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New Construction for:

Belmont College - Construction Trades Building

Addendum No. 04 – 21.162

January 17, 2025

This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto. The following clarifications, amendments, revisions, changes and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum. Each bidder shall acknowledge receipt of this Addendum in his bid proposal. Bidders shall be responsible for becoming familiar with every item of this Addendum.

General:

1. Pre bid meeting agenda and sign in sheet attached.

2. Question: Ref. Spec Sections 075253 and 133419, and Sheet 4.4.

   A. Snow guard components specified appear to refer to a through-fastener system for a membrane roof. Sheet 4.4 appears to indicate a rail-type snow guard. Because the specified roof system is a standing seam roof, our supplier recommends a fence-type system with brackets that clamp to the standing seam ribs. Please confirm the intent.

      Response: S-5 Colorgard snow guard system has been added as basis of design for snow guard. Please see revised 07 52 53.

   B. Are snow / ice flags, attached to the fence, required between the ribs? If so, what spacing is required with 24" rib spacing?

      Response: Snow / ice flags are not required.

   C. Will PE-stamped calculations be required for the snow guard system?

      Response: Yes.

3. Question: Ref. Spec Section 033500 – Liquid Densifier, and Sheets 9.1-9.2. Is this intended for use in conjunction with Polished Concrete, Floor Finish Code "SC1", or applied in other locations?

   Response: Liquid densifier will not be used in spaces with polished concrete finish. It will be used for spaces with sealed concrete SC1 finish.

4. Question: Ref. Sheet 9.1. Many rooms indicate no finish marks or only a floor finish. Is this correct?

   Response: Finish Tags for rooms 109, 113, 119, 120, 122 added. Please see revised Drawing 9.1.

5. Question: Ref. Sheet E30. It appears that information at line leaders has been covered / omitted. Please clarify missing information.

   Response: Text that was covered has been removed.

6. Question: Ref. Sheets E30 and C-105. There appears to be a conflict in primary electric service routes. Please confirm which is correct. If connection point is per Sheet E30, are conduits across Belmont College Way to be bored or open cut?

   Response: The location of the site electrical was established several months ago. It is the opinion of the civil engineer that the correct location of the electrical conduit should utilize the route as shown on C-105. Electrical site plan has been updated to reflect pathing shown on civil drawings.

7. Question: Ref. Sheet C-105. Please confirm that the Owner is paying all Utility Tap and Connection Fees. Please provide project contacts for gas company.

   Response: The Owner is responsible for the payment of all tap and connection fees. Contact information for all utility providers, is displayed on Civil Drawing C-001.

8. Question: Ref. Sheet T30. Please clarify scope of communications conduit connection at Health Sciences Building. Are there existing conduits or a pull box outside of the HSB that new conduits will terminate at? Is any work required within the HSB?

   Response: Drawing T30 has been updated through Addendum #4 to clarify the new conduit and contractor requirements.

9. Question: The spec section calls for triple glazed units with integral blinds. Are these in the project?

   Response: triple glazed units with integral blinds have been removed from spec. See 08 80 00.

10. Question: Ref. Document 001000 – Solicitation and Spec Section 012300 – Alternates.

    A. For Alternates #6 - #11, please confirm that the Base Bid is to include listed equipment purchased / furnished by the Contractor, and that the Alternates should therefore be deducts for the Owner to purchase / furnish the listed equipment.

       Response: Base bid is to include listed equipment purchased/furnished by the contractor, and that the Alternates #6-#11 should therefore be deducts.

    B. For Alternates #10 - #11, please clarify which BAS system is to be included in the Base Bid, and what the alternates should be

       Response: For alternate 10 and 11 refer to H72.1 and H72.2 Architecture system diagrams.

11. Question: Have plans been submitted to Belmont County Sanitary Sewer District or Cumberland Trail Fire District for review? They have very stringent requirements for connections / services.

Response: Plans for the sanitary lateral have not been submitted to the Sewer District. We had previously been told that no additional approvals were required. It is the responsibility of the contractor, per the approved plan documents, to coordinate all connections with utility providers.

12. Question: Please confirm that the Owner is paying costs associated with new water meters.

Response: The owner would be responsible for the cost of new water meters and associated appurtenances.

13. Question: Please clarify if the Water Service taps are to be provided by the Contractor or the Utility.

Response: It is the responsibility of the contractor, per the approved plan documents, to coordinate all connections with utility providers.

14. Question: Ref. Sheets C-105, FP11, and P11. Please clarify water service line size(s).

A. Details and notes show 3" CW Water line at building.

Response: The information previously provided to the civil engineer by the MEP professional, indicated a 3" CW service.

B. Fire hydrant shows typical 6" detail from main tee.

Response: It is anticipated that a reduced will be required for hydrant connection.

C. Sheet FP11 indicates 6" fire line.

Response: Yes

D. Sheet C-105 does not indicate any service line size, or details for service separation. Please provide.

Response: C-105 indicates that the service line to the building from the existing main, is to be 3" in diameter.

15. Question: Ref. Detail 4/C-505 – Solid Pipe Bedding. Please clarify the location to use this detail. Is it to be utilized at all storm water piping, or just at the Outlet Structure?

Response: All storm water piping.

16. Question: Ref. Detail 5/C-504. Detail references "City of Columbus Design Standards". Is this correct?

Response: The hydrant should follow the detail provided; however, the reference to the City of Columbus is not applicable.

17. Question: Ref. Spec Section 233000 revised / reissued in Addendum 3. Items, 2.6.D and 2.8.C appear to have selections that were not made. Please provide the applicable information.

    Response: Specification section has been revised. Refer to Addendum 4.

18. Question: Ref. Sheet H03 – Dust Collector Schedule. Remarks 1-13 are noted in the list of remarks, but only Remarks 1-11 are included in the actual schedule. Are Remarks 12-13 to be included with the equipment?

    Response: Schedule has been revised. Refer to Addendum 4.

19. Question: Ref. Sheet H11 – Plan Note 1. Please provide a detail for the Frost Proof Concrete Equipment Pad.

    Response: General Note has been added, all exterior concrete equipment pads shall be constructed to ASCE 32 or as indicated on the civil drawings.

20. Question: Ref. Sheets H11, E30, and C-102. On Sheet C-102, are the two pads at the southeast corner of the building designated as HD Concrete Pavement intended to be the Frost Proof Concrete Equipment Pads for ACH-1 and DC-1 indicated on Sheet H11, one of those pieces of equipment and the transformer pad shown on E30, or something different?

    Response: Drawing H11 indicated what equipment will be in which pad with regard to Div 23.

21. Question: Ref. Addendum 3 – General Item 12; Spec Section 323300-2.1; and Detail 12/Sheet C-501. Spec calls for removable bollards, Detail 12 indicates fixed bollards. Are any removable bollards required? If so, please identify locations.

    Response: This is a discrepancy. Fixed bollards are to be utilized in all locations other than the six (6) bollard locations at each of the two main building entrances. In which case, the fixed bollard detail will apply to non-entry/site bollards and the spec section referencing a specific removable bollard (or approved equal) shall apply to the six (6) main entrance bollard locations.

22. Question: Ref. Sheet 3.00 – "Building Pad Preparation" and "Pyritic Shale", and Geotechnical Report.

    A. Per the Geotechnical Report, because of the unknown pyritic content of soils throughout the site related to their suitability to be used as backfill, is an allowance being established to cover the cost of importing suitable inert fill material if required?

       Response: The owner is carrying contingency in the event poor soils are discovered and imported fill material is required.

23. Question: Ref. Detail J-3 / Sheet 8.3. Detail shows overhead door track and vinyl seal anchoring to the end of brick veneer units. We feel that the attachment should be to something more substantial. Please provide an alternate detail.

Response: Refer to the plan details. The section door can extend over and anchor into the CMU.

24. Question: Ref. Sheets 12.1 – 12.2. Please identify which Casework Elevations apply to which location.

Response: See sheets 4.5 ENLARGED FLOOR PLAN & 11.1 EQUIPMENT PLAN for casework elevation marker locations.

25. Question: Ref. Sheets 4.0 and 9.1. Does wall tile in restrooms go full height? Wall Types on 4.0 call for tile backer board to be installed full height, but 9.1 includes notes for paint. No restroom elevations were provided.

Response: Restroom wall tile is full height. Finish tags denote 4" WT1 base on all walls and marks which walls will have tile. Unmarked walls will be P01.

26. Question: Looking at the General Notes on 9.1 a little closer now, can you also look at Notes 1 and 2? They don't appear to be complete. Also, Note 5 refers to switch / wall plates matching wall paint. With the "non-white" wall colors being blue, switches, especially the low voltage lighting controls specified, are not available in blue. Please clarify that requirement.

Response: Note 1 refers to exterior hollow metal doors and Note 2 refers to interior hollow metal doors. Regarding note 5. We will select from available manufacturers colors at the time of submittals.

27. Question: Please confirm if the Liquidated Damages are $5,000 or $2,000 per day. The specs and contract state different values.

Response: Refer to the state contract for liquidated damages.

28. Question: Who pays for the utility tap fees? Water, Sanitary, Electric Gas & Telecomm?

Response: It is understood that the Owner is responsible for the payment of all tap and connection fees. Contact information for all utility providers, is displayed on Civil Drawing C-001. (Answer copied from #7)

29. Question: There is no piping detail for the buffer tank in the shilled water system. Please advise.

Response: Please refer to revised drawings.

30. Question: There is no piping detail for the VAV boxes. Please advise.

Response: Please refer to revised drawings.

31. Question: There is no piping detail for the chilled water and hydronic piping serving the air handler units. Please advise.

Response: Please refer to revised drawings.

32. Question: Please confirm that all excavation spoils, including material from the building pad undercut that is unsuitable for use as backfill, can be disposed of on site.

    Response: The college will make provisions to dispose on nearby college property.

33. Question: Ref. Sections / Details on Sheets 7.1 – 7.4. Can the use of fluid-applied weather barrier and rigid insulation in lieu of closed cell spray foam insulation be considered?

    Response: No

34. Question: Is the BAS for this project intended only for Siemens and Trane? These are proprietary systems that only Siemens Branch or Trane can access. We understand if this your intention, but wanted to confirm.

    Response: For alternate 10 and 11 refer to H72.1 and H72.2 Architecture system diagrams

35. Question: Running bond brick is called out in the spec and a header bond is shown graphically on the elevations. Can running bond be used throughout?

    Response: Yes

36. Question: Who will pay for permit and tap fees?

    Response: Owner.

37. Question: There are 15 lockers on Building Elevation 6.3, but they are not shown on the Layout A1.1. Are these 15 lockers new?

    Response: Lockers to be provided by owner and are shown for reference only.

38. Question: The specification index references Process Equipment Subgroup and lists Divisions 40-48 but are not referenced in the body of the specification document. Please advise if we are responsible for these spec sections or is this a typo in the index. Thank You.

    The Process Equipment Subgroup listed in the table of contents is not in the scope of this project.

<u>Specifications:</u>

1. Specification 00 10 00 – Solicitation:

    A. EDGE requirement removed

    B. Alternates #6-#11 shown as deducts.

2. Specification 01 12 26 – Project Phasing and Schedule

A. Milestone dates have been revised.

B. Liquidated Damages amounts removed. Refer to state contract for amounts.

3. Specification 07 52 53 – Snow Guards:

A. Carlisle removed from list of manufacturers. Provide S-5 Colorgard snow guards are new basis of design.

4. Specification 08 80 00 – Glazing:

A. Triple glazed units with integral blinds have been removed from spec.

5. Specification 23 30 00 – Air Distribution

A. Revised.

<u>Drawings:</u>

1. Drawing 3.10 – FOUNDATION PLAN

A. Clarified top of footing elevation at masonry storage, metals storage, water service, and electric.

2. Drawing 3.30 – FOUNDATION SECTIONS

A. Clarified top of footing elevation graphically in section 2.

3. Drawing 9.1 – FIRST FLOOR FINISH PLAN

A. Finish room tags added to room 109, 113, 119, 121, and 122.

B. WT1 finish markers in rooms 110 & 111 moved to clarify which walls receive tile.

4. Drawing E04 – Mechanical Equipment Schedule

A. Modified AHP-1 & AHP-2 breaker, wire and conduit sizes

5. Drawing E30 – Electrical Site Plan

A. Modified conduit pathing to match civil pathing

B. Modified background leaders and notes that were covered

6. Drawing E81 – Electrical Schedules

A. Modified panel schedules to reflect breaker sizes for AHP-1 and AHP-2

7. Drawing T30 – Technology Site Plan

A. Updated outside plant conduit plans to reflect owner requested changes.

B. Updated plan notes to reflect new conduit plans.

8. Drawing H01 – HVAC Legend and General Notes

A. Added general note

9. Drawing H03 – HVAC Schedules

A. Revised schedule

10. Drawing H11 – First Floor HVAC Plan

A. Revised

11. Drawing H62 – HVAC Details and Diagrams

A. Added details

12. Drawing H64 – HVAC Piping Diagrams

A. Added details

- - - END OF ADDENDUM NO. 04 - - -

Attachments:

Pre bid meeting agenda
Pre bid meeting sign in sheet
Specification 00 10 00 – Solicitation
Specification 01 12 26 – Project Phasing and Schedule
Specification 07 52 53 – Snow Guard
Specification 08 80 00 – Glazing
Specification 23 30 00 – Air distribution
Drawing 3-10 – Foundation Plan
Drawing 3-30 – Foundation Sections
Drawing 9.1 – First Floor Finish Plan
Drawing E04 – Mechanical Equipment Schedule
Drawing E30 – Electrical Site Plan

Drawing E81 – Electrical Schedules
Drawing T30 – Technology Site Plan
Drawing H01 – HVAC Legend and General Notes
Drawing H03 – HVAC Schedules
Drawing H11 – First Floor HVAC Plan
Drawing H62 – HVAC Details and Diagrams
Drawing H64 – HVAC Piping Diagrams

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Pre-Bid Meeting Agenda

Belmont College Construction Trades Building

EDA Award No: 06-01-06458
1.14.2025

1. Introductions

   A. Owner
      1. Belmont College – 68094 Hammond Road, St. Clairsville, OH 43950
         a. Dr. Paul F. Gasparro – College President
         b. Kristy M. Kosky – Chief of Staff and Executive Assistant to the President
         c. Edward Mowrer – Energy Institute – Manager
         d. Keith Kaczor – Director of Industrial Trades
         e. Derrick Smith – Assistant Professor, BPR

   B. Owner Representatives
      1. Ohio Facilities Construction Commission
         a. Chris Frommeyer – Project Manager
      2. Ohio Mid-Eastern Governments Association
         a. Evan Scurti – Economic Development Director

   C. Architect – SoL Harris/Day Architects
      1. Justin Gantz – Project Architect
      2. Karpinski Engineering – MEP Engineer
      3. Thorson Baker + Associates – Structural Engineer
      4. Wallace Pancher Group – Civil engineer, Landscape Architecture

   D. Fill out “Contacts” sheet
      1. Supply current and active e-mail address
      2. I will distribute the contact list this week
      3. As more contacts are relevant, I will add them to the list and re-distribute

2. Project Overview:

   A. The work consists of the new Belmont Construction Trades Building facility with an approximate building square footage of 20,000 sf and associated site and utilities work for Belmont College.
      1. Single prime contract

   B. SCHEDULE OF ALTERNATES
      1. **Alternate #1:** Build-out of Study Café & Comp Lab/Library
         a. Base Bid item: Build out space as provided in drawings with complete interior walls, finishes, and casework.
         b. Alternate item: Space to remain “white box” with simple finishes. All HVAC
      2. **Alternate #2**: Asphalt Parking Lot and Access Drive
         a. Base Bid item: Aggregate Paving (Access Road and Parking)
         b. Alternate item: Asphalt access road and parking with parking stall striping
      3. **Alternate #3:** Brick Paver College Logo
         a. Base Bid item: Conctete Slab.
         b. Alternate item: Two (2) Belmont College logo in brick pavers
      4. Alternate #4: Aluminum Curtain Wall Sunshade

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a. Base Bid Item: No sunshades on Frame Elevation F22.
b. Alternate item: Provide and install sunshade for Frame Elevation 22 as outlined in the drawings.

5. Alternate #5: Classroom – Casework
   a. Base Bid Item: Install wall finishes in lieu of casework shown.
   b. Alternate Item: Provide and install casework as identified on the drawings.
6. Alternate #6: Air Handling Unit-2
   a. AHU-2 purchased by owner and received and installed by the contractor. Provide individual line item for equipment cost. Refer to equipment schedule(s).
7. Alternate #7: Air Handling Unit-3
   a. AHU-3 purchased by owner and received and installed by the contractor. Provide individual line item for equipment cost. Refer to equipment schedule(s).
8. Alternate #8: Air Cooled Chiller 1
   a. ACH-1 purchased by owner and received and installed by the contractor. Provide individual line item for equipment cost. Refer to equipment schedule(s).
9. Alternate #9: Hybrid VRV System
   a. Hybrid VRF System purchased by owner and received and installed by the contractor. Provide individual line item for equipment cost. Refer to equipment schedule(s).
10. Alternate #10: Main BAS
    a. Main BAS (BOD: Siemens) equipment purchased by owner and received and installed by the contractor. Provide individual line item for equipment cost. Refer to Alternate BAS Architecture Diagram.
11. Alternate #11: Manufacturer specific BAS
    a. Manufacturer specific (BAS BOD: Trane) purchased by owner and received and installed by the contractor. Provide individual line item for equipment cost. Refer to Alternate BAS Architecture Diagram.

C. Estimated cost of construction

1. General Contract.....$6,674,297.00
   Alternate 1: Build-out of Study Café and Comp Lab ..($80,000.00)
   Alternate 2: Asphalt Parking Lot and Access Drive....$67,500.00
   Alternate 3: Brick Paver College Logo $20,000.00
   Alternate 4: Aluminum Curtain Wall Sunshade $20,000.00
   Alternate 5: Classroom Casework $50,000.00
   Alternate 6: Air Handling Unit – 2.....($213,000.00)
   Alternate 7: Air Handling Unit – 3.....($156,000.00)
   Alternate 8: Air Cooled Chiller – 1 .....($175,000.00)
   Alternate 9: Hybrid VRV System.....($175,000.00)
   Alternate 10: Main BAS (Siemens).....($180,000.00)
   Alternate 11: Manufacturer specified BAS (Trane) ....($180,000.00)

D. Electronic bids will be received until **January 30th, 2025**, at **11:00 a.m. via bid express**, when all Bids will be electronically opened. Bid tabulations will be posted no later than 5:00 p.m. on the day Bids are opened.

E. This project is tax-exempt.

3. Building Permits

A. State of Ohio Building Department – Submitted, awaiting approval

B. Permits paid for and obtained by the owner.

4. Site Access / Usage

   A. Additional site visits during bid will be permitted within College hours of operation.

   B. Work restrictions. Material Delivery/Refuse Removal
      1. Time Restrictions: Coordinate with Architect.
      2. Access Restrictions: Coordinate with Architect.

5. Clarifications/Questions/Substitutions

   A. All significant questions/clarifications/substitution requests shall be submitted to the architect's office via email no later than January 23rd by 5:00pm.

   B. Email – jgantz@solharrisday.com

   C. Any addenda will be issued via BidExpress.

6. Schedule:

   A. Contractor may, but is not required to, include alternative proposed construction schedule and or phasing plan in their bid.

   B. Milestone Dates:
      1. Bids Due: January 30th 2025
      2. Apparent low contractor will be given 10 days to provide required bid documents
      3. OFCC will have up to 60 days to execute contract
      4. Construction 1 year.

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Sign in Sheet
Pre-bid Meeting

Belmont College Construction Trades Building

EDA Award No: 06-01-06458 1.14.2025

1. Name Steve Miller Company Stanley Miller Const. Co.
   Phone 330.484.2229 Fax 330.484.4510 Email steve.miller@smillerconst.com
2. Name Dan Carpenter Company Cattrell Companies Inc
   Phone (304) 639-4885 Fax _____ Email dcarpenter@cattrell.com
3. Name BRIAN STEELE Company COLAIANNI CONST., INC.
   Phone 740-769-2362 Fax _____ Email BSTEELE@COLAIANNICONST.COM
4. Name JACK BOSTOU Company GRAE-CON CONSTRUCTION
   Phone 740-282-6830 Fax _____ Email JBOSTOU2@GRAECON.COM
5. Name John R. Dietz Company Grae-Con
   Phone 740-282-6826 Fax _____ Email jdietz@graecon.com
6. Name Walt Byron Company Border Patrol LLC.
   Phone 740-317-3353 Fax _____ Email Waterworksconstruction1@gmail.com
7. Name Jeff Lettieri Company Border Patrol LLC.
   Phone 240-457-9539 Fax _____ Email JLettieri@BorderPatrolConstruction.com

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Sign in Sheet
Pre-bid Meeting

Belmont College Construction Trades Building

EDA Award No: 06-01-06458 1.14.2025

8. Name Michael Larson-Edwards Company Higley Construction
Phone 412-778-7879 Fax Email mikelarsonedwards@amhigley.com

9. Name Rudy Höffert Company City Neon, USA LLC
Phone 304-599-1852 Fax Email rhoffert@cityneon.com

10. Name Todd Hebb Company Quality Steel Erecting
Phone 304-639-4456 Fax Email thebbqse@gmail.com

11. Name Andy Peklinsky Company JD+S
Phone 304-559-7814 Fax Email andyp@jde-inc.com

12. Name Lou Sinagoga Company Climatech
Phone 412-670-0619 Fax Email LSinagoga@Climatech.com

13. Name Jarrett Carlson Company Waller Corporation
Phone 724-223-9680 Fax Email info@wallercorporation.com

14. Name Ken Smyers Company Chesapeake Controls, Inc.
Phone 412-736-3417 Fax Email kensmyers@chesapeakecontrols.com

15. Name DANIEL COLLIE Company OHIO VALLEY TOP SHOP
740-525-9294 daniel.collie@topshopwv.com

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Sign in Sheet
Pre-bid Meeting

Belmont College Construction Trades Building

EDA Award No: 06-01-06458 1.14.2025

Phone_____ Fax_____ Email_____

16. Name Samantha Wozniak Company KCI technologies Inc
Phone 412-942-6213 Fax_____ Email Samantha.Wozniak@KCI.com

17. Name Anthony Falbo Company KCI technologies INC
Phone 724-561-4073 Fax_____ Email anthony.falbo@KCI.com

18. Name EVAN Scurti Company OMEGA
Phone 740-572-3093 Fax_____ Email escurti@omegadistrict.org

19. Name Ed Mowrer Company Belmont College
Phone 740-699-3860 Fax_____ Email emowrer@belmontcollege.edu

20. Name CHRIS Frommeyer Company OFCC
Phone_____ Fax_____ Email CHRIS.frommeyer@OFCC.OHIO.GOV

21. Name Charles Wolfe Company Ohio Valley Top Shop
Phone_____ Fax_____ Email charles.wolfe@topshopww.com

22. Name Jordan Fisher Company HE Neumann
Phone 304-639-9971 Fax_____ Email JFisher@HEneumann.com

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Sign in Sheet
Pre-bid Meeting

Belmont College Construction Trades Building

EDA Award No: 06-01-06458 1.14.2025

23. Name CJ Van Aelst Company Custom Controls Group
Phone 614-425-8694 Ex. 1007 Fax _____ Email CJV@CCGohio.com

24. Name Rob Miller Company Custom Controls Group
Phone 740-590-1130 Fax _____ Email robm@CCGOhio.com

25. Name Dan Lunger Company Mongiovi and Son Excavating
Phone 412-551-2881 Fax _____ Email dlunger@mongiovisandson.com

26. Name Kristy Kosky Company Belmont College
Phone 740-699-3037 Fax _____ Email KKOSKY@Belmontcollege.edu

27. Name Tom Schiffer Company United Electric of Wheeling
Phone 304-780-0533 Fax _____ Email tschiffer@unitedelectricwv.com

28. Name Keith Kaczor Company Belmont
Phone 304.312.9956 Fax _____ Email Kkaczor@belmontCollege.edu

29. Name _____ Company _____
Phone _____ Fax _____ Email _____

Document 00 10 00 - Solicitation (General Contracting / Electronic Bid)
State of Ohio Standard Requirements for Public Facility Construction

Electronic bids will be received by:

Ohio Facilities Constriction Commission

for the following Project:

Project
EDA Award No: 06-01-06458
Belmont College Construction Trades Building
Belmont College
Saint Clairsville, Belmont County

in accordance with the Contract Documents prepared by:

SoL Harris/Day Architecture
6677 Frank Ave NE
North Canton, Ohio 44720
(330) 493-3722
Justin Gantz
jgantz@solharrisday.com
www.solharrisday.com

In compliance with Section 153.08 of the Ohio Revised Code and Section 153:1-8-01 of the Ohio Administrative Code, Bids for this Project are being received, opened, and published through electronic means using the State's electronic bidding service.

To access this Project through the electronic bidding service, you must first register at https://bidexpress.com by clicking on the "REGISTER FOR FREE" button and following the instructions. In order to bid, you must create and enable a digital ID within the service. This process requires the submission of notarized paperwork and may take up to five business days to complete. There are no fees to register, create and enable a digital ID, or to download bid documents. There is a small expense on a monthly or per bid basis to submit a bid. The electronic bidding service offers customer support that may be reached at 888.352.2439 or via email at support@bidexpress.com.

Bidders may submit requests for consideration of a proposed Substitution for a specified product, equipment, or service to the Architect/Engineer ("A/E") no later than 10 days prior to the bid opening. Additional products, equipment, and services may be accepted as approved Substitutions only by written Addendum.

From time to time, the Commission issues new editions of the "State of Ohio Standard Requirements for Public Facility Construction" and may issue interim changes. Bidders must submit Bids that comply with the version of the Standard Requirements included in the Contract Documents.

Prevailing Wage rates and Equal Employment Opportunity requirements are applicable to this Project.

This Project is subject to the State of Ohio's Encouraging Diversity, Growth, and Equity ("EDGE") Business Development Program. A Bidder is required to submit with its Bid and with its Bidder's Qualifications form, certain information about the certified EDGE Business Enterprise(s) participating on the Project with the Bidder. Refer to **Section 6.1.10** of the **Instructions to Bidders**.

~~The EDGE Participation Goal for the Project is **5.0 percent**.~~

For more information about EDGE certification, contact the State of Ohio, Department of Development, Minority Business Division at www.minority.ohio.gov or email certifications@development.ohio.gov.

The Bidder may be subject to a Pre-Award Affirmative Action Compliance Review in accordance with Section 123:2-5-01 of the Ohio Administrative Code including a review of the Bidder's employment records and an on-site review.

The Bidder must indicate on the electronic Bid Form, the locations where its services will be performed in the spaces provided or by attachment in accordance with the requirements of Executive Order 2019-12D related to providing services only within the United States and the requirements of Executive Order 2022-02D prohibiting purchases from or investment in any Russian institution or company. Failure to do so may cause the Bid to be rejected as non-responsive.

DOMESTIC STEEL USE REQUIREMENTS AS SPECIFIED IN OHIO REVISED CODE SECTION 153.011 APPLY TO THIS PROJECT. COPIES OF OHIO REVISED CODE SECTION 153.011 CAN BE OBTAINED FROM ANY OF THE OFFICES OF THE OHIO FACILITIES CONSTRUCTION COMMISSION.

Bidders are encouraged to be enrolled in and to be in good standing in a Drug-Free Safety Program ("DFSP") approved by the Ohio Bureau of Workers' Compensation ("OBWC") prior to submitting a Bid and provide, on the Electronic Bid Form with its Bid, certain information relative to their enrollment in such a program; and, if awarded a Contract, shall comply with other DFSP criteria described in **Section 1.6** of the **General Conditions**.

Electronic bids will be received for:

Trade	Estimate
General Contract	$6,674,297.00
Alternate 1: Build-out of Study Café and Comp Lab	($80,000.00)
Alternate 2: Asphalt Parking Lot and Access Drive	$67,500.00
Alternate 3: Brick Paver College Logo	$20,000.00
Alternate 4: Aluminum Curtain Wall Sunshade	$20,000.00
Alternate 5: Classroom Casework	$50,000.00
Alternate 6: Air Handling Unit – 2	($213,000.00)
Alternate 7: Air Handling Unit – 3	($156,000.00)
Alternate 8: Air Cooled Chiller – 1	($175,000.00)
Alternate 9: Hybrid VRV System	($175,000.00)
Alternate 10: Main BAS (Siemens)	($180,000.00)
Alternate 11: Manufacturer specified BAS (Trane)	($180,000.00)

until **January 23rd, 2025**, at **11:00 a.m.**, when all Bids will be electronically opened. Bid tabulations will be posted no later than 5:00 p.m. on the day Bids are opened.

All Bidders are strongly encouraged to attend the Pre-Bid Meeting on **January 7th, 2024, at 11:00 a.m.,** at the following location: **Belmont College Health Sciences Building, 68131 Hammond Rd, Room 102, St Clairsville, OH 43950.**

The Contractor is responsible for scheduling the Project, coordinating the Subcontractors, and providing other services identified in the Contract Documents.

The Contract Documents are available for purchase from **AA Blueprint, 2757 Gilchrist Rd, Akron, OH 44305, (330) 794-8803.**

The Contract Documents may be downloaded as electronic PDF files from the State's electronic bidding service at https://bidexpress.com at no charge.

END OF DOCUMENT

SECTION 01 12 16

PROJECT PHASING AND SCHEDULE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the General Conditions, Supplementary Conditions, and the other Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SUMMARY

A. Work of this Contract is divided into One (1) phase.

1.3 PROJECT SCHEDULE

A. Milestone Dates:

1. ~~Construction Commencement: 02/10/2025~~
2. ~~Substantial Completion: 02/09/2026~~
3. Bids Due: January 30th 2025
4. Apparent low contractor will be given 10 days to provide required bid documents
5. OFCC will have up to 60 days to execute contract
6. Construction 1 year.

1.4 DATE FOR COMPLETION/LIQUIDATED DAMAGES

A. Date for Completion. The successful Bidder shall have its Work on the Project substantially completed (as Substantial Completion is defined in the Contract Documents) as identified in this section. By submitting its Bid, the Bidder agrees that the period for performing the Work is reasonable, and that the Bidder's Work can be completed by the Project Schedule.

B. Liquidated Damages. If the successful Bidder does not have its Work on the Project substantially complete by the Completion Dates for its portion of the work as established by the Project Schedule, the Owner shall be entitled to retain or recover from the successful Bidder, as Liquidated Damages, and not as a penalty in compliance with Ohio Revised Code Section 153.19, the amounts set forth in the table included in the Owner/Contractor Agreement for each and every calendar day beyond the Completion Dates per the Project Schedule, as such dates may be extended in accordance with the Contract Documents. The Owner's right to recover Liquidated Damages as defined in the Owner/Contractor Agreement shall not substitute for any right of recovery for additional costs incurred should the successful Bidder fail to complete the Contract according to the Contract Documents. Liquidated Damages are necessary in that it is impossible to precisely calculate the monetary loss to the Owner as the result of any delay in completion.
The Bidder acknowledges, by submitting its bid for the Work and entering into a Contract with the Owner, that such amounts of Liquidated Damages represent a reasonable estimate of the actual damages that the Owner would incur if the Work is not substantially completed

by the Project Schedule for the project. These Liquidated Damages are damages for loss of use of the Project, and the successful Bidder in addition to the Liquidated Damages described herein and in the Owner/Contractor Agreement will be obligated to indemnify and hold the Owner harmless from any claims, and, if the Work on the Project is accelerated because of a delay caused by the Contractor, for all costs related to the acceleration of the Work, as provided in the Contract Documents.

LIQUIDATED DAMAGES

Contract Amount	Dollars Per Day
~~$1.00 to $150,000.00~~	~~$250.00~~
~~$150,000.01 to $650,000.00~~	~~$500.00~~
~~$650,000.01 to $800,000.00~~	~~$750.00~~
~~$800,000.01 to $1,000,000.00~~	~~$1,000.00~~
~~$1,000,000.01 to $1,500,000.00~~	~~$1,500.00~~
~~$1,500,000.01 to $2,000,000.00~~	~~$2,000.00~~
~~$2,000,000.01 to $2,500,000.00~~	~~$2,500.00~~
~~$2,500,000.01 to $3,000,000.00~~	~~$3,000.00~~

Refer to state contract for actual amounts.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 07 52 53

SNOW GUARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.

B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.

C. Related Sections:
1. Section 01 74 19 – Construction Waste Management
2. Section 06 10 00 – Rough Carpentry
3. Section 07 54 19 – PVC Membrane Roofing

1.2 SUMMARY

A. System Description:
1. Section specifies snow guards that are compatible for the specified roof system.

1.3 BID REQUIREMENTS

A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.

B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.4 SUBMITTALS

A. In accordance with Section 01 33 00 – Submittal Procedures.

B. Product Data: Furnish product data sheets for review.

C. Shop Drawings: Submit manufacturer's specifications, standard detail drawings, and recommended layout and installation instructions.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Installer Qualifications: Installer to be experienced in the installation of specified roofing material and snow guards for not less than 5 years in the area of the project.

1.6 DELIVERY, STORAGE & HANDLING

A. Inspect material upon delivery and order replacements for any missing or defective items. Keep material dry, covered and off the ground until installed.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturers (*Specification is based on this manufacturer):
   1. *Alpine Snow Guards
      a. A division of Vermont Slate & Copper Services Inc., 289 Harrell St, Morrisville, VT 05661 (888) 766-4273.
   2. Zaleski
      a. 11 Alden Street New Britain Connecticut Post Office Box 700 New Britain Connecticut 06050, (860)-225-1614
   3. ~~Carlisle~~
   4. *S-5 ColorGard by Metal Roof Innovations, Ltd.
      a. 500 W Hwy St., Iowa Park, Texas 76367 (877)615-2973.

2.2 SYSTEM DESCRIPTION

A. COMPONENTS:
   1. Manufactured from 6061-T6 alloy and temper aluminum extrusions conforming to ASTM B221 and AA Aluminum Standards and Data or Cast Aluminum.
      a. Model: VersaBracket
   2. Fasteners
      a. To be of metal compatible with snow guards.
      b. Fasteners should be selected for compatibility with the roof deck.
      c. Fastener strength should exceed or be equal to that of the snow guard system (see test information).
   3. Sealant: to be membrane roof manufacturer approved when desired.
   4. Provide appropriate snow guard and fasteners for the roof system.
   5. Color Strips: Same material and finish as roof panels: obtained from roof panel manufacturer.
   6. Snow and ice Clips: Aluminum, with rubber foot, minimum 3" wide.

B. DESIGN REQUIREMENTS:
   1. Spacing for Snow Guards to be 16" o.c. and as noted on the Roof Plan.
   2. Provide fasteners at snow guard base plate per manufacturer recommendation.
   3. It is important to design new structures or assess existing structures to make sure that they can withstand retained snow loads.

2.3 MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so the minimum post-consumer recycled content plus one-half of pre-consumer recycled content is as follows:

1. Post-Consumer – 50%

B. Snow guard Block is extruded and milled 6061-T6 Aluminum

C. Base Plate: 11 gauge 304 Stainless Steel.

D. Fasteners connecting base plate to Snow guard Block are 304 Stainless Steel.

2.4 FINISH - All materials provided mill finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Substrate: Inspect roof system to be properly attached and installed to withstand additional loading incurred.

B. Notify General Contractor of any deficiencies before installing Alpine SnowGuards.

3.2 INSTALLATION

A. Comply with architectural drawings for location and with Manufacturer's instructions for installation.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.

B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.

C. Related Sections:
1. Section 01 74 19 – Construction Waste Management
2. Section 10 28 13 – Toilet Accessories (mirror units generally in restrooms)

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Doors; interior and exterior (less All-Glass Entrances).
2. Interior hollow metal frames.
3. Aluminum Windows
4. Curtain wall framing.
5. Storefront framing; interior and exterior.
6. Mirror glass.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thickness: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications or deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written

instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surface of glass.

F. Specific Hazardous Locations: The following shall be considered specific hazardous locations for purposes of glazing.
   1. Glazing in ingress and means of egress doors.
   2. Glazing adjacent to a door and within the same wall plane as the door whose nearest vertical edge is within 24 inches of the door in a closed position and whose bottom edge is less than 60 inches above the floor or walking surface, unless an intervening interior permanent wall is between the door and the glazing.
   3. Glazing in fixed panels having a glazed area in excess of 9 square feet with the lowest edge less than 18 inches above the finish floor level or walking surface within 36 inches of such glazing, unless a horizontal member not less than 1-1/2 inches in width is located between 24 inches and 36 inches above the walking surface.

1.4 BID REQUIREMENTS

A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.

B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.5 SUBMITTALS

A. In accordance with Section 01 33 00 – Submittal Procedures.

B. Product Data: Submit manufacturer's technical data for each glass type and glazing materials required, including installation and maintenance instructions.

C. Samples:
   1. 12-inch square, for each type of glass product indicated, other than monolithic clear float glass.
   2. 12-inch long samples of each color required for each type of sealant or gasket exposed to view.

D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Manufacturer's Certificates:
   1. Certificate on shading coefficient.
   2. Certificate on "R" value when value is specified.

F. Sample Warranty: Sample copy of manufacturer's warranty, as specified in this section.

G. Close-Out Document Submittals
   1. Warranty: Signed warranty.
   2. Operations & Maintenance Data: Operation & maintenance instructions. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance.

B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.

C. Source Limitations for Glass: Obtain the following through on source from a single manufacturer for each glass type: clear float glass, coated float glass, laminated glass and insulated glass.

D. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coating: Where solar-control low-E coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-E-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

E. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

F. Safety Glazing Products: Comply with testing requirements in Consumer Product Safety Commission CPSC 16 CFR 1201.
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Certification Council or another certification agency acceptable to authorities having jurisdiction.
   2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorties having jurisdiction.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual".
   2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."

3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Sloped Glazing Guidelines."
4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

H. Thermal Movement: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on materials' actual surfaces temperatures due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

I. Insulating-Glass Certification Program: Permanently marked on either spacers or on at least one component lite of units with appropriate certification label of the following testing and inspection agency:
1. Insulating Glass Certification Council.

1.7 DELIVERY, STORAGE & HANDLING

A. Deliver glass to site in suitable containers that will protect glass from the weather and from breakage. Carefully store material, as directed, in a safe place where breakage can be reduced to a minimum. Deliver sufficient glass to allow for normal breakage. Glazing compounds shall arrive at the project site in labeled containers which have not been opened.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Install liquid sealants at ambient and substrate temperatures above 40 degrees F.

1.9 PERFORMACE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacturer, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

B. Glass Design: Glass thicknesses as indicated are for detailing only. Confirm glass thicknesses by analyzing Project loads and in service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
a. Select glass thickness to withstand dead loads, winds loads and snow loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.
b. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
c. Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm.

C. Mirror Glass:

1. Safety Glazing Standard: Where safety glass mirrors are indicated or required by authorities having jurisdiction, provide types or products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

1.10 WARRANTY

A. See Section 01 77 00 – Closeout Procedures, for additional close out submittal information.

B. See Section 01 78 36 – Warranties, for additional warranty requirements.

C. General: 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 will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

D. Manufacturer's Warranty on Insulating Glass: Submit written warranty signed by manufacturer of insulating glass agreeing to furnish replacements for insulating glass units that deteriorate, f.o.b. point of manufacturer, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.
   1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

E. Manufacturer's Warranty on Laminated Glass: Submit written warranty signed by laminated glass manufacturer agreeing to furnish replacements for laminated glass units that deteriorate, f.o.b. point of manufacturer, freight allowed project site within specified warranty period indicated below. Warranty shall cover deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.
   1. Warranty Period: 5 years from date of Substantial Completion.

F. Manufacturer's Warranty on Coated Glass: Submit written warranty signed by coated glass manufacturer agreeing to furnish replacements for coated glass units that deteriorate, f.o.b. point of manufacturer, freight allowed project site within specified warranty period indicated below. Warranty shall cover deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Primary Glass; provide products from one of the following:
   1. Guardian Industries Corp.
   2. LOF / Pilkington
   3. PPG Industries, Inc.

4. AFG Industries, Inc.
5. Visteon Float Glass Operations

B. Laminated Glass: Provide laminated glass from one of the following:
1. Laminated Glass Corp.
2. Guardian Industries Corp.
3. Northwestern Industries, Inc.
4. AFG Industries, Inc.

C. Fabricators: Subject to compliance with requirements, provide glass from one of the following:
1. Guardian Industries Corp.
2. Interpane Glass Company
3. Pilkington
4. PPG Industries, Inc.
5. AFG Industries, Inc.
6. Viracon

2.2 GLASS PRODUCTS

A. Primary Glass Products:
1. Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.
2. Clear Float Glass: Type I (transparent flat glass), Class 1 (clear), Quality q3 (glazing select).

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass), Quality q3, of class, kind, and condition indicated.
1. Fabrication process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is required or indicated.

C. Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during initial manufacture, and complying with other requirements specified.

D. Laminated Glass Products:
1. General:
a. Laminated Glass Products: Comply with ASTM C 1172; Refer to primary and heat-treated glass requirements relating to glass products comprising laminated glass products.

b. Provide clear polyvinyl butyral (PVB) plasticized resin sheeting for laminating panes of glass showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, clear, unless otherwise indicated, one piece, no seams.
c. Use 0.060 inch thick PVB for Acoustical Glazing.
d. Laminating Process: Fabricate by laminating lites with interlayer in autoclave with heat plus pressure.

E. Mirror Glass:
1. Safety Glass Mirrors
a. Tapeback: Provide annealed float glass mirrors with manufacturer applied safety tape applied to the back surface and complying with FS DD-G-1403, ANSIZ97.1-1984 CPSC 16 CFR 1201 Category II.
2. Mirror Glass Production and Fabrication
a. Glass coating: coat second surface of glass, unless otherwise indicated, with glass coating system complying with FS DD-M-00411 requirements and consisting of successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard protective organic coating.
3. Mirror Sizes: After application of glass coating, cut mirror glass to sizes as shown on Drawings and in ¼ inch glass thickness.
4. Edges: Seal edges after treatment to prevent chemical or atmospheric penetration of backing. Preform edge treatment and sealing in factory immediately after cutting to final size.
5. Mastic: Mirro-Mastic, Palmer Products Corp., Louisville, Kentucky.

F. Interior Glazing:
1. Glass for Vestibule Doors, Sidelights, Interior Windows and Transoms: ¼ inch thick clear safety glass.

G. Low-E Insulating Glass:
1. Overall thickness: 1" insulated glass
2. Outboard Lite: 1/4" VE1-2M Low E #2 Surface Heat-Strengthened
3. Air Space: 1/2" with black silicone seal
4. Inboard Lite: 1/4" Clear Heat-Strengthened
~~5. See Drawings for Triple Pane Glazing Units: 1" insulated glass, integral blinds and 1/4" Clear Heat-Strengthened~~
6. Performance Requirements:
a. Visible Lite Transmittance: 70%
b. Solar Engery Transmittance: 33%
c. U-V Transmittance: 10%
d. Visible Light Reflectance Exterior: 11%
e. Visible Light Reflectance Interior: 12%
f. Solar Energy Reflectance: 31%
g. Winter Nightime U-Value: 0.29
h. Summer Daytime U-Value: 0.26
i. Shading Coefficient: 0.44
j. Solar Heat Gain Coefficient: 0.38

2.3 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements.
   1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: As recommended in writing by sealant and gasket manufacturers. Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrate. Refer to Division 7 – Section "Joint Sealants".

2.4 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 804.3 tape, where indicated.
   2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.5 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
   1. Neoprene, ASTM C 864.
   2. EPDM, ASTM C 864.
   3. Thermoplastic polyolefin rubber, ASTM C 1115.
   4. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
   1. Neoprene.
   2. EPDM.
   3. Thermoplastic polyolefin rubber.
   4. Any material indicated above.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Compressible Filler Rod: Shall be closed-cell or waterproof jacketed rodstock of synthetic rubber or plastic foam with proven compatibility with sealants used. Rod shall be flexible and resilient with 5-10 PSI compression strength for 25 percent deflection.

2.7 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine glass framing, with glazier present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
   2. Presence and functioning of weep system.
   3. Minimum required face or edge clearances.
   4. Effective sealing between joints of glass framing members.

3.2 PREPARATION FOR GLAZING

A. Clean the glazing channel or other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate. Remove lacquer from metal surfaces wherever elastomeric sealants are used.

B. Apply primer or sealer to joint surfaces wherever recommended by sealant manufacturer.

3.3 INSTALLATION

A. Watertight and airtight installation of each piece of glass is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure, including loss or breakage of glass, failure of sealants or gaskets to remain watertight and air tight, deterioration of glazing materials, and other defects in the Work.

B. Protect glass from edge damage at all times during handling, installation, and operation of the building.

C. Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance, and adequate sealant thicknesses with reasonable tolerances. The glazier is responsible for correct glass size for each opening within the tolerances and necessary dimensions established.

D. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing and their technical representatives except where more stringent requirements are shown or specified.

E. Comply with "Glazing Manual" by Flat Glass Marketing Association and the manufacturers of the glass and glazing materials except as shown and specified otherwise.

F. Inspect each piece of glass immediately before installation and eliminate those which have observable edge damage or face imperfections.

G. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw, and bow oriented in the same direction as other pieces.

3.4 GLAZING

A. Install setting blocks of proper size at quarter points of sill rabbet. Set blocks in thin course of the heel bead compound.

B. Provide spacers insides and out and of proper size and spacing for glass sizes larger than 50 united inches, except where gaskets are used for glazing. Provides 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width; except with sealant tape, use thickness slightly less than final compressed thickness of tape.

C. Voids and Filler Rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in the channel at the heel of jambs and head (do not leave voids in the sill channels) except as otherwise indicated, depending on light size, thickness and type of glass, and complying with manufacturer's recommendations.

D. Do not attempt to cut, seam, nip, or abrade glass which is tempered, heat strengthened or coated.

E. Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

F. Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from the glass. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.

G. Clean and trim excess glazing materials from the glass and stops or frames promptly after installation and eliminate stains and discoloration.

H. Where wedge shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs or by proven adhesives including embedment of gasket tail in cured heel bead.

3.5 MIRROR INSTALLATION

A. Mirrors shall be butt mounted to unpainted wall with Mastic and mechanically fastened to comply with manufacturer's recommendations.

3.6 CURE, PROTECTION, AND CLEANING

A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability.

B. Protect exterior glass from breakage immediately upon installation by attachment of crossed streamers to framing held away from glass. Do not apply markers to surfaces of glass.

C. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during the construction period including natural causes, accidents, and vandalism.

D. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other work.

E. Wash and polish glass on both faces not more than 4 days prior to Owner's acceptance of the work in each area. Comply with glass manufacturer's recommendations.

3.7 GLASS SCHEDULE

A. Exterior - Curtain Wall & "FG' Aluminum Doors:
   1. Solarscreen Radiant Low-E Insulating Glass:
   2. Insulating Spandrel Glass:

B. Interior:
   1. Glass for Vestibule Doors, Sidelights, and Transoms: ¼ inch thick clear safety glass.
   2. Glass for Interior Aluminum Storefront: ¼ inch clear safety glass.
   3. Glass for Interior Fire-Rated Frame Assemblies rated 60 minutes or more: See Section 08 81 01 – Fire-Rated Glass and Framing.
   4. Glass for Interior Non-Fire Rated Doors and Windows: ¼ inch clear safety glass.
   5. Large Mirrors: Where indicated.

6. Interior 1/4 inch thick Spandrel Glass: Where indicated. Custom color as selected by A/E.

END OF SECTION

SECTION 233000 - AIR DISTRIBUTION

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Ductwork

B. Inserts, Hanger and Supports

C. Flexible Duct

D. Flexible Duct Connections

E. Ductwork Access Doors

F. Dampers and Deflectors

G. Grilles and Diffusers

H. Louvers

I. Cleaning of Air Conveyance System

1.2 QUALITY ASSURANCE

A. Air Distribution System Cleanliness

1. The air distribution system shall be free of construction debris. New ductwork installation shall comply with this Specification and SMACNA Duct Cleanliness for New Construction Guidelines - Intermediate Duct Cleanliness Level.

a. Protect ductwork and air distribution equipment stored on site and during delivery, from construction dust and debris and from moisture such as rainwater and building system leaks. Ductwork stored on the project site shall be stored off the ground, on wood pallets or blocks and covered with plastic or tarps to prevent from becoming covered with construction dust or debris prior to installation.

b. The internal surfaces of ductwork and air distribution equipment shall be wiped to remove dust, immediately prior to installation.

c. Installed ductwork and air distribution equipment shall be protected prior to air distribution system operation. All open ends of ductwork or openings to equipment shall be covered/sealed to prevent entry of dust and debris. This includes both completed systems and overnight work in progress.

d. Protect ductwork and air distribution equipment with methods meeting the following minimum standards.

1) Ductwork openings for ductwork installed or stored on site

a) Plastic adhesive film: colored for easy identification on the project site. Thickness: minimum 2.5 mils. Tensile strength: minimum 11 pounds per inch.
b) Protective cover bag: colored for easy identification on the project site. Polypropylene plastic. Thickness: .002 mil. Elastic end band.

2) Air distribution equipment openings

a) Plastic coverings as described for ductwork.
b) Plywood or sheet metal with protective tape around edges.
c) Plastic shrink wrap.

3) Plastic garbage bags, grocery bags, scrap plastic sheeting, are not acceptable for use in protection of air distribution systems.

e. Remove all ductwork and air distribution equipment protection prior to equipment start up, testing, and balancing. Dispose of removed materials properly and remove from site.

2. If air distribution system is to be used during construction, comply with the following requirements:

a. Cover all outdoor air and return air openings to duct system with temporary construction filters. Filters shall be a minimum of MERV 8. Replace filters when dirty. At completion of construction, filters shall be removed.
b. In addition to filters specified on outdoor air and return air duct openings, provide specified pre-filters and final filters in air handling equipment. Replace periodically when dirty. Do not operate air handling equipment without specified pre-filters and final filters installed.
c. After construction is complete and before project turnover, provide new (clean) pre-filters and (clean) final filters in air handling units.

3. If ductwork and/or air distribution equipment become dirty or contaminated with construction dust, dirt, or debris, during delivery or installation, while stored or installed on site, or being operated during construction, equipment and/or ductwork shall be cleaned.

a. Cleaning to include air handling units, fans, ductwork, terminal units, coils, dampers, louvers, grilles and diffusers.

b. Contractor shall be a member of the National Air Duct Cleaners Association (NADCA) and certified by NADCA to perform Air Conveyance System (ACS) cleaning.
c. The standard of cleanliness shall be consistent with NADCA Standard ARC - 2013: Assessment, Cleaning and Restoration of HVAC Systems.
d. Interior of the entire air distribution system shall be cleaned using direct contact vacuum methods. Provide access openings at intervals that will enable the cleaning technician to maintain close contact with the surfaces being cleaned. Remote type vacuuming, air washing or cleaning methods utilizing hoses longer than can be visually observed from the point of insertion are not acceptable.
e. All access openings shall be closed with prefabricated sheet metal cover plates, fastened with sheet metal screws and caulked to prevent air leakage. Access openings cut into round ductwork shall be closed with Ductmate brand round access doors to ensure proper air tight enclosure. Any rigid or blanket type insulation removed to allow for installation of duct access openings shall be re-installed and seams covered and secured to eliminate any heat or cooling loss.

B. Duct Leakage Testing

1. The HVAC Contractor shall be responsible for sealing all ductwork and performing duct leakage testing in accordance with procedures described in Chapter 23 of AABC's National Standards, Sixth Edition, 2002. Allowable leakage shall not exceed 2% of design airflow in duct section being tested. Test pressure shall be equal to duct construction pressure. The following systems shall be tested:

   a. Supply ductwork upstream of VAV terminal units
   b. Exhaust ductwork
   c. Return ductwork
   d. Smoke exhaust ductwork
   e. Stair pressurization ductwork
   f. Ductwork installed outdoors

2. All duct leakage testing shall be witnessed, and results verified by a certified AABC or NEBB test agency. Copies of the final results, as witnessed by the test agency, shall be included in the Operating and Maintenance Manual.
3. If any portion of the ductwork system fails the duct leakage test, the HVAC Contractor shall be responsible for correcting all deficiencies and providing additional testing until leakage is within acceptable limits.

1.3 SUBMITTALS

A. Refer to Section 230100 and 23 01 01 for additional information.

B. Submit product data for all manufactured items listed in paragraph 1.1 WORK INCLUDES.

C. Prior to start of work submit [full size hard copies and] electronic ductwork fabrication drawings in AutoCAD format indicating duct layout, fittings, gauges, sizes, welds, reinforcing, elevations and configuration.

1.4 CONSTRUCTION DOCUMENTATION

A. Refer to Section 230101.

B. Submit ductwork pressure test documentation upon completion of testing. Include final copies in the Operating and Maintenance Manuals.

PART 2 - PRODUCTS

2.1 DUCTWORK

A. General Ductwork

1. Ductwork and plenum chambers shall be constructed to the gauge (26 minimum) and corresponding reinforcing schedule as indicated in the latest edition of SMACNA Standards.
2. Ductwork shall have a minimum thickness of 26 gauge for code compliance as a fully ducted system. Deviation from this requirement may prompt the need for additional fire dampers.
3. All ductwork shall be constructed of galvanized steel except where indicated to be of another material. Exposed ductwork in Architecturally finished spaces shall be fabricated G90 galvanized steel and thoroughly cleaned prior to painting.

B. Ductwork with a static pressure above 2-inches.

1. Round Ductwork

a. Galvanized steel spiral conduit, lock seam construction.

1) Fittings, welded steel construction for tight slip fit with spiral. Provide connections from mains to branches or to flexible ducts with conical tee take-off.
2) All spiral ducts and fittings shall be as manufactured by United Sheet Metal Co., Semco or Lindab.

2. Rectangular Ductwork

a. Construct of galvanized steel of the U.S. standard gauge indicated in the latest edition of SMACNA Standards.

C. Special Service Ductwork

1. Hood exhaust: 18 gauge (minimum) type 304 stainless steel with welded joints.
2. Dust collection exhaust: Galvanized G90 steel spiral pipe fabricated from 5.394" slit coil with 4-ply lock seam. Grooved seam material must be formed on the exterior of the duct, creating a smooth inside surface.

    a. Connections shall be made with angle rings welded to the spiral duct. Angle rings shall have prepunched holes for bolt connection and fabricated from the same material as the duct. Connection shall be bolted together with neoprene gasket between the connection angle rings.
    b. Fittings shall consist of the same duct constuction and angle rings. and consist of sweep elbows, reducers, and full body takeoff wyes. Duct tees and short radius elbows are not allowed. Final tap off of main shall be full body takeoff with end cap.
    c. Duct access doors shall be heavy-duty sandwich type with bolt fasteners.
    d. Duct system shall be capable of negative 20 in wg of pressure.

D. Air Duct Sealants

1. Air duct sealants shall conform to NFPA 90A, ASTM E84, ASTM E96, UL181A, and UL181B.
2. Acceptable manufacturers: Ductmate Industries, Inc. "Proseal" or "Fiberseal", RCD Corp. Provide all products in this section from a single manufacturer.
3. Air duct sealant: Ductmate Industries, Inc. "Proseal", water-based, 66% solids content, 11 lbs. per gallon, non-flammable, synthetic latex emulsion for permanently sealing fabricated joints and seams of sheet metal air ducts, UL 181 listed rigid fiberglass air ducts, UL181 listed flexible air ducts and thermal insulation; for repairing damaged and leaking air duct.
4. Air duct sealant where fiberglass reinforcement is required. Ductmate Industries, Inc. "Fiberseal", water-based, 66% solids content, 11 lbs. per gallon, non-flammable, synthetic latex emulsion with polypropylene fiber reinforcement for permanently sealing fabricated joints and seams of sheet metal air ducts, UL181 listed rigid fiberglass air ducts, UL181 listed flexible air ducts and thermal insulation; for repairing damaged and leaking air ducts.
5. Sealant application temperature: 35 degrees F to 110 degrees F; Sealant service temperature: -25 degrees F to 175 degrees F; Storage temperature: 40 degrees F to 85 degrees F.
6. VOC content of air duct sealants shall not exceed 10 grams per liter.

E. Acoustic Duct Lining

1. Where indicated, for ductwork located inside building line ductwork with 1-1/2 inch thick Owens-Corning QuietR Acoustic Duct Liner (R-Value = 6.3). Coating shall be UL rated for flame spread less than 25 and smoke developed less than 50. Lining to be installed with stick-klips and adhesive per manufacturer's instructions.
2. Where indicated, for supply and return air ductwork located in unheated areas or ventilated attics, line ductwork as specified above except lining shall be 2 inch thick (R-Value = 8.0).
3. Where indicated, for supply and return ductwork located outdoors, line ductwork as specified above except lining shall be 1 inch thick (R-Value = 4.2). In addition, provide insulation on the exterior of the duct. Refer to the Ductwork Insulation Schedule for additional information.
4. Equivalent Manufacturers: Knauf, Certain Teed, and Johns Manville.

2.2 INSERTS, HANGERS AND SUPPORTS

A. Manufacturer: Basis of design shall be Anvil. Other acceptable manufacturers include Mason, Modern or Erico/Caddy.

B. Provide all inserts, hangers, anchors, guides and supports to properly support and retain ductwork and prevent sway and vibration.

C. Provide inserts for support of work in concrete construction.

D. Provide forged steel beam clamps when attaching to steel construction.

E. Provide supplementary steel angles, channels, and plates where supports are required between building structural members, span the space and attach to building structural members by welding, bolting or anchors.

F. Provide hangers, threaded rods, anchors, and all other miscellaneous specialties for the attachment of hangers and supports to structure.

1. For up to 3/4 inch diameter rod: Anvil Figure 92, 93, or 94 beam clamps.
2. For 7/8 inch and 1 inch diameter rod: Anvil Figure 134 beam clamp with Anvil Figure 290 eyenut.
3. Pressed steel beam clamps are not permitted.

G. Provide rods, angles, rails, struts, brace plates, and platforms required for suspension or support of ductwork.

H. Do not support ductwork from another pipe or ductwork. Do not support ductwork from conduit. Do not support ceiling framing or lighting from ductwork. Do not support any item from metal roof deck.

I. Support ductwork with 16 gage galvanized steel strap hangers, steel rods or steel trapeze hangers per SMACNA Standards. Maximum spacing 8'-0".

J. Where fireproofing is removed or damaged to allow attachment to building structural members, repair to maintain integrity of fireproofing.

2.3 FLEXIBLE DUCT

A. Type 1 - Insulated

1. Tested and classified by Underwriters Laboratories, Inc. as Class 1 Air Duct and labeled in accordance with Underwriters Laboratories, Inc. Standard for Air Ducts, UL 181. The flame spread rating shall be 25 or less and the smoke developed rating shall not exceed 50.
2. Flexible ductwork shall be rated for low or high pressure with a vapor transmittance of 0.05 perm per ASTM E96, Procedure A. Minimum positive pressure rating shall be 6" w.g. for sizes up to 12", and 4" w.g for size 14" and above. Minimum negative pressure rating shall be ¾" w.g for sizes up to 12", and ½" w.g for sizes 14" and above. Minimum rated air velocity of 5000 feet per minute.
3. Inner core construction shall be double or triple laminated, polyester, or Chlorinated polyethylene (CPE) that is permanently bonded to or encapsulating a steel wire helix. Outer jacket shall be made of fiberglass scrim reinforced metalized polyester.
4. Fiberglass insulation sleeve shall have minimum thermal resistance value of R-4.2. Flexible duct shall be manufactured with the following information printed on the exterior jacket: name of manufacturer, thermal resistance R-value at the specified thickness, flame spread and smoke development of the composite material.
5. Product shall carry a minimum 5 year limited warranty.
6. Manufacturer: Atco UPC #030, Flexmaster Type 5M, or Thermaflex Type M-KE.

B. Type 2 - Non-Insulated

1. Tested and classified by Underwriters Laboratories, Inc. as Class 1 Air Connector and labeled in accordance with Underwriters Laboratories, Inc. Standard for Air Ducts, UL 181. The flame spread rating shall be 25 or less and the smoke developed rating shall not exceed 50.
2. Flexible ductwork shall be rated for low or high pressure with a minimum positive pressure rating of 6" w.g. for all diameters. Minimum negative pressure rating shall be ¾" w.g for all diameters. Minimum rated air velocity of 5000 feet per minute.
3. Construction shall be double or triple laminated, metalized polyester that is permanently bonded to or encapsulating a steel wire helix.
4. Product shall carry a minimum 5 year limited warranty.
5. Manufacturer: Atco UPC #050, Flexmaster Type 5NI, or Thermaflex Type S-LD.

C. Type 3 - Non-Insulated

1. Tested and classified by Underwriters Laboratories, Inc. as Class 1 Air Connector or Class 0 Air Duct and labeled in accordance with Underwriters Laboratories, Inc. Standard for Air Ducts, UL 181. The flame spread rating shall be 25 or less and the smoke developed rating shall not exceed 50.
2. Flexible ductwork shall be rated for low or high pressure with a minimum positive pressure rating of 6" w.g. and negative pressure rating of 4" w.g. for all diameters. Minimum rated air velocity of 4000 feet per minute.
3. Construction shall be heavy gauge corrugated aluminum with water tight continuous lock seams.
4. Product shall carry a minimum 5 year limited warranty.
5. Manufacturer: Atco UPC #017, Cleveflex Type S, or Flexmaster Type NI-TL.

2.4 FLEXIBLE DUCT CONNECTIONS

A. Provide flexible connections with 1 inch slack between ducts and fans where indicated. Flexible material shall be Duro Dyne Metal Fab with "Grip Loc" metal to fabric seam.

B. Flexible fabric shall be UL classified black neoprene coated woven fiberglass (weight 30 oz/sq.yd.)

2.5 DUCTWORK ACCESS DOORS

A. Ductwork access doors shall be double wall with 1 inch thick insulation, latches, hinges and felt gaskets Cesco-Advanced Air model HADF-10, Ventlock, Duro Dyne or Ruskin.

B. Access door material and pressure classification shall match ductwork in which it is installed.

C. Main door hardware shall include three hinges with latches operable from either side, and all other access doors shall include two hinges and latches. Open doors outward on suction side, inward on pressure side. Doors shall be double wall construction with minimum 6 pound density fiberglass insulation.

2.6 DAMPERS AND DEFLECTORS

A. Furnish and install all manual dampers, and deflectors where indicated or where necessary to properly distribute and balance air. Provide damper in each supply duct leaving duct main and in each branch serving individual supply, return and exhaust outlets and where otherwise indicated.

B. Dampers shall be fabricated with blades no larger than 8 inches wide by 48 inches long. Dampers over 48 inches in length shall have intermediate support and bearings.

C. Provide all manual dampers with Young Regulator Company, Ventlock or Duro Dyne operators. Use Young Regulator No. 443-B operators for balancing dampers. Opposite end of damper rod shall have Young Regulator No. 670 or 656 bearing set.

D. Where dampers are concealed above inaccessible ceilings or behind walls provide access doors.

E. Install additional dampers where required by the Air Balance Contractor to properly adjust the system air volumes.

2.7 GRILLES AND DIFFUSERS

A. See Drawings for all grille, diffuser and accessory specifications, locations and air quantity.

B. In general, Titus grilles and diffusers are specified, equals as manufactured by Anemostat, Krueger, E. H. Price Company, Tuttle and Bailey or Nailor-Hart are acceptable.

C. All grilles, registers and diffusers shall have a factory applied white finish unless noted otherwise.

D. Refer to Architectural Drawings for exact location of ceiling diffusers.

2.8 LOUVERS

A. Louvers shall be provided by the HVAC Contractor.

B. Louvers: 6 inch deep, stormproof, extruded aluminum, with 1/2 inch square mesh aluminum screen on interior face. Water penetration: 0.01 ounces of water per square foot of free area at a velocity of 875 FPM according to AMCA test. AMCA certified ratings for both water penetration and air performance.

C. Finish: Provide with the following finish: anodized. Color to be selected by Architect.

D. Manufacturer: American Warming, Model LE-31, or equivalent by Airolite, Arrow or Ruskin.

2.9 CLEANING OF AIR CONVEYANCE SYSTEMS

A. General Description of Work

1. The work to be accomplished under this project includes thoroughly cleaning existing ductwork and air handling equipment associated with the HVAC systems as identified on the drawings.

2. The area of operation is an occupied facility and disruptions shall be held to a minimum.
3. Refer to Part 3 - Execution of this section.

B. Scope of Work

1. The work consists of furnishing all labor, supervision, materials and equipment necessary to clean the ductwork and HVAC components as indicated. Cleaning to include existing supply, exhaust and return ductwork, reheat coils, dampers, grilles and diffusers.

C. Project Scheduling

1. Schedule and coordinate all work with the Owner and with work of other trades.
2. Prior to start of work, Contractor shall provide the Owner with a schedule of the work to be performed.

D. Work Hours

1. Work hours will be pre-approved by the Owner.
2. All systems shall be assumed to be in operation during cleaning. Coordinate with the progress of other construction.

E. Project Reports

1. The Contractor will be required to leave a daily status report for the Owner's Construction Representative.
2. Provide a list of any mechanical or ductwork deficiencies noted during performance of services, to allow for immediate corrective action.

F. Qualifications of Contractor and Required Standards

1. Contractor shall be member to the National Air Duct Cleaners Association (NADCA) and is certified by NADCA to perform Air Conveyance System (ACS) cleaning.
2. Contractor shall be regularly engaged in the field of ACS cleaning and submit a list of references upon request.
3. The standard of cleanliness shall be consistent with the current NADCA Standard 1992-01, titled "Mechanical Cleaning of Non-Porous Air Conveyance System Components".

G. Protection of Property and Occupants

1. Keep doorways and aisles clear of any equipment and materials at all times.
2. All equipment and furniture shall be covered and protected from any dust or contaminants in each work area.
3. Keep work areas neat and orderly at all times.

4. All vacuum equipment utilized to clean the Air Conveyance System shall be HEPA filtered to prevent contamination of the occupied space.

H. Materials, Services and Utilities

1. Water: Furnished by the Owner at no cost to the Contractor.
2. Electricity: Furnished by the Owner at no cost to the Contractor, from existing electrical system adjacent to the site. All connections to the power source - cables, equipment, temporary lighting, etc., shall be provided by the Contractor.
3. Waste Disposal: Contractor will be responsible for the disposal of all solid and liquid waste.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide all sheet metal work as indicated and according to the latest edition of the ASHRAE guide and data book, SMACNA standards and this specification, the most demanding of which shall be the minimum standard.

B. Install ductwork where indicated. Make all necessary changes in cross sections and offsets, whether or not specifically indicated.

C. All changes in cross section shall be made without reducing the design area of the duct.

D. Cap all open ends of ductwork until connected to grilles, diffusers, equipment to prevent entrance of debris, dust, etc.

E. No pipe or other obstructions shall pass through air ducts.

F. Install all ductwork run above ceiling so as to maintain design ceiling heights, ductwork run exposed shall be installed to provide maximum headroom in all rooms and corridors.

G. Locate ductwork a sufficient distance from walls, piping, other ductwork, other obstacles, to permit application of full thickness of insulation specified.

H. Ducts passing through exterior walls shall be provided with weatherproof flashings, ducts passing through roof shall be provided with roof curb and counter flashing. Where ducts pass exposed through interior building walls provide a sheet metal collar to conceal the gap between the wall opening and the duct.

I. Ducts shall not be hung from other ducts, pipe, conduit or from metal deck.

J. Ducts exposed to the weather shall be constructed with waterproof joints. Coat the entire duct and supports with aluminum color outdoor vapor barrier mastic.

K. Duct dimensions are gross including dimensions for lined ducts where dimensions are outside sheet metal size.

L. Set all automatic air control dampers furnished by the Automatic Temperature Control Contractor.

M. All joints and seams in ducts shall be air-tight; poorly made joints, splits, visible holes at corners, etc., shall be reworked or new pieces of ductwork installed. Where excessive pulsating of ductwork or plenum housing is found, additional stiffeners shall be added. Any cracking in the coating around seams or joints, or in any other part of the formed ducts that is apparent upon inspection shall be sufficient to warrant rejection.

N. Sheet metal exposed to view through air distribution devices in finished areas of the building shall be coated with primer and a flat black finish coat.

O. Provide flexible duct connections at all fan inlets and outlets.

P. Size openings for ductwork penetrating non fire-rated walls and floor or ceilings so the opening is 1/2 to 3/4 inches larger than the duct or sleeve. Loosely stuff the annular opening with glass or mineral fiber, and caulk both sides with a non-aging, non-hardening acoustical sealant.

Q. Provide ductwork access doors for each automatic damper, fire damper, fire/smoke damper, smoke damper, smoke detector, reheat coil inlet and outlet, humidifier and where indicated. Locate access doors to allow proper access to and inspection of the device.

3.2 DUCTWORK

A. General Ductwork

1. Ductwork shall be constructed per SMACNA Standard for the static pressure and seal class as follows:

System	Static Press.	Seal Class
Supply ductwork upstream of terminal units	3	A
Supply ductwork downstream of terminal	2	A

units		
Return ductwork	2	A
Exhaust ductwork	2	A
Smoke exhaust ductwork	4	A
Stair pressurization ductwork	3	A

2. Radius elbows shall be utilized throughout the ductwork system. Splitter vanes are not required where full radius elbows are used. Do not substitute 90° mitered elbows with turning vanes without prior approval of the Engineer.
3. Branch connections shall be 45 degree entry for rectangular and round ducts. Straight taps are not permitted. Conical tees are acceptable in round branch take-off from round duct mains.
4. Seal all seams, joints, fasteners, penetrations and connections per SMACNA requirements.

B. Ductwork Identification

1. All ductwork (supply, return, exhaust, etc.) serving multiple spaces or floors shall be identified with directional flow arrows and unit identification numbers (AHU-1, EF-1, etc.) on the side of each duct (or bottom if abutting other systems or obstructions).
2. All identification numbers and flow arrows shall be stencil painted or similar to Seton Name Plate Company vinyl labels. Refer to Section 230300 for stenciling requirements.

3.3 FLEXIBLE DUCT

A. Flexible duct shall only be used in non-visible locations above a ceiling. Type shall be as follows:

1. Type 1: Supply air connections to diffusers and air terminal unit inlets.
2. Type 2: Return and exhaust air connections to grilles.
3. Type 3: Return and exhaust air connections to air terminal unit inlets.

B. Flexible duct shall not be used where ductwork is exposed (visible). Flexible duct shall not penetrate through walls or floors - rigid sheetmetal ductwork is required at all wall or floor penetrations. Flexible duct shall not be installed in chases.

C. Install flexible duct per manufacturer's recommendations.

D. The minimum length of flexible duct shall be used. Install flexible duct fully extended free of sags and properly supported to avoid any kinks or airflow restrictions. Support with 3 inch wide saddle type supports as manufactured by Thermo Manufacturing Inc. Do not lay unsupported on ceiling tiles.

E. Secure flexible duct in place with duct adhesive and plastic band using banding tool supplied by manufacturer. Adhesive shall be RCD No. 8, Duro Dyne "DSW" or MEI ECC EZ Seal 44-41. Adhesive must be compatible with flexible duct material. Where insulated flexible duct is used, insulation vapor barrier shall be taped in place tight to duct collar connections with two (2) complete wraps of duct tape.

F. Maximum length of flexible duct connections to diffusers and grilles shall be 60 inches. Bends shall be made with not less than one duct diameter centerline radius.

G. Maximum length of flexible duct connections to air terminal unit inlets shall be 24 inches. Maximum bend shall be 22 degrees.

3.4 LOUVERS

A. Install louver plumb in opening. Seal edges air and water tight with silicon caulk matching louver or brick color.

B. Insulate unused, interior portions of louvers with 1 inch thick polyisocyanurate (R= 6.0 minimum) cover exterior and interior sides of insulation with 20 gauge galvanized sheetmetal with stainless steel fasteners.

3.5 CLEANING OF AIR CONVEYANCE SYSTEMS

A. Ductwork - The interior of all supply, exhaust and return, ductwork shall be cleaned using direct contact vacuum methods. Utilizing existing and newly cut access openings in the duct system at intervals that will enable the cleaning technician to maintain close contact with the surfaces being cleaned. Note remote type vacuuming, air washing or cleaning methods utilizing hoses longer than can be visually observed from the point of insertion are not acceptable.

B. Existing reheat coils shall be vacuum cleaned to remove surface contamination then pressure washed to remove debris from between coil fins.

C. Dampers shall be cleaned. If dampers must be moved to ensure complete cleaning, they shall be marked and returned to their original position to prevent unbalancing the system.

D. Where applicable all existing grilles and diffusers and their internal components shall be removed, washed and replaced in their original position.

E. The ceiling/walls surrounding the grilles and diffusers shall be vacuum cleaned to remove loose dirt accumulation.

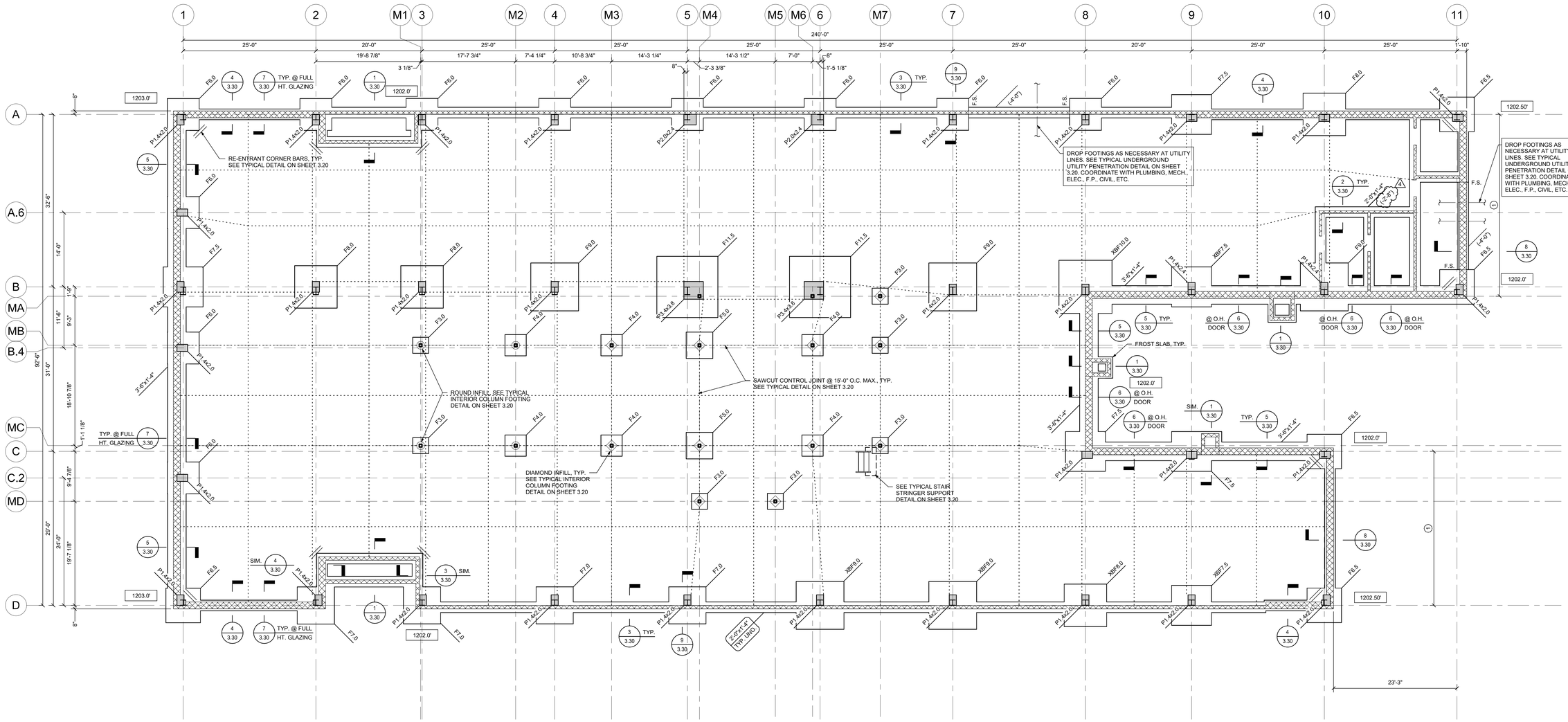
F. Every effort shall be made to clean the ductwork and components, which includes cutting access into the ductwork and removing panels from equipment.

G. Access Openings

1. Contractor shall provide access openings as required for proper cleaning, at various points of the ductwork, for physical and mechanical entry.
2. Access openings in rectangular ductwork shall be closed with prefabricated sheet metal cover plates, fastened with sheet metal screws and caulked to prevent air leakage.
3. Access openings in round ductwork shall be closed with Ductmate brand round duct access doors to ensure proper air tight enclosure.
4. Any rigid or blanket type insulation removed to allow for the installation of duct access doors shall be re-installed and seams covered and secured to eliminate any heat or cooling loss.

H. Contractor shall prevent dust and contaminants from returning to air handling unit.

END OF SECTION



FOUNDATION PLAN

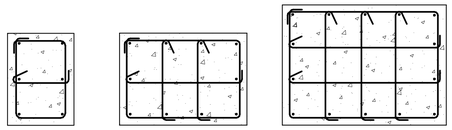
SCALE: 1/8" = 1'-0"

NOTES:

- FLOOR CONSTRUCTION: 6" CONCRETE SLAB ON GRADE WITH ONE LAYER OF 6x6-W2.1xW2.1 W.W.R. PROVIDE 10 MIL VAPOR RETARDER AND 4" LAYER OF GRANULAR FILL BELOW SLAB (UNO).
- TOP OF SLAB ON GRADE ELEVATION = "SLAB ON GRADE", SEE ELEVATION LEGEND. PROJECT DATUM ELEVATION = 1202.00' USGS.
- ELEVATIONS NOTED THUS (+X'-X") ARE TO TOP OF FOOTING REFERENCED FROM SLAB ON GRADE ELEVATION (UNO).
- TOP OF INTERIOR FOOTING ELEVATION = (-1'-0") (UNO).
- TOP OF EXTERIOR FOOTING ELEVATION = (-2'-8") (UNO).
- TOP OF CONCRETE PIER ELEVATION = 0'-0" (UNO).
- CONTINUOUS FOOTINGS ARE MARKED THUS: WIDTH x DEPTH (TOP OF FTG. EL.)
- COORDINATE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITY LINES CROSSING OR ADJACENT TO FOUNDATIONS WITH PLUMBING, MECH., ELEC., F.P., CIVIL, ETC. DROP FOOTINGS AS NECESSARY. SEE TYPICAL DETAIL AT UNDERGROUND UTILITY PENETRATION.
- PROVIDE (2) #4x3'-0" LONG AT ALL REENTRANT CORNERS.
- SEE ARCHITECTURAL DRAWINGS FOR EXTENT AND FINISH OF SLAB ON GRADE AND ANY FLOOR DEPRESSIONS, UNDERFLOOR CONDUITS, DRAINS, ETC.
- SEE SHEET 3.00, 3.01, & 3.02 FOR GENERAL NOTES.
- SEE SHEET 3.20 FOR TYPICAL DETAILS.
- FX.X DENOTES SPREAD FOOTINGS. SEE FOOTING SCHEDULE THIS SHEET.
- MFX.X DENOTES SPREAD FOOTINGS AT MOMENT FRAMES. SEE FOOTING SCHEDULE THIS SHEET.
- XBFX.X DENOTES SPREAD FOOTING AT X-BRACES. SEE FOOTING SCHEDULE THIS SHEET.
- XXXX DENOTES PRESUMED FINISH GRADE AT LOCATION SHOWN. VERIFY VALUE WITH FINAL SITE PLAN AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
- (1) DENOTES: FULL HEIGHT CMU WALL REQUIRING STEEL GIRT @ ROOF LINE TO BRACE WALL LATERALLY. SEE SECTION 8/3.30 FOR ADDITIONAL INFORMATION. PEMB BUILDING TO BE DESIGNED TO BRACE CMU WALL FOR L/600 DEFLECTION.

NOTE: FOUNDATION DESIGN AND ANCHOR ROD DESIGN SHOWN IS SUBJECT TO CHANGE BASED ON FINALIZED PEMB REACTIONS

CONCRETE PIER SCHEDULE			
MARK	PIER SIZE	TYPE	REINFORCING
P1.4x2.0	1'-4"x2'-0"	I	(6) - #6 VERT. W/ #4 TIES @ 3" O.C. @ A.R., #4 TIES @ 12" O.C. REMAINING
P1.4x2.4	1'-4"x2'-4"	I	(8) - #6 VERT. W/ #4 TIES @ 3" O.C. @ A.R., #4 TIES @ 12" O.C. REMAINING
P2.0x2.4	2'-0"x2'-4"	II	(8) - #7 VERT. W/ #4 TIES @ 3" O.C. @ A.R., #4 TIES @ 12" O.C. REMAINING
P3.4x3.8	3'-4"x3'-8"	III	(14) - #7 VERT. W/ #4 TIES @ 3" O.C. @ A.R., #4 TIES @ 12" O.C. REMAINING



CONCRETE PIER TYPES

COLUMN FOOTING SCHEDULE 2000 PSF				
	FOOTING SIZES			
MARK	LENGTH	WIDTH	THICKNESS	REINFORCING
F3.0	3' - 0"	3' - 0"	1' - 4"	(4) - #4 E.W. BOT.
F4.0	4' - 0"	4' - 0"	1' - 4"	(6) - #4 E.W. BOT.
F5.0	5' - 0"	5' - 0"	1' - 4"	(5) - #5 E.W. BOT.
F6.0	6' - 0"	6' - 0"	1' - 4"	(7) - #5 E.W. TOP & BOT.
F6.5	6' - 6"	6' - 6"	1' - 4"	(8) - #5 E.W. TOP & BOT.
F7.0	7' - 0"	7' - 0"	1' - 4"	(8) - #5 E.W. TOP & BOT.
F7.5	7' - 6"	7' - 6"	1' - 4"	(6) - #6 E.W. TOP & BOT.
F8.0	8' - 0"	8' - 0"	1' - 4"	(11) - #5 E.W. TOP & BOT.
F9.0	9' - 0"	9' - 0"	1' - 6"	(8) - #6 E.W. TOP & BOT.
F11.5	11' - 6"	11' - 6"	2' - 6"	(10) - #8 E.W. TOP & BOT.
XBF7.5	7' - 6"	7' - 6"	1' - 4"	(6) - #6 E.W. TOP & BOT.
XBF8.0	8' - 0"	8' - 0"	1' - 4"	(11) - #5 E.W. TOP & BOT.
XBF9.0	9' - 0"	9' - 0"	1' - 6"	(8) - #6 E.W. TOP & BOT.
XBF10.0	10' - 0"	10' - 0"	1' - 8"	(12) - #6 E.W. TOP & BOT.

ELEVATION LEGEND		
LEVEL DESIGNATION	ELEVATION (UNO)	PROJECT DATUM
T/MEZZANINE	10' - 6"	
T/MEZZANINE STEEL	10' - 1"	
SLAB ON GRADE	0' - 0"	•

- ELEVATIONS ON PLAN MAY VARY FROM ELEVATIONS SHOWN IN THE ELEVATION LEGEND. SEE PLAN FOR SPECIFIC ELEVATION VARIATIONS.
- • DENOTES THE LEVEL THAT IS THE PROJECT DATUM.

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SAL Harris/Day Architecture

STATE OF OHIO
DONALD J. SCHEHL
E-69919
REGISTERED PROFESSIONAL ENGINEER
1/17/25

Thorson • Baker + Associates
CONSULTING ENGINEERS
3030 West Streetsboro Road (330) 659-6688 Ph.
Richfield, Ohio 44286 (330) 659-6675 Fax

Belmont College Construction Trades Building

Hammond Rd
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

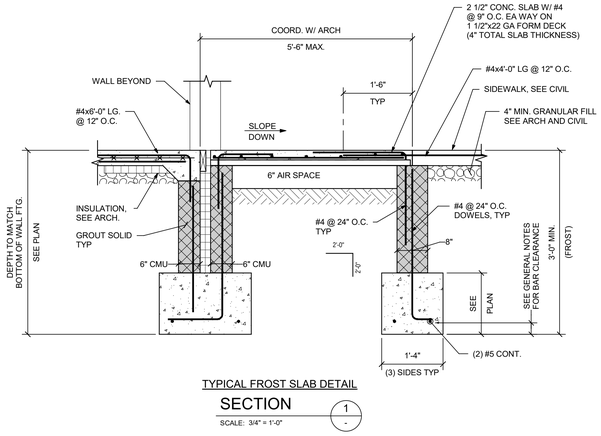
100% CONSTRUCTION DOCUMENTS: 07/08/2024

DRAWING UPDATES

4	Addendum No 4	1/17/2025

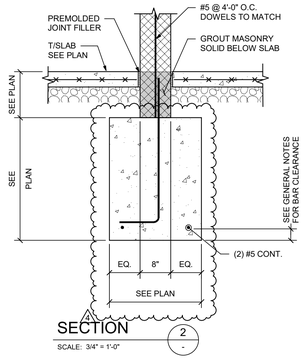
FOUNDATION PLAN

3.10



TYPICAL FROST SLAB DETAIL

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



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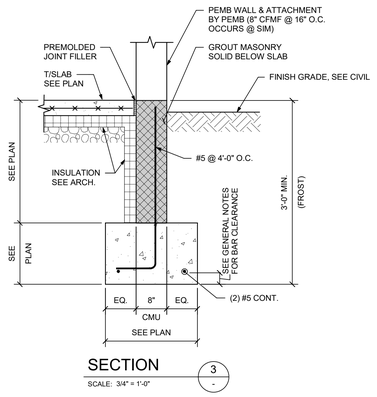

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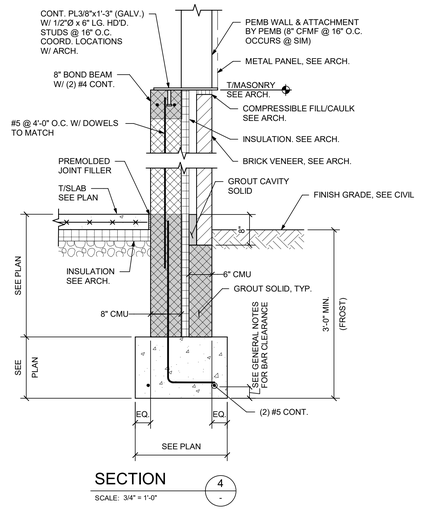
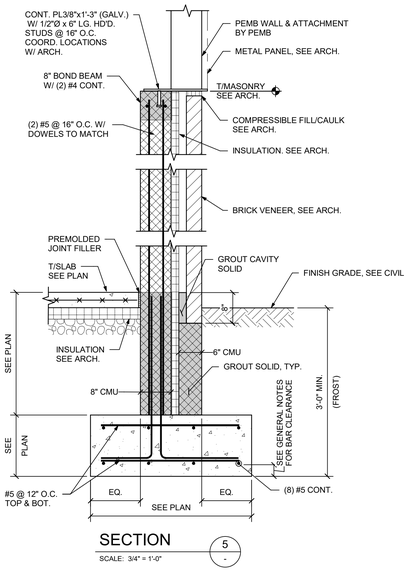


SECTION 4
SCALE: 3/4" = 1'-0"



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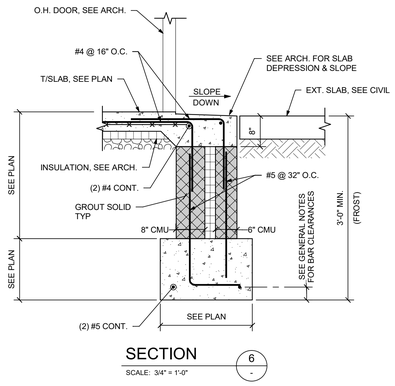

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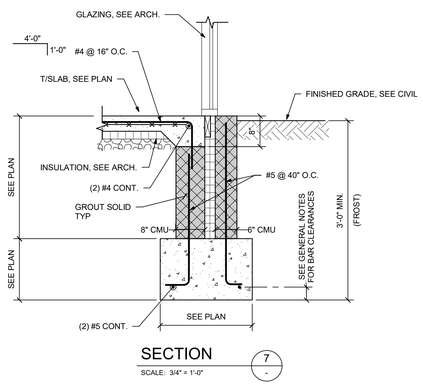
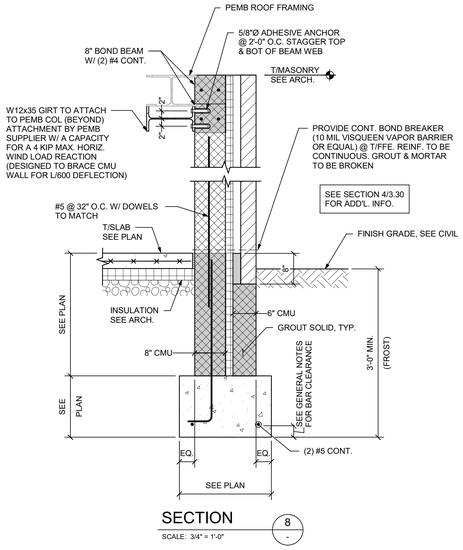


SECTION 7
SCALE: 3/4" = 1'-0"



SECTION 8
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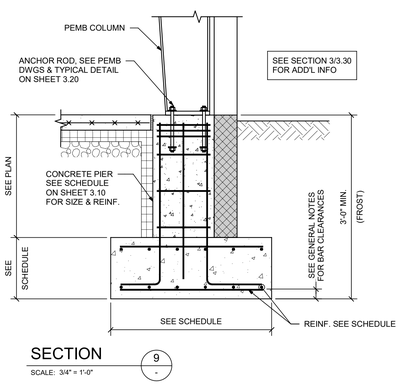

SECTION 9
SCALE: 3/4" = 1'-0"

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SAL Harris/Day Architecture

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(330) 659-6675 Fax

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DRAWING UPDATES

4	Addendum No 4	1/17/2025

FOUNDATION SECTIONS

3.30

FINISH PLAN SCHEDULE AND NOTES

FINISH LEGEND

** INDICATES SPECIFIC FINISH TYPE

FLOOR

CODE	MANUFACTURER/STYLE	COLOR
CT1	PATCRAFT 24X24 10536 MOVING	00580 PATHWAY
CT2	PATCRAFT-18X36 PLANK HEIRLOOM TWEED	00540 TAUPE TUFT
SC1	CONCRETE	COLOR NAME/NUMBER
PC	POLISHED CONCRETE	CLEAR
FT1	DALTILE 30x30 ASSEMBLE	AS11 MAGISTRATE
LVT1	PATCRAFT-9X36 PLANK 1560V LINOCUT	BAREN V1 00490

BASE

CODE	MANUFACTURER/STYLE	COLOR
RB1	JOHNSONITE 4.5" MILLWORK WALL BASE-MANDALAY	23 VAPOR GRAY
RB2	JONSONITE 4" BASEWORKS WITH TOE	23 VAPOR GREY
TS1	JOHNSONITE REDUCER (CARPET TO CONCRETE)	23 VAPOR GREY
TS2	SCHLUTER- VINPRO-U (LVT-CONCRETE)	COLOR NAME/NUMBER
TS3	SCHLUTER RENO RAMP K (TILE TO CONCRETE)	

WALL

CODE	MANUFACTURER/STYLE	COLOR
P01	PAINT - SHERWIN WILLAMS	PEARLY WHITE/ SW7009
P02	PAINT - SHERWIN WILLAMS	SILVER PLATE/SW7649
P03	PAINT - SHERWIN WILLAMS	DIGNITY BLUE - SW 6804
P04	PAINT - SHERWIN WILLAMS	INVIGORATE - SW 6886
P05	PAINT - SHERWIN WILLAMS	REGALE BLUE - SW 6801
P06	PAINT - SHERWIN WILLAMS	MAJOR BLUE - SW 6795
WT1	DALTILE-4X12 STENCIL LINEAR (RESTROOMS)	SC38 INDIGO RECTANGULAR LINEAR
WT2	DALTILE-4X12 STENCIL LINEAR (KITCHENETTE)	SC32 WHITE RECTANGULAR LINEAR
WC1	LEVELS WALL COVERING- DOT MATRIX	SUEDE BLUE
WC2	LEVELS WALL COVERING	SC32 WHITE RECTANGULAR LINEAR

SOLID SURFACE/PLASTIC LAMINATE

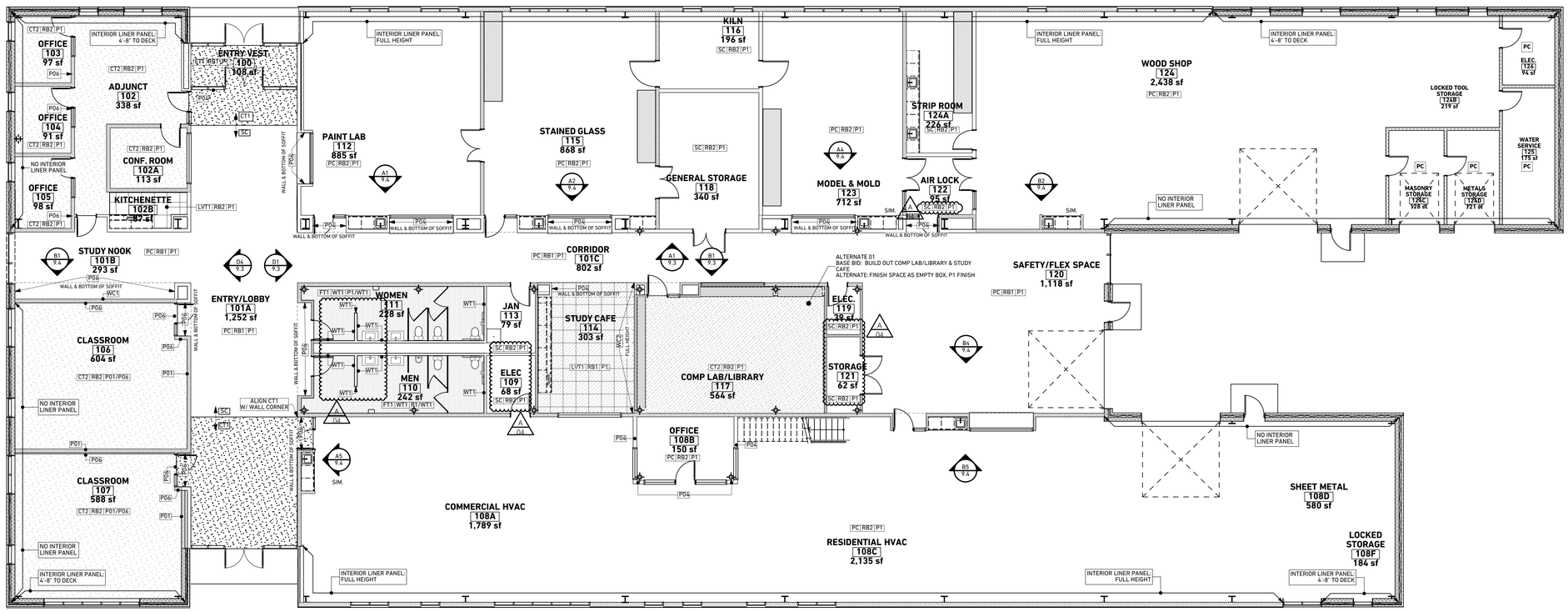
CODE	MANUFACTURER/STYLE	COLOR
PL1	WILSONART LAMINATE	LANDMARK WOOD
SS1	CORIAN	ANTARCTICA

GROUT

CODE	MANUFACTURER/STYLE	COLOR
G1	GROUT MANF./STYLE	GROUT COLOR/NUMBER
G2	GROUT MANF./STYLE	GROUT COLOR/NUMBER

GENERAL NOTES:

1. HOLLOW METAL DOORS SHALL BE PAINTED....
2. HOLLOW METAL DOORS & FRAMES SHALL BE PAINTED TO MATCH ADJACENT WALLS...
3. CONTRACTOR IS RESPONSIBLE FOR FLOOR PREP/MOISTURE LEVELS PER MFG. REQUIREMENTS.
4. ALL MILLWORK & WALL LAMINATE PANELS BY MILLWORK CONTRACTOR
5. ALL SWITCH/FACE PLATES TO MATCH WALL PAINT WHERE INSTALLED; VERIFY WITH ARCHITECT BEFORE PURCHASE & INSTALLATION.
6. SEE REFLECTED CEILING PLAN FOR CEILING PAINT COLORS.
7. ALL EXPOSED STRUCTURAL STEEL, BEAMS, JOISTS, GIRTS, COLUMNS, BRACING, CONNECTIONS, ETC. TO BE PAINTED.
8. ALL EXPOSED CMU BLOCK TO BE PAINTED P01 UNLESS NOTED OTHERWISE(U.N.O)
9. **FOR EXCESS MATERIALS:** UPON COMPLETION, EACH RESPECTIVE CONTRACTOR SHALL LEAVE ALL WHOLE EXCESS MATERIAL AND REMNANTS AS INDICATED BELOW (IF APPLICABLE):
   - PAINT: ONE GALLON OF EACH COLOR AND TYPE
   - CARPET TILE: ALL LEFTOVER CARPET TILE
   - WALL TILE: ONE FULL CARTON
   - VINYL TILE FLOORING: ONE FULL CARTON AND ANY LEFTOVER TILE
   - CEILING TILE: ONE FULL CARTON OF EACH TYPE
   - HVAC UNIT FILTER: ONE FOR EACH UNIT
   - REPLACEMENT LAMPS: SEE ELECTRICAL DRAWINGS
   - OTHER MATERIALS APPLICABLE TO PROJECT...



A1 FIRST FLOOR FINISH PLANS
SCALE: 1/8" = 1'-0"

Sōl Harris/Day Architecture

STATE OF OHIO
JUSTIN GANTZ
1616769
REGISTERED ARCHITECT
JUSTIN GANTZ, LICENSE #1616769
EXPIRATION DATE: 12/31/2025

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS: 07/08/2024

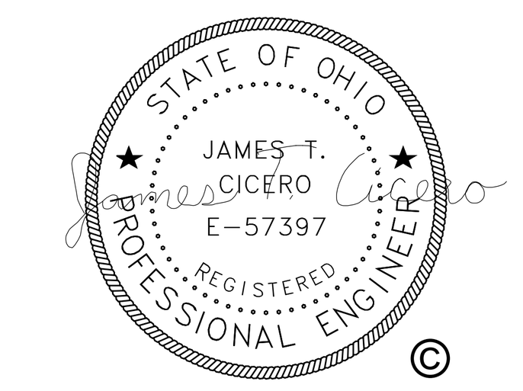
DRAWING UPDATES

1	ADDENDUM NO 3	1.10.2025
2	ADDENDUM NO 4	1.17.2025

FIRST FLOOR FINISH PLAN

9.1

Karpinski
ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com



MECHANICAL EQUIPMENT SCHEDULE

EQUIPMENT TAG ABBREV.	MARK	DESCRIPTION	VOLTAGE	PHASE	HP	FLA	KW	CONN.	WIRING	PANEL	CKT#	SWITCH OR STARTER RATINGS: SWITCH / FUSE / STARTER	REMARKS
AC	1	GENERAL PURPOSE AIR COMPRESSOR	0	3			0.0	(none)					
AC	2	AIR COMPRESSOR	0				0.0	(none)					
AC	57	GENERAL PURPOSE AIR COMPRESSOR	0	3			0.0	(none)					
ACH	1	AIR COOLED CHILLER	480	3		120.3	100.0	DS	REFER TO RISER	HDP	4	200A	
AHP	1	AIR SOURCE HEAT PUMP	208	3		35.3	12.7	DS	3#4, 1#8, 1-1/2" C	L1	38,40,42	70A	
AHP	2	AIR SOURCE HEAT PUMP	208	3		45.0	16.2	DS	3#2, 1#8, 1-1/2" C	L1	43,45,47	90A	
AHU	2	AIR HANDLING UNIT	480	3		0.0	0.0	VFD					
AHU	2	AIR HANDLING UNIT SUPPLY	480	3	(2)5	34.9	29.0	VFD	4#4, 1#8 GND, 1 1/2" C.	H2	1,3,5	70A	
AHU	2	AIR HANDLING UNIT EXHAUST	480	3	(2)1	7.5	6.2	VFD	3#12, 1#12, 3/4"C	H2	7,9,11	20A	
AHU	3	AIR HANDLING UNIT	480	3		0.0	0.0	VFD					
AHU	3	AIR HANDLING UNIT SUPPLY	480	3	(2)5	34.9	29.0	VFD	4#4, 1#8 GND, 1 1/2" C.	H2	2,4,6	70A	
AHU	3	AIR HANDLING UNIT EXHAUST	480	3	(2)2	11.1	9.2	VFD	3#12, 1#12, 3/4"C	H2	8,10,12	20A	
AHU	3	AIR HANDLING UNIT WHEEL	480	3	-	0.7	0.6	VFD	3#12, 1#12, 3/4"C	H2	14,16,18	20A	
CB	1	BOILER (NON-CONDENSING HYDRONIC)	120	1	-	12.5	1.5	DS	2#12, 1#12, 3/4"C	L2	16	20A	
CB	2	BOILER (NON-CONDENSING HYDRONIC)	120	1	-	12.5	1.5	DS	2#12, 1#12, 3/4"C	L2	18	20A	
CUH	1	CABINET UNIT HEATER	120	1	-	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	51	20A	
DOAS	1	ROOFTOP UNIT	480	3		24.1	20.0	DS	3#6, 1#10, 1" C	H2	31,33,35	60A	
DWH	1	DOMESTIC WATER HEATER	120	1		2.1	0.3	DS	2#12, 1#12, 3/4"C	L1	2	20A	
EF	1	EXHAUST FAN	120	1	0.75	13.8	1.7	MMS	2#12, 1#12, 3/4"C	L2	27	20A	
EF	2	EXHAUST FAN	120	1	0.75	16.0	1.9	MMS	2#12, 1#12, 3/4"C	L2	29	20A	
EF	3	EXHAUST FAN	120	1	0.5	13.8	1.7	MMS	2#12, 1#12, 3/4"C	L2	31	20A	
EF	4	EXHAUST FAN	120	1	0.33	5.8	0.7	MMS	2#12, 1#12, 3/4"C	L2	33	20A	
EF	5	EXHAUST FAN	120	1	0.25	13.8	1.7	MMS	2#12, 1#12, 3/4"C	L2	35	20A	
EF	6	EXHAUST FAN	120	1	0.25	5.8	0.7	MMS	2#12, 1#12, 3/4"C	L2	37	20A	
EF	7	EXHAUST FAN	120	1	0.75	16.0	1.9	MMS	2#12, 1#12, 3/4"C	L2	39	20A	
FCU	1	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	47,49	20A	
FCU	2	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	42,44	20A	
FCU	3	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	42,44	20A	
FCU	4	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	42,44	20A	
FCU	5	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	50,52	20A	
FCU	6	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	38,40	20A	
FCU	7	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	38,40	20A	
FCU	8	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	46,48	20A	
FCU	9	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	34,36	20A	
FCU	10	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	34,36	20A	
FCU	11	FAN COIL UNIT	208	1		2.3	0.5	DS	2#12, 1#12, 3/4"C	L2	34,36	20A	
GMP	1	GLYCOL MAKE-UP PACKAGE	120	1	1/3	7.2	0.9	DS	2#12, 1#12, 3/4"C	L2	54	20A	
PCWP	1	PRIMARY CHILLED WATER PUMP	480	3	3	4.8	4.0	VFD	3#12, 1#12, 3/4"C	H2	13,15,17	20A	
PCWP	2	PRIMARY CHILLED WATER PUMP	480	3	3	4.8	4.0	VFD	3#12, 1#12, 3/4"C	H2	19,21,23	20A	
PHWP	1	PRIMARY HEATING WATER PUMP	480	3	1	1.7	1.4	VFD	3#12, 1#12, 3/4"C	H2	20,22,24	20A	
PHWP	2	PRIMARY HEATING WATER PUMP	480	3	1	1.7	1.4	VFD	3#12, 1#12, 3/4"C	H2	20,22,24	20A	
RHWP	1	RECIRCULATING HOT WATER PUMP	120	1	1/6	0.4	0.1	MMS	2#12, 1#12, 3/4"C	L1	4	20A	
SHWP	1	SECONDARY HEATING WATER PUMP	480	3	3	4.8	4.0	VFD	3#12, 1#12, 3/4"C	H2	25,27,29	20A	
SHWP	2	SECONDARY HEATING WATER PUMP	480	3	3	4.8	4.0	VFD	3#12, 1#12, 3/4"C	H2	26,28,30	20A	
TCP(B-AAC)		TEMPERATURE CONTROL PANEL	120	1	-	15.0	1.8	(none)	2#12, 1#12, 3/4"C	L2	43	20A	
TCP(B-AAC)		TEMPERATURE CONTROL PANEL	120	1	-	15.0	1.8	(none)	2#12, 1#12, 3/4"C	L2	45	20A	
TCP(B-AAC)	26	TEMPERATURE CONTROL PANEL	120	1	-	15.0	1.8	(none)	2#12, 1#12, 3/4"C			20A	
UH	1	UNIT HEATER	115	1	1/15	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	53	20A	
UH	2	UNIT HEATER	115	1	1/15	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	53	20A	
UH	3	UNIT HEATER	115	1	1/15	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	53	20A	
UH	4	UNIT HEATER	115	1	1/15	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	53	20A	
UH	5	UNIT HEATER	115	1	1/15	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	53	20A	
UH	6	UNIT HEATER	115	1	1/15	0.6	0.1	DC	2#12, 1#12, 3/4"C	L2	53	20A	
VFD	1	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	13,15,17		
VFD	2	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	19,21,23		
VFD	3	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	2,4,6		
VFD	4	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	8,10,12		
VFD	5	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	25,27,29		
VFD	6	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	26,28,30		
VFD	7	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	1,3,5		
VFD	8	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	7,9,11		
VFD	9	VARIABLE FREQUENCY DRIVE	480	3	-	0.0	0.0	DC	REFER TO EQUIPMENT CONTROLLED BY VFD	H2	14,16,18		

2

MECHANICAL EQUIPMENT SCHEDULE NOTES:

1. E.C. SHALL VERIFY AND COORDINATE WITH M.C. WHERE ANY THREE PHASE EQUIPMENT WILL REQUIRE A NEUTRAL. COORDINATE WITH FINAL EQUIPMENT SELECTION PRIOR TO ROUGH-IN.

MECHANICAL EQUIPMENT CONNECTION LEGEND

MECH CONNECTION	MECHANICAL CONNECTION DESCRIPTION
DC	DIRECT CONNECTION. PROVIDE JUNCTION BOX AND SEALTITE CONNECTION. (MECHANICAL EQUIPMENT FURNISHED WITH INTEGRAL MEANS OF DISCONNECT)
DS	UNFUSED DISCONNECT SWITCH
MMS	MANUAL MOTOR STARTER
VFD	VARIABLE FREQUENCY DRIVE FURNISHED BY MC, INSTALLED AND WIRED BY EC

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

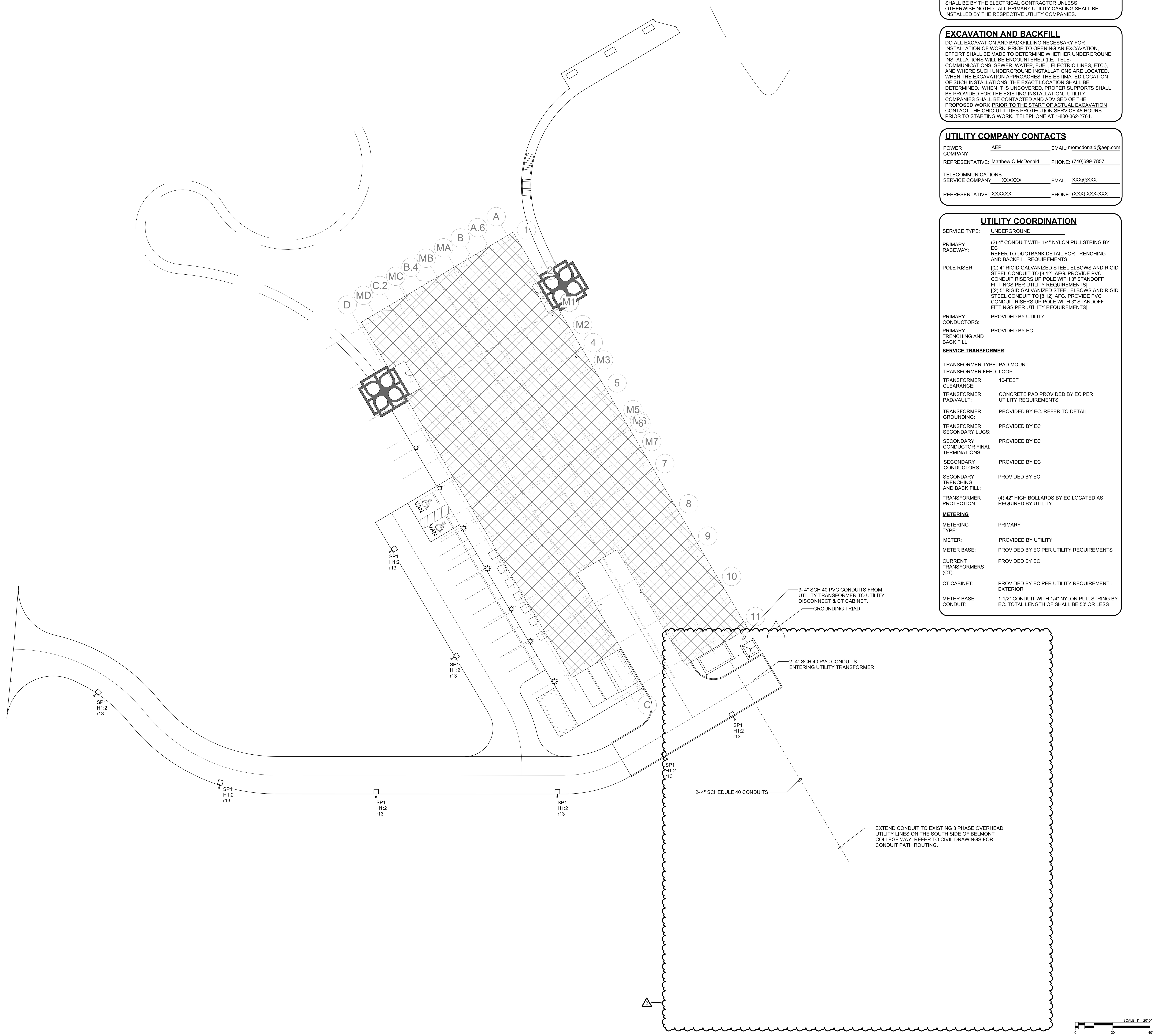
DRAWING UPDATES

2	Addendum No 4	01/17/25

KEY PLAN

MECHANICAL EQUIPMENT SCHEDULE

E04



COORDINATION OF UNDERGROUND WORK

ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT ROUTING AND ELEVATION OF UNDERGROUND DUCTBANKS AND CONDUITS WITH ALL OTHER TRADES ON SITE PRIOR TO EXCAVATION AND INSTALLATION. ALL TRENCHING, BACKFILL, PATCHING, ETC., SHALL BE BY THE ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED. ALL PRIMARY UTILITY CABLING SHALL BE INSTALLED BY THE RESPECTIVE UTILITY COMPANIES.

EXCAVATION AND BACKFILL

DO ALL EXCAVATION AND BACKFILLING NECESSARY FOR INSTALLATION OF WORK. PRIOR TO OPENING AN EXCAVATION, EFFORT SHALL BE MADE TO DETERMINE WHETHER UNDERGROUND INSTALLATIONS WILL BE ENCOUNTERED (I.E., TELE-COMMUNICATIONS, SEWER, WATER, FUEL, ELECTRIC LINES, ETC.), AND WHERE SUCH UNDERGROUND INSTALLATIONS ARE LOCATED. WHEN THE EXCAVATION APPROACHES THE ESTIMATED LOCATION OF SUCH INSTALLATIONS, THE EXACT LOCATION SHALL BE DETERMINED. WHEN IT IS UNCOVERED, PROPER SUPPORTS SHALL BE PROVIDED FOR THE EXISTING INSTALLATION. UTILITY COMPANIES SHALL BE CONTACTED AND ADVISED OF THE PROPOSED WORK PRIOR TO THE START OF ACTUAL EXCAVATION. CONTACT THE OHIO UTILITIES PROTECTION SERVICE 48 HOURS PRIOR TO STARTING WORK. TELEPHONE AT 1-800-362-2764.

UTILITY COMPANY CONTACTS

POWER COMPANY:	AEP	EMAIL:	momcdonald@aep.com
REPRESENTATIVE:	Matthew O McDonald	PHONE:	(740)699-7857
TELECOMMUNICATIONS SERVICE COMPANY:	XXXXXX	EMAIL:	XXX@XXX
REPRESENTATIVE:	XXXXXX	PHONE:	(XXX) XXX-XXX

UTILITY COORDINATION

SERVICE TYPE:	UNDERGROUND
PRIMARY RACEWAY:	(2) 4" CONDUIT WITH 1/4" NYLON PULLSTRING BY EC REFER TO DUCTBANK DETAIL FOR TRENCHING AND BACKFILL REQUIREMENTS
POLE RISER:	[(2) 4" RIGID GALVANIZED STEEL ELBOWS AND RIGID STEEL CONDUIT TO [8,12]' AFG. PROVIDE PVC CONDUIT RISERS UP POLE WITH 3" STANDOFF FITTINGS PER UTILITY REQUIREMENTS] [(2) 5" RIGID GALVANIZED STEEL ELBOWS AND RIGID STEEL CONDUIT TO [8,12]' AFG. PROVIDE PVC CONDUIT RISERS UP POLE WITH 3" STANDOFF FITTINGS PER UTILITY REQUIREMENTS]
PRIMARY CONDUCTORS:	PROVIDED BY UTILITY
PRIMARY TRENCHING AND BACK FILL:	PROVIDED BY EC

SERVICE TRANSFORMER

TRANSFORMER TYPE:	PAD MOUNT
TRANSFORMER FEED:	LOOP
TRANSFORMER CLEARANCE:	10-FEET
TRANSFORMER PAD/VAULT:	CONCRETE PAD PROVIDED BY EC PER UTILITY REQUIREMENTS
TRANSFORMER GROUNDING:	PROVIDED BY EC. REFER TO DETAIL
TRANSFORMER SECONDARY LUGS:	PROVIDED BY EC
SECONDARY CONDUCTOR FINAL TERMINATIONS:	PROVIDED BY EC
SECONDARY CONDUCTORS:	PROVIDED BY EC
SECONDARY TRENCHING AND BACK FILL:	PROVIDED BY EC
TRANSFORMER PROTECTION:	(4) 42" HIGH BOLLARDS BY EC LOCATED AS REQUIRED BY UTILITY

METERING

METERING TYPE:	PRIMARY
METER:	PROVIDED BY UTILITY
METER BASE:	PROVIDED BY EC PER UTILITY REQUIREMENTS
CURRENT TRANSFORMERS (CT):	PROVIDED BY EC
CT CABINET:	PROVIDED BY EC PER UTILITY REQUIREMENT - EXTERIOR
METER BASE CONDUIT:	1-1/2" CONDUIT WITH 1/4" NYLON PULLSTRING BY EC. TOTAL LENGTH OF SHALL BE 50' OR LESS

Karpinski ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

STATE OF OHIO JAMES T. CICERO E-57397 REGISTERED PROFESSIONAL ENGINEER

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

DRAWING UPDATES

2	Addendum No 4	01/17/25

KEY PLAN

N

ELECTRICAL SITE PLAN

E30

Karpinski ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

STATE OF OHIO ★ JAMES T. CICERO E-57397 ★ REGISTERED PROFESSIONAL ENGINEER ©

Lighting and Appliance Panelboard: H2

Location: Elec. 109 | **Volts:** 480/277 Wye | **A.I.C. Rating:** 22 KAIC
Supply From: HDP | **Phases:** 3 | **Mains Type:** MLO
Mounting: Surface | **Wires:** 4 | **Bus Rating:** 200 A
MCB Rating: -

GENERAL NOTES:

Notes	CKT	Circuit Description	Trip Amps	Poles	A		B		C		Poles	Trip Amps	Circuit Description	CKT	Notes
	1				9.7	9.7								2	
	3	AHU-2 SUPPLY	70	3			9.7	9.7			3	70	AHU-3 SUPPLY	4	
	5								9.7	9.7				6	
	7				2.1	3.1								8	
	9	AHU-2 EXHAUST	20	3			2.1	3.1			3	20	AHU-3 EXHAUST	10	
	11								2.1	3.1				12	
	13				1.3	0.2								14	
	15	PWCP-1	20	3			1.3	0.2			3	20	AHU-3 WHEEL	16	
	17								1.3	0.2				18	
	19				1.3	0.9								20	
	21	PWCP-2	20	3			1.3	0.9			3	20	PHWP-1, 2	22	
	23								1.3	0.9				24	
	25				1.3	1.3								26	
	27	SHWP-1	20	3			1.3	1.3			3	20	SHWP-2	28	
	29								1.3	1.3				30	
	31				6.7	0.0								32	
	33	DOAS-1	60	3			6.7	0.0			3	70	SPARE	34	
	35								6.7	0.0				36	
	37	Spare	20	1	0.0	0.0					1	20	Spare	38	
	39	Spare	20	1			0.0	0.0			1	20	Spare	40	
	41	Spare	20	1					0.0	0.0	1	20	Spare	42	
				Total Load:	37.6 kW		37.6 kW		37.6 kW						
				Total Amp:	136 A		136 A		136 A						

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Cooling	58000 VA	100.00%	58000 VA		
HVAC	38800 VA	100.00%	38800 VA	Total Conn. Load:	112.8 kW
Motor	15950 VA	100.00%	15950 VA	Total Est. Demand:	112.8 kW
				Total Conn.:	136 A
				Total Est. Demand:	136 A

Panel Schedule Notes:

Lighting and Appliance Panelboard: H1

Location: Elec. 109 | **Volts:** 480/277 Wye | **A.I.C. Rating:** 22 KAIC
Supply From: HDP | **Phases:** 3 | **Mains Type:** MLO
Mounting: Surface | **Wires:** 4 | **Bus Rating:** 200 A
MCB Rating: -

GENERAL NOTES:

Notes	CKT	Circuit Description	Trip Amps	Poles	A		B		C		Poles	Trip Amps	Circuit Description	CKT	Notes
	1	LTG - WOODSHOP	20	1	1.6	0.9					1	20	LTG - SITE	2	
	3	LTG - MODEL, STAINED GLASS, PAIN...	20	1			1.6	0.1			1	20	LIGHTING RELAY PANEL	4	
	5	LTG - CORRIDOR, FLEX, RESTROOMS	20	1					3.0	0.0	1	20	LIGHTING INVERTER - LI	6	
	7	LTG - CLASSROOMS & OFFICES	20	1	0.3	0.5					1	20	LTG - MEZZANINE	8	
	9	LTG - OFFICE	20	1			0.7	2.2			1	20	LTG- HVAC WORKSHOP	10	
	11	SPARE	20	1					0.0	0.0	1	20	SPARE	12	
	13	SPARE	20	1	0.0	0.0					1	20	SPARE	14	
	15	SPARE	20	1			0.0	0.0			1	20	SPARE	16	
	17	SPARE	20	1					0.0	0.0	1	20	SPARE	18	
	19	SPARE	20	1	0.0	0.0					1	20	SPARE	20	
	21	SPARE	20	1			0.0	0.0			1	20	SPARE	22	
	23	SPARE	20	1					0.0	0.0	1	20	SPARE	24	
	25	SPARE	20	1	0.0	0.0					1	20	SPARE	26	
	27	SPARE	20	1			0.0	--			1	--	SPACE	28	
	29	SPARE	20	1					0.0	--	1	--	SPACE	30	
	31	SPARE	20	1	0.0	--					1	--	SPACE	32	
	33	SPARE	20	1			0.0	--			1	--	SPACE	34	
	35	SPARE	20	1					0.0	--	1	--	SPACE	36	
	37	SPARE	20	1	0.0	--					1	--	SPACE	38	
	39	SPARE	20	1			0.0	--			1	--	SPACE	40	
	41	SPARE	20	1					0.0	--	1	--	SPACE	42	
				Total Load:	3.3 kW		7.6 kW		3.0 kW						
				Total Amp:	12 A		28 A		11 A						

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
LTG	13893 VA	100.00%	13893 VA		
				Total Conn. Load:	13.9 kW
				Total Est. Demand:	13.9 kW
				Total Conn.:	17 A
				Total Est. Demand:	17 A

Panel Schedule Notes:

Lighting and Appliance Panelboard: L3

Location: Residential HVAC 108C | **Volts:** 120/208 Wye | **A.I.C. Rating:** 10 KAIC
Supply From: LDP | **Phases:** 3 | **Mains Type:** MLO
Mounting: Surface | **Wires:** 4 | **Bus Rating:** 250 A
MCB Rating: -

GENERAL NOTES:

Notes	CKT	Circuit Description	Trip Amps	Poles	A		B		C		Poles	Trip Amps	Circuit Description	CKT	Notes
	1	HVAC ROOM - RECEPTACLES	20	1	1.0	0.9					2	20	HVAC - SPLIT SYSTEM	2	
	3	HVAC ROOM - RECEPTACLES	20	1			0.8	0.9						4	
	5	HVAC - REC. COUNTERTOP	20	1					0.2	4.0				6	
	7	REC - OFFICE 108B	20	1	0.8	4.0					3	60	HVAC - EXTERIOR - CARRIER	8	
	9	HVAC ROOM - RECEPTACLES	20	1			0.8	4.0						10	
	11	FREEZER DOORS	20	1					1.0	1.4	2	30	HVAC OUTDOOR UNIT	12	
	13	REC - REFRIGERATOR - HVAC ROOM	20	1	1.0	1.4								14	
	15						4.8	1.4			2	30	HVAC OUTDOOR UNIT	16	
	17	REC - H17	70	3					4.8	1.4				18	
	19				4.8	1.4					2	30	HVAC OUTDOOR UNIT	20	
	21	GEOTHERMAL FLUSH CART	20	1			1.3	1.4						22	
	23	SOLAR BLUE TRAINER	20	1					0.5	1.6	2	20	COOLER CONDENSING UNIT	24	
	25	BUILDING MANAGER TRAINER	30	1	1.8	1.6								26	
	27	REC - PITBULL	20	1			0.5	1.1			2	20	FREEZER EVAP UNIT	28	
	29	REC	20	1					0.6	1.1				30	
	31	REC - EXTERIOR	20	1	0.6	2.8					2	35	FREEZER CONDENSING UNIT	32	
	33	REC - OFFICE 108B - LAPTOP/VR...	20	1			0.6	2.8						34	
	35	HVAC OUTDOOR UNIT	30	2					1.4	0.0	1	20	SPARE	36	
	37				1.4	0.0					1	20	SPARE	38	
	39	HVAC OUTDOOR UNIT	30	2			1.4	0.0			1	20	SPARE	40	
	41								1.4	0.0	1	20	SPARE	42	
	43	COOLER EVAP UNIT	20	1	0.5	0.0					1	20	SPARE	44	
	45	GARAGE DOOR	20	1			1.5	0.0			1	20	SPARE	46	
	47	GARAGE DOOR	20	1					1.5	0.0	1	20	SPARE	48	
	49	SPARE	20	1	0.0	0.0					1	20	SPARE	50	
	51	SPARE	20	1			0.0	0.0			1	20	SPARE	52	
	53	SPARE	20	1					0.0	0.0	1	20	SPARE	54	
	55	SPARE	20	1	0.0	0.0					1	20	SPARE	56	
	57	SPARE	20	1			0.0	0.0			1	20	SPARE	58	
	59	SPARE	20	1					0.0	0.0	1	20	SPARE	60	
				Total Load:	24.0 kW		23.4 kW		21.0 kW						
				Total Amp:	203 A		198 A		175 A						

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
EQ	1000 VA	80.00%	800 VA		
HVAC	15872 VA	100.00%	15872 VA	Total Conn. Load:	68.3 kW
MISC	24547 VA	70.00%	17183 VA	Total Est. Demand:	53.8 kW
Power	3000 VA	100.00%	3000 VA	Total Conn.:	190 A
REC	23920 VA	70.90%	16960 VA	Total Est. Demand:	149 A

Panel Schedule Notes:

Lighting and Appliance Panelboard: L2

Location: Elec. 109 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 10 KAIC
Supply From: LDP | **Phases:** 3 | **Mains Type:** MCB
Mounting: Surface | **Wires:** 4 | **Bus Rating:** 250 A
MCB Rating: -

GENERAL NOTES:

Notes	CKT	Circuit Description	Trip Amps	Poles	A		B		C		Poles	Trip Amps	Circuit Description	CKT	Notes
	1				2.6	1.0					1	20	REC - PAINT LAB 112	2	
	3	K01 - KILN	40	3			2.6	0.6			1	20	P07 - PAINT LAB 112	4	
	5								2.6	1.0	1	20	REC - STAINED GLASS 115	6	
	7				2.6	1.2					1	20	REC - STAINED GLASS 115	8	
	9	K01 - KILN	40	3			2.6	0.6			1	20	REC - KILN 116	10	
	11								2.6	1.0	1	20	REC- GENERAL STOR. 118	12	
	13	REC - PAINT BOOTH	20	1	0.2	1.0					1	20	REC Model & Mold 123	14	
	15	REC - PAINT BOOTH	20	1			0.2	1.5			1	20	CB-1	16	
	17	REC - PAINT BOOTH	20	1					0.2	1.5	1	20	CB-2	18	
	19	REC - PAINT BOOTH	20	1	0.2	0.4					1	20	GRINDER BUFFER	20	
	21	REC - PAINT BOOTH	20	1			0.2	1.8			1	20	DRILL PRESS	22	
	23	REC - PAINT BOOTH	20	1					0.2	0.4	1	20	REC - EXTERIOR	24	
	25	LTG - PAINT BOOTH	20	1	1.0	0.8					1	20	REC - MEZZANINE	26	
	27	EF-1	20	1			1.7	0.0			1	20	DOOR HARDWARE	28	
	29	EF-2	20	1					1.9	0.0	1	20	MAIN ENTRY LOBBY DOORS	30	
	31	EF-3	20	1	1.7	0.4					1	20	REC - STRIP ROOM	32	
	33	EF-4	20	1			0.7	0.7			2	20	FCU 9-11	34	
	35	EF-5	20	1					1.7	0.7				36	
	37	EF-6	20	1	0.7	0.5					2	20	FCU 6-8	38	
	39	EF-8	20	1			1.9	0.5						40	
	41	REC - STRIP ROOM	20	1					0.6	0.7	2	20	FCU 1-2 - 1-4	42	
	43	TCP(B-AAC)	20	1	1.8	0.7								44	
	45	TCP(B-AAC)	20	1			1.8	0.2			2	20	FCU 1-47	46	
	47	FCU 1-1	20	2					0.2	0.2				48	
	49				0.2	0.2					2	20	HVAC	50	
	51	CUH-1	20	1			0.1	0.2						52	
	53	UNIT HEATERS 1-6	20	1					0.4	0.9	1	20	GMP-1	54	
	55	SPARE	20	1	0.0	0.0					1	20	SPARE	56	
	57	SPARE	20	1			0.0	0.0			1	20	SPARE	58	
	59	SPARE	20	1					0.0	0.0	1	20	SPARE	60	
				Total Load:	17.2 kW		17.9 kW		16.8 kW						
				Total Amp:	144 A		150 A		140 A						

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	23232 VA	100.00%	23232 VA		
Heating	70 VA	100.00%	70 VA	Total Conn. Load:	51.9 kW
LTG	1000 VA	100.00%	1000 VA	Total Est. Demand:	43.1 kW
MISC	0 VA	0.00%	0 VA	Total Conn.:	144 A
REC	27606 VA	68.11%	18803 VA	Total Est. Demand:	120 A

Panel Schedule Notes:

Lighting and Appliance Panelboard: L1

Location: Elec. 109 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 10 KAIC
Supply From: LDP | **Phases:** 3 | **Mains Type:** MLO
Mounting: Surface | **Wires:** 4 | **Bus Rating:** 250 A
MCB Rating: -

GENERAL NOTES:

Notes	CKT	Circuit Description	Trip Amps	Poles	A		B		C		Poles	Trip Amps	Circuit Description	CKT	Notes
	1	REC - OFFICE 103	20	1	0.8	0.3					1	20	DWH-1	2	
	3	REC - OFFICE 104	20	1			0.6	0.1			1	20	RHWP-1	4	
	5	REC - OFFICE 105	20	1					0.8	1.0	1	20	REC - REFRIGERATOR - STUDY CAFE	6	
	7	REC - REFRIGERATOR -...	20	1	1.0	0.2					1	20	REC - STUDY/CAFE	8	
	9	REC - KITCHENETTE	20	1			0.4	0.2			1	20	REC - STUDY/CAFE	10	
	11	REC - CONFERENCE ROOM 102A	20	1					0.8	0.2	1	20	REC - STUDY/CAFE	12	
	13	REC - STUDY NOOK	20	1	0.8	0.6					1	20	REC - TELE/DATA	14	
	15	REC - CLASSROOM 106 - FRONT	20	1			1.4	0.6			1	20	SP - TELE/DATA	16	
	17	REC - CLASSROOM 106	20	1					1.4	1.6	1	20	REC - TELE/DATA	18	
	19	REC - CLASSROOM 106	20	1	1.2	0.8					1	20	REC - COMP LAB	20	
	21	REC - CLASSROOM 107 - FRONT	20	1			0.6	0.8			1	20	REC - COMP LAB	22	
	23	REC - CLASSROOM 107	20	1					1.4	0.8	1	20	REC - COMP LAB	24	
	25	REC - CLASSROOM 107	20	1	1.2	0.6					1	20	REC - COMP LAB	26	
	27	REC - ADJUNCT	20	1			0.8	0.7			1	20	REC - COMP LAB	28	
	29	REC - ADJUNCT	20	1					0.8	1.6	1	20	REC - FLEX	30	
	31	REC - ADJUNCT	20	1	1.4	0.8					1	20	PROJ - CLASSROOM 106,107	32	
	33	REC - ENTRY/LOBBY	20	1			1.2	0.4			1	20	NAC PANEL	34	
	35	REC - RESTROOM	20	1					0.6	0.5	1	20	FACP	36	
	37	REC - CORRIDOR	20	1	1.2	4.2								38	
	39	REC - CORRIDOR	20	1			1.2	4.2			3	70	AHP-1	40	
	41	REC - STUDY/CAFE	20	1					0.6	4.2				42	
	43				5.4	0.0					1	20	SPARE	44	
	45	AHP-2	90	3			5.4	0.0			1	20	SPARE	46	
	47								5.4	0.0	1	20	SPARE	48	
	49	REC - ELEC ROOM 109	20	1	0.4	0.0					1	20	SPARE	50	
	51	HAND DRYER (WOMEN)	20	1			1.5	0.0			1	20	SPARE	52	
	53	HAND DRYER (MEN)	20	1					1.5	0.0	1	20	SPARE	54	
	55	SPARE	20	1	0.0	0.0					1	20	SPARE	56	
	57	SPARE	20	1			0.0	0.0			1	20	SPARE	58	
	59	SPARE	20	1					0.0	0.0	1	20	SPARE	60	
				Total Load:	20.9 kW		20.1 kW		23.2 kW						
				Total Amp:	175 A		167 A		195 A						

2 2

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
DATA	1600 VA	50.00%	800 VA		
HVAC	29200 VA	100.00%	29200 VA	Total Conn. Load:	64.2 kW
MISC	3460 VA	70.00%	2422 VA	Total Est. Demand:	52.4 kW
REC	29920 VA	66.71%	19960 VA	Total Conn.:	178 A
				Total Est. Demand:	145 A

Panel Schedule Notes:

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

DRAWING UPDATES

2	Addendum No 4	01/17/25

KEY PLAN

ELECTRICAL SCHEDULES

E81

DRAWING LIST - HVAC

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HVAC SYMBOLS

SYMBOL	DESCRIPTION
	TURNING VANES
	VOLUME DAMPER
FD	FIRE DAMPER (1 ½ HR)
FD(3)	FIRE DAMPER (3 HR)
FSD	FIRE/SMOKE DAMPER (1 ½ HR)
FSD(3)	FIRE/SMOKE DAMPER (3 HR)
SD	SMOKE DAMPER (NOT RATED)
S	DUCT SMOKE DETECTOR
	MOTOR OPERATED DAMPER
T	DUCT TEMPERATURE SENSOR
H	DUCT HUMIDITY SENSOR
SP	DUCT STATIC PRESSURE SENSOR
	HUMIDIFIER
	SUPPLY DUCT
	RETURN OR EXHAUST DUCT
	FLEXIBLE DUCT CONNECTION
	ACOUSTICALLY LINED DUCTWORK
	EXISTING DUCTWORK & EQUIPMENT
	EXISTING DUCTWORK & EQUIPMENT TO BE REMOVED
	BALANCING VALVE
BFP	BACKFLOW PREVENTER
	CHECK VALVE
	CONTROL VALVE (2-WAY)
	CONTROL VALVE (3-WAY)
	EXISTING PIPING
	EXISTING PIPING TO BE REMOVED
	EXPANSION JOINT/COMPENSATOR
	FLEXIBLE PIPE CONNECTION
	PRESSURE REDUCING VALVE
	REMOVE TO POINT AND CAP
	REMOVE TO POINT FOR RECONNECTION
	SHUT OFF VALVE
	STEAM TRAP
	Y-STRAINER WITH BLOW DOWN
	UNION
	PIPE BRANCH TAKE-OFF FROM BOTTOM
	PIPE BRANCH TAKE-OFF FROM TOP
	PIPE DROP
	PIPE RISE
DP	PIPING DIFFERENTIAL PRESSURE SENSOR
C	CARBON DIOXIDE SENSOR
H	HUMIDISTAT/HUMIDITY SENSOR
T	THERMOSTAT/TEMPERATURE SENSOR
	LOUVERED DOOR
UCD	UNDERCUT DOOR
	AIRFLOW DIRECTION
	TEST PLUG
	PRESSURE GAUGE
	RELIEF OR SAFETY VALVE
	THERMOMETER

GENERAL HVAC ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AAT	AMBIENT AIR TEMPERATURE
AC	AIR CONDITIONING
AD	ACCESS DOOR
AF	AIRFOIL
AFF	ABOVE FINISHED FLOOR
AL	ACOUSTICAL LINING
ALUM	ALUMINUM
APD	AIR PRESSURE DROP
ATR	AIR TEMPERATURE RISE
AV	AIR VENT
AWT	AVERAGE WATER TEMPERATURE
BAS	BUILDING AUTOMATION SYSTEM
BFP	BACKFLOW PREVENTER
BI	BACKWARD INCLINED
CABF	CABINET FAN
CEIL	CEILING
CENT	CENTRIFUGAL
CF	CEILING FAN
CO	CLEAN OUT
CTE	CONNECT TO EXISTING
DCV	DEMAND CONTROL VENTILATION
DDC	DIRECT DIGITAL CONTROL
DSD	DUCT SMOKE DETECTOR
DV	DRAIN VALVE
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
EXC	EXPANSION COMPENSATOR
FC	FORWARD CURVED
FPC	FIRE PROTECTION CONTRACTOR
FZP	FREEZE PROTECTION CABLE
F & T	FLOAT & THERMOSTATIC TRAP
GC	GENERAL CONTRACTOR
HTM	HEAT TRANSFER MODULE
IC	IN-LINE-CENTRIFUGAL
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MOP	MAXIMUM OVERCURRENT PROTECTION
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OV	OUTLET VELOCITY
PC	PLUMBING CONTRACTOR
PLEN	PLENUM
PPH	POUNDS PER HOUR
PRE	POWER ROOF EXHAUSTER (DOWNBLAST)
PROP	PROPELLER
RLA	RELIEF AIR
RLF	RELIEF FAN
REX	REMOVE EXISTING
RF	RETURN FAN
RR	REMOVE AND RELOCATE
RV	RELIEF VALVE
SF	SUPPLY FAN
SP	STATIC PRESSURE
SS	STAINLESS STEEL
STR	STRAINER
SV	SAFETY VALVE (STEAM)
T	TRANSFER GRILLE
TC	TUBULAR CENTRIFUGAL
TCC	TEMPERATURE CONTROL CONTRACTOR
TH	TOTAL HEAD
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UF	UTILITY FAN
ULH	ULTRA LOW HARMONIC
UPRE	POWER ROOF EXHAUSTER (UPBLAST)
VA	VANE AXIAL
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THRU ROOF
VVT	VARIABLE VOLUME VARIABLE TEMPERATURE
WPD	WATER PRESSURE DROP

EQUIPMENT TAGGING LEGEND

ABBREVIATION	TAGGING DESCRIPTION
S,R,E,T	XX-XX / XXX(X) — ABBREVIATION; TYPE; DUCT CONNECTION SIZE. SEE GRILLE AND DIFFUSER SCHEDULE FOR ADDITIONAL INFORMATION.; QUANTITY; CFM
CONV	XXX-X — ABBREVIATION; TYPE
FTR, RP	XXX-X-X'X" — ABBREVIATION; LENGTH; TYPE
ACC, ACH, ACU, AHU, AS, B, BDE, BDS, BT, CB, CC, CH, CRAC, CT, CTP, CU, CUA, CUW, DA, DC, DF, DT, EACC, EF, EHC, ERC, ERU, ERV, ET, F, FOP, GV, H, HC, HE, HVU, HX, MAU, P, PRV, RTU, SAT, SEP, ST, TCP, TXP	XXX-X — ABBREVIATION; MARK
ADU, CHB, CUH, EAV, ECH, EH, EUH, FCU, FD, FFU, FPVAV, FSD, GUH, HAV, PTAC, RHC, SAV, SD, UH, UV, VAV, WHP	XXX-X-X — ABBREVIATION; MARK; FLOOR
VFD	VFD-XX-XXXX — SERVICING EQUIPMENT TAG; SPECIFIC COMPONENT DESIGNATION

TEMPERATURE/HUMIDITY DESIGN PARAMETERS

OUTSIDE

SUMMER:	95°F DB, 75°F WB
WINTER:	-5°F

INSIDE (SUMMER):

OFFICE AREAS:	75°F, 60% RH MAXIMUM
CLASSROOMS:	75°F, 60% RH MAXIMUM

INSIDE (WINTER):

OFFICE AREAS:	70°F, NO MINIMUM % RH
CLASSROOMS:	70°F, NO MINIMUM % RH

DUCT SYSTEM ABBREVIATIONS

ABBREVIATION	DESCRIPTION
CAI	COMBUSTION AIR INTAKE
DC	DUST COLLECTION
EA	EXHAUST AIR
FLUE	FLUE
OA	OUTDOOR AIR
RA	RETURN AIR
RLA	RELIEF AIR
SA	SUPPLY AIR

PIPE SYSTEM ABBREVIATIONS

ABBREVIATION	DESCRIPTION
CWR	CHILLED WATER RETURN PIPING
CWS	CHILLED WATER SUPPLY PIPING
HVRF-WS/R	HYBRID VRF WATER SUPPLY/RETURN PIPING
HWR	HEATING WATER RETURN PIPING
HWS	HEATING WATER SUPPLY PIPING
RL	REFRIGERANT LIQUID PIPING
RS	REFRIGERANT SUCTION PIPING

HVAC ABBREVIATIONS

ABBREVIATION	DESCRIPTION
ACH	AIR COOLED CHILLER
AHP	AIR SOURCE HEAT PUMP
AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
BC	Generic Box Placeholder
BT	BUFFER TANK
CB	BOILER (NON-CONDENSING HYDRONIC)
CSF	CHEMICAL SHOT FEEDER
CUH	CABINET UNIT HEATER
DC	DUST COLLECTOR
DOAS	ROOFTOP UNIT
E	EXHAUST GRILLE
EF	EXHAUST FAN
ERU	ENERGY RECOVERY UNIT
ET	EXPANSION TANK
FCU	FAN COIL UNIT
GMP	GLYCOL MAKE-UP PACKAGE
L	LOUVER
MOD	MOTOR OPERATED DAMPER
PCWP	PRIMARY CHILLED WATER PUMP
PHWP	PRIMARY HEATING WATER PUMP
R	RETURN GRILLE
S	SUPPLY GRILLE OR DIFFUSER
SHWP	SECONDARY HEATING WATER PUMP
TCP(B-AAC)	TEMPERATURE CONTROL PANEL
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE

ALTERNATES:

6. AIR HANDLING UNIT - 2

   AHU-2 PURCHASED BY OWNER AND RECEIVED AND INSTALLED BY THE CONTRACTOR. PROVIDE INDIVIDUAL LINE ITEM FOR EQUIPMENT COST. REFER TO EQUIPMENT SCHEDULE(S).

7. AIR HANDLING UNIT - 3

   AHU-3 PURCHASED BY OWNER AND RECEIVED AND INSTALLED BY THE CONTRACTOR. PROVIDE INDIVIDUAL LINE ITEM FOR EQUIPMENT COST. REFER TO EQUIPMENT SCHEDULE(S).

8. AIR COOLED CHILLER - 1

   ACH-1 PURCHASED BY OWNER AND RECEIVED AND INSTALLED BY THE CONTRACTOR. PROVIDE INDIVIDUAL LINE ITEM FOR EQUIPMENT COST. REFER TO EQUIPMENT SCHEDULE(S).

9. HYBRID VRF SYSTEM

   HYBRID VRF SYSTEM PURCHASED BY OWNER AND RECEIVED AND INSTALLED BY THE CONTRACTOR. PROVIDE INDIVIDUAL LINE ITEM FOR EQUIPMENT COST. REFER TO EQUIPMENT SCHEDULE(S).

10. MAIN BAS

    MAIN BAS (BOD: SEIMENS) EQUIPMENT PURCHASED BY OWNER AND RECEIVED AND INSTALLED BY THE CONTRACTOR. PROVIDE INDIVIDUAL LINE ITEM FOR EQUIPMENT COST. REFER TO EQUIPMENT SCHEDULES. REFER TO ALTERNATE BAS ARCHITECTURE DIAGRAM.

11. MANUFACTURER SPECIFIC BAS

    MANUFACTURER SPECIFIC BAS (BOD: TRANE) EQUIPMENT PURCHASED BY OWNER AND RECEIVED AND INSTALLED BY THE CONTRACTOR. PROVIDE INDIVIDUAL LINE ITEM FOR EQUIPMENT COST. REFER TO EQUIPMENT SCHEDULES. REFER TO ALTERNATE BAS ARCHITECTURE DIAGRAM.

1

ALLLOWANCE(S):

1. PROVIDE ALLOWANCE FOR MATERIALS AND LABOR FOR COMPLETE INSTALLATION OF 1/2 TON AIR COOLED SPLIT SYSTEM SERVING ELEC 119. TECHNOLOGY LOADS ARE OWNER DEPENDENT AND SHALL BE VERIFIED DURING CONSTRUCTION. ASSUME 150 FT REFRIGERATION LINESET. CONDENSING UNIT SHALL BE MOUNTED ON OUTDOOR CONCRETE EQUIPMENT PAD. INDOOR FAN COIL SHALL BE WALL MOUNTED ABOVE DOOR. PROVIDE WITH MANUFACTURER THERMOSTAT / TEMPERATURE CONTROL.

GENERAL HVAC NOTES:

A. THE HVAC SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.

B. DRAWINGS ARE DIAGRAMMATIC. INDICATED POSITIONS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. EXACT EQUIPMENT LOCATIONS AND DUCTWORK AND PIPING ROUTING SHALL BE SUBJECT TO BUILDING CONSTRUCTION AND INTERFERENCES WITH OTHER TRADES. WHERE THE LOCATION OF A SPECIFIC PIPE, DUCT, OR DEVICE IS DIMENSIONED, ITS INSTALLED LOCATION SHALL BE AS DIMENSIONED UNLESS COORDINATED OTHERWISE WITH THE ARCHITECT OR ENGINEER.

C. CUTTING AND PATCHING OF WALLS AND FLOORS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION. IF THE MC DEFACES OR DAMAGES WALLS, CEILINGS, FLOORS, OR FINISHES, THE MC SHALL BE RESPONSIBLE FOR PATCHING, REPAIRING, AND REFINISHING. PATCHING MATERIALS SHALL MATCH THE NEW CONDITIONS AS APPLICABLE. FINISH PAINTING SHALL BE BY THE GENERAL CONTRACTOR.

D. PROVIDE FIRESTOPPING AT PENETRATIONS OF FIRE-RATED ASSEMBLIES. REFER TO THE ARCHITECTURAL LIFE SAFETY PLANS FOR THE LOCATION OF FIRE-RATED ASSEMBLIES. FIRESTOPPING SHALL BE PERFORMED BY THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION.

E. EXCEPT FOR SLAB ON GRADE, PROVIDE FIRESTOPPING AT PENETRATIONS OF NON-FIRE-RATED FLOORS. FIRESTOPPING SHALL BE PERFORMED BY THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION.

F. WHERE DUCTS, CONDUITS, OR PIPES ARE REMOVED THROUGH FIRE-RATED FLOORS OR WALLS, THE CONTRACTOR REMOVING THE DEVICE/MATERIAL SHALL SEAL THE REMAINING OPENING TO MAINTAIN FIRE RATING.

G. INSTALL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION IN SUCH A MANNER SO THAT PROPER CLEARANCE IS PROVIDED FOR SERVICING PER THE NATIONAL ELECTRIC CODE.

H. PROVIDE SEISMIC RESTRAINT OF HVAC SYSTEMS AS INDICATED IN THE SPECIFICATIONS.

I. EQUIPMENT LAYOUT IS BASED ON SCHEDULED EQUIPMENT. ACTUAL INSTALLED EQUIPMENT SIZE, CONFIGURATION, AND DUCTWORK/PIPING CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING AND DUCTWORK/PIPING LAYOUT.

J. EQUIPMENT SCHEDULES CONTAIN BOTH NOTES AND REMARKS. NOTES APPLY TO ALL EQUIPMENT SCHEDULED. REMARKS APPLY ONLY TO SPECIFIC EQUIPMENT AS INDICATED.

K. EQUIPMENT, VALVES, DAMPERS, CONTROL DEVICES, ETC. SHALL BE ACCESSIBLE. IF LOCATED ABOVE DRYWALL CEILING OR BEHIND FINISHED WALL, PROVIDE AN ACCESS DOOR. COORDINATE ACCESS DOOR LOCATIONS WITH ARCHITECT.

L. HVAC SYSTEM PIPING AND DUCTWORK SHALL NOT BE INSTALLED IN ELEVATOR SHAFTS, ELEVATOR MACHINE ROOMS, ELECTRICAL ROOMS, OR INFORMATION TECHNOLOGY (LOW VOLTAGE) ROOMS. EXCEPTION – PIPING AND DUCTWORK DIRECTLY RELATED TO HVAC EQUIPMENT CONDITIONING THE ROOM. ROUTE PIPING AND DUCTWORK INTO THE ROOM OVER THE DOOR AND NOT OVER PANELS OR EQUIPMENT. CONTACT ARCHITECT/ENGINEER PRIOR TO INSTALLATION OF ANY OTHER PIPING OR DUCTWORK.

M. DO NOT SUPPORT DUCTWORK OR PIPING FROM ANOTHER DUCT, PIPE, OR CONDUIT. DO NOT SUPPORT ANY ITEM FROM METAL ROOF DECK.

N. NO EXPOSED PIPING OR DUCTWORK SHALL BE INSTALLED BELOW 7 '-6" IN AN EGRESS CORRIDOR.

O. ATTENTION IS CALLED TO THE LIMITED CEILING SPACE. COORDINATE ALL WORK WITH CEILING HEIGHTS, SOFFITS, STRUCTURE, AND LIGHTS. HOLD DUCTWORK AS HIGH AS POSSIBLE, TO DECK BETWEEN BEAMS IF REQUIRED, AND TIGHT TO STRUCTURE. PROVIDE ANY AND ALL OFFSETS AND EFFORT REQUIRED TO FACILITATE THE INSTALLATION OF OTHER EQUIPMENT AND SYSTEMS. COORDINATE CLOSELY WITH OTHER TRADES. NOTE WHERE DUCT AND PIPE ELEVATIONS ARE INDICATED ON PLAN.

P. REFER TO EQUIPMENT DRAWINGS FOR OWNER FURNISHED EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS. PROVIDE PIPING/DUCTWORK CONNECTIONS AS REQUIRED. ROUGH-INS SHALL BE FIELD COORDINATED WITH ACTUAL EQUIPMENT PURCHASED.

Q. UNLESS NOTED OTHERWISE, STANDARD ROOM SENSOR/THERMOSTAT MOUNTING HEIGHT SHALL BE 44" ABOVE THE FINISHED FLOOR TO THE CENTERLINE OF THE DEVICE. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

R. DO NOT LOCATE THERMOSTATS OR SENSORS ON AN EXTERIOR WALL, BEHIND OPEN DOORS, OR IN CONFLICT WITH FURNITURE OR WALL HUNG DEVICES. COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT.

S. CONTROL WIRING SHOWN ON PLAN DOES NOT INDICATE ROUTING OR SCOPE OF WORK BETWEEN EQUIPMENT AND SENSOR/STAT. CONTROL WIRING SHOWN INDICATES EQUIPMENT ZONING.

T. DUCTWORK DIMENSIONS SHOWN ARE GROSS (OUTSIDE SHEETMETAL SIZE). NET FREE AREA OF LINED OR DOUBLE WALL DUCTWORK IS REDUCED BY THE DUCT LINING OR INSULATION THICKNESS.

U. DURING CONSTRUCTION, COVER SUPPLY, RETURN, AND EXHAUST DUCTWORK OPENINGS TO PREVENT CONSTRUCTION DUST FROM ENTERING THE DUCTWORK. IF DUST COLLECTS INSIDE DUCTWORK, DUCTWORK SHALL BE CLEANED PRIOR TO PROJECT TURNOVER.

V. DUCTWORK SHALL BE PRESSURE TESTED AS INDICATED IN THE SPECIFICATIONS. IF A SECTION OF DUCTWORK FAILS THE TEST, THE SECTION SHALL BE SEALED AND RETESTED UNTIL IT PASSES.

W. RADIUS ELBOWS SHALL BE UTILIZED THROUGHOUT THE DUCTWORK SYSTEM. UNLESS SPECIFICALLY SHOWN, DO NOT USE 90° ELBOWS WITH TURNING VANES WITHOUT PRIOR APPROVAL OF THE ENGINEER.

X. STRAIGHT BRANCH INLET DUCTS TO VAV TERMINAL UNITS WITHIN FIVE FEET OF THE SUPPLY MAIN SHALL BE THE VAV TERMINAL UNIT CONNECTION SIZE UNLESS NOTED OTHERWISE. IF BRANCH INLET DUCT INCLUDES ELBOWS OR IS GREATER THAN FIVE FEET LONG, DUCT SIZE SHALL BE INCREASED 2" TO A POINT TWO FEET FROM THE VAV TERMINAL UNIT INLET.

Y. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING TYPES, GRID LAYOUT, AND EXACT LOCATIONS OF CEILING DIFFUSERS AND GRILLES.

Z. DUCT RUNOUT SIZE SHALL BE THE SAME AS THE DIFFUSER OR GRILLE CONNECTION SIZE UNLESS NOTED OTHERWISE.

AA. INSTALL AND PROPERLY SUPPORT FLEXIBLE DUCTWORK TO AVOID AIRFLOW RESTRICTIONS. NO KINKS OR CRIMPS ARE PERMITTED.

AB. FLEXIBLE DUCTWORK SHALL NOT PENETRATE THRU WALLS. RIGID SHEETMETAL DUCTWORK IS REQUIRED AT WALL PENETRATIONS.

AC. FLEXIBLE DUCTWORK SHALL NOT BE USED IN EXPOSED LOCATIONS.

AD. PROVIDE A VOLUME DAMPER FOR EACH DIFFUSER AND GRILLE. LOCATE THE DAMPER AT THE BRANCH DUCTWORK CONNECTION TO THE MAIN. EXCEPTION – FOR A VAV TERMINAL UNIT SERVING A SINGLE SUPPLY AIR DIFFUSER, A VOLUME DAMPER IS NOT REQUIRED AT THE CONNECTION TO THE DIFFUSER OR GRILLE.

AE. PROVIDE VOLUME DAMPER HANDLE EXTENSIONS FOR VOLUME DAMPERS INSTALLED IN INSULATED DUCTWORK.

AF. PROVIDE FIRE DAMPERS AND FIRE/SMOKE DAMPERS WHERE INDICATED AND WHERE REQUIRED BY CODE. REFER TO THE ARCHITECTURAL LIFE SAFETY PLANS FOR THE LOCATION OF FIRE AND SMOKE-RATED ASSEMBLIES. WHERE THE LOCATION OF A DAMPER (INDICATING A RATED ASSEMBLY), CONFLICTS WITH THE LIFE SAFETY PLAN, NOTIFY THE ARCHITECT OR ENGINEER.

AG. DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY DIV. 26, INSTALLED BY DIV. 23, AND WIRED BY DIV. 26. MECHANICAL CONTRACTOR SHALL COORDINATE EXACT DETECTOR LOCATION WITH ELECTRICAL CONTRACTOR.

AH. PROVIDE DUCTWORK ACCESS DOORS FOR MOTOR OPERATED DAMPERS, FIRE DAMPERS, SMOKE DAMPERS, FIRE/SMOKE DAMPERS, SMOKE DETECTORS, HUMIDIFIERS, AND REHEAT COIL INLETS AND OUTLETS. WHERE REHEAT COIL IS INTEGRAL WITH A VAV TERMINAL UNIT, TERMINAL UNIT SHALL INCLUDE A BOTTOM ACCESS DOOR. IMPORTANT THAT DUCTWORK ACCESS DOORS ARE ACCESSIBLE. IF LOCATED ABOVE DRYWALL CEILING OR BEHIND FINISHED WALL, PROVIDE ACCESS DOOR. COORDINATE ACCESS DOOR LOCATIONS WITH ARCHITECT.

AI. PROVIDE AIR VENTS IN PIPING SYSTEMS AS REQUIRED FOR COMPLETE AIR ELIMINATION. PROVIDE HOSE END DRAIN VALVES AS REQUIRED TO ALLOW COMPLETE SYSTEM DRAINING. NOTE LOCATIONS ON AS-BUILT DRAWINGS.

AJ. BRANCH PIPING CONNECTIONS TO EQUIPMENT SHALL BE 3/4" MINIMUM UNLESS NOTED OTHERWISE.

AK. INTER-CONNECTING PIPING BETWEEN RADIANT CEILING PANELS SHALL BE 1/2" USING A COMBINATION OF HARD COPPER PIPE AND SOFT COPPER TUBING TO ALLOW FOR EXPANSION AS RECOMMENDED BY THE MANUFACTURER.

AL. BULLHEAD PIPING CONFIGURATIONS IN PIPING ARE PROHIBITED.

AM. PROVIDE TRAPPED AIR CONDITIONING CONDENSATION DRAINS FOR COOLING COILS. SIZE TRAPS PER DETAIL. PIPE COOLING COIL CONDENSATE DRAIN PIPING TO NEAREST FLOOR DRAIN. PROVIDE AIR GAP AT TERMINATION.

2 AN. ALL EXTERIOR EQUIPMENT PADS SHALL BE INSTALLED PER ASCE 32 OR AS DETAILED ON THE CIVIL/ARCHITECTURAL DRAWINGS.

Karpinski ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

STATE OF OHIO
FRANKLIN A. EISENHOWER
E-65457
REGISTERED
PROFESSIONAL ENGINEER

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

DRAWING UPDATES

1	Addendum No 3	01/10/25
2	Addendum No 4	01/17/25

KEY PLAN

HVAC LEGEND AND GENERAL NOTES

H01

ROOFTOP UNIT SCHEDULE PART 1

EQUIPMENT TAG		DISCHARGE	SUPPLY AIR												RELIEF AIR												COOLING COIL																		HEATING SECTION										REMARKS
ABBREV.	MARK		TOTAL CFM	MIN OA CFM	NO. FANS	CFM (EA)	TSP ("WC)	ESP ("WC)	TYPE	SIZE (IN)	RPM	DRIVE	BHP	MOTOR HP	TOTAL CFM	NO. FANS	CFM (EA)	TSP ("WC)	ESP ("WC)	TYPE	SIZE (IN)	RPM	DRIVE	BHP	MOTOR HP	MAX CFM	MIN CFM	TOTAL MBH	SENSIBLE MBH	EAT (DB °F)	EAT (WB °F)	LAT (DB °F)	LAT (WB °F)	FACE VEL (FPM)	APD ("WC)	ROWS	FPI	DISCHARGE SP ("WC)	AC COND DRAIN SIZE (IN)	REFRIG. TYPE	REFRIG. CHARGE (lb)	EER	CFM	INPUT (MBH)	OUTPUT (MBH)	MIN. GAS PRESS ("WC)	EAT (°F)	LAT (°F)	STAGES	FACE VEL (FPM)	APD ("WC)	EFICIENCY (%)	
DOAS	1	HORIZONTAL	2,500	2,500	1	2,500	3.74	1.5	BC	-	-	DIRECT	2.31	3	2,500	1	2,500	1.17	0.5	BC	-	-	DIRECT	1.12	2	2,500	2,500	112.2	74.9	81.1	67.2	51	51	400	0.57	6	12	-0.4	-	410A	-	17.8	2,500	150	121.5	-		75	5:1	-	0.26	80	1,2

ROOFTOP UNIT SCHEDULE PART 2

EQUIPMENT TAG		COMPRESSOR DATA			CONDENSER DATA			FILTER BANK #1					FILTER BANK #2					RA FINAL FILTER					ENERGY RECOVERY MARK	ELECTRICAL				OPER. WEIGHT (LB)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK	NO (EA)	FLA (EA)	CAPACITY STEPS (%)	NO. FANS (EA)	HP (EA)	AAT (°F)	TYPE	MERV	DEPTH (IN)	CLEAN APD ("WC)	DIRTY APD ("WC)	TYPE	MERV	DEPTH (IN)	CLEAN APD ("WC)	DIRTY APD ("WC)	TYPE	MERV	DEPTH (IN)	CLEAN APD ("WC)	DIRTY APD ("WC)		VOLT	PH	MCA	MOP				
DOAS	1	1	27.6	MODULATING	1	1.3	95	PLEATED	8	2	0.31	0.47	CARTRIDGE	14	12	0.52	0.78	PLEATED	8	2	0.31	0.47	ERU-DOAS-1	480	3			3,500	NEXGEN	NRAK	1,2

NOTES:

A. SUPPLY FAN TSP IS TO INCLUDE DIRTY APD OF ALL FILTERS
B. HEATING COIL CFM IS THE AIRFLOW TO BE USED TO SELECT COIL CAPACITY. FACE VELOCITY AND APD ARE BASED ON SUPPLY AIR TOTAL CFM.
C. COOLING COIL MAXIMUM CFM IS THE AIRFLOW TO BE USED TO SELECT THE COIL COOLING CAPACITY. MINIMUM CFM IS THE LOWEST AIRFLOW THE UNIT WILL OPERATE AT - IT IS IMPORTANT THAT AT THIS AIRFLOW, COOLING PERFORMANCE IS STABLE WITH NO POSSIBILITY OF FREEZING THE COIL. COORDINATE MAXIMUM AND MINIMUM OPERATING CONDITIONS WITH REFRIGERANT CYCLE LIMITATIONS.
D. REFER TO AHU DIAGRAM(S) FOR UNIT COMPONENT LAYOUT AND SIZE REQUIREMENTS.
E. FILTERS SHALL BE LOCATED UPSTREAM OF COILS, HEAT EXCHANGERS, ENERGY RECOVERY COMPONENTS, AND SUPPLY FANS.
F. ALL 3 PHASE MOTORS, 5 HP AND ABOVE, SHALL BE PROVIDED WITH PHASE LOSS PROTECTION.
G. FOR EQUIPMENT WITH INTEGRAL OVERCURRENT PROTECTIVE DEVICES, UNLESS NOTED OTHERWISE, THE MINIMUM SHORT CIRCUIT CURRENT RATING (SCCR) FOR EACH DEVICE SHALL BE 14kA FOR 480 VOLT AND 10kA FOR 208/240 VOLT.

REMARKS:
1. PROVIDE VIBRATION ISOLATION ON ALL FANS.
2. PROVIDED BY OWNER AND INSTALL UNDER THIS CONTRACT. DIV 23 SHALL COORDINATE WITH ALL OTHER TRADES.

FAN COIL UNIT SCHEDULE

EQUIPMENT TAG			CONFIGURATION	INLET	DISCHARGE	RECESSED DEPTH (IN)	FAN DATA			GPM	WPD (FT)	COOLING PERFORMANCE										HEATING PERFORMANCE					ELECTRICAL				MANUFACTURER	MODEL	REMARKS
ABBREV.	FLOOR	MARK					CFM	ESP ("WC)	MOTOR HP			TOTAL MBH	SENSIBLE MBH	EAT (DB °F)	EAT (WB °F)	LAT (DB °F)	LAT (WB °F)	EWT (°F)	LWT (°F)	AHP MARK	BC MARK	MBH	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	V	PH	MOP	MCA			
FCU	1	1	CONCEALED	DUCTED	DUCTED	-	600	-	-	-	-	17.3	14.9	76	63	53.1	52.8	44	56	AHP-1	BC-1	19.4	70	90	140	110	208	1	15	15	TRANE	TPEFYW	1,2,3,4
FCU	1	2	RECESSED	BOTTOM	BOTTOM	13	330	-	-	-	-	9.5	8.2	76	63	53.1	52.8	44	56	AHP-1	BC-1	10.6	70	90	140	110	208	1	15	0.35	TRANE	TPLFYW	5
FCU	1	3	RECESSED	BOTTOM	BOTTOM	13	250	-	-	-	-	7.2	6.2	76	63	53.1	52.8	44	56	AHP-1	BC-1	8.1	70	90	140	110	208	1	15	0.35	TRANE	TPLFYW	5
FCU	1	4	RECESSED	BOTTOM	BOTTOM	13	250	-	-	-	-	7.2	6.2	76	63	53.1	52.8	44	56	AHP-1	BC-1	8.1	70	90	140	110	208	1	15	0.35	TRANE	TPLFYW	5
FCU	1	5	RECESSED	BOTTOM	BOTTOM	13	200	-	-	-	-	5.8	5	76	63	53.1	52.8	44	56	AHP-1	BC-1	6.5	70	90	140	110	208	1	15	0.35	TRANE	TPLFYW	5
FCU	1	6	CONCEALED	DUCTED	DUCTED	-	800	-	-	-	-	23	19.9	76	63	53.1	52.8	44	56	AHP-1	BC-1	26	70	90	140	110	208	1	15	15	TRANE	TPEFYW	1,2,3,4
FCU	1	7	CONCEALED	DUCTED	DUCTED	-	1000	-	-	-	-	28.8	24.8	76	63	53.1	52.8	44	56	AHP-2	BC-2	32.4	70	90	140	110	208	1	15	15	TRANE	TPEFYW	1,2,3,4
FCU	1	8	CONCEALED	DUCTED	DUCTED	-	1300	-	-	-	-	37.4	32.2	76	63	53.1	52.8	44	56	AHP-2	BC-2	42.1	70	90	140	110	208	1	15	15	TRANE	TPEFYW	1,2,3,4
FCU	1	9	RECESSED	BOTTOM	BOTTOM	13	200	-	-	-	-	5.8	5	76	63	53.1	52.8	44	56	AHP-2	BC-2	6.5	70	90	140	110	208	1	15	15	TRANE	TPLFYW	5
FCU	1	10	RECESSED	BOTTOM	BOTTOM	13	200	-	-	-	-	5.8	5	76	63	53.1	52.8	44	56	AHP-2	BC-2	6.5	70	90	140	110	208	1	15	0.35	TRANE	TPLFYW	5
FCU	1	11	CONCEALED	DUCTED	DUCTED	-	800	-	-	-	-	23	19.9	76	63	53.1	52.8	44	56	AHP-2	BC-2	26	70	90	140	110	208	1	15	0.35	TRANE	TPEFYW	1,2,3,4

NOTES:

A. HEATING CAPACITY IS BASED ON MORNING WARM-UP OPERATION.

REMARKS:
1. PROVIDE PLENUM RATED LITTLE GIANT MODEL VCCA CONDENSATE REMOVAL PUMP WITH HARD WIRED CONNECTION. DISCONNECT SWITCH SHALL BE PROVIDED BY THE EC.
2. PROVIDE WITH FILTER BOX ON RETURN.
3. PROVIDE FLEX CONNECTORS.
4. INSTALLED ABOVE CEILING.
5. INSTALLED RECESSED IN CEILING.

AIR SEPARATOR SCHEDULE

EQUIPMENT TAG		SERVICE	GPM	WPD (FT)	SIZE (IN)	SYSTEM FILL PRESSURE (PSI)	OPER. WEIGHT (LB)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK									
AS	1	HEATING WATER	130	0.1	3	-	300	SPIROTHERM	VXN300FA	1,2,3
AS	2	CHILLED WATER	120	0.2	3	-	270	SPIROTHERM	VDN300FA	1,2,3

NOTES:

1

A. DESIGNED, CONSTRUCTED AND STAMPED FOR 125 PSI IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE.
B. HIGH CAPACITY AIR VENT.
C. MAKEUP WATER PRESSURE REDUCING VALVE SHALL BE SET TO SYSTEM FILL PRESSURE.

REMARKS:

1. INTEGRAL STRAINER.
2. PROVIDE WITH REMOVABLE HEAD.
3. PROVIDE WITH VENT HEAD.

VARIABLE FREQUENCY DRIVE SCHEDULE

EQUIPMENT TAG		SERVICE	TYPE	ELECTRICAL				ENCLOSURE	OPTIONS								OPER. WEIGHT (LB)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK			TYPE	VOLT	PH	MOTOR HP		DRIVE STATUS CIRCUIT	BYPASS	PASSIVE HARMONIC FILTER	OUTPUT LC FILTER	MULTIPLE MOTOR OUTPUT	DAMPER CONTROL CIRC.	DISCONNECT SAFETY CIRC.	REDUNDANT DRIVE PACK.				
VFD	1	PCWP-1	6 PULSE	NORMAL	480	3	3	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	2	PCWP-1	6 PULSE	NORMAL	480	3	3	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	3	AHU-3-SF-1	6 PULSE	NORMAL	480	3	20	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	4	AHU-3-RF-1	6 PULSE	NORMAL	480	3	7.5	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	5	SHWP-1	6 PULSE	NORMAL	480	3	3	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	6	SHWP-2	6 PULSE	NORMAL	480	3	3	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	7	AHU-2-SF-1	6 PULSE	NORMAL	480	3	20	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	8	AHU-2-RF-1	6 PULSE	NORMAL	480	3	3	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	
VFD	9	AHU-2-RF-2	6 PULSE	NORMAL	480	3	3	NEMA 12	YES	MANUAL	YES	YES	NO	NO	YES	NO	200	ABB	ACH580	

NOTES:

A. ALL VFDS SHALL BE BY THE SAME MANUFACTURER.
B. MC SHALL COORDINATE VFD SIZE WITH MOTOR HP.
C. VFDS SHALL BE FURNISHED BY THE MC, INSTALLED AND WIRED BY THE EC. BOTH MC AND EC SHALL COORDINATE ALL FINAL LOCATIONS AND REQUIRED SERVICE CLEARANCES.
D. ALL VFD OPTIONS EXCEPT THE OUTPUT LC FILTERS SHALL BE INTEGRAL TO THE VFD ENCLOSURE.
E. OUTPUT LC FILTER SHALL BE LOCATED IN A SEPARATE DEDICATED ENCLOSURE. FILTER SHALL BE FURNISHED WITH THE VFD. FILTER SHALL BE INSTALLED AND WIRED BY THE EC. BOTH MC AND EC SHALL COORDINATE FINAL LOCATION AND REQUIRED SERVICE CLEARANCES.

REMARKS:
1. PROVIDE PLENUM RATED LITTLE GIANT MODEL VCCA CONDENSATE REMOVAL PUMP WITH HARD WIRED CONNECTION. DISCONNECT SWITCH SHALL BE PROVIDED BY THE EC.
2. PROVIDE WITH FILTER BOX ON RETURN.
3. PROVIDE FLEX CONNECTORS.

PUMP SCHEDULE

1

EQUIPMENT TAG		SERVICE	TYPE	GPM	TH (FT)	NPSH RQD (FT)	SIZE (IN x IN x IN)	DRIVE	BHP	MOTOR HP	VFD MARK	RPM	ELECTRICAL		OPER. WEIGHT (LB)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK												VOLT	PH				
PCWP	1	CHILLED WATER	END SUCTION	130	50	4.42	2 X 2.5 X 7.375	CLOSE COUPLED	2.1	3	VFD-1	1,729	480	3	300	BELL & GOSSETT	E-1510	2,3
PCWP	2	CHILLED WATER	END SUCTION	130	50	4.42	2 X 2.5 X 7.375	CLOSE COUPLED	2.1	3	VFD-2	1,729	480	3	300	BELL & GOSSETT	E-1510	2,3
PHWP	1	HEATING WATER	INLINE	75	25	4.25	2.5 X 2.5 X 5.5	CLOSE COUPLED	0.75	1	-	1,712	480	3	300	BELL & GOSSETT	E-80	1,3
PHWP	2	HEATING WATER	INLINE	75	25	4.25	2.5 X 2.5 X 5.5	CLOSE COUPLED	0.75	1	-	1,712	480	3	300	BELL & GOSSETT	E-80	1,3
SHWP	1	HEATING WATER	END SUCTION	75	54	4.36	1 X 2 X 7	CLOSE COUPLED	1.55	3	VFD-5	1,794	480	3	300	BELL & GOSSETT	E-1510	2,3
SHWP	2	HEATING WATER	END SUCTION	75	54	4.36	1 X 2 X 7	CLOSE COUPLED	1.55	3	VFD-6	1,794	480	3	300	BELL & GOSSETT	E-1510	2,3

REMARKS:

1. STARTER PROVIDED BY EC.
2. VARIABLE FREQUENCY DRIVE FURNISHED BY MC, INSTALLED BY EC.
3. DISCONNECT SWITCH WITH AUXILIARY CONTACT, PROVIDED BY EC.

EXPANSION TANK SCHEDULE

1

EQUIPMENT TAG		SERVICE	TYPE	MOUNTING	TANK VOLUME (GAL)	ACCEPT. VOLUME (GAL)	DIAMETER	HEIGHT	WEIGHT WHEN FULL (LB)	CHARGE PRESSURE (PSI)	MAX WORK PRESSURE (PSI)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK													
ET	1	HEATING WATER	BLADDER	VERTICAL	53	53	24	38	700	15	150	AMTROL	200-L	-
ET	2	CHILLED WATER	BLADDER	VERTICAL	53	53	24	38	700	15	150	AMTROL	200-L	-

NOTES:

A. DESIGN, CONSTRUCTED, AND STAMPED IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE.
B. STANDARD FACTORY AIR PRESSURE CHARGE IS 12 PSI. PRIOR TO SYSTEM FILL, MC SHALL FIELD SET CHARGE AS REQUIRED BY MANUFACTURER'S INSTRUCTIONS.

BUFFER TANK SCHEDULE

EQUIPMENT TAG		SERVICE	TANK VOLUME (GAL)	CONNECTIONS		DIAMETER (IN)	HEIGHT	WEIGHT WHEN FULL (LB)	MAX WORK PRESSURE (PSI)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK			NO	SIZE (IN)							
BT	1	CHILLED WATER	300	2	3	36	72	3,200	150	WESSELS	CBT-300-3F-150	1,2,3,4,5

2

NOTES:

A. DESIGN, CONSTRUCTED, AND STAMPED IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE.
B. 1" DRAIN VALVE WITH HOSE THREAD CONNECTION. PROVIDE PIPING FROM TANK DRAIN CONNECTION TO VALVE INLET SO THAT VALVE IS ACCESSIBLE.
C. LIFTING LUGS.

REMARKS:

1. AUTOMATIC AIR VENT.
2. LOWER CONNECTIONS.
3. TEMPERATURE AND PRESSURE GAUGE.
4. HAND HOLE.
2 5. INTERNAL BAFFLE.

CABINET UNIT HEATER SCHEDULE

EQUIPMENT TAG			TYPE	CONFIGURATION	INLET	DISCHARGE	RECESSED DEPTH (IN)	FAN					HEATING COIL									BOTTOM AFF (IN)	MANUFACTURER	MODEL	REMARKS
ABBREV.	FLOOR	MARK						CFM	ESP ("WC)	MOTOR HP	VOLT	PH	MBH	EAT (°F)	LAT(°F)	GPM	EWT(°F)	LWT (°F)	WPD (FT)	PPH	PSI				
CUH	1	1	HORIZONTAL	RECESSED	BOTTOM FRONT	TOP FRONT	10	350	-	1/15	120	1	13.5	70	105.6	1.4	140	120	0.4	-	-	4	RITTLING	RFRW-340-06	1,2

1

REMARKS:
1. ARCHITECT SHALL SELECT CABINET COLOR.
2. PROVIDE WITH INTEGRAL DISCONNECT SWITCH.

GLYCOL MAKE-UP PACKAGE SCHEDULE

EQUIPMENT TAG		SERVICE	TANK VOLUME (GAL.)	PUMP HP	PRESSURE RANGE (PSI)	CAPACITY (GPM @ PSI)	ELECTRICAL					OPER. WEIGHT (LB)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK						TYPE	DISCONNECT	OPERATION	VOLT	PH				
GMP	1	CHILLED WATER	50	1/3	10-70	1.8 @ 70	NORMAL	BY EC	INTEGRAL	120	1	550	WESSELS	GMP-13050	1,2

NOTES:

A. SEE AIR SEPARATOR SCHEDULE FOR SYSTEM FILL PRESSURE.

REMARKS:

1. FILL SYSTEM WITH 30% PROPYLENE GLYCOL FOR FREEZE PROTECTION TO -5 F.
2. MC (TCC) SHALL MONITOR OPERATION OF GMP WITH CURRENT SENSING RELAY.

DUST COLLECTOR SCHEDULE

1

EQUIPMENT TAG		AREA SERVED	TYPE	CONFIGURATION	SUPPLY AIR													FILTER					OPER. WEIGHT (LB)	MANUFACTURER	MODEL	REMARKS
ABBREV.	MARK				TOTAL CFM	NO. FANS	CFM (EA)	ESP ("WC)	TYPE	SIZE (IN)	RPM	DRIVE	BHP	MOTOR HP	VOLT	PH	VFD (Y/N)	TYPE	MERV	AREA (SQ FT)	QUANTITY	A/C RATIO				
DC	1	WOOD SHOP	DUAL DRUM	RECIRCULATING	10,676	1	10,676	14.0	BI	-	-	DIRECT	-	40	480	3	YES	CONICAL CARTRIDGE	15	5200	16	2.05:1	8,000	CAMFIL APC	GS16SQ	1,2,3,4,5,6,7,8,9,10,11,12,13

2

NOTES:

A. FILTERS SHALL BE LOCATED UPSTREAM OF FAN.
B. FILTER MEDIA SHALL BE FLAME RETARDANT.
C. ALL 3 PHASE MOTORS, 5 HP AND ABOVE, SHALL BE PROVIDED WITH PHASE LOSS PROTECTION.
D. FOR EQUIPMENT WITH INTEGRAL OVERCURRENT PROTECTIVE DEVICES, UNLESS NOTED OTHERWISE, THE MINIMUM SHORT CIRCUIT CURRENT RATING (SCCR) FOR EACH DEVICE SHALL BE 14kA FOR 480 VOLT AND 10kA FOR 208/240 VOLT.
E. EXTERNAL STATIC PRESSURE SHALL BE CALCULATED BASED ON A COMPLETE MATERIALS PACKAGE.

REMARKS:

1. PROVIDE WITH STINGER EXPLOSION PROTECTION ISOLATION VALVE.
2. PROVIDE WITH EXPLOSION VENT PLENUM ANGLED AT 55 DEG. KST 199.
3. PROVIDE WITH HIGH SPEED ABORT GATE AND ASSOCIATED SPARK DETECTORS FOR GATE OPERATION.
4. PROVIDE WITH SPARK ARRESTORS.
5. PROVIDE WITH STAGGERED CHANNEL INLET BAFFLES.
6. PROVIDE WITH INTERNAL SPRINKLER SYSTEM, SYSTEM SHALL BE PIPED FROM DRY VALVE IN BUILDING. COORDINATE WITH DIVISION 21 CONTRACTOR.
7. PROVIDE WITH INTEGRAL SAFETY MONITORING FILTER SYSTEM, AS COMBINED FILTER AND SPARK ARRESTOR FOR RECIRCULATION AIR FLOW.
8. PROVIDE WITH NEMA 12 CONTROL ENCLOSURE WITH VFD.
9. PROVIDE WITH AUTOMATIC PULSE CLEANING SYSTEM, SERVED FROM BUILDING AIR COMPRESSOR. COORDINATE WITH DIVISION 22 CONTRACTOR.
10. PROVIDE FULL SET OF REDUNDANT FILTERS FOR OWNER MAINTENANCE STOCK.
11. PROVIDE WITH ULTRA-SONIC DRUM LEVEL SENSING CONTROLS.
12. PROVIDE WITH REMOTE CONTROL PANEL LOCATED IN WOODSHOP.
13. PROVIDE WITH BAS CONNECTION. COORDINATE WITH DIVISION 23 CONTRACTOR.

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Karpinski
ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

STATE OF OHIO
FRANKLIN A. EISENHOWER
E-65457
REGISTERED
PROFESSIONAL ENGINEER

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

DRAWING UPDATES

1	Addendum No 3	01/10/25
2	Addendum No 4	01/17/25

KEY PLAN

HVAC SCHEDULES

H03

Karpinski
ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

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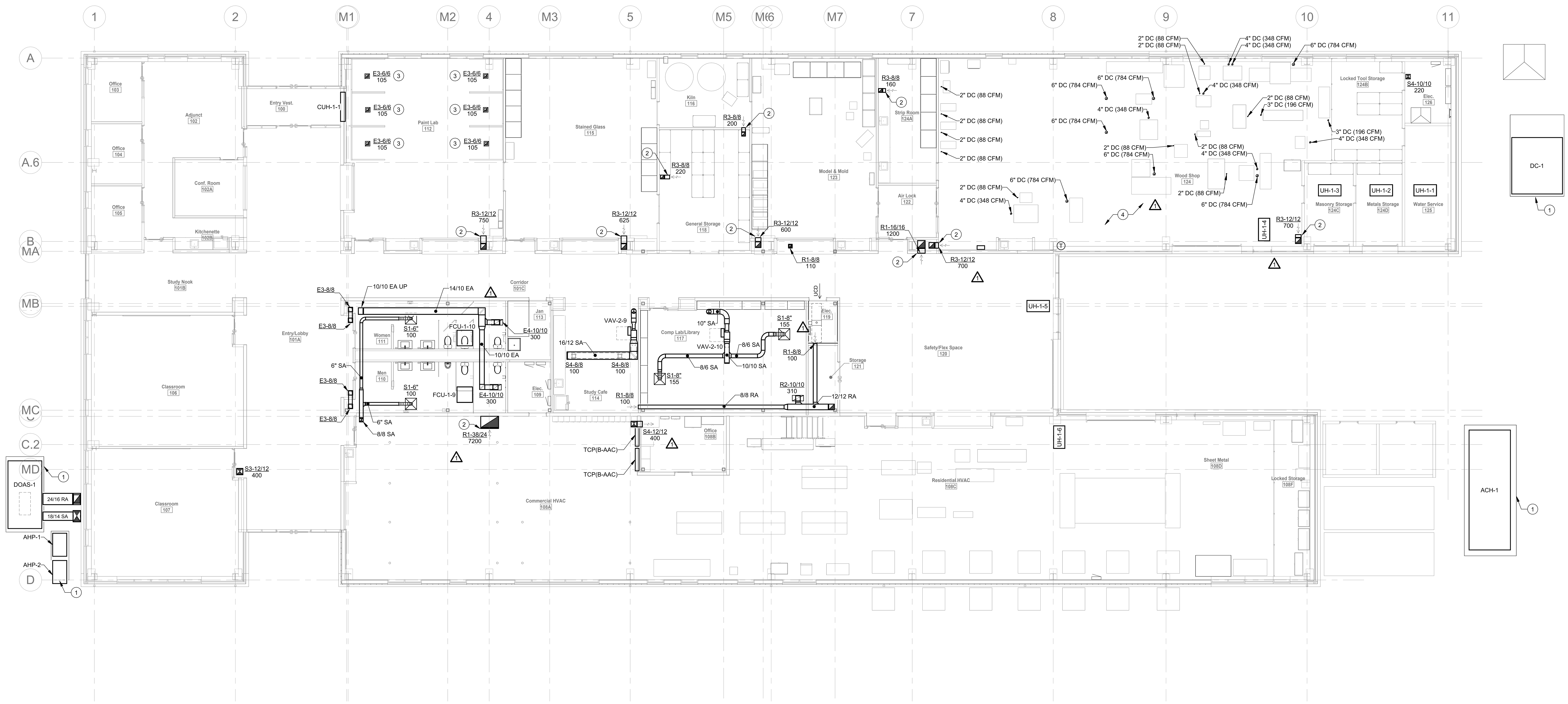


PLAN NOTES

1. FROST PROOF CONCRETE EQUIPMENT PAD. PAD SHALL EXTEND 8" BEYOND THE FOOTPRINT OF THE ASSOCIATED EQUIPMENT IT SUPPORTS. PAD SHALL EXTEND 6" ABOVE SURROUND FINISH GRADE.
2. INSTALL RETURN GRILLE 12" AFF.
3. COORDINATE SPECIFIC GRILLE LOCATION WITH OWNER. GRILLE MAY MOVE OUT OF CEILING TO ADJACENT LOCATON NEAR PAINTING NOOK.
4. ALL DC DUCT OUTLETS SHALL EXTEND TO 6FT AFF. EACH DC OUTLET SHALL TERMINATE WITH A FULL BLAST GATE. OWNER SHALL MAKE FINAL CONNECTIONS TO SHOP EQUIPMENT WITH FLEXIBLE DUCT.

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

DRAWING UPDATES

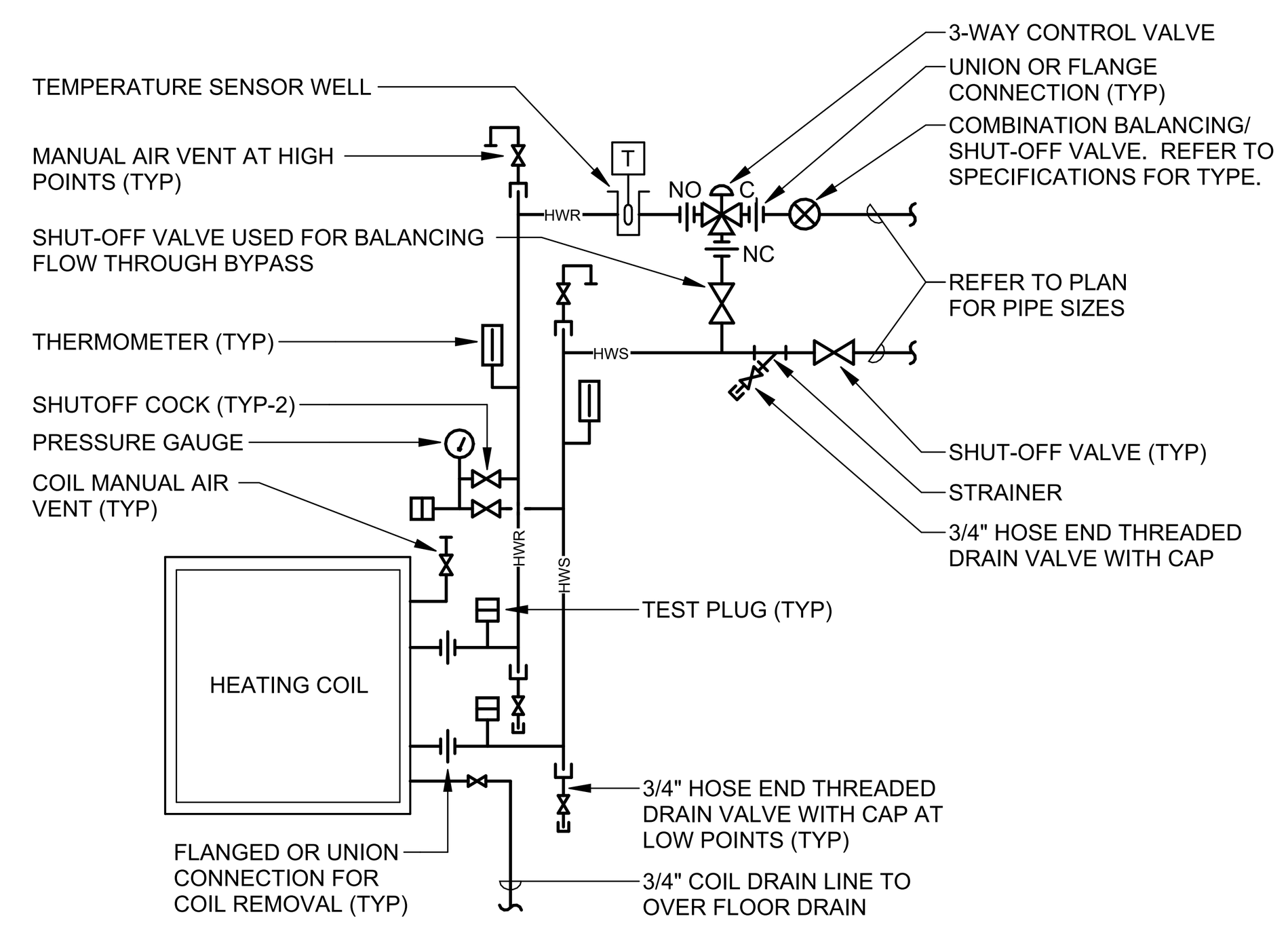
1	Addendum No 3	01/10/25

KEY PLAN

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

FIRST FLOOR HVAC PLAN

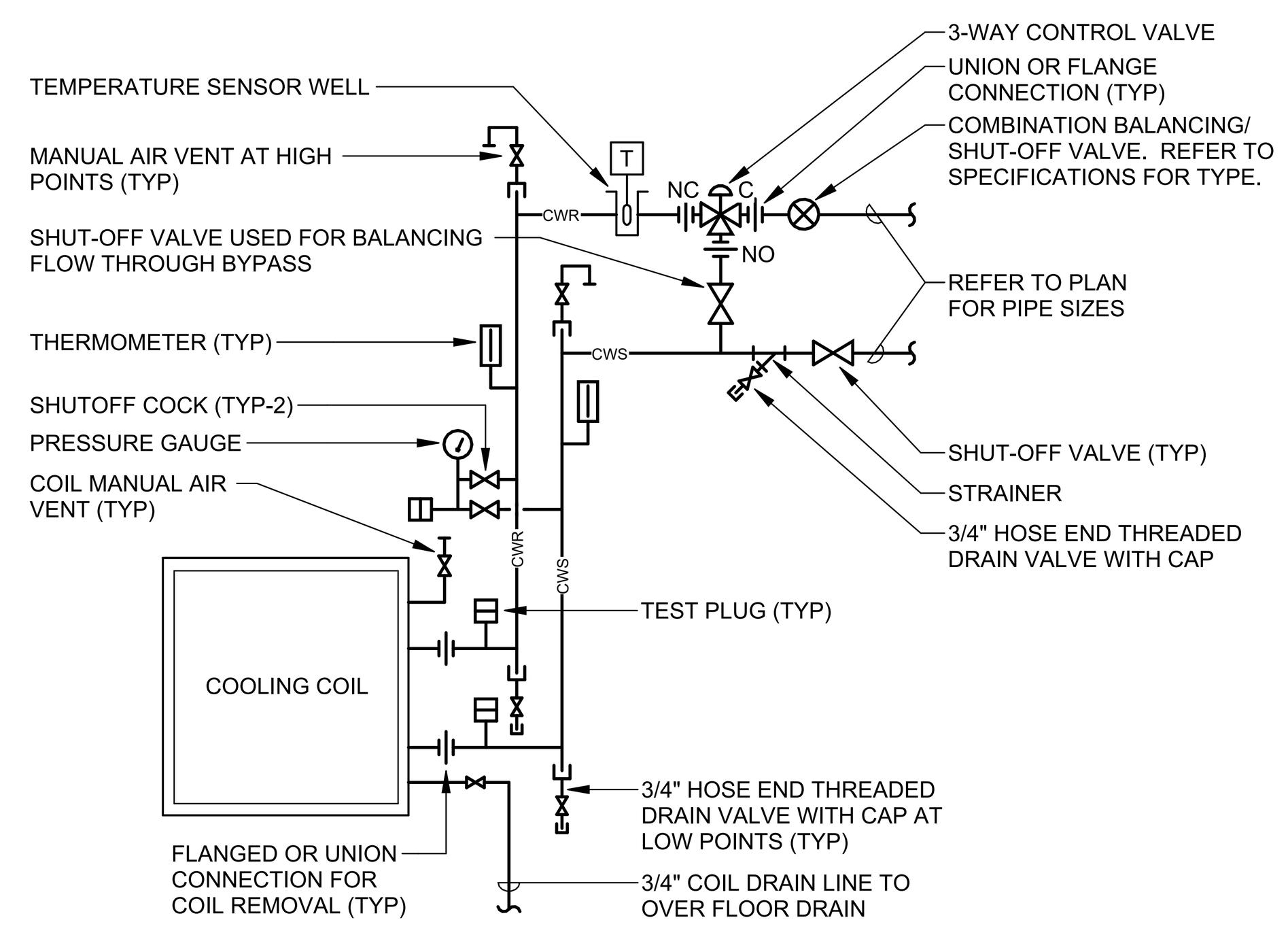
H11



NOTES:
A. ARRANGE PIPING AND PROVIDE REMOVABLE PIPING SECTIONS AS REQUIRED TO PERMIT COIL REMOVAL.
B. SHUT-OFF VALVES USED FOR BALANCING SHALL BE EQUIPPED WITH MEMORY STOP. BALL TYPE SHUT-OFF VALVES SHALL INCLUDE STAINLESS STEEL BALL AND STEM.

AHU HEATING COIL PIPING DIAGRAM

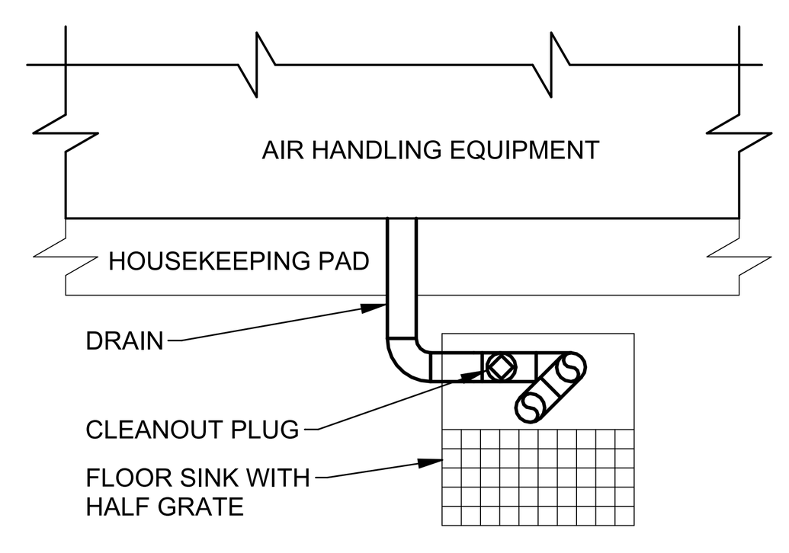
(SINGLE COIL - 3-WAY CONTROL VALVE) SCALE: NONE



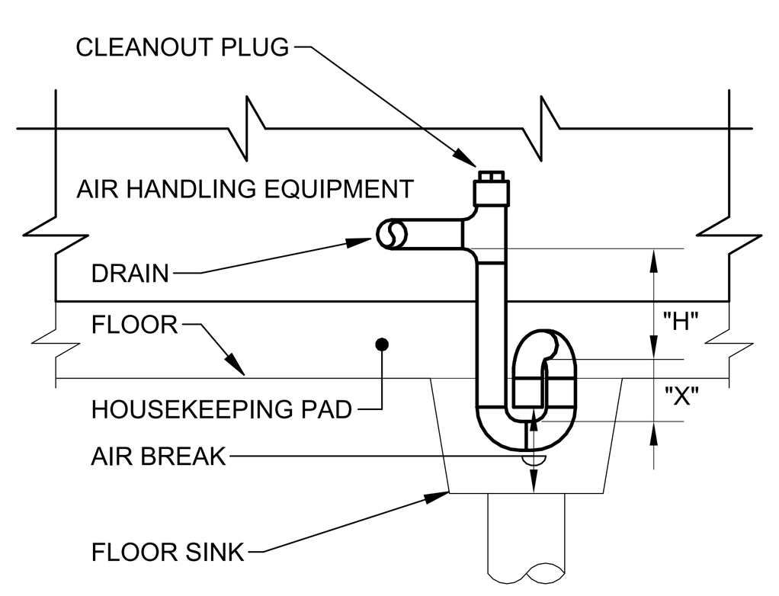
NOTES:
A. PIPE COIL COUNTER FLOW AIR TO WATER.
B. ARRANGE PIPING AND PROVIDE REMOVABLE PIPING SECTIONS AS REQUIRED TO PERMIT COIL REMOVAL.
C. SHUT-OFF VALVES USED FOR BALANCING SHALL BE EQUIPPED WITH MEMORY STOP. BALL TYPE SHUT-OFF VALVES SHALL INCLUDE STAINLESS STEEL BALL AND STEM.

AHU COOLING COIL PIPING DIAGRAM

(SINGLE COIL - 3-WAY CONTROL VALVE) SCALE: NONE



PLAN



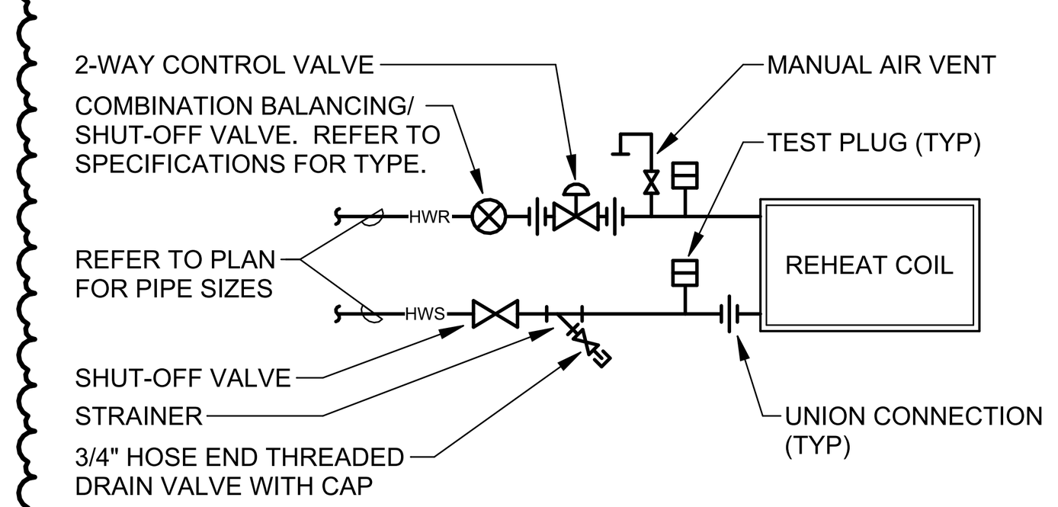
ELEVATION

TRAP DIMENSIONS		
COIL DISCHARGE STATIC PRESSURE ("WC)	"H" (IN)	"X" (IN)
-1.5	2.5	1.25
-2.0	3.0	1.5
-2.5	3.5	1.75
-3.0	4.0	2.0
-3.5	4.5	2.25
-4.0	5.0	2.5
-4.5	5.5	2.75
-5.0	6.5	3.0
-5.5	6.5	3.25
-6.0	7.0	3.5

NOTES:
1. THIS DETAIL REFERS TO A FLOOR MOUNTED AIR HANDLING UNIT INSTALLED ON A CONCRETE HOUSEKEEPING PAD.
2. WHERE UNIT IS SUSPENDED, PROVIDE TRAP AS DIMENSIONED. EXTEND DISCHARGE TO NEAREST FLOOR DRAIN AND TERMINATE WITH AN AIR BREAK.
3. WHERE AN AC CONDENSATE PUMP IS REQUIRED, PROVIDE TRAP AS DIMENSIONED. EXTEND DISCHARGE TO AND TERMINATE AT PUMP COLLECTION TANK.
4. TRAP SHALL BE CONSTRUCTED WITH DIMENSIONS AS INDICATED IN THE TABLE ABOVE. COIL DISCHARGE STATIC PRESSURE LISTED IN THE TABLE IS AT THE POINT IMMEDIATELY DOWNSTREAM OF THE COOLING COIL. REFER TO EQUIPMENT SCHEDULE. WHERE NOT SCHEDULED, STATIC PRESSURE SHALL BE MEASURED BY THE CONTRACTOR IN THE FIELD, AFTER STARTUP. WHERE MEASURED, ADD 1.0" WC TO ACCOUNT FOR DIRTY FILTERS.
5. HORIZONTAL DRAIN PIPING SHALL SLOPE AT A MINIMUM OF 1/4" PER FOOT.
6. WHERE NOT SCHEDULED, DRAIN PIPE SIZE SHALL MATCH UNIT CONNECTION SIZE.
7. WHERE SPACE IS AVAILABLE, LOCATE TRAP ABOVE FLOOR SINK.

INDOOR COOLING COIL CONDENSATE TRAP DETAIL

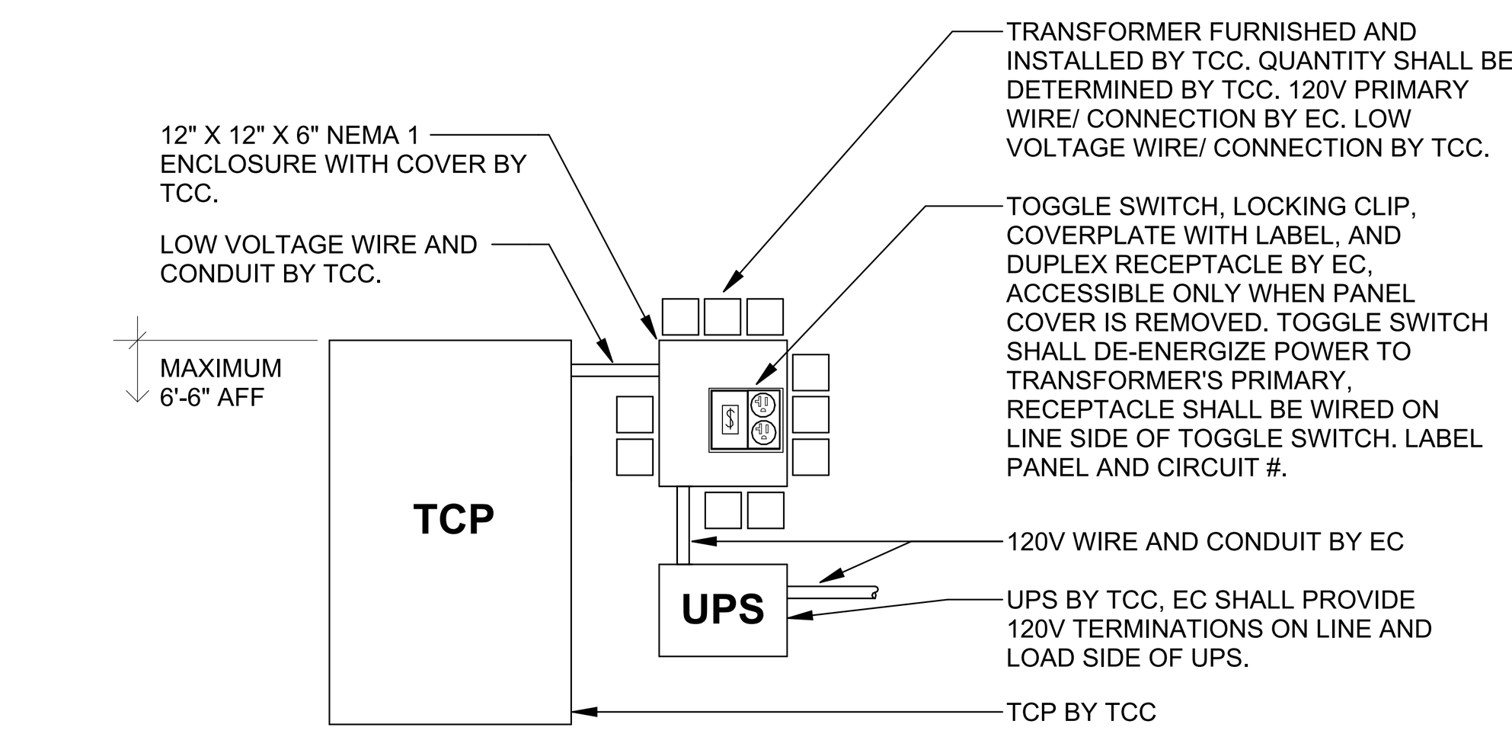
(NEGATIVE STATIC PRESSURE - DRAWTHRU) SCALE: NONE



NOTE:
1. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS AND DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM.

REHEAT COIL PIPING DIAGRAM

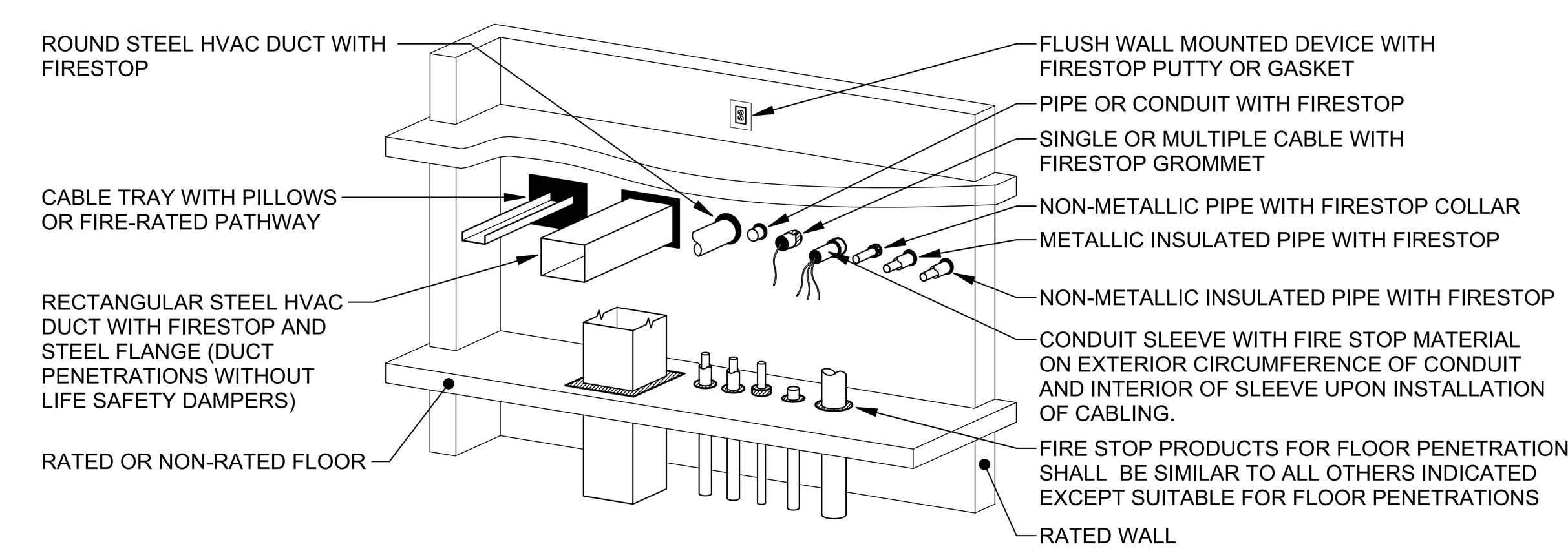
(2-WAY CONTROL VALVE) SCALE: NONE



NOTES:
A. TCP SHALL ONLY CONTAIN LOW VOLTAGE DEVICES AND WIRE.
B. PROVIDE UPS AS SPECIFIED. REFER TO SPECIFICATION 23 09 00.
C. TCC SHALL PROVIDE LABELS AS FOLLOWS:
 - NUMBER EACH TRANSFORMER (1,2,3,...)
 - INSIDE COVER: LIST OF DEVICES SERVED BY EACH TRANSFORMER.
D. DETAIL IS FOR REFERENCE ONLY. FINAL LAYOUT/CONFIGURATION SHALL BE FIELD DETERMINED AND COORDINATED WITH EC.
E. WHEN TCP INCLUDES A DATA OUTLET, TCC SHALL PROVIDE ROUGH-IN BOX INSIDE PANEL AND 1" CONDUIT STUB OUT FOR TELECOMMUNICATIONS CABLE. CABLE SHALL BE TERMINATED ON BISCUIT JACK WITHIN PANEL ENCLOSURE - FINAL CONNECTION WITH PATCH CORD.

TEMPERATURE CONTROL PANEL (TCP) DETAIL

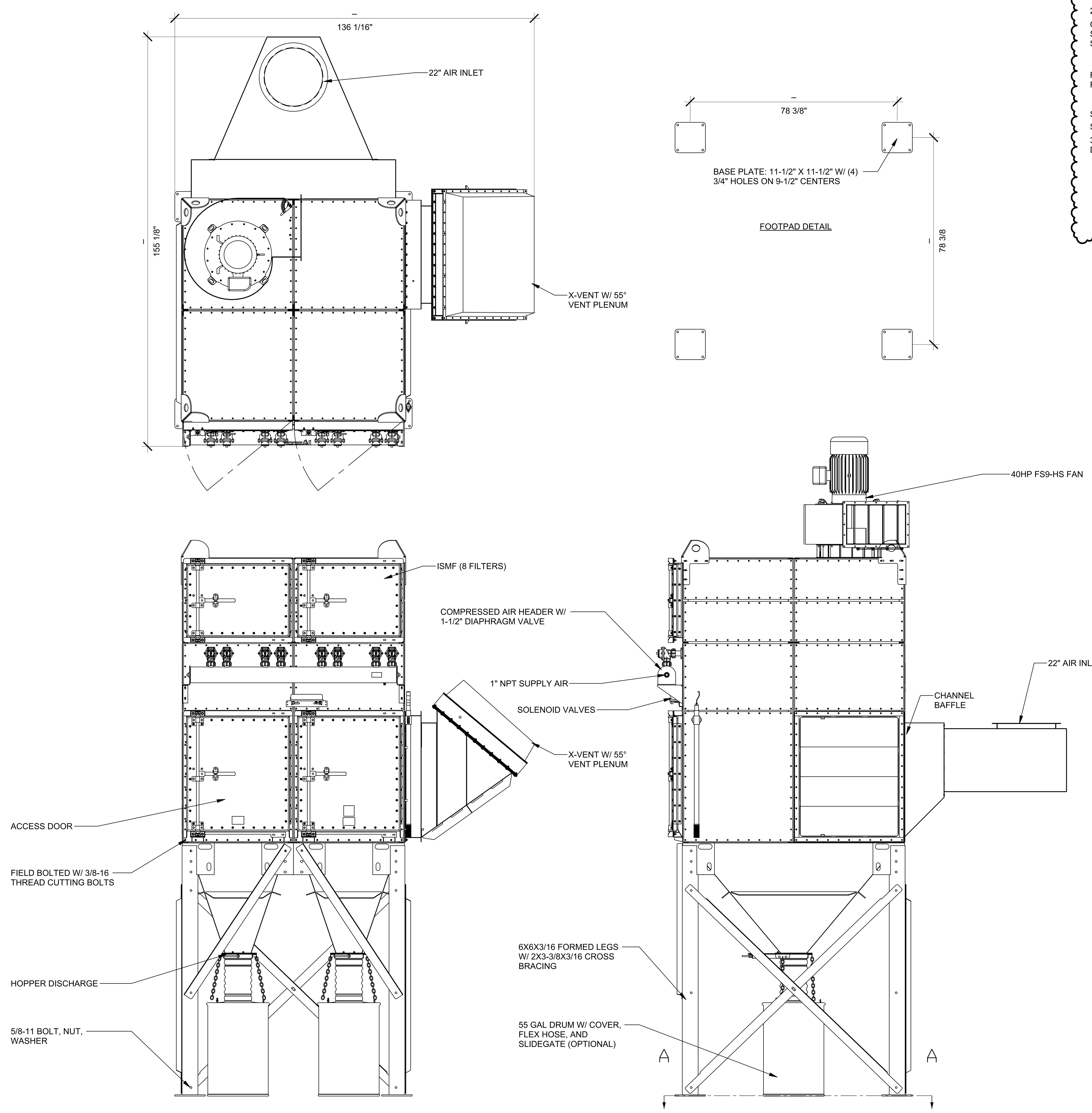
SCALE: NONE



NOTES:
1. REFER TO UL FIRE RESISTANCE DIRECTORY FOR COMPLETE INSTALLATION REQUIREMENTS.
2. IN AN OCCUPIED BUILDING, PERMANENT FIRESTOPPING SHALL BE INSTALLED WITHIN 24 HOURS OF PENETRATING A FIRE-RATED ASSEMBLY. IF PERMANENT FIRESTOPPING CANNOT BE INSTALLED WITHIN THIS TIME PERIOD, TEMPORARY FIRESTOP PILLOWS/ BLOCKS ARE PERMITTED, WHERE INSTALLATION ALLOWS, UNTIL PERMANENT FIRESTOP MATERIALS CAN BE PROPERLY INSTALLED.
3. THIS DETAIL IS A GENERAL DEPICTION OF FIRESTOPPING CONDITIONS. SOME CONDITIONS MAY NOT APPLY TO THE PROJECT SCOPE. REFER TO APPLICABLE SPECIFICATIONS AND LIFE SAFETY DRAWINGS AND REFERENCES FOR ADDITIONAL INFORMATION.

FIRESTOPPING DETAIL

SCALE: NONE

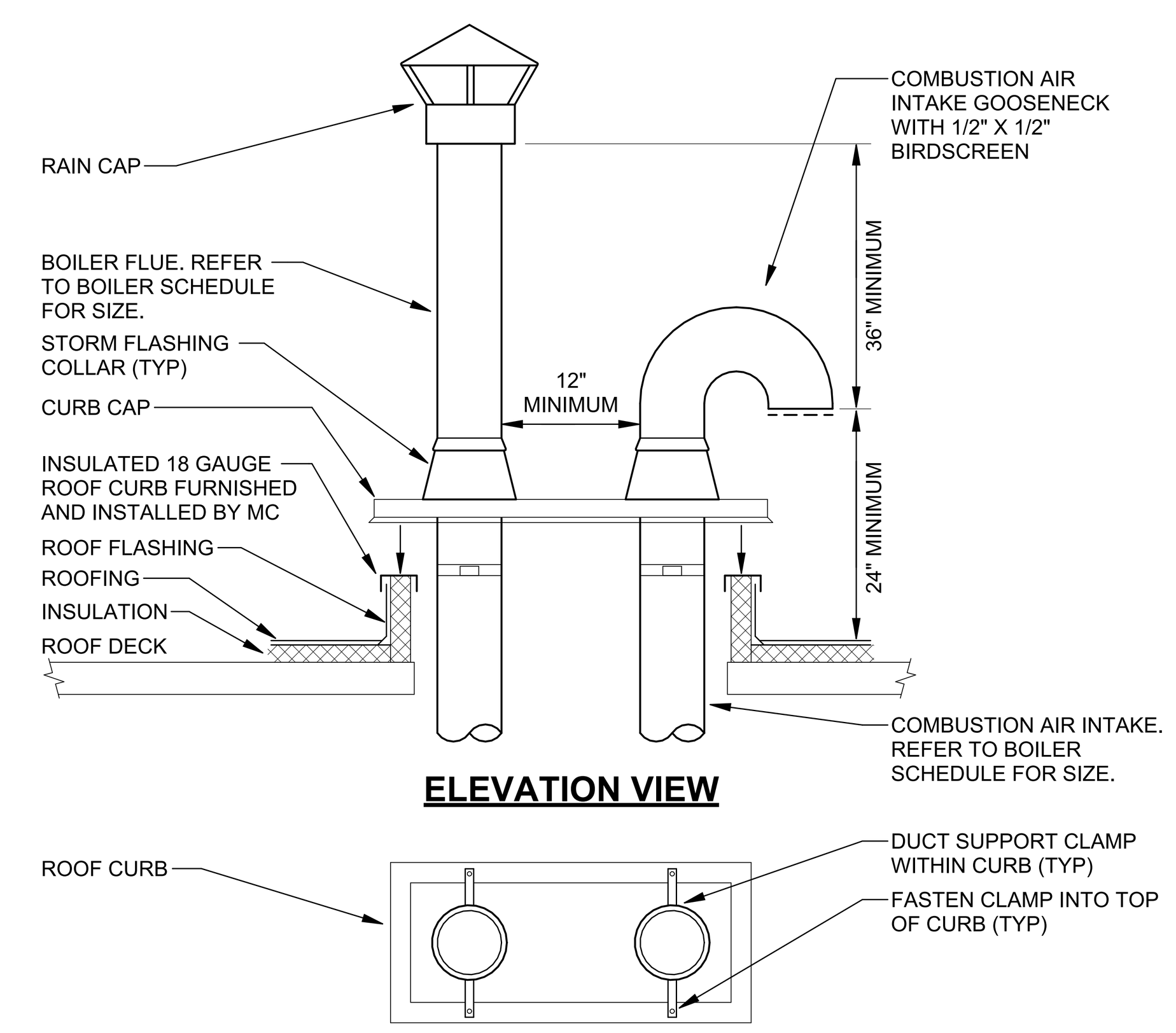


1. MODULAR CONSTRUCTION FROM 10 GA & 7 GA HRCS
2. SOLID STATE TIMER CONTROLS REQUIRE 120/240 VAC SINGLE PHASE 60HZ.
3. SOLENOIDS REQUIRE 120/1/60 VAC.
4. SOLENOID ENCLOSURE NEMA 4 RATED, INTEGRATED TIMER CONTROL ENCLOSURE NEMA 12 RATED, OTHER ELECTRICAL DEVICE ENCLOSURES & FARR DUST COLLECTOR TIMER ENCLOSURE NEMA 4X RATED.
5. IMPORTANT NOTE:
 FANS TYPICALLY EXPERIENCE FOUR TO TEN TIMES THE FULL LOAD AMPS DURING START-UP. CIRCUITS AND FUSES MUST BE ADJUSTED ACCORDINGLY.
6. CLEANING SYSTEM REQUIRES 30 SCFM OF CLEAN DRY COMPRESSED AIR WITH FACTORY SETTINGS AT 90 PSI.
7. OPERATING VESSEL PRESSURE:
 WITH X-VENT: -3 TO 0 PSIG
8. EXPLOSION VESSEL STRENGTH: 9.75 PSIG
9. WEIGHTS:
 COLLECTOR & FILTERS: 5,402 LBS
 HOPPER & SUPPORT: 1,323 LBS
 TOTAL WEIGHT: 6,725 LBS
10. ITEMS 2 & 3 MAY BE SHIPPED ASSEMBLED

NOTE:
1. VERIFY AND ADJUST ALL DIMENSIONS PER THE INSTALLED APPLIANCE'S REQUIREMENTS.

DUST COLLECTOR DETAIL

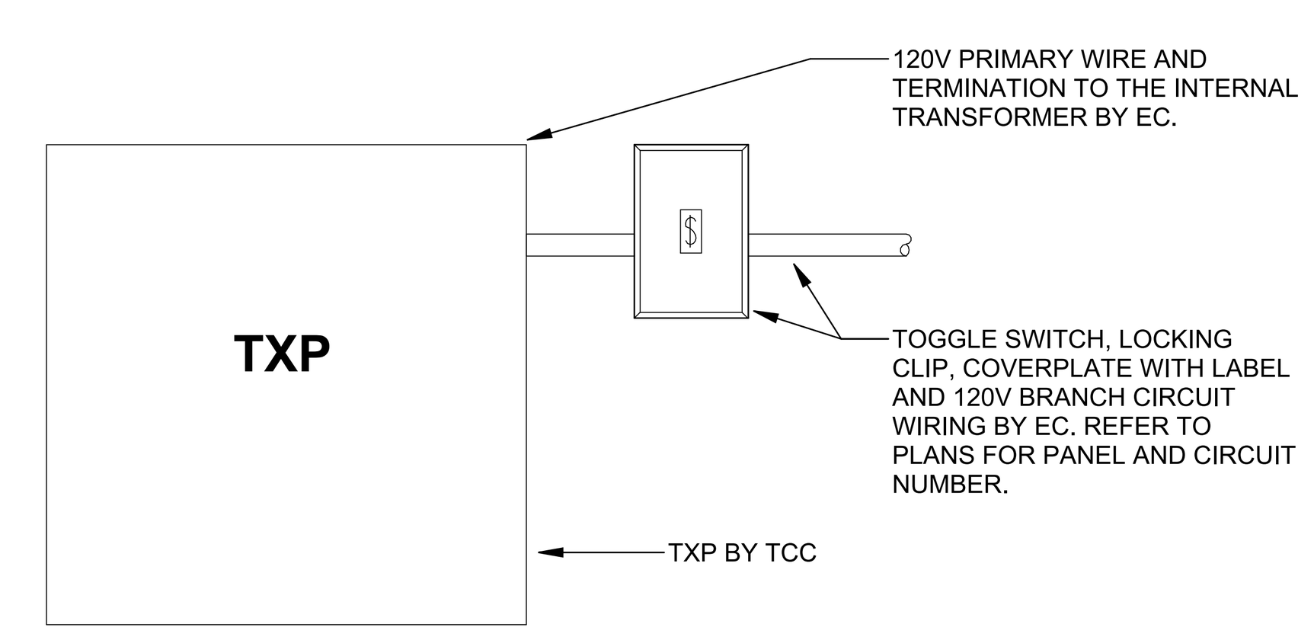
SCALE: NONE



NOTE:
1. VERIFY AND ADJUST ALL DIMENSIONS PER THE INSTALLED APPLIANCE'S REQUIREMENTS.

CONDENSING APPLIANCE FLUE/CAI ROOF TERMINATION DETAIL

SCALE: NONE



NOTES:
A. REFER TO SPECIFICATIONS SECTION 230900.
B. THE TXP SHALL BE NEMA 1 METAL ENCLOSURE WITH 120V INCOMING POWER SUPPLY WITH ONE TRANSFORMER SIZED TO ACCOMMODATE (5) OUTGOING LOW VOLTAGE OUTPUTS. (4) OUTPUTS SHALL BE UTILIZED FOR A MAXIMUM OF (4) VAV OR TERMINAL UNITS PER OUTPUT. (1) OUTPUT SHALL REMAIN AS A SPARE FOR FUTURE USE.
C. TCC SHALL BE RESPONSIBLE FOR VERIFYING POWER REQUIREMENTS AND MODIFYING AS REQUIRED. ANY MODIFICATION SHALL INCLUDE (1) SPARE OUTPUT FOR FUTURE USE.
D. TCC IS RESPONSIBLE FOR INSTALLING THE PROPER LOW VOLTAGE WIRE GAUGE AS REQUIRED FOR CURRENT AND VOLTAGE DROP. TCC SHALL PROVIDE LABELS AS FOLLOWS:
 a. OUTSIDE COVER: LIST OF TERMINAL EQUIPMENT SERVED.
 b. INSIDE: LIST OF TERMINAL EQUIPMENT SERVED BY EACH LOW VOLTAGE OUTPUT.

TEMPERATURE CONTROL TRANSFORMER PANEL (TXP) DETAIL

SCALE: NONE

Karpinski ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

STATE OF OHIO FRANKLIN A. EISENHOWER E-65457 REGISTERED PROFESSIONAL ENGINEER

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

100% CONSTRUCTION DOCUMENTS 07/08/2024

DRAWING UPDATES

2	Addendum No 4	01/17/25

KEY PLAN

HVAC DETAILS AND DIAGRAMS

H62

Karpinski ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

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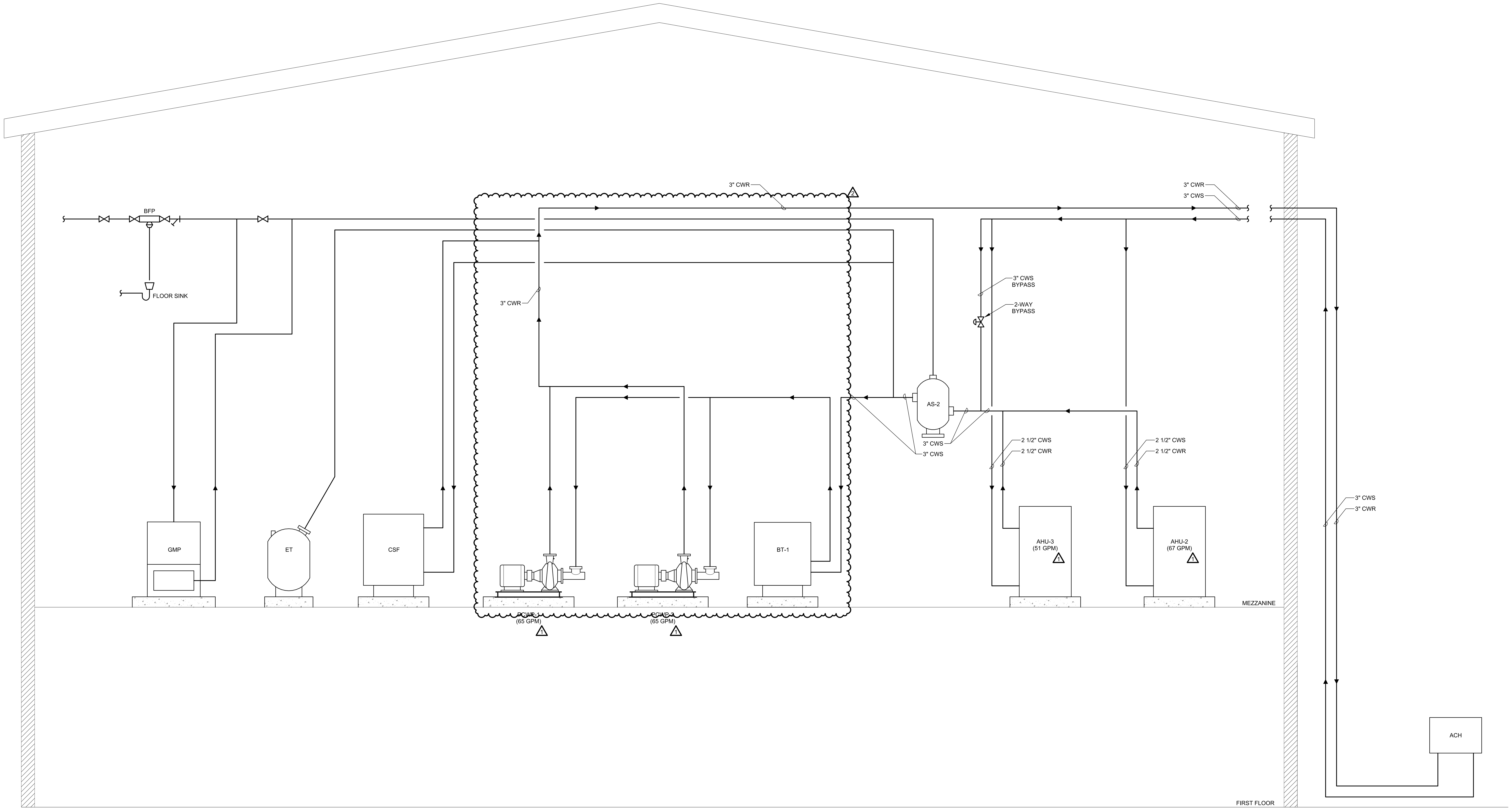

CHILLED WATER SYSTEM DIAGRAM
SCALE: NONE

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100% CONSTRUCTION DOCUMENTS 07/08/2024

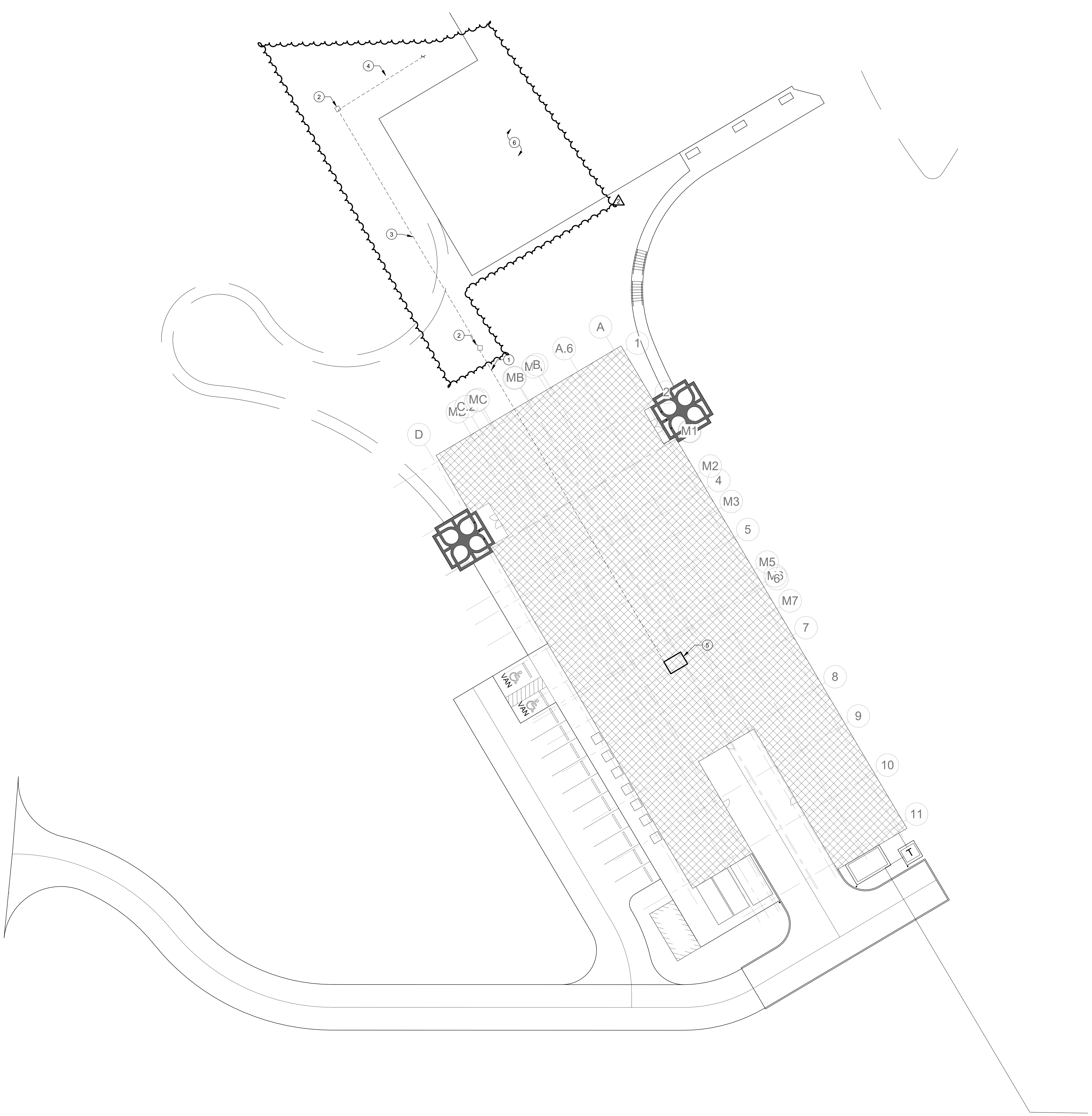
DRAWING UPDATES

1	Addendum No 3	01/10/25
2	Addendum No 4	01/17/25

KEY PLAN

HVAC PIPING DIAGRAMS

H64



PLAN NOTES

#	
1	PROVIDE (2) 4" CONDUITS FROM NEW TECHNOLOGY ROOM TO NEW 24"X24" COMMUNICATIONS HAND HOLE. REFER TO TECHNOLOGY DETAILS FOR ADDITIONAL INFORMATION.
2	PROVIDE NEW 24"X24" COMMUNICATIONS HAND HOLE.
3	PROVIDE (2) 4" CONDUITS BETWEEN TELECOMMUNICATIONS HAND HOLES.
4	PROVIDE (2) 4" CONDUITS TO INTERCEPT OFE CONDUITS FROM HEALTH SCIENCES BUILDING.
5	APPROXIMATE LOCATION OF MAIN TECHNOLOGY ROOM.
6	APPROXIMATE LOCATION OF HEALTH SCIENCES BUILDING.

Karpinski
ENGINEERING
8800 Lyra Dr., Suite 530
Columbus, OH 43240
614-430-9820
karpinskieng.com

STATE OF OHIO
JAMES T. CICERO
E-57397
REGISTERED
PROFESSIONAL ENGINEER

Belmont College Construction Trades Building

45869 Hammond Rd Connector
St Clairsville, OH, 43950

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DRAWING UPDATES

2	Addendum No 4	01/17/25

KEY PLAN

N

TECHNOLOGY SITE PLAN

SCALE: 1" = 20'-0"
0 20' 40'

T30