate Pier system shall be designed to preclude plastic bulging deformations at the top-of-pier design stress and to preclude significant tip stresses as determined from the shape of the telltale test curve from telltales installed in modulus test piers.

PART 3 - EXECUTION

3.01 RESPONSIBILITIES OF THE GENERAL CONTRACTOR

- A. The Construction Manager shall be responsible for delegating the responsibilities of the General Contractor to the contractors operating on site or else the Construction Manager will assume the responsibilities.
- B. Site Preparation and Protection:
 - 1. The General Contractor shall locate and protect underground and aboveground utilities and other structures from damage during installation of the Rammed Aggregate Pier elements.

2. Site grades for Rammed Aggregate Pier installation shall be within 1 foot of the top of footing elevation or finished grade elevation to minimize Rammed Aggregate Pier installation depths. Ground elevations and bottom of footing elevations shall be provided to the Rammed Aggregate Pier Installer in sufficient detail to estimate installation depth elevations to within 3 inches.
 3. The General Contractor will provide site access to the Installer, after earthwork in the area has been completed. A working surface shall be established and maintained by the General Contractor to provide wet weather protection of the subgrade and to provide access for efficient operation of the Rammed Aggregate Pier installation.
 4. Prior to, during and following Rammed Aggregate Pier installation, the General Contractor shall provide positive drainage to protect the site from wet weather and surface ponding of water.
 5. If spoils are generated by Rammed Aggregate Pier installation, spoil removal from the Rammed Aggregate Pier work area in a timely manner to prevent interruption of Rammed Aggregate Pier installation is required.
- C. Rammed Aggregate Pier Layout: The location of Rammed Aggregate Pier-supported foundations for this project, including layout of individual Rammed Aggregate Pier elements, shall be marked in the field using survey stakes or similar means at locations shown on the drawings.
- D. Excavations Of Obstructions:
1. Should any obstruction be encountered during Rammed Aggregate Pier installation, the General Contractor shall be responsible for promptly removing such obstruction, or the pier shall be relocated or abandoned. Obstructions include, but are not limited to, boulders, timbers, concrete, bricks, utility lines, etc., which shall prevent placing the piers to the required depth, or shall cause the pier to drift from the required location.
 2. Dense natural rock or weathered rock layers shall not be deemed obstructions, and piers may be terminated short of design lengths on such materials.
- E. Utility Excavations: The General Contractor shall coordinate all excavations made subsequent to Rammed Aggregate Pier installations so that excavations do not encroach on the piers as shown in the Rammed Aggregate Pier construction drawings. Protection of completed Rammed Aggregate Pier elements is the responsibility of the General Contractor. In the event that utility excavations are required in close proximity to the installed Rammed Aggregate Pier elements, the General Contractor shall contact the Rammed Aggregate Pier Designer immediately to develop construction solutions to minimize impacts on the installed Aggregate Pier elements.
- F. Footing Bottoms:
1. Excavation and surface compaction of all footings shall be the responsibility of the General Contractor.
 2. Foundation excavations to expose the tops of Rammed Aggregate Pier elements shall be made in a workman-like manner, and shall be protected until concrete placement, with procedures and equipment best suited to (1) avoid exposure to water, (2) prevent softening of the matrix soil between and around the Rammed Aggregate Pier elements before pouring structural concrete, and achieve direct and firm contact between the dense, undisturbed Rammed Aggregate Pier elements and the concrete footing.
 3. All excavations for footing bottoms supported by Rammed Aggregate Pier foundations shall be prepared in the following manner by the General Contractor. Recommended procedures for achieving these goals are to:
 - a. Limit over-excavation below the bottom of the footing to 3-inches (including disturbance from the teeth of the excavation equipment).
 - b. Compaction of surface soil and top of Rammed Aggregate Pier elements shall be prepared using a motorized impact compactor ("Wacker Packer," "Jumping Jack," or similar). Sled-type tamping devices shall only be used in granular soils and when

- approved by the designer. Loose or soft surficial soil over the entire footing bottom shall be recompacted or removed, respectively. The surface of the aggregate pier shall be recompacted prior to completing footing bottom preparation.
- c. Place footing concrete immediately after footing excavation is made and approved, preferably the same day as the excavation. Footing concrete must be placed on the same day if the footing is bearing on moisture-sensitive soils. If same day placement of footing concrete is not possible, open excavations shall be protected from surface water accumulation. A lean concrete mud-mat may be used to accomplish this. Other methods must be pre-approved by the Designer.
4. The following criteria shall apply, and a written inspection report sealed by the project Testing Agency shall be furnished to the Installer to confirm:
 - a. That water (which may soften the unconfined matrix soil between and around the Rammed Aggregate Pier elements, and may have detrimental effects on the supporting capability of the Rammed Aggregate Pier reinforced subgrade) has not been allowed to pond in the footing excavation at any time.
 - b. That all Rammed Aggregate Pier elements designed for each footing have been exposed in the footing excavation.
 - c. That immediately before footing construction, the tops of Rammed Aggregate Pier elements exposed in each footing excavation have been inspected and re-compacted as necessary with mechanical compaction equipment.
 - d. That no excavations or drilled shafts (elevator, etc) have been made after installation of Aggregate Pier elements within the excavation limits described in the Rammed Aggregate Pier construction drawings, without the written approval of the Installer or Designer.
 5. Failure to provide the above inspection and certification by the Testing Agency, which is beyond the responsibility of the Rammed Aggregate Pier Installer, may void any written or implied warranty on the performance of the Rammed Aggregate Pier system.

3.02 INSTALLATION

- A. Approved Installation Procedures: The following sections provide general criteria for the construction of the Rammed Aggregate Pier elements. Unless otherwise approved by the Designer, the installation method used for Rammed Aggregate Pier construction shall be that as used in the construction of the successful modulus test.
- B. Augered Rammed Aggregate Pier Systems:
 1. Augered Rammed Aggregate Pier system shall be pre-augered using mechanical drilling or excavation equipment.
 2. Installer shall indicate a conservative estimate of anticipated auger spoil volume with their bid proposal.
 3. If cave-ins exceeding 10 percent of the lift volume occur during excavation such that the sidewalls of the hole are deemed to be unstable, steel casing shall be used to stabilize the cavity or a displacement Rammed Aggregate Pier system may be used.
 4. Aggregate shall be placed in the augered cavity in lift thicknesses as determined by the Rammed Aggregate Pier Designer.
 5. Should cave-ins occur on top of a lift of aggregate, such that the volume of the caved soil is greater than 10% of the volume of the aggregate in the lift, then the aggregate shall be considered contaminated and shall be removed and replaced with uncontaminated aggregate.
 6. A specially-designed beveled tamper and high-energy impact densification apparatus shall be employed to densify lifts of aggregate during installation. The apparatus shall apply direct downward impact energy to each lift of aggregate. Compaction equipment that induces horizontal vibratory energy (such as Vibroflot equipment) is not permitted.
- C. Displacement Rammed Aggregate Pier Systems:

1. Displacement Rammed Aggregate Pier systems shall be constructed by advancing a specially designed mandrel with a minimum 15 ton static force augmented by dynamic vertical ramming energy to the full design depth. The hollow-shaft mandrel, filled with aggregate, is incrementally raised, permitting the aggregate to be released into the cavity, and then lowered by vertically advancing and/or ramming to densify the aggregate and force it laterally into the adjacent soil. The cycle of raising and lowering the mandrel is repeated to the top of pier elevation. The cycle distance shall be determined by the Rammed Aggregate Pier designer.
2. Special high-energy impact densification apparatus shall be employed to vertically densify the Rammed Aggregate Pier elements during installation of each constructed lift of aggregate.
3. Densification shall be performed using a mandrel/tamper. The mandrel/tamper foot is required to adequately increase the lateral earth pressure in the matrix soil during installation. Compaction equipment that induces horizontal vibratory energy (such as Vibroflot equipment) is not permitted.
4. Downward crowd pressure shall be applied to the mandrel during installation.

3.03 FIELD QUALITY CONTROL

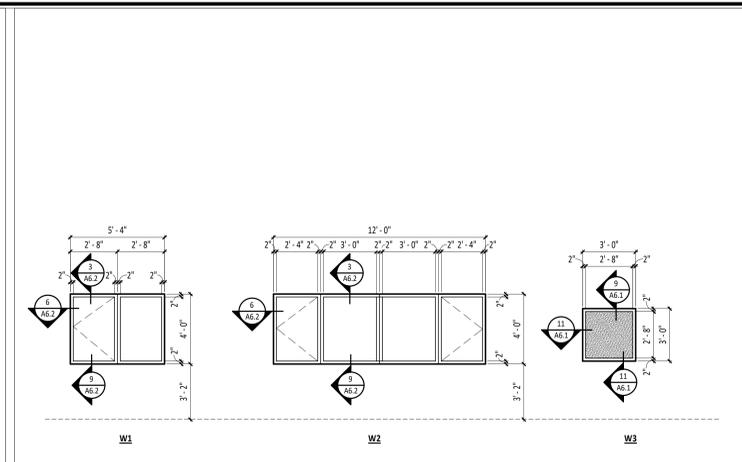
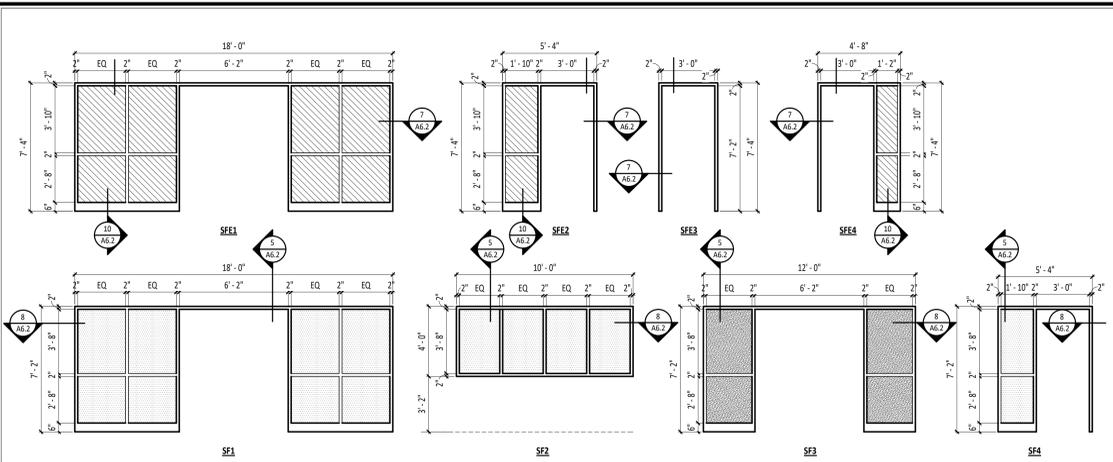
- A. Plan Location and Elevation of Rammed Aggregate Pier Elements: The as-built center of each pier shall be within 6 inches of the locations indicated on the plans. Piers installed outside of the above tolerances and deemed not acceptable shall be rebuilt at no additional expense to the Owner. Top elevation of pier is to match that indicated on construction documents within 3 inches.
- B. Rejected Rammed Aggregate Pier Elements: Rammed Aggregate Pier elements installed beyond the maximum allowable tolerances shall be abandoned and replaced with new piers, unless the Designer approves the condition or provides other remedial measures. All material and labor required to replace rejected piers shall be provided at no additional cost to the Owner, unless the cause of rejection is due to an obstruction.
- C. Quality Control Technician: The Installer shall have a full-time, on-site Quality Control Technician to verify and report all installation procedures. The QC person shall immediately report any unusual conditions encountered during installation to the Rammed Aggregate Pier Designer, the General Contractor, and to the Testing Agency. The QC person shall not be dual-purposed as crew labor and or operator. Automated, electronic, and or remote quality control will not be acceptable as a replacement for the on-site QC person.
- D. Rammed Aggregate Pier Modulus Test: As required by the RAP designer, a Rammed Aggregate Pier Modulus Test(s) will be performed at locations agreed upon by the Rammed Aggregate Pier Designer and the Testing Agency to verify or modify Rammed Aggregate Pier designs. Modulus Test Procedures shall utilize appropriate portions of ASTM D 1143 and ASTM D 1194, as outlined in the Rammed Aggregate Pier design submittal.
- E. Bottom Stabilization Testing (BSTs) / Crowd Stabilization Testing (CSTs): Bottom stabilization testing (BSTs) or Crowd stabilization testing (CSTs) shall be performed by the Control Technician during the installation of the modulus test pier. Additional testing as required by the Rammed Aggregate Pier Designer shall be performed on selected production Rammed Aggregate Pier elements to compare results with the modulus test pier.
- F. Independent Engineering Testing Agency (Owner's Quality Assurance): The Rammed Aggregate Pier Installer shall provide full-time Quality Control monitoring of Rammed Aggregate Pier construction activities. The Owner is responsible for retaining an independent engineering testing firm to provide Quality Assurance services.
- G. Plan Location & Elevations: The as-built center of each RAP shall be within 4" of the locations indicated on the plans. If this is not possible due to unforeseen or underground conditions, the installers QC person shall report this to the General Contractor, Testing Agency and Design Engineer for approval.

3.04 QUALITY ASSURANCE

- A. Responsibilities of Independent Engineering Testing Agency:
 - 1. The Testing Agency shall monitor the modulus test pier installation and testing. The Installer shall provide and install all dial indicators and other measuring devices.
 - 2. The Testing Agency shall monitor the installation of Rammed Aggregate Pier elements to verify that the production installation practices are similar to those used during the installation of the modulus test elements.
 - 3. The Testing Agency shall report any discrepancies to the Installer and General Contractor immediately.
 - 4. The Testing Agency shall observe the excavation, compaction and placement of the foundations as described in Section 7.05. Dynamic Cone Penetration testing may be performed to evaluate the footing bottom condition as determined by the Testing Agency.
- B. Dynamic Cone Penetrometer Test
 - 1. The Rammed Aggregate Pier elements shall be tested by the Dynamic Cone Penetrometer method (ASTM STP 399) at locations within the upper 1/3 of the pier shaft length.
 - 2. The minimum acceptable criteria as an indicator of acceptable densification shall be at least 15 blows per 1-3/4 inch penetration.
 - 3. Dynamic Cone Penetrometer testing shall be performed in each Rammed Aggregate Pier until such time as five consecutive tests indicate that the minimum criterion is met. Thereafter, such tests need not be performed on every pier, provided that the aggregate used in the elements is representative of that previously tested. If average penetration resistances measured exceed 15 blows, and less than 10% of tests fall below 15 blows, then testing may be reduced to spot checks. A pattern of successful tests is sufficient to reduce testing to several tests per day.
 - 4. Observation of questionable aggregate moisture content or questionable aggregate gradation appearance may determine the need for additional dynamic penetration testing to verify that the proper densification is being achieved
 - 5. Use of Dynamic Cone Penetrometer is not appropriate for use on open-graded aggregate such as No. 57 stone.

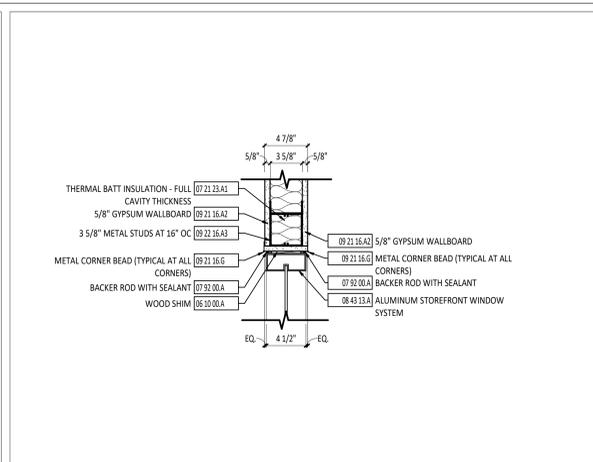
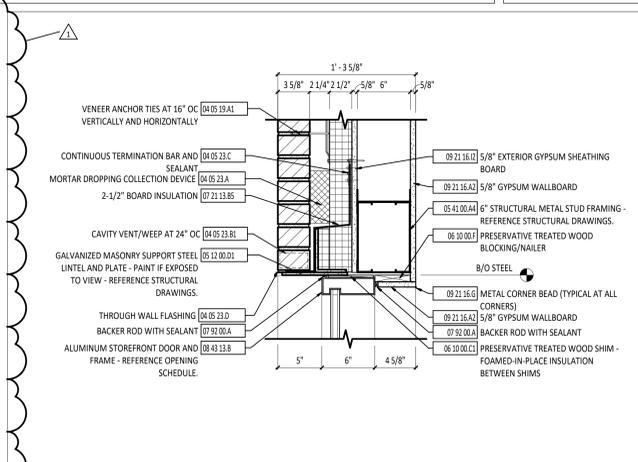
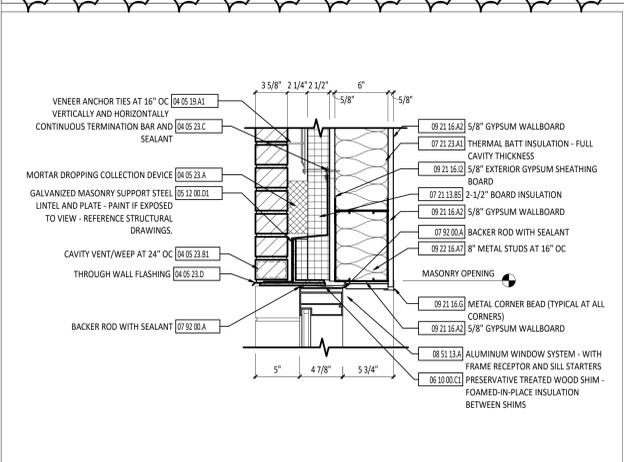
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1 STOREFRONT AND WINDOW ELEVATIONS AND DETAILS
1/4" = 1'-0"

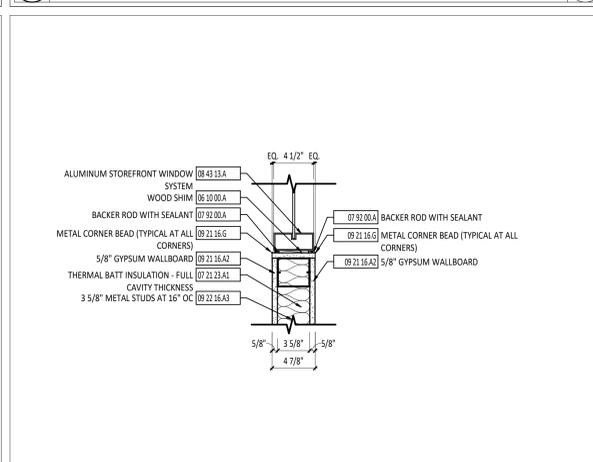
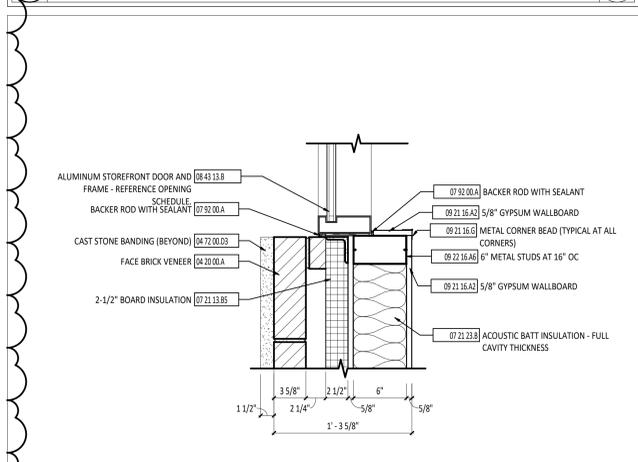
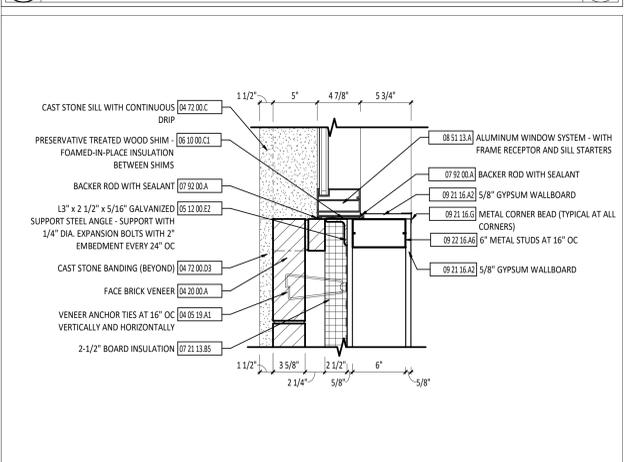
2 WINDOW ELEVATIONS
1/4" = 1'-0"



3 HEAD DETAIL - EXTERIOR
1 1/2" = 1'-0"

4 HEAD DETAIL - EXTERIOR
1 1/2" = 1'-0"

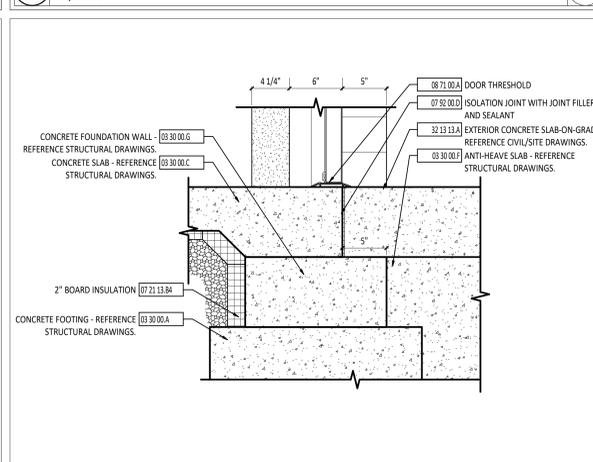
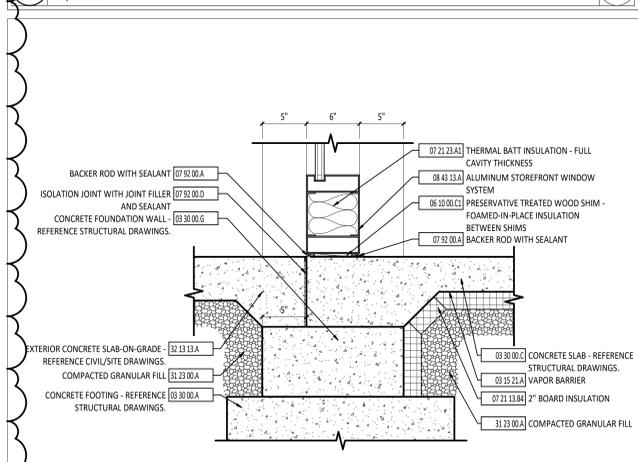
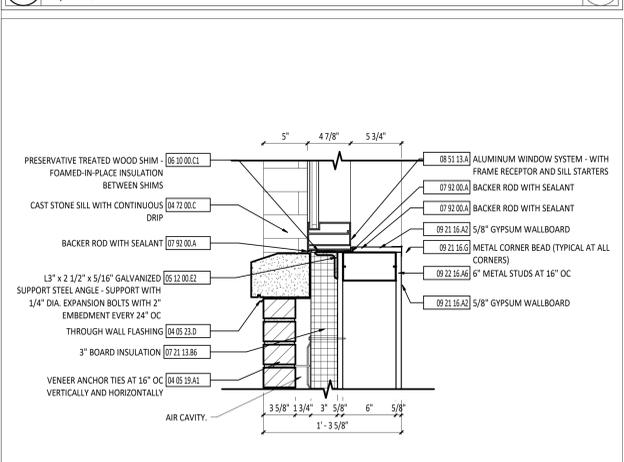
5 HEAD DETAIL - INTERIOR
1 1/2" = 1'-0"



6 JAMB DETAIL - EXTERIOR
1 1/2" = 1'-0"

7 JAMB DETAIL - EXTERIOR
1 1/2" = 1'-0"

8 JAMB DETAIL - INTERIOR
1 1/2" = 1'-0"



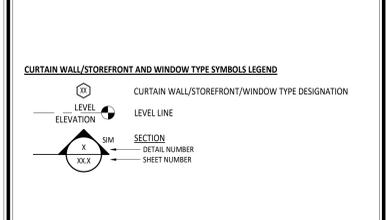
9 SILL DETAIL - EXTERIOR
1 1/2" = 1'-0"

10 SILL DETAIL - EXTERIOR
1 1/2" = 1'-0"

12 SILL DETAIL - EXTERIOR
1 1/2" = 1'-0"

EXTERIOR STOREFRONT SCHEDULE			
MARK	DESCRIPTION	FUNCTION	NOTES
SFE1	2" x 6" - STOREFRONT - FRONT SET	Exterior	
SFE2	2" x 6" - STOREFRONT - FRONT SET	Exterior	
SFE3	2" x 6" - STOREFRONT - FRONT SET	Exterior	
SFE4	2" x 6" - STOREFRONT - FRONT SET	Exterior	

INTERIOR STOREFRONT SCHEDULE			
MARK	DESCRIPTION	FUNCTION	NOTES
SF1	2" x 4 1/2" - STOREFRONT - CENTER SET	Interior	
SF2	2" x 4 1/2" - STOREFRONT - CENTER SET	Interior	
SF3	2" x 4 1/2" - STOREFRONT - CENTER SET	Interior	
SF4	2" x 4 1/2" - STOREFRONT - CENTER SET	Interior	



CURTAIN WALL/STOREFRONT AND WINDOW TYPE SYMBOLS LEGEND

LEVEL ELEVATION

SECTION

SHEET NUMBER

[Symbol]	EG-1 REFLECTIVE INSULATED VISION GLAZING
[Symbol]	EG-2 REFLECTIVE INSULATED LAMINATED VISION GLAZING
[Symbol]	G-1 VISION GLAZING
[Symbol]	G-2 BALLISTIC GLAZING



CLERMONT COUNTY FACILITIES PHASE 2
MANAGEMENT BUILDING

ISSUANCES/REVISIONS

CONSTRUCTION DOCUMENTS	02/19/2020
1 ADDENDUM 02	03/24/2020

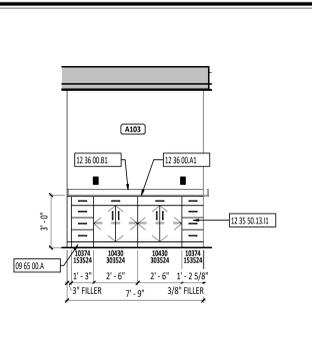
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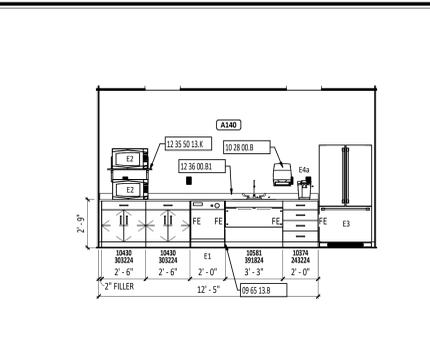
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EXTERIOR STOREFRONT ELEVATIONS AND DETAILS

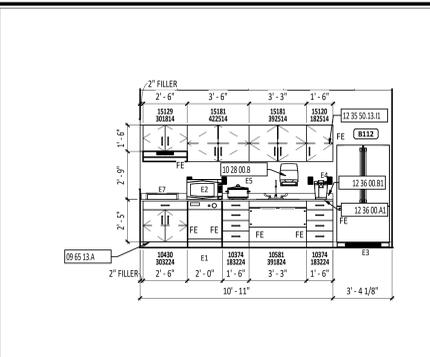
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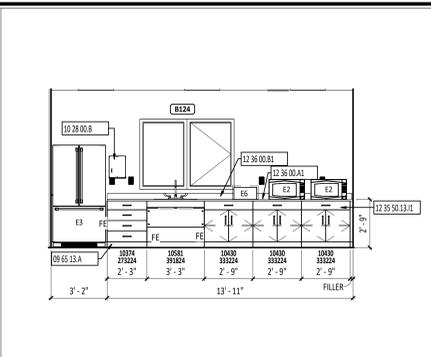
2 CASEWORK ELEVATION - MULTI PURPOSE RM
 1/4" = 1'-0"



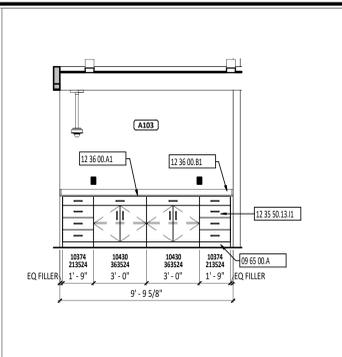
3 CASEWORK ELEVATION - BREAK ROOM A140
 1/4" = 1'-0"



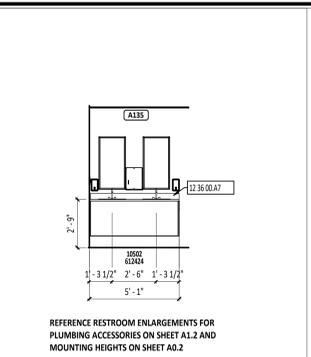
4 CASEWORK ELEVATION - BREAK ROOM B112
 1/4" = 1'-0"



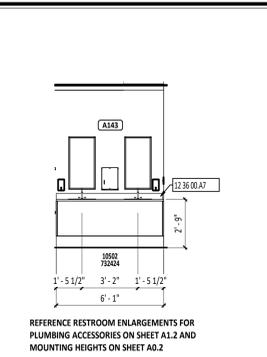
5 CASEWORK ELEVATION - STP KITCHEN B122
 1/4" = 1'-0"



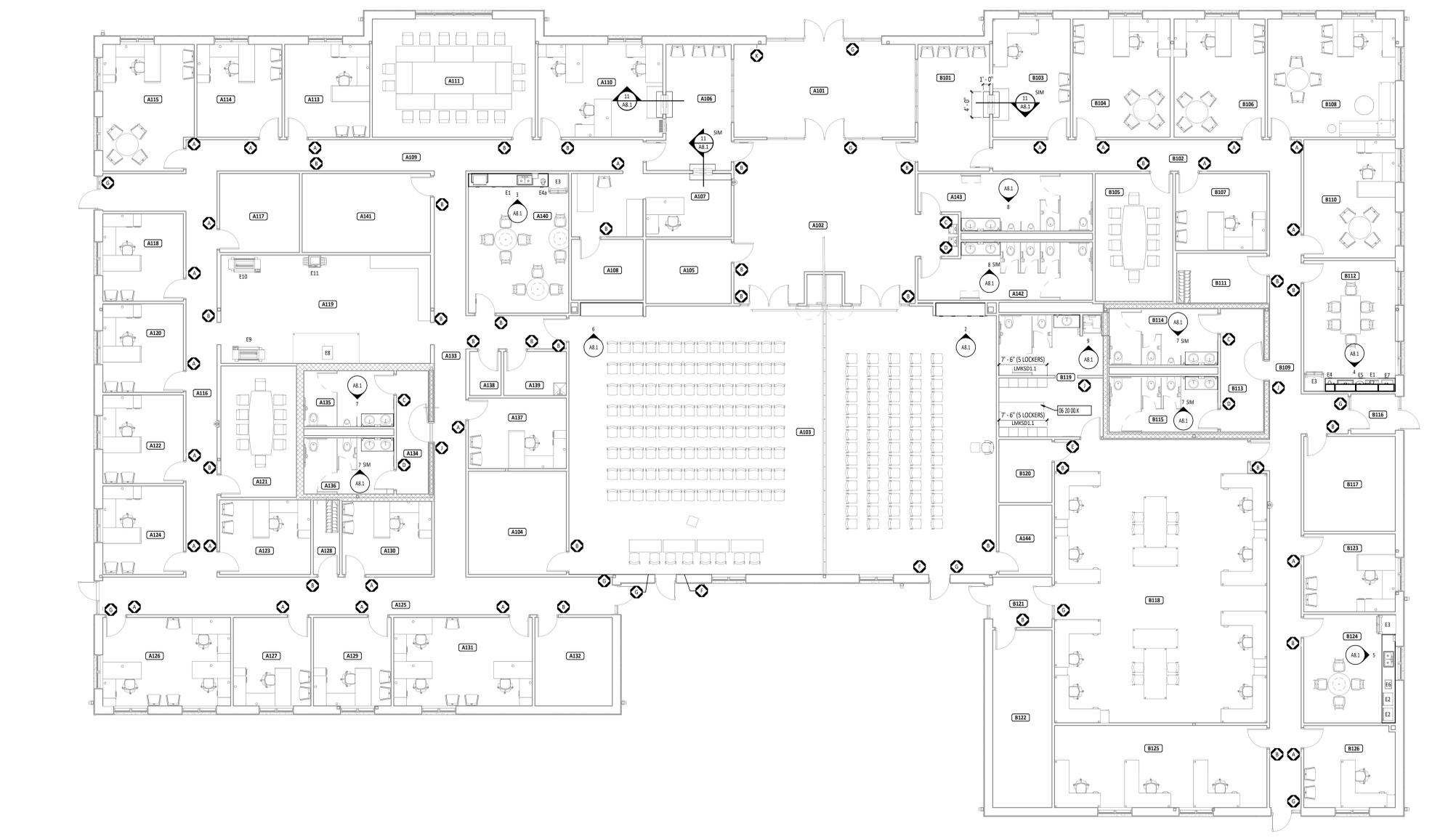
6 CASEWORK ELEVATION
 1/4" = 1'-0"



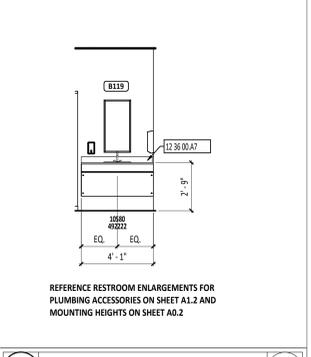
7 RESTROOM A135
 1/4" = 1'-0"



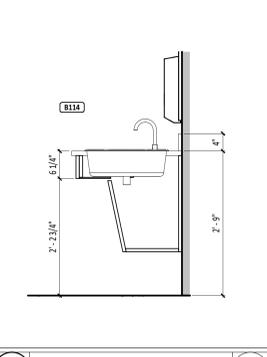
8 RESTROOM A143
 1/4" = 1'-0"



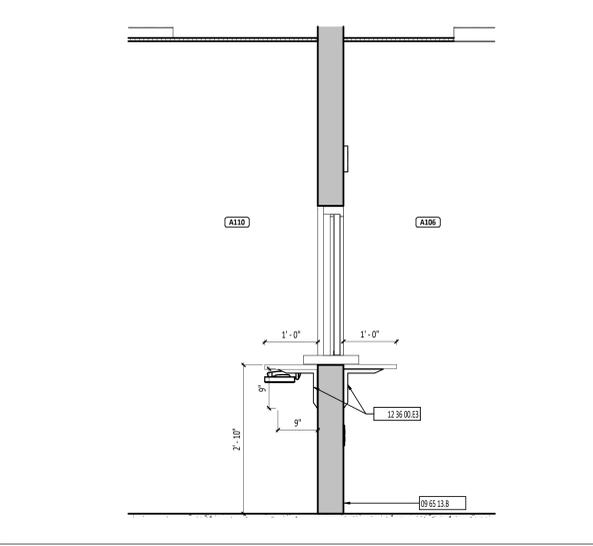
1 FIRST FLOOR EQUIPMENT PLAN
 1/8" = 1'-0"



9 RESTROOM B119
 1/4" = 1'-0"



10 SINK SECTION
 3/4" = 1'-0"



11 PASS THRU WINDOW SECTION
 3/4" = 1'-0"

ROOM NUMBER	ROOM NAME	AREA
A101	VESTIBULE	412 SF
A102	LOBBY	741 SF
A103	MULTIPURPOSE	2,843 SF
A104	STORAGE	248 SF
A105	TECH ROOM	134 SF
A106	CCEO LOBBY	216 SF
A107	ADMIN	246 SF
A108	MAIL	107 SF
A109	CORRIDOR	349 SF
A110	TAX MAP	284 SF
A111	CONFERENCE	472 SF
A113	FISCAL	194 SF
A114	SENIOR ADMIN	194 SF
A115	COUNTY ENGINEER	275 SF
A116	CORRIDOR	385 SF
A117	OFFICE	155 SF
A118	GIS	173 SF
A119	PLOTTING	560 SF
A120	SENIOR ENGINEER	175 SF
A121	CONFERENCE	244 SF
A122	CONSTRUCTION ENGINEER	175 SF
A123	CAD	167 SF
A124	DEPUTY ENGINEER	175 SF

ROOM NUMBER	ROOM NAME	AREA
A125	CORRIDOR	471 SF
A126	SURVEY	278 SF
A127	BRIDGE INSPECTOR	168 SF
A128	STAIR	48 SF
A129	PERMITS	168 SF
A130	INTERN OFFICE	161 SF
A131	INSPECTIONS	301 SF
A132	MECHANICAL	168 SF
A133	CORRIDOR	396 SF
A134	CORRIDOR	97 SF
A135	MENS RESTROOM	123 SF
A136	WOMENS RESTROOM	124 SF
A137	OFFICE	169 SF
A138	ELECTRICAL	34 SF
A139	CUSTODIAL	68 SF
A140	BREAK ROOM	343 SF
A141	FILES	249 SF
A142	WOMENS RESTROOM	231 SF
A143	MENS RESTROOM	225 SF
A144	STORAGE	90 SF
B101	FACILITIES LOBBY	223 SF
B102	CORRIDOR	236 SF
B103	ADMIN	225 SF

ROOM NUMBER	ROOM NAME	AREA
B104	ASSISTANT DIRECTOR	282 SF
B105	CONFERENCE	243 SF
B106	EXECUTIVE ASSISTANT	264 SF
B107	BADGE OFFICER	172 SF
B108	DIRECTOR	370 SF
B109	CORRIDOR	554 SF
B110	PROJECT MANAGER	265 SF
B111	STORAGE	110 SF
B112	EMPLOYEE KITCHEN	294 SF
B113	CORRIDOR	131 SF
B114	MENS RESTROOM	150 SF
B115	WOMENS RESTROOM	148 SF
B116	VESTIBULE	43 SF
B117	STORAGE	213 SF
B118	FIELD OFFICE	1,460 SF
B119	LOCKER ROOM	305 SF
B120	STORAGE	82 SF
B121	VESTIBULE	73 SF
B122	MECHANICAL	258 SF
B123	STP OFFICER	175 SF
B124	STP KITCHEN	244 SF
B125	HVAC TECHS	428 SF
B126	STO	183 SF

EQUIPMENT GENERAL NOTES

A KEY CASEWORK LOCKS ALIKE PER ROOM. PROVIDE MASTER KEY FOR ALL LOCKS.

B FOR ALL SINKS LABELED "ADA" REFERENCE SHEET A0.2.

C RESILIENT BASE ALONG ALL CABINET BASE FINISH IS TO BE PROVIDED BY SPECIFICATION SECTION 09 65 13.

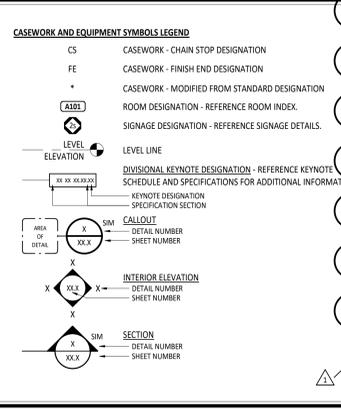
D ALL OPENINGS IN CASEWORK AND COUNTERTOPS TO BE CUT BY CASEWORK CONTRACTOR ONLY.

E REFERENCE FINISH MATERIAL SCHEDULE FOR LAMINATE COLOR SELECTIONS.

F ALL LOCKER BANK FILLERS SHALL BE EQUAL WIDTHS AT EACH END.

G PROVIDE BLANK BACKER ON OPPOSITE SIDE OF GLASS WHERE SIGNAGE IS MOUNTED TO GLASS - BACKER COLOR TO MATCH SIGNAGE.

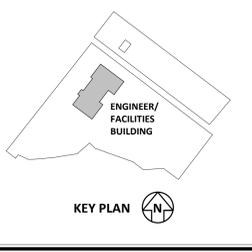
H ALL LOCKER BANK FILLERS SHALL BE EQUAL WIDTHS AT EACH END.



MARK	New or Existing	DESCRIPTION	NOTES
E1	NEW	DISHWASHER - ADA	TO BE FURNISHED AND INSTALLED BY CONTRACTOR
E2	NEW	MICROWAVE	PROVIDED AND INSTALLED BY OWNER
E3	NEW	DOUBLE DOOR REFRIGERATOR WITH FREEZER ON BOTTOM	TO BE FURNISHED AND INSTALLED BY CONTRACTOR
E4	NEW	COFFEE MAKER - KEURIG	PROVIDED AND INSTALLED BY OWNER
E4a	NEW	COFFEE MAKER - Burnt Aolios	PROVIDED AND INSTALLED BY OWNER
E5	NEW	CROCK POT	PROVIDED AND INSTALLED BY OWNER
E6	NEW	TOASTER OVEN	PROVIDED AND INSTALLED BY OWNER
E7	NEW	ELECTRIC HOT PLATE	PROVIDED AND INSTALLED BY OWNER
E8	EXISTING	LAMINATOR	PROVIDED AND INSTALLED BY OWNER
E9	EXISTING	PLOTTER WITH STAND - EPSON	PROVIDED AND INSTALLED BY OWNER
E10	EXISTING	PLOTTER WITH STAND - KIP	PROVIDED AND INSTALLED BY OWNER
E11	EXISTING	SHARP COPIER	PROVIDED AND INSTALLED BY OWNER

#	KEYNOTE DESCRIPTION
06 20 00.K	84" LONG X 9-1/4" WIDE X 1-1/4" THICK WOOD BENCH WITH BULLNOSE EDGES AND PEDESTALS 17" AFF. STAIN
09 65 00.A	RESILIENT FLOORING - REFERENCE FINISH MATERIAL SCHEDULE.
09 65 13.A	RESILIENT BASE (RB3) AT THIS LOCATION - REFERENCE FINISH MATERIAL SCHEDULE.
09 65 13.B	RESILIENT BASE (RB1) AT THIS LOCATION - REFERENCE FINISH MATERIAL SCHEDULE.
10 28 00.B	TOWEL DISPENSER TO BE FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR - COORDINATE FINAL LOCATION AND MOUNTING HEIGHT WITH OWNER AND ARCHITECT.
12 35 50	17" DEEP SHELF WITH 2 BRACKETS
13.K	12.35
12.35	12.35
50.13.11	PLASTIC LAMINATE FINISH TO BE LT1 - REFERENCE FINISH MATERIAL SCHEDULE.
12.36 00.A1	PLASTIC LAMINATE COUNTERTOP FINISH TO BE LT2 - REFERENCE FINISH MATERIAL SCHEDULE.
12.36 00.A7	SOLID SURFACING COUNTERTOP
12.36 00.B1	4" HIGH BACKSPLASH - SAME MATERIAL AS COUNTERTOP AND HEIGHT AS LABELED UNLESS NOTED OTHERWISE
12.36 00.E3	2"W X 9"H 9"D COUNTER SUPPORT

MARK	DESCRIPTION	NOTES
LMKSD1.1	METAL LOCKER - 18IN WIDE X 18IN DEEP X 72IN HIGH SINGLE-TIER STANDARD LOCKER	



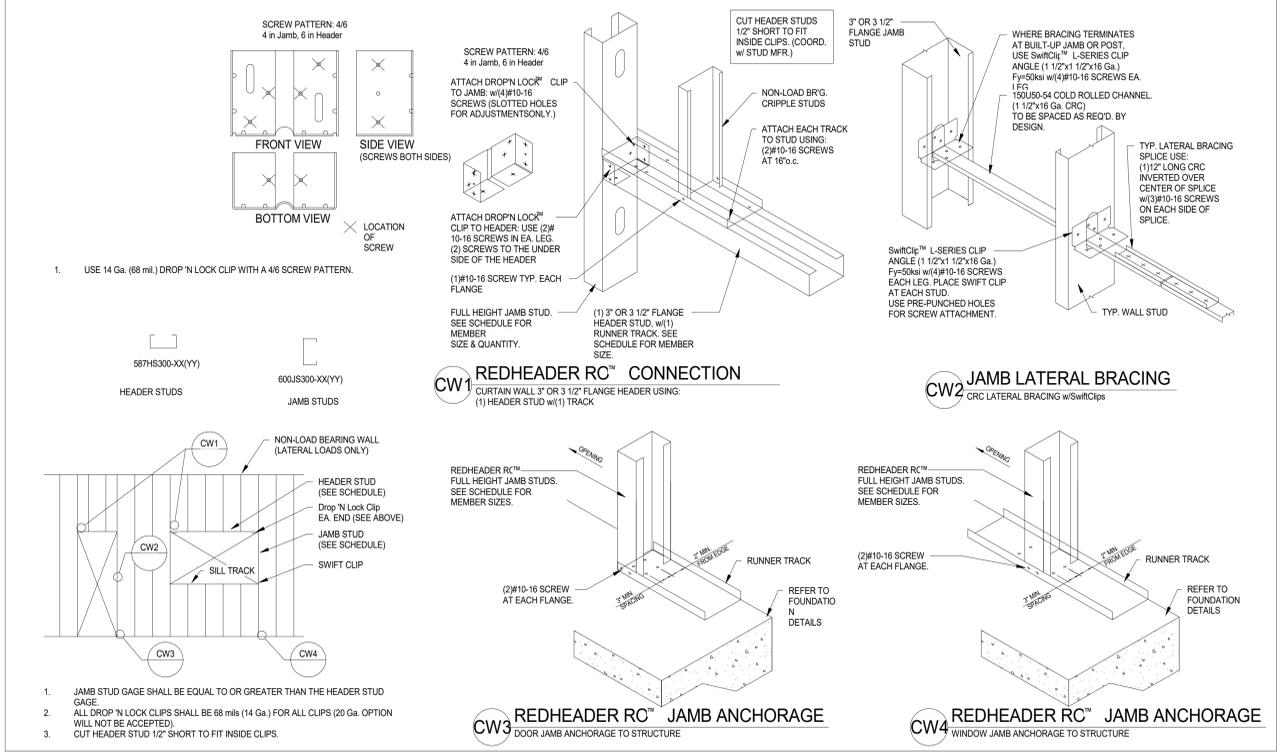
ISSUANCES/REVISIONS
CONSTRUCTION DOCUMENTS 02/19/2026
1 ADDENDUM 02 03/24/2026

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:
22001.00	RLS	MCN

SHEET TITLE:
FIRST FLOOR EQUIPMENT PLAN & CASEWORK ELEVATIONS

SHEET NUMBER:
A8.1

NON-LOAD BEARING HEADER AND JAMB DETAILS (CLARK DIETRICH REDHEADER RO ASSEMBLY)

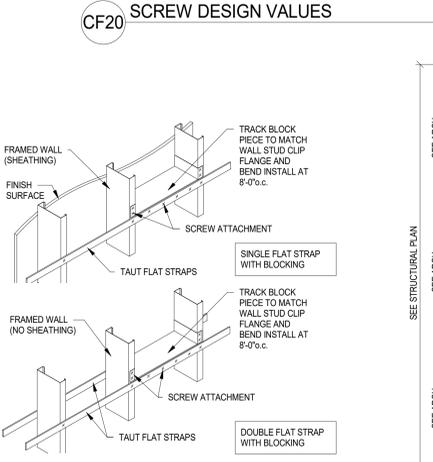


MINIMUM ALLOWABLE LOAD (lbs.)

	#8-18 HWH	#10-16 HWH	#12-14 HWH	1/4"-14 HWH
33 mils (20Ga)	TENSION 71	84	93	106
	SHEAR 162	177	186	199
43 mils (18Ga)	TENSION 92	109	121	138
	SHEAR 241	263	277	296
54 mils (16Ga)	TENSION 167	198	219	250
	SHEAR 333	467	562	600
68 mils (14Ga)	TENSION -	249	276	315
	SHEAR -	467	667	849
97 mils (12Ga)	TENSION -	356	393	450
	SHEAR -	467	667	867
118 mils (10Ga)	TENSION -	-	480	549
	SHEAR -	-	667	867

43 mils and less : Fy = 33 ksi ; 54 mils and greater : Fy = 50 ksi

MIN. HEAD DIAMETER 0.25" 0.375" 0.375" 0.5"
 MIN. EDGE DISTANCE 1/4" 5/16" 3/8" 3/8"
 DIST. BET. FSTNRS. 1/2" 5/8" 11/16" 3/4"



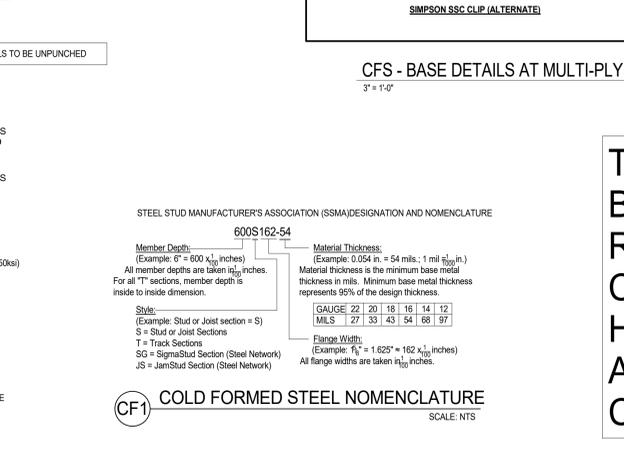
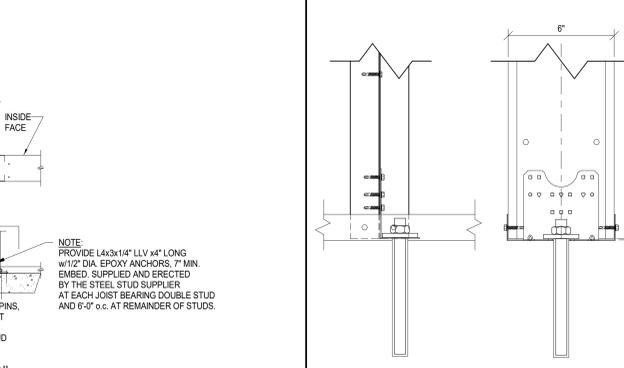
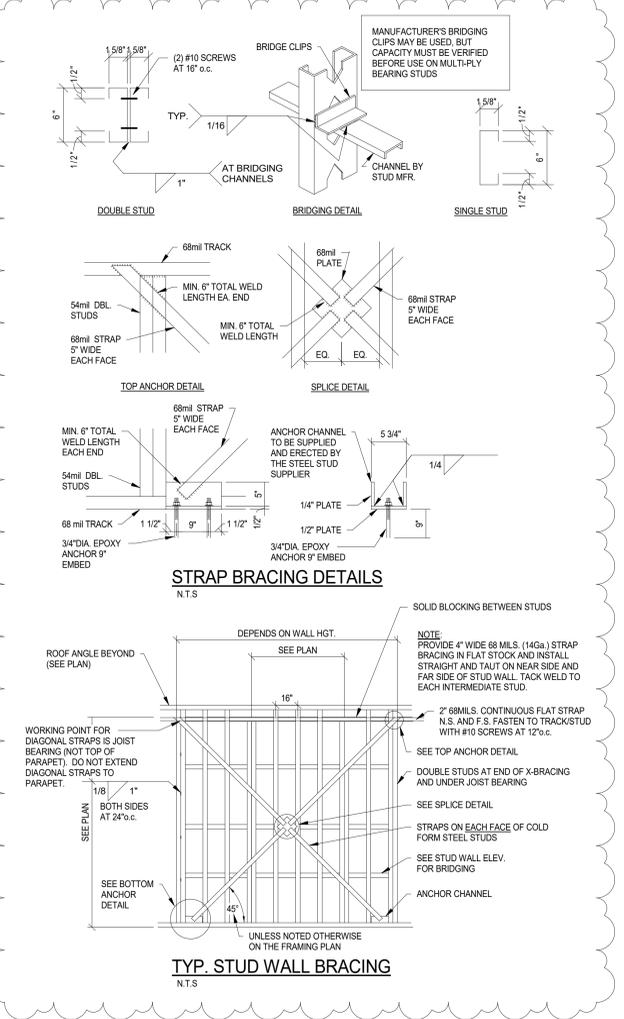
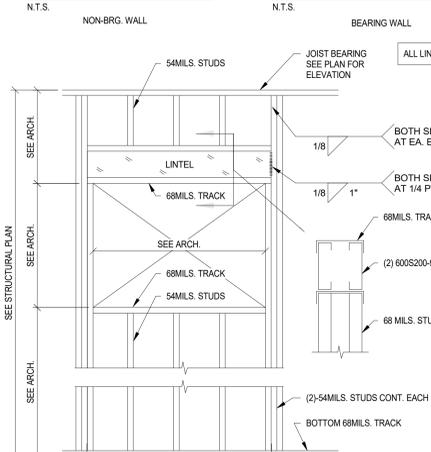
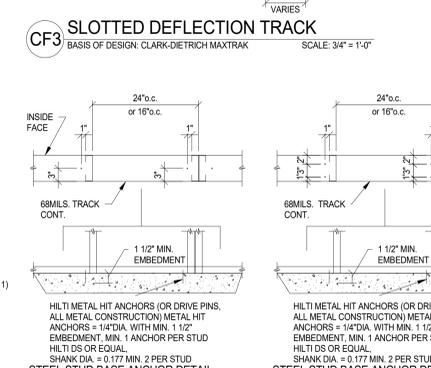
4 BRIDGING TERMINATION DETAIL
1/4" = 1'-0"

MIN. STRENGTH (lbs.)

	NOMINAL SHEAR STRENGTH, P _{ns}	NOMINAL TENSION STRENGTH, P _{nt}
#8-18 HWH	1000	1545
#10-16 HWH	1400	1936
#12-14 HWH	2000	2778
1/4"-14 HWH	2600	4060

CF3 SLOTTED DEFLECTION TRACK
BASIS OF DESIGN: CLARK-DIETRICH MAXTRAK SCALE: 3/4" = 1'-0"

CF1 COLD FORMED STEEL NOMENCLATURE



COLD FORMED STEEL FRAMING NOTES

- DESIGN, FABRICATION, AND ERECTION OF ALL COLD FORMED STEEL FRAMING MEMBERS SHALL CONFORM TO THE NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS (AISI S100).
- ALL FRAMING MEMBERS SHALL BE FORMED STEEL CONFORMING TO ASTM A1003 WITH A MINIMUM YIELD STRENGTH AS FOLLOWS:
 54 MILS. AND HEAVIER MEMBER Fy = 50 ksi (GRADE ST59)
 43 MILS. AND LIGHTER MEMBERS Fy = 33 ksi (GRADE ST38)
- STUDS USED FOR BRICK VENEER BACKUP SHALL BE GALVANIZED WITH A G-90 COATING MEETING THE REQUIREMENTS OF ASTM A653 (REFERENCE: THE BRICK INDUSTRY ASSOCIATION, TECHNICAL NOTE 388). ALL OTHER FRAMING MEMBERS SHALL BE G-40.
- MEMBERS SHALL BE THE MANUFACTURER'S STANDARD "C" SHAPED STUDS/JOISTS OF THE SIZE, FLANGE WIDTH, AND GAUGE INDICATED. ALL MEMBERS SHALL HAVE A MINIMUM FLANGE UP RETURN OF 1/2" AND SATISFY THE MINIMUM PROPERTIES OF "CLARK DIETRICH" (BASIS OF DESIGN), OR APPROVED EQUAL.
- THE GAUGE OF ALL LOAD BEARING TRACKS SHALL BE 68 MILS. (14 GA.), UNLESS NOTED OTHERWISE. CONNECT TRACKS TO CONCRETE WITH 0.157" DIA. POWER DRIVEN FASTENERS (WITH 1.50" EMBEDMENT) AT EACH STUD OR 16" ON CENTER MAX.
- ALL WELDING SHALL BE IN ACCORDANCE WITH AMERICAN WELDING SOCIETY SPECIFICATION AWS D1.3. ALL WELDS SHALL BE TOUCHED UP WITH ZINC RICH PAINT.
- ALL STRUCTURAL MEMBERS SHALL BE PROPERLY CONNECTED TO EACH OTHER AND TO THE SUPPORTING BACK-UP FRAMING. FASTENINGS SHALL BE MADE WITH SELF TAPPING SCREWS OR WELDS OF SUFFICIENT SIZE TO INSURE THE CONNECTION STRENGTH, UNLESS OTHERWISE NOTED. CONNECT ALL MEMBERS BASED ON THE FOLLOWING LOADINGS:
 7.1 INTERIOR STUDS: 5 psf
 8. PROVIDE BRIDGING FOR STUDS, JOISTS AND RAFTERS AT MIDSPAN AND AT A MAXIMUM SPACING NOT TO EXCEED 4'-0". ALL BRIDGING SHALL BE INSTALLED PRIOR TO THE ADDITION OF ANY LOADING. CONNECT BRIDGING TO EACH MEMBER BY WELDING, CLIP ANGLES OR OTHER APPROVED METHOD PER THE MANUFACTURER'S REQUIREMENTS.
 9. SPLICES IN STUDS ARE NOT PERMITTED.
 10. PROVIDE THE MANUFACTURER'S STANDARD TRACK CLIP ANGLES, BRACING, REINFORCEMENTS, FASTENERS AND ACCESSORIES AS RECOMMENDED BY THE MANUFACTURER FOR THE APPLICATION INDICATED AND AS NEEDED TO PROVIDE A COMPLETE FRAMING SYSTEM UNLESS OTHERWISE NOTED. INSTALL THE METAL FRAMING SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTION (MPI) AND RECOMMENDATIONS.
 11. PROVISION FOR STRUCTURE VERTICAL MOVEMENT SHALL BE PROVIDED WHERE INDICATED ON THE PLANS USING THE MANUFACTURER'S VERTICAL DEFLECTION CLIP OR OTHER MEANS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. CLIPS SHALL BE SPACED TO BE CAPABLE OF RESISTING THE REQUIRED INTERIOR MINIMUM LATERAL LOAD OF 5 psf.

SUBMITTALS

- SHOP DRAWINGS
 - CONTRACTOR SHALL SUBMIT DRAWINGS PREPARED BY THE MANUFACTURER FOR APPROVAL BY THE ENGINEER OF RECORD. THESE DRAWINGS SHALL INCLUDE:
 - CROSS-SECTIONS, PLANS AND/OR ELEVATIONS DEPICTING COMPONENT LOCATIONS
 - CONNECTION DETAILS SHOWING SCREW TYPES AND LOCATIONS, WELD LENGTHS AND LOCATIONS OR OTHER RELATED FASTENER REQUIREMENTS

SPECIALTY COLD FORMED STEEL

- ONLY WHERE NOTED, A PROPRIETARY HEADER, JAMB STUD, OR CONNECTOR MAY BE USED IN LIEU OF CONVENTIONAL "SSMA" DESIGNATED STUDS.
- COMPONENTS FROM DIFFERENT MANUFACTURERS SHALL NOT BE USED INTERCHANGEABLY.
- ALL PRODUCTS SHALL BE ORDERED AND INSTALLED PER THE MANUFACTURER'S WRITTEN SPECIFICATIONS.
- PROPRIETARY COMPONENTS (STUDS, HEADERS, ETC.) SHALL BE CONNECTED USING AN APPROPRIATELY SIZED CONNECTOR FROM THE SAME MFR. (U.N.O.)
- PROPRIETARY DETAILS ARE SHOWN AS A CONVENIENCE TO THE G.C. DETAILS SHALL BE VERIFIED WITH THE LATEST MANUFACTURER'S SPECIFICATIONS AND DETAILS.

THIS SHEET INDICATES BASIS OF DESIGN AND REFERENCE DETAILS. FINAL CFS DESIGN OF STUDS, HEADERS, JAMBS, SILLS, AND STRAP BRACING BY CFS DELEGATED DESIGNER.

SHELL + MEYER ASSOCIATES INC.
STRUCTURAL ENGINEERS
2202 S PATTERSON BLVD
DAYTON, OH 45409-1930
PH: 937-298-4451
EMAIL: @SHELLANDMEYER.COM



CLERMONT COUNTY FACILITIES PHASE 2 MANAGEMENT BUILDING

ISSUANCES/REVISIONS

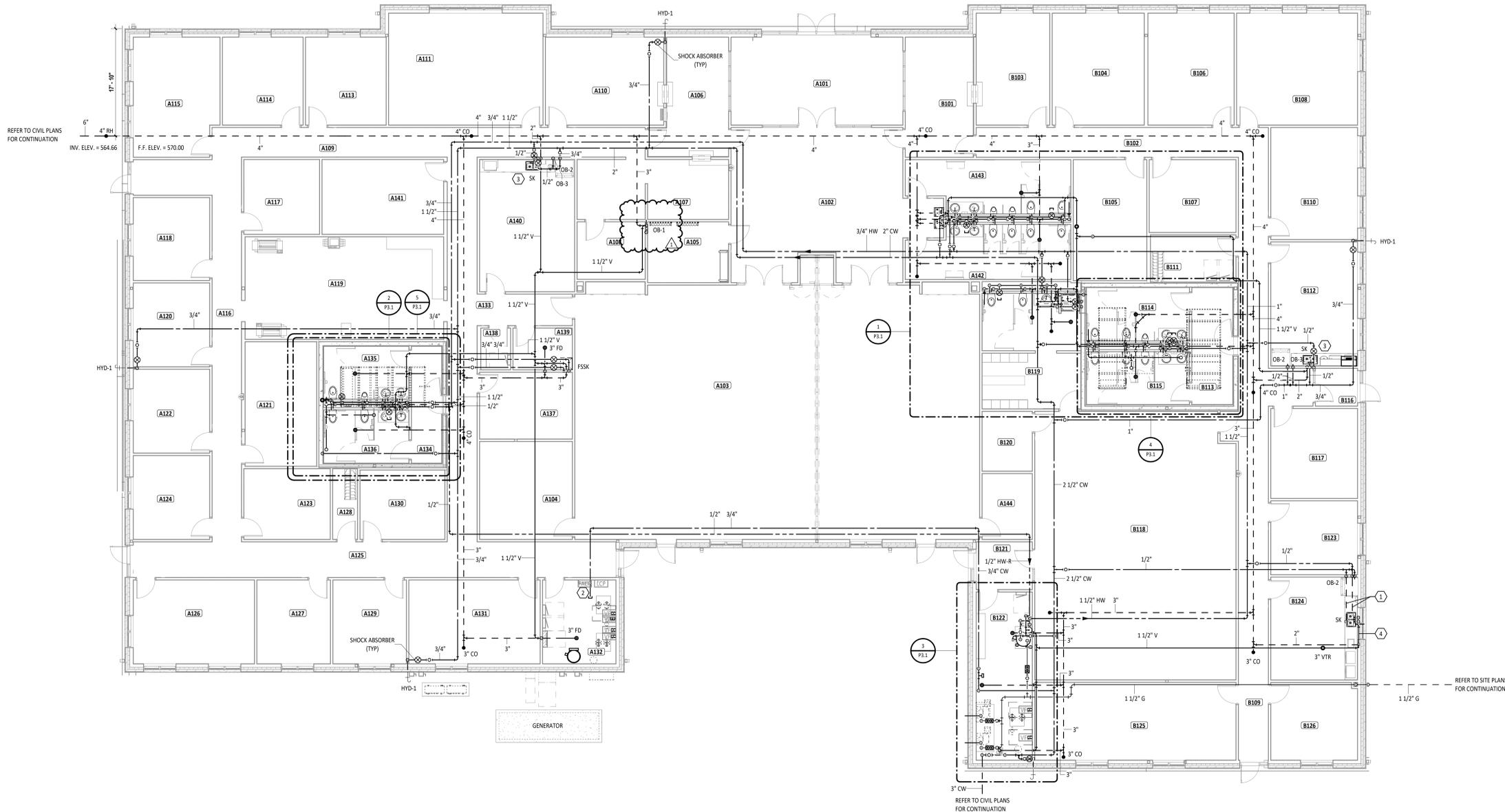
CONSTRUCTION DOCUMENTS	01/14/2026
ADDENDUM 02	03/24/2026

PROJECT NUMBER: 22001.00

DRAWN BY:	CHECKED BY:
TE	PR

SHEET TITLE:
COLD FORMED STEEL STUDS

SHEET NUMBER:
55.0



REFER TO CIVIL PLANS FOR CONTINUATION

REFER TO SITE PLANS FOR CONTINUATION

REFER TO CIVIL PLANS FOR CONTINUATION

FIRST FLOOR PLAN ROOM INDEX

ROOM NUMBER	ROOM NAME	AREA
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A142	WOMENS RESTROOM	231 SF
A143	MENS RESTROOM	225 SF
A144	STORAGE	90 SF
B101	FACILITIES LOBBY	223 SF
B102	CORRIDOR	236 SF
B103	ADMIN	225 SF
B104	ASSISTANT DIRECTOR	282 SF
B105	CONFERENCE	243 SF
B106	EXECUTIVE ASSISTANT	264 SF
B107	BADGE OFFICER	172 SF
B108	DIRECTOR	370 SF
B109	CORRIDOR	554 SF
B110	PROJECT MANAGER	265 SF
B111	STORAGE	110 SF
B112	EMPLOYEE KITCHEN	294 SF
B113	CORRIDOR	131 SF
B114	MENS RESTROOM	150 SF
B115	WOMENS RESTROOM	148 SF
B116	VESTIBULE	43 SF
B117	STORAGE	213 SF
B118	FIELD OFFICE	1,460 SF
B119	LOCKER ROOM	305 SF
B120	STORAGE	82 SF
B121	VESTIBULE	73 SF
B122	MECHANICAL	258 SF
B123	STIP OFFICER	175 SF
B124	STIP KITCHEN	244 SF
B125	HVAC TECHS	428 SF
B126	STO	183 SF
B201	MECHANICAL MEZZANINE	509 SF
B202	MECHANICAL MEZZANINE	412 SF

PLUMBING GENERAL NOTES

- A PROVIDE TRAP PRIMERS FOR FLOOR DRAINS SERVING MECHANICAL ROOMS, MECHANICAL DECKS, EMERGENCY SHOWERS, KITCHEN FLOOR DRAINS, AND AS REQUIRED BY CODE. SUPPLY NEAREST COLD WATER PIPING CONNECTED TO A FLUSH VALVE OR SOLENOID VALVE. SUPPLY PIPING SHALL BE 1/2" VALVED COLD WATER LINE. REFERENCE DETAIL FOR ADDITIONAL INFORMATION.
- B VERIFY INVERT ELEVATIONS ON UNDERGROUND SANITARY AND STORM PIPING. COORDINATE DEPTHS WITH THE BUILDING CONSTRUCTION AND ALL OTHER UTILITIES.
- C ALL SANITARY AND VENT PIPING IN CHASE EXPOSED TO THE PLENUM AND ABOVE CEILING WHERE PLENUM IS USED FOR RETURN AIR SHALL BE CAST IRON. REFERENCE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- D ALL FINAL GAS CONNECTIONS SHALL BE MADE WITH FLEXIBLE STAINLESS STEEL PIPE OR RIDGED PIPE WITH UNION, SHUT-OFF VALVE AND DIRT LEG. REFERENCE DETAIL FOR ADDITIONAL INFORMATION.
- G PITCH UNDERFLOOR SANITARY WASTE AND STORM PIPING 3" AND GREATER AT 1/8" PER FOOT, UNLESS NOTED OTHERWISE. PITCH ALL OTHER WASTE PIPING AT 1/4" PER FOOT UNLESS OTHERWISE NOTED.
- H FIELD VERIFY LOCATION AND INVERTS OF SITE UTILITIES PRIOR TO INSTALLATION.
- I ROUTE DOMESTIC WATER, FIRE PROTECTION, SANITARY SEWER, AND STORM SEWER SERVICES TO SITE UTILITIES 5'-0" FROM BUILDING UNLESS NOTED OTHERWISE. REFERENCE CIVIL PLANS.
- J PROVIDE CLEANOUT IN ACCESSIBLE LOCATION AT THE BASE OF ALL PLUMBING RISERS.
- L WHERE FLOOR DRAINS OCCUR WITHIN THE LIMITS OF CONSTRUCTION, PREVENT CONSTRUCTION DEBRIS FROM ENTERING DRAIN BODY BY SEALING DRAIN OPENING PRIOR TO START OF WORK.
- M FIRE SEAL AROUND PIPING PENETRATIONS OF FIRE RATED WALLS. REFERENCE SPECIFICATION.
- N PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.
- O FIELD VERIFY ALL NEW WATER, WASTE, AND VENT PIPING CONNECTIONS AND PROVIDE NEW CONNECTIONS AS REQUIRED FOR PROPERLY OPERATING SYSTEMS.
- Q WASTE AND VENT PIPING BELOW FLOOR AND THROUGH FLOOR SHALL BE 2" MINIMUM.
- R PROVIDE CLEANOUT IN ACCESSIBLE LOCATION AT THE BASE OF ALL SANITARY AND STORM RISERS.

#	KEYNOTE DESCRIPTION
1	ROUTE DOMESTIC HOT AND COLD WATER PIPING BELOW FLOOR TO FIXTURE AS SHOWN. ROUTE THROUGH CABINET AND INSTALL HAMMER ARRESTOR ACCESSIBLE WITHIN SINK. COORDINATE WORK WITH THE GENERAL CONTRACTOR.
2	DIVISION 22 PLUMBING CONTRACTOR SHALL EXTEND COLD WATER PIPING TO CHILLED MAKE-UP WATER CONNECTION. COORDINATE EXACT LOCATION WITH DIVISION 23 MECHANICAL CONTRACTOR.
3	DIVISION 22 PLUMBING CONTRACTOR SHALL INSTALL DISHWASHER AND PROVIDE ALL SANITARY AND DOMESTIC WATER CONNECTIONS REQUIRED FOR INSTALLATION. REFER TO DETAIL FOR ADDITIONAL INFORMATION.
4	ROUTE SANITARY CONCEALED WITHIN EXTERIOR WALL TO APPROXIMATE LOCATION SHOWN. COORDINATE EXACT LOCATION AND ELEVATION WITH THE GENERAL CONTRACTOR.



KEY PLAN



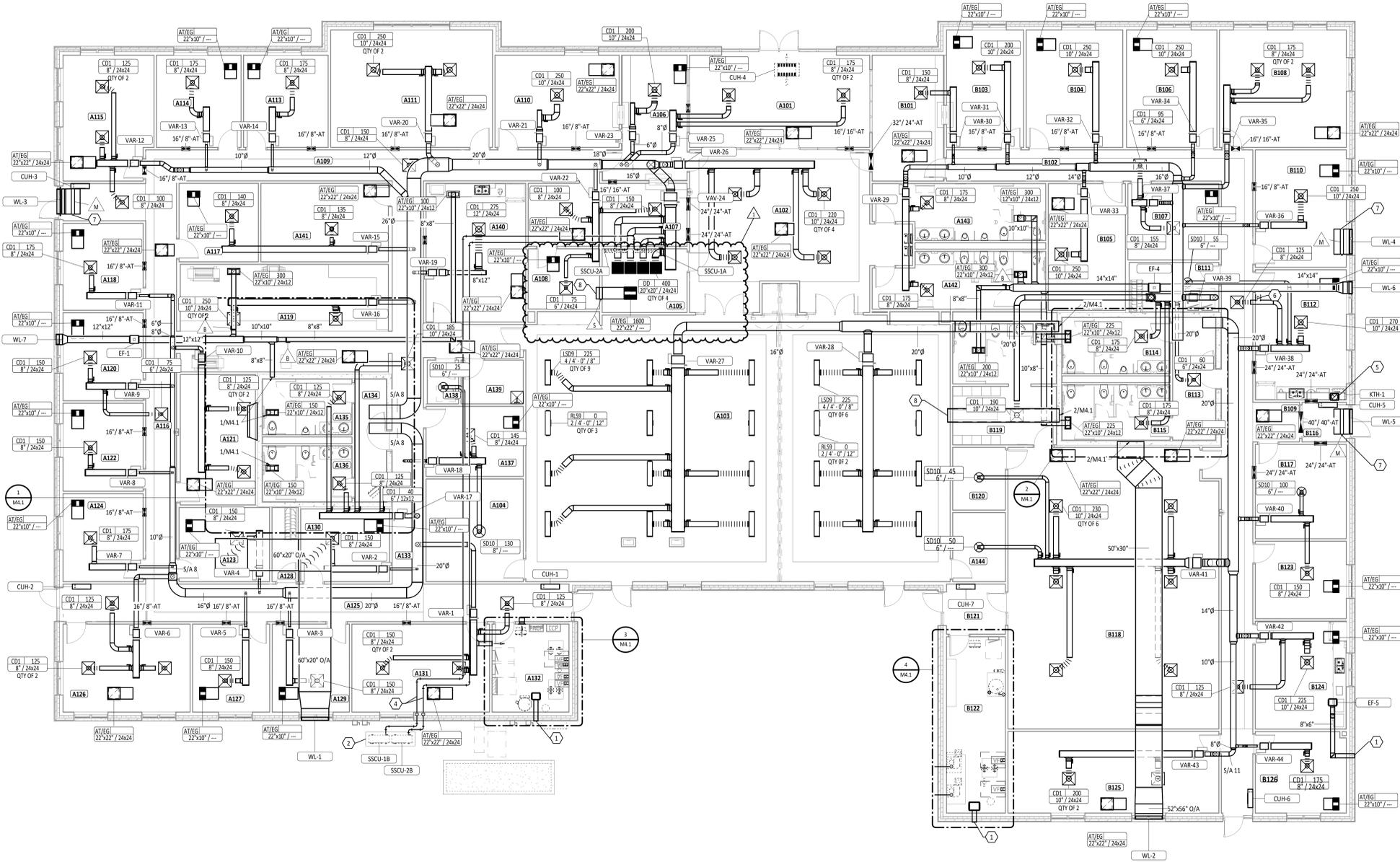
CLERMONT COUNTY FACILITIES PHASE 2
MANAGEMENT BUILDING

ISSUANCES/REVISIONS		
CONSTRUCTION DOCUMENTS	02/18/2025	
ADDENDUM #2	03/24/2025	

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:
22001.00	LGW	CSM

SHEET TITLE:
PLUMBING PLAN

SHEET NUMBER:
P2.1



HVAC GENERAL NOTES

- A DIVISION 23 MECHANICAL CONTRACTOR IS REQUIRED TO COORDINATE DIFFUSER AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS.
- B ALL EQUIPMENT LOCATED ABOVE CEILING REQUIRING MAINTENANCE SHALL BE INSTALLED WITHIN (2) FEET OF THE CEILING FOR MAINTENANCE PURPOSES. DO NOT INSTALL UNITS ABOVE LIGHTS AND CEILING SPEAKERS. COORDINATE LOCATION WITH ARCHITECTURAL REFLECTED CEILING PLAN AND GENERAL CONTRACTOR.
- C COORDINATE THE EXACT LOCATION OF THE VAV BOXES WITH ALL OTHER TRADES. VAV BOXES SHALL BE INSTALLED SUCH THAT THE CONTROL BOXES CAN BE EASILY ACCESSED AND MAINTAINED.
- D ANY BALANCING DAMPERS OR OTHER DEVICES IN DUCTS ABOVE HARD CEILINGS SHALL BE LOCATED ABOVE NEAREST ACCESSIBLE CEILING.
- E THIS CONTRACTOR SHALL BE REQUIRED TO REPLACE FILTERS ON HVAC EQUIPMENT AFTER ALL DUST PRODUCING CONSTRUCTION HAS BEEN COMPLETED AND PRIOR TO THE FINAL PUNCH.
- F ALL ROOF MOUNTED EQUIPMENT SHALL BE A MINIMUM 10'-0" FROM EDGE OF ROOF.
- G LOCATE DUCTWORK AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS, TRANSFORMERS, AND OTHER ELECTRICAL EQUIPMENT.
- H PROVIDE SLEEVES AND/OR OPENINGS TO RUN DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.
- I CONTRACTOR SHALL LOCATE THERMOSTATS AND TEMPERATURE SENSORS AT 3'-8" AFF, A MINIMUM OF 4" FROM LIGHT SWITCH.
- J CONDENSATE DRAINS SHALL BE SUPPLIED FOR ALL COOLING EQUIPMENT. CONTRACTOR SHALL ENSURE PROPER INSTALLATION AND DRAINAGE AS REQUIRED BY FEDERAL, STATE, AND LOCAL CODES. CONDENSATE PIPING SHALL BE TYPE "L" COPPER.
- K ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK SHALL BE RATED FOR PRESSURE CLASS OF 2" W.G. UNLESS OTHERWISE NOTED OTHERWISE.
- L REMOVE ALL UNUSED PIPING, DUCTWORK, AND ACCESSORIES. DISPOSE OF THESE ITEMS OFF SITE.
- M THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING, PRIOR TO FINAL BID, ALL EXISTING CONDITIONS FOR PLUMBING AND MECHANICAL SYSTEMS WITHIN SCOPE AREA AND WITHIN CLOSE PROXIMITY OF THE SCOPE AREA.
- N WHERE FLOOR DRAINS OCCUR WITHIN THE LIMITS OF CONSTRUCTION, PREVENT CONSTRUCTION DEBRIS FROM ENTERING DRAIN BODY BY SEALING DRAIN OPENING PRIOR TO START OF WORK. UNSEAL DRAIN AT COMPLETION OF CONSTRUCTION.
- O COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.
- P THE CONTRACTOR SHALL BE FAMILIAR WITH ALL THE CONDITIONS BOTH EXISTING AND THOSE ILLUSTRATED BY THESE DOCUMENTS AS WELL AS THOSE WHICH CAN BE REASONABLY ANTICIPATED INCLUDING, BUT NOT LIMITED TO ARCHITECTURAL, ELECTRICAL, VENTILATION, PLUMBING, AND OTHER SYSTEMS INVOLVED ON THIS PROJECT.
- Q FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF THE APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.
- R LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.
- S ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.
- T PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.
- U INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKSMANSHIP CONSISTENT WITH THE SPECIFICATIONS.
- V LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD. CONSULT ENGINEER IF MANUFACTURER'S MINIMUM CLEARANCE REQUIRED CANNOT BE MAINTAINED.
- W INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.

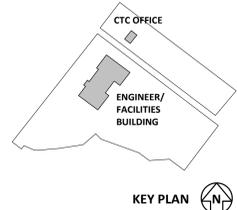
#	KEYNOTE DESCRIPTION
1	TERMINATE VENT THROUGH EXTERIOR WALL AS SHOWN. PROVIDE 8" X 8" SHEET METAL PLENUM AND WALL CAP WITH DAMPER AND BIRDSCREEN. GREENHECK MODEL WC 8 X OR EQUAL. COLOR BY ARCHITECT.
2	PROVIDE 3 1/2" CONCRETE HOUSEKEEPING PAD FOR CONDENSING UNITS. CONCRETE PAD SHALL EXTEND A MINIMUM OF 6" BEYOND THE EDGE OF THE EQUIPMENT. CONFIRM UNIT DIMENSIONS AND CLEARANCES WITH APPROVED MANUFACTURER'S SUBMITTAL. INSTALL CONDENSING UNITS PER MANUFACTURER'S RECOMMENDATIONS.
3	PROVIDE 6" CONCRETE HOUSEKEEPING PAD FOR CHILLER. CONCRETE PAD SHALL EXTEND A MINIMUM OF 6" BEYOND THE EDGE OF THE EQUIPMENT. CONFIRM UNIT DIMENSIONS AND CLEARANCES WITH APPROVED MANUFACTURER'S SUBMITTAL. INSTALL CHILLER PER MANUFACTURER'S RECOMMENDATIONS. REFER TO TO CONCRETE PAD DETAIL FOR ADDITIONAL INFORMATION.
4	ROUTE REFRIGERATION LINES IN EXTERIOR WALL AND ABOVE CEILING BETWEEN CONDENSING UNITS AND WALL MOUNTED AIR CONDITIONING UNITS. SEAL EXTERIOR WALL PENETRATIONS AIR AND WATER TIGHT.
5	ROUTE KITCHEN HOOD EXHAUST THROUGH CABINET AND INSTALL FACTORY PROVIDED INLINE FAN IN DUCT ABOVE CEILING IN PLENUM. ROUTE DUCT THROUGH ROOF AND TERMINATE WITH ROOF HOOD. GREENHECK MODEL RJ-10X10 OR EQUAL. COORDINATE ROOF PENETRATION WITH GENERAL CONTRACTOR. COLOR BY ARCHITECT.
6	APPROXIMATE LOCATION FOR KITCHEN HOOD FIRE SUPPRESSION PULL STATION. PULL STATION SHALL BE PROVIDED BY DIVISION 23 CONTRACTOR WITH THE KITCHEN HOOD. DIVISION 26 CONTRACTOR SHALL PROVIDE THE ROUGH-IN.
7	RELIEF AIR CONTROL DAMPER MOUNTED IN DUCTWORK BELOW ROOF HOOD. DAMPER SHALL BE PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY DIVISION 23 MECHANICAL CONTRACTOR. REFER TO SPECIFICATIONS FOR CONTROL.
8	END OF LINED RETURN DUCT OPEN TO SPACE ABOVE CEILING.

1
M2.1 FIRST FLOOR MECHANICAL PLAN
1/8" = 1'-0"

ROOM NUMBER	ROOM NAME	AREA
A101	VESTIBULE	412 SF
A102	LOBBY	741 SF
A103	MULTIPURPOSE	2,843 SF
A104	STORAGE	248 SF
A105	TECH ROOM	134 SF
A106	CCOO LOBBY	216 SF
A107	ADMIN	246 SF
A108	MAIL	107 SF
A109	CORRIDOR	349 SF
A110	TAX MAP	284 SF
A111	CONFERENCE	472 SF
A113	FISCAL	194 SF
A114	SENIOR ADMIN	194 SF
A115	COUNTY ENGINEER	275 SF
A116	CORRIDOR	385 SF
A117	OFFICE	155 SF
A118	GIS	173 SF
A119	PLOTTING	560 SF
A120	SENIOR ENGINEER	175 SF
A121	CONFERENCE	244 SF
A122	CONSTRUCTION ENGINEER	175 SF
A123	CAD	167 SF
A124	DEPUTY ENGINEER	175 SF
A125	CORRIDOR	471 SF
A126	SURVEY	278 SF
A127	BRIDGE INSPECTOR	168 SF
A128	STAIR	48 SF
A129	PERMITS	168 SF
A130	INTERN OFFICE	161 SF

ROOM NUMBER	ROOM NAME	AREA
A131	INSPECTIONS	301 SF
A132	MECHANICAL	168 SF
A133	CORRIDOR	396 SF
A134	CORRIDOR	97 SF
A135	MENS RESTROOM	123 SF
A136	WOMENS RESTROOM	124 SF
A137	OFFICE	169 SF
A138	ELECTRICAL	39 SF
A139	CUSTODIAL	68 SF
A140	BREAK ROOM	343 SF
A141	FILES	249 SF
A142	WOMENS RESTROOM	231 SF
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A144	STORAGE	90 SF
B101	FACILITIES LOBBY	223 SF
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ROOM NUMBER	ROOM NAME	AREA
B116	VESTIBULE	43 SF
B117	STORAGE	213 SF
B118	FIELD OFFICE	1,460 SF
B119	LOCKER ROOM	305 SF
B120	STORAGE	82 SF
B121	VESTIBULE	73 SF
B122	MECHANICAL	258 SF
B123	STP OFFICER	175 SF
B124	STP KITCHEN	244 SF
B125	HVAC TECHS	428 SF
B126	STO	183 SF
B201	MECHANICAL MEZZANINE	509 SF
B202	MECHANICAL MEZZANINE	412 SF



KEY PLAN

ISSUANCES/REVISIONS	
CONSTRUCTION DOCUMENTS	02/19/2025
1 ADDENDUM #02	03/24/2025

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:
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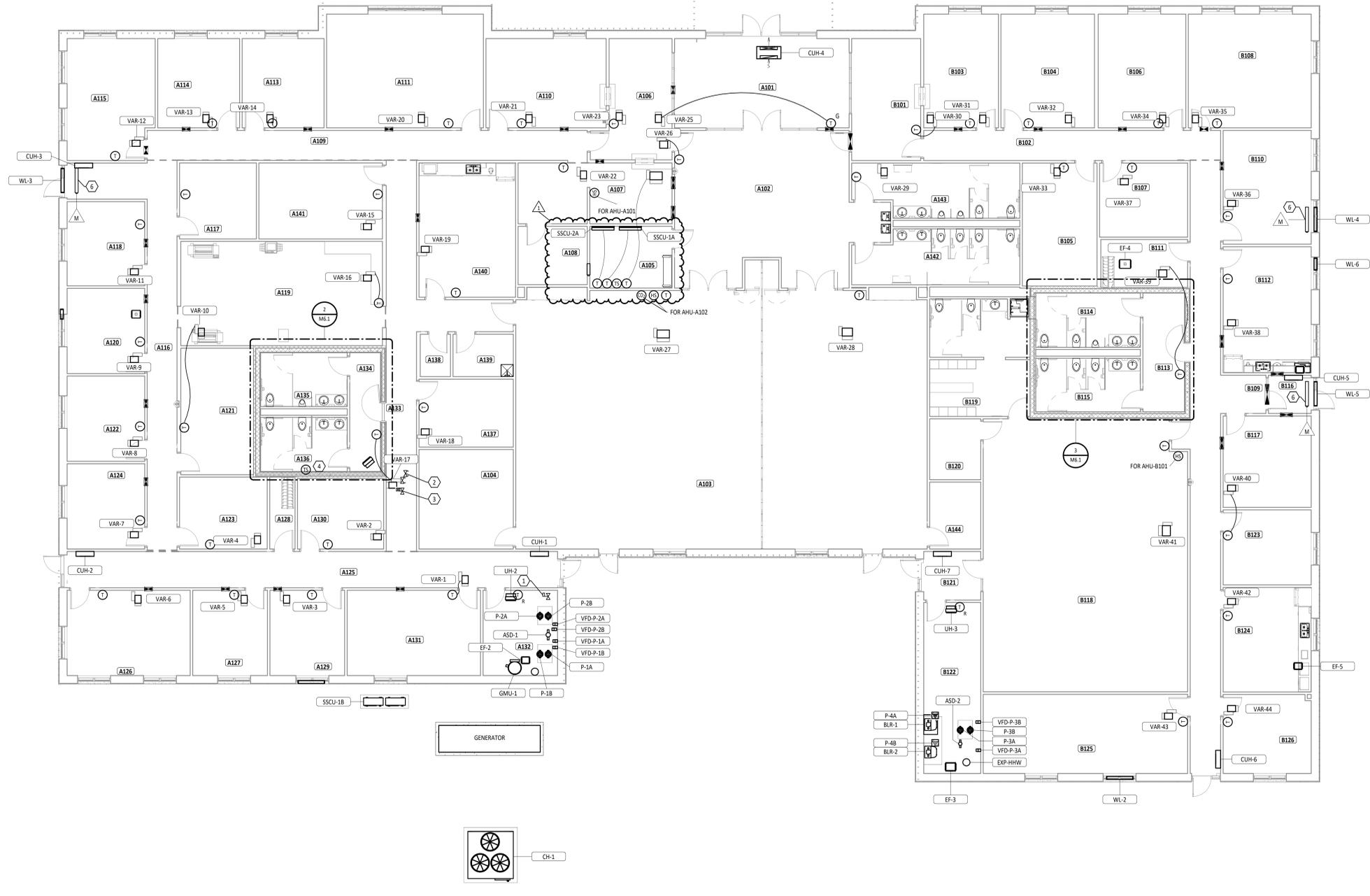
SHEET TITLE:
**FIRST FLOOR
MECHANICAL
PLAN**

SHEET NUMBER:
M2.1

TEMPERATURE CONTROL GENERAL NOTES

- A REFER TO SECTION 23 0913 AND 23 0993 FOR TEMPERATURE CONTROL SPECIFICATIONS.
- B MOUNT THE THERMOSTATS AND SENSORS WITH BOTTOM AT 44" AFF UNLESS OTHERWISE NOTED, A MINIMUM OF 8" FROM LIGHT SWITCH. COORDINATE HEIGHT WITH LIGHT SWITCHES. SEE DETAIL FOR ADDITIONAL INFORMATION.
- C ALL THERMOSTATS ASSOCIATED WITH THE VARIABLE REFRIGERANT EQUIPMENT IS TO BE PROVIDED BY THE VARIABLE REFRIGERANT EQUIPMENT MANUFACTURER. THE TEMPERATURE CONTROL CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL ALL CONTROLS AND ALL TEMPERATURE CONTROL WIRING PER MANUFACTURER REQUIREMENTS.

#	KEYNOTE DESCRIPTION
1	APPROXIMATE LOCATION OF CHILLED WATER SYSTEM FLOW METER. FLOW METER PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY DIVISION 23 MECHANICAL CONTRACTOR. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2	LOCATION OF DIFFERENTIAL PRESSURE TRANSMITTER FOR HEATING WATER PUMPS VARIABLE SPEED PUMP CONTROL. TRANSMITTER PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY DIVISION 23 MECHANICAL CONTRACTOR. REFER TO DETAIL FOR ADDITIONAL REQUIREMENTS AND INFO. MOUNT TRANSMITTER ON WALL OF NEAREST MECHANICAL ROOM/ELECTRICAL ROOM.
3	LOCATION OF BYPASS VALVE FOR HEATING WATER SYSTEM BYPASS. VALVE SHALL BE PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. VALVE SHALL BE SIZED TO PROVIDE MINIMUM FLOW FOR SECONDARY PUMPS. REFER TO DETAIL AND SPECIFICATIONS FOR ADDITIONAL INFO.
4	VAV POWER SUPPLY UNIT SHALL BE PROVIDED BY AND INSTALLED BY TEMPERATURE CONTROL CONTRACTOR. DIVISION 26 ELECTRICAL CONTRACTOR SHALL PROVIDE A 115V/1PH POWER SUPPLY TO UNIT AND WIRE. TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE LOW VOLTAGE WIRING FROM POWER SUPPLY TO VAV BOXES. A MAXIMUM OF 30 VAV BOXES (6 PER CIRCUIT) SHALL BE WIRED TO ONE POWER SUPPLY. POWER SUPPLY SHALL BE EQUAL TO RIB MODEL PSH500A. COORDINATE EXACT PANEL LOCATION WITH DIVISION 26 ELECTRICAL CONTRACTOR AND DIVISION 23 MECHANICAL CONTRACTOR.
5	APPROXIMATE LOCATION OF DUCT MOUNTED SMOKE DETECTOR. SMOKE DETECTOR SHALL BE PROVIDED AND INSTALLED BY DIVISION 26 ELECTRICAL CONTRACTOR.
6	LOCATION OF RELIEF AIR CONTROL DAMPER. DAMPERS SHALL BE PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY DIVISION 23 MECHANICAL CONTRACTOR.
7	LOCATION OF DIFFERENTIAL PRESSURE TRANSMITTER FOR CHILLED WATER SECONDARY PUMPS VARIABLE SPEED PUMP CONTROL. TRANSMITTER PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY DIVISION 23 MECHANICAL CONTRACTOR. REFER TO DETAIL FOR ADDITIONAL REQUIREMENTS AND INFO. MOUNT TRANSMITTER ON WALL OF NEAREST MECHANICAL ROOM/ELECTRICAL ROOM.
8	LOCATION OF BYPASS VALVE FOR CHILLED WATER SYSTEM BYPASS. VALVE SHALL BE PROVIDED BY TEMPERATURE CONTROL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. VALVE SHALL BE SIZED TO PROVIDE MINIMUM FLOW FOR SECONDARY PUMPS. REFER TO DETAIL AND SPECIFICATIONS FOR ADDITIONAL INFO.



1 LEVEL 1 HVAC PLAN
1/8" = 1'-0"

FIRST FLOOR PLAN ROOM INDEX

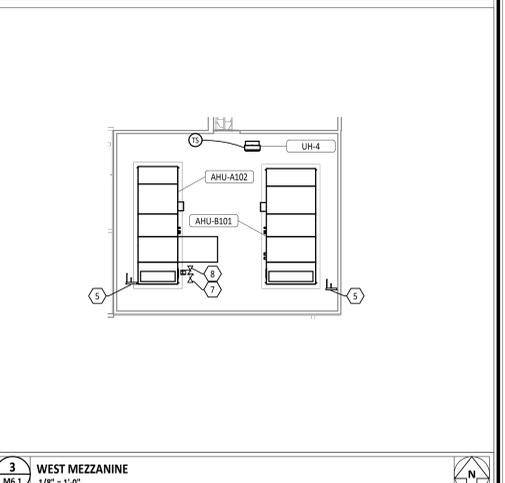
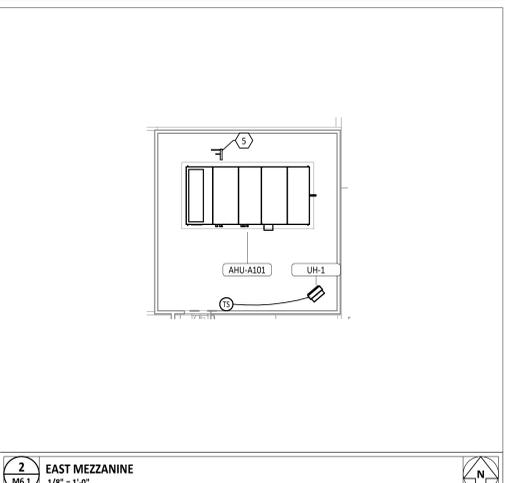
ROOM NUMBER	ROOM NAME	AREA
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FIRST FLOOR PLAN ROOM INDEX

ROOM NUMBER	ROOM NAME	AREA
A131	INSPECTIONS	301 SF
A132	MECHANICAL	168 SF
A133	CORRIDOR	396 SF
A134	CORRIDOR	97 SF
A135	MENS RESTROOM	123 SF
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FIRST FLOOR PLAN ROOM INDEX

ROOM NUMBER	ROOM NAME	AREA
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B117	STORAGE	213 SF
B118	FIELD OFFICE	1,460 SF
B119	LOCKER ROOM	305 SF
B120	STORAGE	82 SF
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B126	STO	183 SF
B201	MECHANICAL MEZZANINE	509 SF
B202	MECHANICAL MEZZANINE	412 SF



THERMOSTAT / SENSOR LEGEND

- (CC) CARBON DIOXIDE SENSOR
- (CO) CARBON MONOXIDE SENSOR
- (N2) NITROGEN DIOXIDE SENSOR
- (HS) HUMIDITY SENSOR
- (H) HUMIDISTAT
- (TH) TEMPERATURE & HUMIDITY SENSOR
- (TS) TEMPERATURE SENSOR
- (T) THERMOSTAT
- (SW) MANUAL SWITCH
- (S) SENSOR
- (G) GUARD
- (E) ELECTRIC LINE VOLTAGE THERMOSTAT
- (R) REVERSE ACTING THERMOSTAT

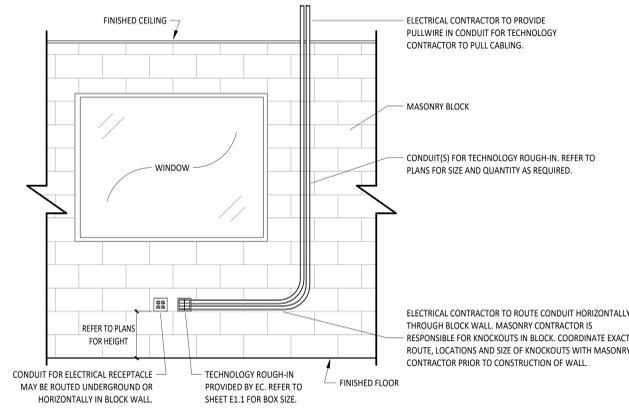
ISSUANCES/REVISIONS

CONSTRUCTION DOCUMENTS	02/19/2025
1 ADDENDUM #02	03/24/2025

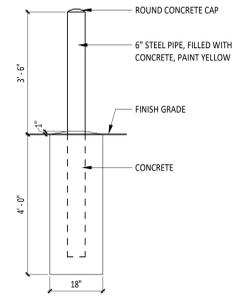
PROJECT NUMBER: 22001.00 **DRAWN BY: RAG** **CHECKED BY: APH**

SHEET TITLE:
**FIRST FLOOR
TEMPERATURE
CONTROL PLAN -
UNITS A & B**

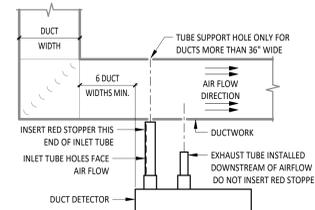
SHEET NUMBER:
M6.1



1 TECHNOLOGY ROUGH-IN UNDER WINDOW
NTS

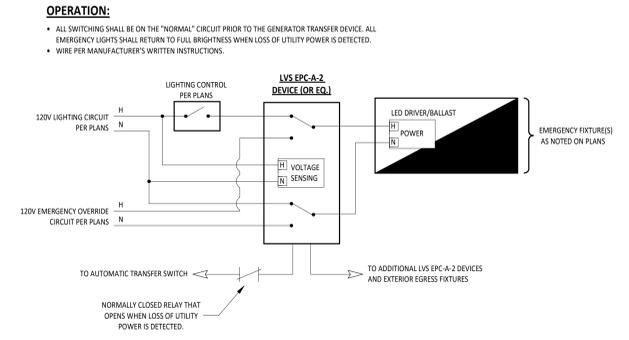


2 PROTECTIVE BOLLARD DETAIL
NTS

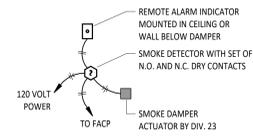


GENERAL NOTES:
A. MOUNTINGS SHOWN ARE TYPICAL. DETECTORS CAN BE INSTALLED SIDE, BOTTOM OR TOP OF DUCT AS LONG AS PROPER TUBE OPERATION AND FLOW/PRESSURE PERFORMANCE IS MAINTAINED.
B. DUCT DETECTOR SHALL, WHEN POSSIBLE, BE LOCATED A MINIMUM OF SIX DUCT WIDTHS DOWNSTREAM FROM A SOURCE OF TURBULENCE (BENDS, INLETS, OR DEFLECTION PLATES).

3 DUCT DETECTOR DETAIL
NTS

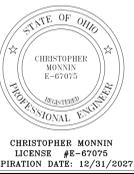


4 LIGHTING CONTROL SCHEMATIC - GENERATOR TRANSFER DEVICE
NTS



SMOKE DETECTOR REQUIREMENTS
DUCT WIDTH < 36" = 1 DETECTOR CENTERED IN OPENING
DUCT WIDTH 36" -> 72" = 2 DETECTORS LOCATED AT 1/4 POINTS OF THE OPENING
DUCT WIDTH > 72" = 1 DETECTOR FOR EACH FULL 24" OF OPENING
DUCT DEPTH < 36" = 1 DETECTOR CENTERED IN OPENING
DUCT DEPTH 36" -> 72" = 2 DETECTORS LOCATED AT 1/4 POINTS OF THE OPENING
DUCT DEPTH > 72" = 1 DETECTOR FOR EACH FULL 24" OF OPENING

5 SMOKE DAMPER WIRING DIAGRAM
1/8" = 1'-0"



CLERMONT COUNTY FACILITIES PHASE 2
MANAGEMENT BUILDING

ISSUANCES/REVISIONS		
CONSTRUCTION DOCUMENTS	02/19/2008	
1 ADDENDUM #02	03/24/2008	

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:
22001.00	CDH	AEM

SHEET TITLE:
**ELECTRICAL
DETAILS**

SHEET NUMBER:
E1.3

ISSUANCES/REVISIONS	
CONSTRUCTION DOCUMENTS	02/19/2025
1 ADDENDUM #02	03/24/2025

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:
22001.00	CDH	AM

SHEET TITLE:
SYSTEMS PLAN

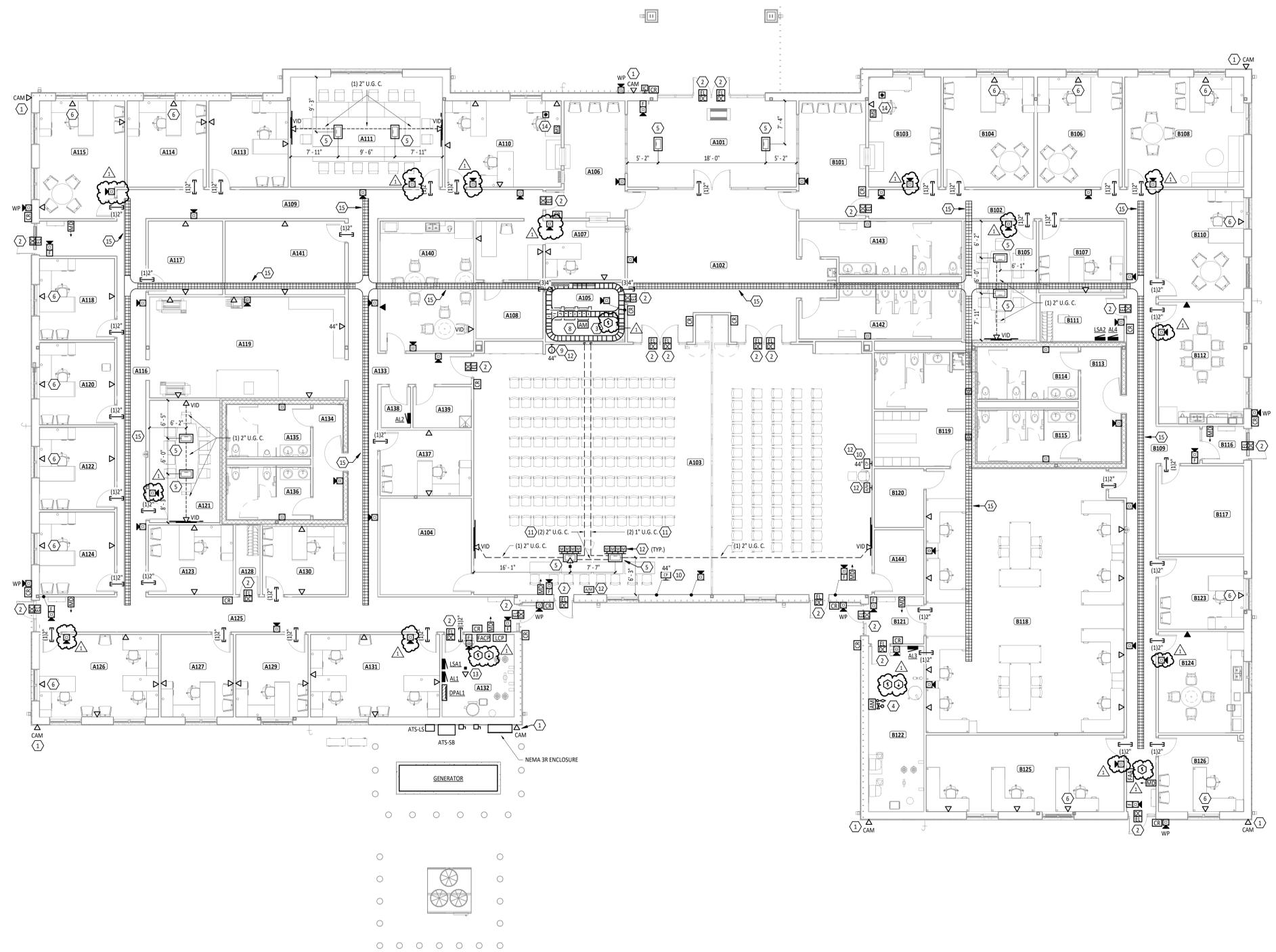
SHEET NUMBER:
E3.1

FIRST FLOOR PLAN ROOM INDEX

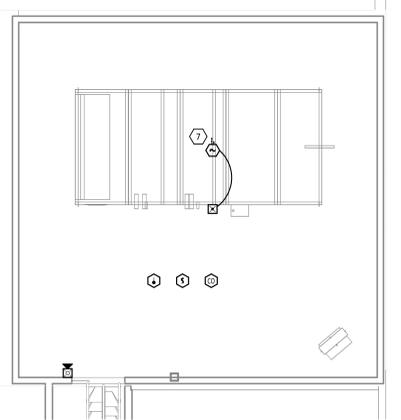
ROOM NUMBER	ROOM NAME	AREA
A101	VESTIBULE	412 SF
A102	LOBBY	741 SF
A103	MULTIPURPOSE	2,843 SF
A104	STORAGE	248 SF
A105	TECH ROOM	134 SF
A106	ICEED LOBBY	216 SF
A107	ADMIN	246 SF
A108	MAIL	107 SF
A109	CORRIDOR	349 SF
A110	TAX MAP	284 SF
A111	CONFERENCE	472 SF
A113	FISCAL	194 SF
A114	SENIOR ADMIN	194 SF
A115	COUNTY ENGINEER	275 SF
A116	CORRIDOR	385 SF
A117	OFFICE	155 SF
A118	GIS	173 SF
A119	PLOTTING	360 SF
A120	SENIOR ENGINEER	175 SF
A121	CONFERENCE	244 SF
A122	CONSTRUCTION ENGINEER	175 SF
A123	CAD	167 SF
A124	DEPUTY ENGINEER	175 SF
A125	CORRIDOR	471 SF
A126	SURVEY	278 SF
A127	BRIDGE INSPECTOR	168 SF
A128	STAIR	48 SF
A129	PERMITS	168 SF
A130	INTERIM OFFICE	161 SF
A131	INSPECTIONS	301 SF
A132	MECHANICAL	168 SF
A133	CORRIDOR	398 SF
A134	CORRIDOR	97 SF
A135	MENS RESTROOM	123 SF
A136	WOMENS RESTROOM	124 SF
A137	OFFICE	169 SF
A138	ELECTRICAL	34 SF
A139	CUSTODIAL	68 SF
A140	BREAK ROOM	343 SF
A141	FILES	249 SF
A142	WOMENS RESTROOM	231 SF
A143	MENS RESTROOM	225 SF
A144	STORAGE	90 SF
B101	FACILITIES LOBBY	233 SF
B102	CORRIDOR	236 SF
B103	ADMIN	225 SF
B104	ASSISTANT DIRECTOR	282 SF
B105	CONFERENCE	243 SF
B106	EXECUTIVE ASSISTANT	264 SF
B107	BADGE OFFICER	172 SF
B108	DIRECTOR	370 SF
B109	CORRIDOR	554 SF
B110	PROJECT MANAGER	265 SF
B111	STORAGE	110 SF
B112	EMPLOYEE KITCHEN	294 SF
B113	CORRIDOR	131 SF
B114	MENS RESTROOM	150 SF
B115	WOMENS RESTROOM	148 SF
B116	VESTIBULE	43 SF
B117	STORAGE	213 SF
B118	FIELD OFFICE	1,460 SF
B119	LOCKER ROOM	305 SF
B120	STORAGE	82 SF
B121	VESTIBULE	73 SF
B122	MECHANICAL	258 SF
B123	STP OFFICER	175 SF
B124	STP KITCHEN	244 SF
B125	HVAC TECHS	428 SF
B126	STD	183 SF
B201	MECHANICAL MEZZANINE	509 SF
B202	MECHANICAL MEZZANINE	412 SF

SYSTEMS GENERAL NOTES

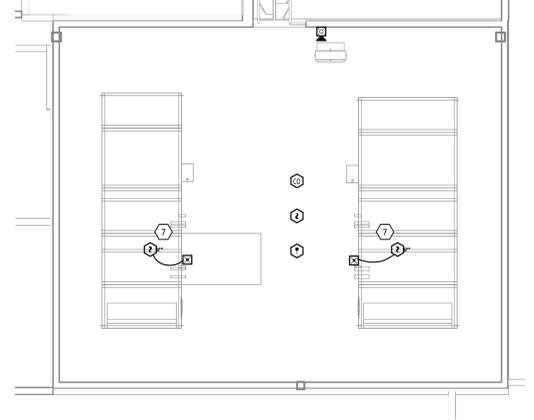
- A WHERE DEVICES ARE SHOWN UNDER CABINETS, CASEWORK, FURNITURE AND THE LIKE, REFER TO ARCHITECTURAL ELEVATIONS FOR EXACT PLACEMENT SO THAT DEVICES SHALL BE LOCATED WITHIN KNEE SPACE OR OPEN AREA.
- B ALL LOW VOLTAGE CABLING FOR THE SCOPE OF WORK BY DIVISION 26, 27, AND 28 IN EXPOSED CEILING SPACES SHALL BE ROUTED INSIDE CONDUIT. COORDINATE WITH INSTALLER OF EACH SYSTEM PRIOR TO ROUGH-IN. PAINT CONDUIT TO MATCH SURROUNDING AREA.
- C CONDUIT IN EXPOSED CEILING SPACES SHALL BE CONCEALED INSIDE WALLS. EXPOSED CONDUIT SHALL ONLY BE ALLOWED IN JOIST SPACE NEAR ROOF.
- D ALL CONDUIT ENDS FOR CABLING NOT CONNECTED TO A BOX OR FITTING SHALL BE PROVIDED WITH NYLON BUSHINGS TO PROTECT CABLING FROM DAMAGE.
- E ALL MOUNTING HEIGHTS REFER TO BOTTOM OF BOX, UNO.



1 SYSTEMS PLAN
1/8" = 1'-0"



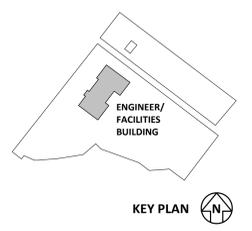
2 ENLARGED MECHANICAL MEZZANINE UNIT A SYSTEMS PLAN
1/4" = 1'-0"



3 ENLARGED MECHANICAL MEZZANINE UNIT B SYSTEMS PLAN
1/4" = 1'-0"

#	KEYNOTE DESCRIPTION
1	PROVIDE SINGLE GANG, FLUSH MOUNTED JUNCTION BOX ON EXTERIOR OF BUILDING WITH 1" CONDUIT STUBBED TO INSIDE. MOUNT THE BOX AND CABLE SLEEVE ABOVE THE CEILING FOR EXTERIOR CAMERA. PROVIDE PLASTIC BUSHING ON END OF CONDUIT AND WEATHERPROOF BLANK COVER FOR EXTERIOR BOX. REFERENCE TECHNOLOGY DRAWINGS FOR MORE DETAILS. COORDINATE WORK WITH TECHNOLOGY CONTRACTOR PRIOR TO ROUGH-IN.
2	DOOR PROVIDED WITH ELECTRIC STRIKE AND POWER PACK BY DOOR HARDWARE SUPPLIER. DIVISION 26 TO PROVIDE POWER TO POWER PACK ABOVE CEILING. BACK BOXES, RACEWAYS, BUSHINGS AND PULL STRINGS FOR CABLING FROM ABOVE CEILING/POWER PACK TO ELECTRIC STRIKE IN DOOR FRAME. CABLING BY SECURITY/ACCESS CONTROL CONTRACTOR. COORDINATE WORK WITH DOOR HARDWARE INSTALLER AND SECURITY/ACCESS CONTROL CONTRACTOR. REFERENCE ES SHEETS FOR 120V/120V POWER REQUIREMENTS.
3	PROVIDE NEW 12" W X 4" H LADDER TYPE CABLE TRAY. REFER TO SPECIFICATIONS.
4	TAMPER SWITCHES AND FLOW SWITCHES PROVIDED BY SPRINKLER CONTRACTOR. PROVIDE FIRE ALARM CONNECTIONS AS REQUIRED TO MONITOR VALVES AND SWITCHES. PROVIDE 120V CONNECTION TO SPRINKLER SYSTEM BELL THROUGH FLOW SWITCH. BELL PROVIDED BY SPRINKLER SYSTEM CONTRACTOR. REFERENCE WATER MAIN DETAIL ON SHEET FP-1. COORDINATE WITH DIVISION 23 PRIOR TO INSTALLATION.
5	PROVIDE CONDUIT FOR TECHNOLOGY CABLING TO FLOOR BOX. REFER TO POWER PLANS FOR ADDITIONAL REQUIREMENTS.
6	DEVICE LOCATED BELOW WINDOW. REFER TO DETAIL 1/E1.3.
7	PROVIDE AND INSTALL DUCT MOUNTED SMOKE DETECTOR(S) IN RETURN AIR OF MECHANICAL UNIT. COORDINATE LOCATION AND QUANTITY WITH DUCT SIZE. REFERENCE DETAIL 3/E1.3. PROVIDE A REMOTE STATUS INDICATOR ON SIDE OF AHU, APPROXIMATELY 44" A.F.F. COORDINATE WITH DIVISION 23.
8	PROVIDE A FIRE ALARM ADDRESSABLE MODULE FOR AUTO-MUTE OF THE MULTIPURPOSE SOUND SYSTEM. THE SOUND SYSTEM SHALL MUTE WHEN THE FIRE ALARM SYSTEM IS ACTIVATED. COORDINATE WITH THE SOUND SYSTEM INSTALLER.

#	KEYNOTE DESCRIPTION
9	PROVIDE A 3-GANG FLUSH MOUNT BOX FOR SOUND SYSTEM MEDIA OUTLET. PROVIDE A 1" CONDUIT WITH PULL STRING FROM BOX TO ABOVE ACCESSIBLE CEILING. PROVIDE BUSHINGS ON END OF CONDUIT. COORDINATE WORK WITH SOUND SYSTEM INSTALLER PRIOR TO ROUGH-IN.
10	PROVIDE BACK BOX FOR SOUND SYSTEM TOUCH SCREEN CONTROL PANEL. COORDINATE BOX AND RACEWAY REQUIREMENTS WITH SOUND SYSTEM INSTALLER.
11	PROVIDE TWO (2) 1" UNDERGROUND CONDUITS FROM FLOOR BOX FOR SOUND SYSTEM. STUBBED TO ABOVE ACCESSIBLE CEILING IN MAIN TECHNOLOGY ROOM. PROVIDE PULL STRING AND PLASTIC BUSHINGS ON EACH CONDUIT.
12	SOUND SYSTEM DEVICE. REFERENCE TC DRAWINGS.
13	DIVISION 26 SHALL PROVIDE RACEWAYS AND BACK BOXES FOR DATA CABLING TO TEMPERATURE CONTROL PANELS/BAS SYSTEM FOR HVAC SYSTEM. COORDINATE WITH DIVISION 27.
14	PUSH BUTTON(S) FOR DOOR RELEASE/PANIC LOCKDOWN. BUTTON AND CABLING BY OTHERS. DIVISION 26 TO PROVIDE RACEWAY AND BACKBOX TO ALLOW CABLING TO RUN IN CASEWORK. COORDINATE WORK WITH CASEWORK INSTALLER AND SECURITY/ACCESS CONTROL CONTRACTOR.
15	PROVIDE CABLE TRAY ABOVE CEILING. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.



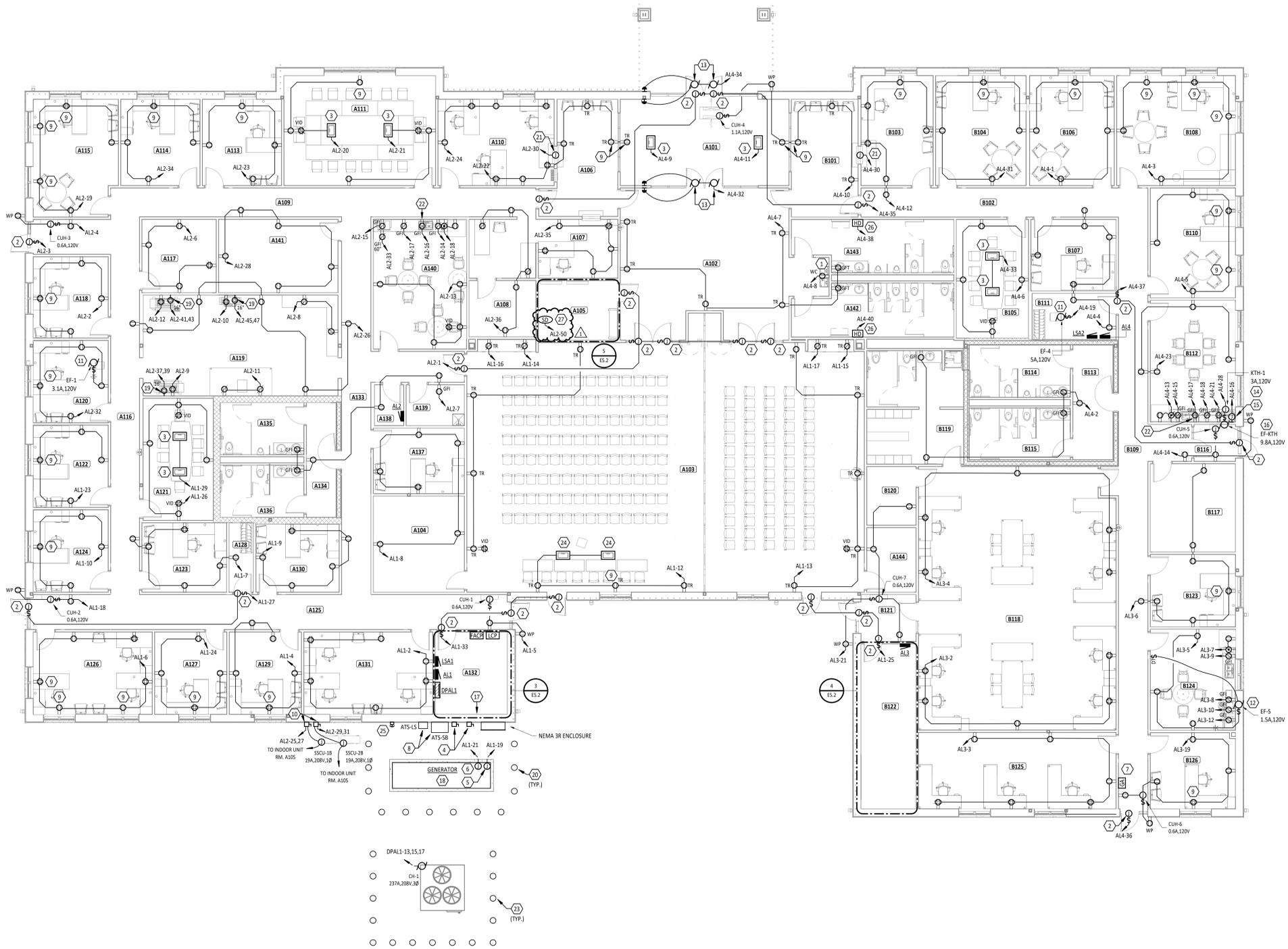
KEY PLAN

FIRST FLOOR PLAN ROOM INDEX

ROOM NUMBER	ROOM NAME	AREA
A101	VESTIBULE	412 SF
A102	LOBBY	741 SF
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A104	STORAGE	248 SF
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A119	PLOTTING	560 SF
A120	SENIOR ENGINEER	175 SF
A121	CONFERENCE	244 SF
A122	CONSTRUCTION ENGINEER	175 SF
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A127	BRIDGE INSPECTOR	168 SF
A128	STAIR	48 SF
A129	PERMITS	168 SF
A130	INTERIM OFFICE	161 SF
A131	INSPECTIONS	301 SF
A132	MECHANICAL	168 SF
A133	CORRIDOR	396 SF
A134	CORRIDOR	97 SF
A135	MENS RESTROOM	123 SF
A136	WOMENS RESTROOM	124 SF
A137	OFFICE	169 SF
A138	ELECTRICAL	34 SF
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B104	ASSISTANT DIRECTOR	282 SF
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B123	STP OFFICER	175 SF
B124	STP KITCHEN	244 SF
B125	HVAC TECHS	428 SF
B126	STO	163 SF
B201	MECHANICAL MEZZANINE	509 SF
B202	MECHANICAL MEZZANINE	412 SF

POWER GENERAL NOTES

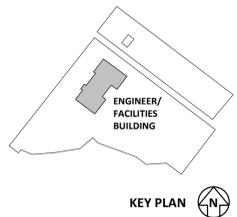
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- B CASEWORK INSTALLER SHALL CUT HOLES IN CASEWORK FOR RECEPTACLES, DEVICES, ETC., UNLESS NOTED OTHERWISE.
- C ALL CONDUCTORS FOR EQUIPMENT CONNECTIONS SHALL BE COPPER UNLESS NOTED OTHERWISE AND APPROVED BY THE MANUFACTURER.
- D COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ALL REQUIRED CLEARANCES ABOUT ELECTRICAL EQUIPMENT WITH ACCORDANCE TO THE NATIONAL ELECTRICAL CODE.
- E REFER TO MECHANICAL, PLUMBING, AND OTHER APPLICABLE DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
- F MAINTAIN ALL FIRE RATINGS WHERE CONDUIT PENETRATES WALL, CEILINGS, AND FLOORS WITH ONLY U.L. LISTED FIRE ASSEMBLIES.
- G ALL MOUNTING HEIGHTS REFER TO BOTTOM OF BOX, UNO.

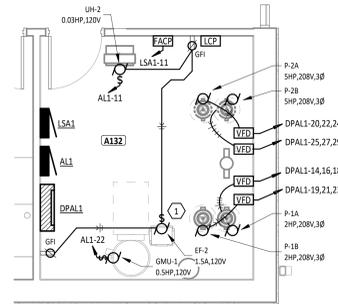
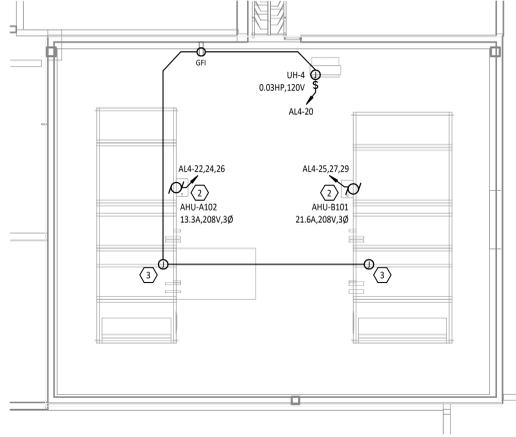
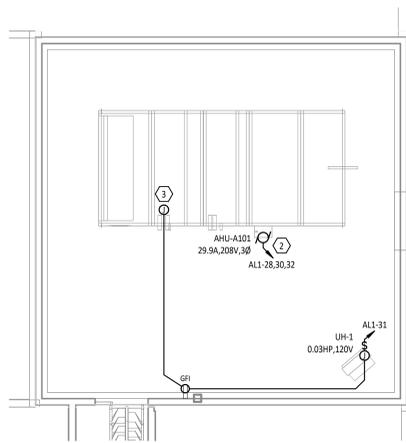


1 POWER PLAN
1/8" = 1'-0"

#	KEYNOTE DESCRIPTION
1	RECEPTACLE FOR WATER COOLER. COORDINATE EXACT MOUNTING LOCATION OF RECEPTACLE WITH PLUMBING CONTRACTOR. REFERENCE DETAIL 5/E1.2
2	PROVIDE POWER CONNECTION ABOVE CEILING FOR ELECTRIC STRIKE POWER PACK(S), TRANSFORMER(S) AND ACCESS CONTROL PANEL(S). REFER TO E3 SHEETS FOR EXACT QUANTITIES.
3	FLOOR BOX, 4-GANG CAPACITY WITH SATIN NICKEL LID, TWO DUPLEX RECEPTACLES, AND TECHNOLOGY OUTLETS AS INDICATED. BOX SHALL BE LEGRAND EVOLUTION SERIES FB30S OREG. PROVIDE THE PROPER COVER FOR THE ASSOCIATED ROOM FLOOR TYPE. COORDINATE WORK WITH CABLING CONTRACTOR.
4	LOCATION OF SERVICE ENTRANCE DISCONNECT(S). REFER TO ONE LINE DIAGRAM FOR ADDITIONAL INFORMATION.
5	PROVIDE CONNECTIONS TO GENERATOR BATTERY CHARGER.
6	PROVIDE CONNECTIONS TO GENERATOR BLOCK HEATER.
7	EMERGENCY/STANDBY GENERATOR ANNUNCIATOR. PROVIDE BACK BOX FOR FLUSH MOUNTING. PROVIDE CONDUIT AS REQUIRED BY MANUFACTURER.
8	PROVIDE HEATER BRANCH CIRCUIT INSIDE EXTERIOR TRANSFER SWITCH AND CIRCUIT FROM PANEL ALL. REFER TO SPECIFICATIONS.
9	DEVICE LOCATED BELOW WINDOW. REFER TO DETAIL 1/E1.3.
10	MINI SPLIT A/C UNIT FOR TECHNOLOGY ROOM. PROVIDE NECESSARY CONNECTIONS REQUIRED FOR UNIT. EXTEND POWER/CONTROL WIRING TO INDOOR UNIT AS REQUIRED. PROVIDE 30K, 208V, 1Ø, NON-FUSED, NEMA-3R DISCONNECT SWITCH. COORDINATE REQUIREMENTS WITH MECHANICAL CONTRACTOR.
11	EXHAUST FAN TO BE CONTROLLED VIA BAS CONTROL WIRING BY M.C.). PROVIDE ALL NECESSARY ELECTRICAL CONNECTIONS.
12	EXHAUST FAN CONTROLLED BY DIGITAL TIMER SWITCH. SWITCH BY DIVISION 26. PROVIDE ALL NECESSARY ELECTRICAL CONNECTIONS. COORDINATE WORK WITH DIVISION 23.
13	HANDICAP PUSHBUTTON DOOR OPERATOR FURNISHED BY OTHERS. E.C. TO PROVIDE ALL POWER CONNECTIONS TO MOTOR AND PUSHBUTTONS. COORDINATE WITH DOOR OPERATOR INSTALLER.
14	PROVIDE CONNECTION TO KITCHEN RANGE HOOD. COORDINATE CONTROL LOCATION AND REQUIREMENTS WITH HOOD INSTALLER.

#	KEYNOTE DESCRIPTION
15	PROVIDE HARDWIRED CONNECTION TO COUNTERTOP HOT PLATE. COORDINATE REQUIREMENTS WITH GC PRIOR TO ROUGH-IN.
16	KITCHEN HOOD EXHAUST FAN TO BE INTERLOCKED WITH KITCHEN HOOD 'KTH-1'. PROVIDE ALL NECESSARY ELECTRICAL CONNECTIONS. COORDINATE EXACT REQUIREMENTS WITH DIVISION 23.
17	COORDINATE INCOMING UTILITY FEED WITH UNDERGROUND PLUMBING IN THIS AREA.
18	EMERGENCY/STANDBY GENERATOR. REFER TO SPECIFICATIONS AND ONE-LINE DIAGRAM FOR ADDITIONAL INFORMATION. ELECTRICAL CONTRACTOR SHALL PROVIDE CONCRETE PAD AS RECOMMENDED BY GENERATOR MANUFACTURER. THE PAD SHALL BE AT A MINIMUM: SET ON FOOTERS EXTENDING BELOW THE FROST LINE, PAD 12" THICK, #4 REBAR CRISS-CROSSING AT 12" ON CENTER, PAD EXTENDED 4" BEYOND EDGES OF GENERATOR ENCLOSURE, 45 DEGREE CHAMFERED EDGES. TOP OF PAD SHALL BE 4" ABOVE FINISHED GRADE. ALL REQUIRED CONDUITS SHALL BE UNDERGROUND.
19	COORDINATE RECEPTACLE CONFIGURATION WITH OWNER PROVIDED EQUIPMENT.
20	PROVIDE PROTECTIVE BOLLARDS FOR GENERATOR NO LESS THAN 3" FROM FUEL TANK AND NO MORE THAN 4" ON CENTER. REFER TO DETAIL 2/E1.3.
21	PROVIDE 120V CONNECTION TO PASS THROUGH WINDOW MICROPHONE. COORDINATE REQUIREMENTS WITH WINDOW INSTALLER PRIOR TO ROUGH-IN.
22	PROVIDE RECEPTACLE UNDER SINK FOR DISHWASHER. PROVIDE DISHWASHER POWER CORD IF ONE IS NOT PROVIDED WITH THE UNIT. COORDINATE WORK WITH DISHWASHER INSTALLER.
23	PROTECTIVE BOLLARDS FOR CHILLER BY OTHERS. SHOWN FOR REFERENCE ONLY.
24	FLOOR BOX, 10-GANG CAPACITY WITH SATIN NICKEL LID, TWO DUPLEX RECEPTACLES, AND TECHNOLOGY OUTLETS AS INDICATED. BOX SHALL BE LEGRAND EVOLUTION SERIES FB30S OREG. PROVIDE THE PROPER COVER FOR THE ASSOCIATED ROOM FLOOR TYPE. COORDINATE WORK WITH CABLING CONTRACTOR.
25	EMERGENCY STOP FOR GENERATOR. REFER TO SPECIFICATIONS.
27	HANDICAP PUSHBUTTON DOOR OPERATOR FURNISHED BY OTHERS. E.C. TO PROVIDE ALL POWER CONNECTIONS TO MOTOR AND PUSHBUTTONS. COORDINATE WITH DOOR OPERATOR INSTALLER. PROVIDE 120V CONNECTION TO SMOKE DAMPER. COORDINATE LOCATION AND ELECTRICAL REQUIREMENTS WITH DIV. 23 PRIOR TO ROUGH-IN. REFER TO DETAIL 5/E1.3 FOR ADDITIONAL INFORMATION.

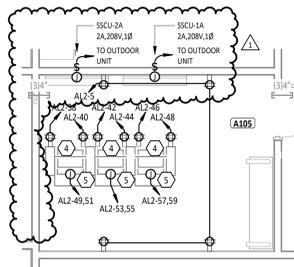
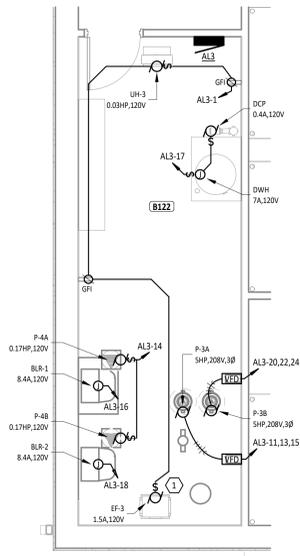




1
E5.2 ENLARGED MECHANICAL MEZZANINE UNIT A POWER PLAN
1/4" = 1'-0"

2
E5.2 ENLARGED MECHANICAL MEZZANINE UNIT B POWER PLAN
1/4" = 1'-0"

3
E5.2 ENLARGED MECHANICAL ROOM A132 POWER PLAN
1/4" = 1'-0"



4
E5.2 ENLARGED MECHANICAL ROOM B127 POWER PLAN
1/4" = 1'-0"

5
E5.2 ENLARGED TECH ROOM A105 POWER PLAN
1/4" = 1'-0"

POWER GENERAL NOTES

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- B CASEWORK INSTALLER SHALL CUT HOLES IN CASEWORK FOR RECEPTACLES, DEVICES, ETC., UNLESS NOTED OTHERWISE.
- C ALL CONDUCTORS FOR EQUIPMENT CONNECTIONS SHALL BE COPPER UNLESS NOTED OTHERWISE AND APPROVED BY THE MANUFACTURER.
- D COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ALL REQUIRED CLEARANCES ABOUT ELECTRICAL EQUIPMENT WITH ACCORDANCE TO THE NATIONAL ELECTRICAL CODE.
- E REFER TO MECHANICAL, PLUMBING, AND OTHER APPLICABLE DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
- F MAINTAIN ALL FIRE RATINGS WHERE CONDUIT PENETRATES WALL, CEILING, AND FLOORS WITH ONLY U.L.L. LISTED FIRE ASSEMBLIES.
- G ALL MOUNTING HEIGHTS REFER TO BOTTOM OF BOX, UNO.

#	KEYNOTE DESCRIPTION
1	EXHAUST FAN CONTROLLED BY REVERSE ACTING THERMOSTAT. THERMOSTAT FURNISHED BY DIVISION 23, WIRED AND INSTALLED BY DIVISION 26. PROVIDE ALL NECESSARY ELECTRICAL CONNECTIONS. COORDINATE WORK WITH DIVISION 23.
2	MECHANICAL UNIT HAS INTEGRATED DISCONNECT. PROVIDE ALL ELECTRICAL CONNECTIONS.
3	PROVIDE A 120V CONNECTION TO AIR HANDLER UNIT FOR RECEPTACLE AND LIGHTING CONNECTIONS. COORDINATE EXACT LOCATION ON UNIT AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
4	RACK MOUNTED RECEPTACLES. PROVIDE CIRCUIT AND EMT CONDUIT FROM ABOVE TECH RACK TO TOP OF RACK AND SECURE. COORDINATE EXACT LOCATION WITH TECHNOLOGY CONTRACTOR PRIOR TO ROUGH-IN.
5	PROVIDE ELECTRICAL CONNECTION TO TECHNOLOGY RACK UPS. VERIFY CONNECTION TYPE AND COORDINATE REQUIREMENTS WITH DIVISION 27.



**CLERMONT COUNTY FACILITIES PHASE 2
MANAGEMENT BUILDING**

NEW BUILDING OR

4011 BILMOR ROAD, BATAVIA, OH 45103

ISSUANCES/REVISIONS	
CONSTRUCTION DOCUMENTS	02/19/2025
1 ADDENDUM #02	03/24/2025

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:
22001.00	CDH	AEM

SHEET TITLE:
ENLARGED POWER PLANS

SHEET NUMBER:
E5.2

