Addendum 03

DOCUMENT 00 91 00

DATE: April 1, 2026

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

PROJECT #: 22001.00

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

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

TO: Prospective Bidders

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

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

This addendum consists of 2 pages, 5 specification sections, 1 re-issued drawing sheet, and 1 exhibit.

FOR INFORMATION ONLY

1. The owner has approximately 6,000 cubic yards of fill dirt at a site adjacent to the project site that shall be utilized as needed for the project. See attached map for reference.

CHANGES TO THE PROJECT MANUAL

1. Section 00 11 00 Request for Bid Packet: Instructions to Bidders – Replace Article 2 section - denote bid opening date has moved back (2) weeks to April 23, 2026.
2. Section 01 21 00 Allowances: Add $60,000 tap fee contingency allowance.

GARMANN MILLER

3. Section 01 22 00 Unit Prices – Delete Section 1.05, B, 1, b (Tested Uncontaminated Soils) in its entirety.
4. Section 08 51 13 Aluminum Windows: Add Manko Window System Inc. to acceptable manufacturers.
5. Section 23 07 19 HVAC Piping Insulation: Changed 3.02.N to be pre-insulated polypropylene pipe and reference section 23 21 13.
6. Section 23 21 13 Hydronic Piping: Added 2.03 Chilled Water and Glycol Piping, Buried.
7. Section 23 64 23 Scroll Water Chillers: Paragraph 2.05 corrected Electrical Service.

CHANGES TO THE DRAWINGS

1. Drawing Sheet C1.1 Demolition Plan: Clarification of demolition scope – all existing structures and other items noted in the demo notes that are within the hatched area are to be removed and disposed of by contractor. Removal of existing propane tanks and above ground fuel storage tanks is the responsibility of the owner.
2. Drawing Sheet FP1.1: Provide new hose valve cabinet in the locations shown.

ATTACHMENTS

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

Specification Sections: 00 11 00, 01 21 00, 23 07 19, 23 21 13, 23 64 23

Drawing Sheets: FP1.1

Exhibit: Phase 2 Fill Dirt

END OF ADDENDUM

GARMANN MILLER

ARTICLE 2

Public/Legal Notification

The Clermont Sun

Date: February 19th, 2026

The Board of County Commissioners, Clermont County, Ohio, will be accepting sealed bids for the Filager Campus Improvement Phase 2, located at 4011 Filager Road Batavia, Ohio 45103. All bids shall be submitted in a sealed envelope marked: BID – Filager Campus Improvement Phase 2. All bids must be received in the Office of the Board of Clermont County Commissioners, 101 E. Main Street, Suite 329, Batavia, Ohio 45103, no later than **2:00 P.M. local time on Thursday, April 23rd, 2026**, at which time all bids shall be opened and read publicly.

Bid Documents (instructions to contractors, drawings, specifications, and bid form outlining the terms and conditions) may be purchased in hard copy or electronic PDF form at DC Reprographics, 1254 Courtland Ave, Columbus, Ohio 43201; www.DCplanroom.com; Phone 614-297-1200. Partial sets may only be purchased in addition to a minimum of one full set. Cost for the documents is non-refundable. Bid documents may also be viewed by interested parties at Garmann Miller ; 38 South Lincoln Drive, P.O. Box 71, Minster, OH 45865, Phone (419) 628-4240 or at the offices of the Clermont County Facilities Management Department; 4001 Filager Road, Batavia, Ohio, 45103, Phone: (513) 732-8850, rlinne@clermontcountyohio.gov Office hours are from 8:00 A.M. to 4:30 P.M., local time, Monday thru Friday.
There will be a pre-bid conference at the newly constructed Highway Operations Building, 4475 OH-222, Batavia, Ohio 45103 at 10 A.M. local time, Thursday, March 5th, 2026. Deadline for questions Wednesday, March 25th, 2026, by 12:00 P.M. local time.

NOTE: ALL PROSPECTIVE BIDDERS/RESPONDENTS ARE HEREBY CAUTIONED NOT TO CONTACT ANY MEMBERS OF THE CLERMONT COUNTY STAFF OR OFFICIALS OTHER THAN THE SPECIFIED CONTACT PERSONS.

The Architect's Estimate for the work of this project is $11,352,000.00

Each Bidder MUST submit their bid in DUPLICATE, one (1) original paper copy, along with one (1) searchable PDF copy on a USB. All copies must be in a sealed envelope marked: BID**-** Filager Campus Improvement Phase 2. Each bidder must deposit with his bid, security in the amount of 100% of the bid if in the form of a Bid Bond or in the amount of not less than ten (10%) percent of the bid if in the form of a certified check, cashier's check or letter of credit, for and subject to the conditions provided in the Information for Bidders and pursuant with Ohio Revised Code Section 153.54. Bid security furnished in Bond form shall be issued by a surety company or corporation licensed in the State of Ohio to provide said surety. Letters of credit and bid bonds must be filed with original signatures. Facsimile and electronic copies of the letter of credit, bid bond and Power of Attorney of the Surety will be deemed non-responsive.

The Board of Clermont County Commissioners reserves the right to waive any informalities, reject any or all bids and to hold such bids for a period of sixty (60) days before taking any action and to award a contract to the lowest and best bidder.

This notice is also posted on Clermont County's web site at the following URL link: www.clermontcountyohio.gov. In order to view the legal notice click on the link Legal Notices located on the Clermont County Home Page.

BOARD OF COUNTY COMMISSIONERS
CLERMONT COUNTY, OHIO

Bonnie J. Batchler, President
David L. Painter, Vice President
Claire B. Corcoran, Member

ATTEST:

_____
Gael Fawley, Clerk of the Board

Bill to:
Board of Clermont County Commissioners
ATTN: Angie Livesay
101 E. Main Street
Batavia, Ohio 45103

ARTICLE 3

General Instructions to Bidders

ARTICLE 3: GENERAL INSTRUCTIONS TO BIDDERS

1. *Bid Submittal:*

Reply to:

Board of County Commissioners
Clermont County
101 E. Main Street
Batavia, Ohio 45103-2960

All bids submitted for consideration by the Board of Clermont County Commissioners (referred to herein as “County” or “Owner”) must comply with these instructions in order to be considered. These instructions set forth minimum requirements as to the terms and conditions of the contract. Therefore, if any time frames, bid bond or other surety requirements set forth herein are in conflict with stated requirements in the specifications, the more stringent requirements shall prevail.

2. *Schedule of Activities:*

Bids Due and Opened:
Time: 2:00 P.M. local time
Date: Thursday, April 23rd, 2026
Location: Board of Clermont County Commissioners
Clermont County
101 E. Main Street, 3rd Floor
Batavia, Ohio 45103-2960

Pre-Bid Conference and Site Visit
Time: 10:00 A.M. local time
Date: Thursday, March 5, 2026
Location: County Engineer Highway Operations Building
Batavia, Ohio 45103

3. *Contractor Requirements:* It is required that the bidder have prior experience/expertise in the area pertaining to the bid items listed in Article 5 Project Specifications as attached.

4. *Foreign Corporations:* If the Bidder to be awarded the Contract is a foreign corporation, the Secretary of State has certified that such corporation is authorized to do business in this state; and until if the Bidder so awarded the Contract, is a person or partnership has filed with the Secretary of State as its

agent for the purpose of accepting service of summons in any action brought under Section 153.05 of the Revised Code or under Sections 4123.01 to 4123.94, inclusive of the Revised Code.

5. *Implied Requirements:* All products and services not specifically mentioned in the bid, but which are necessary to provide the functional capabilities described by the vendor, shall be included in the vendor's base bid.

6. *Base and/or Alternate Bids:* Bids may contain descriptions of options or alternatives that may be available to the County. The Base Bid will contain all material and labor to execute the base project as indicated in the bid request and all other bidding documents. All bidders must also include Alternate Bids for listed alternates.

The County reserves the right to award a contract that includes the base bid alone or the base bid and any combination of alternate bids.

7. By responding to this RFB, the bidder hereby agrees that if it is awarded the bid it shall indemnify and hold the County harmless from any claims, demands or losses of any type or nature to any person, bidder or corporation arising in any manner from the bidder's performance or failure to perform the work required under this RFB and shall pay any judgment or liability obtained or growing out of said claims, liabilities, or judgments, including reasonable attorney's fees and costs.

8. *Contractor-supplied Materials:* Any material submitted by a vendor shall become the property of the County.

9. *Rejection of Bids:* The County reserves the right to reject any and all bids, to waive any informalities in the bidding procedure, to accept any bid which it deems to be for the best interest of the County and to hold such bids for a period of sixty (60) days before taking action to award a contract. The bid will be awarded to the "lowest and best" bidder.

10. *Bid Identification and Submittal:* Bids shall be clearly marked on the envelope: "**BID – Filager Campus Improvement Phase 2***"* and include the bidders name and address. Bids must be in a sealed envelope submitted with one (1) original copy and (1) searchable PDF copy on a USB. Replies must be received in the Office of the Board of County Commissioners no later than 2:00 P.M. local time on April 23rd, 2026. Late bids will not be considered. Bidders will not be permitted to alter their bids after bid closing. Should the bidder wish to mail in the bid, they should send them to the County at the address indicated and must be received by the County prior to the above date and time.

11. *Bid Opening:* Bid opening will occur at 2:00 P.M. local time on Thursday, April 23rd, 2026 at the Office of the Board of Clermont County Commissioners, 101 E. Main Street, 3rd Floor, Batavia, Ohio 45103.

12. Each person bidding for a contract for the construction, demolition, alteration, repair, or reconstruction of any public improvement is required to file with his bid a bid guaranty in the form of either (1) a bond for the full amount of the bid or (2) a certified check, cashier's check, or letter of credit pursuant to Chapter 1305 of the Revised Code in an amount equal to ten (10) percent of the total amount of the bid (including add alternates) pursuant to Section 153.54 of the Ohio Revised Code. The successful bidder at the time he enters into the contract shall be required to file a performance bond in the full amount of the contract pursuant to Section 153.54 (C) of the Ohio Revised Code. Letters of credit and bid bonds must be filed with original signatures. Facsimile and electronic copies of the letter of credit, bid bond and Power of Attorney of the Surety will be deemed non-responsive.

13. Bids may be rejected if all required papers are not returned with the bid. The bid bond shall be returned:

A: If said bid shall be rejected.

B: If said bid shall be accepted and the principal shall execute and deliver contract properly completed in accordance with said bid, and the successful bidder enters into a performance bond, guaranteeing performance of all required under the contract.

14. *Bid Duration:* All prices quoted by the bidder in their bid must remain unchanged for a period of sixty (60) days after the date of bid opening.

15. *Bid Suitability:* When analyzing the bids submitted, when applicable, superior design, technology, workmanship, materials, size of component parts, operating cost, warranty, service facility etc. will be considered in addition to price. It is Clermont County's intent to accept the bid for which a thorough analysis of the bids submitted, proves to be the most suitable for the intended use.

16. *Discounts:* Bidders may offer cash discounts for prompt payment of invoices, but their discounts will not be used in determining the final net prices bid. The County will endeavor to take advantage of such discounts if offered.

17. *Prices:* Fixed price on Bid Cost Sheet governs the award unless otherwise specified in the RFB. Detailed fixed prices must be entered and totaled for all items on the attached Bid Detail Cost Sheet at the time of submission of the RFB.

18. *Cost Liability:* The County assumes no responsibility, and no liability, for costs incurred by the prospective bidders for the purposes of preparing and submitting bids.

19. *Delivery:* Every effort shall be made by the Bidder awarded the contract to deliver items by or before the time designated in the contract. Any delinquency in such delivery without satisfactory written explanation directed to the Clermont County Commissioners may result in cancellation of the contract and substitution of other goods. The defaulting bidder shall be liable for any increased cost or expenses incurred as a result of such default.

20. *Performance:* The Board of County Commissioners reserves the right to require faithful performance of all things to be done under the contract and may require, as a condition of entering a purchase contract, lease, or lease with option to purchase the bond provided for by Section 153.57 of the Revised Code, with good and sufficient surety in an amount not to exceed the amount of the bid.

21. ***REQUIRED BID CONTENTS****:*

A. Each bid shall include a letter of transmittal which bears the signature of the President, Vice-President, or any other Office or Official as long as accompanied by affidavit of authority to bind the vendor.

B. All bidders are required to submit the following affidavits with their bid:

1. Affidavit Affirming Compliance with 9.24 and 5719.042 ORC.
2. Non-Collusion Affidavit
3. W-9 TAXPAYER IDENTIFICATION

These affidavits and specifications heretofore referenced shall be incorporated into and become a part of the Contract document.

C. The successful bidder will be required to enter into a written Contract with the Board of Clermont County Commissioners within ten (10) days of the notification of award thereof.

D. Bid Security: Each bidder is required, pursuant with Ohio Revised Code Section 153.54, to file with his bid a bid guaranty in the form of either:

a. A bond, for the full amount of the bid, prepared in the form provided herein and duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner. The Surety on such bond shall be a duly authorized surety company satisfactory to the Owner and Bidder must supply a certificate stating that Surety executing the Bond is authorized to do business in the State of Ohio.

b. A certified check, cashier's check, or letter of credit pursuant to Chapter 1305 of the Ohio Revised Code. Any such letter of credit shall be revocable only at the option of the beneficiary state, political subdivision, district, institution, or agency. The amount of the certified check, cashier's check, or letter of credit shall be equal to ten percent (10%) of the bid.

c. Bid security filed pursuant with this Section shall be returned to all unsuccessful bidders immediately after the contract is executed, or if no award has been made within the 60 days after the date of opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid or extended the bid. The guaranty filed pursuant to this section shall be returned to the successful bidder upon filing of the bond required under Item 20 of this Section.

d. Bid bonds must be filed with original signatures. Facsimile and electronic copies of the bid bond and Power of Attorney of the Surety will be deemed non-responsive.

e. If a bidder furnished a cashier's check, letter of credit, or certified check as bid security, the bidder shall furnish a surety bond or bonds in the amount of 100% of the bid simultaneously with his delivery of the executed contract, as security for faithful performance of this contract and for the payment of all persons performing labor on the project under the contract and furnishing materials in connection with this contract, as specified in the specifications included herein.

f. If the bidder has furnished a combination bid guaranty and contract bond, this bond shall become the security for faithful performance of the executed contract and for payment of all

persons performing labor on the project under the contract and for furnishing materials in connection with the contract.

E. Each bidder shall complete and submit the Required Contractor Information as specified in Article 4 of this bid packet.

F. Unless otherwise specified, all material shall be new and of the best grade in its particular line; all articles shall be complete and in first class condition; all articles shall include all applicable manufacturer's warranties. Such warranty shall be reflected in the bid documents. All work shall be done in the best and most skilled manner, exactly as specified or detailed, and shall be subject to the approval of Clermont County Officials. When required in the specifications, bidders shall make available for inspection a sample or similar model of the bid item prior to the award of the bid.

22. *Subcontracting:* It is to be understood that no part of this bid shall be assigned, transferred, conveyed, sublet, or otherwise disposed of, without the expressed written approval of the State of Ohio Subcontractor Forms by the Owner's Representative. **State of Ohio Subcontractor Forms will be required from Contractor at the Pre-Construction Meeting after the Award of Bid.

23. *Basis of Design:* Reference to a particular trade name, manufacturer's catalog or model number (Basis of Design) are made for descriptive purposes to guide the bidder in interpreting the requirements of the County. They should not be construed as excluding bids on other types of materials, equipment and supplies. However, the bidder, if awarded a contract, will be required to furnish the particular item referred to in the specifications or description. If the Basis of Design is not as proposed, the bidder shall clearly note, describe, and highlight the departure in the bid.

24. *Type of Contract:* Bidders should be aware that the contract is to be of a fixed cost nature. Cost plus/percentage of cost contracts will not be acceptable.

25. *Exemption:* Clermont County is exempt from payment of Federal Excise Tax, Transportation Tax and Ohio State Tax. Prices shall not include these taxes.

26. *Receipt and Opening of Bids:* Any bid may be withdrawn prior to the scheduled time and date for the bid opening.

27. *Obligations of Bidder:* At the time of opening of bids, it shall be presumed that each bidder has reviewed the specifications to clear up any questions. The

failure of any bidder to examine any bid requirement shall in no way relieve the bidder of any obligation or condition of these contract documents.

28. *Bidder Qualifications:* The County reserves the right to conduct any investigations that it deems necessary to establish the responsibility, qualifications and financial ability of the bidders, proposed subcontractors and other persons and organizations to do the work in accordance with the Contract documents to the County's satisfaction within the prescribed time limits. The bidder shall furnish the County any and all such information, documents and data for this purpose that the County may request.

29. *Statements of Conditionality:* Bids which contain statements of conditionality will not be accepted. The County also reserves the right to reject any bid should the information submitted by or the investigation of such bidder fails to satisfy the County that such bidder is sufficiently qualified to carry out any and all obligations of the contract.

30. All materials and exhibits submitted in the bid response shall become the property of Clermont County and will not be returned to the bidder. All bids received constitute public information as a matter of statutory law and will be made available for public inspection and copying upon request by members of the public pursuant to the requirements of Section 149.43 of the Ohio Revised Code. Any portion of the bid that the bidder requires to be treated as confidential in nature must be marked to that effect and provided that the information falls within an appropriate exemption enumerated under Section 149.43 of the Ohio Revised Code, that portion will not be considered public record. **A blanket indication of confidentiality or privilege will not be accepted and unless specific materials that fall within the appropriate statutory exemption are identified, the entire bid response will be treated as a public record.**

31. *Inquiries:* Respondents must address any questions or requests for interpretation regarding the RFB via e-mail to the County's point of contact, Ralph Linne, rlinne@clermontcountyohio.gov, no later than 12:00PM (noon) local time, Wednesday, March 25, 2026. The person submitting the question or request shall be responsible for its prompt delivery. Answers to all questions or requests for interpretation will be sent via e-mail by 4:30 PM local time on Friday, March 27, 2026, to all Respondents that have submitted a written request for the proposal or have registered an email address.

SECTION 01 21 00
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Contingency allowance.

B. Payment and modification procedures relating to allowances.

1.02 RELATED REQUIREMENTS

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

1.03 CONTINGENCY ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

1. All overhead and profit contemplated for the Work performed under each Allowance is to be included in the Base Bid.

B. Funds will be drawn from the Contingency Allowance by Change Order.

C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.04 ALLOWANCES SCHEDULE

A. Contingency Allowance: General Contract - A; Include the stipulated sum/price of $540,500.00 for use upon Owner's instructions.

B. Contingency Allowance: Aid to Construction: Include the stipulated sum/price of $30,000 for use upon Owner's instructions.

C. Contingency Allowance: Tap Fee; Include the stipulated sum/price of $60,000 for use upon Owner's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

C. Section 23 21 13-Hydronic Piping: Pre-insulated underground piping.

1.03 REFERENCE STANDARDS

A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2020a.

B. ASHRAE Standard 90.1 - Energy Standard for Buildings Except Low Rise Residential Buildings.

1.04 SUBMITTALS

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

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE

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

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

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

2.02 GLASS FIBER

A. Manufacturers:
   1. Knauf Insulation
   2. Johns Manville Corporation
   3. Owens Corning Corp
   4. CertainTeed Corporation
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation: ASTM C547 ; rigid molded, noncombustible.
   1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum service temperature: 850 degrees F.
   3. Maximum moisture absorption: 5 percent by weight.

C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. All joints to be sealed with factory-applied, self-seal lap and butt strips.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:
   1. Aeroflex USA, Inc; Aerocell
   2. Armacell LLC
   3. K-Flex USA LLC
   4. Nomaco
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation material shall be an EPDM rubber, flexible, closed-cell elastomeric insulation in tubular or sheet form. The product will be tested for and meet or exceed the requirements defined in ASTM C 534.

C. EPDM elastomeric insulation material shall be manufactured without the use of CFC's, HFC's or HCFC's.

D. EPDM elastomeric insulation shall have a flame-spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E 84, for all products through 2” thickness. Product to be suitable for use from -297F to 300F continuous service temperature, per ASTM C 411.

E. EPDM elastomeric insulation shall have a maximum thermal conductivity of 0.245 Btu-in./h-ft2 F at a 75 F mean temperature when tested in accordance with ASTM C 177 or ASTM C 518.

F. EPDM elastomeric insulation shall have a maximum water vapor transmission of 0.03 perm-inches when tested in accordance with ASTM E 96, Procedure A, latest revision.

G. Product must exhibit long-term UV resistance, when unfinished in outdoor installations, per ASTM G 7 and ASTM G 90.

H. EPDM elastomeric insulation must not contribute to external stress corrosion cracking as when tested by ASTM C 692.

I. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Accessories and adhesives shall not detract from any of the system ratings as specified above.

2.04 JACKETS

A. PVC Plastic.
   1. Manufacturers:
      a. Knauf
      b. Owens Corning Corp
      c. Johns Manville International, Inc:
      d. Certainteed Corp
      e. Zeston 2000.
      f. PROTO PVC Corp.
      g. VentureClad.
      h. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Jacket: One or two piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.

d. Thickness: 30 mil.
e. Connections: Brush on welding adhesive.

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

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with the Midwest Insulation Contractors Association (MICA), National Commercial and Insulation Standard.

C. All insulation shall be applied so that there is no fiberglass exposed to the return air plenum. All fiberglass insulation, including all exposed edges, shall be coated, or mylar or other suitable material shall be provided between fiberglass and the air stream.

D. Exposed Piping: Locate insulation and cover seams in least visible locations.

E. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

F. Glass fiber insulated pipes conveying fluids below ambient temperature:
1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

G. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

H. For hot piping conveying fluids over 110 degrees F, insulate flanges and unions at equipment.

I. Glass fiber insulated pipes conveying fluids above ambient temperature.
1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

J. Inserts and Shields:
1. Application: Piping 1 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.
4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

K. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

L. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

M. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with PVC or aluminum jacket with seams located on bottom side of horizontal piping.

N. Buried Chilled Water Piping: Provide factory pre-insulated polypropolylene piping with polyurethane insulation and polyethylene jacket. Refer to Section 23 21 13 Hydronic Piping.

3.03 SCHEDULE

A. Heating Systems:
   1. Heating Water Supply & Return:
      a. Glass Fiber Insulation:
         1) Pipe Size Range: 1 1/4 inch or less
            (a) Thickness: 1 inch
         2) Pipe Size Range: 1 1/2 inches and larger:
            (a) Thickness: 1-1/2 inch
   2. Flexible Elastomeric Foam Insulation:
      a. Pipe Size Range: 1 inch or less
         1) Thickness: 3/4 inch
      b. Do not use on piping 1 1/4 inch or above.

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

END OF SECTION

SECTION 23 21 13
HYDRONIC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hydronic system requirements.

B. Chilled water piping, buried.

C. Pipe and pipe fittings for:
   1. Heating water piping system.
   2. Chilled water and glycol piping system.
   3. Equipment drains and overflows.
   4. Pipe hangers and supports.
   5. Unions, flanges, mechanical couplings, and dielectric connections.
   6. Dielectric fittings.

D. Valves:
   1. Ball valves.
   2. Butterfly valves.
   3. Check valves.

E. Differential Pressure Controller

F. Manual Balance Valve

G. Testing and Repair.

1.02 RELATED REQUIREMENTS

A. Section 01 3516 - Submittal Forms

B. Section 01 3516.01 - Material Documentation Sheet

C. Refer to Section 01 6000 - Product RequirementsSection

D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

E. Section 01 6116.01 - Accessory Material VOC Content Certification Form.

F. Section 07 84 00 - Firestopping.

G. Section 23 0548 - Vibration and Seismic Controls.

H. Section 23 0533 - HVAC Identification

I. Section 23 0719 - HVAC Piping Insulation.

J. Section 23 05 16 - Expansion Fittings and Loops.

K. Section 23 05 53 - HVAC Identification.

L. Section 23 07 19 - HVAC Piping Insulation.

M. Section 23 21 14 - Hydronic Specialties.

N. Section 23 25 00 - HVAC Water Treatment: Pipe cleaning.

1.03 REFERENCE STANDARDS

A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2021.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

C. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

F. ASME B31.9 - Building Services Piping; 2020.

G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2019.

I. ASTM B32 - Standard Specification for Solder Metal; 2020.

J. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2020.

K. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 2024.

L. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).

M. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2019).

N. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.

O. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings; 2021.

P. AWWA C606 - Grooved and Shouldered Joints; 2015.

Q. ANSI/ASME Section 9, AWS D10.9 & D1.1 - National Certified Pipe Welding Bureau.

R. ANSI B16.18 - Soldering Procedures

1.04 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Use grooved mechanical couplings and fasteners in accessible locations.

C. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.

D. Use non-conducting dielectric connections whenever jointing dissimilar metals.

E. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.

F. Use ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

G. Use ball valves for throttling, bypass, or manual flow control services.

H. Use plug cocks for throttling service. Use non-lubricated plug cocks only when shut-off or isolating valves are also provided.

I. Use lug or grooved end butterfly valves or ball valves to isolate equipment.

J. Use 3/4 inch ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

1.05 SUBMITTALS

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

B. Provide submittals and documentation per section 01 3000.

C. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.

D. Product Data:
   1. Include data on pipe materials, pipe fittings, valves, and accessories.
   2. Provide manufacturers catalogue information.
   3. Indicate valve data and ratings.

E. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

F. Project Record Documents: Record actual locations of valves.

G. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

H. Submit a complete list of balancing assemblies with location, gpm and pressure drop requirements to the balancing contractor for his use.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

C. All piping shall be American made and shall comply with the Buy American Provision of the ARRA.

1.07 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 code for installation of piping system.

B. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.

C. Provide certificate of compliance from authority having jurisdiction, indicating approval of welders.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
   1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
   2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
   3. Grooved mechanical joints may be used in accessible locations only.
      a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, above lay-in ceilings, and as approved by Architect.
      b. Use rigid joints unless otherwise indicated.
   4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
   1. Where grooved joints are used in piping, provide grooved valve/equipment connections if available; if not available, provide flanged ends and grooved flange adapters.

D. Valves: Provide valves where indicated:
   1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate or ball valves with cap; pipe to nearest floor drain.
   2. Provide shutoff valves upstream of differential pressure controllers and associated manual balance valve provided by temperature control contractor. If PICCV valve option is taken by temperature control contractor, manual shutoff valves shall remain in locations as shown to provide system isolation.

E. If pressure independent characterized control valves (PICCV) are provided for all equipment, provide P/T ports on each side of PICCV valve. Refer to piping diagram for additional information.

2.02 HEATING WATER AND CHILLED WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
   1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
   2. Threaded Joints: ASME B16.3, malleable iron fittings.
   3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
   4. Steel Pipe Press Fitting Joints: Fittings to conform to ASME B31.1 code for pressure piping, ASME B31.9 building services piping.

B. Copper Tube 2" and smaller: ASTM B 88 (ASTM B 88M), Type L (B), drawn. Copper piping will not be allowed for piping over 2".
   1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
      a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
      b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
   2. Grooved Joints: AWWA C606 grooved tube, fittings of same material, and copper-tube-dimension mechanical couplings.
   3. Mechanical Press Sealed Fittings: Double pressed type complying with ASME B16.22, utilizing EPDM, nontoxic synthetic rubber sealing elements.

C. Grooved Pipe Option:
   1. Manufacturers:
      a. Victualic; Style 107 "QuickVic"
      b. Tyco/Grinnell; Style 772
      c. Anvil/Gruvlok; Style 74 "Slidelok"
      d. Substitutions: Not Permitted.
   2. Couplings, 2" through 12" Sizes: Rigid coupling system cast of ductile iron, conforming to ASTM A536, with a pressure responsive gasket, Grade "EHP" EPDM for water service from minus 30 degrees F to plus 230 degrees F, conforming to ASTM D2000.
   3. Flexible type couplings (where noted on drawings): Victaulic Style 177 'QuickVic for 2 inch thru 6 inch and Victaulic Style 77 for 8 inch thru 12 inch, or Gruvlok Style 7001.
   4. If the rigid couplings are provided by Anvil Gruvlok, the bolt pads must have equal gaps on each side. Follow proper installation procedure as instructed by ANVIL Factory Representative. Couplings do not require the measuring of torque. Refer to most current Gruvlok Rigid Coupling installation instructions.

5. Gaskets by Anvil Gruvlok, in applications above 150 degrees F, must be lubricated (inside and out) with Gruvlok Xtreme Lubricant.
6. Flange adapters shall be ASTM A536 ductile iron, flat faced, for incorporating flange components with ANSI Class 125, 150, and 300 bolt-hole patterns to a grooved piping system.
7. Grooved end fittings shall be ductile iron conforming to ASTM A536, forged steel or fabricated carbon steel conforming to ASTM A53, with factory grooved ends designed to accept the same manufacturers couplings.
8. Options to fittings used for tees and outlets in grooved piping systems may be mechanical tee-type bolted branch outlets. Vic-o-Wells and Vic-lets shall be used for thermometer or gauge outlets.
9. The use of mechanical couplings may not be utilized as a means of expansion regardless of manufacturer.

D. Copper Press Fittings Option:
1. Source Quality Control:
   a. Fittings shall be listed and approved for their intended application.
2. Material:
   a. Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.
3. Installation: Copper press fittings shall be made in accordance with the manufacturers installlation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fittings alignment shall be checked against the mark on the tubing to assure the tubing is fully inserted into the fitting. The joints shall be pressed using the tool approved by the manufacturer.

2.03 CHILLED WATER AND GLYCOL PIPING, BURIED

A. Manufacturers:
1. Aquatherm
2. Nupi Americas - Niron
3. Rovanco Piping Systems, Inc.
4. Substitutions: See Section 01 6000 - Product Requirements

B. Pre-insulated pipe shall be a complete system of factory pre-insulated polypropylene piping for the specified service. All straight sections, fittings, valves, and other accessories shall be factory fabicated, insulated, and jacketed. Field insulation of fittings shall not be allowed.

C. Carrier pipe shall be manufactured from a polypropylene PP-R or PP-RCT resin meeting the short-term properties and long-term strength requirements of ASTM F 2389. The pipe shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipe shall be made in a three layer extrusion process. All pipe shall comply with the rated pressure requirements of ASTM F 2389. All pipe shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11. 2.

D. Insulation shall be polyurethane foam either spray applied or injected with one shot into the annular space between carrier pipe and jacket with a minimum thickness of 1". Insulation shall be rigid, 90-95% closed cell polyurethane with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K- Factor) of 0.16 and shall conform to ASTM C-591.

E. Jacketing material shall be extruded, black, high-density polyethylene (HDPE), having a minimum wall thickness of 100 mils for jacket sizes less than or equal to 12”.

F. Fittings: Pre-insulated fittings shall meet the same requirements as the pre-insulated pipe. Manufacturer shall provide on-site insulation kit to connect to the pre-insulated system to make a continuous insulation system.

G. The piping system layout shall be analyzed by the piping system manufacturer to determine the stresses and displacements of the service pipe. The piping system design and manufacture shall be in accordance with B31.1, latest edition. Factory trained field technical assistance shall be provided for critical periods of installation, field joint instruction, and testing.

H. All pipes, fittings and accessories shall be installed in accordance with the manufacturers recommendations.The services of a factory-trained field service instructor shall be required. The field service instructor shall be present during the critical stages of the installation and testing.
   1. Fusion-weld tooling, welding machines, and electrofusion devices shall be as specified by the pipe and fittings manufacturer.
   2. Prior to joining, the pipe and fittings shall be prepared in accordance with F 2389 and the manufacturer's specifications.
   3. Joint preparation, setting and alignment, fusion process, cooling times, and working pressure shall be in accordance with the pipe and fitting manufacturer's specifications.
   4. Data loggers shall be used to log each joint made. Data logger shall record at least the date, time of day and person making the joint. Data logger shall also record the required pressure/leak test for Warranty.

I. Backfilling and Testing:
   1. A four inch layer of sand or fine gravel shall be placed and temped in the trench to provide a uniform bedding for the pipe. The entire trench width shall be evenly backfilled with a similar material as the bedding in six inch compacted layers to a minimum height of six inches above the top of the insulated pipe. The remaining trench shall be evenly and continuously backfilled and compacted in uniform layers with suitable excavated soil.
   2. Immediately after the system has been installed in the ditch, a partial backfill shall be made in the middle ofeach unit, leaving the joints exposed for inspection during the hydrostatic tests. Hydrostatic tests of 150 psig or 1.5 times the design pressure whichever is greater shall be required for a period of four hours. No leakage shall be allowed.
   3. Any leaks detected shall be repaired at the contractor's expense by removing the leaking part and replacing with new parts welded per the pipe manufacturer's guidelines.
   4. The pipes shall be flushed with cold water after finishing the installation. Flush the system until the water runs clear of debris and dirt.
   5. The final backfill shall be placed and spread in approximately uniform layers in such a manner as to fill the trench completely so that there will be no unfilled spaces under or about rocks or lumps of earth in the backfill. Large rocks, stones, frozen clods, and other debris greater than 3 in. (76 mm) in diameter shall be removed. Hand mechanical compaction is the preferred method of compaction to a minimum of 12" of cover. When further compaction is required, rolling equipment or heavy tampers shall only be used to consolidate the final backfill, provided the pipe is covered by at least 18-in. of backfill. Initial backfill materials shall be placed in compacted layers of 6-in. A minimum of 12 to 18-in. of cover is required where light traffic is expected. A minimum cover of 24 in. shall be provided for locations with heavy traffic.
   6. Trenches under pavements, sidewalks, or roads shall be backfilled and compacted to the required density specified by contract documents or by the appropriate government jurisdiction.

J. IDENTIFICATION
   1. Install continuous metallic/plastic underground warning tapes during back filling of trenches for underground hydronic piping. Locate tapes 6 to 8 inches (150 to 200 mm) below finished grade, directly over piping. Alternativelyinstall 8 - 10 gage copper wire at 6-

8" directly over the pipeline. Provide warning tapes above the wire at 6 to 8" below the finished grade directly over the pipeline.

2.04 EQUIPMENT DRAINS AND OVERFLOWS

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn; using one of the following joint types:
   1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

2.05 PIPE HANGERS AND SUPPORTS

A. Conform to ASME B31.9.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2 Inches and Greater: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

E. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

F. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

G. Wall Support for Pipe Sizes 4 Inches and Greater: Welded steel bracket and wrought steel clamp.

H. Wall Support for Hot Pipe Sizes 6 Inches and Greater: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.

I. Vertical Support: Steel riser clamp.

J. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

K. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

L. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

M. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

N. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.06 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe 2 Inches and Less:
   1. Ferrous Piping: 150 psig malleable iron, threaded.
   2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe 2 Inches and Greater:
   1. Ferrous Piping: 150 psig forged steel, slip-on.
   2. Copper Piping: Bronze.
   3. Gaskets: 1/16 inch thick preformed neoprene.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
   1. Dimensions and Testing: In accordance with AWWA C606.
   2. Mechanical Couplings: Comply with ASTM F1476.
   3. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F to 230 degrees F.

4. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
5. When pipe is field grooved, provide coupling manufacturer's grooving tools.

2.07 DIELECTRIC FITTINGS

A. Dielectric Nipples for heating, chilled water and geoexchange systems: ASTM A-53, galvanized steel schedule 40, with cross-linked polyethelene insulators to prevent galvanic corrosion. Meet ASTM F-492-95, rated for 230 deg. F maximum temperature for 1/2 inch to 4 inch sizes.

2.08 BALL VALVES

A. Manufacturers:
1. Apollo Valves: www.apollovalves.com/#sle.
2. Conbraco Industries
3. Milwaukee Valve Company
4. Nibco, Inc: www.nibco.com.
5. Crane Co. - Valve Division.
6. Hammond.
7. Watts
8. Kitz Co.
9. ANVIL / Smith Cooper / SHARPE
10. Jomar
11. Substitutions: See Section 01 60 00 - Product Requirements.

B. Up To and Including 2 Inches:
1. Valves shall be rated 150 psi CWP and 600 psi non-shock WOG and will have 2 piece cast bronze bodies, TFE seats, full port, separate packnut with adjustable stem packing, anti-blowout stems and chrome plated brass/bronze ball. Valve ends shall have full depth ANSI threads or extended solder connections and be manufactured to comply with MSS SP-110. Metal lever handles with epoxy coating.
2. Where piping is insulated, ball valves shall be equipped with 2" extended handles of non-thermal conductive material. Also provide a protective sleeve that allows operation of the valve without breaking the vapor seal or disturbing the insulation. Memory stops, which are fully adjustable after insulation is applied, shall be included.

2.09 BUTTERFLY VALVES

A. Manufacturers:
1. Crane Co.: www.cranevalve.com.
2. Hammond Valve
3. Milwaukee Valve Company: www.milwaukeevalve.com.
4. Victaulic Company
5. Nibco.
6. Watts.
7. Kitz Co.
8. ANVIL / Gruvlok / Smith Cooper / Sharpe Valve
9. Jomar
10. Substitutions: See Section 01 60 00 - Product Requirements.

B. Valves shall be lug of I.P.S. grooved body style manufactured in accordance with MSS SP-67 rated at least 200 psi non-shock cold water working pressure. Body to have 2 inch extended neck for insulating and to be cast iron or ductile iron. Valve to have aluminum bronze alloy disc with EPDM rubber seat and seals; or EPDM rubber encapsulated disc with polymer coated body. Stem shall be 400 series stainless steel and shall not have exposed stem to disc fastners. Sizes 2 inch - 6 inch shall be lever operated with 10 position throttling plate; sizes 8 inch and larger shall have gear operators. Lug style and grooved style shall be capable for use

as isolation valves and recommended by the manufacturer for dead-end service at full pressure without the need for downstream flanges.

C. Grooved End Butterfly Valves:
   1. 2 inches through 12 inches: Ductile iron body, electroless nickel-plated ductile iron disc, 416 stainless steel stem, disc shall be offset from the stem centerline to provide continuous 360 degree seating, EPDM seat and seal material, TFE-lined fiberglass bearings, 10 position or lever lock handle or gear operator with memory stop.
   2. Grooved end butterfly valves shall be from the same manufacturer as the grooved couplings.

2.10 SWING CHECK VALVES

A. Manufacturers:
   1. Hammond Valve
   2. Milwaukee Valve Company
   3. Nibco, Inc
   4. Victaulic Company
   5. Milwaukee Valve Company
   6. Crane Co. - Valve Division.
   7. Watts.
   8. Kitz Co.
   9. ANVIL Gruvlok
   10. Jomar
   11. Substitutions: See Section 01 60 00 - Product Requirements.

B. Up To and Including 2 Inches:
   1. Valves shall be Y-Pattern swing-type manufactured in accordance with MSS SP-80 Class 125, bronze ASTM B-62 body with TFE seat disc. Where higher operating pressures approach 150 psi, Class 150 valves of like construction shall be used. Valve ends may be threaded or solder type.

C. Over 2 Inches:
   1. For horizontal lines shall be swing-type manufactured in accordance with MSS SP-71 Class 125, flanged, ASTM A-126 Class B, cast iron body with bronze trim, non-asbestos gasket. For vertical lines or pump discharge, valves shall be wafer or lug style, in line, spring actuated lift check manufactured in accordance with MSS SP-126. Body shall be cast iron ASTM A-126, Class B with stainless steel spring, bronze disc plates, rubber seat.

2.11 SPRING LOADED CHECK VALVES

A. Manufacturers:
   1. Crane Co.
   2. Hammond Valve
   3. Nibco, Inc
   4. Watts.
   5. Milwaukee Valve Company
   6. Victaulic Company
   7. Kitz Co.
   8. ANVIL / Gruvlok
   9. Substitutions: See Section 01 60 00 - Product Requirements.

B. Iron body, bronze trim, split plate, hinged with stainless steel spring, resilient seal bonded to body, wafer or threaded lug ends.

C. Grooved End Spring-Loaded Check Valves:
   1. 2-1/2 Inches through 12 Inches:

a. 2-1/2 Inches and 3 Inches: Ductile iron body, aluminum bronze disc, stainless steel spring and shaft, PPS coated seat. Victaulic Series 716.
b. 4 Inches Through 12 Inches: Ductile iron body, elastomer encapsulated ductile iron disc, stainless steel spring and shaft, welded-in nickel seat. Victaulic Series 716 or Series 779 with venturi taps.
c. 14 Inches through 24 Inches: Ductile iron body, stainless steel dual disc design, stainless steel spring and shaft, EPDM seat bonded to the valve body, AGS grooved ends. Victaulic Series W715.

2.12 DIFFERENTIAL PRESSURE CONTROLLERS

A. Manufacturers:
1. IMI Hydronics / TA (STAP)
2. Griswold
3. Danfoss
4. Substitutions: See Section 01 6000 - Product Requirements

B. Valve shall provide differential pressure modulating control

C. Shutoff function.

D. Construction
1. For 1/2 inch through 2 inch pipe size: Dezincification Bronze or brass body with HNBR rubber membrane, stainless steel spring, NPT end fittings.
2. For 2 1/2" and bove: Ductile iron body, dezincification bronze bonnet and spindle, EPDM seat rings, flanged end fittings.

E. A 6 mm copper capillary tube shall connect the differential pressure controller to manual balance valve. Refer to manufacturer installation manual for installation requirements.

F. Balancing & Commissioning: The Dp controller manufacturer's representative shall calculate and define setpoints for all differential pressure controllers for each hydronic system on the project, and furnish this information to the balancing contractor.

2.13 MANUAL BALANCE VALVE

A. Manufacturers:
1. IMI Hydronics / TA (STAD/STAG)
2. Griswold
3. Danfoss
4. Nexus Valve
5. Belimo
6. ANVIL
7. Substitutions: See Section 01 6000 - Product Requirements

B. Manual balancing devices shall be calibrated balance or globe style. Devices shall be precision machined and calibrated for an accuracy of 3 percent full scale. The induced differential reading shall be greater than one foot water column at the specified flow with the valves in the wide open position. The valves shall have differential read-out ports fitted with check valve and protective cap.

C. Valve shall be provided with P/T ports and connection to balancing tube from Differential Pressure Controller.

D. Valve shall be from the same manufacturer as the differential pressure controller.

E. Valves shall have position indication readout and built in memory stop for repeatable regulation and control.

F. Construction

1. For 1/2 inch through 2 inch pipe size: Dezincification Bronze or brass body with with EPDM seat rings, NPT end fittings.
2. For 2 1/2" and bove: Ductile iron body, dezincification bronze bonnet and spindle, EPDM seat rings, grooved end fittings.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare piping connections to equipment using jointing system specified.

E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

F. After completion, fill, clean, and treat systems. Refer to Section 23 25 00 for additional requirements.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and to avoid interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Sleeve pipe passing through partitions, walls, foundations, floors and roof.

F. Slope piping and arrange to drain at low points.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

H. Inserts:
1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

I. Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
2. Support horizontal piping as scheduled.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. Refer to Section 09 9123. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

J. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 0719.

K. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 31 00 .

L. Use eccentric reducers to maintain top of pipe level.

M. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

N. Furnish and install differential pressure controller, manual balancing valve, and joining capillary tube in locations shown on the drawings, union, and isolation valves on both sides of balancing assembly as required and indicated on the drawings. DP controller and balance valve shall be properly sized by valve supplier to be capable of balancing to GPM and delta P.

O. Install air vents at the highest point in the main piping runs.

P. Grooved Joints: Grooved joint piping systems shall be installed in accordance with the manufacturer's guidelines and recommendations. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. Gaskets shall be supplied by the same manufacturer as the fittings. Grooved end shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove. A manufacturers factory trained field representative shall provide on-site training to contractor's field personnel in the installation of grooved piping products. Factory trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products. Mechanical contractor shall prove to engineer upon request that the fittings are tightened to the proper torque insuring proper installation.

Q. Provide valve kit for VAV box connection. Temperature Control and balance valve shall be supplied by temperature control contractor and shipped to factory for assembly and testing of complete kit. If a combination balance and control valve is not supplied by temperature control contractor, a manual balance valve shall be supplied by the TC and installed as part of coil package. Coordinate valves with temperature control contractor.

R. Install valves with stems upright or horizontal, not inverted.

S. Fire caulk around all penetrations of fire rated walls.

3.03 TESTING AND REPAIR

A. Upon completion of each respective piping/ductwork system, but prior to insulating, covering, or backfilling, each system shall be thoroughly cleaned and flushed to remove construction dirt and foreign matter.

B. Test Piping as Specified Herein

1. No piping work shall be concealed or covered until it has been inspected and approved by the project inspector, who shall be notified when the Work is ready for inspection. Work shall be completely installed and tested as required by this Contract and Ordinances of the local Municipality and shall be leaktight to the satisfaction of those making the inspection and the Architect/ Engineer.
2. In general, pressure tests shall be applied to piping. In no case shall piping be subject to pressure exceeding its rating. Defective work shall be promptly repaired or replaced and test shall be repeated until the particular system and component parts thereof receive approval of the Architect/Engineer.
3. Provide temporary equipment for testing, including pump and gauges. Test piping system before insulation is installed and remove control devices before testing. Test each natural section of each piping system independently, but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating.

4. Repair piping system sections which fail required piping test by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stopleak compounds, mastics, or other temporary repair methods.
5. Drain test water from piping systems after testing and repair work has been completed.
6. Pressure for Testing of Piping Systems shall be as follows:
    a. Hydronic Supply and Return Piping including heating water, chilled water, and/or heat pump water systems:
        1) Piping shall be tested and results approved by Architect/Engineer prior to application of insulation.
        2) Piping system shall be subjected to a static water pressure of 50 psig above operating pressure and a minimum of 125 psig, and pressure maintained for 4 hours with no leaks or loss in pressure.
        3) Test source shall be isolated before conducting pressure tests.
7. Accurately record and report methods of testing, times, and dates of test, witnesses to the test, and the results of the test. Test reports shall be neatly typewritten on standard 8-1/2 inch by 11 inch sheets and submitted in 5 copies to Architect/Engineer for approval within 5 days after test has been performed.

C. Damage resulting from tests shall be repaired or damaged materials replaced, to satisfaction of Architect/Engineer, and at no cost to Owner.

3.04 SCHEDULES

A. Hanger Spacing for Copper Tubing.
1. 1/2 inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. 1 inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. 1-1/2 inch and 2 inch: Maximum span, 8 feet; minimum rod size, 3/8 inch.

B. Hanger Spacing for Steel Piping.
1. 1/2 inch, 3/4 inch, and 1 inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
2. 1-1/4 inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
3. 1-1/2 inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
4. 2 inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
5. 2-1/2 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
6. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
7. 4 inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
8. 6 inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.
9. 8 inches: Maximum span, 19 feet; minimum rod size, 5/8 inch.

END OF SECTION

SECTION 23 64 23
SCROLL WATER CHILLERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory-assembled packaged chiller.

B. Charge of refrigerant and oil.

C. Controls and control connections.

D. Chilled water connections.

E. Electrical power connections.

1.02 RELATED REQUIREMENTS

A. Commissioning
   1. Section 01 9113 - General Commissioning Requirements
   2. Section 01 9114 - Commissioning Authority Responsibility

B. Section 03 30 00 - Cast-in-Place Concrete: Concrete housekeeping pads.

C. Section 23 05 48 - Vibration and Seismic Controls.

D. Section 23 05 53 - HVAC Identification.

E. Section 23 05 93 - Testing, Adjusting, and Balancing.

F. Section 23 08 00 - Commissioning of HVAC.

G. Section 23 0913 - Instrumentation / Control Devices

H. Section 23 09 93 - Sequence of Operations.

I. Section 23 21 13 - Hydronic Piping.

J. Section 23 21 14 - Hydronic Specialties.

K. Section 23 2123 - Hydronic Pumps.

L. Section 26 05 83 - EQUIPMENT WIRING.

1.03 REFERENCE STANDARDS

A. AHRI 550/590 (I-P) - Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle; 2020.

B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2019, with All Amendments and Errata.

C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2021.

E. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

F. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

G. ASHRAE Standard 135-1995 BACnet Protocol

1.04 SUBMITTALS

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

B. Product Data: Provide rated capacities, weights, specialties and accessories, electrical requirements and wiring diagrams.

C. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Indicate equipment, piping and connections, valves, strainers, and thermostatic valves required for complete system.

D. Manufacturer's Instructions: Submit manufacturer's complete installation instructions.

E. Operation and Maintenance Data: Include start-up instructions, maintenance data, parts lists, controls, and accessories; include trouble-shooting guide.

F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Provide certification of inspection for conformance to requirements of authority having jurisdiction.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. All controls, control logic, and control wiring shall be factory installed and programmed.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written installation instructions for rigging, unloading, and transporting units.

B. Deliver units to the job site completely assembled and charged with refrigerant and oil by manufacturer.

C. Drain plugs shall be removed from equipment where the possibility of freeze damage may exist.

D. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.07 WARRANTY

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

B. Manufacturer's Warranty: Provide minimum five year warranty to include coverage for materials and labor for compressor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Trane Inc

B. Carrier Corporation

C. Johnson Controls, Inc <>

D. Daikin McQuay

E. Dunham Bush

F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 CHILLERS

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

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

2.03 COMPRESSORS AND EVAPORATOR

A. Compressors: Hermetic scroll type.
1. Unit: Fully hermetic type with multiple, direct drive compressors with discharge and suction service valves.
2. Vibration Control: Factory installed internal isolators or field installed external isolators.
3. Oil Lubrication System: Initial oil charge, oil sump, heater, oil level, and sight glass.
4. Capacity Reduction System: Compressor staging with control down to 12 percent of full load without the activation of hot gas by-bass.
5. Motor: 3600 or 3500 rpm, suction gas-cooled, with thermal or current overload protection.

B. Evaporator: Provide shell and tube or brazed plate type.
1. Shell and tube type.
    a. Shell, removable heads and tube support sheets constructed of carbon steel.
    b. Tubes: Mechanically expand and fasten, seamless, externally or internally enhanced, copper tubes into intermediate tube support sheets along the length of shell to avoid contact and relative motion between tubes.
    c. Refrigerant Working-Side Pressure Rating: 400 psig minimum.
    d. Water Working-Side Pressure Rating: 150 psig minimum.
    e. Provide with flanged or grooved connections.
    f. Insulation for all cold surfaces.
        1) Insulation is factory or field installed on shell, connections, and suction piping.
        2) 0.75 inches minimum thick, closed cell, expanded polyvinyl chloride, polyurethane, or vinyl nitrate polymer insulation with a maximum k value of 0.28.
    g. Provide factory or field installed vents and water drain connections on evaporator or piping.
    h. Provide factory or field installed fittings for temperature control sensors on evaporator or piping.
    i. Freeze Protection for Outdoor Locations: Provide thermostatically controlled electric heater to protect from freezing at ambient temperatures down to minus 20 degrees F.
2. Brazed plate type.
    a. Plate Material: 316 stainless steel.
    b. Refrigerant Working-Side Pressure Rating: 430 psig minimum.
    c. Water Working-Side Pressure Rating: 150 psig minimum.
    d. Provide with flanged or grooved connections.
    e. Insulation for all cold surfaces.
        1) Insulation is factory or field installed on evaporator, connections, and suction piping.
        2) 0.75 inches minimum thick, closed cell, expanded polyvinyl chloride, polyurethane, or Armaflex II insulation with a maximum k value of 0.28.

f. Provide factory or field installed vents and water drain connections on evaporator or piping.
g. Provide factory or field installed fittings for temperature control sensors on evaporator or piping.
h. Freeze Protection for Outdoor Locations: Provide thermostatically controlled electric heater to protect from freezing at ambient temperatures down to minus 20 degrees F.

3. Design, test, and stamp refrigerant side for 225 psig working pressure and water side for 150 psig working pressure, in accordance with ASME (BPV VIII, 1).
4. Provide water drain connection and thermometer wells for temperature controller and low water temperature cutout.

2.04 AIR-COOLED CONDENSER AND FANS

A. Provide finned-tube or brazed one-piece type.
1. Finned-tube type.
a. Mechanically bond aluminum fins to copper tubing and protect with corrosion resistant materials or coatings.
b. Clean, dehydrate and test.
c. Leak Test: 650 psig minimum.

B. Coil Guards: Provide corrosion proof, louvered panels, heavy gage wire panels, or grilles, factory installed. Provide coil protection for shipping by enclosing entire condenser coil with heavy plastic to prevent coil damage during shipping or rigging.

C. Fans and Motors:
1. Fans: Dynamically balance propeller, shrouded-axial, or airfoil type fans of reinforced polymer or glass fiber reinforced composite corrosion resistant construction equipped with sealed, permanently lubricated ball bearings.
2. Discharge Fan Guards: Corrosion resistant, heavy gage, steel wire.
3. Discharge Direction: Vertical.
4. Motors: Direct drive, totally enclosed for outdoor use with current overload protection.

2.05 CHILLER ENCLOSURES

A. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.

B. Mount starters in NEMA ICS 6 weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.

C. Electrical Service:
1. Single point power connection
2. Power supply shall be to a high short-circuit current rated panel with a single point high interrupting capacity unit disconnect switch breakers for each circuit.
a. High SCCR > 64,000 A

D. Provide power disconnect switch on face of chiller panel.

2.06 REFRIGERATION CIRCUITS

A. Provide multiple independent refrigeration circuit(s) with multiple compressor(s) per circuit.

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

C. Refrigerant: R410a.

2.07 INTEGRATED MICROPROCESSOR BASED DDC CONTROLS PACKAGE

A. Locate on chiller, mount NEMA 3R/12 (IP 55) weatherproof, steel control panel, containing starters, power and control wiring, [<>] factory wired with single point power connection and disconnect on face of chiller panel.

B. Provide an unit mounted and prewired flow switch.

C. For each compressor, provide part winding starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection.

D. Provide devices on control panel face:
   1. Compressor run lights.
   2. System start-stop switch.
   3. Control power fuse of circuit breaker.
   4. Compressor lead-lag switch.
   5. Demand limit switch.

E. Provide safety controls with indicating lights arranged so any one will shut down machine and require manual reset:
   1. Low chilled water temperature switch.
   2. High discharge pressure switch for each compressor.
   3. Low suction pressure switch for each compressor.
   4. Oil pressure switch.
   5. Flow switch in chilled water line.
   6. Flow switch in condenser water line.
   7. Relay for remote mounted emergency shut-down.

F. Provide operating controls:
   1. Multi-step chilled water temperature controller that conforms to EIA 709.1. BACnet Protocol shall be provided. Controller shall provide interface to the BAS system with a BACnet profile. Controller shall cycle compressor and activates capacity controls , with remote thermostat. Manufacturer shall coordinate protocol required with successful Temperature Control Contractor. [<>]
      a. At a minimum, the following points shall be available to the BAS:
         1) Outputs:
            (a) Chilled Water Setpoint
            (b) Current Limit Setpoint
            (c) Chiller Auto Stop command
            (d) Remote Diagnostics Reset Command
         2) Inputs:
            (a) Active setpoint temperature
            (b) Active current limit setpoint
            (c) Actual running capacity
            (d) Unit Power consumption
            (e) Running Mode
            (f) Operating Mode
            (g) MP Communication Status
            (h) Run Enable
            (i) Alarm Present
            (j) Shutdown Alarm Present
            (k) Last Diagnostic

2. Controller shall be capable of receiving a 4-20ma single from the Building Automation System to demad limit the chiller to a capacity as determined from energy analysis.
3. Five minute off timer prevents compressor from short cycling.
4. Part winding start timer.
5. Periodic pump-out timer to pump down on chilled water flow and high evaporator refrigerant pressure.
6. Solenoid valve between heat recovery condenser and receiver to limit refrigerant level in condenser.
7. Load limit thermostat to limit compressor loading on high return water temperature.
8. Three phase monitor to protect unit by stopping compressor on phase loss, phase reversal, phase unbalance, or under voltage.
9. Hot gas bypass sized for minimum compressor loading [<>], bypasses hot refrigerant gas to evaporator.
10. Cycle counter and operating hour meter.
11. Crankcase Heaters: Compressor crankcase heaters to provide extra protection against liquid migration.

G. Provide pre-piped gage board or digital display with pressure gages for suction and discharge refrigerant pressures, and oil pressures for each compressor.

H. Provide alarm package with test button and indicating lights that indicate control circuit is energized and compressor is running and that sounds an audible alarm and indicating light upon detection of compressor malfunction, low chilled water temperature, or evaporator water flow failure.

I. Pre-wire, assemble, factory mount, and test operating and safety control system consisting of a digital display or gages, on-auto-off switch, motor starters, disconnect switches, power and control wiring. Provide controls, monitoring, programmable set-points, alarms, and BAS as defined below:
   1. Automatic Adjustable Operating Controls:
      a. Temperature of chilled water leaving chiller.
      b. Chiller system capacity control based on set-points and system load.
      c. Compressor short-cycling prevention.
      d. Lead/lag for multiple compressors.
      e. Automatic reset on power source failure.
      f. Load limiting.
   2. Normal Operation Monitoring and Open Cover-less Displays:
      a. Hours of operation.
      b. Suction and discharge refrigerant pressures.
      c. Automatic diagnostics.
      d. Number of starts.
      e. On/off compressor status.
      f. Entering and leaving chilled water temperatures.
      g. Status of operation.
      h. Weekly purge cycle totalization if applicable.
      i. Oil pressure.
   3. Set-Points:
      a. Leaving chilled water temperature.
      b. Date/time.
   4. Automatic Chiller Shut-Down Safety Controls and Alarm:
      a. Automatic Reset:
         1) Chilled water flow interlock.
         2) Voltage protection (over/under).

3) Phase reversal protection.

b. Manual Reset:
   1) Evaporator low pressure.
   2) High motor winding temperature.
   3) Low chilled water temperature.
   4) Low chilled water flow.
   5) High condenser refrigerant discharge pressure.
   6) Motor current overload and phase loss.
   7) Low oil flow.

c. Remote Alarm: Activate remote, audible bell upon safety shutdown of chiller.

5. Building Automation System (BAS) Communications via Shielded Cable:
   a. Minimum Data Transmission to BAS:
      1) All system operating conditions.
      2) Capacity control information.
      3) Safety shutdown conditions.
   b. Minimum Operating Commands from BAS:
      1) Remote unit start/stop.
      2) Remote chilled water reset.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Align chiller package on steel or concrete foundations.

C. Install units on vibration isolators.

D. Connect to electrical service.

E. Connect to chilled water piping.

F. Arrange piping for easy dismantling to permit tube cleaning and removal.

3.02 SYSTEM STARTUP

A. Supply service of factory trained representative to supervise testing, dehydration and charging of machine, and start-up of system.

B. Supply initial charge of refrigerant and oil.

C. Demonstrate system operations and verify specified performance.

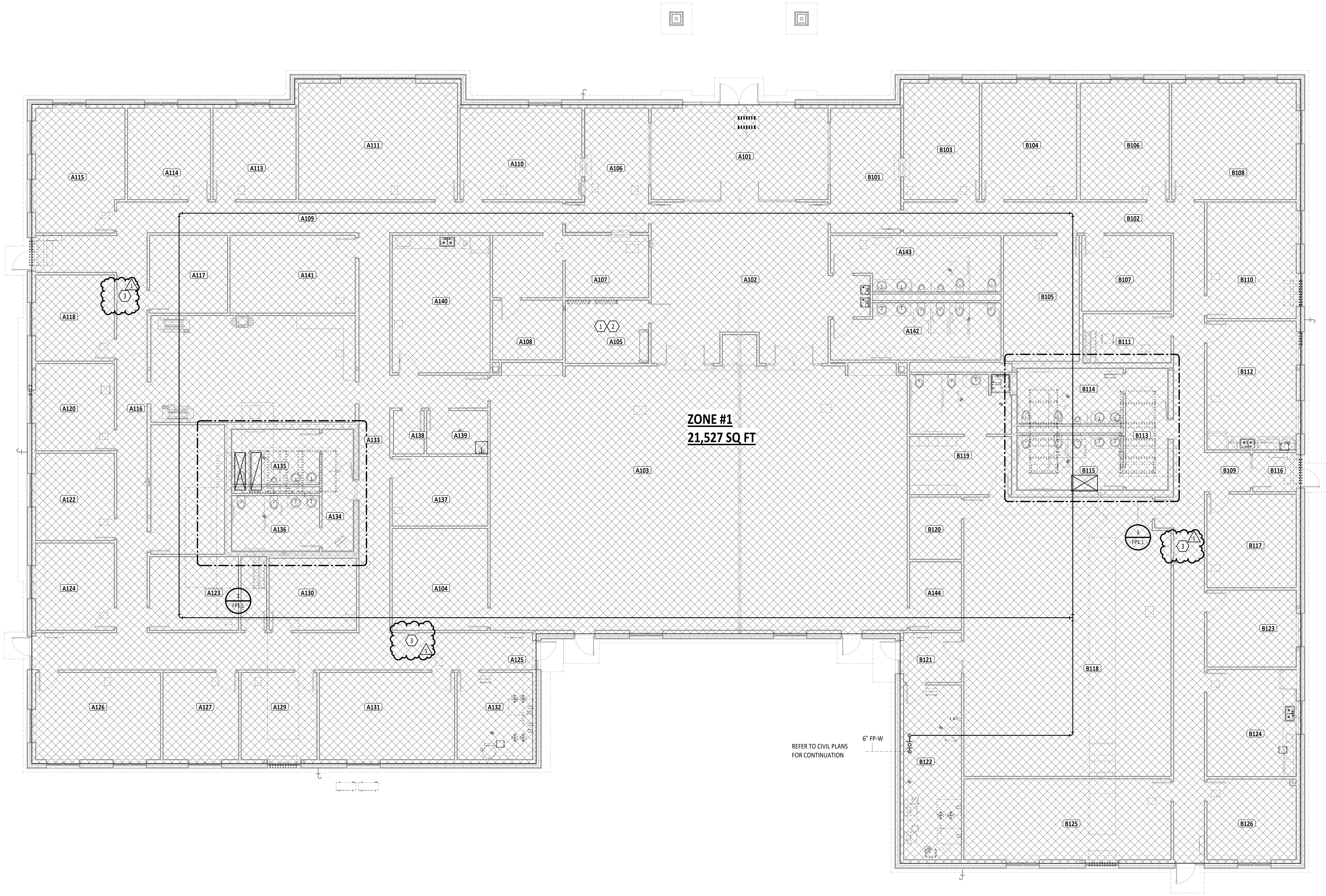
3.03 CLOSEOUT ACTIVITIES

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

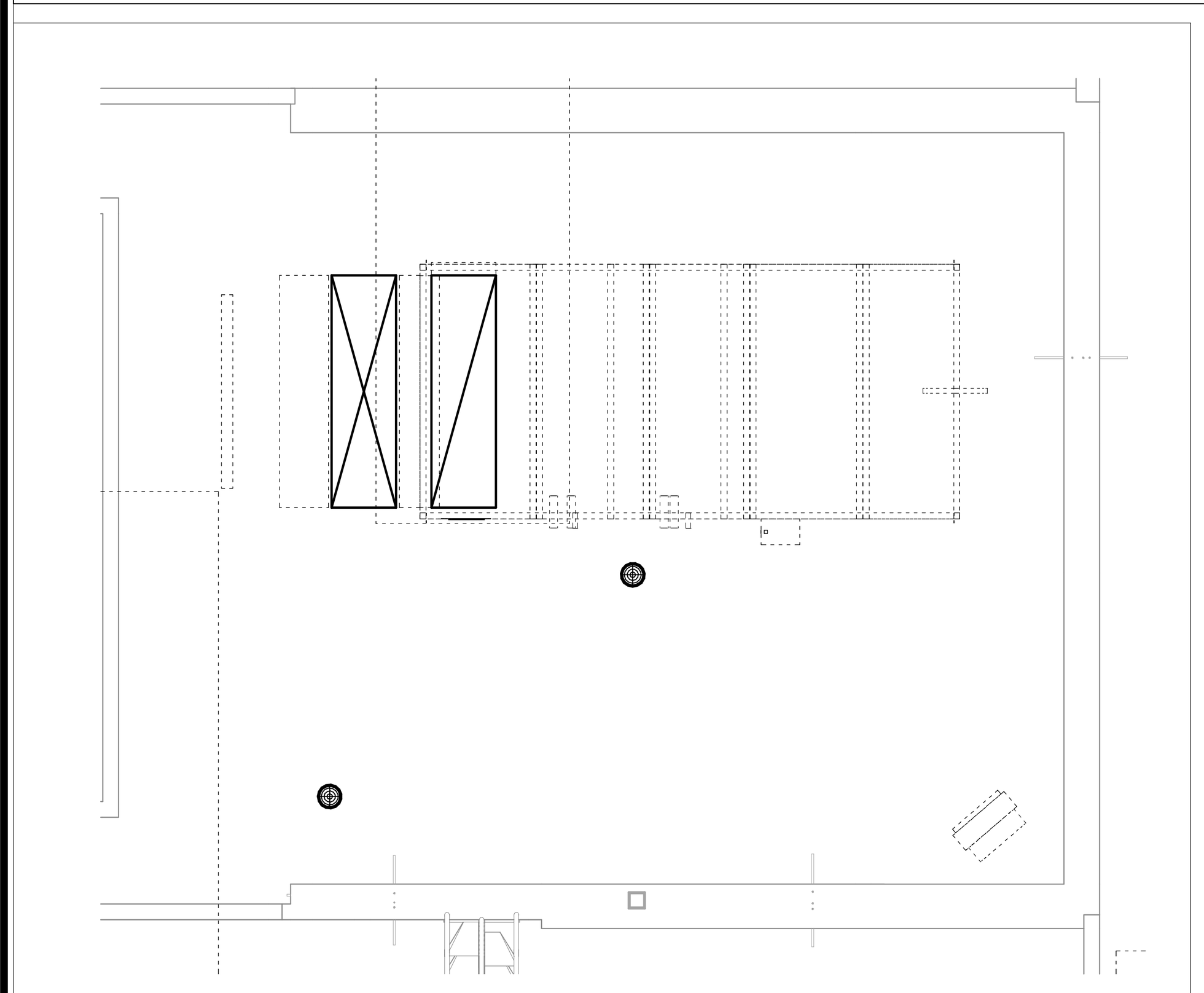
END OF SECTION

FIRST FLOOR PLAN ROOM INDEX

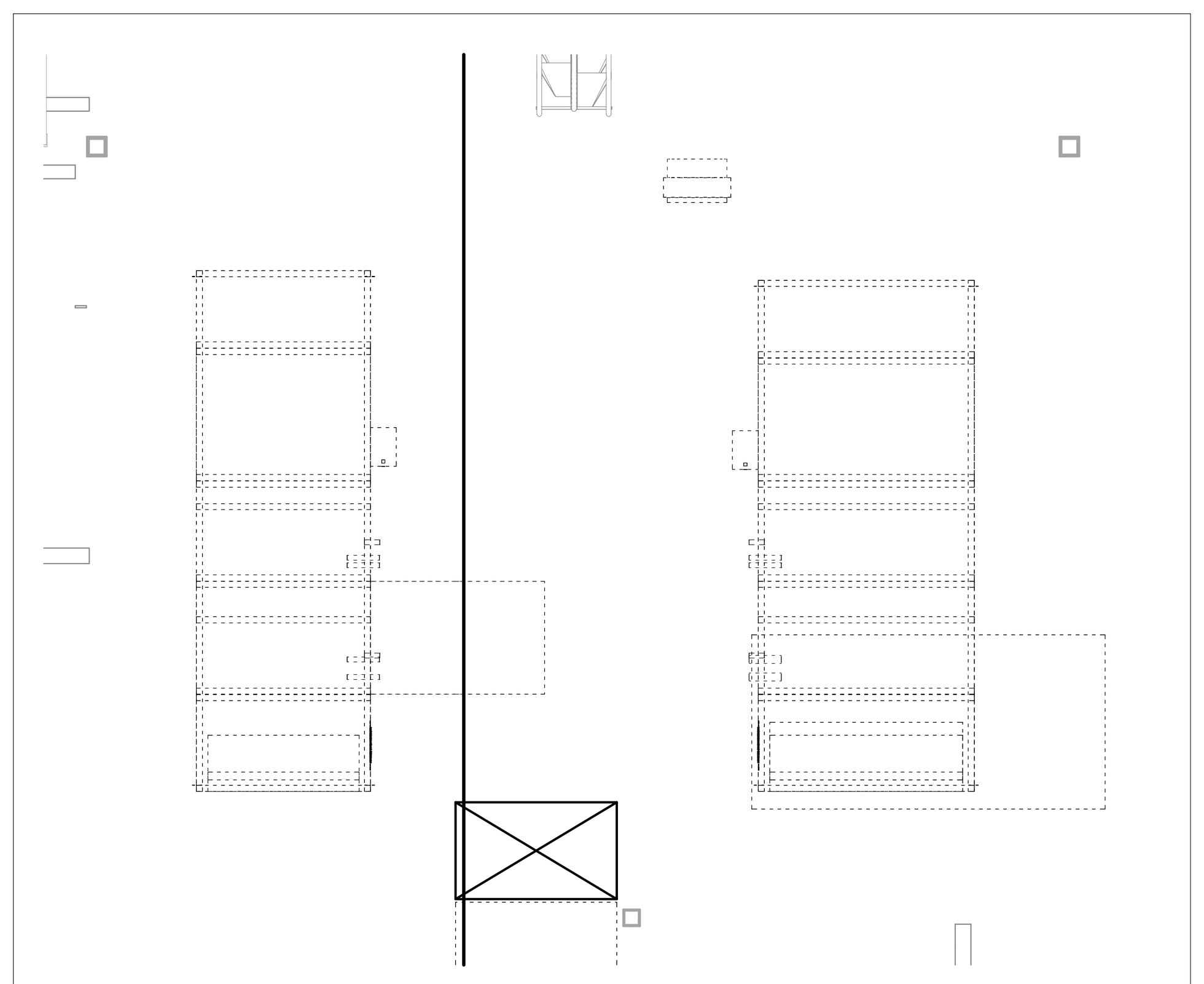
ROOM NUMBER	ROOM NAME	AREA
A101	VESTIBULE	412 SF
A102	LOBBY	741 SF
A103	MULTIPURPOSE	2,843 SF
A104	STORAGE	248 SF
A105	TECH ROOM	134 SF
A106	CCEO LOBBY	216 SF
A107	ADMIN	246 SF
A108	MAIL	107 SF
A109	CORRIDOR	349 SF
A110	TAX MAP	284 SF
A111	CONFERENCE	472 SF
A113	FISCAL	194 SF
A114	SENIOR ADMIN	194 SF
A115	COUNTY ENGINEER	275 SF
A116	CORRIDOR	385 SF
A117	OFFICE	155 SF
A118	GIS	173 SF
A119	PLOTTING	560 SF
A120	SENIOR ENGINEER	175 SF
A121	CONFERENCE	244 SF
A122	CONSTRUCTION ENGINEER	175 SF
A123	CAD	167 SF
A124	DEPUTY ENGINEER	175 SF
A125	CORRIDOR	471 SF
A126	SURVEY	278 SF
A127	BRIDGE INSPECTOR	168 SF
A128	STAIR	48 SF
A129	PERMITS	168 SF
A130	INTERN OFFICE	161 SF
A131	INSPECTIONS	301 SF
A132	MECHANICAL	168 SF
A133	CORRIDOR	396 SF
A134	CORRIDOR	97 SF
A135	MENS RESTROOM	123 SF
A136	WOMENS RESTROOM	124 SF
A137	OFFICE	169 SF
A138	ELECTRICAL	34 SF
A139	CUSTODIAL	68 SF
A140	BREAK ROOM	343 SF
A141	FILES	249 SF
A142	WOMENS RESTROOM	231 SF
A143	MENS RESTROOM	225 SF
A144	STORAGE	90 SF
B101	FACILITIES LOBBY	223 SF
B102	CORRIDOR	236 SF
B103	ADMIN	225 SF
B104	ASSISTANT DIRECTOR	282 SF
B105	CONFERENCE	243 SF
B106	EXECUTIVE ASSISTANT	264 SF
B107	BADGE OFFICER	172 SF
B108	DIRECTOR	370 SF
B109	CORRIDOR	554 SF
B110	PROJECT MANAGER	265 SF
B111	STORAGE	110 SF
B112	EMPLOYEE KITCHEN	294 SF
B113	CORRIDOR	131 SF
B114	MENS RESTROOM	150 SF
B115	WOMENS RESTROOM	148 SF
B116	VESTIBULE	43 SF
B117	STORAGE	213 SF
B118	FIELD OFFICE	1,460 SF
B119	LOCKER ROOM	305 SF
B120	STORAGE	82 SF
B121	VESTIBULE	73 SF
B122	MECHANICAL	258 SF
B123	STP OFFICER	175 SF
B124	STP KITCHEN	244 SF
B125	HVAC TECHS	428 SF
B126	STO	183 SF
B201	MECHANICAL MEZZANINE	509 SF
B202	MECHANICAL MEZZANINE	412 SF



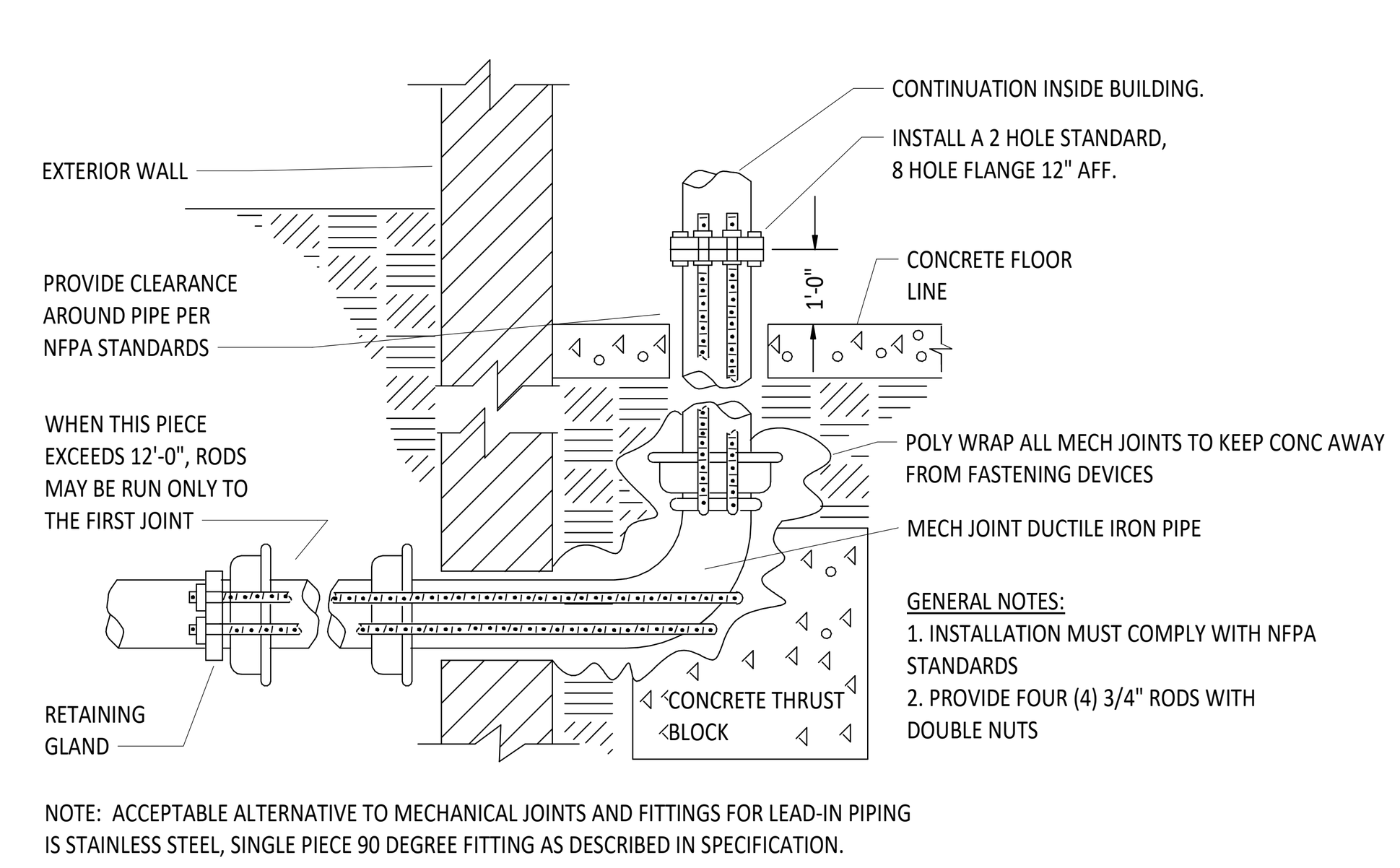
1 FP1.1 **FIRE PROTECTION PLAN**
1/8" = 1'-0"



2 FP1.1 **FIRE PROTECTION ENLARGMENT - MECHANICAL MEZZANINE ABOVE A139, A140, A141**
1/4" = 1'-0"



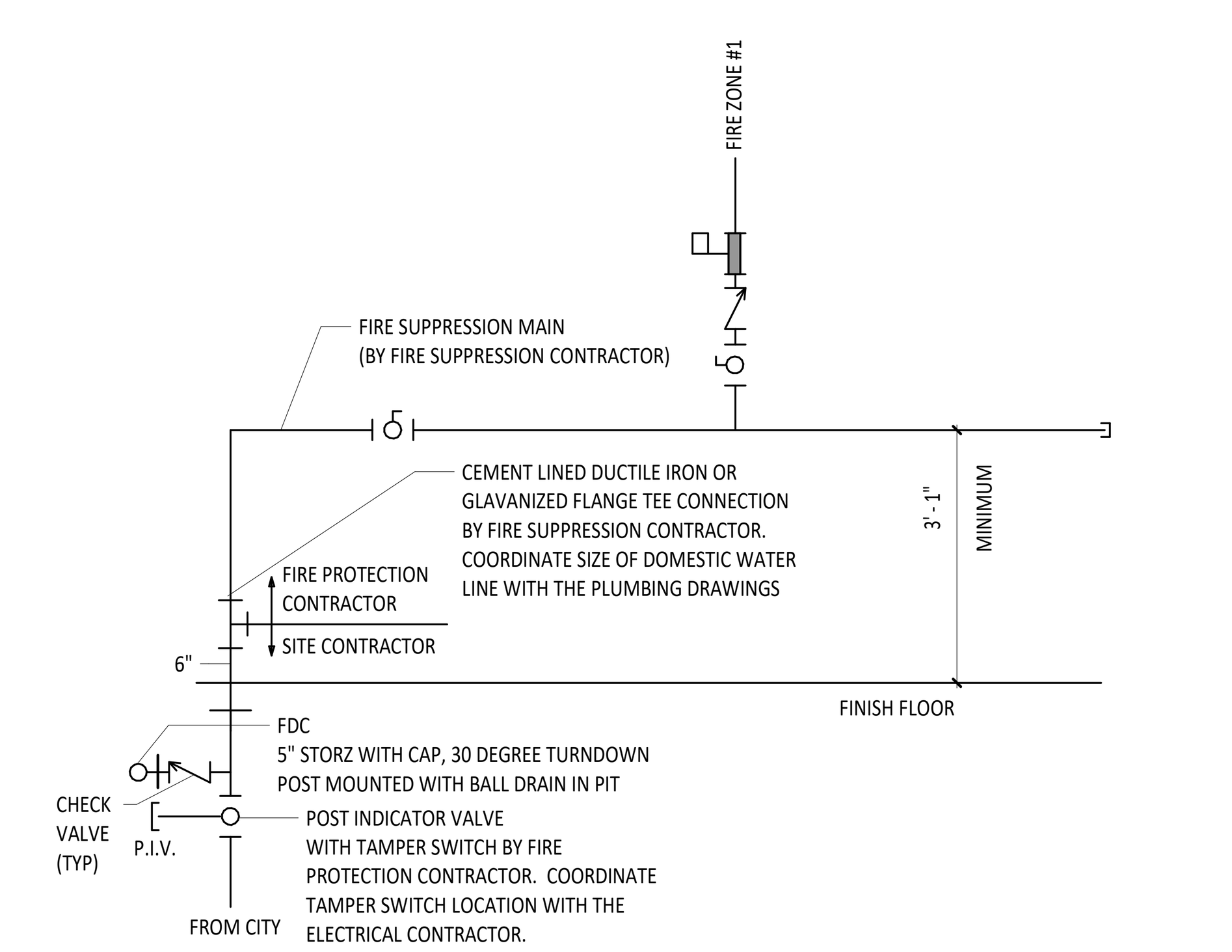
3 FP1.1 **FIRE PROTECTION ENLARGMENT - MECHANICAL MEZZANINE ABOVE B113, B114, B115**
1/4" = 1'-0"



GENERAL NOTES:
1. INSTALLATION MUST COMPLY WITH NFPA STANDARDS
2. PROVIDE FOUR (4) 3/4" RODS WITH DOUBLE NUTS

NOTE: ACCEPTABLE ALTERNATIVE TO MECHANICAL JOINTS AND FITTINGS FOR LEAD-IN PIPING IS STAINLESS STEEL, SINGLE PIECE 90 DEGREE FITTING AS DESCRIBED IN SPECIFICATION.

4 FP1.1 **WATER SERVICE LINE EXTENSION DETAIL**
NTS



5 FP1.1 **INCOMING WATER MAIN FIRE SUPPRESSION RISER DIAGRAM**
NTS

FIRE PROTECTION GENERAL NOTES

A. PROVIDE A COMPLETE WET TYPE FIRE PROTECTION SYSTEM AS REQUIRED TO ACCOMMODATE THE FLOOR PLAN AND CEILING TYPES INCLUDING MAINS, BRANCHES, HEADS, VALVES, AND ACCESSORIES AS REQUIRED. THE SYSTEM SHALL BE INSTALLED ACCORDING TO DIVISION 21 SPECIFICATIONS AND RECOMMENDATIONS OF THE STATE BUILDING CODE, LOCAL FIRE DEPARTMENT, AND ALL FEDERAL, STATE, AND LOCAL AUTHORITIES, NFPA, AND FACTORY MUTUAL.

B. SPRINKLER PIPING SERVING HIGH BAY AREAS SHALL BE ROUTED AS HIGH AS POSSIBLE. COORDINATE ROUTING OF SPRINKLER PIPING WITH BUILDING CONSTRUCTION, DUCTWORK, LIGHTING AND ALL OTHER UTILITIES. COORDINATE SPRINKLER HEAD LOCATIONS WITH ARCHITECTURAL CLOUDS. SPRINKLER PIPING SHALL NOT BE ROUTED BELOW CLOUDS.

C. COORDINATE THE LOCATION OF SPRINKLER HEADS AND PIPING WITH BUILDING CONSTRUCTION, DUCTWORK AND MECHANICAL PIPING IN MEZZANINES. ROUTE SPRINKLER PIPING ABOVE THE BOTTOM CHORD OF THE ROOF TRUSSES IN THE MEZZANINE. DO NOT SUPPORT SPRINKLER PIPING FROM DUCTWORK OR EQUIPMENT.

D. FIRE PROTECTION SPRINKLER MAINS AND ZONES SHALL BE ROUTED AS DENOTED ON DRAWINGS. ANY ALTERNATE ROUTING MUST BE APPROVED BY THE ARCHITECT/ENGINEER. THIS CONTRACTOR SHALL DETERMINE THE ACTUAL PIPE SIZING AND ROUTING REQUIRED AND COORDINATE WORK WITH ALL OTHER TRADES TO AVOID CONFLICTS.

E. THE SPRINKLER SYSTEM SHALL BE DESIGNED BASED UPON ACTUAL WATER FLOW TEST DATA OBTAINED AT OR NEAR THE JOB SITE.

F. DIVISION 21 CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR PROPER INSTALLATION OF THE FIRE PROTECTION SYSTEMS ALARM DEVICES INVOLVED WITH FIRE SPRINKLER SYSTEM.

G. ALL SPRINKLER SYSTEM PIPING SHALL BE CONCEALED ABOVE THE SUSPENDED CEILING SYSTEM, UNLESS NOTED OTHERWISE. WRITTEN AUTHORIZATION SHALL BE OBTAINED FROM THE ARCHITECT PRIOR TO EXPOSING ANY PIPING IN ANY ROOM WHICH HAS A SUSPENDED CEILING.

H. AN INSPECTOR'S TEST CONNECTION SHALL BE PROVIDED FOR EACH FIRE SPRINKLER ZONE. THIS CONTRACTOR SHALL PROVIDE FIXED PIPING FROM THE TEST CONNECTION TO AN ADEQUATELY SIZED RECEPTOR WHICH IS CAPABLE OF ACCEPTING THE FULL FLOW OF THE TEST. EXTERIOR DISCHARGE OF THE TEST CONNECTION SHALL BE PERMITTED ONLY BY SPECIFIC WRITTEN INSTRUCTION FROM THE ENGINEER.

I. SHOW ALL ROOM NUMBERS ON SHOP DRAWING PLANS.

J. ROUTE SPRINKLER PIPING SUCH THAT IT DOES NOT RUN ABOVE ELECTRICAL PANELS, SWITCHGEAR, OR SIMILAR EQUIPMENT. SPRINKLER MAINS SHALL NOT RUN THROUGH ELECTRICAL OR COMMUNICATION ROOMS. SPRINKLER HEADS IN THESE ROOMS SHALL BE SERVED BY A DEDICATED BRANCH LINE FOR EACH ROOM.

K. PROVIDE A COMPLETE LIGHT HAZARD WET-TYPE SPRINKLER SYSTEM FOR ALL FIRE ZONES AS SHOWN ON THE DRAWINGS. PROVIDE ORDINARY HAZARD IN SPACE WHERE REQUIRED. INSTALL SPRINKLER SYSTEM PER NFPA 13, STATE AND LOCAL FIRE MARSHALL AND DIVISION 21 OF THE SPECIFICATIONS.

L. THE BUILDINGS COMPLETE OPERATIONAL FIRE PROTECTION SYSTEMS SHALL REMAIN IN PLACE. THIS CONTRACTOR SHALL REPAIR ANY DAMAGE TO THIS SYSTEM CREATED BY THE REMOVAL OF ANY OTHER MECHANICAL SYSTEMS OR COMPONENTS.

M. THIS CONTRACTOR SHALL COORDINATE PHASING OF SPRINKLER WORK WITH ALL OTHER CONTRACTORS PRIOR TO STARTING WORK.

N. THIS CONTRACTOR SHALL PREPARE HYDRAULIC CALCULATIONS BASED UPON THE CONFIGURATION OF THE ACTUAL SYSTEM DESIGN AS SHOWN ON THIS CONTRACTOR'S SHOP DRAWINGS.

O. THIS CONTRACTOR SHALL PROVIDE ALL ADDITIONAL SPRINKLER HEADS AS REQUIRED TO ENSURE AN APPROVED FIRE PROTECTION SYSTEM AT NO ADDITIONAL COST TO THE OWNER.

P. PROVIDE AUXILIARY DRAIN VALVES AS REQUIRED BY NFPA. AUXILIARY DRAINS SHALL BE EXPOSED WITH 1" DRAIN VALVES. WHEN 5 OR MORE GALLONS ARE TRAPPED, THIS CONTRACTOR SHALL PROVIDE FIXED PIPING TO AN ADEQUATELY SIZED RECEPTOR WHICH IS CAPABLE OF ACCEPTING THE FULL FLOW OF THE DRAIN. WHEN LESS THAN 5 GALLONS ARE TRAPPED, A HOSE BIB SHALL BE PROVIDED AT THE DRAIN VALVE.

Q. AUXILIARY DRAINS SHALL NOT BE LOCATED ABOVE PLASTER OR GYPSUM BOARD CEILING SYSTEMS. ONLY BY A SPECIFIC WRITTEN INSTRUCTION FROM THE ENGINEER WILL A VARIANCE BE PROVIDED.

R. THE CONTRACTOR SHALL PARTICIPATE IN THE 3D COORDINATION PROGRESS MEETINGS LED BY DIVISION 23 MECHANICAL CONTRACTOR. THE DIVISION 21 FIRE SUPPRESSION CONTRACTOR SHALL PROVIDE 3D MODEL OF SPRINKLER SYSTEM DESIGN TO INCLUDE IN 3D COORDINATION MODEL.

S. FLOW TEST DATA FROM 03/05/25 INDICATES THE FOLLOWING: STATIC PRESSURE 65 PSI. RESIDUAL PRESSURE: 25 PSI AT 731 GPM. CONTRACTOR IS REQUIRED TO PERFORM THEIR OWN FLOW TEST AND RECORD THAT WITH THE LOCAL FIRE DEPARTMENT AND MUNICIPLE WATER DEPARTMENT.

#	KEYNOTE DESCRIPTION
1	PROVIDE CLEAN AGENT TECHNOLOGY ROOM SAFE FIRE SUPPRESSION SYSTEM FOR TECHNOLOGY ROOM. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE WORK WITH THE GENERAL CONTRACTOR AND TECH EQUIPMENT.
2	~~NO FIRE PROTECTION MAIN PIPING TO BE LOCATED ABOVE THIS ROOM.~~
3	FURNISH AND INSTALL SEMI-RECESSED HOSE VALVE CABINET IN THE LOCATION SHOWN. COORDINATE THE EXACT LOCATION WITH THE GENERAL CONTRACTOR.

STATE OF OHIO
CHRISTOPHER MONNIN
E-67075
REGISTERED
PROFESSIONAL ENGINEER

CHRISTOPHER MONNIN
LICENSE #E-67075
EXPIRATION DATE: 12/31/2027

GARMANN MILLER
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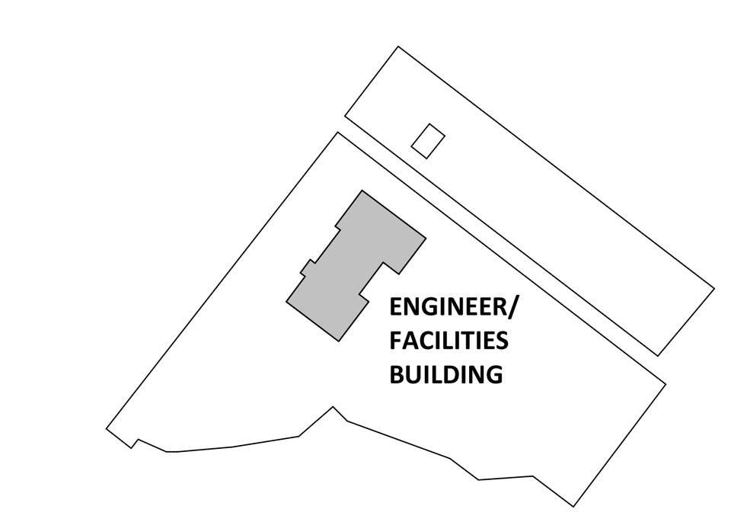
NEW BUILDING FOR
CLERMONT COUNTY FACILITIES PHASE 2 MANAGEMENT BUILDING
4011 FILAGER ROAD BATAVIA, OH 45103

ISSUANCES/REVISIONS

	CONSTRUCTION DOCUMENTS	02/19/2026
1	ADDENDUM #03	04/01/2026

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



KEY PLAN

SHEET TITLE:
FIRE PROTECTION PLAN

SHEET NUMBER:
FP1.1

PRINTED ON: 4/1/2026 7:50:42 AM


FILAGER RD
JESSICAS VW
JESSICAS CHASE
Haul Route
Phase 2 Site
EAST FILAGER RD
FILAGER RD
Fill Dirt Stockpile
Up to 6,000 CY
Available
222
N
W
E
S
1 inch = 150 feet