Project No. 25-0225.00

February 18, 2026

02/18/2026

ADDENDUM NO. 2
TO THE
DRAWINGS AND PROJECT MANUAL
FOR
KISD 2025 FRP
KLEIN I.S.D.
KLEIN, TEXAS

VLK
20445 State Highway 249, Suite 350
Houston, TX 77070
281.671.2300 voice
vlkarchitects.com

2.1 GENERAL

A. This addendum modifies the drawings and project manual, dated January 27, 2026, as noted within and shall become part of the Contract Documents.

B. Each holder of proposal documents registered with the Architect will receive a copy of the addendum. Each prime proposer is responsible for distribution of information conveyed by this addendum to its sub-proposers and suppliers.

C. Proposers shall acknowledge receipt of this addendum in the space provided on the proposal form. Failure to do so may subject proposer to disqualification.

2.2 DOCUMENT 00 01 10 - TABLE OF CONTENTS

A. Delete this Document in its entirety insert attached **revised** Document.

2.3 DOCUMENT 00 42 00 - PROPOSAL FORM

A. Delete this Document in its entirety insert attached **revised** Document.

2.4 SECTION 01 22 00 - UNIT PRICES

A. This Section, attached hereto, is entirely **new** and is hereby made a part of this addendum.

2.5 SECTION 01 23 00 - ALTERNATES

A. Delete this Section in its entirety and insert attached **revised** Section.

2.6 SECTION 01 45 23 - TESTING AND INSPECTION SERVICES (BY OWNER)

A. Delete this Section in its entirety and insert attached **revised** Section.

2.7 SECTION 05 31 00 - STEEL DECKING

A. This Section, attached hereto, is entirely **new** and is hereby made a part of this addendum.

2.8 SECTION 07 54 23 - THERMOPLASTIC-POLYOLEFIN ROOFING (TPO)

A. This Section, attached hereto, is entirely **new** and is hereby made a part of this addendum.

2.9 SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

A. Delete this Section in its entirety and insert attached **revised** Section.

2.10 SECTION 08 71 00 - DOOR HARDWARE

A. This Section, attached hereto, is entirely **new** and is hereby made a part of this addendum.

2.11 SECTION 09 30 00 - TILING

A. This Section, attached hereto, is entirely **new** and is hereby made a part of this addendum.

2.12 SECTION 10 14 00 - IDENTIFYING DEVICES

A. Delete this Section in its entirety and insert attached **revised** Section.

2.13 MECHANICAL, ELECTRICAL AND PLUMBING ADDENDUM ITEMS

A. Attached document by Salas O'Brien shall hereby become a part of this addendum.

2.14 REVISED DRAWINGS

A. Sheet Nos. INDEX, A12.01, A19.11, A32.11E, A36.01, A36.11, A39.11, A49.11, A69.11, A69.12, M12.02, M13.01, M13.02, M32.01, M43.01, M62.01, E31.01, P60.01, P61.01, and P65.01 dated February 18, 2026 and attached hereto, are revised drawings and are hereby made a part of this addendum.

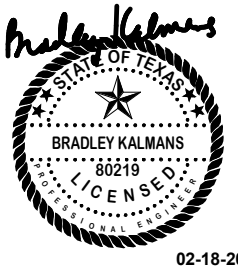
2.15 NEW DRAWINGS

A. Sheets No. A65.01, A65.02, P62.02, P62.20, P63.01, and P64.01, dated February 18, 2026, attached hereto, are new drawings and are hereby made a part of this addendum.

END OF ADDENDUM NO. 2

February 18, 2026

MEPT ADDENDUM NO. 2 ITEMS



02-18-2026

1. **SECTION 25 09 33 Building Management and Control System**

   A. Replace this section in its entirety.

2. **SHEET P64.01A Plumbing Underfloor Plan – Nitsch – Unit A**

   A. Delete this sheet in its entirety.

3. **SHEET P62.02 Plumbing Demolition Enlarged Plan – Kitchen - Nitsch**

   A. This sheet, attached hereto, is entirely new and is hereby made a part of this addendum.

4. **SHEET P62.20 Plumbing Enlarged Underfloor Plan – Kitchen - Nitsch**

   A. This sheet, attached hereto, is entirely new and is hereby made a part of this addendum.

5. **SHEET P63.01 Plumbing Enlarged Plan – Kitchen - Nitsch**

   A. This sheet, attached hereto, is entirely new and is hereby made a part of this addendum.

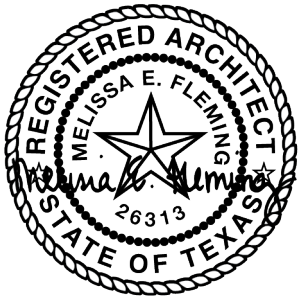
6. **SHEET P64.01 Plumbing Roof Plan - Nitsch**

   A. This sheet, attached hereto, is entirely new and is hereby made a part of this addendum.

END OF SALAS O'BRIEN ADDENDUM ITEMS

DOCUMENT 00 01 10

TABLE OF CONTENTS



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DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

PROCUREMENT REQUIREMENTS

Document 00 11 19 - Request for Competitive Sealed Proposals
00 21 16 - Instructions to Proposers
00 42 00 - Proposal Form
00 45 19 - Non-collusion Affidavit
00 45 20 - Felony Conviction Notification
00 45 25 - Certification of Criminal History Record Information Review by Contractor-Employer
00 45 46 - Conflict-of-Interest Questionnaire
00 45 47 - HB 89 and SB 252 Certification

CONTRACTING REQUIREMENTS

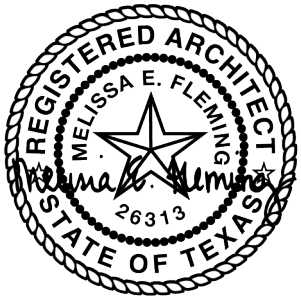
Document 00 61 13.13 - Performance Bond Form
00 61 13.16 - Payment Bond Form
00 65 00 - Release of Lien Documents
00 70 00 - General Conditions of the Contract for Construction, AIA Document A201-2017
00 73 00 - Klein ISD Supplementary Conditions to the AIA Document A201-2017 General Conditions of the Contract for Construction
00 73 46 - Prevailing Wage Rates
00 73 50 - Weather Table

DIVISION 01 - GENERAL REQUIREMENTS

Section 01 11 00 - Summary of Work
01 21 00 - Allowances
01 22 00 - Unit Prices *[Addendum No. 2]*
01 23 00 - Alternates
01 29 00 - Payment Procedures
01 31 00 - Project Management and Coordination
01 31 19 - Project Meetings
01 31 19.13 - Preconstruction Meetings
01 32 16 - Construction Progress Schedules
01 33 23 - Shop Drawings, Product Data, and Samples
01 35 00 - Alteration Project Procedures
01 41 00 - Regulatory Requirements
01 42 00 - References
01 42 16 - Definitions
01 45 00 - Quality Control
01 45 23 - Testing and Inspection Services
01 50 00 - Temporary Facilities and Controls
01 56 39 - Temporary Tree and Plant Protection
01 62 00 - Product Options
01 65 00 - Product Delivery Requirements
01 66 00 - Product Storage and Handling Requirements
01 73 29 - Cutting and Patching
01 74 13 - Cleaning
01 77 00 - Closeout Procedures
01 78 23 - Operation and Maintenance Data
01 78 30 - Warranties and Bonds
01 78 39 - Project Record Documents
01 78 40 - Spare Parts, Overages and Maintenance Materials

DIVISION 02 - EXISTING CONDITIONS

Section 02 41 19 - Selective Demolition



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DIVISION 03 - CONCRETE

Section 03 01 30.62 - Repair of Cast-in-Place Concrete

DIVISION 04 - MASONRY

Section 04 20 00 - Masonry Units

DIVISION 05 - METALS

Section **05 31 00 - Steel Decking *[Addendum No. 2]***
05 40 00 - Cold-Formed Metal Framing
05 50 00 - Metal Fabrications

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Section 06 10 00 - Rough Carpentry

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 07 21 00 - Building Insulation
07 27 26 - Fluid-Applied Membrane Air Barriers
07 42 13.00 - Metal Wall Panels
07 48 00 - Rainscreen Attachment System
07 54 23 - Thermoplastic-Polyolefin Roofing (TPO) *[Addendum No. 2]*
07 62 00 - Sheet Metal Flashing and Trim
07 65 00 - Flexible Flashing
07 92 00 - Joint Sealants

DIVISION 08 - OPENINGS

Section 08 11 00 - Hollow Metal Doors and Frames
08 14 23 - Plastic-Laminate-Faced Wood Doors
08 71 00 - Door Hardware ***(not included with this issue) [Addendum No. 2]***
08 80 00 - Glazing

DIVISION 09 - FINISHES

Section 09 21 16 - Gypsum Board Assemblies
09 30 00 - Tiling *[Addendum No. 2]*
09 51 00 - Acoustical Ceilings
09 65 00 - Resilient Flooring
09 91 00 - Painting
09 96 53 - Elastomeric Coatings

DIVISION 10 - SPECIALTIES

Section 10 14 00 - Identifying Devices

DIVISION 11 - EQUIPMENT

Section 11 40 00 - Foodservice Equipment

DIVISION 12 - FURNISHINGS

NONE IN THIS PROJECT

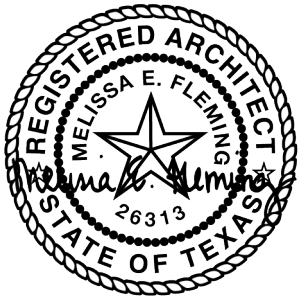
DIVISIONS 13 through 20 - Not used.

DIVISION 21 - FIRE SUPPRESSION

NONE IN THIS PROJECT

DIVISION 22 - PLUMBING

Section 22 01 00 - Plumbing Operating and Maintenance Manuals
22 05 00 - Plumbing General Provisions
22 05 10 - Plumbing Contract Quality Control
22 05 12 - Shop Drawings, Coordination Drawings, And Product Data
22 05 13 - Electrical Provisions of Plumbing Work
22 05 14 - Plumbing Alterations Project Procedures
22 05 15 - Plumbing Earthwork
22 05 16 - Excavating, Backfilling and Compacting for Utilities Outside Building Slab
22 05 17 - Plumbing Access Doors
22 05 23 - Valves, Strainers and Vents
22 07 19 - Plumbing Piping Insulation
22 13 16 - Soil, Waste and Sanitary Drain Piping, Vent Piping and Appurtenances
22 20 00 - Plumbing Pipe and Pipe Fittings - General
22 40 00 - Plumbing Fixtures and Fixture Carriers



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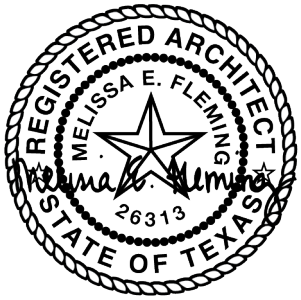
DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

Section 23 01 00 - HVAC Operating and Maintenance Manuals
23 05 00 - Mechanical General Provisions
23 05 10 - HVAC Contract Quality Control
23 05 11 - Mechanical Alterations Project Procedures
23 05 12 - HVAC Shop Drawings, Coordination Drawings & Product Data
23 05 13 - Electrical Provisions of HVAC Work
23 05 14 - HVAC Condensate Drain Piping
23 05 17 - Mechanical Access Doors
23 05 18 - Variable Frequency Inverter
23 05 19 - HVAC Pressure and Temperature Instruments
23 05 23 - HVAC Valves, Strainers and Vents
23 05 48 - Vibration Isolation
23 05 93 - Testing, Balancing and Adjusting (TAB) Of Environmental Systems
23 05 94 - Coordination of Testing and Balancing
23 07 13 - External Duct Insulation
23 07 19 - HVAC Piping Insulation
23 08 00 - Mechanical Commissioning Coordination
23 08 00A - Pre-Functional Test Checklist - General
23 08 00B - Pre-Functional Test Checklist - MZU
23 08 00C - PRE-FUNCTIONAL TEST CHECKLIST – MZU Zone
23 08 00D - Pre-Functional Test Checklist - SZU
23 08 00E - Pre-Functional Test Checklist – OAHU
23 08 00F - Pre-Functional Test Checklist – Child Zone
23 08 00G - Pre-Functional Test Checklist – Current Switch
23 08 00H - Pre-Functional Test Checklist – Current Transducer
23 08 00I - Pre-Functional Test Checklist – Type 1 Chiller Plant
23 08 00J - Pre-Functional Test Checklist – Type 1 Boiler Plant
23 20 00 - Mechanical Pipe and Pipe Fittings – General
23 21 13 - Hot Water and Chilled Water Piping, Valves and Appurtenances
23 23 00 - Refrigerant Piping and Appurtenances
23 25 13 - Circulating Water System Chemical Treatment
23 31 13 - Ductwork
23 34 16 - Fans
23 41 00 - Air Filtration
23 82 41 - Electric Duct Heaters

DIVISIONS 24 - Not used.

DIVISION 25 - INTEGRATED AUTOMATION



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DIVISION 26 - ELECTRICAL

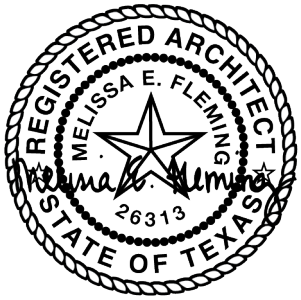
DIVISION 27 - COMMUNICATIONS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

DIVISIONS 29 and 30 - Not used.

DIVISION 31 - EARTHWORK

Section 31 10 00 - Site Clearing
31 20 00 - Earth Moving
31 32 13 - Soil Mixing Stabilization
31 50 00 - Excavation Support and Protection



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DIVISION 32 - EXTERIOR IMPROVEMENTS

Section 32 13 13 - Concrete Paving
32 13 14 - Concrete Sidewalk
32 13 73 - Concrete Paving Joint Sealants
32 17 23 - Pavement Markings
32 31 15 - Vinyl-Clad Chain Link Fencing

DIVISION 33 – UTILITIES through DIVISION 46 - WATER AND WASTEWATER EQUIPMENT

NONE IN THIS PROJECT

DIVISION 47 - Not used.

DIVISION 48 - ELECTRICAL POWER GENERATION

NONE IN THIS PROJECT

DIVISION 49 - Not used.

DOCUMENT 00 42 00

PROPOSAL FORM

KISD 2025 FRP
KLEIN INDEPENDENT SCHOOL DISTRICT
KLEIN, TEXAS

02/18/2026

PROPOSAL OF: _____
(Name) (Date)

TO: Mr. August Wunderlich, Chief of Operations
Klein Independent School District
7200 Spring Cypress Road
Klein, TX 77379

Dear Sir:

Having examined the drawings, project manual, and related documents and having inspected the site of proposed Work, I (we) agree to furnish all labor, materials, and to perform all work described in the specifications and shown on the drawings for the sum of:

BASE PROPOSAL: For complete construction, including General, Mechanical, Plumbing, and Electrical Work, for the sum of:

_____ DOLLARS

($_____).

ALLOWANCES: The above base proposal includes all allowances listed in SECTION 01 21 00 - ALLOWANCES.

ALTERNATES:

Alternate No. 1: For prepping and painting the interior partitions as indicated on the Kaiser Elementary School drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 2: For prepping and painting the interior partitions as indicated on the Nitsch Elementary School drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 3: For replacing Public Address System devices and cabling, as indicated on the Eiland Elementary School drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 4: For replacing Public Address System devices and cabling, as indicated on the McDougle Elementary School drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 5: For replacing the exterior site lighting at Erhardt Elementary School as indicated in the drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 6: For replacing Public Address System devices and cabling, as indicated on the Klenck Elementary School drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 7: For replacing Public Address System devices and cabling, as indicated on the Nitsch Elementary School drawings, add to the base proposal the sum of:

_____ DOLLARS

($_____).

Alternate No. 8: For replacing the existing 4" grease waste line outside the kitchen to the existing grease trap at Nitsch Elementary School as shown in the documents, add to the base proposal the sum of:

_____ DOLLARS

($_____). *[Addendum No. 2]*

Alternate No. 9: For providing a new 4" sanitary line from the outfall of the grease trap through the kitchen and connecting to the existing sanitary line in the central plant at Nitsch Elementary School as shown in the documents, add to the base proposal the sum of:

_____ DOLLARS

($_____). *[Addendum No. 2]*

Alternate No. 10: For removing existing roof curb and insulation as needed to install new metal roof deck to size and profile matching existing, providing new insulation, and new gypsum roof board to match existing at Nitsch Elementary School, add to the base proposal the sum of:

_____ DOLLARS

($_____). *[Addendum No. 2]*

Voluntary Alternate:
This section is to document any voluntary alternate(s) that would impact the schedule and/or cost of the project. Note: any voluntary alternate offered must include a clear scope description as well as the associated impact on schedule and cost if accepted. All proposed voluntary alternates shall be covered by the specified warranties. If more space is required, please submit a separate document. *[Addendum No. 2]*

_____
_____
_____

UNIT PRICES: For changing quantities of work items from those indicated by the drawings, the following unit prices shall prevail:

	UNIT	EXTRA	CREDIT
Removal and replacement of roofing system to include (2) layers of 2.2" polyiso insulation and ½" gypsum roof board down to existing metal deck. *[Addendum No. 2]*	**_____Sq. Ft.**	**$_____**	**$_____**

	UNIT	EXTRA	CREDIT
Removal and replacement of ½" gypsum roof board ***[Addendum No. 2]***	**_____Sq. Ft.**	**$_____**	**$_____**

Note: Each unit price for CREDIT shall be at least 66% of the corresponding unit price for EXTRA. [Addendum No. 2]

The undersigned agrees, if this proposal is accepted, to commence work on or before a date to be established in the written "Notice-to-Proceed" of the Owner and to attain substantial completion of all Work on or before July 31, 2026, subject to extensions of time as described in Article 8.3 of the General Conditions.

The undersigned further agrees that, from the compensation otherwise to be paid, the Owner may retain the single sum of $500.00 per campus per day for each calendar day after the substantial completion date that the Work remains incomplete, which sum is agreed upon as the proper measure of liquidated damages which the Owner will sustain per diem by the failure of the undersigned to complete the Work at the time stipulated in the contract. This sum is not to be construed in any sense a penalty.

I (we) acknowledge receipt of the following addenda:

Addendum No. 1 Dated _____ Addendum No. 2 Dated _____

Addendum No. 3 Dated _____ Addendum No. 4 Dated _____

It is our intent to utilize the following major trade subcontractors for their respective portions of the Work:

Fire Alarm _____

Electrical _____

Mechanical _____

Digital Marquee _____

Hardware _____

Paint _____

Roofing _____ **[Addendum No. 2]**

Upon receipt of notice of acceptance of this proposal within 30 days after the opening of proposals, I (we) agree to execute formal contract forms, acceptable surety bonds, and required insurance certificates within five days of receipt of the Contract.

Should I (we) fail to execute and deliver the Contract, along with the satisfactory surety bonds and insurance certification within the time set forth, the proposal security, attached hereto without endorsement, in the sum of:

_____ DOLLARS($_____).

shall become the property of Klein Independent School District as liquidated damages for the delay caused and the additional work required.

_____
Respectfully submitted, (Signature)

_____
By (Please Print or Type)

_____
Title

Contractor

Business Address

Telephone Number FAX Number

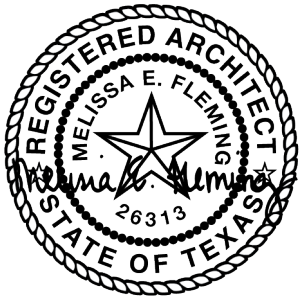
Indicate whether - Individual
Partnership
Corporation

ATTEST:

Secretary

SECTION 01 22 00

UNIT PRICES



02/18/2026

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for unit prices.

B. Related Requirements:
1. Document 00 42 00 - Proposal Form
2. Section 01 29 00 - Payment Procedures: Procedures for submitting and handling Change Orders.

1.2 DEFINITIONS

A. Unit price is an amount proposed by bidders as a price per unit of measurement for materials or services added to or deducted from the contract sum by appropriate modification, if the estimated quantities of work required by the contract documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, profit and applicable taxes.

B. Measurement and Payment: Refer to individual specification sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those sections.

C. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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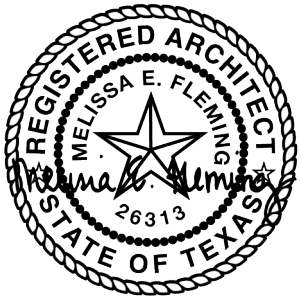
SECTION 01 23 00

ALTERNATES



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PART 1 - GENERAL

1.1 SUMMARY

A. Requirements Included:
   1. Identification and description of alternate work.
   2. The amount shown in the proposal form for each alternate shall include all overhead, profit, insurance and other costs incidental to the performance under the alternate.

B. Related Requirements:
   1. Proposal Form: Quotation of cost of each alternate.
   2. Contract Form: Alternates accepted by Owner for incorporation into the work.
   3. Section of specifications identified in each alternate.

1.2 PROCEDURES

A. Proposers are required to submit alternate amounts to add work or to deduct work from the base proposal as described below. Failure to submit alternate amounts in spaces provided on proposal form shall be basis for disqualification of proposal.

B. The successful proposer shall not modify, withdraw or cancel any of the alternate proposals or any part thereof for 30 days after date of receipt of proposals, unless specifically noted otherwise.

C. Contractor shall be responsible for any changes in the Work affected by acceptance of alternates. Claims for additional costs or time extensions resulting from changes to the Work as a result of the Owner's election of any or all alternates will not be allowed.

D. Refer to drawings and technical specifications sections for items of work affected by alternates.

E. Election of alternates will be exercised at the option of Owner.

F. Coordinate related work and modify or adjust surrounding work as required to complete the Work, including changes under each alternate.
   1. Include as part of each alternate, miscellaneous devices, accessory objects and similar items incidental to, or required for, a complete installation whether or not indicated as part of alternate.
   2. Cost listed for each alternate include cost of related coordination, modification, or adjustment.

G. Notification: Immediately following the award of contract, Contractor shall prepare and distribute to each entity or person to be involved in the performance of the Work, a notification of the status of each alternate scheduled herein. Indicate which alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates, if any.

1.3 SELECTION AND AWARD OF ALTERNATES

A. Indicate variation in base proposal amount as a result of the prices for the alternates described below and listed on the proposal form document or any supplement to it, by adding to, or deducting from, the base proposal amount or by indicating "No Change."

B. Indicating "No Proposal" as an alternate is unacceptable and is reason for rejection of proposal.

1.4 SCHEDULE OF ALTERNATES

A. Alternate No. 1: State in the proposal form the amount to be added to the base proposal for prepping and painting the interior partitions as indicated on the Kaiser Elementary School drawings.

B. Alternate No. 2: State in the proposal form the amount to be added to the base proposal for prepping and painting the interior partitions as indicated on the Nitsch Elementary School drawings.

C. Alternate No. 3: State in the proposal form the amount to be added to the base proposal for replacing Public Address System devices and cabling, as indicated on the Eiland Elementary School drawings.

D. Alternate No. 4: State in the proposal form the amount to be added to the base proposal for replacing Public Address System devices and cabling, as indicated on the McDougle Elementary School drawings.

E. Alternate No. 5: State in the proposal form the amount to be added to the base proposal for replacing the exterior site lighting at Erhardt Elementary School as indicated in the drawings.

F. Alternate No. 6: State in the proposal form the amount to be added to the base proposal for replacing Public Address System devices and cabling, as indicated on the Klenck Elementary School drawings.

G. Alternate No. 7: State in the proposal form the amount to be added to the base proposal for replacing Public Address System devices and cabling, as indicated on the Nitsch Elementary School drawings.

H. **Alternate No. 8: State in the proposal form the amount to be added to the base proposal for replacing the existing 4" grease waste line outside the kitchen to the existing grease trap at Nitsch Elementary School as shown in the documents. *[Addendum No. 2]***

I. **Alternate No. 9: State in the proposal form the amount to be added to the base proposal for providing a new 4" sanitary line from the outfall of the grease trap through the kitchen and connecting to the existing sanitary line in the central plant at Nitsch Elementary School as shown in the documents. *[Addendum No. 2]***

J. **Alternate No.10: State in the proposal form the amount to be added to the base proposal for removing existing roof curb and insulation as needed to install new metal roof deck to size and profile matching existing, providing new insulation, and new gypsum roof board to match existing at Nitsch Elementary School. *[Addendum No. 2]***

K. **Voluntary Alternate: This section is to document any voluntary alternate(s) that would impact the schedule and/or cost of the project. Note: any voluntary alternate offered must include a clear scope description as well as the associated impact on schedule and cost if accepted. All proposed voluntary alternates shall be covered by the specified warranties. *[Addendum No. 2]***

PART 2 - PRODUCTS

Not used.

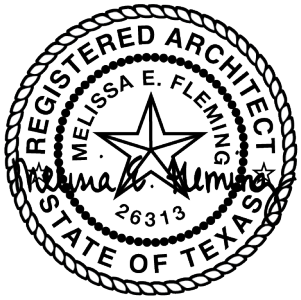
PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 45 23

TESTING AND INSPECTION SERVICES (BY OWNER)



02/18/2026

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements Included: Owner provided materials testing laboratory services.

B. Related Requirements:
1. Terms and Conditions: Inspections, testing, and approvals required by public authorities.
2. Section 01 45 00 - Contract Quality Control: Manufacturer's certificates.
3. Section 01 78 39 - Project Record Documents.
4. Individual Specifications Sections: Inspections and tests required, and standards for testing.

1.2 SELECTION AND PAYMENT

A. Owner will employ services of an independent materials testing laboratory to perform specified inspection and testing and will pay for these services directly to the testing laboratory.

B. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of contract documents. Contractor will pay all testing required by local authorities having jurisdiction.

1.3 QUALITY ASSURANCE

A. Laboratory shall comply with requirements of ASTM E 329 and ASTM D 3740 and provide certifications to this effect.

B. Laboratory shall maintain a full-time registered Engineer on staff to review specific tests required by this specification.

C. Laboratory shall be authorized to operate in State in which project is located.

D. Testing equipment shall be calibrated to ensure accurate results and values in order to ensure that test results are true and valid, and at intervals with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constants.

1.4 LABORATORY RESPONSIBILITIES

A. Provide qualified personnel at site after due notice from the contractor; cooperate with Architect, Contractor, and appropriate public authorities having jurisdiction in performance of services.

B. Perform specified inspection, sampling, and testing of products in accordance with latest, up-to-date standards.

C. Ascertain compliance of materials and mixes with requirements of contract documents.

D. Promptly notify Architect, appropriate consultants, Contractor, Owner, and authority having jurisdiction of observed irregularities or non-conformance of work or products.

E. Perform additional inspections and tests required by Architect, Owner, Contractor, or authority having jurisdiction.

1.5 LABORATORY REPORTS

A. After each inspection and test, promptly submit two copies of laboratory report to Architect, one to applicable consultant, one to Owner, one to Contractor, and one to City. Include: Date issued, project title and number, name of inspector, date and time of sampling or inspection, weather conditions, identification of product and specifications section, location in the project, type of inspection or test, date of test, results of tests, and specific indication of conformance, or lack of such, with contract documents. When requested by Architect/Engineer, provide interpretation of test results.

1.6 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of contract documents.

B. Laboratory may not approve or accept any portion of the work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop work.

1.7 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location adequate samples of materials proposed to be used which require testing, together with proposed mix designs.

B. Cooperate with laboratory personnel, and ensure ready access to work and to manufacturer's facilities, if requested by testing lab.

C. Provide incidental labor and facilities for access to work to be tested, to obtain and handle samples at the site, or at source of products to be tested, in order to facilitate tests and inspections, and for storage and curing of test samples.

D. Notify laboratory of material sources and furnish lab-determined necessary quantities of representative samples of materials proposed for use which are required to be tested.

E. Notify Architect and laboratory 24 hours prior to expected time for operations requiring inspection and testing services. Cancel notifications in a timely manner if items or systems are not ready for inspection as intended. Reimburse Owner for trip charges when cancellation notifications are not made in a timely fashion.

F. Advise laboratory in a timely fashion to complete required inspection and testing prior to subsequent work being performed.

G. Reimburse Owner for all subsequent re-testing of products or systems found to be defective or otherwise not in accordance with specification requirements, and for any overtime pay required as a result of any inspection requirements that may fall outside of normal job-site weekday work schedule. Remove rejected products or work and replace with products or work of specified quality.

H. Notification of Source Change: The Contractor shall be responsible for notifying the Owner, Architect, Engineer, and testing laboratory when the source of any material is changed after the original tests or inspections have been made.

PART 2 - PRODUCTS – Not used.

PART 3 - EXECUTION

3.1 FORMWORK, REINFORCING STEEL AND INSERTS

A. Make general inspection of formwork.

B. Prior to each concrete pour, inspect fabrication and bending of bars, bar sizes, spacing, placement and tying in accordance with ACI 315.

C. Prior to each concrete pour, inspect positioning of steel inserts and assemblies, sizes, and spacing, and inspect fusion-welded anchors and sheer connectors.

3.2 CAST-IN-PLACE CONCRETE

A. Design Mixes:
1. At the beginning of the work, Contractor shall submit proposed concrete mixes for review by the Architect, structural engineering consultant, and testing laboratory, including the sieve analysis of fine and course aggregate ASTM C 136, dry rodded weight of coarse aggregate - ASTM C 29, and the specific gravity (bulk saturated surface dry), of fine and coarse aggregates ASTM C 127 and C 128.
2. The testing laboratory will submit their findings to the structural consultant, who will subsequently forward this information, with their review of the submittals, to the Architect.
3. Contractor shall not mix concrete for placing in the work until confirmation laboratory reports are supplied to reflect that each proposed mix will develop the strength required. Successful past history in accordance with ACI 318 will be satisfactory.

B. Test Cylinders: Make at least one test of each day's pouring of concrete or each 100 cubic yards, whichever is the least, on each different portion or section of the work. Mold and cure specimens in accordance with ASTM C 31, and test in accordance with ASTM C 39. Test cylinders shall be made and tested by the laboratory. Footings, walls, and floor systems constitute different sections. Each test shall consist of four specimens, one of which shall be broken at seven days, two at 28 days and one held in reserve. Determine temperature and air content for each set of test cylinders in accordance with ASTM C 231.

C. Field Quality Control:
1. Determine slump for each concrete strength test and whenever consistency of concrete varies, in accordance with ASTM C 143.
2. Monitor and record addition of water to concrete and length of time concrete is allowed to remain in truck.
3. Verify delivery tickets indicating class of concrete, amount of water added during initial batching, and time initial batching occurred.
4. Monitor work being performed in accordance with ACI (American Concrete Institute) recommendations as a standard of quality.
5. Reference SECTION 03 30 00 - CAST-IN-PLACE CONCRETE for additional requirements.

D. Source Quality Control: An independent testing laboratory representative shall periodically inspect and control concrete mixing and loading of transit mix trucks at batch plant at intervals appropriate to monitor quality of material issued on job.

3.3 MORTAR, GROUT, AND MASONRY REINFORCEMENT

A. Coordinate with Owner’s testing laboratory to provide periodic inspection of the following task:
1. As masonry construction begins, the following shall be verified to ensure compliance:
   a. Proportions of site prepared mortar.
   b. Construction of mortar joints.
   c. Location of reinforcement and connectors.
2. The inspection program shall verify:
   a. Size and location of structural elements.
   b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.
   c. Specified size, grade, and type of reinforcement.
   d. Protection of masonry during cold weather (temperature below 40°F.) or hot weather (temperature above 90°F.).

3. Prior to grouting, the following shall be verified to ensure compliance:
   a. Grout space is clean.
   b. Placement of reinforcement and connectors.
   c. Proportions of site-prepared grout.
   d. Construction of mortar joints.

B. Coordinate with Owner's testing laboratory to provide continuous inspection of the following task:
   1. Grout placement shall be verified to ensure compliance with code and construction document provisions.

3.4 METAL DECKING

A. **Qualification of Welders: Qualify the welding process and all welders (at Contractor expense), and periodically monitor the work in accordance with the requirements of AWS D1.3.**

B. **Testing Laboratory shall inspect steel decking to ensure the material and installation is in accordance with the specifications and shop drawings. [Addendum No. 2]**

3.5 METAL DECK AND FIELD WELDED SHEAR STUDS:

A. **The erection of metal deck and field welded shear studs shall be subject to inspection by the testing agency.**

B. **Shear Studs:**
   1. **Test minimum of two shear studs welded at start of each production period in order to determine generator, control unit and stud welder setting. Studs shall be capable of being bent 45° from vertical without weld failure. If, after welding, visual inspection reveals that sound weld or a full 360° fillet has not been attained for a particular stud, such stud shall be struck with hammer and bent 15° off perpendicular to nearest end of beam. Studs failing under this test shall be replaced.**
   2. **When the temperature is below 32°F., two studs from each group of 100 studs (or one stud if less than 100 studs are present) should be tested after cooling. Studs shall not be welded below 0°F. or when surfaces are wet with rain or snow. If stud fails in weld, two new studs shall pass test before resumption of welding. [Addendum No. 2]**

3.6 OTHER WORK REQUIRING TESTS

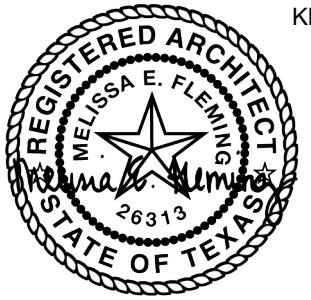
A. Refer to individual sections covered under Divisions 22, 23, and 26 for other work requiring tests by independent testing laboratory.

B. Other Tests:
   1. Moisture content in face brick.

END OF SECTION

SECTION 05 31 00

STEEL DECKING



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PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Roof decking.

B. Related Sections:
1. Section 05 50 00 - Metal Fabrications: Framing deck openings with miscellaneous steel shapes.

1.2 SUBMITTALS

A. Shop Drawings: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Indicate type of deck, gage and finish of metal, and shape and size of special pieces and accessories. Indicate fastening to supporting structure and side lap fastening.

1.3 QUALITY ASSURANCE

A. Manufacturer: Shall have a minimum of 5 years experience in the design and manufacture of metal deck units.

B. Installer: Company specializing in performing the work of this section with minimum 3 years documented experience.

C. Welders must show proof of certification within the last year prior to starting any welding on the project. Welders and welding procedures shall comply with the requirements of ANSI/AWS D1.3 Structural Welding Code or as shown in the Steel Deck Institute Manual of Construction with Steel Deck.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of SECTION 01 65 00 - PRODUCT DELIVERY REQUIREMENTS.

B. Store decking under provisions of SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIRE-MENTS on wood sleepers with slope for positive drainage.

1.5 COORDINATION

A. Coordinate installation with structural steel erection. Do not proceed until structure is ready to receive metal decking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers; Subject to compliance with requirements, provide products by the following:
Canam United States; Canam Group, Inc.
Nucor Corp.; Nucraft Division

2.2 MATERIALS

A. Roof Decking: Provide 1-1/2" deep 22 gage wide rib deck units with ribs spaced 6" o.c. Deck plate shall have a flat surface; ribbed top flange is not acceptable. Product/manufacturer; one of the following:
P-3606; Canam Group, Inc.
Type 1.5B Roof Deck; Nucor Corp.; Vulcraft Division

B. Finish: Roof decking units shall have a light commercial class zinc coating in accordance with ASTM A 653, Class G60.

2.3 ACCESSORIES

A. Fasteners: Galvanized hardened steel.

B. Weld Washers: Mild steel, uncoated 3/4" outside diameter, 1/8" thick.

C. Screws: #10 x 3/4 - HWH TEKS/1 self-drilling screw manufactured from galvanized heat treated carbon steel as manufactured by "Buildex".

PART 3 - EXECUTION

3.1 ERECTION

A. Placement: Place steel deck units on the supporting steel framework and adjust to final position before fastening permanently. Bring each unit to proper bearing on the supports. Place the units in straight alignment and with a minimum of clearance between the ends of abutting units. Deck units shall be continuous over at least three spans.

B. Fastening: Weld deck units to steel framework at ends and at intermediate supports with 3/4" diameter fusion welds. Space welds as indicated on structural drawings.
1. Fasten side joints of roof decking together at mid-span with No. 10 self-tapping screws.
2. Fasten side joints of floor decking together by tack welding or mechanical crimping.

C. Opening: As the steel deck units are erected, cut and form the holes and openings which are located and dimensioned on the drawings. Holes required for the work of the other trades will be cut by the trades requiring them. Provide deck reinforcing for openings as recommended by the manufacturer.

3.2 FIELD QUALITY CONTROL

A. Inspection and Testing: Verification inspection and testing of all field connections shall be done by an Independent Testing Laboratory, and copies of the inspection and test reports shall be submitted to the Architect, Engineer, City, Owner, and the Contractor. The cost of these inspections and tests shall be paid as specified in SECTION 01 45 23 - TESTING AND INSPECTION SERVICES.

END OF SECTION

SECTION 07 54 23

THERMOPLASTIC-POLYOLEFIN ROOFING (TPO)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Insulation and fully adhered UL Class A, factory applied white color finish, non-ballasted single-ply roofing system. Single-ply roofing system shall not have torch-sealed seam construction.

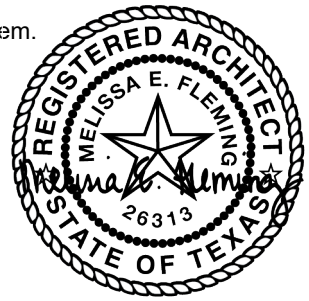
B. Related Sections:
1. Section 06 10 00 - Rough Carpentry: treated wood nailers, blocking, and curbs.
2. Section 07 62 00 - Sheet Metal Flashing and Trim.
3. Division 22 - Mechanical: roof drains.

1.2 SUBMITTALS

A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Product Data:
1. Furnish manufacturer's printed specifications and instructions for installation of system.
2. Include procedures and materials for terminations, flashing, splicing, expansion joints, and bonding.

C. Shop Drawings shall indicate:
1. Roof configuration.
2. Design of tapered insulation system showing layout, slope and thickness of entire system.
3. Sheet layout.
4. Location of field splices.
5. Type of splices.
6. Mechanical equipment flashing.
7. Expansion joints.
8. Termination details.
9. Penetration details.
10. Parapet wall details.
11. Roof slopes.
12. Cricket locations.



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D. Samples:
1. Submit a 12" x 12" sample of membrane material.
2. Submit a sample of each type of fastener.

E. Certificates:
1. Submit manufacturer's certification stating materials ordered and supplied are compatible with each other, suited for locale and purpose intended, and shipped in sufficient quantity to ensure proper, timely installation.
2. Submit manufacturer's approval of proposed fasteners.
3. Submit manufacturer's approval of installer.
4. Submit installer's experience record.
5. Certify materials shipped to site meet membrane manufacturer's published performance requirements.

F. Roofing System Letter - Tested Assembly: Provide a letter from the primary roofing material manufacturer stating that the roofing system (from deck up) and (as submitted) is a tested roofing assembly meeting the specified performance requirements for wind uplift. The letter shall specifically include applicable fastener patterns and supporting data clearly illustrating conformance to performance requirements for wind uplift.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. Obtain primary sheet roofing materials from a single manufacturer.
2. Provide secondary materials as recommended in writing by manufacturer of primary materials.

3. Manufacturer's qualified technical representative will be required to visit project site to advise Installer of procedures and precautions for installation of roofing materials and to verify warranty inspection requirements. Manufacturer's representative shall make inspection of the membrane installation a minimum of three times. Manufacturer's written reports of findings shall be submitted for the Architect and Owner's review.
4. Provide primary products, including each type of flexible sheet roofing and sheet flashing produced by a single manufacturer, which has produced that type product successfully for not less than 5 years. Provide accessory products which are acceptable to manufacturers of primary products.

B. Applicator Qualifications: Five years successful experience in installation of roofing systems similar to system for this project and approved by membrane manufacturer. Similar in system shall be experience with same type, same insulation, same substrate, and same method of attachment. Insulation applicator and application method shall be approved by the manufacturer of the single-ply roofing materials to be installed.

C. Compatibility of Roofing System: Roof insulation, roof crickets and tapered insulation roof system shall be compatible with the roofing materials to be used and shall be approved by the manufacturer of the singly-ply sheet roofing materials.

D. Provisions for Expansion: If in the manufacturer's or installer's expert opinions, the roofing area is large enough to require expansion joints, then they are to be provided, whether shown on the construction documents or not. Contractor shall consult with the Architect regarding the exact joint locations.

E. Pre-roofing Conference:
1. At least one week prior to start of roofing installation, convene pre-roofing conference at project site.
2. Attendance is required by Contractor, installer, manufacturer's technical representative, Architect, and effected subcontractors, i.e. mason, electrical, and plumber.
3. Review requirements for work and conditions which could possibly interfere with successful performance of work.
4. Minimum Formal Written Agenda:
   a. Review project specifications and drawings.
   b. Review weather and working conditions.
      1) Substrate requirements.
      2) Insulation installation.
      3) Membrane installation.
      4) Roof terminations, flashings, and roof drain requirements, including roof drain location, i.e. minimum distance from parapets allowed by roofing membrane manufacturer. Coordinate reglet location.
      5) Mechanical equipment placement, supports, and height requirements.
      6) Inspection, testing, and quality control procedures.
      7) Protection requirements for construction period beyond roofing installation.
      8) Procedures for making roof penetrations after membrane installation.
      9) Water cutoffs at end of day's work.
5. Conduct tour of roof deck; report discrepancies and problem areas to Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original unopened packaging with legible labels intact.

B. Store materials on site in enclosures or under protective coverings off ground.

C. Insulation stored on the site shall be raised above deck or ground level on pallets and covered with waterproof tarpaulins or plastic sheeting.

D. Do not store material in or on building in such concentrations as to impose excessive strain on deck or structural members.

1.5 PROJECT CONDITIONS

A. Weather:
1. Proceed with roofing work when existing and forecasted weather conditions permit performance in accordance with manufacturer's recommendations and warranty requirements.
2. Take special precautions as recommended by manufacturer when applying roofing below 40°F. Ensure cements, adhesives, mastics, and coatings are not affected by freezing weather.

B. Protection: Protect finished surfaces of the building from damage and staining during the installation work with suitable covers.

C. Contractor shall clean roof on a daily basis. Remove construction debris which could harm the membrane. Construction material spillage must be removed without harming the membrane. If spillage cannot be removed satisfactorily, remove and replace the damaged membrane.

D. Smoking on the roof during installation shall not be allowed.

E. Roof membrane shall be cleaned for the removal of all stains following installation. Cleaning to be performed in accordance with manufacturer's recommendations.

1.6 WARRANTY

A. Furnish written 20-year, no dollar limit (NDL), warranty of materials and workmanship:
1. For watertightness extended to include but not be limited to flashings, seams, membrane, penetrations, and pitch pockets.
2. Against 2" hail damage.

B. Warranty shall be signed by membrane manufacturer, agreeing to repair or replace defects in material or workmanship and failure of roof to resist water penetration for period of twenty years from substantial completion of project. Warranty shall be furnished without financial limitation based on initial installation cost or inclusion of other financial constraints that would limit manufacturer's repair or replacement costs during warranty period.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis of Design shall be Elevate UltraPly Fleece Back TPO Adhered Membrane as manufactured by Holcim (Formerly Firestone Building Products Co.) The following manufacturers may bid this project provided they comply with all of the performance requirements of this specification and submit evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein:
Everguard Fleece Back Membrane; GAF
Elevate UltraPly Fleece Back TPO; Holcim (Formerly Firestone Building Products Co.)
Genflex EZ TOP Fleece Back; Genflex Roofing Systems
JM TPO Fleece Backed Roofing Membrane; Johns Manville

2.2 INSULATION MATERIALS

A. Installation procedures for insulation shall be subject to acceptance by the single-ply roofing membrane manufacturer.
1. Polyisocyanurate Insulation: Reinforced polyisocyanurate foam core faced both sides with non-asphaltic glass fiber facers chemically bonded in the manufacturing process and that are compatible with the single-ply roofing membrane.
a. Compressive Strength: 20 psi
b. Install in not less than 2 layers of 2.2" min. thickness per board.

B. Cover Board: ASTM C 1177, glass-mat, water-resistant gypsum substrate as manufactured by G-P Gypsum Corporation. Provide 1/2-inch thick DensDeck® Prime Roof Board over insulation.

C. Crickets and Cants: Provide crickets and cants at locations as shown. Cricket and cant must be compatible with single-ply roofing membrane.

D. Tapered Roof Insulation: Provide tapered roof insulation as required to fulfill slope requirements. Tapered roof insulation must be compatible with single-ply roofing membrane.

E. Mechanical Fasteners: Stainless steel deck fasteners, size and configuration of fasteners shall be approved by roof insulation manufacturer and single-ply roofing membrane manufacturer.

2.3 TPO SHEET ROOFING

A. Membrane Material:
1. Thermoplastic Polyolefin (TPO) fleeceback sheet material.
2. Thickness: 60 mil minimum, reinforced for fully adhered membranes.
3. Exposed membrane shall be resistant to ozone, ultraviolet radiation, and water permeable.

B. Sheet Size: Maximum width and length of sheet possible as determined by project conditions.

C. Slip Sheet: As determined by membrane manufacturer if installation is necessary for conditions encountered.

D. Flashing: White unsupported TPO as furnished by membrane manufacturer.

2.4 RELATED MATERIALS

A. Adhesives:
1. As recommended by roofing sheet manufacturer for bonding to substrates and for waterproof sealing of seams.
2. Do not use bonding adhesive for splice cement.

B. Accessories: Provide primers, batten strips, adhesives, sealants, mastics, prefabricated pipe flashing, roof drain flashing, liquid sealers, sponge tubing expansion joint filler, expansion joint flashing, and appropriate cleaning agents and solvents as recommended by membrane manufacturer for conditions encountered.

C. Expansion Joints: Provide manufacturer's approved expansion joints for conditions encountered. Provide expansion joint sponge tubing installed on 2" high tapered cant strips where required by membrane system.

D. Walkway Protection: Provide additional layer of sheet roofing membrane around all roof-top mounted mechanical equipment, surrounding roof access ladders, path from access ladder to mechanical equipment, and where shown on the drawings

2.5 PERFORMANCE/DESIGN CRITERIA

A. Wind Up-lift Requirements: Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressures calculated according to ASCE-7. Wind uplift pressures for this area, based on a 3-second gust shall be per structural notes and drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces scheduled to receive roofing to assure that they are smooth, dry, and free from oils, grease, and conditions that will adversely affect execution, permanence, or quality of work.

3.2 PREPARATION OF SURFACES

A. Comply with manufacturer's instructions for substrate preparation.

B. Sweep surfaces upon which sheet is applied, removing loose and foreign materials.

C. Fill voids in substrate as recommended by system manufacturer.

D. Coat metal surfaces with primer or adhesive as recommended by manufacturer.

E. Prior to installation of insulation, install one layer of gypsum board in accordance with insulation manufacturer's instructions.

3.3 INSULATION INSTALLATION

A. Install insulation in two layers over all areas to receive roof insulation.
   1. Mechanically fasten first layer to the roof deck.
   2. Apply second layer over first layer in broken joint pattern so that each layer breaks joints both ways with the preceding layer.
   3. Apply insulation with long joints continuous and short joints staggered.
   4. Bring insulation panels into moderate contact with each other and cope to fit neatly around projections. Joints parallel to ribs on steel deck installation shall be located over solid bearing.
   5. Mechanically fasten first layer to the roof deck throughout, adhere second layer to first layer of insulation. Spacing and number of fasteners shall meet current building code requirements and per ASCE 7 calculations.
   6. Tapered roof insulation system and crickets shall be adhered per manufacturer's instructions as required to meet current building code requirements and per ASCE 7 calculations.
   7. Do not install more insulation at one time than the amount which can be covered with roofing the same day.
   8. At the end of each day's work and after any other work stoppage, apply temporary water cutoffs in accordance with single-ply membrane manufacturer's approval.

3.4 COVER BOARD INSTALLATION

A. Install ½" cover boards by adhering to insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.
   1. Adhere cover boards to meet current building code requirements and per ASCE 7 calculations.
   2. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.
   3. Use appropriate adhesive as recommended by manufacturer.

3.5 MEMBRANE INSTALLATION

A. General: Manufacturer's technical representative is required to be present as necessary to ensure proper installation. Install materials in accordance with manufacturer's printed instructions.

B. Slip Sheet:
   1. Install slip sheet loosely laid above insulation, lapping joints 4" minimum.
   2. Turn slip sheet up parapets and curbs.
   3. Spot adhere slip sheet on vertical surfaces not more than 8" above roof line.

C. Membrane Installation:
   1. Cut sheets to maximum size possible in order to minimize seams.
   2. Unroll membrane over insulation.
   3. Allow membrane to relax for ½ hour before fastening or splicing. Wrinkles in roof membrane will not be acceptable.
   4. Lap adjoining sheets: 6" minimum.
   5. The membrane "bridging" over varying heights of substrates at roof drains will not be acceptable.
   6. Clean lap areas and bond or weld as recommended by membrane manufacturer to obtain 100% coverage on both mating surfaces.
   7. Bond and seal all seams.
   8. Fully adhere membrane as recommended by manufacturer.
   9. Cover batten strips with solvent or hot-air welded membrane strip.
   10. Apply sealant bead to membrane strip.

D. Equipment Pads:
   1. Adhere membrane over equipment supports or pads prior to installation of mechanical equipment.
   2. Place loose piece of membrane under each equipment isolator pad prior to attachment of equipment to pad.
   3. Provide sealant over exposed fasteners.

E. Expansion Joints: Install expansion joints in accordance with manufacturer's recommendations.

F. Flashing:

1. Install flashings as indicated and recommended by manufacturer.
2. Use longest pieces practicable.
3. Extend splice 3" beyond fasteners which attach membrane to batten strip.
4. Apply bonding adhesive to flashing and surface to which flashing is to be applied to obtain 100% bond.
5. After bonding adhesive has dried to point where it does not string, roll flashing into adhesive.
6. Take measures to assure flashing is not ridging where there is change of direction.
7. Full flashing at parapet walls shall extend up under metal parapet coping to exterior face of wall.
8. Fasten top of flashing under metal counterflashing at manufacturer's recommended spacing.
9. Flash penetrations passing through membrane.
10. Use factory prefabricated pipe seals where installation is possible.
11. When prefabricated pipe seals cannot be used, field fabricate pipe seals.
12. Provide prefabricated pipe seals for pitch pockets.
13. Install fillers around penetrations and fill pocket with nonshrink grout and manufacturer's approved sealer.

3.6 TERMINATIONS

A. Provide water cutoffs at end of each day's work as discussed at pre-roofing conference.

B. Pull membrane loose from water cutoff and remove contaminated material before resuming work.

3.7 WALKWAY PROTECTION

A. Install additional layer of roofing membrane around all roof-top mounted mechanical equipment, surrounding roof access ladders path from access ladder to mechanical equipment, and where shown on the drawings

B. Invert walkway membrane (if possible), producing a contrasting color from roof membrane.

C. Clean roof membrane and bond walkway membrane to obtain 100% coverage on both mating surfaces. Seal all seams.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

02/18/2026

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Sheet metal flashing and trim.

B. Related Sections:
1. Section 07 92 00 - Joint Sealants.
2. Section 09 91 00 - Painting.

1.2 SUBMITTALS

A. Samples:
1. Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
2. Submit for approval samples of parapet coping cover expansion joint and soldered joint.

B. Product Certificates:
1. Showing that each type of coping and roof edge flashing is ANSI/SPRI/FM 4435/ES-1 tested.
2. Showing that each type of gutter securing the perimeter edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen and single-ply roofs is ANSI/SPRI GT-1 tested for Test Methods G-1 and G-2.

C. Evaluation Reports:
1. For copings and roof edge flashing, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.
2. For gutters securing the perimeter edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen and single-ply roofs, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI GT-1, Test Methods G-1 and G-2.

1.3 QUALITY ASSURANCE

A. Standard: Comply with the requirements of the Architectural Sheet Metal Manual published by SMACNA.

B. Installer Qualifications: Company specializing in sheet metal flashing work with three years minimum experience in similar sized installations

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle and protect products under provisions of SECTION 01 65 00 - PRODUCT DELIVERY REQUIREMENTS and SECTION 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS.

B. Stack pre-formed material to prevent twisting, bending, and abrasions, and to provide ventilation.

C. Prevent contact with materials which may cause discoloration or staining.

1.5 WARRANTY

A. Furnish to the Owner a written warranty providing the following without cost to the Owner.
1. Sheet metal roof flashings shall be maintained in normal repair and free of leaks for a period of 2 years from the date of acceptance of the roof.
2. At end of 2-year period, Owner and Contractor shall make final inspection of flashing work. Holes, breaks and other defects shall be promptly repaired at the Contractor's expense.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet Metal:
   1. Roof top accessories, including but not limited to, expansion joint covers, flanges, and concealed counterflashings not visible from ground level shall be stainless-steel, ASTM A 666, unless jurisdiction requires ASTM A 240, Type 304, dead soft, fully annealed, with smooth, flat surface.
      a. Minimum 24 gauge thickness unless noted otherwise.
      b. Finish: 2D (dull, cold rolled)
   2. Areas which can be seen from the ground level, including but not limited to, coping, edging, gutters, conductor heads, downspouts, and expansion joint terminations shall be ASTM A 653, zinc coated (galvanized) copper-bearing steel sheet prefinished with fluorocarbon coating containing 70% Kynar 500. Colors shall be selected by Architect from Fluropon Standard colors as manufactured by Valspar.

B. Reglet: Two piece snaplock receiver, Per **Figure 4-4C, SMACNA Manual, 8th Edition**, of 24 gauge stainless steel**.**

C. Underlayment: ASTM D 226, 30 lb/100 s.f. weight felt containing no additives corrosive to sheet metals.

D. Solder: ASTM B 32, made from block tin and pig lead (50/50) with no antimony.

E. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.

F. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

G. Sealant: Two component polyurethane, non-sagging, sealant as specified in SECTION 07 92 00 - JOINT SEALANTS.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

I. Miscellaneous items such as nails and mastic shall be furnished as required by the conditions of use and must be of the best grade available.

2.2 FABRICATION

A. Form sections true to shape, accurate in size, square, free from distortion and defects, to profiles indicated in accordance with SMACNA Architectural Sheet Metal Manual.

B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.

C. Form pieces in longest practical lengths.

D. Hem exposed flashings on underside ½"; miter and seam corners.

E. Solder and seal metal joints except those indicated or required to be expansive type joints. After soldering, remove flux. Wipe and wash solder joints clean.

F. Fabricate corners from one place with minimum 18" long legs; solder for rigidity; seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward ¼" and hemmed to form drip.

H. Fabricate flashings to allow toe to extend minimum 2" over wall surfaces.

I. Fabricate as much as possible in shop with machinery to eliminate as much hand tooling on the job as possible. Shop fabricate to allow for adjustments in the field for proper anchoring and joining.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to receive work of this section. Notify Architect of any existing conditions which will adversely affect execution. Beginning of execution will constitute acceptance of existing conditions.

B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

C. Verify membrane termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Install starter and edge strips, and cleats before starting installation.

C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

D. Install one layer of underlayment prior to installing copings.

3.3 INSTALLATION

A. General: Fabricate, assemble, and install sheet metal work in conformance with referenced standard.
1. Make adequate provision for metal expansion and contraction without buckling or splitting. Use cleats and watertight slip and expansion joints.
2. Nails and screws shall be of the same metal as the member on which used. Nails through exposed wash surfaces will not be permitted.
3. When soldering, use flux and wash off surplus flux after soldering has been completed.
4. Set sheet metal with horizontal lines straight and level. Surfaces shall be flat without wrinkles and waves. Profiles shall align at joints with no offsets.
5. Conform to drawing details included in manuals published by SMACNA and NRCA.
6. Edge Securement for Low-Slope Roofs: Design in accordance with ANSI/SPRI ES-1 for basic wind speed zone with 3-second gusts.
7. Gutter Securement for Low-Slope Roofs: Design in accordance with ANSI/SPRI GT-1 for basic wind speed zone with 3-second gusts.
8. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
9. Seal metal joints watertight.
10. Provide electrolytic separation between dissimilar metals with protective back paint.

B. Reglet: Install surface mounted reglets on walls.
1. Clean surface of oil, grease and loose particles.
2. Place sealant bead on back in groove and on lap.
3. Secure reglet in precise alignment to wall with power driven pins spaced 12" o.c.
4. Lap joints 3" and bed in sealant. Miter and seal corners.

C. Reglet Counterflashing: Counterflashing for reglet shall be formed of 24 gage metal to fit the reglet in conformance with the manufacturer's instructions.
1. Lap counterflashing down over flashing strip approximately 4" and form lower edge with a spring bend against the base flashing.
2. After roofing and flashing strip have been installed, snap counter-flashing up into reglet so that it is held securely in place without screws or clips.
3. Lap end joints 3" and bed in sealant. Miter and seal corners.

D. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous metal receiver with integral drip-edge cleat to engage fascia cover and secure modified roof membrane. Provide matching corner units.
1. Metallic-Coated Steel Sheet Fascia Covers: Zinc-coated (galvanized) steel, nominal thickness as required to meet performance SPRI ES-1 requirements.
a. Surface: Smooth, flat finish.

b. Finish coping covers with a fluorocarbon coating containing 70% Kynar 500. Color shall be selected by Architect from Fluropon Standard colors as manufactured by Valspar.

E. **Vent Stack Roof-Penetration Flashing: Flashing shall have a weight range of 2 – 4 lbs/sq. ft. Coordinate installation of roof-penetration lead flashing flange with installation of roofing and other items penetrating roof. Base flashing shall be flanged 4 in. onto the roof. The flange is fastened through the roofing felts and is then stripped in by the roofer. Turn the top of the flashing down inside the vent pipe. Seal with sealant per Section 07 92 00 – Joint Sealants, and clamp flashing to pipes that penetrate roof. *[Addendum No. 2]***

F. Miscellaneous flashings and other items of sheet metal roof work shall be provided as required for a weathertight job.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

02/18/2026

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:
1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:
   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
   a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
   b. Complete (risers, point-to-point) access control system block wiring diagrams.
   c. Wiring instructions for each electronic component scheduled herein.
2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
   1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
   1. Quantity: Provide the following hinge quantity:
      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
   a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
   b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
5. Manufacturers:
   a. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
   1. Manufacturers:
      a. Pemko (PE) - EL-CEPT Series.
      b. Securitron (SU) - EL-CEPT Series.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
   1. Provide one each of the following tools as part of the base bid contract:
      a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
      b. McKinney (MK) - Connector Hand Tool: QC-R003.
   2. Manufacturers:
      a. McKinney (MK) - QC-C Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
   1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
   2. Furnish dust proof strikes for bottom bolts.
   3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
   4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
   5. Manufacturers:
      a. Rockwood (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
   1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:
   a. Rockwood (RO).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders. **Cores to be ordered with SPARNC C100 for cores less logo stamped with keyset.**

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).

F. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.
1. Manufacturers:
   a. Sargent Manufacturing (SA) - 8200 Series.

2.7 DEADLOCKS AND LATCHES

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
   1. Manufacturers:
      a. Sargent Manufacturing (SA) - 4870 Series.

2.8 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
   4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:
   1. Strikes for Mortise Locks and Latches: BHMA A156.13.
   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
   4. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. Exit devices shall have a five-year warranty.
   2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
   3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
   4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
   5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
   6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
      a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
      b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
   7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
   8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
   9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
   10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
   11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.
   1. Electromechanical exit devices shall have the following functions and features:
      a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
      b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
      c. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
      d. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
      e. Five-year limited warranty for electromechanical features.
   2. Manufacturers:
      a. Sargent Manufacturing (SA) - 80 Series.

2.10 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
   1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
   2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
   3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
   4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
   6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
   1. Heavy duty surface mounted door closers shall have a 30-year warranty.
   2. Manufacturers:
      a. Sargent Manufacturing (SA) - 351 Series.

2.11 ARCHITECTURAL TRIM

A. Door Protective Trim
   1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
   2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
   3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
   a. Rockwood (RO).

2.12 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
   1. Manufacturers:
      a. Rockwood (RO).

2.13 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
   1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
   1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

   1. Pemko (PE).

2.14 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
   1. Manufacturers:
      a. Securitron (SU) - DPS Series.

B. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.
   1. Manufacturers:
      a. Securitron (SU) - AQD Series.

2.15 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
   1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
   1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
   3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
   4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

   1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
   4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:
   1. MK - McKinney
   2. SU - Securitron
   3. RO - Rockwood
   4. SA - SARGENT
   5. PE - Pemko
   6. OT – Other

Hardware Sets based on plans dated 1/27/2026

Eiland

Set: E 1.0
Doors: 025, 115
Description: Existing

3	Field verify	Replace hinges		MK
1	Existing	Hardware existing to remain		OT

Set: E 2.0
Doors: 100
Description: Vest Pair - Classroom Exit x lever

6	Hinge (heavy weight)	T4A3786 4 1/2" x 4 1/2"	US26D	MK
1	Removable Mullion	12-L980	PC	SA
2	Rim Exit Device, Classroom	16 TB 43 72 8813 ETL	US32D	SA
1	Mullion Cylinder	72 980C1	US26D	SA
3	Small Format Inter Core	7P-7300B x SPAR NC C100	US15	SA
2	Surface Closer	TB 351 CPS brkt/spacer as req	EN	SA
2	Drop Plate	351D as required	EN	SA
1	Kit	581-2	EN	SA
1	Astragal Set (2)	18041CNB		PE
1	Perimeter Seal	S88BL		PE

Set: E 3.0
Doors: 50
Description: Elec - Outswing - Panic

3	Hinge (heavy weight)	T4A3786 4 1/2" x 4 1/2"	US26D	MK
1	Rim Exit Device, Storeroom	TB 43 72 8804 ETL	US32D	SA
1	Small Format Inter Core	7P-7300B x SPAR NC C100	US15	SA
1	Surface Closer	TB 351 CPS brkt/spacer as req	EN	SA
1	Perimeter Seal	S88BL		PE

Set: E 4.0
Doors: 120
Description: *Gate - By Others

1	All Hardware	By door manufacturer		OT	

Kaiser

Set: K 1.0
Doors: 100
Description: Vest Pair - Access Control

6	Hinge (heavy weight)	T4A3786 4 1/2" x 4 1/2"	US26D	MK	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Removable Mullion	L980S	PC	SA	
1	Rim Exit MELR RX	TB 43 55 56 72 8804 862	US32D	SA	⚡
1	Rim Exit MELR RX	16 TB 43 55 8810 862	US32D	SA	⚡
1	Mullion Cylinder	72 980C1	US26D	SA	
4	Small Format Inter Core	7P-7300B x SPAR NC C100	US15	SA	
2	Surface Closer	TB 351 CPS brkt/spacer as req	EN	SA	
1	Perimeter Seal	S88BL		PE	
1	Gasketing	5110BL		PE	
2	Elec Cables - Exit to Hinge	QC-CxxxP		MK	⚡
2	Elec Cables - Hinge to Above	QC-C1500P		MK	⚡
1	Power Supply	By Security Contractor.		OT	

Notes: Buzzer by security contractor. Doors are normally closed and secure. Presentation of valid credential will allow entry by pull. Upon loss of power, doors will remain secure. Free egress at all times.

Set: K 2.0
Doors: 101, 121
Description: Sgl - Access Control Exit

3	Hinge (heavy weight)	T4A3786 4 1/2" x 4 1/2"	US26D	MK	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Rim Exit MELR RX	TB 43 55 56 72 8804 862	US32D	SA	⚡
2	Small Format Inter Core	7P-7300B x SPAR NC C100	US15	SA	
1	Surface Closer	TB 351 CPS brkt/spacer as req	EN	SA	
1	Perimeter Seal	S88BL		PE	
1	Elec Cables - Exit to Hinge	QC-CxxxP		MK	⚡
1	Elec Cables - Hinge to Above	QC-C1500P		MK	⚡
1	Power Supply	By Security Contractor.		OT	

Notes: Buzzer by security contractor. Doors are normally closed and secure. Presentation of valid credential will allow entry by pull. Upon loss of power, doors will remain secure. Free egress at all times.

Set: K 3.0
Doors: 102, 103
Description: Storage - Closer

3	Hinge, Full Mortise	TA2714 4 1/2" x 4 1/2"	US26D	MK
1	Storeroom/Closet Lock	72 8204 LNL	US26D	SA
1	Small Format Inter Core	7P-7300B x SPAR NC C100	US15	SA
1	Door Closer	TB 351 O	EN	SA
1	Door Stop	481	US26D	RO
3	Silencer	608		RO

Notes: At existing doors and frames, verify all existing conditions and modify hardware as required prior to purchase.

Set: K 4.0
Doors: 122
Description: *Gate - By Others

1	All Hardware	By door manufacturer	OT

Klenk

Set: Klenk 1.0
Doors: 117
Description: Pair Mech/Elec - Outswing

6	Hinge, Full Mortise	TA2714 4 1/2" x 4 1/2"	US26D	MK
1	Dust Proof Strike	570	US26D	RO
2	Flush Bolt	555 - 12"/72" A.F.F.	US26D	RO
1	Storeroom/Closet Lock	72 8204 LNL	US26D	SA
1	Small Format Inter Core	7P-7300B x SPAR NC C100	US15	SA
1	Surface Closer	351 PS	EN	SA
1	Astragal	355CS		PE
1	Perimeter Seal	S88BL		PE

Notes: Closer on active leaf.

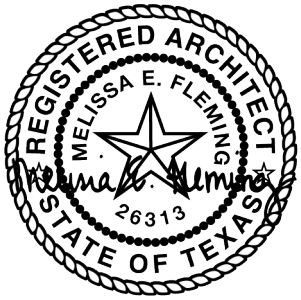
Set: Klenk 2.0
Doors: 126
Description: *Gate - By Others

1	All Hardware	By door manufacturer	OT

END OF SECTION

SECTION 09 30 00

TILING



02/18/2026

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Quarry Tile.
2. Tile Trim and Accessories.

B. Related Sections:
1. Section 07 92 00 - Joint Sealants.
2. Section 09 21 16 - Gypsum Board Assemblies.

1.2 SUBMITTALS

A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Product Data:
1. Submit manufacturer’s written product data for each tile type and accessory.
2. Submit tile manufacturer's written recommendations for sealing specific quarry tile for this project.

C. Samples: Submit tile samples of the same size scheduled for each particular type of tile required.

D. Certificate: Furnish one master grade certificate on ceramic tile executed prior to delivery of the tile to the site.

1.3 QUALITY ASSURANCE

A. Standard: Tile shall be Standard Grade complying with the requirements of ANSI A 137.1. Deliver tile to the project site in grade sealed containers.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained.

B. Do not install adhesives in a closed, unventilated environment.

C. Maintain 50°F. during installation of mortar materials.

1.5 MAINTENANCE

A. Extra Materials: Upon completion of work, deliver to the project site one box for each type, color, pattern, and size of tile installed. Furnish maintenance materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identifying labels.

PART 2 - PRODUCTS

2.1 TILE

A. Manufacturers: Ceramic tile and trim as manufactured by American Olean, Dal-Tile Corp., Interceramic, and Crossville Ceramics shall set all standards in the areas of trim shapes availability, tile size, color, pattern, and texture.

B. Quarry Tile:
1. Pavers: Tile shall be as selected by Architect to match existing.

C. Trim Pieces:
   1. Provide factory made fitters and trim shapes required for a finished installation. Keep job-cut fitters and trim shapes to a minimum. Provide bullnose tile at horizontal and vertical tile edges.

D. Floor Tile Wet Dynamic Coefficient of Friction: Not less than 0.42, when tested in conformance with ANSI A137.1.

2.2 QUARRY TILE PROTECTION AND TREATMENT MATERIALS

A. Temporary Protective Coating: Provide one of the following products to protect exposed surfaces of tile against adherence of mortar and grout:
   1. Petroleum paraffin wax, fully refined, tasteless, odorless, containing at least 0.5% oil with a melting point of 120°F. to 140°F. per ASTM D 87.
   2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as a temporary coating for tile.

B. Unglazed Quarry Tile Sealer: Provide Seal 341 low lustre, non-buffing type seal-finish as manufactured by Hillyard. Sealer shall be slip resistant.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, domestic manufacture.

B. Dry-Set Mortar: ANSI A 118.1, factory sanded mortar mix.

C. Adhesive: ANSI A 136.1, Type I, prepared organic adhesive.

D. Grout:
   1. Floor:
      a. ANSI A118.7, latex modified dry-set High Performance Cement Grout or commercial waterproof cement grout. Provide Ultracolor Plus FA as manufactured by MAPEI or approved equivalent by Custom Building Products or Laticrete. Color(s) shall be selected by Architect.
      b. ANSI A118.3; epoxy grout at kitchen, restrooms, and associated areas. Provide Kerapoxy CQ as manufactured by MAPEI or approved equivalent by Custom Building Products or Laticrete. Color(s) as selected by Architect.

E. Lime: ASTM C 207, Type S, hydrated lime.

F. Sand: ASTM C 144, clean, masonry sand.

G. Water: Clean and potable.

H. Reinforcement: 1-1/2" x 17 gage galvanized woven steel wire fabric or 2 x 2 x 16/16 gage galvanized welded steel wire fabric.

I. Quarry Tile Cleavage Membrane: ASTM D 226, No. 15 asphalt saturated roofing felt or 4-mil thick black polyethylene sheeting.

2.4 QUARRY TILE JOINT TREATMENT MATERIALS

A. Joint Filler: ASTM D 1752, Type I, pre-molded closed-cell, sponge rubber expansion joint material.

B. Divider Strips: Equal to 1-1/4" deep brass strips by Manhattan American Terrazzo Strip Company as listed below:
   1. At quarry tile abutting vinyl composition tile, furnish "Edging Strip" having 1/8" recess to receive the resilient tile.
   2. At quarry tile abutting carpet, furnish "Heavy Top Strips" in 1/4" width.

2.5 SETTING BED MORTAR

A. Mix one part Portland cement and 4 parts damp sand, by volume. Hydrated lime may be added for plasticity in an amount not to exceed 1/10 part by volume.

B. Large Format and Heavy Tile Mortar: Provide Ultraflex LFT (medium bed mortar) as manufactured by MAPEI or approved equivalent.
   1. High content of dry polymer
   2. Nonsag and nonslump formula.
   3. Meets the highest ANSI rating of ANSI A118.15.

2.6 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated.
   1. Contractor’s Option: Provide either tile manufacturer’s standard product as stated above, or the following product:
      a. Chlorinated Polyethylene Sheet: Non-plasticized elastomer with non-woven polyester laminated to both sides, nominal 0.030" thickness. Product/manufacturer; NobleSeal CIS; Noble Co.

2.7 ACCESSORIES

PART 3 - EXECUTION

3.1 PREPARATION

A. Sweep concrete slab surfaces clean and free of dirt and debris. Remove oil, grease, paint, and dried mortar.

B. Concrete Slab-on-grade: Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions and recommendations to produce membrane bonded securely to substrate.

C. Quarry Tile Preparation:
   1. For floors in the Kitchen area, place clean sand over the concrete, screed level to a thickness of 1/4", and cover with cleavage membrane. Lap the joints 2".
   2. For floors in other locations, clean the concrete with water and leave damp just before the setting bed is placed.
   3. Field-Applied Temporary Protective Coating: Protect exposed surfaces of tile against adherence of mortar and grout by pre-coating them with a continuous film of either petroleum paraffin wax or grout release temporary protective coating; taking care not to coat unexposed tile surfaces.

3.2 INSTALLATION

A. General Workmanship:
   1. Center and balance areas of tile, if possible.
   2. Do not make an excessive amount of cuts. Usually, no cuts smaller than half size should be made. Make all cuts on the outer edges of the field. Fit tile carefully without marring or chipping the finish.
   3. Smooth cut edges. Install tile without jagged or flaked edges.
   4. Fit tile closely where edges will be covered by trim, escutcheons or other similar devices.
   5. The splitting of tile is expressly prohibited except where no alternative is possible.
   6. Maintain the heights of tilework in full courses to the nearest obtainable dimension where heights, given in feet and inches, are not required to fill vertical spaces exactly.
   7. Make corners of all tile flush and level with corners of adjacent tile, with due allowance to tolerances for tile as specified in ANSI A137.1.
   8. Keep all joint lines straight and even width, including miters.
   9. Thoroughly back-up with thin-set bonding material all thin-set units, molded or shaped pieces; secure firmly in place.
   10. Thoroughly back-up with mortar-bed mix thick-bed nosings, coves, curbing, gutters, flat tile and trimmers, molded or shaped pieces; secure firmly in place.
   11. Bond coat mix shall not be used to back-up thick-bed trim and angles. Coat all thick-bed trim shapes with 1/32" to 1/16" of bond coat mix.
   12. Finish floor and wall areas level and plumb with no variations exceeding 1/8" in 8' from the required plane.
   13. Install accessories in tile work to be evenly spaced, properly centered with tile joints, and level, plumb and true to the correct projection. Install accessories at locations and heights designated.
   14. Finished tile work shall be clean. Replace pitted, chipped, cracked and scratched tiles.

B. Setting Floor Tile - Conventional:
   1. Set floor tile in straight joint pattern using Portland cement mortar in conformance with ANSI A 108.1.
   2. Where tile is to be installed over waterproofing membrane, place wire reinforcing and mortar bed over the membrane. Lap reinforcing one full mesh and support so that it is completely embedded in the mortar bed.
   3. Spread on a bonding coat of pure Portland cement paste not more than 15 minutes ahead of the mortar bed for quarry tile.
   4. Place mortar bed, tamp firmly and screed to true planes and proper slopes. While still plastic, trowel a bond coat of cement paste over the mortar bed or dust a thin layer of dry cement over the mortar bed and work lightly until damp.
   5. Set tile firmly on the mortar bed with close, uniform joints. Press and thoroughly beat in tile while the mortar bed is still plastic. Bring surfaces to true planes at the proper position of elevation. Slope tile down to floor drains. Make any adjustment of tile before initial set of the mortar takes place.

C. Setting Floor Tile - Thinset:
   1. Set floor tile in straight joint pattern using dry-set cement mortar in conformance with ANSI A 108.5.
   2. Mix and apply dry-set mortar in conformance with the manufacturer's recommendations. Cover surface evenly and comb with a notched trowel not more than 10 minutes before applying tile.
   3. Set tile before initial set of the mortar has taken place. Press and beat tile firmly into place to establish proper and complete bond. Joints shall be close and uniform.

D. Grouting:
   1. Force a maximum amount of grout into the joints.
   2. Clean the joints of cushion-edge tile to depth of cushion. Fill joints of square-edge tile flush with face of tile.
   3. Fill all gaps and skips. Mortar shall not show through grouted joints.
   4. Finished grout shall be uniform in color, smooth, and without voids and low spots.
   5. Grout joint width as recommended by tile manufacturer.
   6. Damp cure Portland cement grout for at least 72 hours.

E. Quarry Tile Expansion Joints: Provide 3/8" wide expansion joints where tile work abuts restraining surfaces such as perimeter walls and curbs and at intervals in the field.
   1. Form expansion joint with the joint filler extending down through the mortar bed to the concrete slab. Top of joint filler shall be held approximately 3/8" below the finish tile surface.
   2. Clean the joint and fill full of sealant. Tool the sealant smooth to approximate the appearance of the standard grouted joints.

F. Setting Quarry Tile Divider Strips: Where quarry tile is indicated to abut vinyl composition tile and carpet without a threshold, install the strips specified above.

G. Joints at Frames: Where ceramic tile abuts frame, provide a minimum 1/8" caulked expansion joint to separate tile from the frame.
   1. After tile work and grout are dry, clean the joint at the frame.
   2. Fill the joint with primerless one-part acrylic polymeric sealant.
   3. Color shall be as selected by Architect.
   4. Tool the sealant smooth.

3.3 CLEANING

A. When the work of other trades is completed, clean down tile and marble surfaces and leave in first class condition.
   1. The use of wire brushes or acids is expressly prohibited.
   2. Replace cracked, broken, and chipped tile with new units.
   3. Correct uneven and stained joints.

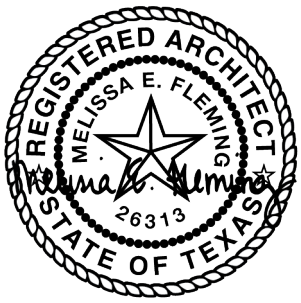
B. Quarry Tile Work:
   1. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to grout manufacturer. Trap and remove coating to prevent it from clogging drains.
   2. Unglazed Quarry Tile Sealer:
      a. Allow floor to set 30 days to insure proper curing of grout joints.
      b. Scrub floor with 1 part Hillyard Renovator to 8 parts hot water (16 oz./gal.). Rinse thoroughly.
      c. The final cleaning of floors is extremely important to successful application of sealer to insure that floor is clean and free of all surface stains and soiling. Do not seal in the dirt nor stains.

d. When floor is thoroughly clean and dry, apply sealer with a clean rayon mop. Allow one hour dry time and apply second thin coat. Allow second coat to dry one hour and apply third thin coat. Allow sealer to cure properly prior to allowing foot-traffic on new sealed floors.

END OF SECTION

SECTION 10 14 00

IDENTIFYING DEVICES



02/18/2026

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Marquee and electronic sign.
   2. Interior room identification signs.

1.2 SUBMITTALS

A. General: Submit in accordance with SECTION 01 33 23 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples: Submit manufacturer's complete line of color samples, 1" x 3", for initial color selection.

C. Invoices: Submit certified copies of invoices indicating description and quantity of signs delivered and installed.

D. Template: Submit full-size template drawing for approval:
   1. Aluminum letter size, stock, spacing, anchorage devices, etc.

1.3 PRE-INSTALLATION CONFERENCE

A. Aluminum Letter Pre-installation Meeting: Contractor shall schedule a pre-installation meeting at the project site with the Architect, Contractor and building letter installer for approval of template field layout prior to beginning of installation.

1.4 QUALITY ASSURANCE

A. Interior signs shall be provided by a single source with at least five years' experience successfully providing signs of similar type and scope.

B. Signs shall comply with the Texas Accessibility Standards (TAS) and other laws and ordinances of authorities having jurisdiction. Braille shall be Grade II, having dimensions as required to meet TAS.

1.5 PACKING, DELIVERY, AND STORAGE

A. Deliver components correctly packaged to prevent damage. Pack modules and back-up plates unassembled to allow for mechanical mounting of backplate to wall with concealed fasteners.

B. Individually and clearly identify each sign number, type, location to be installed, mounting instructions, and other pertinent information.

PART 2 - PRODUCTS

2.1 ELECTRONIC SIGNAGE

A. Basis of Design: GT6x 10 mm Full Color Galaxy LED Display Signs as manufactured by Daktronics, (888) 325-7446. Other manufacturers must have a minimum of five (5) years experience manufacturing products meeting or exceeding the specifications and Comply with Division 1 requirements regarding substitutions to be considered:
   1. Poblocki Sign Company.
   2. PolyVision Corporation.
   3. Spectrum Scoreboards.
   4. **LED Partners *[Addendum No. 2]***

B. Double Sided Full Color LED Display:
   1. Line and Column Spacing: 10 mm.
   2. Character Height: 2.8” (7 pixel front).
   3. Color Capability: 281 trillion colors.
   4. Lifetime (.5 Brightness): 100,000 hours.
   5. Horizontal Viewing Angle: 160 degrees.
   6. Vertical Viewing Angle: 70 degrees.
   7. Maximum Viewing Distance: 21’.
   8. Contrast Enhancement: Non-reflective black louvers and module face grooves disperse light.
   9. Graphic Capability: Text, graphics, logos, basic animation, video clips, multiple font styles, and sizes.
   10. Control Software: Venus Control Suite.
   11. Power: 120/240 VAC Single Phase.
   12. Display Dimming: 64 levels.
   13. Compliance Information: UL Listed, FCC compliance.
   14. Maximum Brightness: 8, 000 units.
   15. Pixel Configuration: 3-in-1 SMD.
   16. **Provide cell dialer with active dialer service for life of sign. *[Addendum No. 2]***

2.2 INTERIOR IDENTIFICATION GRAPHICS

A. “InTouch” photopolymer plaque signs as manufactured by ASI Sign Systems, Inc. (8181 Jetstar Drive, Suite 100, Irving, Texas, 75063) or approved equivalent.
   1. Manufacture face panels utilizing an 1/8" integral photopolymer panel.
   2. Face panel tactile and Grade 2 Braille graphics shall be raised a minimum of 1/32".
   3. Treat the face panel to assure paint adhesion.
   4. Colors to be selected by Architect to meet ADA requirements for contrast.
   5. Characters and background of signs shall have eggshell, non-glare finish.
   6. Sign edges shall be painted to match background.
   7. Sign edges are to be smooth and free of saw marks and imperfections.
   8. Sign design shall be as indicated on drawings.
   9. Typeface font and size shall be per drawings.
   10. Lettering shall be computer generated, accurately reproducing the letterform.
   11. Provide matching coverplate for signs mounted on glass.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Identification Graphics:
   1. On hard surfaces (i.e. ceramic tile, masonry, or plastic laminate), install room identification signs plumb and square with the "Tuff-bond" silicone adhesive furnished by the manufacturer (foam tape is not allowed).
   2. On painted gypsum wallboard or vinyl wallcovering, install room identification signs on backing plates with the "Tuff-bond" silicone adhesive furnished by the manufacturer (foam tape is not allowed).
      a. The backing plate shall be 1/8" thick and shall be the same size as the face panel.
      b. Screw the backing panel into molly bolts in the wall with two countersunk, flathead screws.
   3. Tactile characters on signs shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest tactile character and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character.

4. Unless noted otherwise, install signs on latch side of the door such that clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
5. Installation shall comply with ADA requirements.
6. For signs mounted on glass, install matching coverplate on opposite side of glass and aligned with the sign.

B. Marquee Sign: Install marquee sign in strict compliance with manufacturer's instructions.

3.2 CLEANING

A. On completion, clean exposed surfaces and leave free of defects.

B. Do not use abrasives.

3.3 COORDINATION

A. Contractor shall coordinate the installation of the identifying devices with other trades involved in the project.

3.4 DAMAGE

A. An identifying device which is scratched or defaced will be rejected.

END OF SECTION

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SECTION 25 09 33

BUILDING MANAGEMENT AND CONTROL SYSTEM

TABLE OF CONTENTS

PART 1 - GENERAL

1.1 SCOPE

A. This project also consists of equipment replacement and controls modifications at the following district facilities: Eiland Elementary School (Climatec), Klenk Elementary School (ALC), Kaiser Elementary School (ALC), Nitsch Elementary School (Delta).

All new equipment and modifications to existing systems shall be fully integrated into the existing control system including new graphics for all new equipment. The controls modifications shall include sensors, valves, dampers, valve and damper operators, DDC panels, relays, terminal equipment controllers, mounting brackets and thermowell, etc. Integrate all components to provide a complete and functioning system.

B. Temperature Control System components:
1. Electronic instruments as specified
2. Electric instruments as specified
3. Microcomputer instruments as specified

C. All control devices of the same type product shall be of a single manufacturer.

D. Control, power and interlock wiring necessary to accomplish sequences specified in the Contract Documents shall be provided and installed by the Control Subcontractor. Materials and methods of execution as specified in Division 26, Electrical.
1. Coordinate current characteristics of all electrical instruments and equipment with Division 26 of the specifications and related electrical drawings.

E. The entire Building Management and Control System (BMCS) shall be installed by the Automation System Manufacturer or Authorized Distributor.
1. All components and elements
2. The testing and acceptance procedure

F. The manufacturer of the building automation system shall provide documentation supporting compliance with current ISO standards for Quality Assurance. The intent of this specification requirement is to ensure that the products from the manufacturer are delivered through a Quality System and Framework that will assure consistency in the products delivered for this project.

G. The entire Building Management and Control System (BMCS) shall be installed, Commissioned, and tested; all performed by the Automation System Manufacturer or Authorized Distributor if approved by engineer.
1. All components and elements.
2. Start-up and point verification.
3. The testing and acceptance procedure.

H. Existing Building Management and Control system points lists are available upon request to the engineer for all facilities.

I. It is the responsibility of the bidding contractors to field verify existing conditions prior to

submission of their bid. This shall include location and quantities of equipment such as air handling units, exhaust fans, terminal boxes/zone dampers, temperature sensors, thermo-wells, lighting contactor panels, etc.

J. For central plant applications, design and layout of controllers shall follow the equipment train and redundancy requirements of the equipment and equipment train layout. No more than one equipment train's control input/outputs shall be connected to a single controller and directly connected expansion modules.

1.2 RELATED WORK

A. Division 23, Mechanical
1. 23 09 34 BMCS Points Lists
2. 23 09 94 Building Management and Control System - Graphics
2. 23 09 93 Sequence of Operations for Building Management and Control System
3. 01 91 13 and 23 08 00 Commissioning

B. Division 26, Electrical

1.3 SUBMITTALS

A. Submit items of the Building Management and Control System (BMCS).
1. Temperature control equipment & Field devices.
2. Wiring & Flow diagrams.
3. Complete, detailed, control and interlock-wiring diagram.
4. Indicate mechanical and electrical equipment furnished and electrical interlocks, indicating terminal designation of equipment. Respective equipment manufacturers shall furnish through the Mechanical Contractor, approved drawings of equipment to be incorporated in this diagram.
5. Submit Input / Output summary of all points.
6. Submit an outline of testing procedures from section Testing and Acceptance.
7. Mark up a copy of the specifications for the product. Indicate in the margin of each paragraph the following: "Comply, "Do Not Comply", or "Not Applicable". Explain all "Do Not Comply" statements.
8. Submit sample of space temperature sensor and guards for review prior to purchase or installation.
9. Submit project specific sequence testing procedures for all equipment outlined on drawings and specifications.
10. Submit documents in color of the AHU and sensor level area maps.
11. Submittals shall be updated to "As-Built" status at the end of the project and provided to the Owner, including IP addresses added to network riser diagram.

B. Owner shall have final review and approval prior to start of work.

1.4 COOPERATION WITH OTHER TRADES

A. Furnish control valves, temperature sensing element wells, flow and pressure sensing devices, dampers and other similar devices to the Mechanical Contractor in a timely manner for installation under the Building Management and Control System (BMCS), Subcontractor's supervision.

1.5 PARTS AND LABOR WARRANTY

A. Provide with a manufacturer's parts and labor warranty for a period of two years from

substantial completion. Warranty shall also include unlimited telephone and on-site technical support. Through warranty period and at the end of warranty period firmware, software and front end shall be updated to be the most current version available at no cost to the owner.

PART 2 - PRODUCTS

2.1 PREFERRED MANUFACTURERS

A. Bosch Building Technologies – Alerton
B. Automated Logic Corp. – Automated Logic
C. Team Solutions – Delta Controls

2.2 SYSTEM ARCHITECTURE

A. The Building Management and Control System (BMCS) shall capable of both an information-sharing network of stand-alone Direct Digital Control Panels (DDCP) to monitor and control equipment as specified of the control sequence and input/output summary.

B. "Information sharing" shall be defined as: The function of each DDCP to exchange data on the network trunk with other DDCP's without the need for additional devices such as network managers, gateways or central computers.

C. "Stand-alone" shall be defined as: The function of each DDCP to independently monitor and control connected equipment through its own microcomputer.

2.3 COMMUNICATIONS PROCESSING

A. The BMCS shall operate as a true token-pass peer-to-peer communication network. Resident processors in each DDCP shall provide for full exchange of system data between other DDCP's on the BLN trunk. Systems that limit data exchange to a defined number of system points are not acceptable.

B. The BMCS shall support networking via ethernet or MSTP of the Building Level Network Controllers which includes, Air Handler, and Central Plant control panels. The Field Level Network for terminal equipment shall be a true token-pass peer-to-peer network.

C. Systems Field Level Network that operate via polled response or other types of protocols that rely on a central processor or similar device to manage DDCP to DDCP communications may be considered only if a similar device is provided as a stand-by. Upon a failure of malfunction of the primary device, the stand-by shall automatically, without any operator intervention, assume all BMCS network management activities.

D. The failure of any DDCP on the network shall not affect the operation of other DDCP's and be capable of standalone operation. All DDCP failure shall be annunciated at the specified alarm pages, remote notifications and graphical notification will be represented in a unique color on the front-end building graphic. Provide a table and floor plan graphic page that indicates which controllers are experiencing communication failures.

E. Network ethernet shall support a minimum communications speed of 115.2 Kbps for Air Handlers, and Central Plant equipment.

F. Network shall support an unlimited number of DDC controllers.

G. System shall support integration of third party systems (fire alarm, security, lighting, PCL, chiller, boiler) via panel mounted open protocol processor. This processor shall exchange

data between the two systems for inter-process control. All exchange points shall have full system functionality as specified herein for hardwired points.

H. BacNet instance numbers MUST follow Klein ISD BacNet Instance Number Standards. If BacNet conflicts are created, the contractor is responsible for all costs associated with correcting issues.

I. Provide Klein ISD, at closeout, a list of all BacNet devices IDs and IP addresses used as part of this work.

J. Each system shall be provided with a minimum of one data connection to Klein ISD servers. However, each manufacturer shall provide as many data connections to Klein ISD servers as required by the control system to ensure full system communication and functionality. The data connections shall only be provided by the district approved installers, NCS, Accutek, and Fisk

2.4 DDCP HARDWARE

A. Each DDCP shall consist of a 32-bit microprocessor and controller, power supply, input / output boards and communication board. All program and point databases shall be stored in battery-backed RAM. Provide a minimum of 16 MEG RAM in each DDCP to allow for point expansion and trend data storage.

B. Each DDCP shall incorporate a real-time clock.

C. Each DDCP shall be provided with two industry standard communications ports. Connecting an operator terminal, whether portable or stationery, shall allow the user to communicate with the entire network.

D. Each DDCP shall provide for input / output connections to field equipment. The following point types shall be supported:
1. Analog inputs (AI) - for measuring sensed variables. Inputs shall be capable of accepting voltage, resistance, current or pressure signals.
2. Analog outputs (AO) - for controlling end devices. Outputs shall be capable of producing voltage, resistance, current or pressure signals.
3. Digital inputs (DI) - for monitoring dry contacts such as relays, switches, pulses, etc.
4. Digital outputs (DO) - to control two position devices such as starters, actuators, relays, lighting contactors, etc.

E. Each DDCP shall be listed under UL916 (Energy Management Systems), and shall be tested to comply with sub-part J of Part 15 FCC rules for Class A computing equipment.

F. Each DDC Controller shall have sufficient memory to support its own operating system and databases, including:
1. Control processes
2. Energy management applications
3. Alarm management applications including custom alarm messages for each level alarm for each point in the system.
4. Historical/trend data for points specified
5. Maintenance support applications
6. Custom processes
7. Operator I/O
8. Network communications
9. Manual override monitoring
10. Seven (7) calendar days of operating schedules

11. Stand-alone operation

G. DDC Controllers shall provide local LED status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device. Graduated intensity LEDs or analog indication of value shall also be provided for each analog output.

H. In the event of the loss of normal power, there shall be an orderly shutdown of all DDC Controllers to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.
1. Upon restoration of normal power, the DDC Controller shall automatically resume full operation without manual intervention.
2. Should DDC Controller memory be lost for any reason, the user shall have the capability of reloading the DDC Controller via the local communications port, and via a network workstation PC.

I. Operator shall have the ability to manually override automatic or centrally executed commands at the DDC Controller via local, point discrete, on-board hand/off/auto operator override switches for digital control type points and gradual switches for analog control type points.
1. DDC Controllers shall monitor the status of all overrides and inform the operator that automatic control has been inhibited. DDC Controllers shall also collect override activity information for reports.

J. Each control panel shall be provided with the either 10% or a minimum of two (2) spare inputs and two (2) spare outputs

2.5 PROGRAMMING FUNCTIONS

A. Resident software in each DDCP shall provide custom programming of control strategies.
1. Point database
2. Operator interface
3. Network communications
4. Facilities and energy management functions

B. Programming of control and energy management strategies shall be accomplished via a high-level computer language. A standard math processor shall be part of the programming language. All analog loops shall be capable of proportional, integral and derivative control.

C. Each DDCP shall incorporate an operator interface program (OIP) that provides an English language user interface. The OIP shall allow the user to program, interrogate, command and edit the BMCS via a self-prompting method. Operator terminals, whether textual or graphical, shall be able to access the entire network from any DDCP. Access shall be accomplished in a transparent fashion; that is, the operator shall not be required to address specific DDCP's in order to display or command system points.

2.6 FACILITY MANAGEMENT SOFTWARE

A. The BMCS shall be provided with standard and custom report generation functions that include:
1. Alarm summaries
2. Motor status summaries
3. Point displays by type, system, status, overrides, failures, location, equipment and

enabled/disabled.
4. Program listings

B. All reports shall be either displayed or printed by:
1. Operator request.
2. Time of day.
3. Event conditions (such as in response to an alarm, interlock, etc.).

C. All reports shall be time and date stamped.

D. An alarm-processing program shall be provided to annunciate those points designated as alarmable. Alarm points shall, upon alarm occurrence, be displayed or sent to via remote notifications.

E. Historical trend data shall be collected and stored at each DDCP for later retrieval. Retrieval shall be manual or automatic and user adjustable to be either manual, automatic or both. Any point, physical or calculated, may be designated for trending. The system shall allow for two methods of trend collection: Either by a pre-defined time interval sample or upon a pre-defined change of value. Trend data shall be presented in a columnar format. Each sample shall be timed stamped. Trend reports may be a single point or may be a group of points, up to a maximum of (8) points in any single group. Any point, regardless of physical location in the system may become part of a multiple point group.

F. Trend and historical data shall be gathered and recorded for digital/binary and analog points and include but not be limited to sensors values, damper position, valve position, and relative humidity. Digital/binary points shall be change of value trend and analog points shall be trended on a 15 minute interval (adjustable per point). Data shall be available to be displayed in a chart form and allow for multiple values to be trended on a single chart. All trends shall be passed through to the front end to be permanently stored.

G. Each BMCS network shall provide a point-monitoring function that can display single or multiple points in a continuous updated fashion for dynamic displays of point values.

H. A database and configuration report program shall be provided that allows the user to interrogate BMCS status. As a minimum, the user shall be able to: Verify available RAM at each DDCP, verify DDCP status (on-line, off-line, and failed) and set the system clock.

I. Any invalid operator entry shall result in an error message.

J. DDCP's shall contain a password access routine that will assign an operator to a minimum of three levels of access.

K. DDCP's shall provide for the accumulation of totalized values for the purposes of run-time or energy totalization. Totalized values may be displayed or printed automatically or by operator request. System shall allow users to reset totalized values.

L. Provide full access to system at one time for an unlimited number of users without the requirement to purchase additional user access.

M. User Levels and Descriptions
1. General Notes – all system users (including: KISD employees, BMCS Company employees, and Consultants) shall be placed into one of the following defined user levels. Each user shall be required to sign the included user agreement and submit to Klein ISD BMCS Department before approval will be granted.
2. User Levels – the following defined user levels shall be set-up by the BMCS

Company as part of this project, with the specific permissions/access defined for each level. Klein ISD Administrators must also be set-up in the system and trained on how to add new users and also how to modify the user level for existing BMCS users (all of this shall take place prior to substantial completion). A change in user level shall be accomplished simply by an Administrator changing the assigned user level for a current user in the system and all rights for the new user level shall be automatically inherited (for example: if a user is already in the system as a Beginning, then changing their user level to an Intermediate would immediately allow them all of the rights of an Intermediate user that they did not previously have as a Beginning).

a. Administrator – this user level shall have access to ALL parts of the BMCS system, including but not limited to Administrator functions (User Management, Admin Reporting, etc.).
b. Advanced – this user level shall have access to the same Programming/Tech/Settings pages as the Administrator, but not the Administrator functions described above
c. Intermediate – this user level shall have similar access to Advanced user level; however, with limitations on the Programming/Tech/Settings pages (this user level shall either have read only access to these pages, if possible, or no access at all). With regard to unit/equipment graphics will have full override capabilities and will be able to schedule all systems (that have scheduling available)
d. Beginner – this user level has view only access to system graphics (no overrides); however, has full scheduling capabilities for all system (that have scheduling available)
e. Read Only – this user has read only to system graphics and schedules.

3. BMCS Forms – will be provided and managed by Klein ISD.

2.7 ENERGY MANAGEMENT SOFTWARE

A. The BMCS shall be provided with a fully functional optimal start program. This feature shall be user selectable to enable or disable.
   1. The optimum start-up time of assigned equipment shall be determined based on a software calculation that takes into consideration outdoor air conditions, space conditions, and building thermal characteristics ("U" factor).
   2. The optimum start program shall control start-up of the cooling and heating equipment to achieve the target occupancy space temperature at the precise time of building occupancy.
   3. A built-In "learning" technique shall cause the BMCS to automatically adjust itself to the most affective time to start equipment based on historical data.

B. The BMCS shall be provided with a global change feature. This feature shall be user selectable to enable or disable.
   1. Global modifications to schedules and setpoints shall be customizable and be accessed and modified from the district, building, zone, wing, pod and classroom level of system.
   2. Global modifications shall download throughout the system as priority and shall be accomplish in an orderly and within 10 minutes.
   3. System shall continue to download global modifications to the rest of the district even when one campus has lost communication because of a failed panel. System shall notify users of which panel has failed and has not accepted the global modification.

C. The BMCS shall be provided with a demand response feature. This feature shall be user selectable to enable or disable.

1. Demand response programming shall be integrated into the system to allow owner to facilitate strategies for shedding load in a timely manner.
2. See also section 23 09 93 for Demand Response requirements.

D. The BMCS shall be provided with an operator interactive time of day (TOD) program. TOD programming and modifying shall be accomplished in a calendar-like format that prompts the user in English language to specify month, year, day and time and associated point commands. It shall be possible to assign single points or groups of points to any on or off time. Appropriate time delays shall be provided to "stagger" on times.
1. TOD shall incorporate a holiday and special day schedule capability, which will automatically bring up a pre-defined holiday or special day schedule of operation. Holidays or special days can be scheduled up to one year in advance.
2. In addition to the time dependent two-state control, TOD also provides time dependent setpoint control. This control provides the capability to output assignable, proportional setpoint values in accordance with the time of day and day of week. This program shall be used to accomplish night setback, morning warm-up and normal daily operating setpoints of all control system loops controlled by the BMCS. As with the two-state control, time dependent setpoint control shall be subject to the holiday schedule. The setpoints desired shall be user definable at any operator terminal.
3. The operator shall be capable of reading and/or altering all sorted data pertaining to time of day, day of week, on/off times, setpoint values, and holiday designation.
4. The TOD program shall also provide an override function that allows the user to conveniently change a start or stop time for any point up to one week in advance. The override command shall be temporary. Once executed the TOD program shall revert to its original schedule.
5. The TOD program shall interface with the optimal start program (OSP) such that stop times may be assigned by OSP.
6. Schedules shall be quickly accessible by no more than two mouse clicks from all graphical pages. Schedules shall incorporate an area for users to add notes for description of event and author names.
7. System shall allow user defined common space group schedule creation and be fully customizable. For example, groups such as all kitchens, all gyms, all athletics, all hallways, etc.
8. System shall incorporate schedule modifications immediately and utilize the new schedule from time of creation.
9. System shall notify user of schedule not downloading and event not occurring as planned.
10. Schedules shall be fully accessible from mobile devices and use a scalable or responsive technology to provide full capabilities and functionality that is provided with the desktop software. Refer to Web Server requirements for mobile devices.
11. System shall include priority level schedules in a hierarchy configuration.
    a. Emergency Off highest priority (Freeze condition)
    b. Override 2nd highest priority (School dude schedules from Fs Direct)
    c. Holiday 3rd highest priority (Spring Break, Thanksgiving, Christmas)
    d. Normal 4th highest priority (Regular school hours)

E. Additional Program functions required are to be installed and programmed as requested by end user at no additional cost:
1. Enthalpy optimization.
2. Supply air reset.
3. Hot water reset.
4. Chilled water reset.
5. Volumetric control.
6. Static pressure reset.

7. Dead band control. Install dual set points as requested by user.
8. All specified energy management programs, whether or not applicable to this project shall be provided such that the owner may enable the program at a future date without the need to purchase additional software or modify existing software.

F. Software shall include an energy management analysis tool which will provide the users the ability to analyze, compare and normalize building energy consumption on a day, week, month and year time interval.

G. Software shall poll local airports and other facility BMCS systems for ambient temperature and humidity valves. These values shall be compared to the readings at each campus and send an alarm to the system that a building temperature and humidity sensor has failed if the building values are 5 ˚F or 5% R.H. above or below (adjustable).

H. Demand Response – Refer to Section 23 09 93 for detailed requirements

2.8 BUILDING MANAGEMENT EDITING SOFTWARE

A. Provide (5) five fully functioning copies of all software required for modifications to graphics, databases, programming, points, etc. Software shall include all user licenses for an unlimited number of years and/or renewals.

B. Software shall be provided with both local and remote access via a remote desktop application.

2.9 SCHOOL DUDE INTEGRATION

A. The BMCS contractor shall integrate and link their system fully with the School Dude software and shall be provided with the following:
1. Training to ten (10) district employees on the linking process of School Dude and the BMCS software.
2. The ability to link School Dude and the BMCS software shall be provided to ten (10) district employees.
3. The linked system shall include all features of the buildings points including the exterior lighting.
4. The linked system must be provided with a testing feature to ensure the linking is correct and functions as intended.
5. Coordination meeting to discuss with the owner the building schedule zoning prior to the creation of any links.

2.10 WEB SERVER ACCESSIBILITY

A. Industry leading encryption technology to provide accessibility through any web browser software including but not limited to Apple’s Safari, Microsoft Internet Explorer, Google Chrome and Mozilla Firefox.

B. Building Manager’s ability to access, view and command critical building information in real time over the intranet or internet.
1. Alarm Display
2. Point Commanding
3. Graphic Display
4. Scheduling
5. Running Reports
6. Point Details

C. Building Manager's access must be compatible with a wide range of mobile device platforms including but not limited to Apple IOS, Android, and Microsoft Windows. Mobile access shall match features and abilities available via a desktop computer browser.

2.11 REMOTE NOTIFICATION AND ALARMS

A. Remote notification sends Alarm and System Event information to various notification devices as indicated below but not limited to. Operators can receive their building automation system alarms without restricting them to dedicated workstations. System shall contain priority notification tree. Coordinate with owner for required points to be set to provide remote notifications.
   1. Email
   2. Cell phones via text messages.
   3. Phones via voice message.

B. Refer to Section 23 09 34 for additional requirements related to this article.

2.12 POINT EXPANSION MODULES

A. Capable of extending its input/output capabilities via special purpose modules.
   1. Modules may be mounted remote from the DDCP.
   2. Shall communicate with the DDCP over a pair of twisted cable or ethernet.
   3. Operator shall have the ability to manually override automatic or centrally executed commands at the DDC Controller via local, point discrete, on-board hand/off/auto operator override switches for digital control type points and gradual switches for analog control type points.

2.13 TERMINAL EQUIPMENT CONTROLLERS

A. Provide for control of each piece of equipment, including, but not limited to, the following:
   1. Variable Air Volume (VAV) boxes
   2. Constant Air Volume (CAV) boxes
   3. Dual Duct Terminal Boxes
   4. Unit Conditioners
   5. Heat Pumps
   6. Unit Ventilators
   7. Room Pressurization
   8. Fan Coil Units
   9. Multi-zone Units

B. Terminal unit controllers and damper actuators shall be separate and individually replaceable.

C. Include the following items:
   1. All input and outputs necessary to perform the specified control sequences.
      a. Analog outputs shall be industry standard signals.
   2. Sufficient memory to accommodate point database, operating programs, local alarming and local trending.
   3. All databases and programs shall be stored in non-volatile EEPROM, EPROM and PROM, or minimum of 100-hour battery backup shall be provided.
   4. Return to full normal operation without user intervention after a power outage of unlimited duration.
   5. Operation programs shall be field selectable for specific applications.
   6. Specific control strategy requirements, allowing for additional system flexibility.
   7. Controllers that require factory changes of all applications are not acceptable.

8. The failure of any terminal equipment controllers on the network shall not affect the operation of other terminal equipment controllers and be capable of standalone operation. All terminal equipment controller failures shall be annunciated at the specified alarm pages.

2.14 ELECTRONIC DAMPER ACTUATORS

A. Two position damper operators:
   1. Spring return to full travel position.
   2. Built in auxiliary switches (motor end switches)
      a. Switch shall be fully adjustable so that cut-in/cut-out points may be preset at any point within angular travel of the motor.
   3. Minimum torque 160-in-lb

B. Modulating damper operators:
   1. Sized with sufficient reserve power to provide smooth modulating action and tight close off against the system pressure
   2. Select the operator with available torque to exceed the maximum required operating torque by not less than 100%
   3. Minimum torque
      a. 160 in-lb for OA Damper application
      b. 100 in-lb for MZU Zones
      c. 44 in-lb for zone box dampers (VAV box, CVB box, etc.)
   4. Actuator shall fail in place.
   5. All modulating actuators shall be selected and installed for 0-10V analog signal that corresponds to 0V = closed and 10V = open.

C. Damper actuators shall not have integral controllers.

D. Outside air damper actuators

   1. Outside air damper actuators shall be interlocked such that damper operates with the starter or VFD in hand or auto. The damper actuator end switch shall energize the fan to run only when end switch for fully open is activated.
   2. Outside air damper actuators shall be provided with a closed end switch for monitoring purposes. The end switch shall be installed to indicate full rotation in in the closed direction.

E. Provide damper actuators to match the existing damper actuator manufacturer.

2.15 CONTROL CABINETS

A. Fully enclosed NEMA 1 for indoors, NEMA 4 for outdoors, NEMA 4X for Natatorium Applications.
   1. Powder coat painted on all sides
   2. Cabinet with continuously piano type hinged door
   3. Locking latch
   4. All locks shall use a common key. 802 or 751 or 1333 are the accepted key types.
   5. Cabinets shall be provided with adequate depth to house all components.
   5. Panels or termination panels must be identified with engraved nameplates.
   6. Provide enamel finish and extruded aluminum alloy frame UL 50 certified.
   7. Provide only 100VA Transformers with integral manual overload reset and a motor rated switch installed on the 120V side for disconnecting means per NEC.

B. Above each control cabinet provide a wire gutter that matches the width of the control

cabinet. All control wiring shall pass through this wiring gutter. Provide each wire with a 3 foot long service loop located in wiring gutter.

C. Each control panel that is directly connected to KISD network, master controllers and panels serving the freezer/cooler systems shall be provided with a two (2) hour UPS. The UPS provided shall contain a hot swappable battery. UPS shall be installed on the wall in a cabinet and not placed on the floor. The connection between the UPS and the line power shall include a manual disconnecting means for disconnecting the power to the UPS and power to the panel to allow replacement of the UPS without turning off the incoming power.

D. Each Air Handling unit shall be provided with a dedicated control transformer. Ensure all safeties related to each air handler are associated with the dedicated control transformer.

E. Each chiller and associated equipment within the chiller equipment train shall be provided with a dedicated control transformer. Ensure all safeties related to each chiller equipment train are associated with the dedicated control transformer.

2.16 AUTOMATIC CONTROL VALVES

A. Pressure ratings: Minimum 125 psig or 1.25 times maximum system operating pressure.

B. Construction:
1. 2" and smaller:
   a. Screwed.
   b. Bodies and internal parts: Bronze, stainless steel or other approved corrosion-resistant metal.
2. 2-1/2" and larger:
   a. Flanged.
   b. Bodies: Cast iron or cast steel.
   c. Seats and parts exposed to fluid: Bronze, stainless steel or other approved corrosion-resistant metal.
3. Characterized port ball valves are acceptable for VAV terminal units only.
4. Pressure Independent Control Valves (PICV) shall not be utilized.
5. All air handling units shall be provided with globe valves on both chilled and hot water coils. Ball valves are not acceptable for air handling units.
6. All valves shall be configured from the factory in the open position thus requiring valve to be driven closed.
7. Valves shall be manufactured by Siemens.

C. Modulating straight through water valves: Equal percentage contoured throttling plugs.

D. Three Way Mixing Valves: Linear throttling plugs allowing total flow through valve to remain constant regardless of position.

E. Sizes: By Automatic Control System Manufacturer for fully modulating operation.
1. Minimum pressure drop: Equal to pressure drop of coil or exchanger.
2. Maximum pressure drop: 5.5 psi.
3. Relief and bypass valves: Sized according to pressure available.
4. 2-position valves: Line size.
5. Manual by-pass operator.

F. Electronic Actuator (Provide actuator manufacturer to match the existing valve manufacturer. Where valves are being replaced with new, provide actuator to match new valve manufacturer.)
1. Direct coupled installation

2. Visual and electronic stroke indicator
3. Die-cast aluminum housing
4. Manual override without disconnecting power
5. Self-lubricating bearing and gear train
6. Automatic calibration
7. Automatic duty cycle protection
8. Overload and stall protection
9. Non-spring return
10. 0-10V / 4-20mA operation (Floating control is not acceptable)
11. UL approved
12. Provide smooth modulating action and tight close off against the system pressure.
13. Torque to exceed the maximum required operating torque by not less than 150%.
14. Actuator input signal shall be compatible with output DDC controller.
15. Provide U.V. resistant material weatherproof metal actuator enclosure for exterior locations.
16. Damper actuators not acceptable for valves.
17. All 120V actuators shall be provided with a motor rated switch for disconnecting means at each individual actuator, and within reach of the actuator. Exterior switches shall be provided with a NEMA 4X enclosure.

G. Chilled Water By-Pass Valve:
1. Modulating straight through butterfly control valve and matching modulating electronic actuator
2. Maximum pressure drop: 5 psi
3. Sized for minimum flow of one chiller as scheduled.
4. Torque to exceed the maximum required operating torque by not less than 150%.
5. Acceptable Manufacturers
   a. Belimo
   b. Bray
6. Follow the following convention on installation: 0% = Closed, 100% = Open, where “Closed” is full flow to building.
7. Furnish with valve position command and position feedback points using 4-20mA signal

2.17 FLOW SWITCHES

A. Wetter parts made of type 316 stainless steel.
1. Designed for mounting in pipe tee.
2. Watertight, dust-tight, and corrosion resistant enclosure.
3. Paddle shall be factory fabricated to accommodate pipe sizes used.
4. Switching action shall be single pole double throw.

B. Approved manufacturer:
1. ITT McDonald Miller #FS7-4WL for piping over 8", FS7-4W for chilled water.
2. ITT McDonald Miller #FS7-4L for piping over 8", FS7-4 for hot and condenser water.

C. Remote Flow Solid-State Flow Detection:
1. Thermal dispersion type
2. Cabinet-mounted control monitor
3. Wetted parts, 316 stainless steel
4. Optional temperature and wire-break outputs
5. Flow and temperature switch points
6. LED bar graph display for status indication

D. Approved Manufacturer:

1. IFM Effector

2.18 TEMPERATURE LOW LIMIT SWITCH

A. Responsive to the coldest 1' section of its length.
   1. Double pole single throw switch
   2. 20' capillary installed with coil clips. Similar metals only.
   3. Line voltage with bellows actuated switch
   4. Manual reset
   5. Refer to manufacturer's installation instructions for installation locations with limited duct access. Support material shall be rigid copper pipe or coil clips.

2.19 TEMPERATURE AND HUMIDITY SENSORS

A. Space Temperature Sensors
   1. Thermistor with resistance of 10,000 ohms at 77°F.
   2. Accuracy shall be +/-1/2°F.
   3. Range of 55° to 95° F.
   4. Provide manufacturers calibration certificate.
   5. Front covers without displays throughout the building.
   6. Provide only the Principal's office with a sensor cover with integrated space temperature readout, setpoint adjustment +/- 3°F (adj.)
   7. Ventilation ring for fast response
   8. Location and height to be approved by Engineer prior to installation
   9. Color to be approved by Engineer/Owner. Submit a sample to reviewed by owner. Acceptance of sample shall be in writing to contractor.
   10. Provide ventilated locking clear plastic guards in the following locations:
      a. Kiln Room line voltage thermostat
      b. Gymnasiums
   11. Provide an insulated sensor wall plate to fully cover wall opening. Back cover plate shall match sensor color.
   12. Where indicated on drawings to provide both space temperature and space humidity, a combination temperature sensor shall be used but device shall still comply with characteristics described in each section of specification.

B. Space / Duct Humidity Sensor
   1. Capacitance element in the space or duct as required and output a 4 to 20 MA signal proportional to 0 to 100% RH to the DDC.
   2. Accuracy shall be +/-2% in the range from 20 to 95% RH.
   3. Relative humidity sensors shall have the sensing element of inorganic resistance media.
   4. Provide manufacturers calibration certificate.
   5. Provide ventilated locking clear plastic guards in the following locations:
      a. Gymnasiums
   6. Provide an insulated sensor wall plate to fully cover wall opening. Back cover plate shall match sensor color.
   7. Where indicated on drawings to provide both space temperature and space humidity, a combination temperature sensor shall be used but device shall still comply with characteristics described in each section of specification.

C. Duct Temperature Sensors
   1. Range of 20° to 120°F.
   2. Multi point sensing of temperature.
   3. Averaging elements of sufficient length to sense temperature across the full face of the coil or 2/3 duct width, provide accurate, representative indication and control and

prevent variances in temperature or stratification.

4. Probes with lengths greater than 3’ shall be externally supported to adjacent structures to prevent unwanted movement.
5. BAPI Rigid Averaging Temperature Sensor with steel junction box. (Note provided sensor shall satisfy the requirement to extend 2/3 across the entire airflow being measured.) If 2/3 rule cannot be achieved using the rigid averaging sensor, then acceptable flexible serpentine sensor shall be furnished and installed.
6. In general, and wherever possible, coil discharge temperatures shall be installed far enough downstream of the coil to avoid radiation effects to/from the coil as well as achieve mixing of air stream after it leaves the coil.
7. Zone reheat coil sensors shall be installed at least four feet downstream of the zone reheat coil. Cases where this is not possible or would result in sensor access issues shall be discussed with and approved by the Owner and Engineer.

D. Liquid Immersion Temperature Sensors
1. Platinum type resistance temperature detector (RTD).
2. Match sensor range to medium being monitored.
   a. Range 30° to 250°F.
3. Furnish matched stainless steel wells for installation by Mechanical Contractor.
4. Locate all sensors in field with Owner/Engineer present.
5. System accuracy for liquid temperature sensing shall be +/-1/2°.
6. Sensors must be removable from wells.

E. Outside Air Temperature and Humidity Sensor
1. Temperature
   a. Range of –40° to 140°F.
   b. Accuracy shall be +/-0.9°F
   c. Encapsulated into Type 304 stainless steel tubes with low conductivity moisture proofing material and lag extension for thickness of insulation.
2. Humidity
   a. Capacitance element in the space or duct as required and output a 4 to 20 MA signal proportional to 0 to 100% RH to the DDC.
   b. Accuracy shall be +/-2%
   c. Range from 20 to 95% RH.
   d. Relative humidity sensors shall have the sensing element of inorganic resistance media.
3. Weatherproof sun shield consisting of multiple white plastic plates to reduce the thermal effects of the sun and increasing air flow between the plates.
4. Sensor shall be mounted a minimum of 6” from all building structures.
5. Minimum of 8' long leads.
6. Provide manufacturers calibration certificate.
7. Provide with a 5-year warranty
8. Manufactured by ACI Model # A/-RH2-AN-O-SUN---NIST

F. Freezer / Cooler Sensors
1. Thermistor with resistance of 10,000 ohms at 77°F.
2. Accuracy shall be +/-1/2°F.
3. Range of -40°F to 210°F.
4. Provide manufacturers calibration certificate.
2. Die cast aluminum construction
3. Liquid tight wire connector to isolate sensor chamber from exterior temperature influence.
4. 1/2” NPT threaded hub
5. Mamac Systems Model #TE-205-F-12
6. Reuse existing wiring penetrations through cooler or freezer where possible. If

existing penetrations through cooler or freezers cannot be reused, seal existing holes with silicone such that opening is airtight.

7. All new penetrations into the cooler or freezer body shall be sealed airtight using silicone. This shall include screw holes and wiring penetrations.

2.20 CURRENT SWITCH

A. Ensure compatibility with VFD applications for variable speed motor status.
   1. Provide with adjustable set point.
   2. Relays must be mounted and not hung by power wires thru CT.
   3. Provide split-core type.
   4. Loop powered.
   5. LED Status.
   6. Relays shall close status contacts in response to current flow in power leads to the equipment being monitored.
   7. Acceptable Manufacturer: Veris Industries / Hawkeye Veris Hawkeye H608 Current Switch for AHUs, Pumps, Cooling Tower Fans and any other equipment with non-fractional HP motors.
   8. For fan wall applications each individual motor shall be monitored for status.

2.21 CURRENT TRANSDUCER

A. Ensure compatibility with VFD and ECM applications for variable speed motor status and current.
   1. Provide with adjustable set point capable of reading lowest required amperage.
   2. The current sensor shall be a split core type with self-gripping iris that adheres to the electrical conductor.
   3. Provide split-core type.
   4. Loop powered.
   5. The current sensor shall be fixed 0-10A and output of 0-10 VDC.
   5. LED Status.
   6. Transducer shall provide a current reading to BMCS
   7. Acceptable Manufacturer: Veris Hawkeye H623-10 Current Transducer for all CVBs, EFs, SFs, and any other equipment with fractional HP motors.
   8. For fan wall applications each individual motor shall be monitored for status.

2.22 DIFFERENTIAL PRESSURE TRANSDUCER

A. Transducers to convert differential pressures to 4-20 MA analog outputs.
   1. Solid state pressure sensor with accuracy of +/- 1% of calibration range.
   2. Factory calibrated and have zero and span trimmers for field calibration.
   3. Range shall be selected to match the medium being monitored.
   4. LCD Display. Display shall be mounted at 5’-6” above finished floor.
   5. Sensor leads shall be routed in conduit from within 1’ of transducer (pipe connection) to display location.
   6. Acceptable Manufacturer: Veris PWRLX04S020A, Senva PW30

2.23 ELECTRIC REMOTE BULB THERMOSTAT

A. Two position outdoors rated remote bulb thermostat:
   1. Bimetal controlled.
   2. Sealed mercury switches.
   3. Provide specified control action.
   4. Adjustment can be made by removing unit cover.

5. Element with capillary length as required for the location.

2.24 ELECTRIC SPACE THERMOSTAT

A. Two position space thermostat.
1. Single Pole switch actuated by bi-metal sensing element.
2. Range shall be 60°F to 90°F.
3. Removable external knob adjustment means.

2.25 HIGH STATIC PRESSURE SWITCH

A. With manual reset switch
1. Approved manufacturer: Cleveland AFS-460 or approved equal.

A. Provide with pitot tube in airstream and route polytube in conduit to remote sensor mounted on wall at 5’-6” above finished floor.

2.26 INSERTION FLOW SENSORS

A. Electromagnetic Flow Meter
1. Retractable hot tap flow sensor
2. Accuracy: +/- 1% of full scale
3. Custom thread-o-let 400 psi / 250°F rated
4. Installed into a 1” full port ball valve
5. Provided with an insertion depth gage
6. Line size from 2-1/2 to 72 inches
7. Metering range from 0.1 to 20 f/sec (200:1 turndown).
8. Remote NEMA 4 wall mounted LCD display. Mounted on wall at 5’-6” above finished floor.
9. Field Pro Software & Communicator
10. Warranty two years
11. Approved Manufacturer: ONICON FT-3400 Series for single-direction applications, ONICON FT-3400-200 for bidirectional applications. Note: for bidirectional applications, two (2) inputs are required. One (1) analog input for the flow rate, and one (1) digital input for the flow direction.

2.27 CONTROL DAMPERS

A. Opposed blade dampers.
1. Frames of 13-gauge galvanized sheet metal.
2. Provisions for duct mounting.
3. Damper blades not exceeding 8" in width.
4. Blades of two sheets of 16-gauge galvanized sheet metal.
5. Blades suitable for high velocity performance.
6. Bearings of nylon or oil-impregnated, sinthered bronze.
7. Shafts of 1/2" zinc-plated steel
8. Leakage does not exceed 1/2% based on 2000 fpm and 4" static pressure.
9. Replaceable resilient seals along top, bottom and sides of frame and blade edge.
10. Submit leakage and flow characteristics data with shop drawings.
11. Linkage shall be concealed out of the air stream within damper frame.
12. Acceptable Model is Ruskin Model CD60.

2.28 WATER LEAK DETECTOR SWITCH

A. Rated at 10 Amps.

1. Shuts off equipment if water level becomes too high.
2. DPDT Contacts.
3. Dwyer # WD3-LP-D2

2.29 BY-PASS AUTOMATIC SHUT-OFF TIMERS - INTERIOR

A. Rated at 10 Amps, 125 VAC
   1. Shuts off equipment with timed switch
   2. White decorated timer
   3. Without hold feature
   4. Classroom EF Time Cycle 60 minutes
   5. Kiln Room EF Time Cycle 6 hours installed parallel to Line Voltage Thermostat so that either device will activate the EF (keyed cover for line voltage thermostat only)

2.30 BY-PASS AUTOMATIC SHUT-OFF TIMERS - EXTERIOR

A. Voltage as required by BMCS system.
   1. Shuts off equipment with timed switch
   2. Stainless steel decorated timer
   3. Without hold feature
   4. Time Cycle 120 minutes with UV resistant time labels.
   5. Installed in a non-keyed weatherproof enclosure.

2.31 HVAC SHUTDOWN STATION

A. Shutdown Switch:
   1. White Mushroom Button within a clear plastic cover
   2. Latches when depressed
   3. Twist reset
   4. Sign “HVAC SHUTDOWN”
   5. Manufactured by STI Model # SS2331HV-EN

2.32 EXTERIOR LIGHTING OVERIDE STATION

A. Override Button:
   1. Yellow Mushroom Button within a clear plastic cover
   2. Momentary contact configuration
   3. Sign “EXTERIOR LIGHTING OVERIDE”
   4. Manufactured by STI Model # SS2234ZA-EN

2.33 PITOT TUBES

A. Duct static pressure and high static sensors shall utilize insertion type pitot tubes.
   1. Tube shall be rigid metal with 90 degree elbow allowing the tip of the tube to be oriented into the air stream.
   2. Product shall be provided with a duct collar and mounting holes.

2.34 REFRIGERANT MONITOR

A. Infrared Halogen Gas monitoring system for low level continuous monitoring of numerous CFC, HFC and HCFC halogen gases used in most refrigeration and air conditioning systems.

B. Two years parts and labor warranty and factory startup.

C. Analyzer:
1. Microprocessor based
2. Infrared (IR) sensor technology
3. Sensing down to 1 (PPM)
4. Monitor multiple compounds
5. Automatic calibration
6. Synchronous 2 wave length infrared filtometer
7. Insensitive to vibration and temperature variations.
8. Response Time: Min.5 sec / Max. 90 sec.
9. Sampling Mode in Auto and Manual operation

D. Multi-Point Sampling System:
1. Minimum of six sample points
2. Adjustable sampling time, with optional skip and hold features for each point.
3. Three stage alarms for each point
4. Flow loss and malfunction indicators
5. Individual relay contacts for each set of channel alarms.
6. Infrared detection

E. Alarming and Display:
1. Digital display in PPM/PERCENTAGE
2. Provide a 0-10V and 4-20mAmp output for direct input into the Building Management System or Direct Digital Control System.
3. Adjustable three level alarm for each point shall and be supplied with common alarm output contacts.
4. Provide local digital indication of PPM level for each sample point.
5. Loss of any sample flow
6. Identify alarm point by flashing display and actual PPM.
7. Automatic zero mechanism and malfunction indicators.
8. Silence audible alarm switch with re-activation after adjustable time delay.
9. As per code, alarm shall shut down all chillers within the plant via hardwired interlock to the refrigerant monitor.

F. Signage
1. Signage shall be provided on each exterior door with 1” white lettering on read background that states, “Warning, a refrigerant leak alarm has been activated, do not enter. Call Klein ISD Maintenance Department”

G. Power requirement:
1. 120 VAC

H. Audible sound pressure level of at least 15Dba above the operating ambient noise level within machine room and providing a distinctive strobe type visual alarm both inside and outside machine room at each entrance. Ceiling mounted rotating beacon in center of machine room. Strobes shall be provided immediately adjacent to and outside of each refrigeration machinery room exit. A clearly identified switch of the break-glass type shall be provided immediately adjacent to and outside of each refrigeration machinery room exit. Upon completion of controls replacement project all non-garage doors shall be equipped with devices as described above.

I. Acceptable manufacturers:
1. Honeywell – Vulcain 301EM-20
2. Approved equal

2.35 MAIN SWITCHBOARD ENERGY MONITOR

A. Provide digital monitoring of the building KVA and KWH. Coordinate with the switchgear manufacturer.

B. Phase voltage and Phase AMPs

C. Electrical Quality monitoring:
1. Monitor Watts, VA, VAR, Demand, Imbalance, and Power Factor.

D. Self Enclosed (NEMA 1) Shark Meter Assembly #ENSHK100B-277-60-10-D2 with Bacnet.
1. In addition, provide (3) current transducers appropriately sized and selected for connection to the switchboard being metered.

PART 3 EXECUTION

3.1 REPLACEMENT OF EXISTING BMCS SYSTEMS

A. Complete replacement of the existing Building Management and Control Systems shall include the following:
1. Remove all existing control devices and replace with new.
2. Remove all existing wiring and replace with new.
3. Remove and replace all existing damper actuators where indicated in base and where indicated by alternate should those alternates be accepted.
4. Remove and replace all terminal unit controllers.
5. Remove and replace all existing BMCS control cabinets.
6. Existing control conduits may be reused where not damaged or aged. Existing conduit shall be extended to new end device locations. All existing control conduit being abandoned shall be removed.
7. New control wiring shall not be routed in the same conduit or pathway as any line voltage wiring.
8. The owner shall be given first right of refusal on all existing control devices.
9. Existing chilled and hot water control valves shall remain unless otherwise indicated. Contractor shall verify proper operation of control valves prior to starting any work. If valve is noted to be damaged or not functioning properly, notify the engineer/owner immediately.
10. Existing motorized damper actuators associated with all exhaust fans, outside air intakes, and relief vents shall be reused unless otherwise noted in the project documents. It is the intent that all exhaust, relief, and intakes include a motorized damper. If a device is found not to have an existing damper or the damper is not functioning, notify the engineer/owner immediately.
11. Line voltage wiring shall not be installed within controls cabinet. If line voltage is required a relay should be mounted in a separate enclosure.

B. The new BMCS system shall maintain control of all equipment and devices currently on the existing BMCS system. Contractor shall field verify all existing equipment and devices prior to bid.

C. It is the responsibility of the contractor to ensure all equipment is under control of a BMCS system prior to the building system being started and building becoming occupied. In instances where this is not possible, it is the responsibility of the contractor to monitor and maintain, within District standards, the operation of the equipment manually until the equipment is under automatic control. The Contractor shall field all hot and cold calls during construction.

D. Verify operation of all existing equipment prior to adding existing equipment to new control system. Notify engineer/owner of inoperable equipment.

E. Contractor is to maintain safety interlocks during all phases of the BMCS installation. This includes providing temporary rough-ins of high static limits to VFD shut downs, freeze stat interlocks to starters/VFDs, etc. The wiring for these rough-ins may be run in a temporary fashion overhead, exposed and unsupported as long as the wiring is not in the path of the normal construction movement in the space. Wires laying on the floor and/or in the path of other workers in not acceptable at any time. These safeties are to be maintained until the AHUs controls are downloaded, commissioned, and operating in automatic mode per sequence of operations.

F. Contractor shall verify each multizone sensor is associated with the correct zone on the AHU and the associated hot water coil. For example, with outside air units deactivated, drive the cooling valve open on the AHU and open only the zone being tested to full open. Using a digital temperature sensor verify the zone at the AHU is supply air to the associated zone. Process shall be repeated in the heating mode to verify the HWC association. Other procedures may be considered but must be presented to the owner and engineer prior to executing tests.

3.2 SERVER REQUIREMENTS

A. Provide all servers required for front new building management and control system.

B. Server work shall include all costs associated with building and licensing virtual servers on Klein ISD equipment.

3.3 INSTALLATION

A. The control system shall be installed, and final adjustments made by full-time employees of the factory-approved BMCS Building Management Control Subcontractor.

B. The contractor shall collaborate through Engineer and Owner to determine the Owner's preference for naming conventions, etc. before entering the data into the system. The agreed-to naming convention shall be used throughout the system included but not limited to all graphic pages where the name is used. Example: Using the name “Supply Air Temperature” on one page and “Discharge Air Temperature” on another is not acceptable. This standard shall follow through all installed devices and graphics including but not limited to wire labels, device labels, GUI labels.

C. Due to actual operational or space conditions, it may be necessary for the Contractor to make sequence of operation modifications and/or controller adjustments, change the location or type of sensor to obtain proper operation and coverage of the system in each room or space. These changes, if requested by the Owner or Engineer, shall be performed at no additional cost to the Owner. Therefore, labor allowances should be made for such changes and adjustments if requested.

D. As per this specification, trend logs for all inputs and outputs shall be set up by the contractor during installation and prior to the start of functional testing.

E. Install laminated instructions with verbiage in English and Spanish as provided by Klein ISD on TLO button and HVAC Shutdown button and any other signage as required such as lab hood operation instructions.

F. Installation process shall meet the following requirements for ensuring safe building conditions are maintained and equipment is protected from damage. If overridden points are necessary during installation, ensure the values are appropriate for the time of year. For example: During summer operation overridden values shall allow all systems to fail safe to avoid condensation within equipment and within the building shell; during winter operation overridden values shall allow all systems to fail safe to avoid freezing of coils and protect against freezing air from entering the building shell.

(1) Outside air temperature and relative humidity sensors along with local weather station API shall be a top priority to ensure all systems are properly protected against extreme temperature and humidity conditions as well as extreme cold conditions throughout the project, and prior to Owner Acceptance.
(2) It is the responsibility of the contractor to ensure that appropriate data is available and provided to the installed system controls and/or equipment controls so that the system protects itself, per the sequence of operation, against high moisture content outside air combined with low space temperatures (Outside Air Dewpoint Temperature greater than Space Temperature Setpoints) that could lead to moisture formation on interior surfaces.
(3) It is the responsibility of the contractor to ensure that appropriate data is available and provided to the installed system controls and/or equipment controls so that the system protects itself, per the sequence of operation, against low temperature outside air (Outside Air Temperature less than 35ºF) that could lead to freezing air entering the equipment and/or building.

G. Installation process shall meet the following requirements for ensuring coordination with the Commissioning Process. Upon completion of Pre-functional Testing of each unique equipment or system type, notify Commissioning Agent and schedule on site meeting to perform the Functional Testing. Make all necessary corrections recorded by the Commissioning agent prior to replicating the program. Upon completion of Functional Testing of each unique equipment or system type, notify Owner and Commissioning Agent and schedule meeting to review the graphics. Make all necessary corrections recorded by the Owner and Commissioning Agent prior to replicating the graphics.

3.4 GRAPHICS

A. The items here within and all items included in specification section 23 09 94 are part of the graphics scope.

B. Provide a set of the "as installed" diagram(s) of the complete control system laminated in plastic and hung in the main mechanical room or as directed by Owner. Provide electronic copy of as-built record drawings, submittals and closeout documents on thumb drive.

C. Provide a set of the "as installed" diagram(s), with wire colors noted for each landed point (all inputs and outputs) on the controller for each control panel system, laminated in plastic and hung on the panel door or as directed by Owner.

D. Provide a color-coded floor plan map of the building, one representative of the AHU level zones, with room numbers and descriptions, and the other to be representative of the space/temperature sensor level and shall indicate the location of each system, the area served by each AHU and each related zone with room numbers and descriptions. Provide both in PDF format with white background and in printed form with white background of professional quality. Printed floor plans are to hang in main mechanical room near central

control panel. In addition to the above, provide a table of Areas served and associated equipment.

E. Provide final graphic room numbers as selected by District.

F. All as built documentation including documents listed above shall be uploaded to the BMCS system and be accessible through the graphical pages. Final location of document link to be verified with district.

G. Global Modify – the system shall allow the operator to change the value of the same point to a common value across all applicable systems. For instance, the systems shall allow changing all space cooling setpoints to 74F, all heating setpoints to 69F, all heating setpoint offsets to 5F, etc.. If the system does not include a native Global Modify function then the contractor shall provide this functionality within the GUI that allows this for all setpoints within the system.

H. Each Floor Plan Graphic and Equipment Graphic shall include a notepad feature that allows the user to enter notes of at least 256 characters.

3.5 IDENTIFICATION

A. Control Panels Labels: Provide a laminated engraved nameplate on all control panels shown on the "as installed" control diagrams. Coordinate engraving with nomenclature used on the diagrams. Identifying nameplates shall be secured to each main cabinet, and each control panels. Identifying nameplates shall have minimum of ½ inch high, engraved letters.

B. Controller labels: Provide a label affixed to the controller on all controllers with the name of the major equipment or system it serves and the Device Identification Number.

B. Ceiling Labels: Provide a label affixed to the ceiling grid below all terminal units, exhaust fans, fan coil unit, hot water coil, and duct static pressure sensors and labeled with the unit tag with those used on the "as installed" control diagrams. Label material shall utilize a black background with white typed lettering and 36 font on 3/4" label material. Coordinate labeling with nomenclature used on the diagrams.

C. Multi-Zone Labels: Provide an identification label on each multi-zone valve and multi-zone damper actuator on multi-zone units. Labels shall include air handling unit number, zone number, and room number. Label material shall utilize a white background with black typed lettering. Coordinate labeling with nomenclature used on the diagrams. For example, Multizone (AHU-X, Zone X, Room X). Provide sample to Klein ISD prior to the start of labeling.

D. Sensor Labels: Provide each space temperature and humidity sensors with label located on the inside of sensor cover. The label shall indicate which device sensor is controlling. If multiple sensors control a single device the sensors shall be labeled with an “A” or “B” etc. Label material shall utilize a white background with black typed lettering. Coordinate labeling with nomenclature used on the diagrams. For example, Multizone (AHU-X, Zone X), VAV (AHU-X, CVB-X), HWC (AHU-X, HWC-X). Provide sample to Klein ISD prior to the start of labeling.

I. Electrical Labels: Provide an identification label on each transformer and relay. The label shall indicate which device they serve and their function. Handwritten labels are not acceptable. Label material shall utilize a white background with black typed lettering. Coordinate labeling with nomenclature used on the diagrams.

J. Wire Labels: Provide an identification label on each wire used for this system. Labels shall be affixed to both ends of the wire. Handwritten labels or handwriting on wiring is not acceptable.
   a. Wiring labels at VAV boxes shall include all wiring entering and exiting the VAV box control box with a description of where it is coming from and where it is going. This shall include all communication wiring and all field device wiring.
   b. Wiring labels at AHUs and FCUs shall include all wires entering and exiting the field controller with a description of where it is coming from and where it is going. This shall include all communication wiring and all field device wiring.

K. Lighting Contactor Labels: Provide an identification labels on each lighting contactor. Labels shall include panel and circuit number serving contactor and the type and location of lights being served by contactor. (i.e. Bus Drop off Canopy). Handwritten labels are not acceptable. Coordinate labeling with nomenclature used on the diagrams.

L. End Devices Labels: Provide an identification label on each end device and sensor. Labels shall include the function of the sensor (i.e. Leaving Air Temperature Sensor). Handwritten labels are not acceptable. Coordinate labeling with nomenclature used on the diagrams.

J. Valve Labels: Provide each campus with twelve (12) red with white lettering laminated plastic engraved tags with the words “VALVE SHALL REMAIN CLOSED”, ½ inch high, engraved letters. Each tag shall be provided with a hole on the top corners of the tag and fitted with an adequate piece of brass "S" hooks or brass chain to allow sign to be hung from valve operator.

K. All labeling as described above shall be completed prior to point checkout and startup. Label description shall be part of point checkout process.

L. The butterfly valve utilized for the Chilled Water Bypass Pipe shall be provided with a metal tag with stamped text and chain hanger. Coordinate text requirement with owner.

3.6 WIRING FOR BUILDING MANAGEMENT AND CONTROL SYSTEMS

A. Prior to the start of any work, controls contractor and wiring subcontractor shall schedule a meeting with the owner and engineer to walk the site to discuss wiring system. Contractor shall provide a 7 day advanced notice of the requested meeting date.

B. Furnish and install all wire, conduit, raceways and cable systems required for the complete operation of the Building Management and Control System.

C. All wiring for the Building Management and Control System is specified in this section and includes, but is not limited to:
   1. Wiring of interlock system.
   2. Wiring of control instruments.
   3. Wiring of control panels.
   4. Wiring of related power supplies, i.e. transformers.
   5. Wiring of 120 VAC power circuits for control panels and devices.

D. All materials and methods specified in this section shall comply with the requirements specified in Division 26 of this specification.

E. All power supply requirements shall be connected to the building electrical distribution system in an approved manner. Do not connect control equipment of circuits common with other building loads or devices.

F. Temperature control wiring shall be jacketed cables installed with or without conduit as specified below or single conductors installed in conduit. Control wiring shall have minimum 300V insulation for low voltage wiring and 600V insulation for line voltage wiring.

G. All line voltage control wiring, all low voltage control wiring which is in areas without ceilings and exposed to the occupied space in the central plant, mechanical rooms, penthouse, and other similar spaces; all low voltage control wiring which is routed through concealed inaccessible locations shall be installed in conduit.

H. All low voltage control wiring which is routed through concealed accessible locations may be run without conduit provided that the wiring run without conduit is properly supported from the building structure on maximum 5' centers and does not depend upon the ceiling grid or the ceiling support system for support. Wiring run in plenum spaces shall be plenum rated. Support all plenum wiring in accessible locations in bridle rings, J-hooks, D rings. Plenum wiring is not to be supported within building structure or attached to conduit raceways. All low voltage wiring must be installed through supports. Wires shall be supported on 5’ centers and identified at each termination point and at 50’ center minimum. Install wire parallel or perpendicular to the structural features of the building.

I. Line and low voltage control wiring shall not be installed in the same conduit.

J. All wiring associated with building management and control system cover shall be as follows:
1. Sensor jacket color, Green, stranded 18 gauge
2. Room Sensors
   a. Room Temperature jacket color, Green, provide a minimum of 18 gauge stranded wire with 4 conductors.
   b. Humidity Sensor jacket color, Green, provide a minimum of 18 gauge stranded wire with 4 conductors.
3. Ethernet Communications, Cable: Berk-Tek LANmark-6 (11049196) Pink, Jack: 6110-RB6 Brown, Patch cord: 7Ft cat 6 patch cord pink (CDW# 3074351).
4. All THHN wiring shall comply with Division 26 insulation color identification
5. Terminal Equipment Controller communications twisted pair, Orange with blue tracer. Wiring shall be a minimum of 22 AWG twisted and stranded unless controller manufacturer dictates otherwise.

K. For central plants, power transformers installed for safety interlocks such as vibration switch, oil level switch, etc. shall be dedicated to one (1) equipment train. One power transformer shall not be used for safety interlocks across multiple equipment trains. An equipment train is defined as one chiller, associated pump(s), and cooling tower.

3.7 EXHAUST AND SUPPLY FANS

A. Provide interlocks as scheduled on the plans unless shown on the electrical drawings.
B. Provide BMCS override to disable operation of all exhaust and supply fans interlocked and/or specified throughout project.
C. Provide time based on/off scheduling of exhaust fans.

POINT DESCRIPTION	TYPE	DEVICE
Start/stop	DO	Control Relay
Outside Air Damper	DO	Electronic Operator
Fan Status	DI	Current Sensitive Relay

3.8 VARIABLE FREQUENCY DRIVE INTERFACE

A. Interface to the VFD directly
B. Interface may be hardwired or via RS-485
C. The following points shall be available at a minimum:

Point Name	Type
Start-stop	DO
Drive alarm	DI
Last fault	AI
Reset drive	DO
Percent output	AI
Frequency output	AI
Speed	AI
Current	AI
Power	AI
Drive temperature	AI
KWH	AI
Run time	AI

EILAND ELEMENTARY SCHOOL

3.9 MULTI-ZONE AIR HANDLING UNITS (AHU-26, AHU-27)

A. The existing system which consists of a chilled water cooling coil in the Cold Deck Zone, electric duct heaters in the zone ductwork and zone mixing dampers is being replaced with new and existing control sequences shall remain and be reused/modified. The existing OA is pretreated before being delivered to unit. All controls end devices shall be replaced with new. Additional coil discharge sensors are being added for monitoring purposes.
B. Provide end device and sequence for temperature low limit switch located on the entering side of the cooling coil to de-energize the air handling unit and supply fan, close the outside air damper, and signal an alarm to the BMCS when the temperature drops below 32°F. Device shall be manual reset.
C. Existing space temperature and humidity sensors shall remain and be reused.

POINT DESCRIPTION	TYPES	DEVICE
Start/Stop	DO	Control Relay
AHU Status	DI	Current Sensitive Relay
Variable Speed Motor (AHU)	AO	Motor Controller
Cold Deck Temperature	AI	RTD Average Probe
CHW Valve	AO	Electronic Operator
Zone Damper	AO	Electronic Operator
Electric Heater	DO	Relay each stage
Heater Discharge Air Temp. (Each Zone)	AI	RTD Average Probe

POINT DESCRIPTION	TYPES	DEVICE
Freeze Status	DI	Temperature Low Limit Switch

3.10 OUTSIDE AIR HANDLING UNIT CONTROL (OAU-1, OAU-2, OAU-3, OAU-4 OAU-5)

A. The existing system which consists of a chilled water coil and a electric heating coil in the PREHEAT position is being replaced with new and existing control sequences shall remain and be reused/modified. All controls end devices shall be replaced with new. Additional coil discharge sensors are being added for monitoring purposes.

B. Provide end device and sequence for temperature low limit switch located on the discharge side of the electric heater to de-energize the air handling unit and supply fan, close the outside air damper, and signal an alarm to the BMCS when the temperature drops below 32°F. Device shall be manual reset.

POINT DESCRIPTION	TYPES	DEVICE
Start/Stop	DO	Control Relay
AHU Status	DI	Current Sensitive Relay
Variable Speed Motor (AHU)	AO	Motor Controller
Cooling Coil Discharge Air Temp.	AI	Duct Thermistor
CHW Valve	AO	Electronic Operator
Outside Air Damper	DO	Electronic Operator
Freeze Status	DI	Temperature Low Limit Switch
Electric Heater	DO	Relay each stage
Heating Coil Discharge Air Temp.	AI	Duct Thermistor

3.11 SINGLE ZONE DX AIR HANDLING UNIT (AHU-PE-1 / CU-PE-1)

A. The existing system which consists of a direct expansion coil and electric duct heater in the reheat position is being replaced with new and existing control sequences shall remain and be reused/modified. The existing OA is not pretreated. All controls end devices shall be replaced. Additional coil discharge sensors are being added for monitoring purposes.

B. In addition, provide new sequences and coordination for A2L leak detector such that if the factory A2L refrigerant leak detector is triggered, BMCS shall receive an alarm and disable compressor. The factory A2L leak dissipation board shall, shut off refrigerant valves, enable unit supply fan, and deactivate all heat associated with the system. When the A2L refrigerant leak detection system is reset, all systems shall go back to normal operation. Refer to equipment specifications for additional information on the A2L refrigerant leak detection system and coordinate with equipment manufacturer to ensure all points and sequence of operations are in compliance with manufacturer requirements.

POINT DESCRIPTION	TYPE	DEVICE

AHU Fan Start/stop	DO	Control Relay
AHU Fan Status	DI	Current Sensitive Relay
Space Temperature	AI	Space Thermistor
Return Air Temperature	AI	Duct Thermistor
Electric Heater	AO	Electronic Operator
Heating Coil Discharge Air Temperature	AI	Duct Thermistor
Condensing Unit	DO	Control Relay(s) (per stage)
Outside Air Damper	DO	Electronic Operator
Cooling Coil Discharge Air Temperature	AI	Duct Thermistor
Refrigerant Leak Alarm	DI	Factory A2L Refrigerant Leak Detection System

3.12 SINGLE ZONE AIR HANDLING UNITS (AHU-1 THRU AHU-25)

A. The existing system which consists of a chilled water coil and an electric duct heater in the supply duct is being replaced with new and existing control sequences shall remain and be reused/modified. The existing OA is pretreated before being delivered to unit. All controls end devices shall be replaced. Additional coil discharge sensors are being added for monitoring purposes.

B. Existing space temperature and humidity sensors shall remain and be reused.

POINT DESCRIPTION	TYPE	DEVICE
Start/Stop	DO	Control Relay
AHU Status	DI	Current Sensitive Relay
Space Temperature	DI	Space Thermistor
Electric Duct Heater	DO	Relay each stage
Heating Coil Discharge Air Temp.	AI	Duct Thermistor
CHW Valve	AO	Electronic Operator
Cooling Coil Discharge Air Temp.	AI	Duct Thermistor

KAISER ELEMENTARY SCHOOL

3.13 SINGLE ZONE DX AIR HANDLING UNIT (AHU-PE-1 / CU-PE-1)

A. The existing system which consists of a direct expansion coil and electric duct heater in the reheat position is being replaced with new and existing control sequences shall remain and be reused/modified. All controls end devices shall be replaced. Additional coil discharge sensors are being added for monitoring purposes.
   1. Provide end device and sequence for temperature low limit switch located on the discharge side of the cooling coil to de-energize the air handling unit and supply fan, close the outside air damper, and signal an alarm to the BMCS when the temperature drops below 32°F. Device shall be manual reset.
   2. In addition, provide new sequences and coordination for A2L leak detector such that if the factory A2L refrigerant leak detector is triggered, BMCS shall receive an alarm and disable compressor. The factory A2L leak dissipation board shall, shut off refrigerant valves, enable unit supply fan, and deactivate all heat associated with the system. When the A2L refrigerant leak detection system is reset, all systems shall go back to normal operation. Refer to equipment specifications for additional information on the A2L refrigerant leak detection system and coordinate with equipment manufacturer to ensure all points and sequence of operations are in compliance with manufacturer requirements.

POINT DESCRIPTION	TYPE	DEVICE
AHU Fan Start/stop	DO	Control Relay
AHU Fan Status	DI	Current Sensitive Relay
Space Temperature**	AI	Space Thermistor
Return Air Temperature	AI	Duct Thermistor
Electric Heater	AO	Electronic Operator
Heating Coil Discharge Air Temperature	AI	Duct Thermistor
Condensing Unit	DO	Control Relay(s) (per stage)
Outside Air Damper	DO	Electronic Operator
Cooling Coil Discharge Air Temperature	AI	Duct Thermistor
Freeze Status	DI	Temperature Low Limit Switch
Refrigerant Leak Alarm	DI	Factory A2L Refrigerant Leak Detection System

KLENK ELEMENTARY SCHOOL

3.14 MULTI-ZONE AIR HANDLING UNITS (AHU-1, AHU-5, AHU-6, AHU-7, AHU-9, AHU-10, AHU-11, AHU-12)

A. The existing system which consists of a chilled water cooling coil in the Cold Deck Zone, electric duct heaters in the zone ductwork and zone mixing dampers is being replaced with new and existing control sequences shall remain and be reused/modified. All

controls end devices shall be replaced with new. Additional coil discharge sensors are being added for monitoring purposes.

B. Provide end device and sequence for temperature low limit switch located on the entering side of the cooling coil to de-energize the air handling unit and supply fan, close the outside air damper, and signal an alarm to the BMCS when the temperature drops below 32°F. Device shall be manual reset.

C. Existing space temperature and humidity sensors shall remain and be reused.

POINT DESCRIPTION	TYPES	DEVICE
Start/Stop	DO	Control Relay
AHU Status	DI	Current Sensitive Relay
Variable Speed Motor (AHU)	AO	Motor Controller
Cold Deck Temperature	AI	RTD Average Probe
CHW Valve	AO	Electronic Operator
Zone Damper	AO	Electronic Operator
Electric Heater	DO	Relay each stage
Heater Discharge Air Temp. (Each Zone)	AI	RTD Average Probe
Freeze Status	DI	Temperature Low Limit Switch

3.15 SINGLE ZONE DX AIR HANDLING UNIT (AHU-PE-1 / CU-PE-1)

A. The existing system which consists of a direct expansion coil and electric duct heater in the reheat position is being replaced with new and existing control sequences shall remain and be reused/modified. All controls end devices shall be replaced. Additional coil discharge sensors are being added for monitoring purposes.

1. Provide end device and sequence for temperature low limit switch located on the discharge side of the cooling coil to de-energize the air handling unit and supply fan, close the outside air damper, and signal an alarm to the BMCS when the temperature drops below 32°F. Device shall be manual reset.
2. In addition, provide new sequences and coordination for A2L leak detector such that if the factory A2L refrigerant leak detector is triggered, BMCS shall receive an alarm and disable compressor. The factory A2L leak dissipation board shall, shut off refrigerant valves, enable unit supply fan, and deactivate all heat associated with the system. When the A2L refrigerant leak detection system is reset, all systems shall go back to normal operation. Refer to equipment specifications for additional information on the A2L refrigerant leak detection system and coordinate with equipment manufacturer to ensure all points and sequence of operations are in compliance with manufacturer requirements.

POINT DESCRIPTION	TYPE	DEVICE
AHU Fan Start/stop	DO	Control Relay

AHU Fan Status	DI	Current Sensitive Relay
Space Temperature**	AI	Space Thermistor
Return Air Temperature	AI	Duct Thermistor
Electric Heater	AO	Electronic Operator
Heating Coil Discharge Air Temperature	AI	Duct Thermistor
Condensing Unit	DO	Control Relay(s) (per stage)
Outside Air Damper	DO	Electronic Operator
Cooling Coil Discharge Air Temperature	AI	Duct Thermistor
Freeze Status	DI	Temperature Low Limit Switch
Refrigerant Leak Alarm	DI	Factory A2L Refrigerant Leak Detection System

3.16 SINGLE ZONE AIR HANDLING UNITS (AHU-2, AHU-3, AHU-8)

A. The existing system which consists of a chilled water coil and an electric duct heater in the supply duct is being replaced with new and existing control sequences shall remain and be reused/modified. The existing OA is pretreated before being delivered to unit. All controls end devices shall be replaced. Additional coil discharge sensors are being added for monitoring purposes.

B. Existing space temperature and humidity sensors shall remain and be reused.

POINT DESCRIPTION	TYPE	DEVICE
Start/Stop	DO	Control Relay
AHU Status	DI	Current Sensitive Relay
Space Temperature	DI	Space Thermistor
Electric Duct Heater	DO	Relay each stage
Heating Coil Discharge Air Temp.	AI	Duct Thermistor
CHW Valve	AO	Electronic Operator
Cooling Coil Discharge Air Temp.	AI	Duct Thermistor

NITSCH ELEMENTARY SCHOOL

3.17 SINGLE ZONE DX AIR HANDLING UNIT (AHU-PE-1 / CU-PE-1)

A. The existing system which consists of a direct expansion coil and electric duct heater in

the reheat position is being replaced with new and existing control sequences shall remain and be reused/modified. All controls end devices shall be replaced. Additional coil discharge sensors are being added for monitoring purposes.

1. Provide end device and sequence for temperature low limit switch located on the discharge side of the cooling coil to de-energize the air handling unit and supply fan, close the outside air damper, and signal an alarm to the BMCS when the temperature drops below 32°F. Device shall be manual reset.
2. In addition, provide new sequences and coordination for A2L leak detector such that if the factory A2L refrigerant leak detector is triggered, BMCS shall receive an alarm and disable compressor. The factory A2L leak dissipation board shall, shut off refrigerant valves, enable unit supply fan, and deactivate all heat associated with the system. When the A2L refrigerant leak detection system is reset, all systems shall go back to normal operation. Refer to equipment specifications for additional information on the A2L refrigerant leak detection system and coordinate with equipment manufacturer to ensure all points and sequence of operations are in compliance with manufacturer requirements.

POINT DESCRIPTION	TYPE	DEVICE
AHU Fan Start/stop	DO	Control Relay
AHU Fan Status	DI	Current Sensitive Relay
Space Temperature**	AI	Space Thermistor
Return Air Temperature	AI	Duct Thermistor
Electric Heater	AO	Electronic Operator
Heating Coil Discharge Air Temperature	AI	Duct Thermistor
Condensing Unit	DO	Control Relay(s) (per stage)
Outside Air Damper	DO	Electronic Operator
Cooling Coil Discharge Air Temperature	AI	Duct Thermistor
Freeze Status	DI	Temperature Low Limit Switch
Refrigerant Leak Alarm	DI	Factory A2L Refrigerant Leak Detection System

3.18 START-UP AND POINT VERIFICATION

A. Final startup and point verification shall include the following information.
   1. Field panel checkout:
      a. Verify enclosure is not mounted on vibrating surface.
      b. Verify class I and class II wiring is physically separated within enclosure.
      c. Check for shorts/grounds/induced voltages/proper voltages.
      d. Verify proper point terminations in accordance with as-builts.
      e. Verify that all modules are in proper place and addressed.
      f. Verify proper power voltage.

g. Load database and programming.
h. Startup the panel.
i. Point and device checkout.

2. Analog input point checkout:
   a. Verify the correct wiring terminations per the design documentation package, at the field panel. Verify that all wiring and terminations are neat and dressed.
   b. Verify the point address by checking that the analog input instrument is wired to the correct piece of field equipment. Do this by altering the environment at the sensing element or by disconnecting one of the wires at the sensor, and verifying that the reading at the field panel has reacted to this change.
   c. Verify the point database to be correct, (i.e., alarmability, alarm limits, slope/intercept, engineering units, etc.). Verify that the correct change of value (COV) limit has been defined.
   d. Verify the sensor has the correct range and input signal. (i.e., 20-120°F, 4 - 20 ma). Verify that the device is mounted in the correct location and is wired and installed correctly per the design documentation package.
   e. Set-up and/or calibrate any associated equipment (i.e., panel LCD meters, loop isolators, etc.). Verify that these auxiliary devices are mounted in the correct location and are wired and installed correctly per the design documentation package.
   f. Verify the correct reading at the field panel using appropriate MMI devices. Verify that any associated LCD panel meters indicate the correct measured value.
3. Digital input point checkout:
   a. Verify the device is correctly wired and terminated as shown in the design documentation package. Verify that all wiring and terminations are neat and properly secured.
   b. Verify the point address by verifying that the digital input is correctly terminated at the controlled piece of equipment.
   c. Verify the point database is correct (i.e., point name, address, alarmability, etc.).
   d. Set-up and/or calibrate the associated equipment, i.e. smoke detector, high/low temp detector, high/low static switch, flow switch, end switch, current relay, pressure switch, etc. is mounted in the correct location, and is wired and installed correctly per the control system installation drawings.
   e. With the controlled equipment running or energized as described in the digital output checkout procedures, verify the correct operation of the digital input point and associated equipment by putting the digital input monitored equipment into its two states. Verify that the proof or status point indicates the correct value at the operator's terminal and that the status led is giving the proper indication in each mode of operation (on/off).
4. Digital output point checkout:
   a. Verify that device is correctly wired and terminated as shown in the design documentation package.
   b. Verify that the correct voltage is utilized in the circuit.
   c. Verify the point database to be correct (i.e. point name, address, etc.).
   d. Check and verify that the end device responds appropriately to the digital output(s).
   e. After verifying the set-up and operation of any associated digital input/proof points, check and verify correct operation of the logical point and associated equipment by commanding the point to all possible states (i.e. off, on, fast, slow, auto, etc.). Verify that the defined proof delay is adequate for all modes of operation.

f. If any interlocked equipment exists that has independent hand-off-auto or auxiliary control wiring, verify correct operation of same. Also check that any interlocked equipment are wired and operate correctly.
g. Verify that the controlled piece or pieces of equipment cannot be caused to change state via the digital output if an associated hand-off-auto switch is in the hand/on or hand/off mode of operation, unless specified as a fireman's override point etc.

5. Analog output point checkout:
   a. Verify the correct wiring or piping terminations per the design documentation package, at the field panel. Verify that all wiring and piping terminations are neat and dressed.
   b. Insure that the correct output device(s) are installed per the Control System Installation Drawings. (i.e., transformers, power supply, etc.). Verify that these devices are installed and wired correctly. Verify that any configuration jumpers are in the proper settings for the required application. Verify related transformers are fused in accordance with installation drawings.
   c. Verify the point database to be correct. Verify that the correct COV limit has been defined.
   d. Verify the point address by checking that the analog output is wired and/or piped to the correct output transducer and/or equipment.
   e. Verify that the controlled device is calibrated and is in the correct location, and is wired and installed correctly per the design documentation package. If the controlled device is not calibrated, then a three-point (high, low and mid-point) calibration procedure must take place. Verify proper operation of the end device. When calibration has been verified, ensure that installation drawings, point database, and PPCL have been updated.
   f. Set-up and or calibrate any associated equipment, (i.e., panel LCD meters, loop isolators, etc.). Also verify that these auxiliary devices are mounted in the correct location, and are wired and installed correctly per the design documentation package.
   g. After verifying the set-up and operation of any associated equipment check for the correct operation of the logical point and associated equipment by commanding the analog output to the top and bottom of its range. Verify that the control device(s) responded appropriately as indicated by the design documentation package. Check to ensure that all network terminals, host console devices, etc. can also command these outputs.
6. Terminal equipment controller checkout:
   a. Load program database
   b. Enable programs
   c. Verify sequence of operations
7. Programming checkout:
   a. Provide checkout for each system and sequence of operation.
   b. The following are sample sequence of operations tests. The intent of these procedures is to provide a plan of action to verify system operations via block checks of the project specific sequence of operations. The procedures may be used in this format, or one procedure to a page should more detail be required. The procedures outlined below should be verified for accuracy, and may be modified to meet your specific requirements.
   c. Description of Test: AHU Alarm Checkout. Verify AHU-1 discharge air temperature alarming is operational and is received at the designated terminal.
   d. Input to Trigger Test: Change discharge temperature high alarm limit through software to a value below the current discharge temperature (discharge temperature - 10°F).
   e. Expected Outcome: A high temperature alarm will be received per the

Alarm Definition Report at its designated terminal.

f. Provide signoff sheet with indication for test Pass, Fail, Date of test and Initials for signoff.
g. Setup and verify all remote notification alarms.
h. Setup and verify all trending.

8. Server/Workstation checkout:
   a. Verify the operation of all trunk interface equipment.
   b. Verify all workstation software, including options, based upon the installation instructions for the PC.
   c. Perform software backup (site, options, etc.)
   d. Complete workstation configuration report for owner signoff.
   e. Provide verification that all graphics have been created, as required by project bid documents.
   f. Verify there are adequate user licenses for both online and offline accounts.
9. All actuators shall be marked with direction of rotation upon system startup.
10. Provide a check out list which indicated each point has been tested as previously described. The list shall be signed and dated by person who performed testing.

3.19 TESTING AND ACCEPTANCE

A. General:
   1. After completion of installation and start-up procedures, commence the specified 3-phase verification and testing sequence leading to final acceptance.
      a. Follow in the order specified.
      b. Each testing phase shall be satisfactorily completed before entering the next phase.
   2. Prior to entering each phase of the sequence, submit for approval, a written agenda describing in detail the procedure to be followed to meet the requirements for each specified verification, test or demonstration.
   3. Submit for approval, a sample of the form on which the test will be reported.
      a. Identify project.
      b. Provide a list of all points, arrange in numerical order of point addresses.
         1) Show point descriptor and location of each.
         2) Indicate DDC panel that processes each point.
         3) Use the list as a basis for the specified report form.
      c. Signatures of participants and observers.
      d. Results.
      e. Description of adjustment or corrections of points in error.
      f. Date.
   4. Provide schedule of tests. Estimate dates of significant events.
   5. Test, calibrate and adjust each point in the system as specified.
   6. Provide dated documentation of all tests and verifications as specified.
   7. Provide dated trend reports indicating proper control of all points for an extended period of time.

B. Phase 1 - Testing, Calibrating, and Adjusting:
   1. Operate each analog point in the entire system.
      a. At a point in the upper quarter of its range.
      b. At a point in the lower quarter of its range.
      c. At its operating point.
   2. Provide personnel and diagnostic instruments at both the central and remote locations.
   3. Provide testing stimulants for alarms.
   4. Use digital meters of double the accuracy of the instruments being calibrated.
   5. Provide an approved test device for simulating high and low temperatures.

6. When the function is performed, read values at the central control and observe the actual function at the field instrument.
7. Exercise each binary point and observe indication at console and simultaneously observe operation in the field.
8. Submit an operation report for each point in the system, in approved format, and describe any corrective or adjusting action taken.
9. Test all power transducers with a Dranetz Power Analyzer.
10. Provide PID loop demonstration to owner and provide PID loop tuning if demonstration shows tuning is not within an acceptable range to owner.

C. Phase 2 - Equipment and Point Verification:
1. Verify calibration or function of each point.
   a. Verify analog points at operating value.
   b. Record on specified form.
   c. Make approved adjustments to out of tolerance points.
      1) Identify these points for ready reference.
2. After verification procedure in completed:
   a. Verify corrected points.
   b. Record on specified form.
   c. Points requiring correction.
      1) Replace sensor or actuator if electrical measurements indicated components are out of specified tolerance.

D. Phase 3 - Software Verification:
1. Submit agenda and report format for software demonstrations.
2. Demonstrate to the Owner and the Engineer that all software programs and automatic control sequences function as specified.
3. Demonstrate compliance with response time specifications.
   a. Simulate normal heavy load conditions.
   b. Initiate at least ten successive occurrences on normal heavy load conditions as specified, and measure response time of typical alarms and status changes.
4. Provide written documentation of demonstration, signed by representatives of the Contractor and Engineer.

E. Provide the following reports to Engineer at final completion of all Testing:
1. List of all points.
2. List of all trended points and trend intervals
2. List of all points currently in alarm.
3. List of all disabled points.
4. List of all points in over-ride status.
5. List of all points currently locked out.
6. List of user accounts and access levels.
7. List all weekly schedules.
8. List all School Dude schedules.
9. List of holiday programming schedules.
10. List of limits and deadbands.
11. System diagnostics reports including, list of DDC panels on line and communicating, status of all DDC terminal units' device points.
12. List of programs.
13. Provide trend data reports to ensure proper operation and sequence control of BMCS.

3.20 TRAINING

A. All district training needs will be arranged by Klein ISD separate from this project scope of work.

3.21 PROJECT MANAGEMENT

A. Provide a designated project manager with a minimum of 5 years' experience in the related field who will be responsible for the following:
   1. Construct and maintain project schedule.
   2. Authorized to accept and execute orders or instructions from General Contractor, Owner and Engineer.
   3. Attend project meetings as necessary to avoid conflict and delays.
   4. Make necessary field decisions relating to this section.
   5. Coordination / Single point contact.
   6. Have Internet access for project management.

END OF SECTION

KISD 2025 FRP

KLEIN ISD

ABBREVIATIONS

A

A.F.F.	ABOVE FINISH FLOOR
A.C.T.	ACOUSTICAL CEILING TILE
ADDL.	ADDITIONAL
A.B.	AIR BARRIER
A.C.M.	ALUMINUM COMPOSITE PANEL
A.D.A.	AMERICANS WITH DISABILITIES ACT
AL./ALUM.	ALUMINUM
APPROX.	APPROXIMATE OR APPROXIMATELY
ARCH.	ARCHITECT OR ARCHITECTURAL
A.W.R.B.	AIR- & WATER-RESISTIVE BARRIER

B

BD.	BOARD
B.O.W.	BOTTOM OF WALL
B.U.R.	BUILT-UP ROOFING
BLDG.	BUILDING

C

℄	CENTER LINE
C.R.	CLASSROOM
C.F.S.	COLD-FORMED STEEL
CONC.	CONCRETE
CMU	CONCRETE MASONRY UNIT
C.M.	CONSTRUCTION MANAGER
CONT.	CONTINUOUS
C.I.	CONTINUOUS INSULATION
C.J.	CONTROL JOINT
COORD.	COORDINATE
CORR.	CORRIDOR

D

DIA.	DIAMETER
D.O.	DOOR OPENING
DN.	DOWN
DS.	DOWNSPOUT

E

EA.	EACH
E.W.	EACH WAY
ELEC.	ELECTRICAL
E.W.C.	ELECTRIC WATER COOLER
ELEV.	ELEVATION
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
E.J.	EXPANSION JOINT
EXT.	EXTERIOR
EIFS	EXTERIOR INSULATION & FINISH SYSTEM

F

FT.	FEET or FOOT
F.R.P.	FIBERGLASS REINFORCED PLASTIC
F.V.	FIELD-VERIFY
FIN.	FINISH
F.F.	FINISH FLOOR
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER & CABINET
F.H.C.	FIRE HOSE CABINET
F.H.C.S.	FLAT-HEAD COUNTERSUNK
FLR.	FLOOR
F.D.	FLOOR DRAIN
FLUOR.	FLUORESCENT

G / H

GALV.	GALVANIZED
GA.	GAGE
G.C.	GENERAL CONTRACTOR
G.O.	GLAZED OPENING
GYP	GYPSUM
HT.	HEIGHT
H.P.	HIGH POINT
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
H.B.	HORIZONTAL BLINDS
H.D.G.	HOT-DIP GALVANIZED
HR.	HOUR

I / J / K

I.D.	INSIDE DIAMETER
INSUL.	INSULATION
INT.	INTERIOR
I.B.C.	INTERNATIONAL BUILDING CODE

L

LAV.	LAVATORY
L.L.H.	LONG LEG HORIZONTAL
L.L.V.	LONG LEG VERTICAL
L.P.	LOW POINT
L.V.T.	LUXURY VINYL TILE

M

MFR.	MANUFACTURER
MFG.	MANUFACTURING
M.B.	MARKERBOARD
M.O.	MASONRY OPENING
MAX.	MAXIMUM
MECH.	MECHANICAL

M (CONT.)

MOD BIT	MODIFIED BITUMEN
MULL.	MULLION
M.E.P.	MECHANICAL-ELECTRICAL-PLUMBING
M.C.M.	METAL COMPOSITE MATERIAL
MIN.	MINIMUM
MISC.	MISCELLANEOUS

N

NOM.	NOMINAL
N/A	NOT APPLICABLE
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO. or #	NUMBER

O

O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.H.	OPPOSITE HAND
OHD.	OVERHEAD
O.F.C.I.	OWNER-FURNISHED, CONTRACTOR-INSTALLED
O.F.O.I.	OWNER-FURNISHED, OWNER INSTALLED

P / Q

PR.	PAIR
P.LAM.	PLASTIC LAMINATE
PL.	PLATE
PLUMB.	PLUMBING
PT.	POINT
P.C.F.	POUNDS PER CUBIC FOOT
P.S.F.	POUNDS PER SQUARE FOOT
P.S.I.	POUNDS PER SQUARE INCH
PREFAB.	PREFABRICATED
PROJ.	PROJECTOR or PROJECTION
Q.T.	QUARRY TILE

R

R.	RADIUS
REBAR	REINFORCING BAR
REF.	REFERENCE or REFER TO
R.C.P.	REFLECTED CEILING PLAN
RE:	REGARDING
REFG.	REFRIGERATOR
REINF.	REINFORCE or REINFORCING
REQD.	REQUIRED
R.	RISER (STAIR)
R.D.	ROOF DRAIN
R.O.	ROUGH OPENING

S

SIM.	SIMILAR
S.C.	SOLID CORE
S.A.B	SOUND ATTENUATION BLANKET
S.A.F.B.	SOUND ATTENUATION FIRE BLANKET
S.T.C.	SOUND TRANSMISSION CLASS
SPEC.	SPECIFICATION
SQ.	SQUARE
S.F.	SQUARE FOOT
S.S.	STAINLESS STEEL
STRUC.	STRUCTURAL
SUSP.	SUSPENDED

T

T.S.	TACKSTRIP
T.W.	TACK WALL
T.C.	TEACHER'S CABINET
T.A.S.	TEXAS ACCESSIBILITY STANDARDS
T.	TREAD (STAIR)
T&B	TOP & BOTTOM
T.O.	TOP OF
T.C.	TOP OF CURB
T.O.D.	TOP OF DECK
T.O.J.	TOP OF JOIST
T.O.S.	TOP OF STEEL
T.O.W.	TOP OF WALL
TYP.	TYPICAL

U / V

U/C	UNDER COUNTER
U.L.	UNDERWRITERS LABORATORY
U.N.O.	UNLESS NOTED OTHERWISE
V.I.F.	VERIFY IN FIELD
VERT.	VERTICAL
V.C.T.	VINYL COMPOSITION TILE
V.W.C.	VINYL WALL COVERING

W / X / Y / Z

W.C.	WATER CLOSET
W.R.B.	WATER-RESISTIVE BARRIER
WT.	WEIGHT
W.	WIDE
W/	WITH
W/O	WITHOUT
W.P.	WORKING POINT
W.W.F.	WELDED WIRE FABRIC

SYMBOLS LEGEND

- ROOM NAME / A101 — ROOM NAME & NUMBER
- A101 — DOOR NUMBER
- AC — ACCESS CONTROL
- HB — HORIZONTAL BLINDS
- X1 — DEMOLITION KEYNOTE
- XXX-01 — BUILDING ASSEMBLY TYPE
- 1 / A101 — BUILDING SECTION
- 1 / A101 — WALL SECTION
- 1 / A101 — DETAIL CALLOUT
- DATUM ELEVATION
- SXX — ALUMINUM-FRAMED GLAZED OPENING SYSTEM
- G.O. 1 — HOLLOW METAL-FRAMED GLAZED OPENING SYSTEM
- LOUVER
- P1 — PARTITION TYPE
- X1 — ACCESSORY OR SPECIALTY ITEM
- XXX — PLUMBING FIXTURE/ EQUIPMENT
- 1/ A101 — INTERIOR ELEVATION/ CASEWORK ELEVATION
- 1/ A101 — DETAIL SECTION
- A101 — BUILDING ELEVATION
- N — NORTH ARROW

MATERIAL LEGEND

- EARTH
- POROUS FILL
- CONCRETE/ GROUT
- BRICK
- CMU (LARGE SCALE)
- MARBLE
- METAL (LARGE SCALE)
- METAL (SMALL SCALE)
- RESILIENT FLOORING
- ACOUSTICAL TILE
- TERRAZZO
- PLASTER, SAND, GROUT, GYPSUM BOARD
- CERAMIC TILE
- GLASS (LARGE SCALE)
- INSULATION (RIGID FOAM BOARD)
- INSULATION (EPS FOAM BOARD)
- INSULATION (BATT/ BLANKET)
- INSULATION (SEMI-RIGID BOARD)
- WOOD, ROUGH (CONTINUOUS)
- WOOD, ROUGH (BLOCKING)
- WOOD, FINISH
- PLYWOOD (LARGE SCALE)
- FIBER CEMENT PANEL
- METAL LATH
- GYPSUM BOARD

PROJECT INFORMATION

PROJECT NAME

KISD 2025 FRP

OWNER

KLEIN I.S.D.

PROJECT LOCATION

SEE SITE LOCATION MAPS

TDLR PROJECT REGISTRATION NUMBER:

TABSXXXXXXXX (TO BE DECIDED)

BUILDING CONSTRUCTION INFORMATION

TYPE OF CONSTRUCTION (TABLE 601 - IBC): TYPE I-B

FIRE PROTECTION SYSTEM: AUTOMATIC SPRINKLER SYSTEM THROUGHOUT

APPROXIMATE BUILDING AREAS

EILAND ELEMENTARY SCHOOL

GROUND LEVEL AREA.:	61,085 S.F.
UPPER LEVEL AREA.:	23,798 S.F.
GYMNASIUM AREA.:	7,590 S.F.
TOTAL BLDG AREA.:	92,473 S.F.
LEGAL DESCRIPTION:	RES A BLOCK 1

GRACE ENGLAND ECC

TOTAL BLDG AREA.:	67,738 S.F.
LEGAL DESCRIPTION:	RES A BLOCK 1

APPROXIMATE BUILDING AREAS

KAISER ELEMENTARY

GROUND LEVEL AREA.:	100,046 S.F.
GYMNASIUM AREA.:	7,502 S.F.
TOTAL BLDG AREA.:	107,548 S.F.
LEGAL DESCRIPTION:	TR 2P ABST 262 J FARWELL

KLENK ELEMENTARY SCHOOL

GROUND LEVEL AREA.:	80,361 S.F.
GYMNASIUM AREA.:	7,571 S.F.
TOTAL BLDG AREA.:	87,932 S.F.

MCDOUGLE ELEMENTARY SCHOOL

GROUND LEVEL AREA.:	85,323 S.F.
GYMNASIUM AREA.:	7,473 S.F.
TOTAL BLDG AREA.:	92,796 S.F.

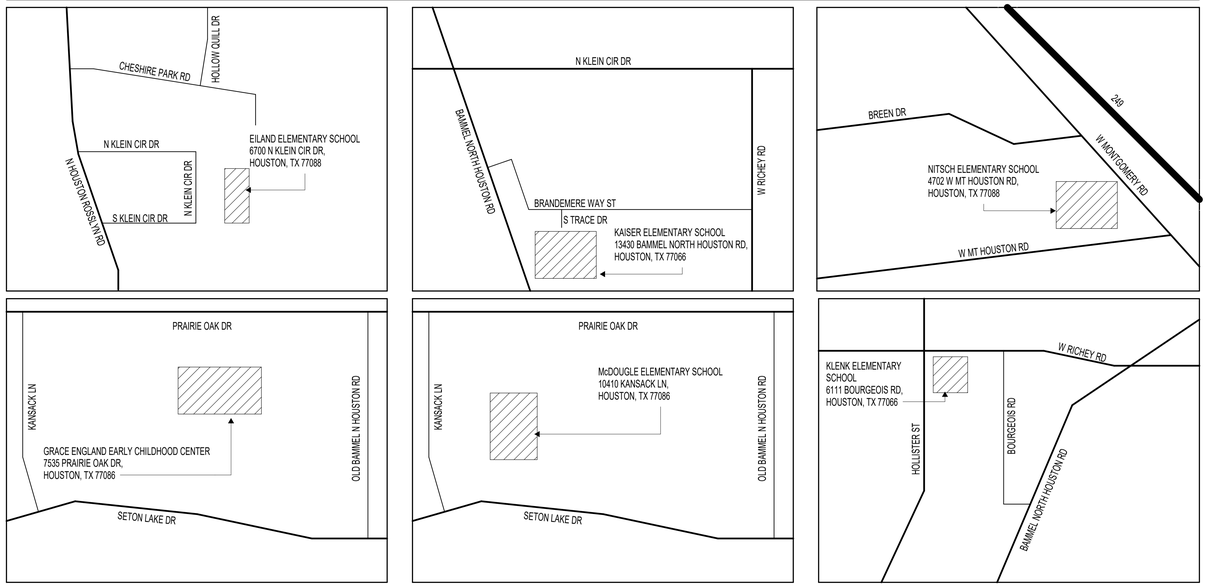
NITSCH ELEMENTARY SCHOOL

GROUND LEVEL AREA.:	83,658 S.F.
GYMNASIUM AREA.:	7,791 S.F.
TOTAL BLDG AREA.:	91,449 S.F.

GENERAL NOTES

1. Refer to the CODE-series sheets tor Code Information, Design Criteria and Fire Protection Requirements.
2. Verify and document existing dimensions and conditions at the site before beginning construction. Notify the Architect of conflicts or variations prior to commencement of construction.
3. Based on the applicable design criteria, submit Shop Drawings of the proposed pattern of control joints in masonry veneer, CMU, gypsum board, plaster and stucco to the Architect for review and approval prior to construction.
4. In case of discrepancies in or between the Contract Documents, the greater quantity or better quality shall be bid. Clarifications regarding the discrepancies shall be requested from the Architect prior to construction, and the resulting interpretations implemented in accordance with the Contract Documents.

SITE LOCATION MAP



INDEX OF DRAWINGS

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Salas O' Brien
10930 W Sam Houston Pkwy N #900
Houston, Texas 77064
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www.salasobrien.com

TECHNOLOGY

PMY
2000 West Loop South
Houston, Texas 77027
Main Phone: 888.650.4580
www.pmygroup.com

FOOD SERVICE

Surcana FSD
7430 Fairbanks N Houston Rd.
Houston, Texas 77040
Main Phone: 832.444.6311
www.surcanafsd.com

REGISTERED ARCHITECT
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26313
STATE OF TEXAS

02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum No. 2	02/18/2026

Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.

25-0225.00

SHEET TITLE

INDEX OF DRAWINGS, GENERAL NOTES & ABBREVIATIONS

SHEET NO.

KISD 2025 FRP

INDEX

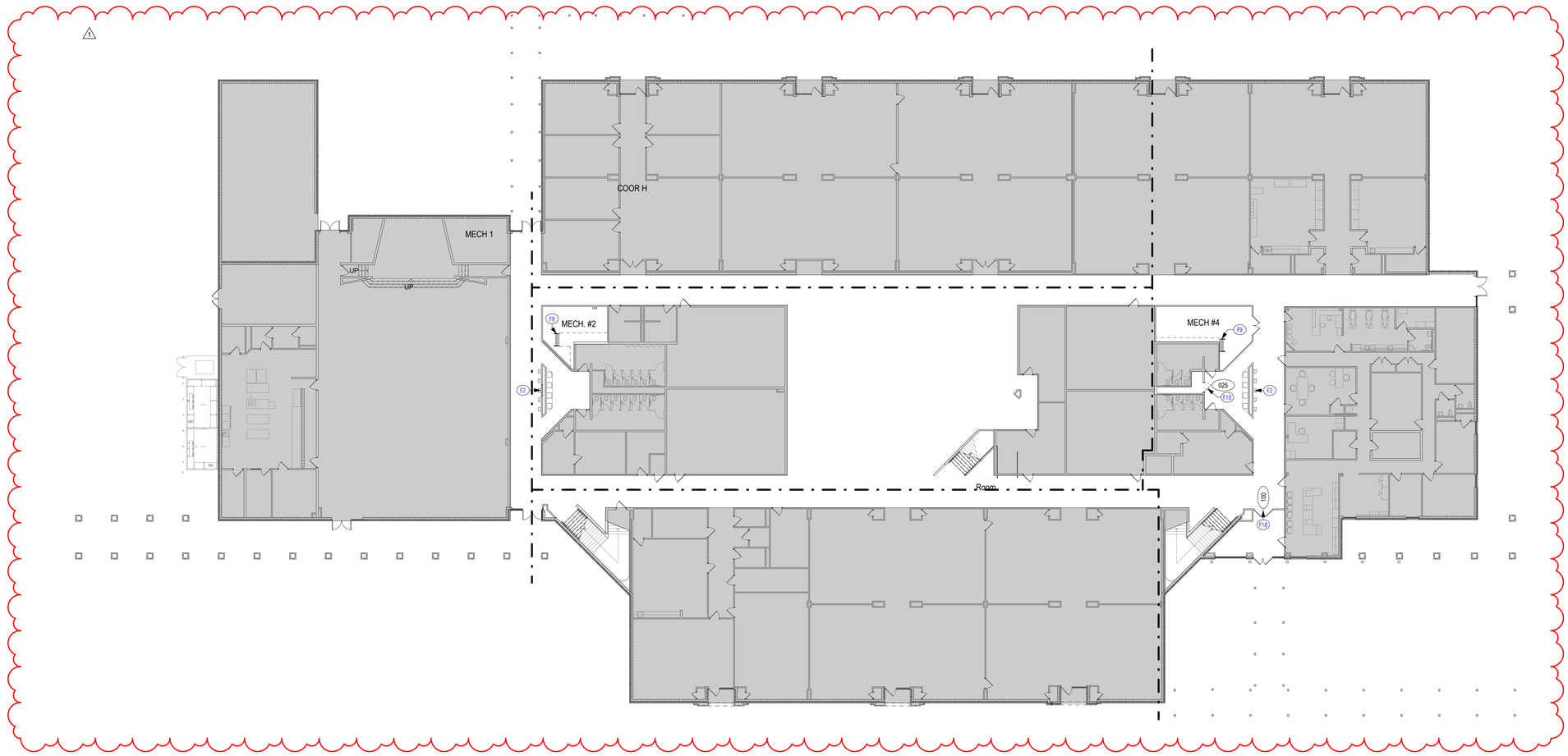
DEMOLITION NOTES

1. Drawings show the general extent of demolition work, however it is impractical to indicate or note every item of demolition. Any items shown dashed are to be removed to make way for new construction, unless noted otherwise.
2. Existing materials containing asbestos to be removed under separate contract prior to construction by Owner's asbestos abatement contractor.
3. Contact the Owner prior to the start of demolition to determine items to be salvaged and returned to Owner.
4. Protect items to remain from damage during demolition.
5. Properly protect and store items to be removed and reinstalled or relocated.
6. Repair or replace at no cost to the Owner any damages to the existing building and site as a result of construction activities.
7. Refer to electrical and mechanical demolition plan for additional information.
8. Patch/repair flooring to match existing at all removed or demolished doors, windows, walls, millwork, lockers and similar items.

GENERAL KEYNOTE LEGEND

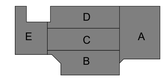
1. ALL EXISTING PUBLIC ANNOUNCMENT (PA) HEADS TO BE REMOVED AND PREP SURFACE FOR INSTALL OF NEW SYSTEM.
2. ALL EXISTING FIRE ALARMS TO BE REMOVED AND PREP SURFACE FOR INSTALL OF NEW SYSTEM.

Keynote Legend	
Key Value	Keynote Text
F2	REMOVE & REPLACE DRINKING FOUNTAIN. REF: PLUMBING.
F9	REMOVE AND REINSTALL HANDRAILS FROM SHIPS LADDER & MEZZANINE FOR INSTALL OF AHU AS NEEDED.
F10	REMOVE EXISTING H.M. DOOR FRAME AND PREP AREA FOR INSTALLATION OF DOOR FRAME AS SCHEDULED. EXISTING P-LAM DOOR TO BE REMOVED AND REINSTALLED; SALVAGE ALL HARDWARE FOR REUSE, REPLACE DOOR HINGES.
F18	REMOVE EXISTING H.M. DOOR FRAME & DOOR. PREP AREA FOR INSTALLATION OF DOOR FRAME, DOOR, & HARDWARE AS SCHEDULED.



N
PLAN NORTH
TRUE NORTH

1 EILAND - OVERALL DEMO FLOOR PLAN - LEVEL 1
SCALE: 1/16" = 1'-0"



KEY PLAN

VLK

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02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum No. 2	02/18/2026

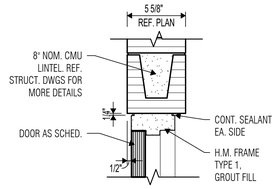
Project Director: MEF
Project Architect: MG
Project Designer: MG
Drawn By: VLK

PROJECT NO.
25-0225.00

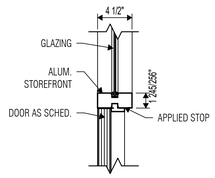
SHEET TITLE
EILAND - OVERALL DEMO PLAN - LEVEL ONE

SHEET NO.
A12.01

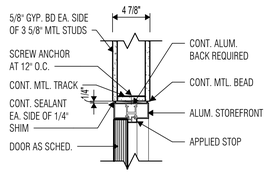
KISD 2025 FRP



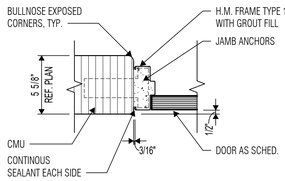
8 HEAD DETAIL H.M.
SCALE: 1 1/2" = 1'-0"



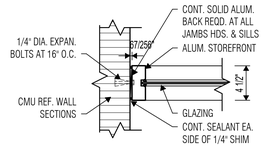
9 STOREFRONT HEAD DETAIL
SCALE: 1 1/2" = 1'-0"



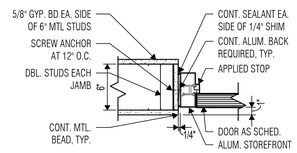
10 HEAD DETAIL ALUM.
SCALE: 1 1/2" = 1'-0"



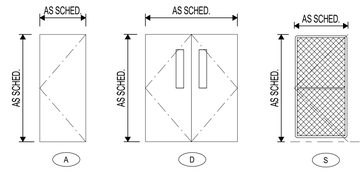
4 JAMB DETAIL H.M.
SCALE: 1 1/2" = 1'-0"



5 STOREFRONT JAMB DETAIL
SCALE: 1 1/2" = 1'-0"



6 JAMB DETAIL ALUM.
SCALE: 1 1/2" = 1'-0"



7 DOOR TYPES
SCALE: 1/4" = 1'-0"

EILAND - DOOR SCHEDULE

DOOR NO.	DOOR TYPE	DOOR MATERIAL	FRAME TYPE	DOOR OPENING WIDTH	DOOR OPENING HEIGHT	DETAIL - REF. A7.11 U.N.O. HEAD	DETAIL - REF. A7.11 U.N.O. JAMB	DETAIL - REF. A7.11 U.N.O. SILL	FIRE RATING	HARDWARE SET	KEYNOTES	REMARKS
025	A	4	HM	3'-0"	7'-0"	4/A19.11	5/A19.11			E 1.0 ⚠1		EXISTING P-LAM DOOR TO BE REMOVED AND REINSTALLED; SALVAGE ALL HARDWARE FOR REUSE, REPLACE DOOR HINGES
50	A	4	HM	4'-0"	7'-0"	8/A19.11	9/A19.11			E 3.0		
100	D	4	HM	6'-0"	7'-0"	6/A19.11	7/A19.11			E 2.0		
115	A	4	HM	3'-0"	7'-0"	4/A19.11	5/A19.11			E 1.0		EXISTING P-LAM DOOR TO BE REMOVED AND REINSTALLED; SALVAGE ALL HARDWARE FOR REUSE, REPLACE DOOR HINGES
120	S	-	-	4'-0"	7'-0"	-	-	-		E 4.0		CHAINLINK

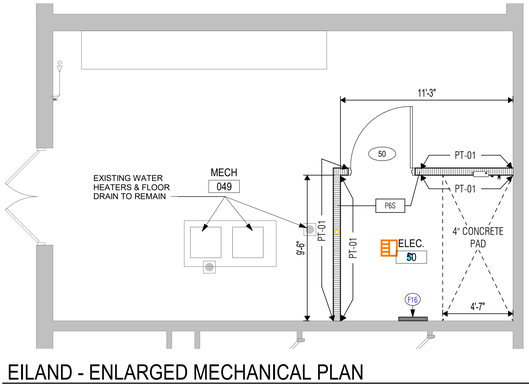
Keynote Legend	
Key Value	Keynote Text
A11	INSTALLATION OF DRINKING FOUNTAIN (W/BOTTLE FILLER).
F9	REMOVE AND REINSTALL HANDRAILS FROM SHIPS LADDER & MEZZANINE FOR INSTALL OF AHU AS NEEDED.
F16	REMOVE EXISTING RACK UNIT. REF: ELECTRICAL

DOOR SCHEDULE KEYNOTES

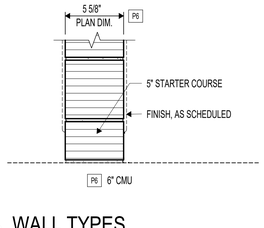
KEY NUMBER	KEYED NOTES
DS7	Access Control / Card Reader

DOOR MATERIAL NOTES

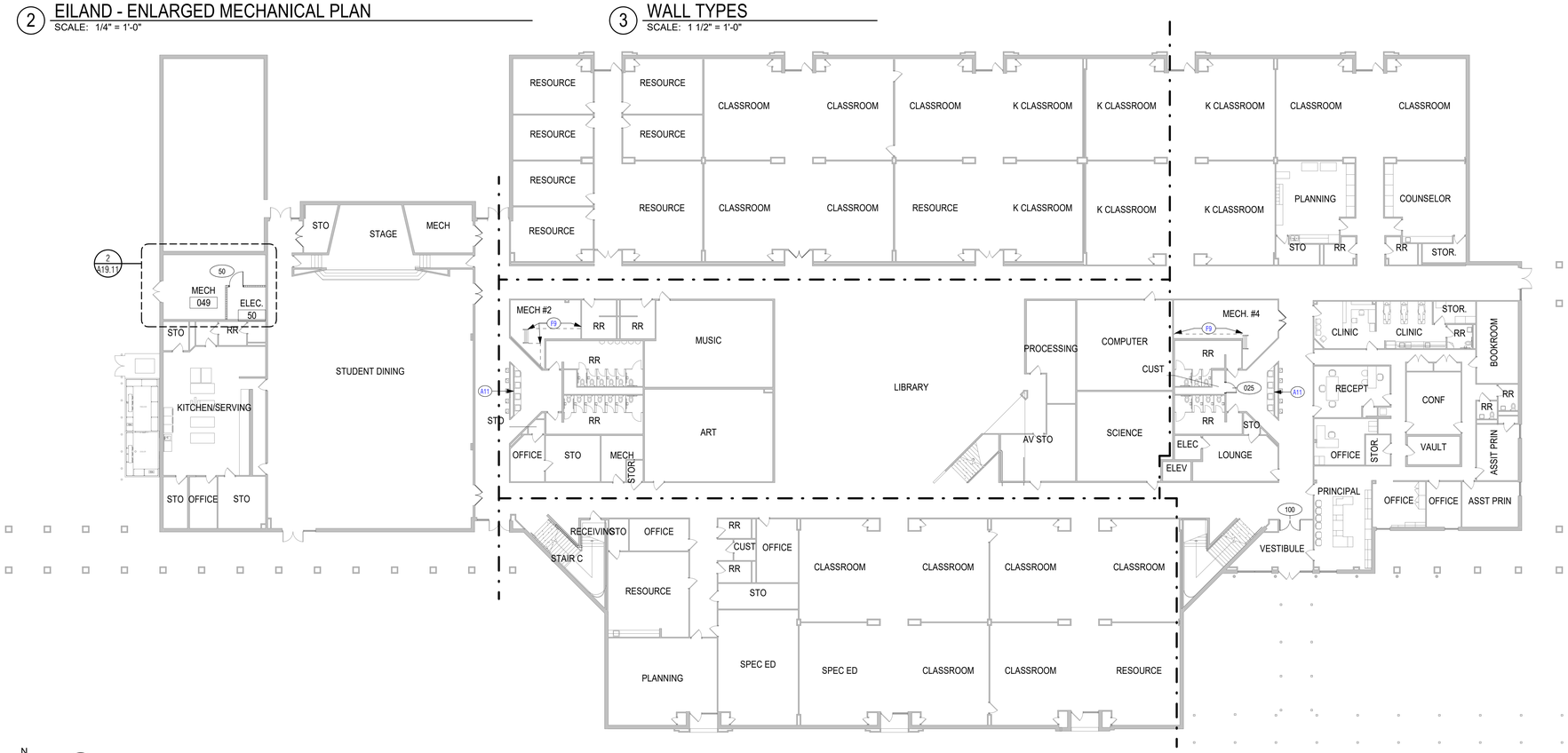
MARK	PANEL MATERIAL
1	Plastic Laminate
4	Painted Hollow Metal



2 EILAND - ENLARGED MECHANICAL PLAN
SCALE: 1/4" = 1'-0"



3 WALL TYPES
SCALE: 1 1/2" = 1'-0"



1 EILAND - OVERALL INTERIOR FINISH PLAN - LEVEL ONE
SCALE: 1/16" = 1'-0"

N
PLAN NORTH
TRUE NORTH

KEY PLAN

VLK

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02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum No. 2	02/18/2026

Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

SHEET TITLE
EILAND - INTERIOR OVERALL FINISH PLAN - LEVEL ONE

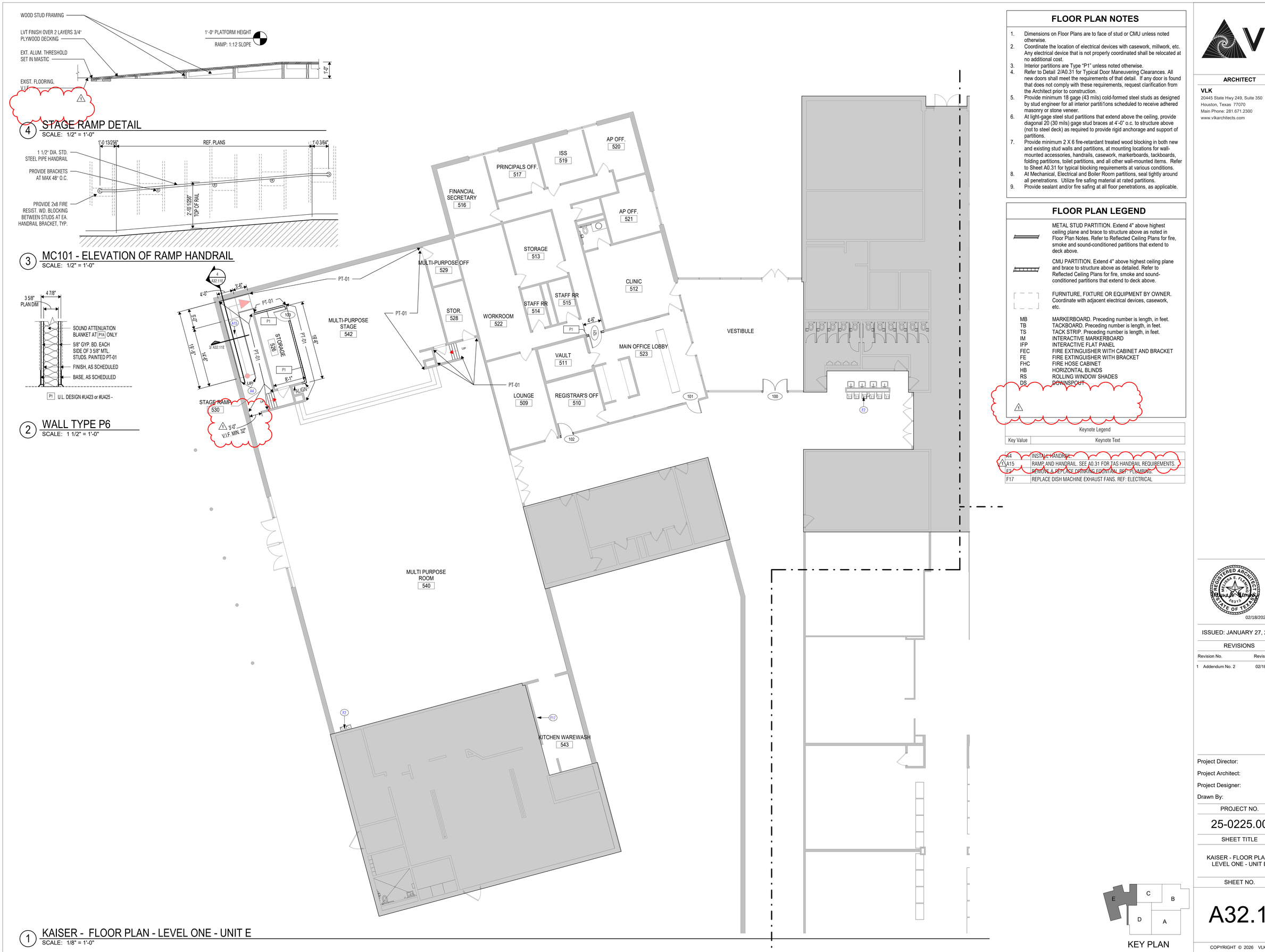
SHEET NO.
A19.11

KISD 2025 FRP

4 STAGE RAMP DETAIL
SCALE: 1/2" = 1'-0"

3 MC101 - ELEVATION OF RAMP HANDRAIL
SCALE: 1/2" = 1'-0"

2 WALL TYPE P6
SCALE: 1 1/2" = 1'-0"



1 KAISER - FLOOR PLAN - LEVEL ONE - UNIT E
SCALE: 1/8" = 1'-0"

FLOOR PLAN NOTES

1. Dimensions on Floor Plans are to face of stud or CMU unless noted otherwise.
2. Coordinate the location of electrical devices with casework, millwork, etc. Any electrical device that is not properly coordinated shall be relocated at no additional cost.
3. Interior partitions are Type "P1" unless noted otherwise.
4. Refer to Detail 2/A0.31 for Typical Door Maneuvering Clearances. All new doors shall meet the requirements of that detail. If any door is found that does not comply with these requirements, request clarification from the Architect prior to construction.
5. Provide minimum 18 gage (43 mils) cold-formed steel studs as designed by stud engineer for all interior partiti1ons scheduled to receive adhered masonry or stone veneer.
6. At light-gage steel stud partitions that extend above the ceiling, provide diagonal 20 (30 mils) gage stud braces at 4'-0" o.c. to structure above (not to steel deck) as required to provide rigid anchorage and support of partitions.
7. Provide minimum 2 X 6 fire-retardant treated wood blocking in both new and existing stud walls and partitions, at mounting locations for wall-mounted accessories, handrails, casework, markerboards, tackboards, folding partitions, toilet partitions, and all other wall-mounted items. Refer to Sheet A0.31 for typical blocking requirements at various conditions.
8. At Mechanical, Electrical and Boiler Room partitions, seal tightly around all penetrations. Utilize fire safing material at rated partitions.
9. Provide sealant and/or fire safing at all floor penetrations, as applicable.

FLOOR PLAN LEGEND

METAL STUD PARTITION. Extend 4" above highest ceiling plane and brace to structure above as noted in Floor Plan Notes. Refer to Reflected Ceiling Plans for fire, smoke and sound-conditioned partitions that extend to deck above.

CMU PARTITION. Extend 4" above highest ceiling plane and brace to structure above as detailed. Refer to Reflected Ceiling Plans for fire, smoke and sound-conditioned partitions that extend to deck above.

FURNITURE, FIXTURE OR EQUIPMENT BY OWNER. Coordinate with adjacent electrical devices, casework, etc.

MB	MARKERBOARD. Preceding number is length, in feet.
TB	TACKBOARD. Preceding number is length, in feet.
TS	TACK STRIP. Preceding number is length, in feet.
IM	INTERACTIVE MARKERBOARD
IFP	INTERACTIVE FLAT PANEL
FEC	FIRE EXTINGUISHER WITH CABINET AND BRACKET
FE	FIRE EXTINGUISHER WITH BRACKET
FHC	FIRE HOSE CABINET
HB	HORIZONTAL BLINDS
RS	ROLLING WINDOW SHADES
DS	DOWNSPOUT

1

Keynote Legend	
Key Value	Keynote Text
A4	INSTALL HANDRAIL
1 A15	RAMP AND HANDRAIL. SEE A0.31 FOR TAS HANDRAIL REQUIREMENTS.
F2	REMOVE & REPLACE DRINKING FOUNTAIN. REF. PLUMBING
F17	REPLACE DISH MACHINE EXHAUST FANS. REF. ELECTRICAL

KEY PLAN

VLK

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KLEIN ISD
KLEIN, TX

REGISTERED ARCHITECT MELISSA F. FLEMING 28313 STATE OF TEXAS

02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum No. 2	02/18/2026

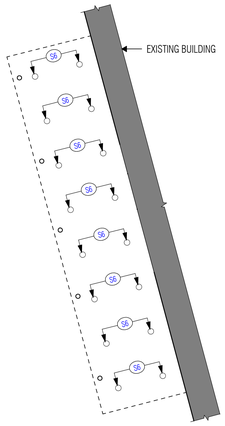
Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

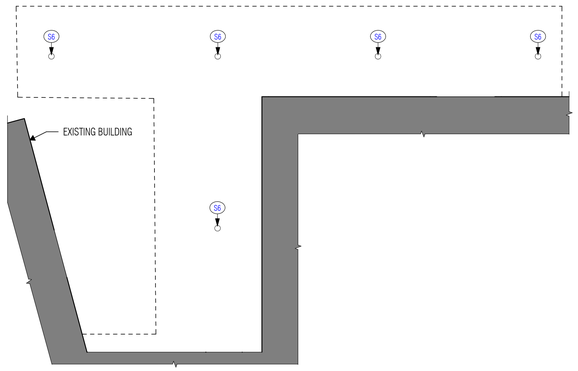
SHEET TITLE
KAISER - FLOOR PLAN - LEVEL ONE - UNIT E

SHEET NO.
A32.11E

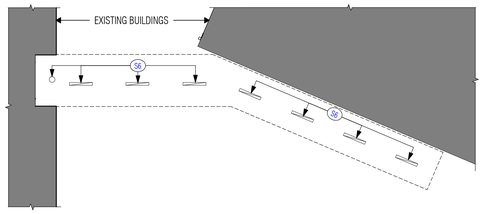
KISD 2025 FRP



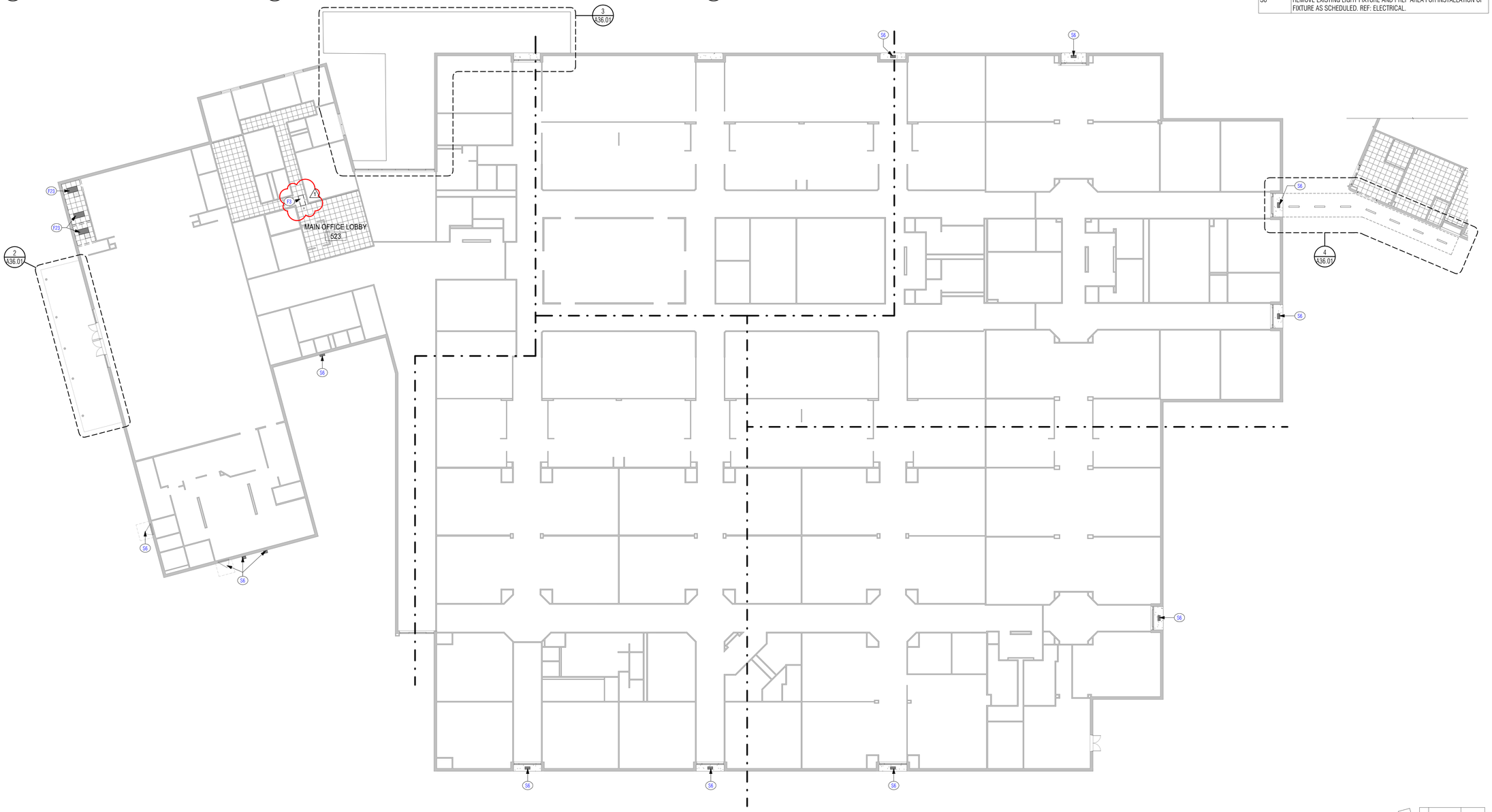
2 KAISER - SOFFIT 1
SCALE: 3/32" = 1'-0"



3 KAISER - SOFFIT 2
SCALE: 3/32" = 1'-0"



4 KAISER - CANOPY 1
SCALE: 3/32" = 1'-0"



1 KAISER - DEMO REFLECTED CEILING PLAN - LEVEL ONE
SCALE: 1/16" = 1'-0"

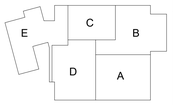
DEMOLITION NOTES

1. Drawings show the general extent of demolition work, however it is impractical to indicate or note every item of demolition. Any items shown dashed are to be removed to make way for new construction, unless noted otherwise.
2. Existing materials containing asbestos to be removed under separate contract prior to construction by Owner's asbestos abatement contractor.
3. Contact the Owner prior to the start of demolition to determine items to be salvaged and returned to Owner.
4. Protect items to remain from damage during demolition.
5. Properly protect and store items to be removed and reinstalled or relocated.
6. Repair or replace at no cost to the Owner any damages to the existing building and site as a result of construction activities.
7. Refer to electrical and mechanical demolition plan for additional information.
8. Patch/repair flooring to match existing at all removed or demolished doors, windows, walls, millwork, lockers and similar items.

GENERAL KEYNOTE LEGEND

1. ALL EXISTING PUBLIC ANNOUNCMENT (PA) HEADS TO BE REMOVED AND PREP SURFACE FOR INSTALL OF NEW SYSTEM.

Keynote Legend	
Key Value	Keynote Text
F3	EXISTING LIGHT TO BE REMOVED AND REINSTALLED.
F23	REMOVE CEILING TILE AND GRID. EXISTING LIGHT FIXTURES TO BE REMOVED AND REINSTALLED. HVAC GRILLES TO REMIAN
S6	REMOVE EXISTING LIGHT FIXTURE AND PREP AREA FOR INSTALLATION OF FIXTURE AS SCHEDULED. REF: ELECTRICAL.



KEY PLAN

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02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum No. 2	02/18/2026

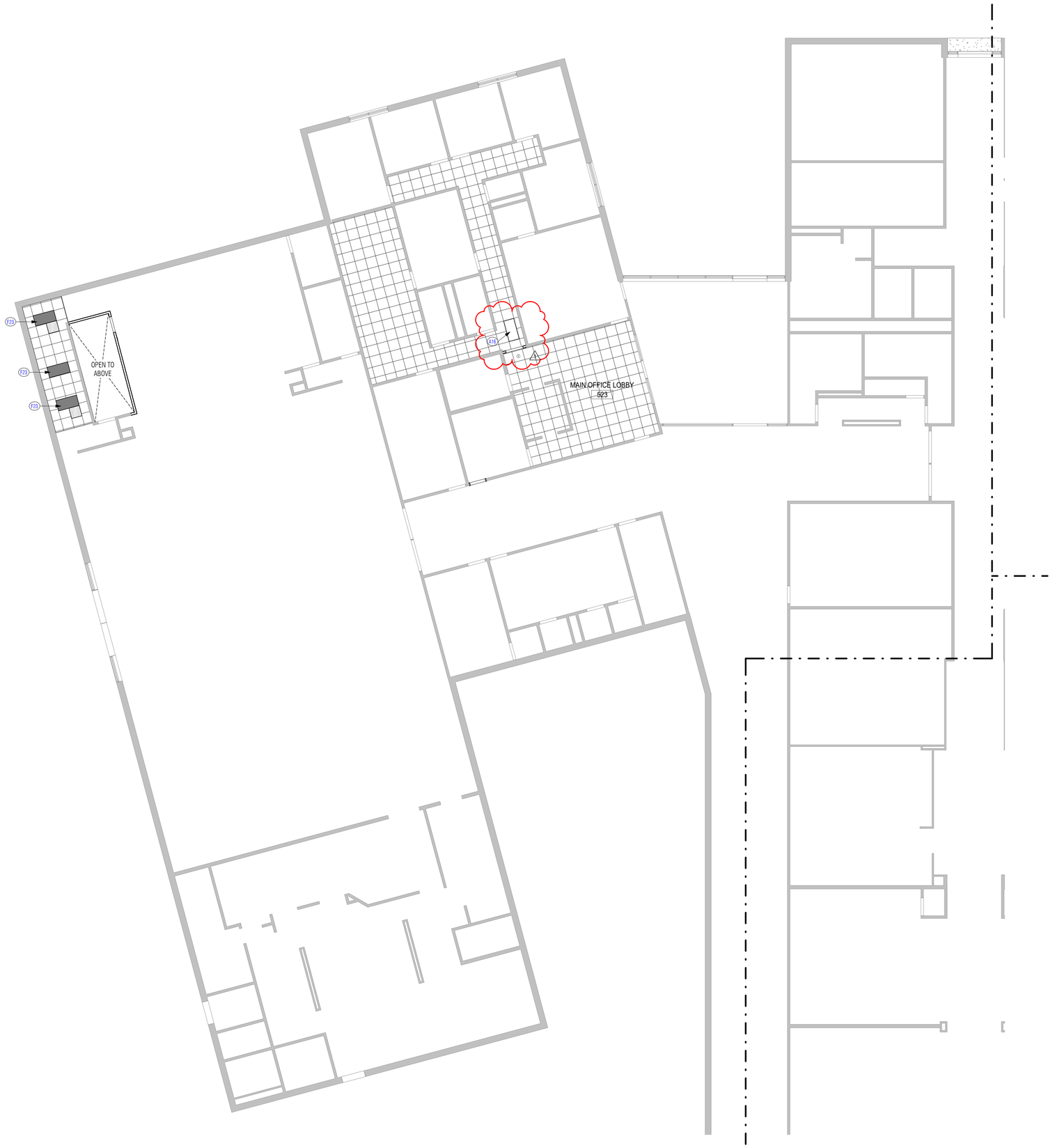
Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

SHEET TITLE
KAISER - DEMO REFLECTED CEILING PLANS - LEVEL ONE

SHEET NO.
A36.01

KISD 2025 FRP



1 KAISER - REFLECTED CEILING PLAN - LEVEL ONE
SCALE: 1/8" = 1'-0"

REFLECTED CEILING PLAN NOTES

1. All ceiling heights shall be [9'-1 1/8"] [8'-11 3/4"] [other] A.F.F. unless noted otherwise.
2. Refer to Detail -/--- for Typical Gypsum Board Ceiling Control Joint Detail.
3. Refer to Detail -/--- for Typical Plaster Ceiling Control Joint Detail.
4. Provide vented reveals at perimeter of all non-insulated exterior plaster soffits. Provide venting strips or perforated panels at perimeter of all non-insulated metal panel soffits (refer to Detail -/---). Venting at non-insulated soffits shall be provided whether specifically indicated on the drawings or not.
5. Provide partition to deck (PTD) at walls surrounding spaces with exposed structure. Refer to Reflected Ceiling Plan Legend for PTD requirements.
6. Provide hold-down clips for all acoustic lay-in ceiling panels at vestibules, at sloped ceilings, at fire-rated ceilings, and within 6 feet of exterior doors without vestibules.
7. At ceiling furring details, the suspended assemblies, bracing, blocking, etc. shown on the details are for schematic representation only. Provide stable, secure and permanent assemblies at these locations in accordance with recommended light-gage steel framing installation practices.
8. At partitions that do not extend to deck above, extend partition 4" minimum above highest adjacent ceiling and brace per Floor Plan Legend and Floor Plan Notes.

REFLECTED CEILING PLAN LEGEND

PYRAMID CEILING DIFFUSER PANELS (SIZE)

H.V.A.C. SUPPLY & RETURN GRILLES
Shown for location purposes only. Refer to Mechanical Drawings.

LIGHT FIXTURES. Refer to Electrical Drawings.

1-HOUR FIRE BARRIER PARTITION

2-HOUR FIRE BARRIER PARTITION

2-HOUR FIRE WALL

3-HOUR FIRE WALL

SMOKE PARTITION

ACOUSTICAL/SOUND PARTITION

NONRATED PARTITION TO DECK

1-HOUR FIRE BARRIER PARTITION. Extend partition to deck above and seal with firestopping as required for fire-resistance requirements. Paint stenciled label on partitions above ceiling at 15'-0" o.c. as follows: '1-HOUR FIRE AND SMOKE BARRIER - PROTECT ALL OPENINGS'. Brace partitions per Floor Plan General Notes.

2-HOUR FIRE BARRIER PARTITION. Extend partition to deck above and seal with firestopping as required for fire-resistance requirements. Paint stenciled label on partitions above ceiling at 15'-0" o.c. as follows: '2-HOUR FIRE AND SMOKE BARRIER - PROTECT ALL OPENINGS'. Brace partitions per Floor Plan General Notes.

2-HOUR FIRE WALL. Extend wall to or through deck above and support wall per UL Design requirements, wall sections and details. Paint stenciled label on partitions above ceiling at 15'-0" o.c. as follows: '2-HOUR FIRE WALL - PROTECT ALL OPENINGS'.

3-HOUR FIRE WALL. Extend wall to or through deck above and support wall per UL Design requirements, wall sections and details. Paint stenciled label on partitions above ceiling at 15'-0" o.c. as follows: '3-HOUR FIRE WALL - PROTECT ALL OPENINGS'.

SMOKE PARTITION. Extend partition to deck above and seal with sealant as required to resist the passage of smoke. Paint stenciled label on partitions above ceiling at 15'-0" o.c. as follows: 'SMOKE BARRIER - PROTECT ALL OPENINGS'. Seal all joints and penetrations. Brace partitions per Floor Plan General Notes.

ACOUSTICAL/SOUND PARTITION. Extend partition to deck above and seal with acoustical sealant. Seal all joints and penetrations with acoustical sealant. Brace partitions per Floor Plan General Notes.

NONRATED PARTITION TO DECK. Extend partition to deck above. Brace partitions per Floor Plan General Notes.

CEILING SCHEDULE

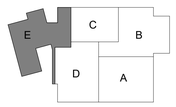
MARK	DESCRIPTION

CEILING FINISH

ACT-01	Acoustic Ceiling Tile (24X24)

Keynote Legend

Key Value	Keynote Text
A16	RELOCATED LIGHT.
F23	REMOVE CEILING TILE AND GRID. EXISTING LIGHT FIXTURES TO BE REMOVED AND REINSTALLED. HVAC GRILLES TO REMIAN



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02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum No. 2	02/18/2026

Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

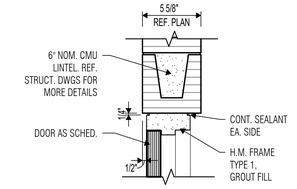
SHEET TITLE
KAISER - REFLECTED CEILING PLAN - LEVEL ONE - UNIT E

SHEET NO.
A36.11

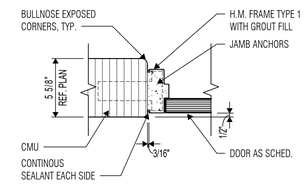
KISD 2025 FRP

KAISER - DOOR SCHEDULE

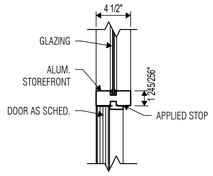
DOOR NO.	DOOR TYPE	DOOR MATERIAL	FRAME TYPE	DOOR OPENING WIDTH	DOOR OPENING HEIGHT	DETAIL - REF. A7.11 U.N.O. HEAD	DETAIL - REF. A7.11 U.N.O. JAMB	DETAIL - REF. A7.11 U.N.O. SILL	FIRE RATING	HARDWARE SET	KEYNOTES	REMARKS
100	D	4	HM	6'-0"	7'-0"	5/A39.11	4/A39.11			K 1.0	DS7	
101	A	1	HM	3'-0"	7'-0"	2/A39.11	3/A39.11			K 2.0	DS7	DOOR RELEASE
102	A	1	-	3'-0"	7'-0"					K 3.0		STOREROOM FUNCTION LOCK
103	A	1	HM	3'-0"	7'-0"	2/A39.11	3/A39.11			K 3.0		DOOR BEING REUSED
121	C	1	AL	3'-0"	7'-0"	8/A39.11	7/A39.11			K 2.0	DS7	CARD READER, DOOR RELEASE AND EXIT DEVICE
122	S	-	-	4'-0"	7'-0"	-	-	-		K 4.0		CHAINLINK



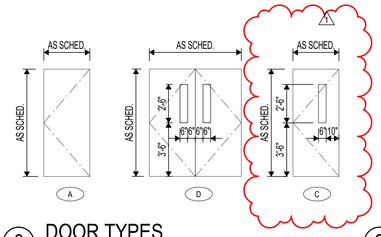
2 HEAD DETAIL H.M.
SCALE: 1 1/2" = 1'-0"



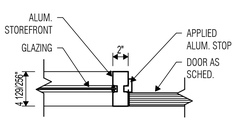
3 JAMB DETAIL H.M.
SCALE: 1 1/2" = 1'-0"



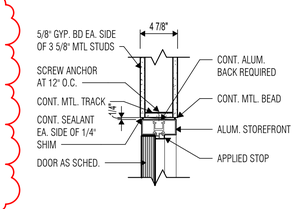
5 STOREFRONT HEAD DETAIL
SCALE: 1 1/2" = 1'-0"



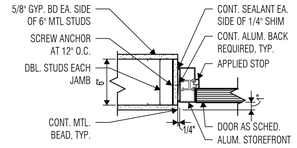
6 DOOR TYPES
SCALE: 1/4" = 1'-0"



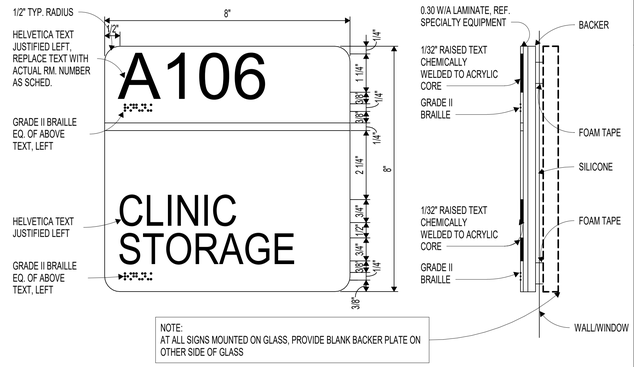
4 STOREFRONT JAMB DETAIL
SCALE: 1 1/2" = 1'-0"



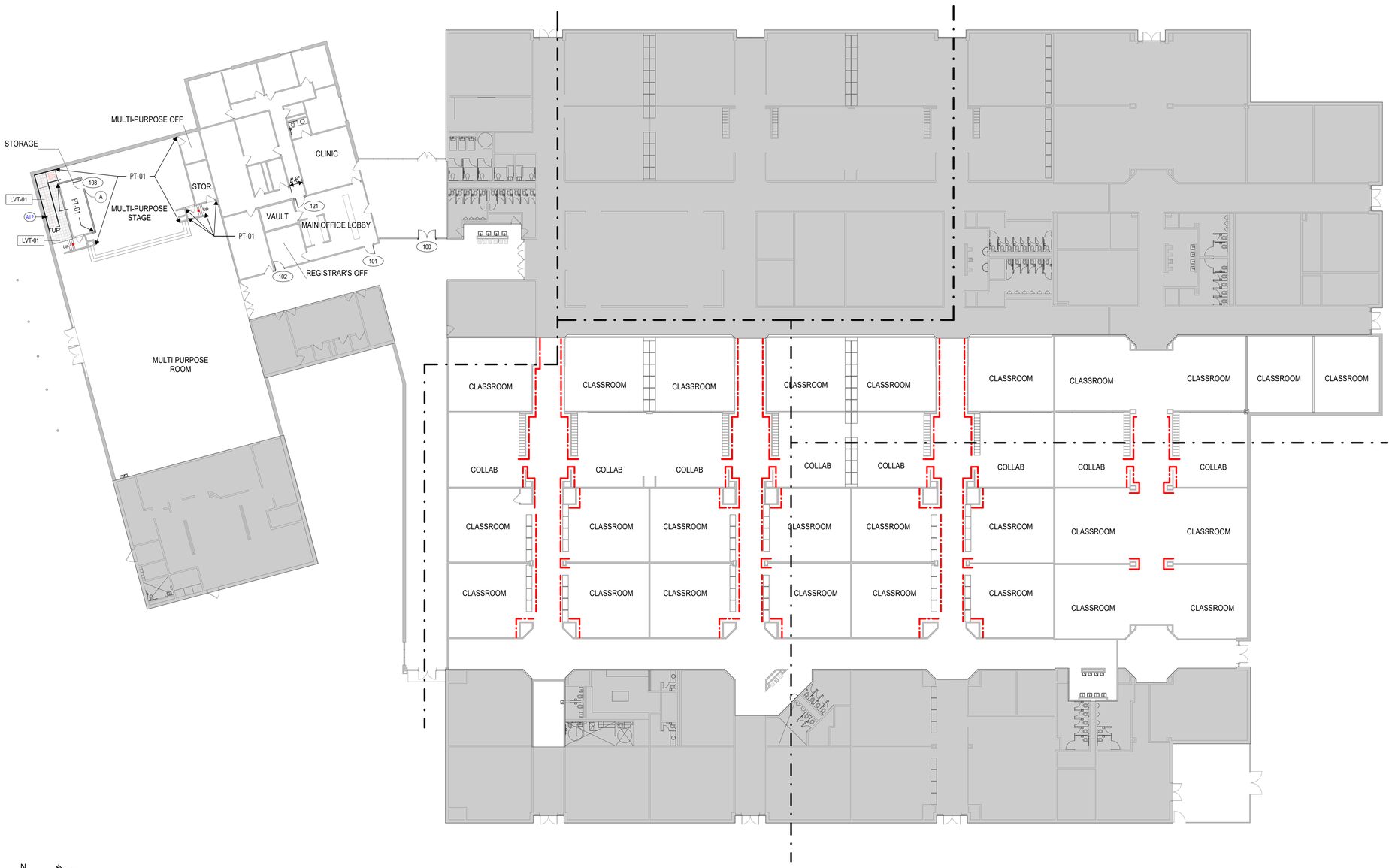
8 HEAD DETAIL ALUM.
SCALE: 1 1/2" = 1'-0"



7 JAMB DETAIL ALUM.
SCALE: 1 1/2" = 1'-0"



9 SIGN TYPE A
SCALE: 6" = 1'-0"



1 KAISER - OVERALL INTERIOR FINISH PLAN - LEVEL ONE
SCALE: 1/16" = 1'-0"

N
PLAN NORTH
TRUE NORTH

INTERIOR FINISH PLAN SCHEDULE

MARK	DESCRIPTION
FLOOR FINISH	
LVT-01	Luxury Vinyl Tile - Field
RG-01	Athletic Flooring

Keynote Legend	
Key Value	Keynote Text
A12	RAMP TO BE PAINTED.

DOOR SCHEDULE NOTES

1. At Doors marked 'SMK', provide smoke seals at frame and door bottom to resist the passage of smoke. Provide threshold if required by code or if necessary for proper function of door bottom seal.
2. At Doors marked 'SND', frames to be stuffed with mineral fiber insulation prior to installation and the perimeter of the frame sealed to the surrounding wall with non-hardening acoustical sealant on both sides of the partition. Threshold, where used, shall be sealed to the floor with acoustical sealant.
3. At Doors without a Frame Type designation, the door frame is part of a Glazing System, Sound-Control Door Assembly, Tornado-Resistant Door Assembly, etc.
4. At Doors with a Frame Type designation "AL", the door frame is an interior aluminum frame that is not part of a glazing system
5. At Doors with a Frame Type designation "N/A", there is no door frame required (e.g. all-glass doors, gates, etc.).
6. At Doors with a Frame Type designation "REF. DET", refer to the referenced Head and Jamb detail for frame information.
7. At Doors with a Door Type or Frame Type designation "EX", the door or door frame is existing to remain.
8. Refer to Hardware Schedule for additional information regarding hardware.

DOOR SCHEDULE KEYNOTES

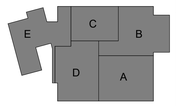
KEY NUMBER	KEYED NOTES
DS7	Access Control / Card Reader

DOOR MATERIAL NOTES

MARK	PANEL MATERIAL
1	Plastic Laminate
4	Painted Hollow Metal

ALTERNATE # 1

WALL TO BE SANDED AND PREPED TO RECIEVE NEW FINISH AS SCHEDULED: PT.00



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02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum No. 2	02/18/2026

Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

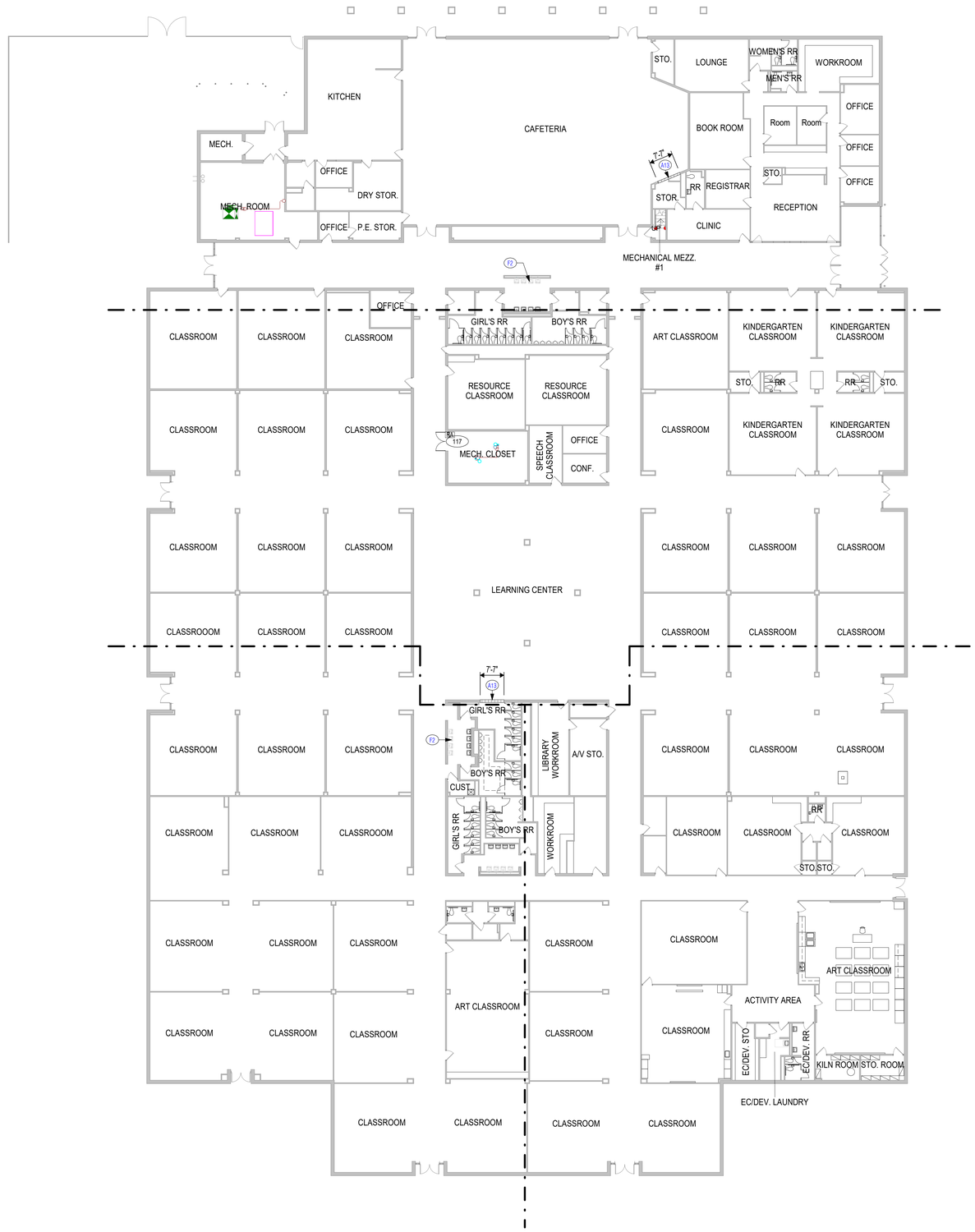
SHEET TITLE
KAISER - INTERIOR OVERALL FINISH PLAN - LEVEL ONE

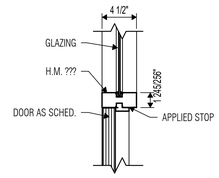
SHEET NO.
A39.11

KISD 2025 FRP

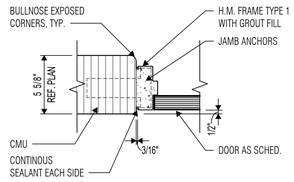
KLENK - DOOR SCHEDULE

DOOR NO.	DOOR TYPE	DOOR MATERIAL	FRAME TYPE	DOOR OPENING WIDTH	DOOR OPENING HEIGHT	DETAIL - REF. A7.11 U.N.O. HEAD	DETAIL - REF. A7.11 U.N.O. JAMB	DETAIL - REF. A7.11 U.N.O. SILL	FIRE RATING	HARDWARE SET	KEYNOTES	REMARKS
117	B	1	HM	6'-0"	7'-0"	5/A49.11	3/A49.11			Klenk 1.0		
126	S	-		4'-0"	7'-0"					Klenk 2.0		CHAINLINK

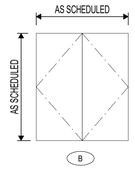




5 HEAD DETAIL H.M.
SCALE: 1 1/2" = 1'-0"



3 JAMB DETAIL H.M.
SCALE: 1 1/2" = 1'-0"



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

Keynote Legend	
Key Value	Keynote Text
A13	PATCH TAPE AND FLOAT GYP. BOARD PARTITION THAT WAS REMOVED FOR INSTALLATION OF AHU. APPROXIMATELY 7'X7'.
F2	REMOVE & REPLACE DRINKING FOUNTAIN. REF: PLUMBING.

DOOR SCHEDULE NOTES

1. At Doors marked 'SMK', provide smoke seals at frame and door bottom to resist the passage of smoke. Provide threshold if required by code or if necessary for proper function of door bottom seal.
2. At Doors marked 'SND', frames to be stuffed with mineral fiber insulation prior to installation and the perimeter of the frame sealed to the surrounding wall with non-hardening acoustical sealant on both sides of the partition. Threshold, where used, shall be sealed to the floor with acoustical sealant.
3. At Doors without a Frame Type designation, the door frame is part of a Glazing System, Sound-Control Door Assembly, Tornado-Resistant Door Assembly, etc.
4. At Doors with a Frame Type designation "AL", the door frame is an interior aluminum frame that is not part of a glazing system
5. At Doors with a Frame Type designation "N/A", there is no door frame required (e.g. all-glass doors, gates, etc.).
6. At Doors with a Frame Type designation "REF. DET", refer to the referenced Head and Jamb detail for frame information.
7. At Doors with a Door Type or Frame Type designation "EX", the door or door frame is existing to remain.
8. Refer to Hardware Schedule for additional information regarding hardware.

DOOR SCHEDULE KEYNOTES

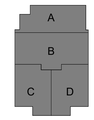
KEY NUMBER	KEYED NOTES
DS7	Access Control / Card Reader

DOOR MATERIAL NOTES

MARK	PANEL MATERIAL
1	Plastic Laminate
4	Painted Hollow Metal

N
PLAN NORTH
TRUE NORTH

1 KLENK - OVERALL INTERIOR FINISH PLAN - LEVEL ONE
SCALE: 1/16" = 1'-0"



KEY PLAN

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STATE OF TEXAS

02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum No. 2	02/18/2026

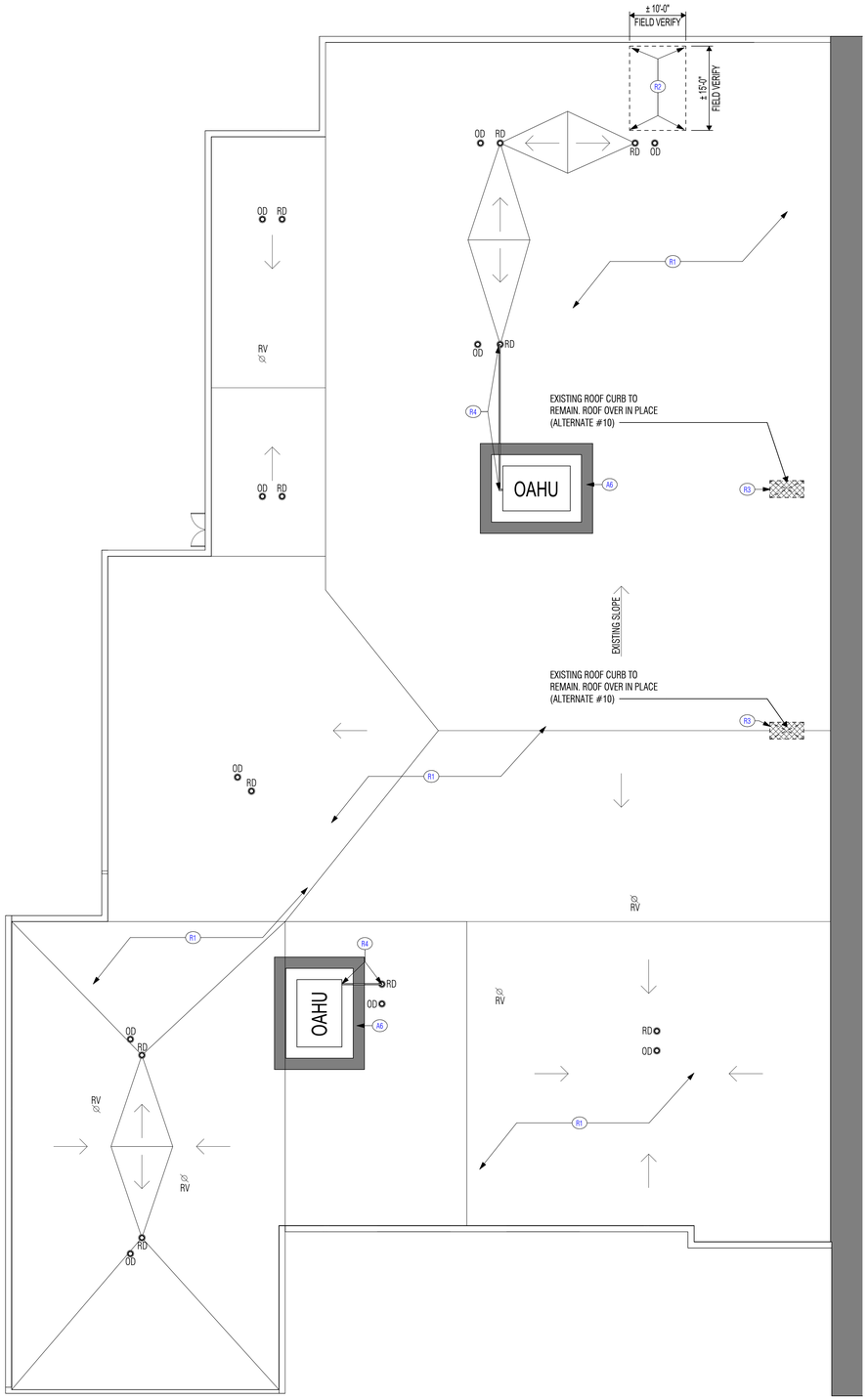
Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

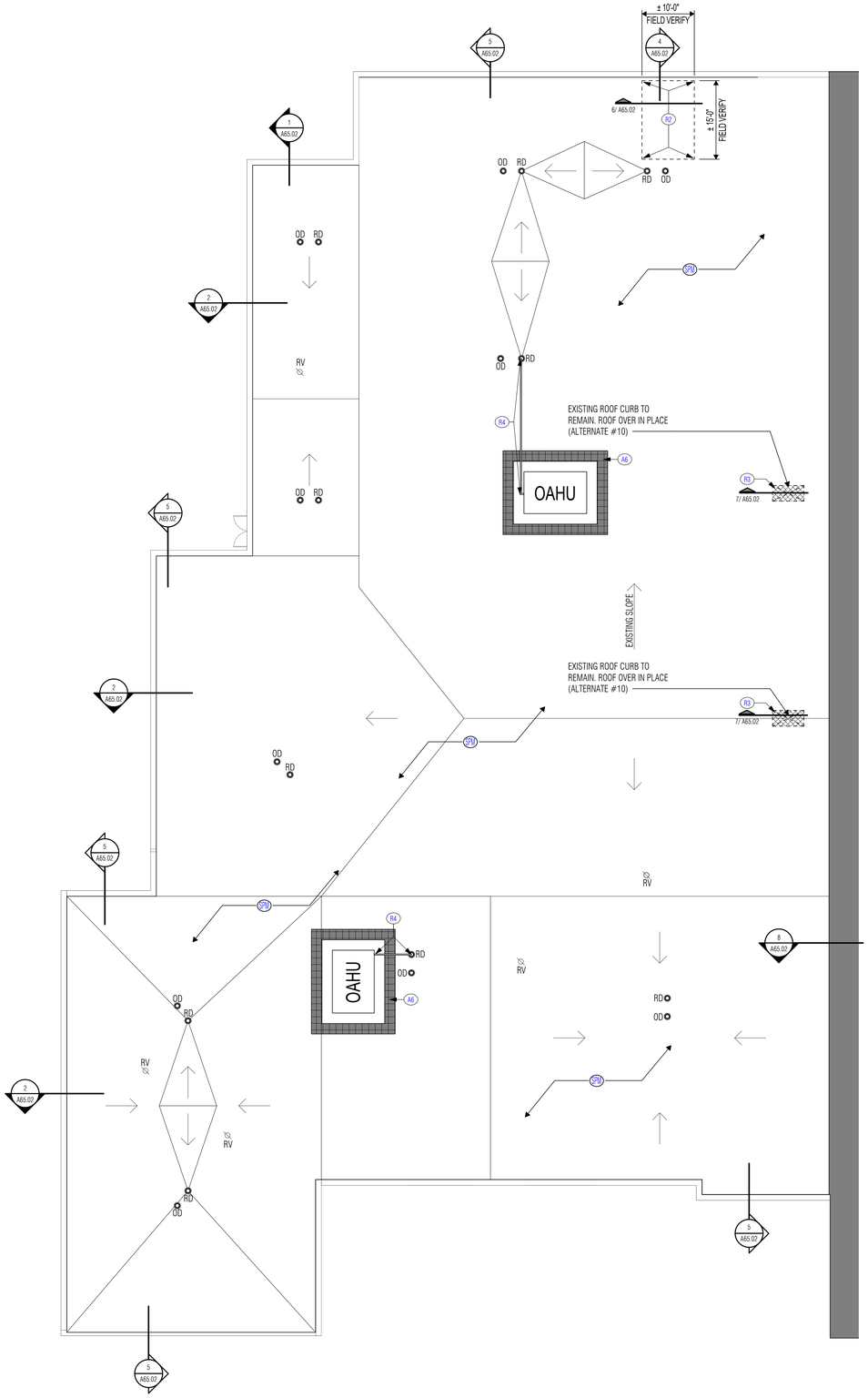
SHEET TITLE
KLENK - INTERIOR OVERALL FINISH PLAN - LEVEL ONE

SHEET NO.
A49.11

KISD 2025 FRP



1 NITSCH - DEMO ROOF PLAN - UNIT D & E
SCALE: 3/32" = 1'-0"



2 NITSCH - ROOF PLAN - UNIT D & E
SCALE: 3/32" = 1'-0"

ROOF PLAN NOTES

1. Provide tapered insulation crickets at the high side of all rooftop curbs, mounting rails, and other miscellaneous roof penetrations as required to shed water around them and to ensure positive roof drainage, whether indicated on the drawings or not.
2. Crickets shall slope 1/2" per foot, unless noted otherwise.
3. Provide roof walkway protection at base of all roof ladders, around all sides of roof hatches, on all sides of rooftop units and condensing units, and on paths leading from roof access points to rooftop units and condensing units, whether indicated on drawings or not.
4. Provide layer of roof walkway protection under all pipe and conduit supports, fully-adhered to roof membrane.
5. Provide additional layer of single-ply roof membrane at the discharge point of downspouts, where splash pans are not provided.
6. Provide metal end closure at the ends of expansion joints, flashings and counterflashings.

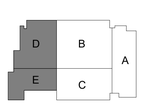
ROOF PLAN LEGEND

SPM	SINGLE-PLY MEMBRANE ROOFING
OAHU	OUTDOOR AIR HANDLING UNIT
RD	ROOF DRAIN, REF: 9/A65.02
OR	OVERFLOW DRAIN, REF: 9/A65.02
RV	RELIEF VENT, REF: 10/A65.02

Keynote Legend	
Key Value	Keynote Text
A6	PROVIDE WALKWAY PAD ALL AROUND UNIT.
R1	REMOVE EXISTING SINGLE-PLY ROOFING MEMBRANE. EXISTING GYPSUM ROOF BOARD AND INSULATION TO REMAIN.
R2	REMOVE EXISTING SINGLE-PLY ROOFING SYSTEM DOWN TO MTL. DECK. AND INSTALL (2) LAYERS OF 2.2 INCH POLYISO INSULATION; 1/2" GYP BOARD AND SINGLE PLY MEMBRANE. RE: 6/A65.02
R3	(ALTERNATE #10) REMOVE EXISTING ROOF CURB AND INSULATION AS NEEDED TO INSTALL NEW METAL DECK. METAL DECK SIZE AND PROFILE TO MATCH EXISTING. PROVIDE INSULATION, AND GYPSUM ROOF BOARD TO MATCH EXISTING. RE: 7/A65.02
R4	EXISTING DRAINAGE PIPES AND PIPE STANDS TO BE REMOVED AND REINSTALLED.

ALTERNATE #10

REMOVE EXISTING ROOF CURB AND INSULATION AS NEEDED TO INSTALL NEW METAL DECK. METAL DECK SIZE AND PROFILE TO MATCH EXISTING. PROVIDE INSULATION, GYPSUM ROOF BOARD TO MATCH EXISTING.



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02/18/2026

ISSUED: FEBURARY 18, 2026

REVISIONS

Revision No.	Revision Date

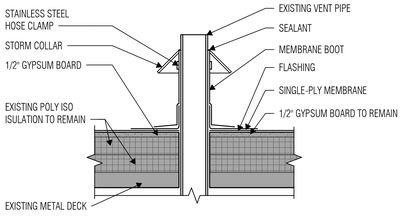
Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

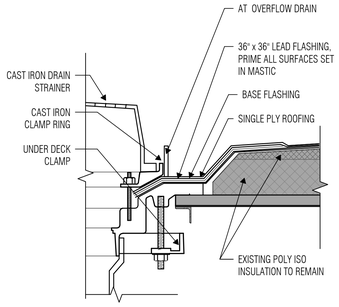
SHEET TITLE
NITSCH - ROOF PLANS - UNIT D & E & ALTERNATE #10

SHEET NO.
A65.01

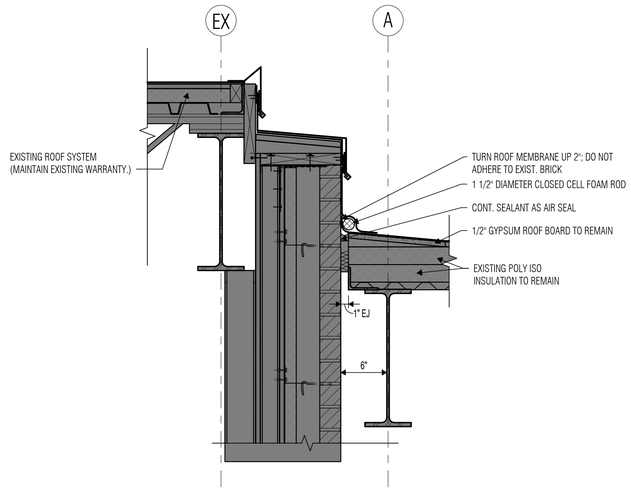
KISD 2025 FRP



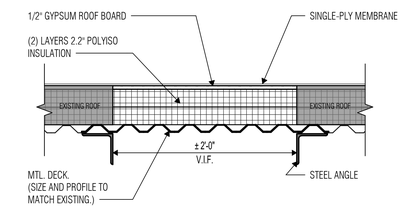
10 TYP. VENT PIPE
SCALE: 1 1/2" = 1'-0"



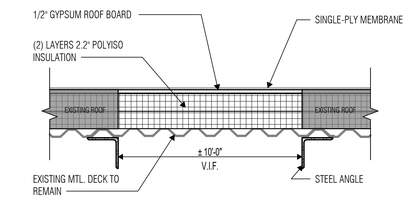
9 ROOF DRAIN DETAIL
SCALE: 3" = 1'-0"



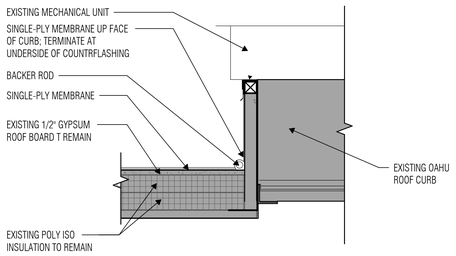
8 ROOF DETAIL CONNECTION AT EXPANSION JOINT
SCALE: 1 1/2" = 1'-0"



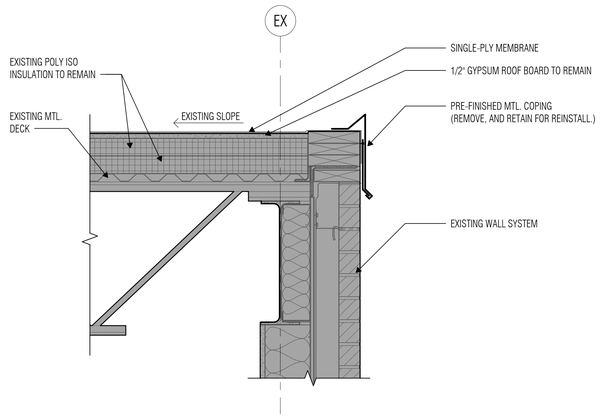
7 (ALTERNATE #10) ROOF CURB INFILL
SCALE: 1 1/2" = 1'-0"



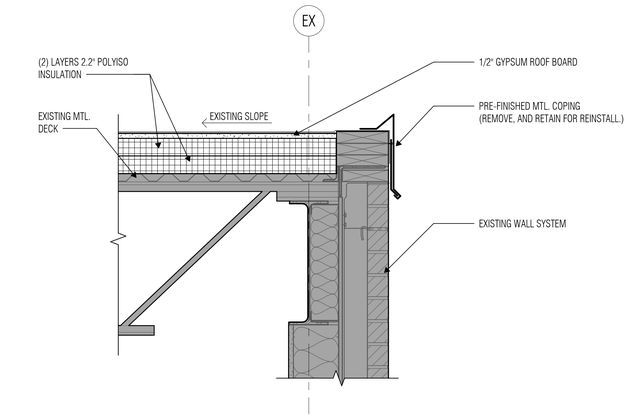
6 ROOF CURB INFILL
SCALE: 1 1/2" = 1'-0"



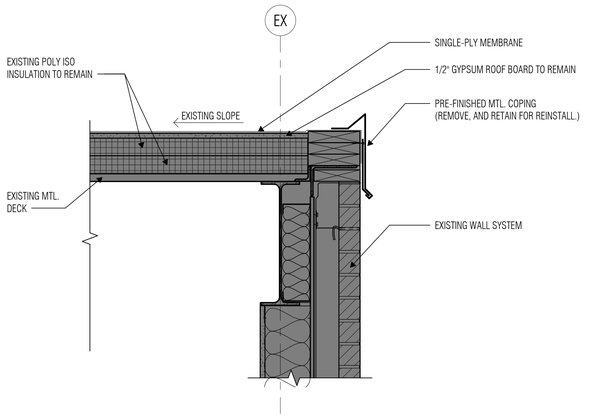
3 OAHU ROOF CURB
SCALE: 1 1/2" = 1'-0"



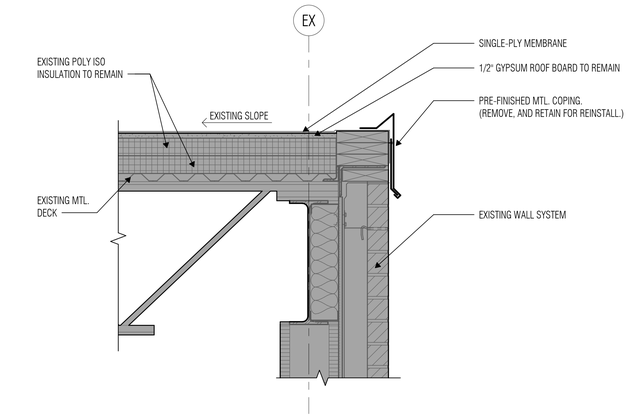
5 ROOF EDGE DETAIL
SCALE: 1 1/2" = 1'-0"



4 ROOF EDGE DETAIL WITH INSULATION
SCALE: 1 1/2" = 1'-0"



2 ROOF EDGE DETAIL (STUD)
SCALE: 1 1/2" = 1'-0"



1 ROOF EDGE DETAIL (CMU)
SCALE: 1 1/2" = 1'-0"

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02/18/2026

ISSUED: FEBURARY 18, 2026

REVISIONS

Revision No.	Revision Date

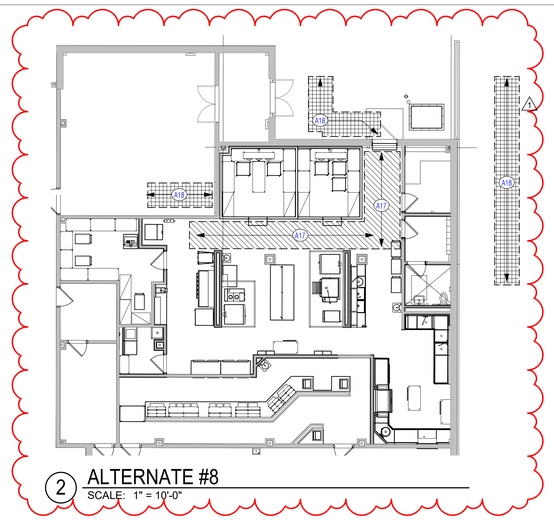
Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

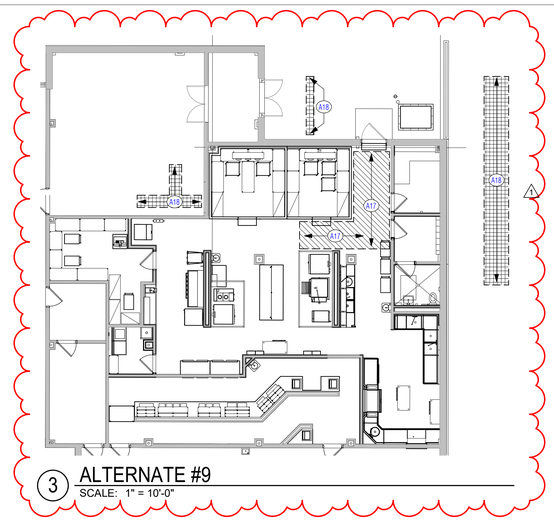
SHEET TITLE
NITSCH - ROOF DETAILS & ALTERNATE #10

SHEET NO.
A65.02

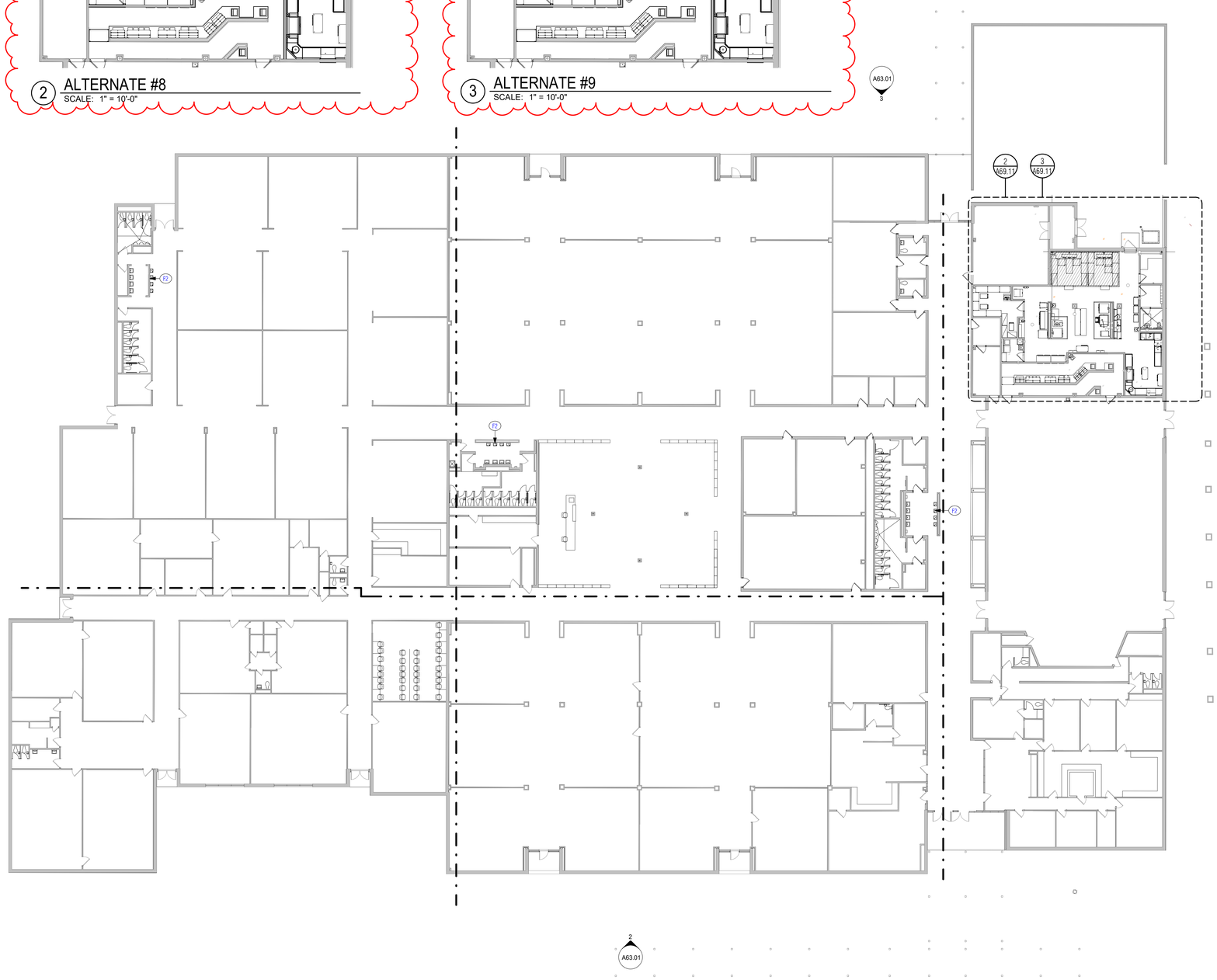
KISD 2025 FRP



2 ALTERNATE #8
SCALE: 1" = 10'-0"



3 ALTERNATE #9
SCALE: 1" = 10'-0"



1 NITSCH - INTERIOR OVERALL FINISH PLAN - LEVEL ONE
SCALE: 1/16" = 1'-0"

N
PLAN NORTH
TRUE NORTH

INTERIOR FINISH PLAN SCHEDULE

MARK	DESCRIPTION
FLOOR FINISH	
LVT-01	Luxury Vinyl Tile - Field
RG-01	Athletic Flooring

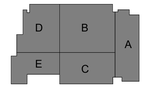
Keynote Legend	
Key Value	Keynote Text
A17	REMOVE AND REPLACE QUARRY TILE AS NEEDED FOR THE PLUMBING INSTALLATION.
A18	SAW CUT AND REPLACE AS NEEDED FOR PLUMBING INSTALLATION.
F2	REMOVE & REPLACE DRINKING FOUNTAIN. REF: PLUMBING.

1

ALTERNATE #8 & 9

REMOVE AND REPLACE QUARRY TILE AS NEEDED FOR THE PLUMBING INSTALLATION.

SAW CUT AND REPLACE CONRETE AS NEEDED FOR PLUMBING INSTALLATION.



KEY PLAN

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MELISSA E. FLEMING
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02/18/2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum No. 2	02/18/2026

Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

SHEET TITLE
NITSCH - INTERIOR OVERALL FINISH PLAN (ALTERNATE #8 & 9)
1

SHEET NO.
A69.11

KISD 2025 FRP

1 NITSCH - INTERIOR OVERALL FINISH PLAN - LEVEL ONE - UNIT D & E (ALTERNATE)
SCALE: 3/32" = 1'-0"

INTERIOR FINISH PLAN SCHEDULE

MARK	DESCRIPTION

FLOOR FINISH

LVT-01	Luxury Vinyl Tile - Field
RG-01	Athletic Flooring

ALTERNATE # 2

WALL TO BE SANDED AND PREPED TO RECIEVE NEW FINISH AS SCHEDULED: PT.00

KEY PLAN

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ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum No. 2	02/18/2026

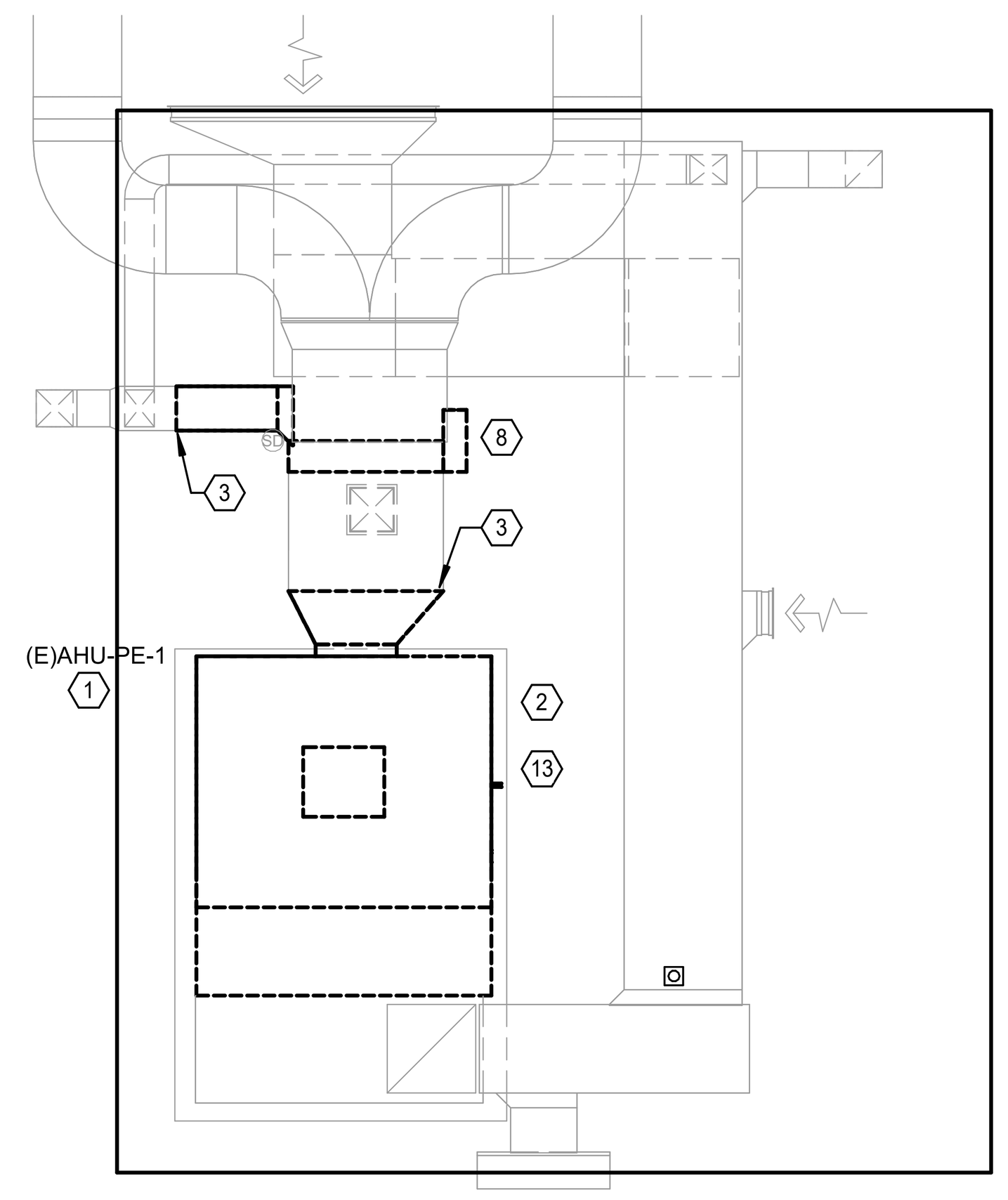
Project Director:	MEF
Project Architect:	MG
Project Designer:	MG
Drawn By:	VLK

PROJECT NO.
25-0225.00

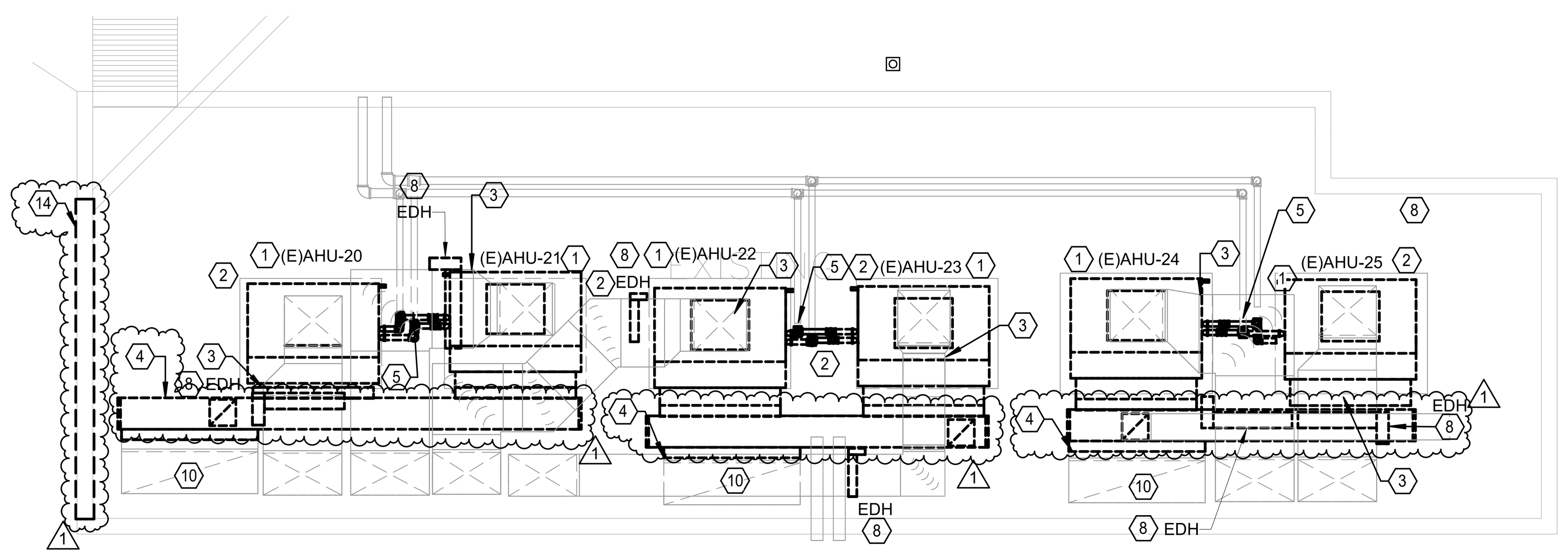
SHEET TITLE
NITSCH - INTERIOR FINISH PLAN - LEVEL ONE - UNIT D & E (ALTERNATE #2)

SHEET NO.
A69.12

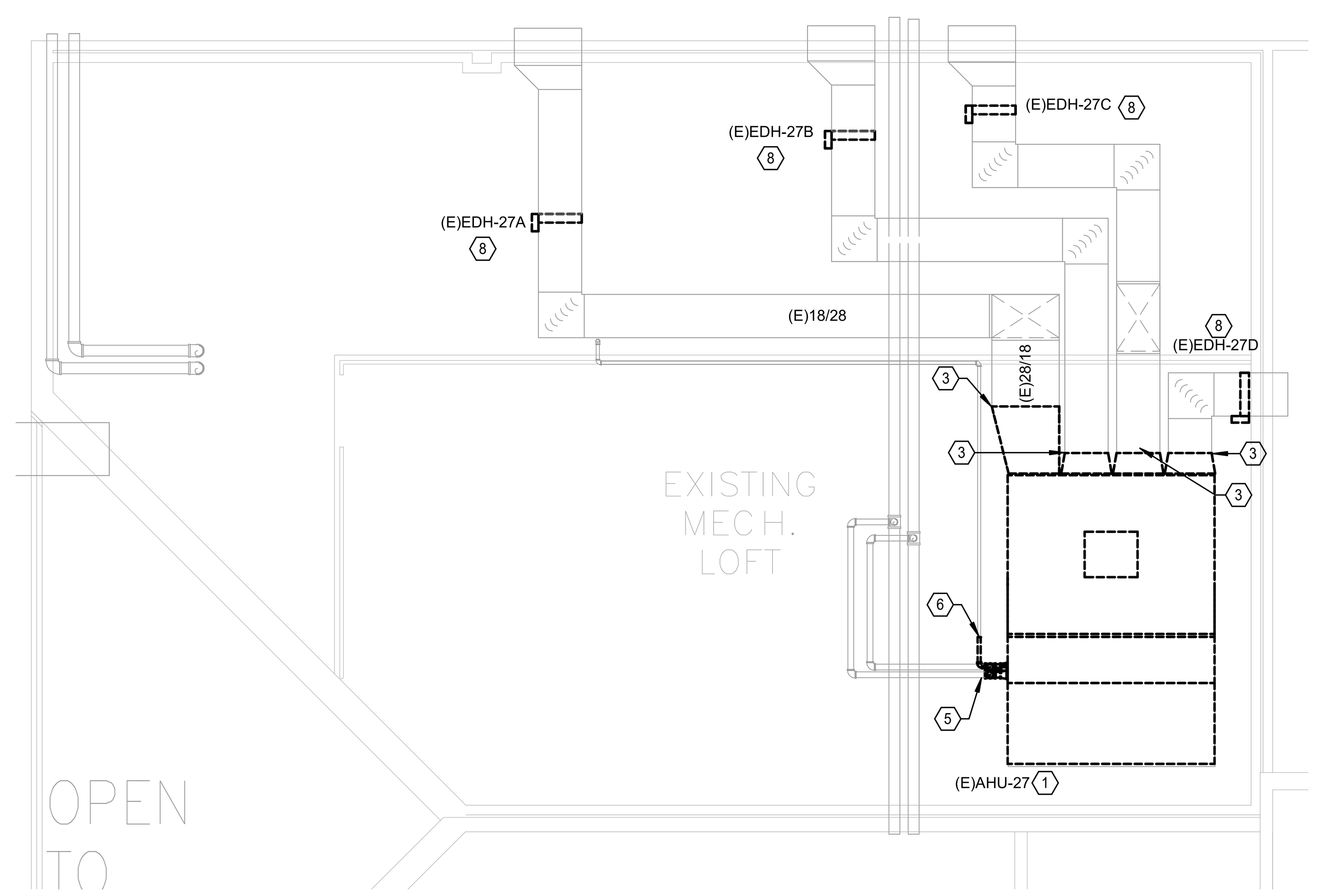
KISD 2025 FRP



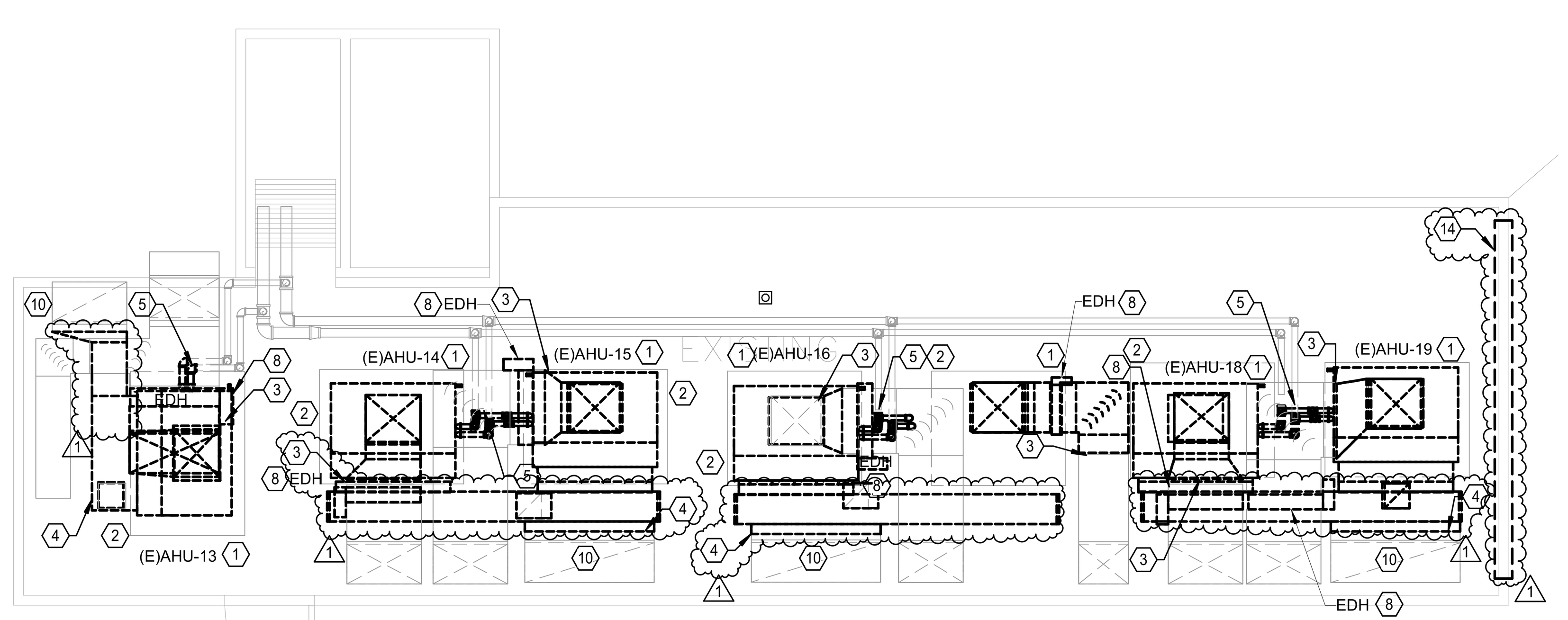
5 **MECHANICAL DEMOLITION ENLARGED PLAN - EILAND - MEZZ GYM**
Scale: 1/4" = 1'-0"



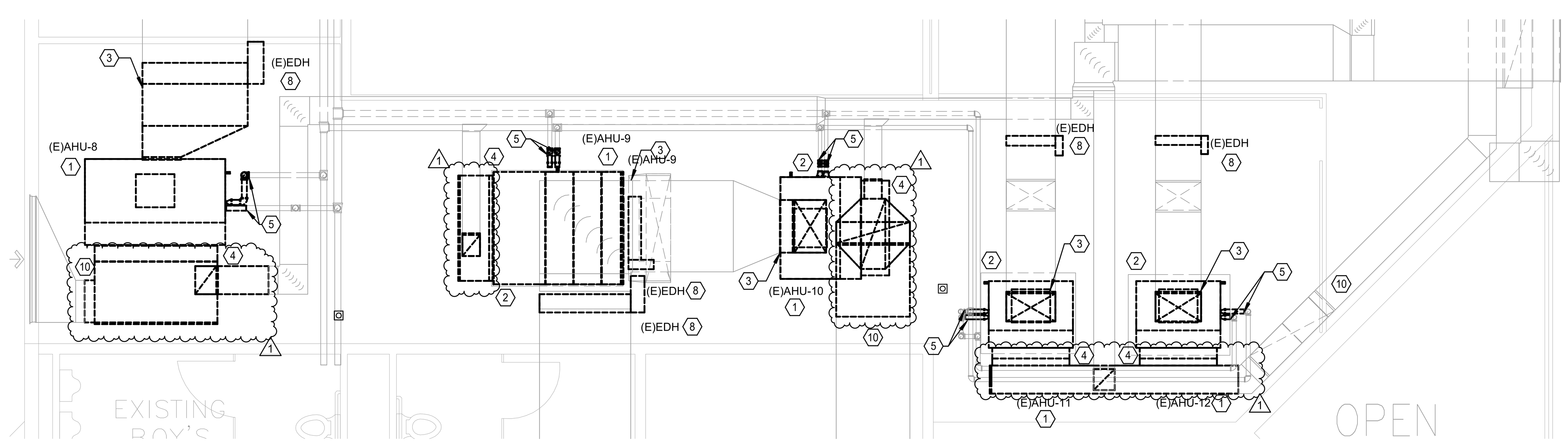
4 **MECHANICAL DEMOLITION ENLARGED PLAN - EILAND - MECH LOFT B301**
Scale: 1/4" = 1'-0"



2 **MECHANICAL DEMOLITION ENLARGED PLAN - EILAND - MECH LOFT A200**
Scale: 1/4" = 1'-0"



3 **MECHANICAL DEMOLITION ENLARGED PLAN - EILAND - MECH LOFT A300**
Scale: 1/4" = 1'-0"



1 **MECHANICAL DEMOLITION ENLARGED PLAN - EILAND - MECH LOFT B208**
Scale: 1/4" = 1'-0"

GENERAL NOTES:

1. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL EQUIPMENT BEING REMOVED ROM THIS PROJECT. THIS INCLUDES BUT IS NOT LIMITHED TO CHILLERS, AIR HANDLING UNITS, FANS, CONDENSING UNITS, BMCS CONTROL PANELS, TEMPERATURE SENSORS, AND CONTROL VALVES.
2. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
3. ALL MECHANICAL SYSTEMS SHOWN ON THIS PLAN ARE FROM ECISTING DRAWINGS AND PRELIMINARY FEILD WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL LOCATIONS AND SIZES OF MECHANICAL SYSTEMS PRIOR TO THE START OF WORK.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
RENOVATIONS	
⌖	POINT OF CONNECTION FROM NEW TO EXISTING
☐	ITEM TO REMAIN
⬚	ITEM TO BE REMOVED

DEMOLITION KEYED NOTES:

1. REMOVE EXISTING AIR HANDLING UNIT AND ASSOCIATED CONDENSATE PIPING. EXISTING DUCTWORK SHALL REMAIN AND REUSED.
2. EXISTING CONCRETE PAD SHALL REMAIN AND BE REUSED.
3. REMOVE EXISTING SUPPLY DUCTWORK UP TO THIS POINT.
4. REMOVE EXISTING RETURN PLENUM.
5. REMOVE EXISTING CHWS&R PIPING BACK TO THIS POINT.
6. REMOVE EXISTING CONDENSATE PIPING BACK TO THIS POINT.
7. EXISTING EQUIPMENT TO REMAIN AND BE REUSED.
8. REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING DUCTWORK SHALL REMAIN AND REUSED.
9. REMOVE EXISTING RETURN DUCTWORK UP TO THIS POINT.
10. EXISTING RETURN DUCTWORK TO REMAIN AND BE REUSED.
11. REMOVE EXISTING OUTSIDE AIR DUCTWORK UP TO THIS POINT.
12. REMOVE EXISTING VFD.
13. REMOVE EXISTING REFRIGERANT LINES.
14. PORTION OF EXISTING WALL SHALL BE REMOVED TO FACILITATE THE REPLACEMENT OF EXISTING EQUIPMENT. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION. (1)

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Project No: 2550-02120-00

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KLEIN, TX

02-18-2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum 02	02/18/2026

KISD 2025 FRP

Project Director:	MR
Designed By:	IP
Checked By:	VP
Drawn By:	IP

PROJECT NO.
25-0225.00

SHEET TITLE
MECHANICAL DEMOLITION ENLARGED PLAN - LEVEL 2 - EILAND

SHEET NO.
M12.02

GENERAL NOTES:

1. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
2. ALL MECHANICAL SYSTEMS SHOWN ON THIS PLAN ARE FROM ECISTING DRAWINGS AND PRELIMINARY FEILD WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL LOCATIONS AND SIZES OF MECHANICAL SYSTEMS PRIOR TO THE START OF WORK.

KEYED NOTES:

1. VERIFY SERVICE CLEARANCE FOR FAN SHAFT AND COIL REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
2. VERIFY SERVICE CLEARANCE FOR AIR FILTER REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
3. SHEET METAL PLENUM, FULL SIZE OF UNIT RETURN AIR OPENING, LENGTH AS REQUIRED FOR ALL DUCT CONNECTIONS SHOWN.
4. ROUTE FULL SIZE CONDENSATE DRAIN PIPE TO EXISTING FLOOR DRAIN LOCATED IN THIS ROOM.
5. VERIFY SERVICE CLEARANCE WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
6. NEW AIR HANDLING SHALL BE INSTALLED ON EXISTING CONCRETE PAD. EXTEND AS REQUIRED FOR NEW UNIT.
7. EXISTING EQUIPMENT TO REMAIN AND BE REUSED.
8. PROVIDE 4" THICK CONCRETE HOUSEKEEPING PAD.
9. ROUTE REFRIGERANT LINES UP TP AHU-PE-1 ON MECHANICAL MEZZANINE. SIZE LINE PER MANUFACTURER'S RECOMMENDATIONS
10. INTERLOCK EXISTING EXHAUST FAN WITH NEW AIR HANDLING UNIT.
11. THIS LOCATION SHALL BE PROVIDED WITH DISPLAY AND SETPOINT ADJUSTMENT.

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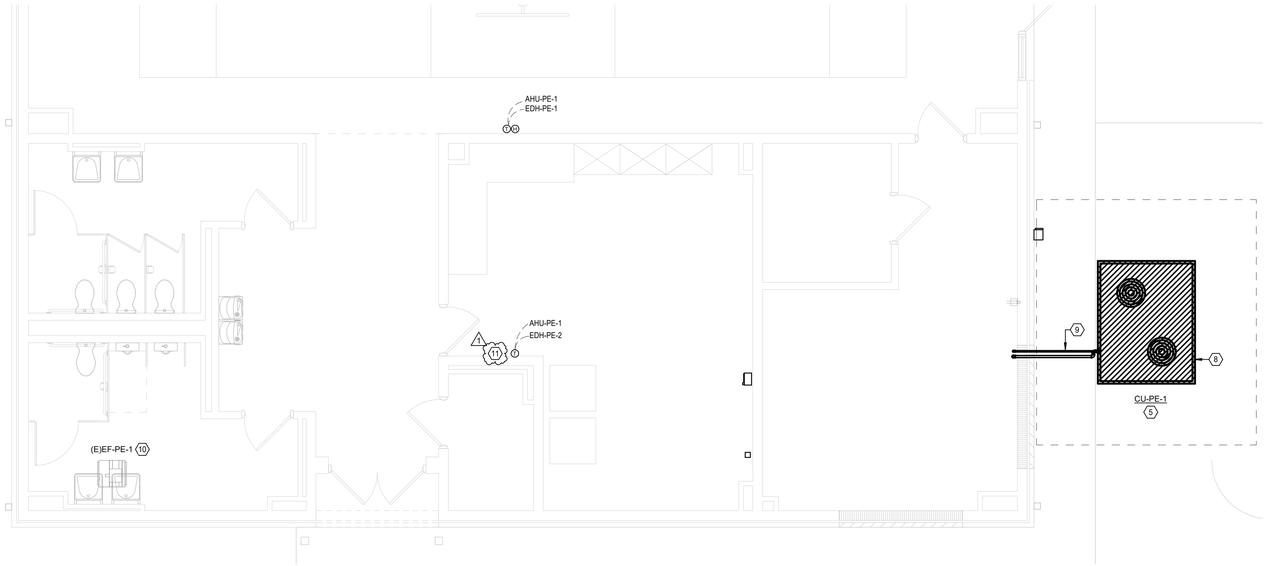
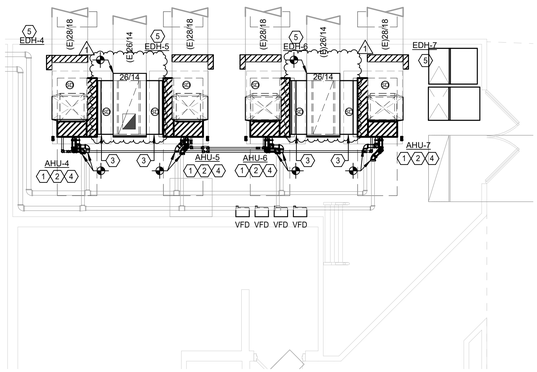
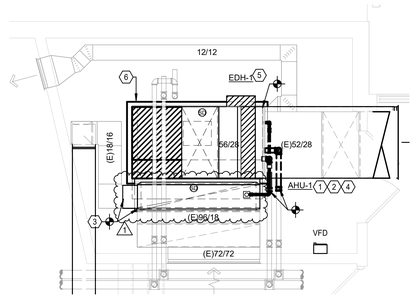


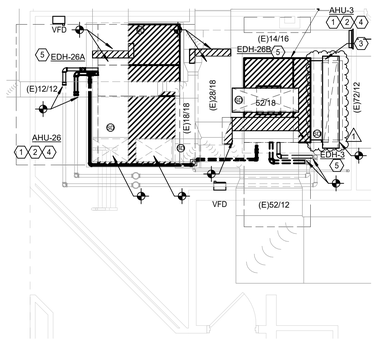
5 MECHANICAL ENLARGED PLAN - EILAND - GYM MECH
Scale: 1/4" = 1'-0"



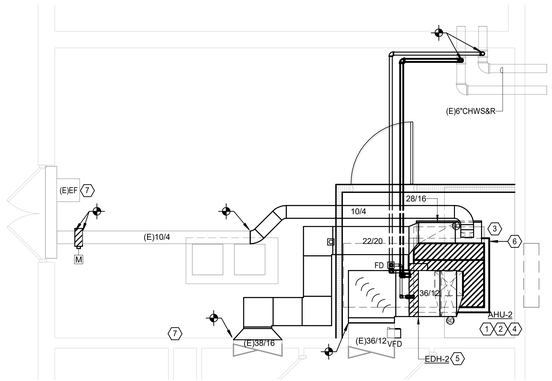
4 MECHANICAL ENLARGED PLAN - EILAND - MECH B143
Scale: 1/4" = 1'-0"



2 MECHANICAL ENLARGED PLAN - EILAND - MECH A108b
Scale: 1/4" = 1'-0"



3 MECHANICAL ENLARGED PLAN - EILAND - MECH A112
Scale: 1/4" = 1'-0"



1 MECHANICAL ENLARGED PLAN - EILAND - MECH A100
Scale: 1/4" = 1'-0"

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02-18-2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum 02	02/18/2026

Project Director:	MR
Designed By:	IP
Checked By:	VP
Drawn By:	IP

PROJECT NO.
25-0225.00

SHEET TITLE
MECHANICAL ENLARGED PLAN - LEVEL 1 - EILAND

SHEET NO.
M13.01

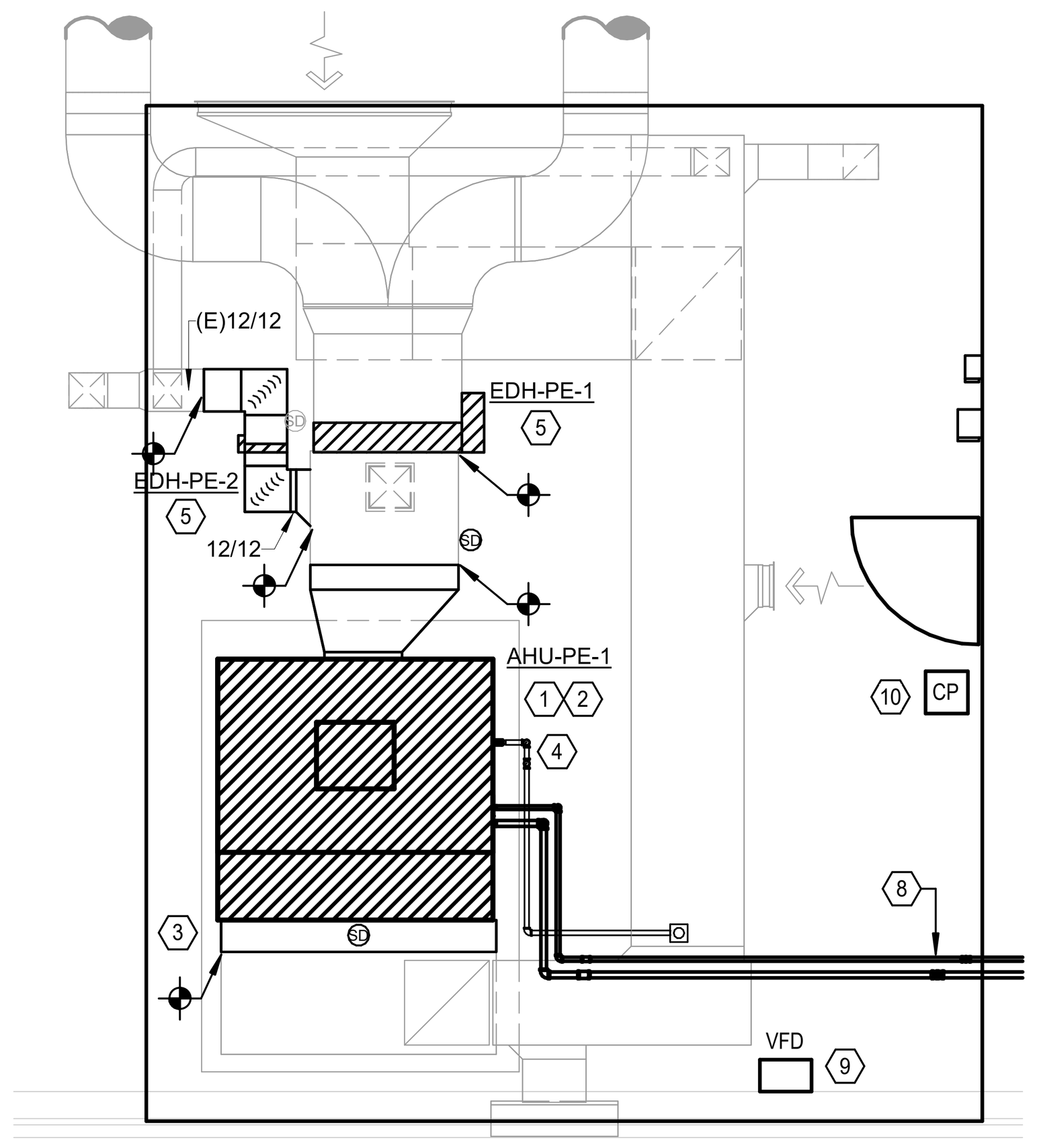
KISD 2025 FRP

GENERAL NOTES:

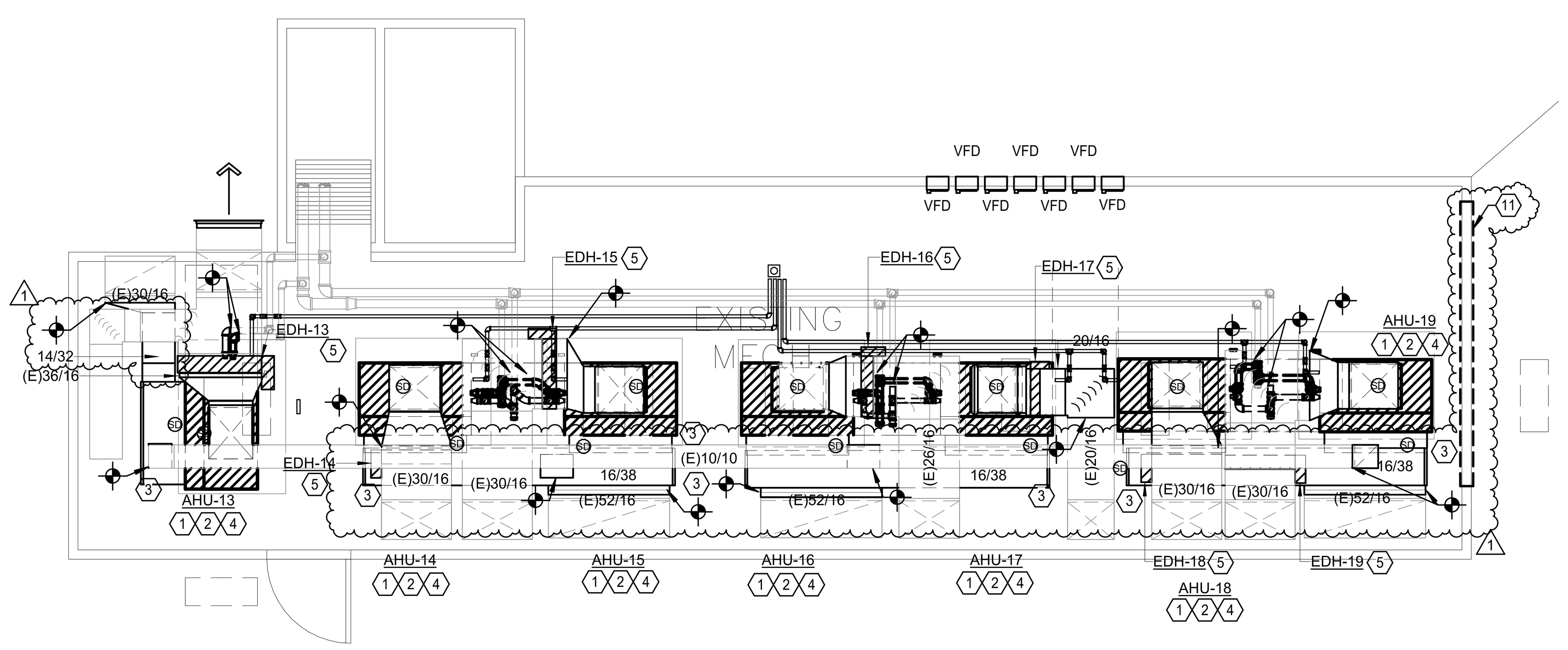
1. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
2. ALL MECHANICAL SYSTEMS SHOWN ON THIS PLAN ARE FROM ECISTING DRAWINGS AND PRELIMINARY FEILD WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL LOCATIONS AND SIZES OF MECHANICAL SYSTEMS PRIOR TO THE START OF WORK.

KEYED NOTES:

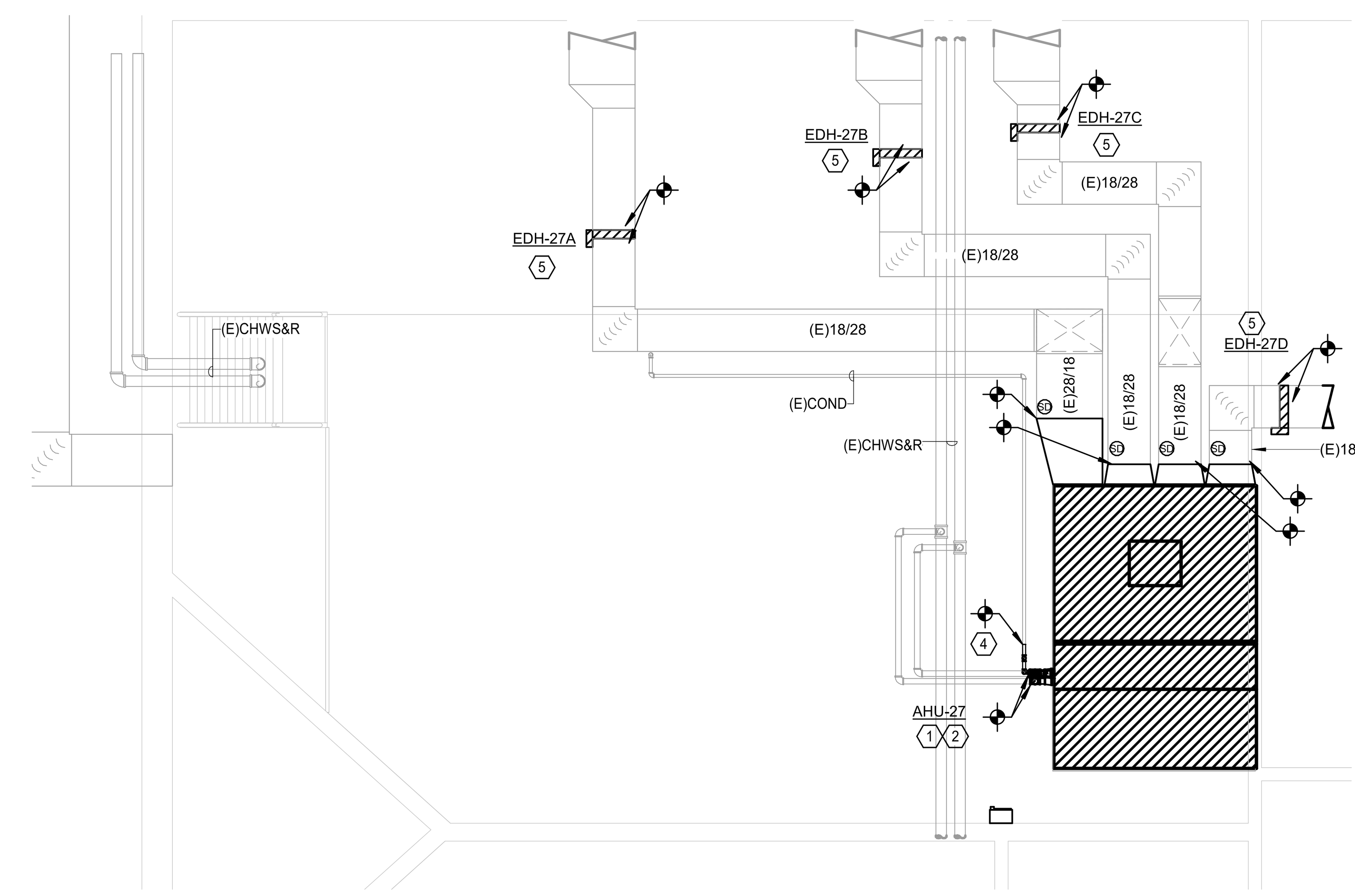
1. VERIFY SERVICE CLEARANCE FOR FAN SHAFT AND COIL REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
2. VERIFY SERVICE CLEARANCE FOR AIR FILTER REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
3. SHEET METAL PLENUM, FULL SIZE OF UNIT RETURN AIR OPENING, LENGTH AS REQUIRED FOR ALL DUCT CONNECTIONS SHOWN.
4. ROUTE FULL SIZE CONDENSATE DRAIN PIPE TO EXISTING FLOOR DRAIN LOCATED IN THIS ROOM.
5. VERIFY SERVICE CLEARANCE WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
6. NEW AIR HANDLING SHALL BE INSTALLED ON EXISTING CONCRETE PAD. EXTEND AS REQUIRED FOR NEW UNIT.
7. EXISTING EQUIPMENT TO REMAIN AND BE REUSED.
8. ROUTE REFRIGERANT LINES TO ASSOCIATED AIR COOLED CONDENSING UNIT ON ROOF. SIZE PER MANUFACTURERS RECOMMENDATIONS.
9. CONNECT NEW VFD TO EXISTING FIRE ALARM WIRING, RECOMMISION FIRE ALARM SYSTEM TO ENSURE AHU SHUTS DOWN WHEN SIGNALED BY THE FIRE ALARM SYSTEM,
10. ADD NEW NETWORK CARD TO EXISTING BMCS PANEL.
11. (1) PORTION OF EXISTING WALL SHALL BE REMOVED TO FACILITATE THE REPLACEMENT OF EXISTING EQUIPMENT. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION.



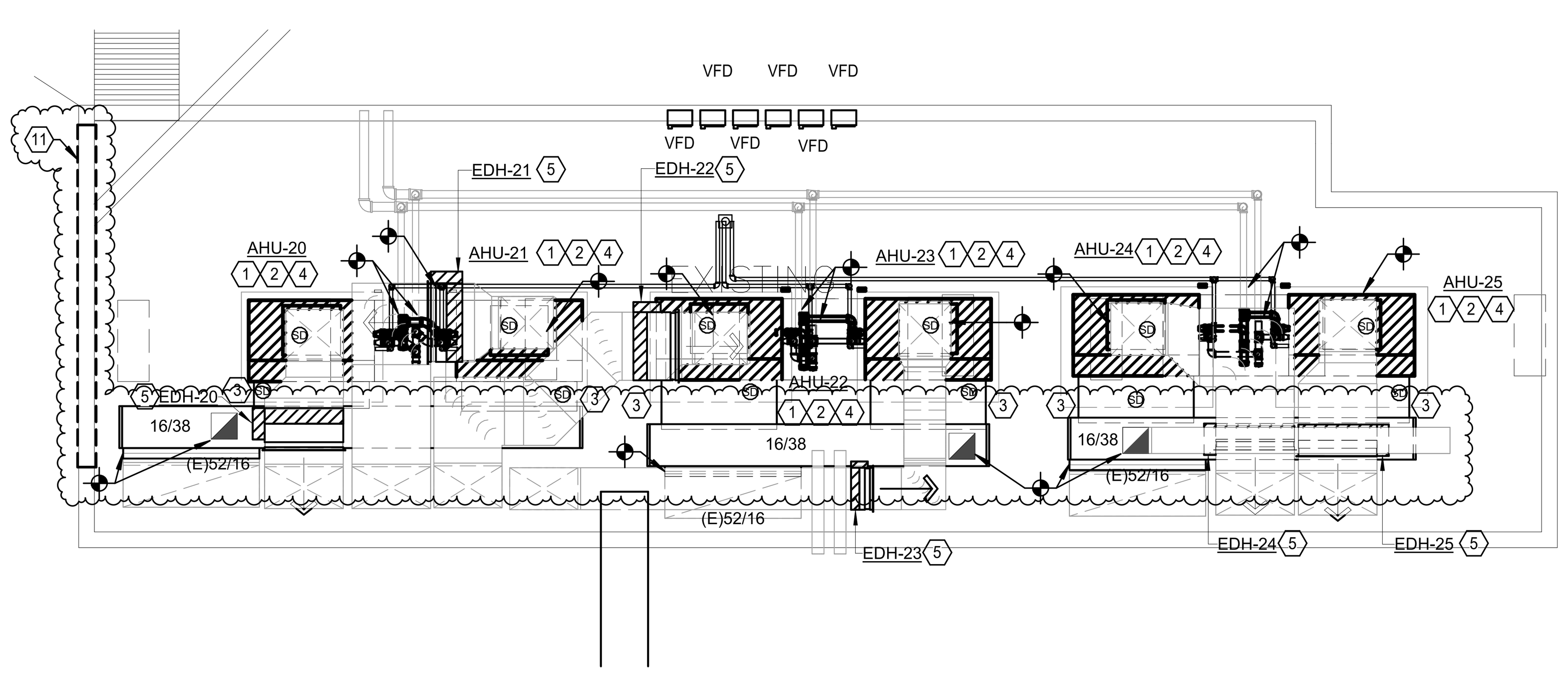
5 **MECHANICAL ENLARGED PLAN - EILAND - GYM MEZZ**
Scale: 1/4" = 1'-0"



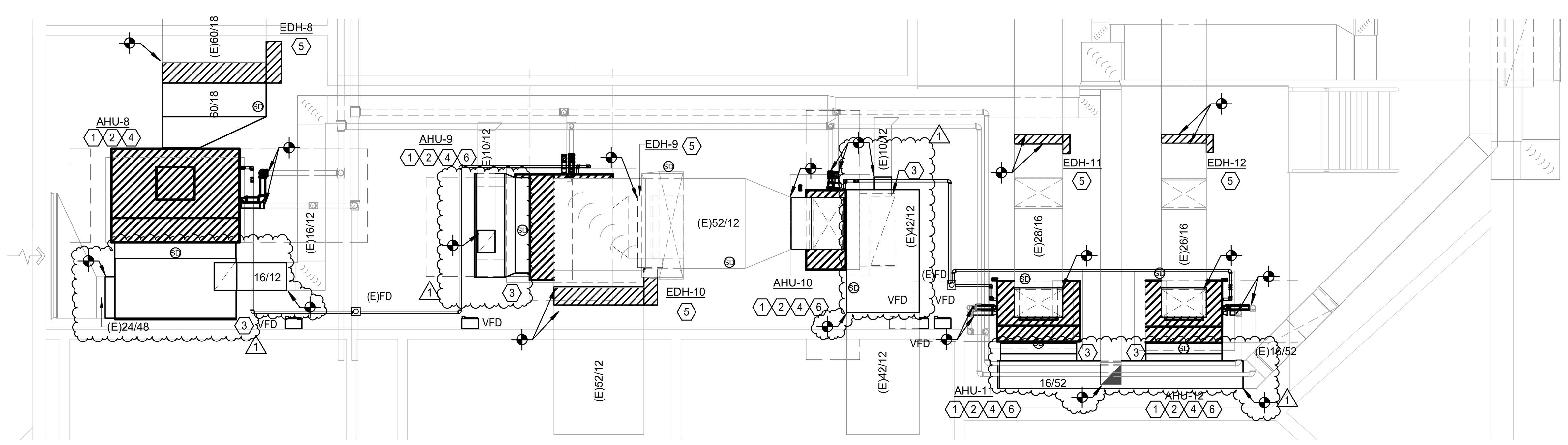
4 **MECHANICAL ENLARGED PLAN - EILAND - MECH LOFT B301**
Scale: 1/4" = 1'-0"



2 **MECHANICAL ENLARGED PLAN - EILAND - MECH LOFT A200**
Scale: 1/4" = 1'-0"



3 **MECHANICAL ENLARGED PLAN - EILAND - MECH LOFT A300**
Scale: 1/4" = 1'-0"



1 **MECHANICAL ENLARGED PLAN - EILAND - MECH LOFT B208**
Scale: 1/4" = 1'-0"

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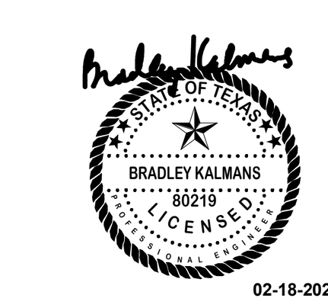


ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum 02	02/18/2026

Project Director:	MR
Designed By:	IP
Checked By:	VP
Drawn By:	IP

PROJECT NO.
25-0225.00

SHEET TITLE
MECHANICAL ENLARGED PLAN - LEVEL 2 - EILAND

KISD 2025 FRP

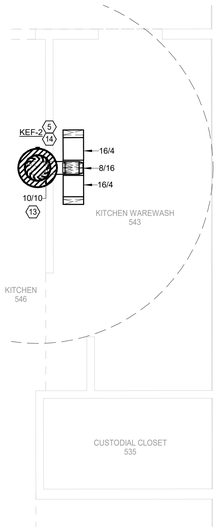
SHEET NO.
M13.02

GENERAL NOTES:

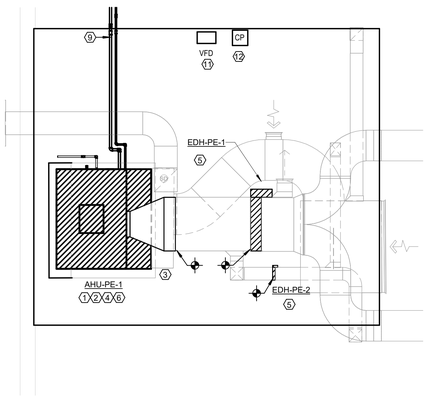
1. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
2. ALL MECHANICAL SYSTEMS SHOWN ON THIS PLAN ARE FROM ECISTING DRAWINGS AND PRELIMINARY FEILD WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL LOCATIONS AND SIZES OF MECHANICAL SYSTEMS PRIOR TO THE START OF WORK.

KEYED NOTES:

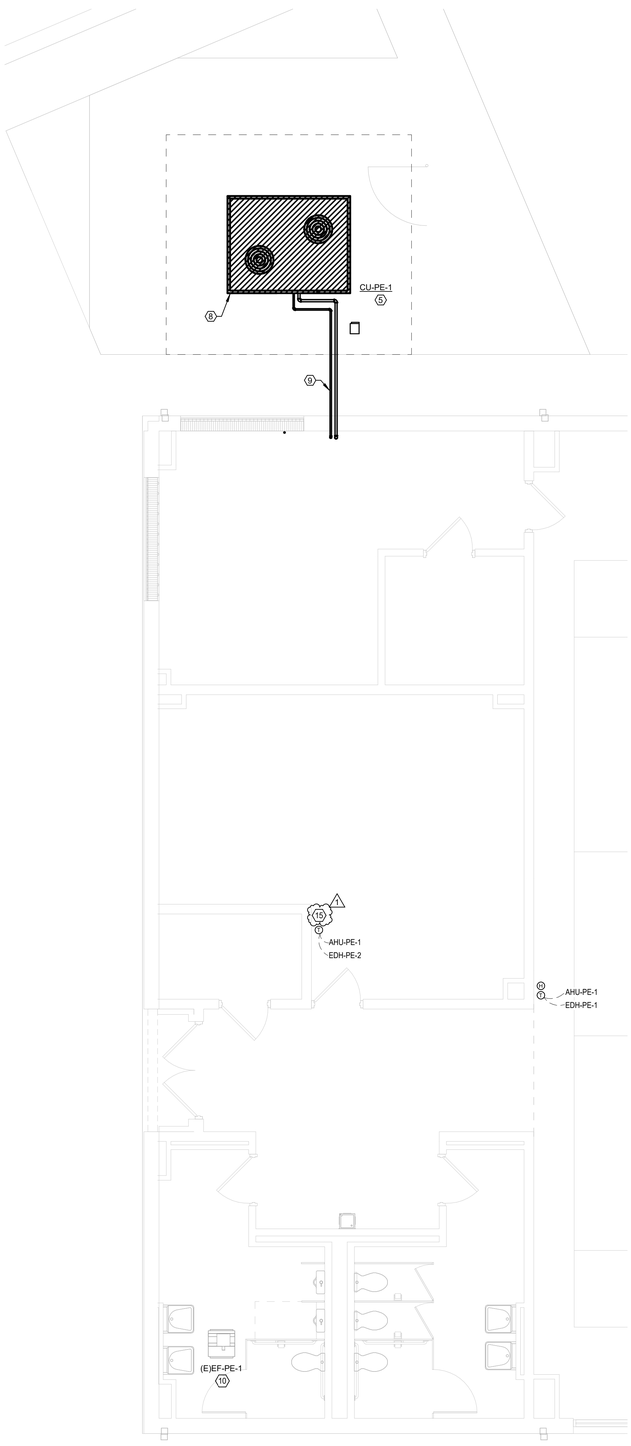
1. VERIFY SERVICE CLEARANCE FOR FAN SHAFT AND COIL REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
2. VERIFY SERVICE CLEARANCE FOR AIR FILTER REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
3. SHEET METAL PLENUM, FULL SIZE OF UNIT RETURN AIR OPENING, LENGTH AS REQUIRED FOR ALL DUCT CONNECTIONS SHOWN.
4. ROUTE FULL SIZE CONDENSATE DRAIN PIPE TO EXISTING FLOOR DRAIN LOCATED IN THIS ROOM.
5. VERIFY SERVICE CLEARANCE WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
6. NEW AIR HANDLING SHALL BE INSTALLED ON EXISTING CONCRETE PAD. EXTEND AS REQUIRED FOR NEW UNIT.
7. EXISTING EQUIPMENT TO REMAIN AND BE REUSED.
8. PROVIDE 4" THICK CONCRETE HOUSEKEEPING PAD.
9. ROUTE REFRIGERANT LINES UP TO AHU-PE-1 ON MECHANICAL MEZZANINE. SIZE LINE PER MANUFACTURER'S RECOMMENDATIONS
10. INTERLOCK EXISTING EXHAUST FAN WITH NEW AIR HANDLING UNIT.
11. CONNECT NEW VFD TO EXISTING FIRE ALARM WIRING, RECOMMISION FIRE ALARM SYSTEM TO ENSURE AHU SHUTS DOWN WHEN SIGNALED BY THE FIRE ALARM SYSTEM.
12. ADD NEW NETWORK CARD TO EXISTING BMCS PANEL.
13. EXHAUST DUCTWORK (DIMENSION AS SHOWN) UP TO EXHAUST FAN ON ROOF. TRANSITION TO FAN INLET AS REQUIRED.
14. NEW EXHAUST FAN SHALL BE INSTALLED ON EXISTING ROOF CURB. PROVIDE ROOF CURB ADAPTOR AS REQUIRED FOR NEW FAN.
15. THIS LOCATION SHALL BE PROVIDED WITH DISPLAY AND SETPOINT ADJUSTMENT.



MECHANICAL ENLARGED PLAN - LEVEL 1 - KAISER KITCHEN
6 Scale: 1/4" = 1'-0"



MECHANICAL ENLARGED PLAN - LEVEL 2 - KAISER GYM
5 Scale: 1/4" = 1'-0"



MECHANICAL ENLARGED PLAN - LEVEL 1 - KAISER GYM
4 Scale: 1/4" = 1'-0"

GENERAL NOTES:

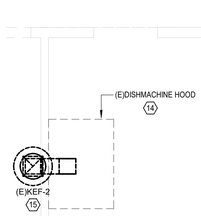
1. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL EQUIPMENT BEING REMOVED ROM THIS PROJECT. THIS INCLUDES BUT IS NOT LIMITHED TO CHILLERS, AIR HANDLING UNITS, FANS, CONDENSING UNITS, BMCS CONTROL PANELS, TEMPERATURE SENSORS, AND CONTROL VALVES.
2. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
3. ALL MECHANICAL SYSTEMS SHOWN ON THIS PLAN ARE FROM ECISTING DRAWINGS AND PRELIMINARY FEILD WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL LOCATIONS AND SIZES OF MECHANICAL SYSTEMS PRIOR TO THE START OF WORK.

SYMBOL LEGEND

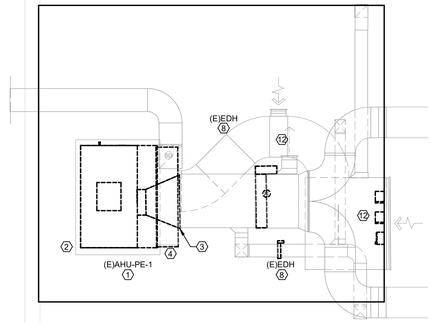
SYMBOL	DESCRIPTION
RENOVATIONS	
⊕	POINT OF CONNECTION FROM NEW TO EXISTING
▭	ITEM TO REMAIN
▭ (dashed)	ITEM TO BE REMOVED

DEMOLITION KEYED NOTES:

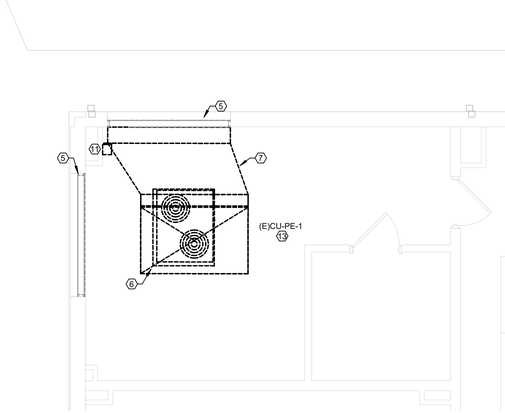
1. REMOVE EXISTING AIR HANDLING UNIT AND ASSOCIATED CONDENSATE PIPING. EXISTING DUCTWORK SHALL REMAIN AND REUSED.
2. EXISTING CONCRETE PAD SHALL REMAIN AND BE REUSED.
3. REMOVE EXISTING SUPPLY DUCTWORK UP TO THIS POINT.
4. REMOVE EXISTING RETURN PLENUM.
5. REMOVE EXISTING WALL LOUVER. EXISTING OPENING SHALL BE SEALED TO MATCH EXISTING WALL FINISH.
6. REMOVE EXISTING CONCRETE PAD.
7. REMOVE EXISTING CONDENSER UNIT PLENUM AIR AND ASSOCIATED DUCTWORK.
8. REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING DUCTWORK SHALL REMAIN AND REUSED.
9. REMOVE EXISTING RETURN DUCTWORK UP TO THIS POINT.
10. REMOVE EXISTING OUTSIDE AIR DUCTWORK UP TO THIS POINT.
11. REMOVE EXISTING ELECTRICAL STARTER.
12. EXISTING RETURN DUCTWORK TO REMAIN AND BE REUSED.
13. REMOVE EXISTING CONDENSER UNIT AND ASSOCIATED REFRIGERANT LINES.
14. REMOVE EXISTING DISHMACHINE HOOD AND ASSOCIATED DUCTWORK UP TO EXISTING KEF-2 ON ROOF.
15. REMOVE EXISTING KEF-2 ON ROOF, ASSOCIATED ROOF CURB TO REMAIN AND BE REUSED.



MECHANICAL DEMOLITION ENLARGED PLAN - LEVEL 1 - KAISER KITCHEN
3 Scale: 1/4" = 1'-0"



MECHANICAL DEMOLITION ENLARGED PLAN - LEVEL 2 - KAISER GYM
2 Scale: 1/4" = 1'-0"



MECHANICAL DEMOLITION ENLARGED PLAN - LEVEL 1 - KAISER GYM
1 Scale: 1/4" = 1'-0"

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KLEIN, TX

BRADLEY KALMAN 86559 LICENSED PROFESSIONAL ENGINEER
02-18-2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum 02	02/18/2026

Project Director:	MR
Designed By:	IP
Checked By:	VP
Drawn By:	IP

PROJECT NO.
25-0225.00

SHEET TITLE
MECHANICAL ENLARGED PLAN - KAISER

SHEET NO.
M32.01

KISD 2025 FRP

GENERAL NOTES:

1. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
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KEYED NOTES:

1. VERIFY SERVICE CLEARANCE FOR FAN SHAFT AND COIL REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
2. VERIFY SERVICE CLEARANCE FOR AIR FILTER REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
3. SHEET METAL PLENUM. FULL SIZE OF UNIT RETURN AIR OPENING, LENGTH AS REQUIRED FOR ALL DUCT CONNECTIONS SHOWN.
4. ROUTE FULL SIZE CONDENSATE DRAIN PIPE TO EXISTING FLOOR DRAIN LOCATED IN THIS ROOM.
5. VERIFY SERVICE CLEARANCE WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
6. NEW AIR HANDLING SHALL BE INSTALLED ON EXISTING CONCRETE PAD. EXTEND AS REQUIRED FOR NEW UNIT.
7. EXISTING EQUIPMENT TO REMAIN AND BE REUSED.
8. PROVIDE 4" THICK CONCRETE HOUSEKEEPING PAD.
9. ROUTE REFRIGERANT LINES UP TP AHU-PE-1 ON MECHANICAL MEZZANINE. SIZE LINE PER MANUFACTURER'S RECOMMENDATIONS
10. INTERLOCK EXISTING EXHAUST FAN WITH NEW AIR HANDLING UNIT.
11. THIS LOCATION SHALL BE PROVIDED WITH DISPLAY AND SETPOINT ADJUSTMENT.

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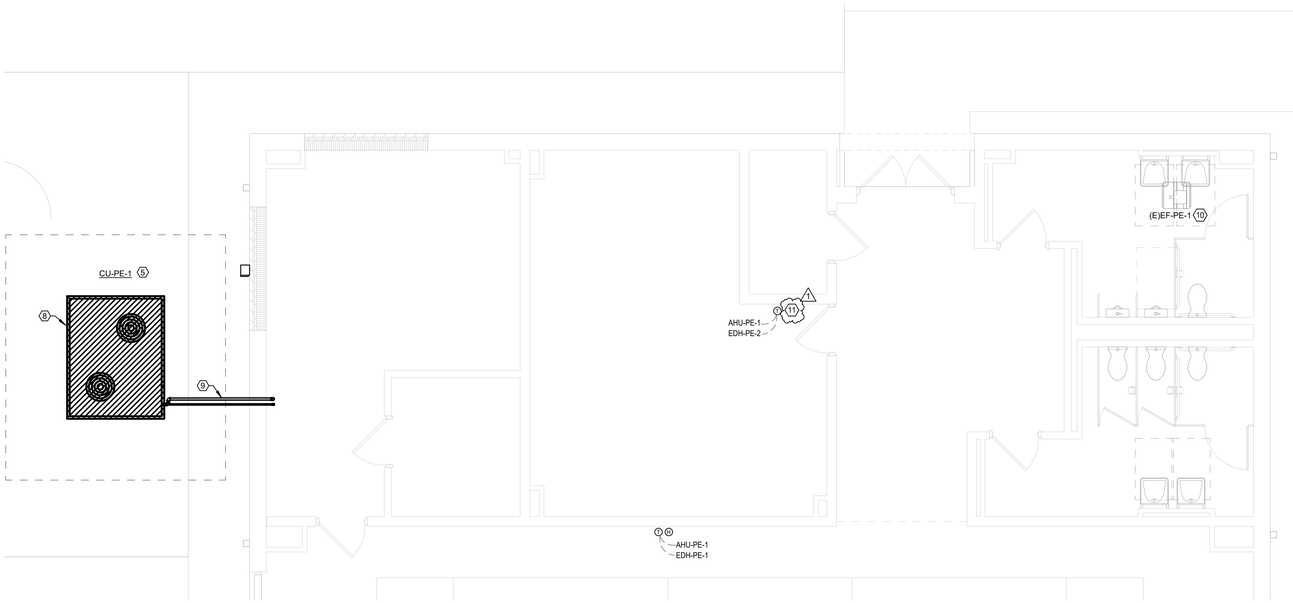
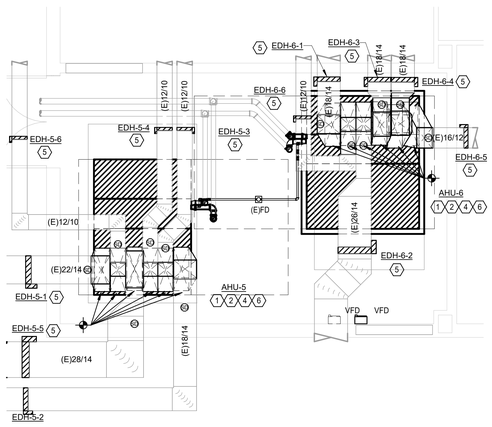
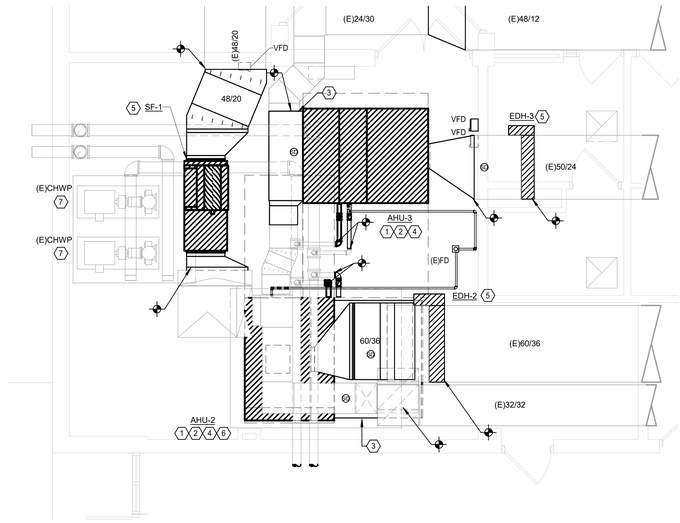


3 MECHANICAL ENLARGED PLAN - KLENK - GYM MECH
Scale: 1/4" = 1'-0"



2 MECHANICAL ENLARGED PLAN - KLENK - MECH 171
Scale: 1/4" = 1'-0"



1 MECHANICAL ENLARGED PLAN - KLENK - MECH 101
Scale: 1/4" = 1'-0"

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KLEIN, TX

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum 02	02/18/2026

Project Director:	MR
Designed By:	IP
Checked By:	VP
Drawn By:	IP

PROJECT NO.
25-0225.00

SHEET TITLE
MECHANICAL ENLARGED PLAN - LEVEL 1 - KLENK

SHEET NO.
M43.01

KISD 2025 FRP

GENERAL NOTES:

1. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC, AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FEILD-VERIFY ALL DIMINSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT ADN ROUTING OF ALL PIPING AND/OR DUCT SYSTEMS.
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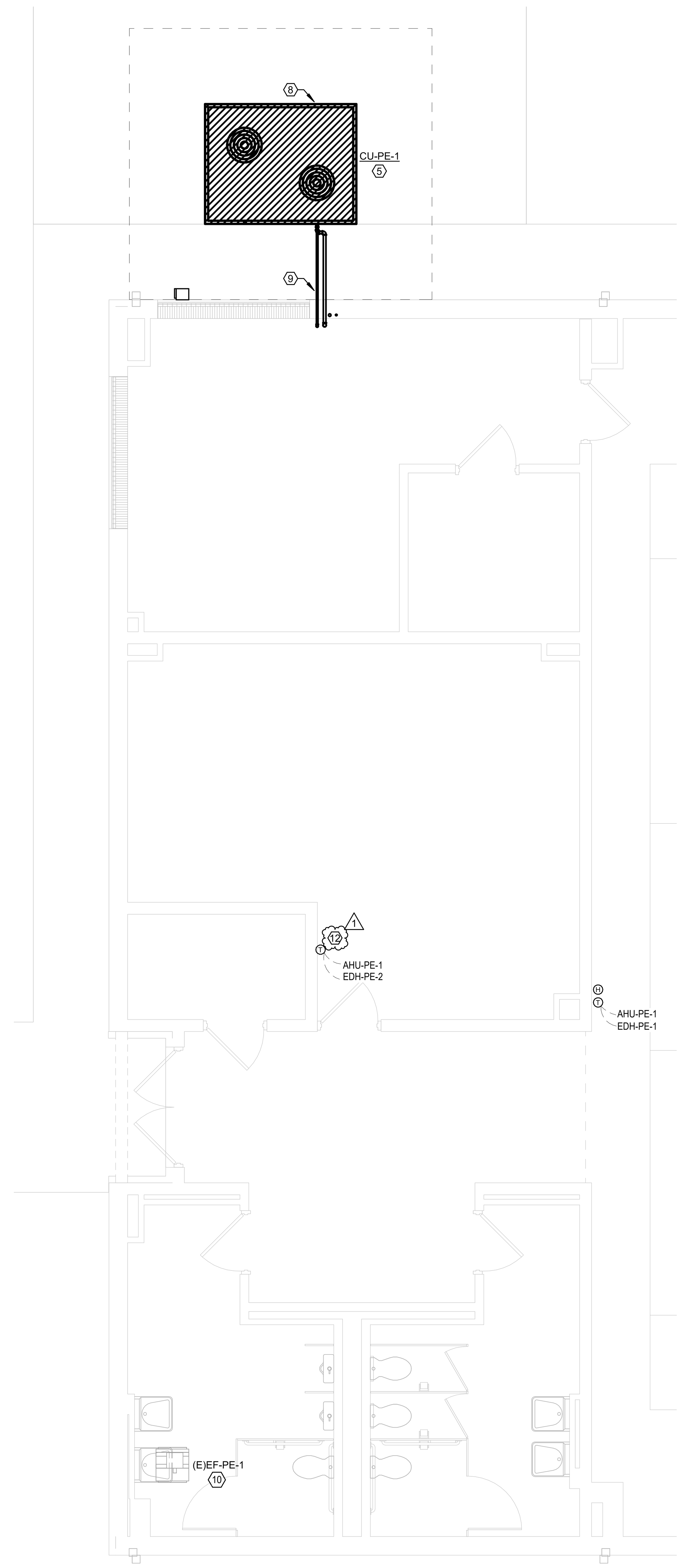
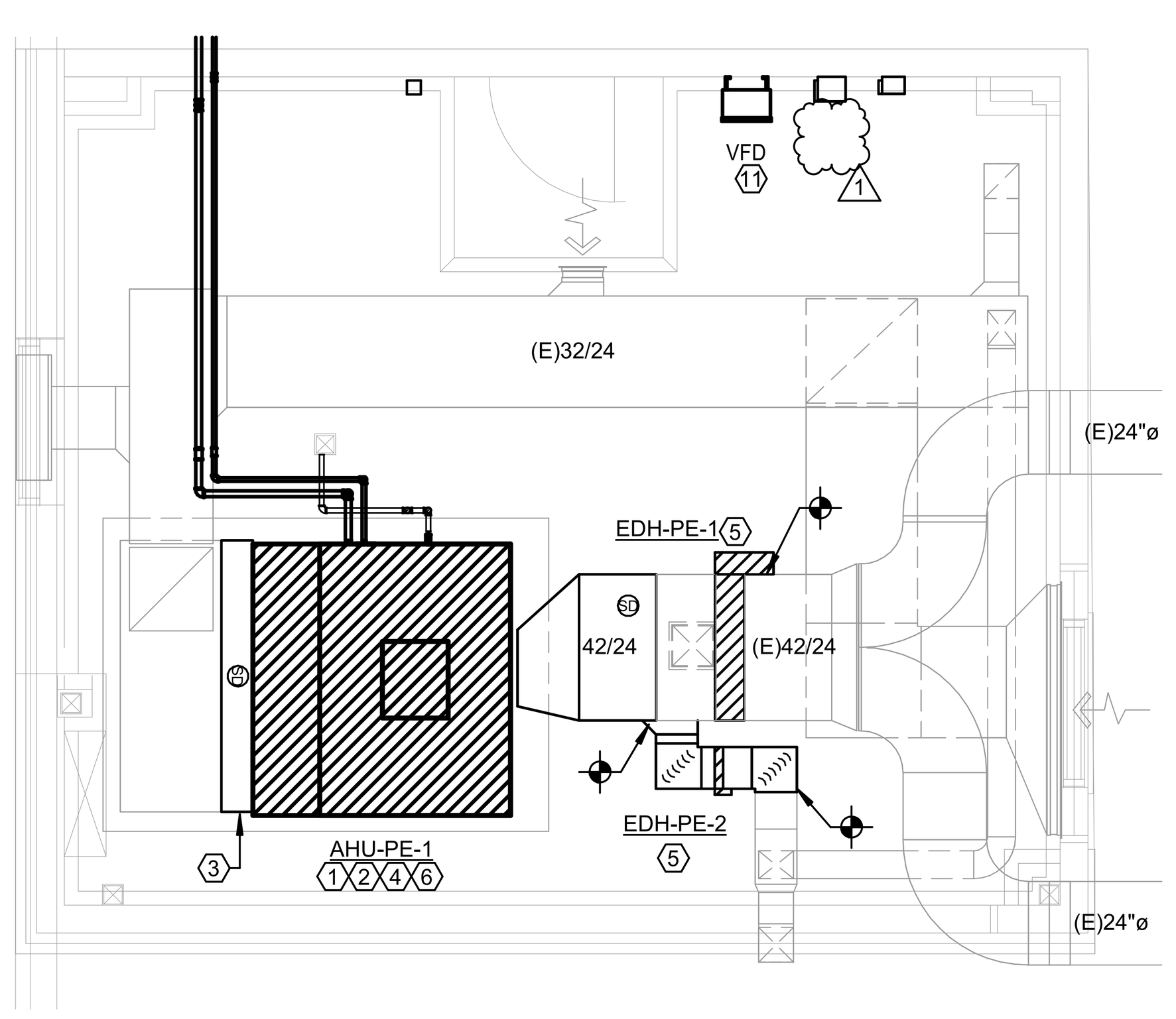
10. INTERLOCK EXISTING EXHAUST FAN WITH NEW AIR HANDLING UNIT.
11. CONNECT NEW VFD TO EXISTING FIRE ALARM WIRING, RECOMMISION FIRE ALARM SYSTEM TO ENSURE AHU SHUTS DOWN WHEN SIGNALED BY THE FIRE ALARM SYSTEM,
12. (1) PROVIDE NEW NETWORKED PROGRAMMABLE THERMOSTAT PER KLEIN ISD STANDARDS. NEW THERMOSTAT SHALL BE PROVIDED WITH CAPABILITIES TO CONTROL 4 STAGES OF COOLING.



3 MECHANICAL ENLARGED PLAN - LEVEL 1 - NITSCH GYM
Scale: 1/4" = 1'-0"



4 MECHANICAL ENLARGED PLAN - LEVEL 2 - NITSCH - NITSCH MECH 415 SF
Scale: 1/4" = 1'-0"

GENERAL NOTES:

1. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL EQUIPMENT BEING REMOVED ROM THIS PROJECT. THIS INCLUDES BUT IS NOT LIMITHED TO CHILLERS, AIR HANDLING UNITS, FANS, CONDENSING UNITS, BMCS CONTROL PANELS, TEMPERATURE SENSORS, AND CONTROL VALVES.
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SYMBOL LEGEND

SYMBOL	DESCRIPTION
RENOVATIONS	
⌖	POINT OF CONNECTION FROM NEW TO EXISTING
☐ (solid)	ITEM TO REMAIN
⬚ (dashed)	ITEM TO BE REMOVED

DEMOLITION KEYED NOTES:

1. REMOVE EXISTING AIR HANDLING UNIT AND ASSOCIATED CONDENSATE PIPING. EXISTING DUCTWORK SHALL REMAIN AND REUSED.
2. EXISTING CONCRETE PAD SHALL REMAIN AND BE REUSED.
3. REMOVE EXISTING SUPPLY DUCTWORK UP TO THIS POINT.
4. REMOVE EXISTING RETURN PLENUM.
5. REMOVE EXISTING WALL LOUVER. EXISTING OPENING SHALL BE SEALED TO MATCH EXISTING WALL FINISH.
6. REMOVE EXISTING CONCRETE PAD.
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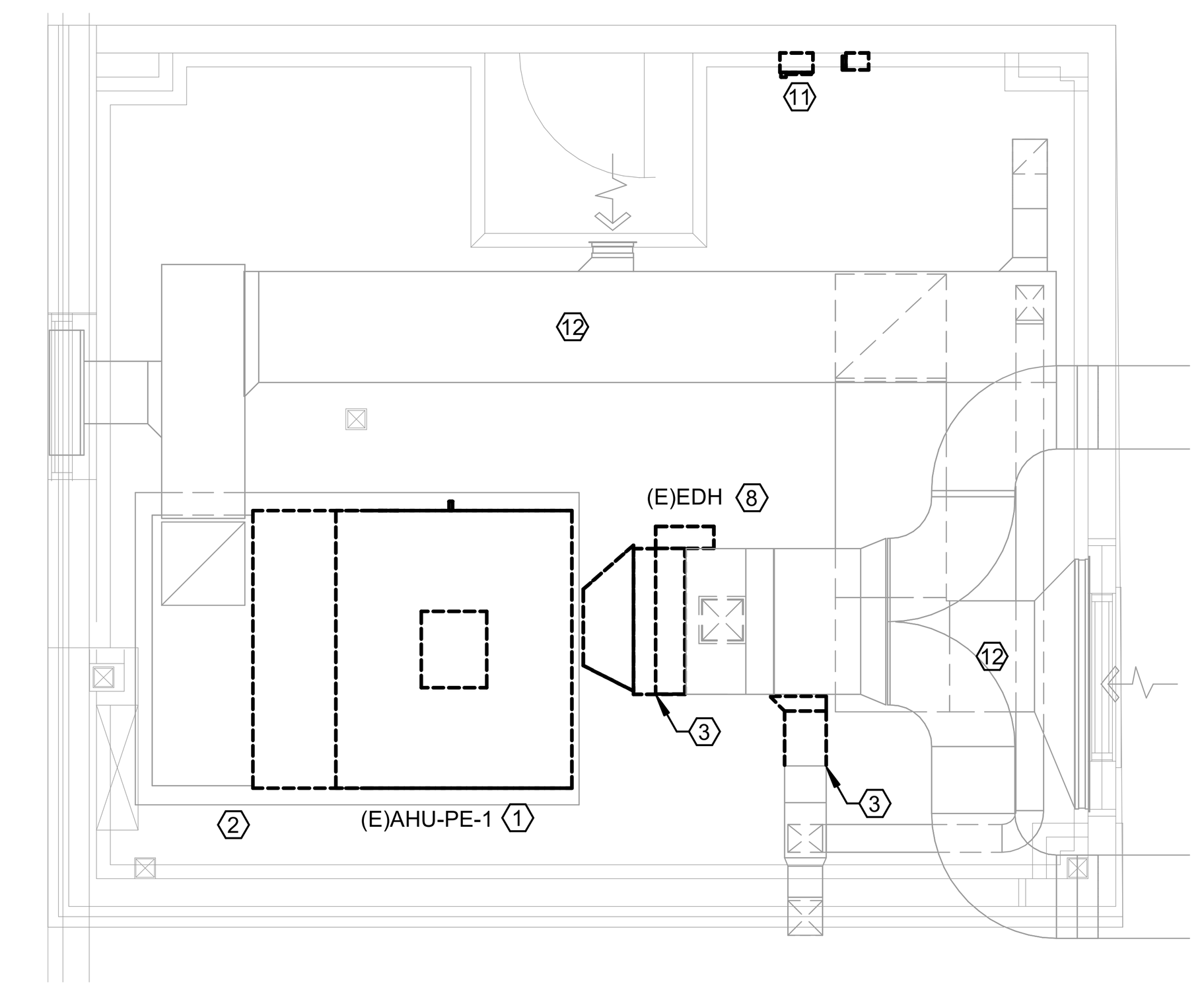
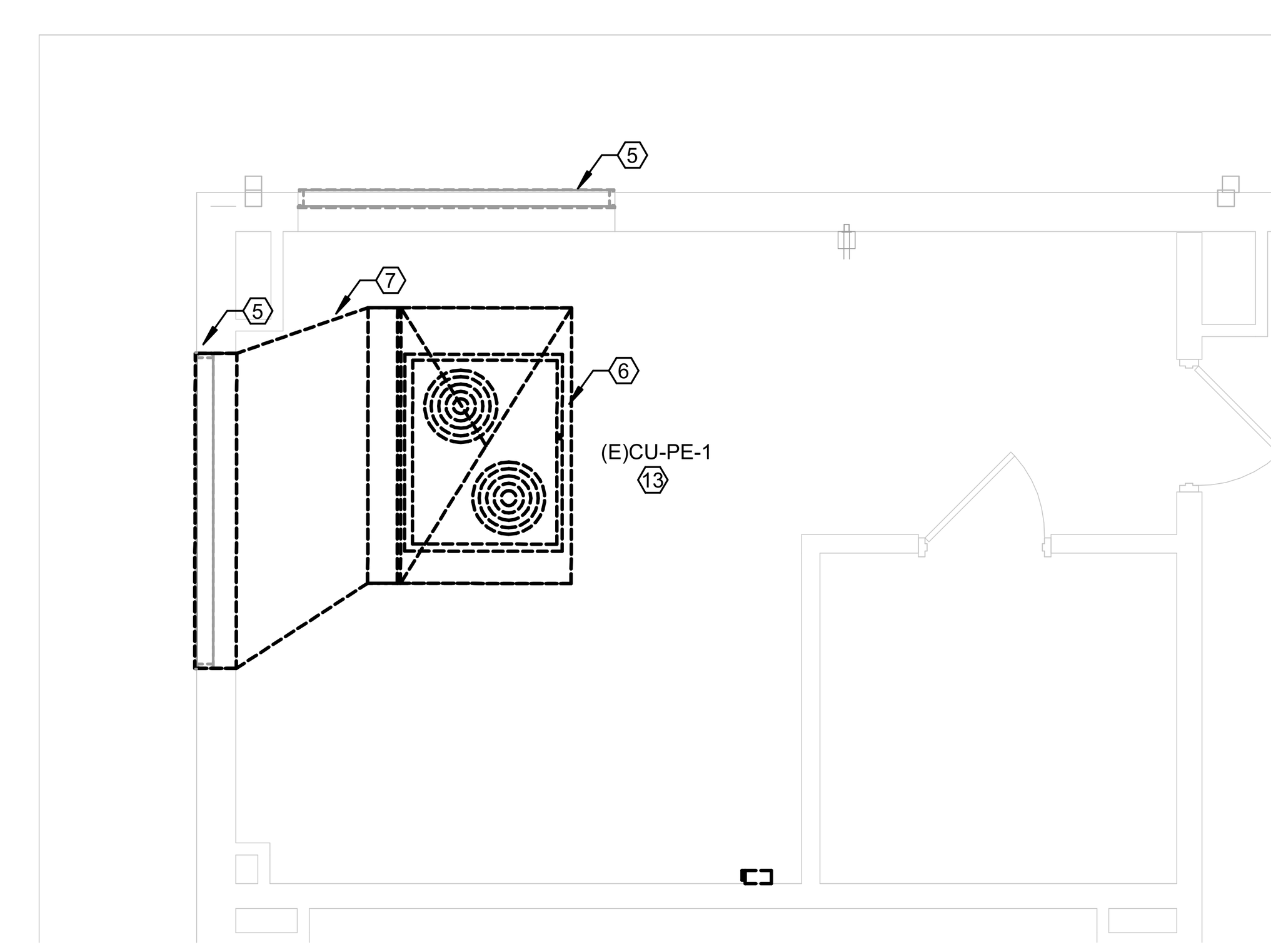
8. REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING DUCTWORK SHALL REMAIN AND REUSED.
9. REMOVE EXISTING RETURN DUCTWORK UP TO THIS POINT.
10. REMOVE EXISTING OUTSIDE AIR DUCTWORK UP TO THIS POINT.
11. REMOVE EXISTING ELECTRICAL STARTER.
12. EXISTING RETURN DUCTWORK TO REMAIN AND BE REUSED.
13. REMOVE EXISTING CONDENSER UNIT AND ASSOCIATED REFRIGERANT LINES.



2 MECHANICAL DEMOLITION ENLARGED PLAN - LEVEL 2 - NITSCH - NITSCH MECH 415 SF
Scale: 1/4" = 1'-0"



1 MECHANICAL DEMOLITION ENLARGED PLAN - LEVEL 1 - NITSCH GYM
Scale: 1/4" = 1'-0"

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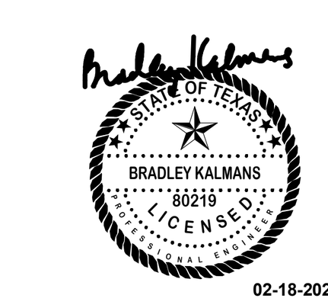


ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
1	Addendum 02	02/18/2026

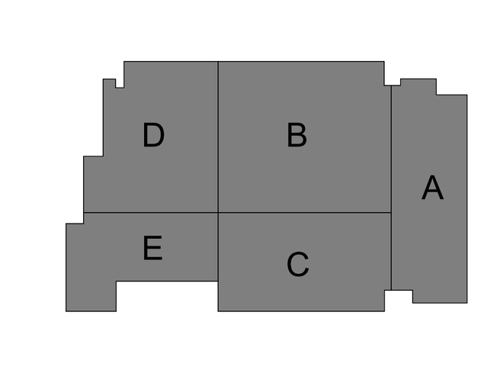
Project Director:	MR
Designed By:	IP
Checked By:	VP
Drawn By:	IP

PROJECT NO.
25-0225.00

SHEET TITLE
MECHANICAL ENLARGED PLAN - NITSCH

SHEET NO.
M62.01

KISD 2025 FRP



KEY PLAN

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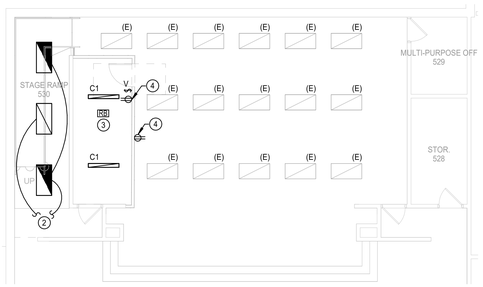
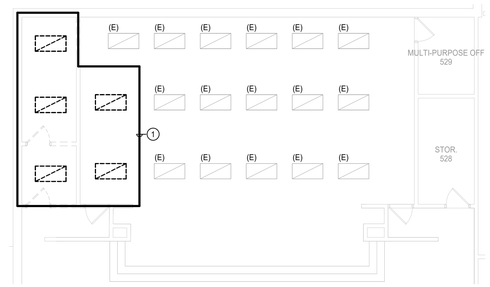


N
3 **ELECTRICAL PLAN - LEVEL 1 - KAISER - STAGE**
Scale: 1/8" = 1'-0"



N
2 **ELECTRICAL DEMOLITION PLAN - KAISER - STAGE**
Scale: 1/8" = 1'-0"

FIRE ALARM NOTES

A. FIRE ALARM SYSTEM IS PERFORMANCE BASED PER SPECIFICATIONS. CONTRACTOR TO REFERENCE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

B. A LICENSED FIRE ALARM PLANNING SUPERINTENDENT CERTIFIED TO A MINIMUM LEVEL 3, IN THE SUBFIELD OF FIRE ALARM SYSTEMS THROUGH THE NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES (NICET), SHALL PROVIDE PLANS AND CALCULATIONS FOR A MANUAL AND AUTOMATIC FIRE DETECTION AND ALARM SYSTEM TO COMPLY WITH THE BUILDING SPACE LAYOUT, BUILDING OCCUPANCY, CURRENT NFPA 72, LOCAL AND STATE CODE REQUIREMENTS, AND THE FIRE ALARM AND DETECTION SYSTEM SPECIFICATIONS.

C. FIRE ALARM DEVICES ARE SHOWN FOR REFERENCE ONLY, FIRE ALARM CONTRACTOR IS RESPOSIBLE FOR VERIFYING EXISTING LOCATIONS AND PROVIDING A COMPLETE AND FUNCTIONING, CODE COMPLIANT SYSTEM.

LINETYPE LEGEND

———	EXISTING TO REMAIN
– – – –	DISCONNECT AND REMOVE
———	NEW WORK

ELECTRICAL KEYED NOTES

1 UNLESS NOTED OTHERWISE, DISCONNECT AND REMOVE ALL EXISTING INTERIOR LIGHT FIXTURES AND SALVAGE FOR RE-USE. UNLESS INDICATED OTHERWISE EXISTING NORMAL AND EMERGENCY POWER 277V CIRCUITS TO REMAIN IN PLACE FOR RE-USE. REMOVE ALL EXISTING LIGHTING CONTROLS EQUIPMENT AND DEVICES. INCLUDING BUT NOT LIMITED TO SWITCH-LEGS, RELAYS, LIGHTING CABINETS, H-LINK AND WEB LINK, CONTACTORS AND SENSORS.

2 INSTALL EXISTING LIGHT FIXTURES SALVAGED AFTER DEMOLITION AS SHOWN. REPLACE DAMAGED LENSES AND PROVIDE NEW FLUORESCENT LAMPS. CONNECT TO EXISTING CIRCUITS AND CONTROLS IN EXISTING CAFETERIA. PROVIDE EMERGENCY CIRCUIT FOR HATCHED FIXTURES. EXTEND WIRING WITH MATCHING CONDUCTORS/CONDUIT TO EXISTING LOCATION AND/OR NEW FIXTURES. FIELD VERIFY CONNECTED LOAD NOT TO EXCEED 3500 W @ 277V. TYPICAL.

3 CONNECT TO EXISTING CIRCUITS AND CONTROLS IN EXISTING CAFETERIA. PROVIDE EMERGENCY CIRCUIT FOR HATCHED FIXTURES. EXTEND WIRING WITH MATCHING CONDUCTORS/CONDUIT TO EXISTING LOCATION AND/OR NEW FIXTURES. FIELD VERIFY CONNECTED LOAD NOT TO EXCEED 3500 W @ 277V. TYPICAL.

4 PROVIDE NEW RECEPTACLES AS SHOWN AND CONNECT TO EXISTING CIRCUITS LEFT IN PLACE AFTER DEMOLITION. EXTEND CONDUCTORS/CONDUIT WITH MATCHING SIZE TO NEW LOCATION. FIELD VERIFY CONNECTED LOAD NOT TO EXCEED 1500 W @ 120 V.

5 TEMPORARILY DISCONNECT AND REMOVE EXISTING LIGHTING FIXTURE AND RE-LOCATE AS SHOWN. PROVIDE LINE VOLTAGE SWITCH AND CONNECT EXISTING CORRIDOR LIGHTING FOR LOCAL CONTROL. EXTEND CONDUCTORS/CONDUIT WITH MATCHING SIZE TO NEW LOCATION.

6 NEW PA SYSTEM HEAD END. PROVIDE NEW RECEPTACLE AS SHOWN AND CONNECT TO EXISTING CIRCUIT LEFT IN PLACE AFTER DEMOLITION. EXTEND CONDUCTORS/CONDUIT WITH MATCHING SIZE TO NEW LOCATION. FIELD VERIFY CONNECTED LOAD NOT TO EXCEED 1500 W @ 120 V. COORDINATE FINAL PA SYSTEM LOCATION.

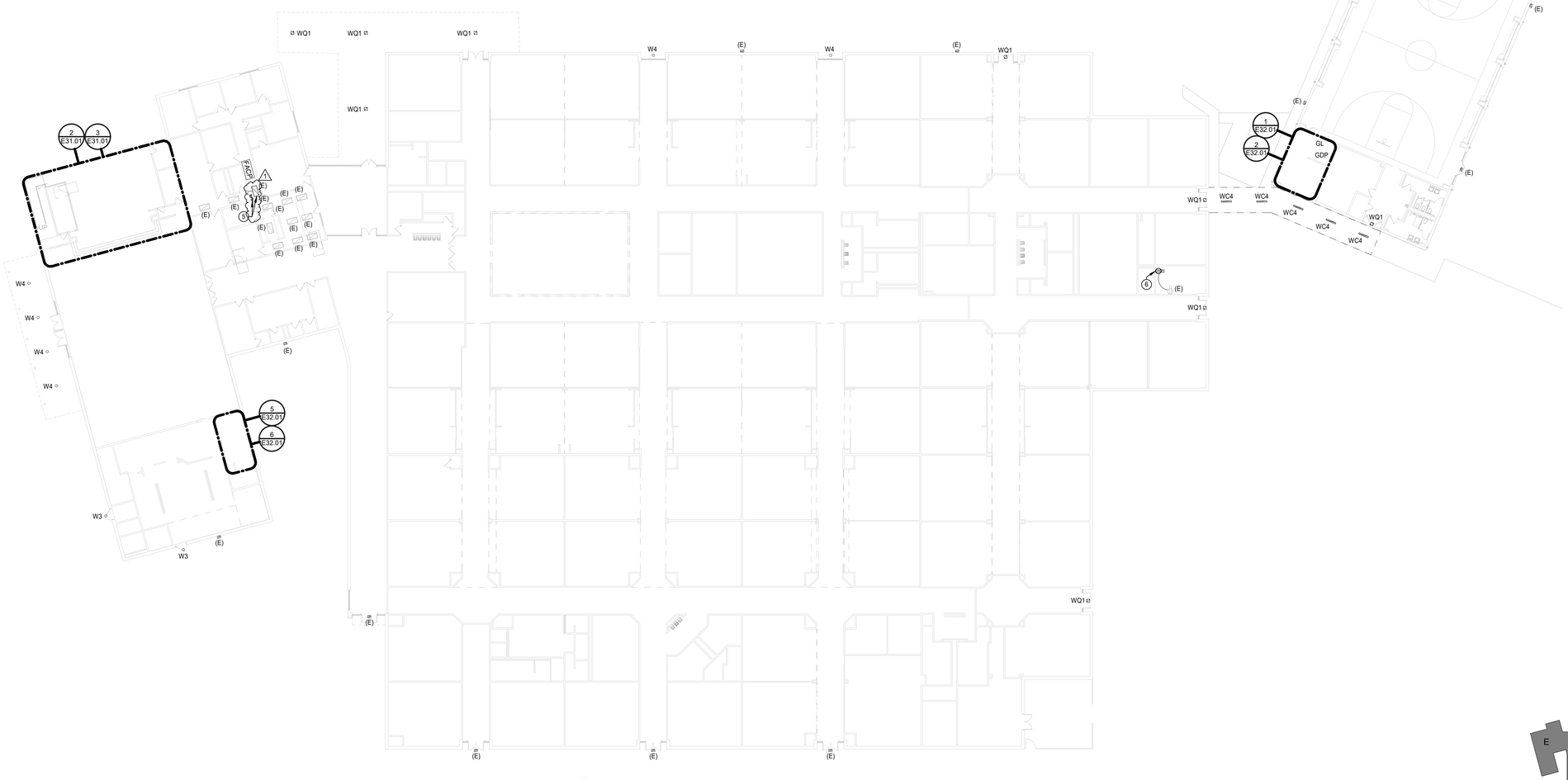
DEMOLITION / EXISTING DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION, AND WHEN AVAILABLE, EXISTING RECORD DOCUMENTS. REPORT DISCREPANCIES TO ARCHITECT BEFORE DISTURBING EXISTING INSTALLATION, AND IMMEDIATELY AFTER SUCH DISCREPANCIES ARE DISCOVERED. CONTRACTOR TO VERIFY EXISTING CONDITIONS ON FIELD AND NOTIFY ENGINEER IF THERE ARE ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND DRAWINGS PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR SHALL REMOVE SUCH EXISTING WORK AS CALLED FOR ON THE DRAWINGS OR AS REQUIRED TO CLEAR THE AREAS OF NEW CONSTRUCTION.

REMOVE EXISTING AND PROVIDE NEW DUCT DETECTORS FOR AIR HANDLING UNITS BEING REPLACED BY DIVISION 23.

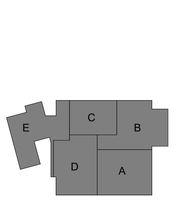
LIGHTING GENERAL NOTES

1 UNLESS NOTED OTHERWISE, DISCONNECT AND REMOVE EXISTING EXTERIOR LIGHTING FIXTURES FOR REPLACEMENT. EXISTING CIRCUITS TO REMAIN IN PLACE FOR RE-USE.

2 CONNECT NEW LIGHT FIXTURES TO EXISTING CIRCUITS LEFT IN PLACE AFTER DEMOLITION. EXTEND CONDUCTORS/CONDUIT WITH MATCHING SIZE TO EXISTING LOCATION AND/OR NEW FIXTURES.



N
1 **ELECTRICAL COMPOSITE PLAN - LEVEL 1 - KAISER ES**
Scale: 1" = 20'-0"



KEY PLAN

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum 02	02/18/2026

Project Director:	MR
Designed By:	LT
Checked By:	PS
Drawn By:	LT

PROJECT NO.
25-0225.00

SHEET TITLE
ELECTRICAL COMPOSITE PLAN - LEVEL 1 - KAISER ES

SHEET NO.
E31.01

KISD 2025 FRP

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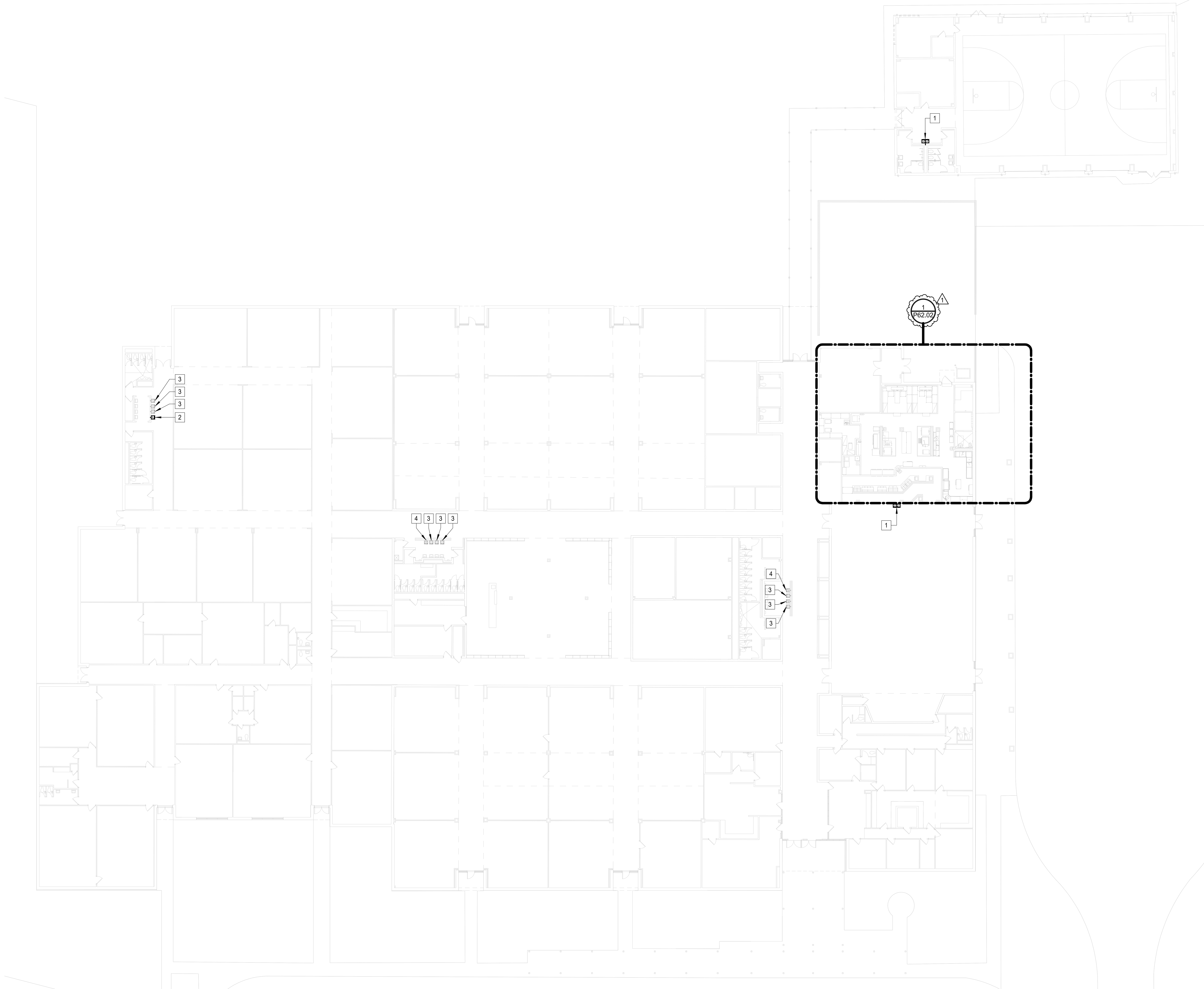
Project No: 2550-02120-00

PLUMBING GENERAL NOTES

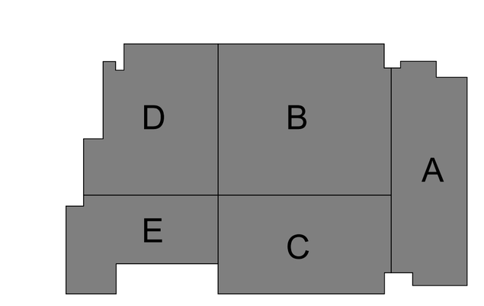
1. CONTRACT DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION, AND WHEN AVAILABLE, EXISTING RECORD DOCUMENTS. CONTRACTOR TO VERIFY AT SITE EXACT LOCATIONS, AND SIZES OF EXISTING PIPING. REPORT DISCREPANCIES TO ARCHITECT BEFORE DISTURBING EXISTING INSTALLATION, AND IMMEDIATELY AFTER SUCH DISCREPANCIES ARE DISCOVERED. CONTRACTOR TO VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF THERE ARE ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND DRAWINGS PRIOR TO COMMENCEMENT OF WORK.
2. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTAL OF BID TO DETERMINE CONDITIONS AFFECTING THE WORK. ANY ITEMS WHICH ARE NOT COVERED IN THE BID DOCUMENTS OR ANY PROPOSED SUBSTITUTIONS SHALL BE LISTED SEPARATELY AND QUALIFIED IN THE CONTRACTORS BID. SUBMITTAL OF BID SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.
3. PLUMBING FIXTURES/EQUIPMENT SHOWN ON PLAN THAT ARE NOT IDENTIFIED AND DO NOT HAVE A FIXTURE DESIGNATION ARE EXISTING AND ARE TO REMAIN.
4. ANY OTHER ITEMS NOT REFERENCED WHICH ARE LOCATED IN THE DEMOLISHED SPACE (VENT, WASTE, WATER HEATER, PLUMBING FIXTURE, ETC.) THAT ARE IDENTIFIED OR DISCOVERED DURING DEMOLITION WHICH WILL NOT BE USED FOR THIS PROJECT, SHALL BE DEMOLISHED BACK TO THE MAIN SOURCE OR RISER, AND DEVICES SHALL BE RETAINED TO THE OWNER STORAGE AS DIRECTED BY THE ARCHITECT/OWNER.
5. OWNER OR ITS REPRESENTATIVE SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL PLUMBING FIXTURES/ EQUIPMENT BEING REMOVED FROM THIS PROJECT. THIS INCLUDES BUT NOT LIMITED TO PUMPS, HEATERS, AND STAINLESS STEEL SINKS. CONTRACTOR TO NOTIFY DISTRICT PRIOR TO DEMOLITION WORK TO DISCUSS ALL RETURNED ITEMS TO DISTRICT.

PLUMBING KEYED NOTES

1 EXISTING BI-LEVEL ELECTRIC DRINKING FOUNTAIN WITH NON-BOTTLE FILLING STATION TO BE REMOVED AND REPLACED WITH A NEW ONE. MAINTAIN EXISTING UTILITIES/ROUGH-IN TO SERVE NEW FIXTURE(S). FIELD VERIFY THE EXACT LOCATION, SIZE, AND CONDITION OF EXISTING PIPING. REPAIR EXISTING PIPING IF NEEDED AND PREPARE FOR NEW CONNECTION.
2 EXISTING SINGLE ELECTRIC DRINKING FOUNTAIN WITH NON-BOTTLE FILLING STATION TO BE REMOVED AND REPLACED WITH A NEW ONE. VERIFY WITH THE DISTRICT WHICH UNIT IS TO BE REPLACED. MAINTAIN EXISTING UTILITIES/ROUGH-IN TO SERVE NEW FIXTURE(S). FIELD VERIFY THE EXACT LOCATION, SIZE, AND CONDITION OF EXISTING PIPING. REPAIR EXISTING PIPING IF NEEDED AND PREPARE FOR NEW CONNECTION.
3 EXISTING SINGLE ELECTRIC DRINKING FOUNTAIN WITH NON-BOTTLE FILLING STATION TO REMAIN.
4 EXISTING RETROFITTED ELECTRIC DRINKING FOUNTAIN WITH BOTTLE FILLING STATION TO REMAIN.



1 **PLUMBING DEMOLITION COMPOSITE PLAN - LEVEL 1 - NITSCH**
Scale: 1" = 20'-0"



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KLEIN ISD
KLEIN, TX

02-18-2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
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KISD 2025 FRP

Project Director:	MR
Designed By:	AA
Checked By:	EH
Drawn By:	AA

PROJECT NO.
25-0225.00

SHEET TITLE
PLUMBING DEMOLITION COMPOSITE PLAN - LEVEL 1 - NITSCH

SHEET NO.
P60.01

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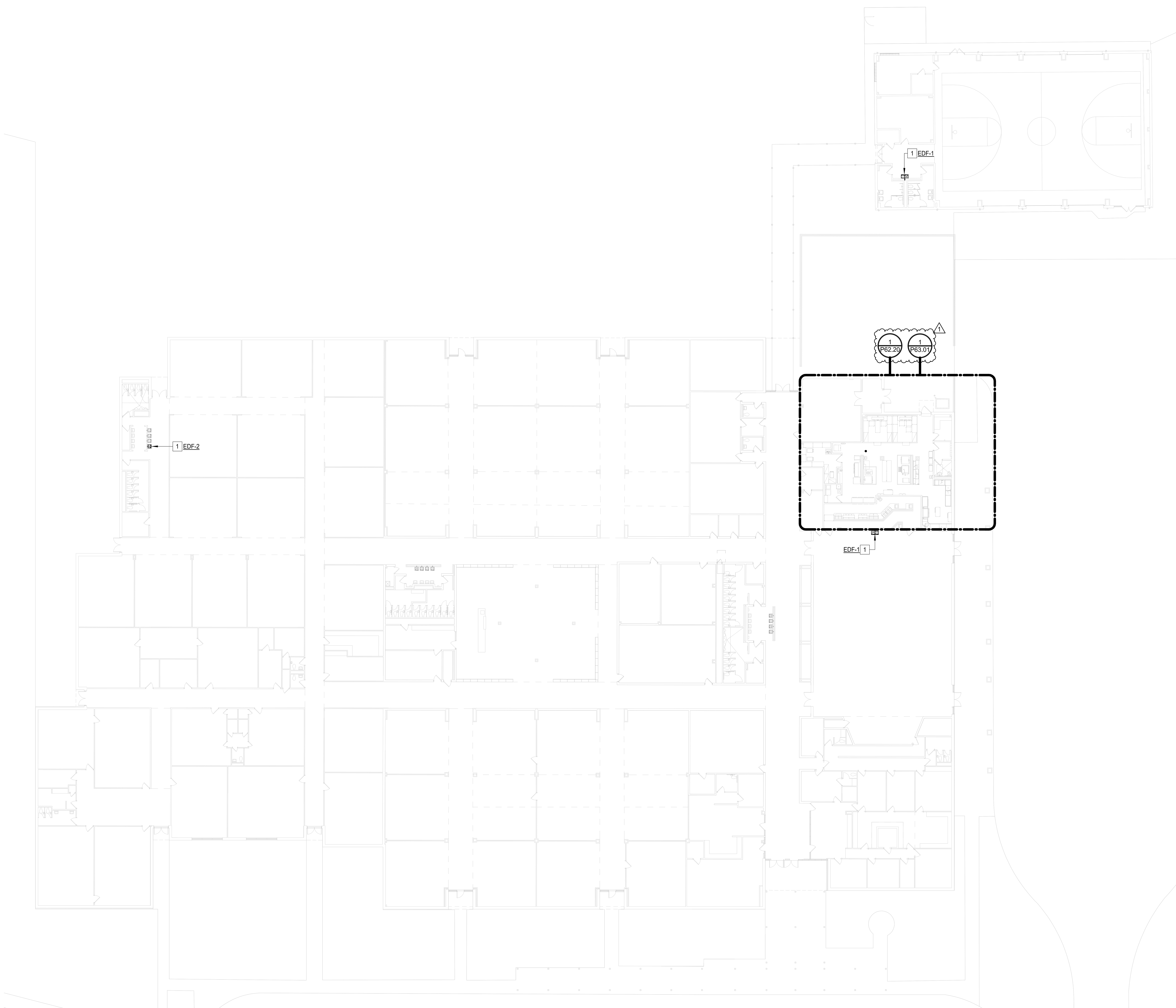
Project No: 2550-02120-00

PLUMBING GENERAL NOTES

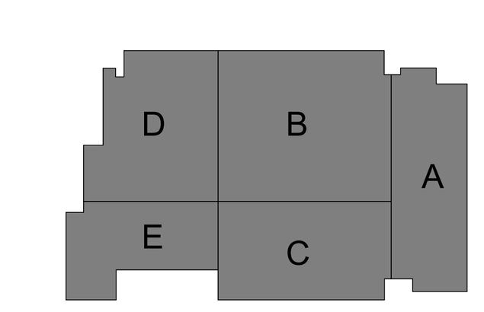
1. CONTRACT DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION, AND WHEN AVAILABLE, EXISTING RECORD DOCUMENTS. CONTRACTOR TO VERIFY AT SITE EXACT LOCATIONS, AND SIZES OF EXISTING PIPING. REPORT DISCREPANCIES TO ARCHITECT BEFORE DISTURBING EXISTING INSTALLATION, AND IMMEDIATELY AFTER SUCH DISCREPANCIES ARE DISCOVERED. CONTRACTOR TO VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF THERE ARE ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND DRAWINGS PRIOR TO COMMENCEMENT OF WORK.
2. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTAL OF BID TO DETERMINE CONDITIONS AFFECTING THE WORK. ANY ITEMS WHICH ARE NOT COVERED IN THE BID DOCUMENTS OR ANY PROPOSED SUBSTITUTIONS SHALL BE LISTED SEPARATELY AND QUALIFIED IN THE CONTRACTORS BID. SUBMITTAL OF BID SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.
3. PLUMBING FIXTURES/EQUIPMENT SHOWN ON PLAN THAT ARE NOT IDENTIFIED AND DO NOT HAVE A FIXTURE DESIGNATION ARE EXISTING AND ARE TO REMAIN.
4. REFER TO ARCHITECTS DRAWING FOR EXACT LOCATION OF FLOOR DRAINS.
5. DO NOT SCALE THE PLUMBING DRAWINGS, REFER TO THE DIMENSIONED ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONAL DATA.
6. REFER TO PLUMBING DETAILS AND SCHEDULES SHEET(S).

PLUMBING KEYED NOTES

1 PROVIDE AND INSTALL NEW PLUMBING FIXTURE(S) AS INDICATED. CONNECT TO EXISTING UTILITIES, CW, SANITARY AND VENT.



1 **PLUMBING COMPOSITE PLAN - LEVEL 1 - NITSCH**
Scale: 1" = 20'-0"



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KLEIN ISD
KLEIN, TX

02-18-2026

ISSUED: JANUARY 27, 2026

REVISIONS

Revision No.		Revision Date
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KISD 2025 FRP

Project Director:	MR
Designed By:	AA
Checked By:	EH
Drawn By:	AA

PROJECT NO.
25-0225.00

SHEET TITLE
PLUMBING COMPOSITE PLAN - LEVEL 1 - NISTCH

SHEET NO.
P61.01

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Project No: 2500-02120-00

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PLUMBING GENERAL NOTES

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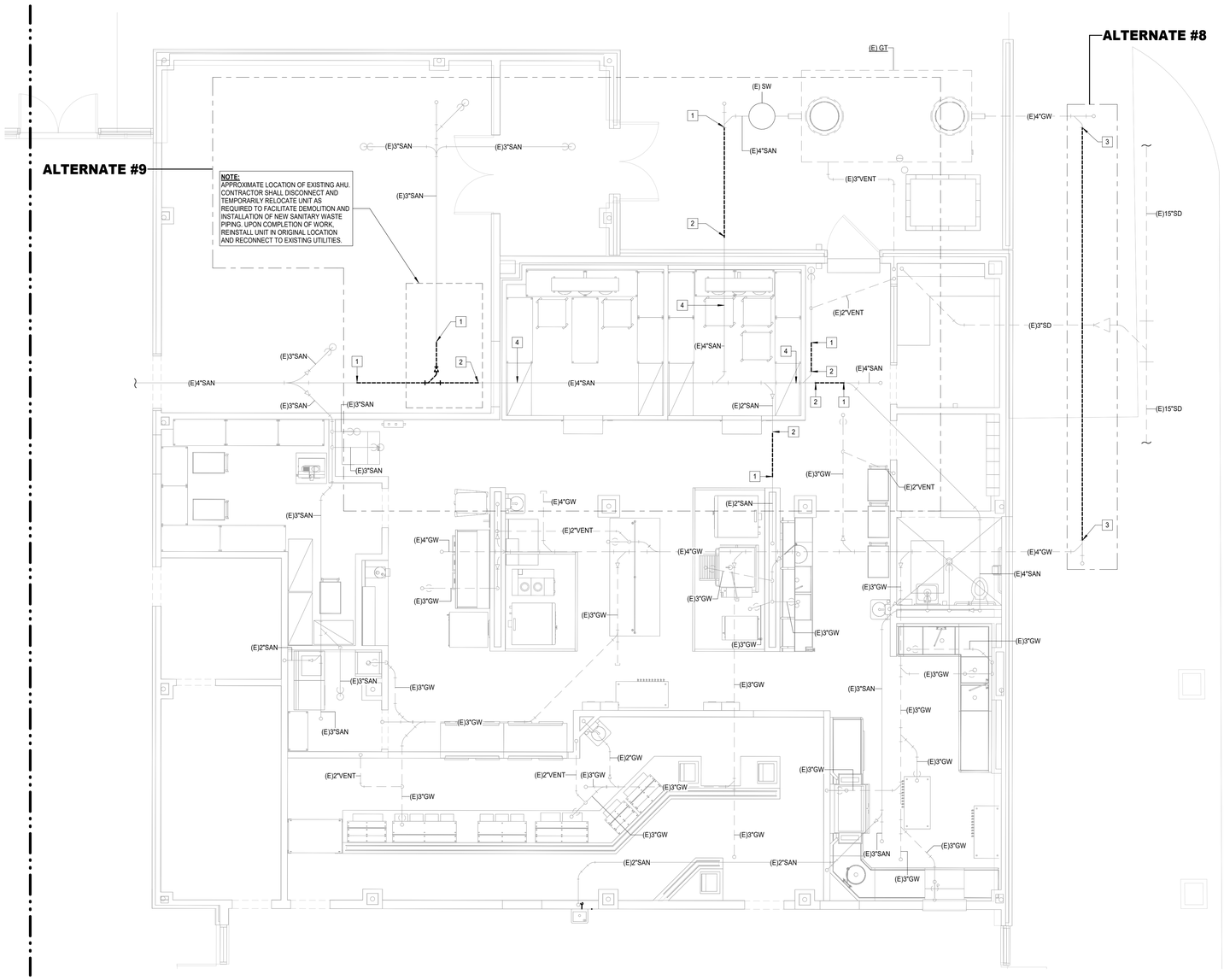
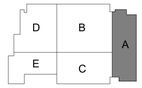
PLUMBING KEYED NOTES

1 REMOVE EXISTING SANITARY TO THIS POINT. REPAIR EXISTING PIPING IF NEEDED AND PREPARE FOR NEW CONNECTION.
2 REMOVE EXISTING SANITARY TO THIS POINT AND CAP.
3 REMOVE EXISTING GREASE WASTE TO THIS POINT. REPAIR EXISTING PIPING IF NEEDED AND PREPARE FOR NEW CONNECTION.
4 EXISTING SANITARY PIPING SHALL BE CAPPED AS INDICATED AND ABANDONED IN PLACE.



1 **PLUMBING DEMOLITION ENLARGED PLAN - KITCHEN - NITSCH**
Scale: 1/4" = 1'-0"



KEY PLAN

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BRADLEY KALMANS
02-18-2026

ISSUED: FEBRUARY 18, 2026

REVISIONS

Revision No.	Revision Date

Project Director:	Approver
Designed By:	Designer
Checked By:	Checker
Drawn By:	Author

PROJECT NO.
25-0225.00

SHEET TITLE
PLUMBING DEMOLITION ENLARGED PLAN - KITCHEN - NISTCH

SHEET NO.
P62.02

KLEIN ISD
KLEIN, TX

KISD 2025 FRP

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Registration: F-4111
Project No: 2550-02120-00

PLUMBING GENERAL NOTES

1. CONTRACT DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION, AND WHEN AVAILABLE, EXISTING RECORD DOCUMENTS. CONTRACTOR TO VERIFY AT SITE EXACT LOCATIONS, AND SIZES OF EXISTING PIPING. REPORT DISCREPANCIES TO ARCHITECT BEFORE DISTURBING EXISTING INSTALLATION, AND IMMEDIATELY AFTER SUCH DISCREPANCIES ARE DISCOVERED. CONTRACTOR TO VERIFY EXISTING CONDITIONS IN FIELD AND NOTIFY ENGINEER IF THERE ARE ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND DRAWINGS PRIOR TO COMMENCEMENT OF WORK.
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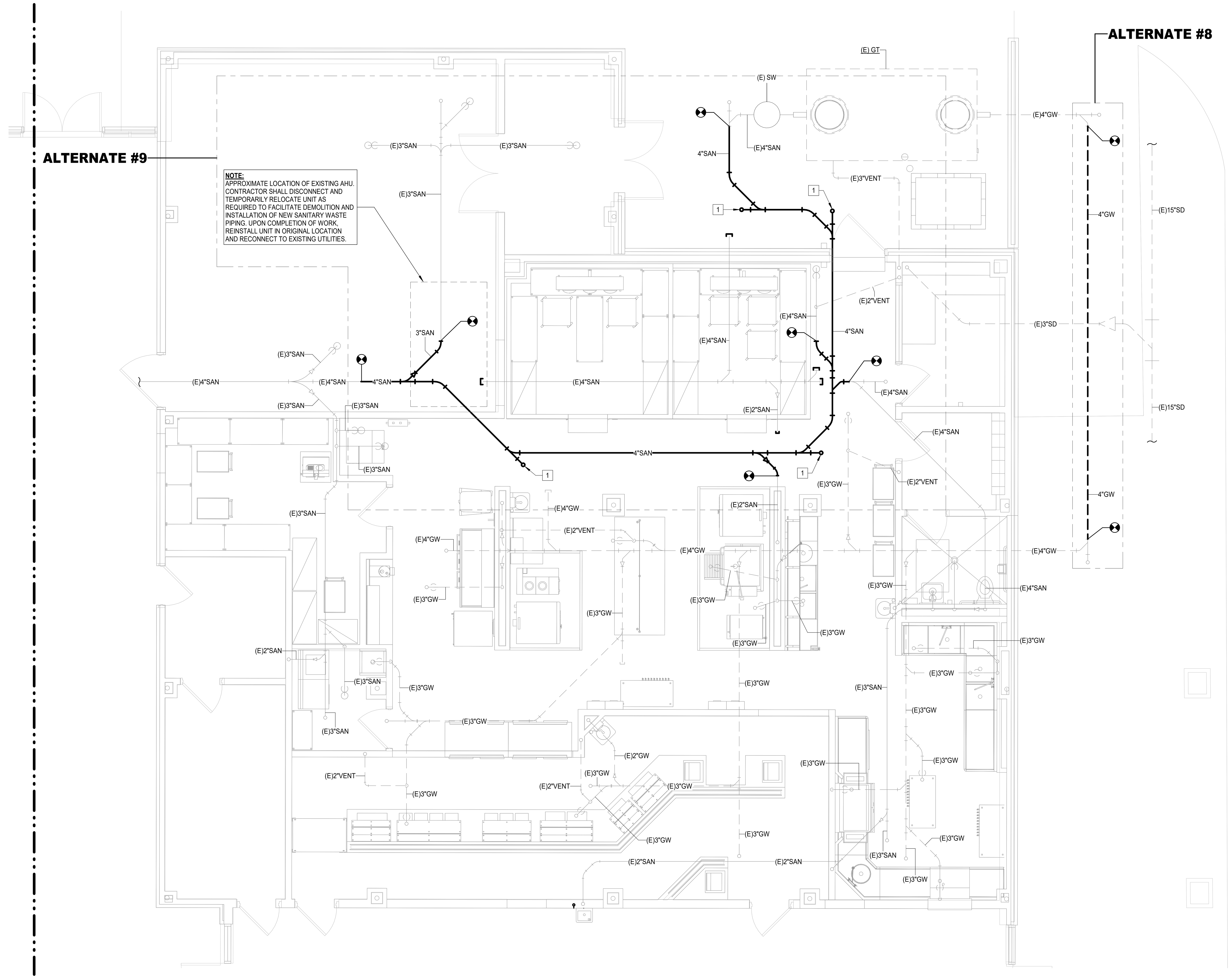
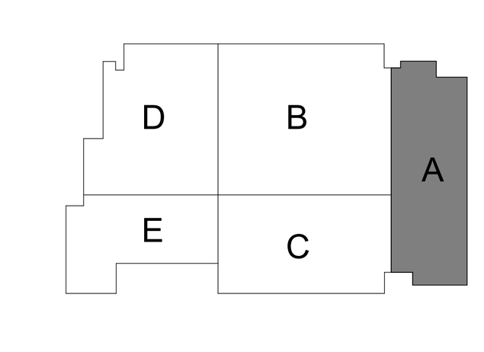
5. SAWCUT EXISTING SLAB AS REQUIRED TO INSTALL NEW PIPING BELOW FLOOR, CONTRACTOR TO SEAL AND PATCH FLOOR TO MATCH EXISTING UPON COMPLETION, CONTRACTOR TO JET AND CAMERA FROM POINT OF CONNECTION TO EXIT POINT OUTSIDE OF BUILDING

PLUMBING KEYED NOTES

1 4" SANITARY FROM CLEANOUT ABOVE.



1 **PLUMBING ENLARGED UNDERFLOOR PLAN - KITCHEN - NITSCH**
Scale: 1/4" = 1'-0"



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KLEIN, TX

ISSUED: FEBRUARY 18, 2026

REVISIONS

Revision No.	Revision Date

Project Director:	Approver
Designed By:	Designer
Checked By:	Checker
Drawn By:	Author

PROJECT NO.
25-0225.00

SHEET TITLE
PLUMBING ENLARGED UNDERFLOOR PLAN - KITCHEN - NISTCH

KISD 2025 FRP

SHEET NO.
P62.20

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Project No: 2500-02120-00

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PLUMBING GENERAL NOTES

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5. DO NOT SCALE THE PLUMBING DRAWINGS, REFER TO THE DIMENSIONED ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONAL DATA.
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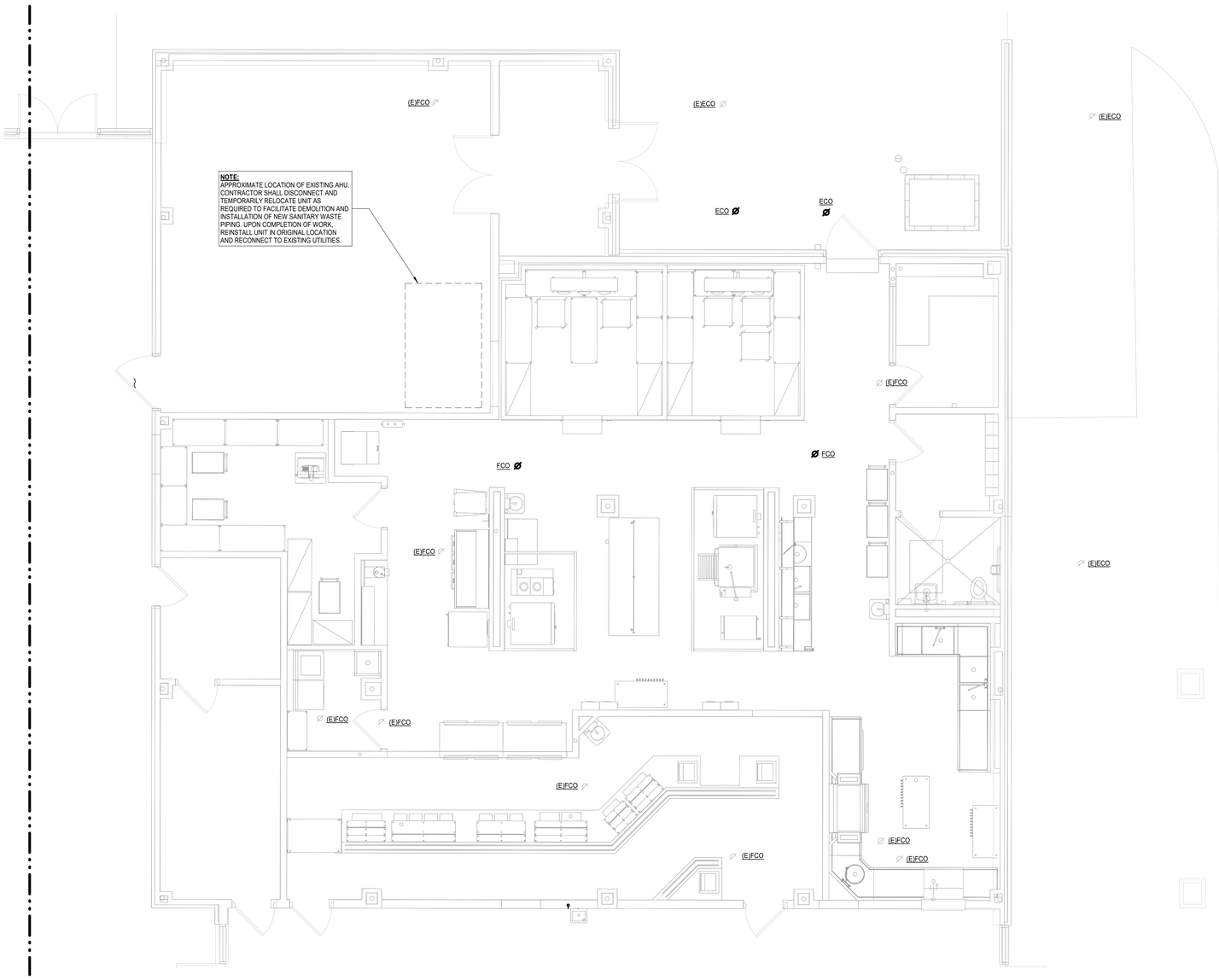

1 **PLUMBING ENLARGED PLAN - KITCHEN - NITSCH**
Scale: 1/4" = 1'-0"

KEY PLAN
D B A E C

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BRADLEY KALMANS
02-18-2026

ISSUED: FEBRUARY 18, 2026

REVISIONS

Revision No.	Revision Date

Project Director:	Approver
Designed By:	Designer
Checked By:	Checker
Drawn By:	Author

PROJECT NO.
25-0225.00

SHEET TITLE
PLUMBING ENLARGED PLAN - KITCHEN - NISTCH

SHEET NO.
P63.01

KISD 2025 FRP

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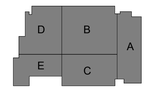
KLEIN ISD
KLEIN, TX

1 **PLUMBING ROOF PLAN - NITSCH**
Scale: 1" = 20'-0"



KEY PLAN

ISSUED: FEBRUARY 18, 2026

REVISIONS

Revision No.	Revision Date

Project Director:	MR
Designed By:	AA
Checked By:	EH
Drawn By:	AA

PROJECT NO.
25-0225.00

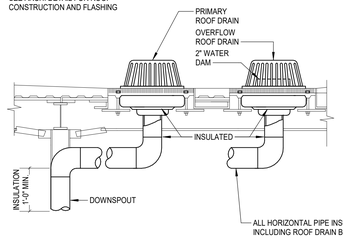
SHEET TITLE
PLUMBING ROOF PLAN - NISTCH

SHEET NO.
P64.01

KISD 2025 FRP

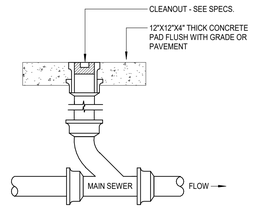
PST02 - 10/29/20

NOTE:
SEE ARCH. DETAIL FOR ROOF CONSTRUCTION AND FLASHING



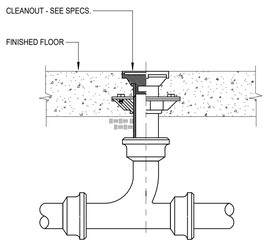
3 STORM DRAIN INSULATION
SCALE: NONE

PSAN04- XX/XX/XX



2 EXTERIOR CLEANOUT
SCALE: NONE

PSAN01- XX/XX/XX



1 FLOOR CLEANOUT
SCALE: NONE

PLUMBING GENERAL NOTES

1. WITHIN THE EXISTING BUILDING, EXISTING WATER, WASTE AND VENT SERVICES ARE TO BE MODIFIED AS REQUIRED AND REUSED FOR THE INSTALLATION OF NEW AND/OR RELOCATED PLUMBING FIXTURES. REFER TO PLUMBING FLOOR PLANS FOR POINTS OF CONNECTION.
2. WITHIN THE EXISTING BUILDING, SAWCUT AND REMOVE EXISTING FLOOR SLAB AS REQUIRED TO PROVIDE NEW AND/OR RELOCATED PLUMBING FIXTURES, CLEANOUTS, AND UNDERSLAB WASTE AND VENT PIPING. PATCH AND REFINISH FLOOR TO MATCH EXISTING.
3. IN AREAS WHERE THE FLOOR SLAB IS REMOVED, CONTRACTOR SHALL ALSO REMOVE UNDERSLAB WASTE AND VENT PIPING WHICH SERVES FIXTURES DESIGNATED FOR REMOVAL PRIOR TO ANY REMOVAL, FIELD VERIFY THAT LINES TO BE REMOVED DO NOT SERVE ANY EXISTING FIXTURES TO REMAIN OR NEW FIXTURES TO BE INSTALLED.
4. IN AREAS WHERE THE FLOOR SLAB IS NOT REMOVED, CONTRACTOR SHALL ABANDON IN PLACE ANY UNDERSLAB WASTE AND VENT PIPING NO LONGER NEEDED, UNLESS THE PIPING MUST BE REMOVED TO ACCOMMODATE NEW CONSTRUCTION. IF NEW WORK DOES NOT NECESSITATE THEIR REMOVAL, CUT AND PLUG SUCH LINES BELOW SLAB, AND PATCH FLOOR TO MATCH EXISTING.
5. FIELD VERIFY EXACT LOCATION, SIZE, DEPTH, DIRECTION OF FLOW, CAPACITY, PIPE MATERIAL AND CONDITION OF EXISTING WASTE PIPING PRIOR TO BEGINNING CONSTRUCTION. ENSURE THAT PROPER CONNECTIONS TO AND EXTENSION OF SUCH UTILITIES CAN BE MADE.
6. WASTE LINES TO BE RE-USED OR RECONNECTED TO SHALL BE THOROUGHLY RODDED OUT AND FLUSHED TO ENSURE THEY ARE FREE FROM BLOCKAGES.
7. CONTRACTOR SHALL COORDINATE ROUTING OF PIPING BELOW SLAB WITH COLUMN FOOTINGS, GRADE BEAMS, UNDERGROUND PLUMBING AND ELECTRICAL UTILITIES, AND OTHER SUB-SURFACE BUILDING ELEMENTS.
8. CONTRACTOR SHALL COORDINATE ROUTING OF PIPING IN CEILING SPACES WITH MECHANICAL AND ELECTRICAL EQUIPMENT, DUCTWORK AND CONDUIT. SHOULD A CONFLICT OCCUR THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER PRIOR TO INSTALLING AN ALTERNATE PIPING PLAN.
9. CONTRACTOR TO COORDINATE ALL REMODEL WORK WITH THE WORK OF OTHER TRADES TO AVOID CONFLICTS AND TO MINIMIZE INTERRUPTION OF SERVICES.
10. COORDINATE ALL FIXTURE AND EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS WITH LATEST ARCHITECTURAL DRAWINGS AND SPECIFICATIONS PRIOR TO ANY ROUGH-INS.
11. DO NOT ROUGH-IN FROM THESE DRAWINGS. REFER TO LATEST ARCHITECTURAL DRAWINGS FOR DIMENSIONED LOCATIONS.
12. CONTRACTOR TO FIELD VERIFY AS NECESSARY THE EXACT ROUTING AND SIZES OF ALL PIPING.
13. ALL WORK, METHODS AND INSTALLATIONS INVOLVED IN THE PLUMBING DESIGN SHALL BE IN ACCORDANCE WITH THE CITY BUILDING CODE, INSPECTION REGULATIONS AND ALL OTHER OFFICIALS HAVING JURISDICTION.
14. THE PROPER INSTALLATION OF NEW FIXTURES AND THE PROPER CONTINUED OPERATION OF EXISTING FIXTURES TO REMAIN SHALL DETERMINE THE EXTENT AND NATURE OF PLUMBING REMODEL WORK.
15. EACH VENT SHALL TERMINATE VERTICALLY NOT LESS THAN 6" ABOVE ROOF. MAINTAIN MINIMUM 10'-0" DISTANCE BETWEEN VENT TERMINALS THROUGH ROOF AND ALL FRESH AIR INTAKES, AND A MINIMUM 5'-0" FROM ANY EXTERIOR WALL.
16. PRIOR TO BEGINNING CONSTRUCTION, COORDINATE BUILDING BACKFLOW PREVENTION REQUIREMENTS WITH THE LOCAL AUTHORITY HAVING JURISDICTION AND PROVIDE AS DIRECTED.

SHOCK ARRESTOR SCHEDULE

P.D.I. SYMBOLS:	FIXTURE UNITS:	THREADED CONNECTION	CERTIFICATION
A	1 - 11	1/2"	ASSE 1010
B	12 - 32	3/4"	ASSE 1010
C	33 - 60	1"	ASSE 1010
D	61 - 113	1"	ASSE 1010
E	114 - 154	1"	ASSE 1010
F	155 - 330	1"	ASSE 1010

PLUMBING FIXTURE SCHEDULE

TYPE: EDF-1 (T.A.S. COMPLIANT) - INTERIOR WITH BOTTLE FILLER
DESCRIPTION: WALL HUNG, BARRIER FREE, SELF-CONTAINED, VANDAL RESISTANT BOTTLE FILLING STATION AND BI-LEVEL ADA COOLER, NON-FILTERED REFRIGERATED STAINLESS. CHILLING CAPACITY OF 8.0 GPH (GALLONS PER HOUR) OF 50F DRINKING WATER, BASED ON 80F INLET WATER AND 90F AMBIENT, PER ASHRAE 18 TESTING. FEATURES SHALL INCLUDE GREEN COUNTER, LAMINAR FLOW, REAL DRAIN, VANDAL RESISTANT. FURNISHED WITH VANDAL RESISTANT BUBBLER. ELECTRONIC BOTTLE FILLER BUTTON WITH MECHANICAL FRONT BUBBLER BUTTON ACTIVATION. PROVIDE CANE TOUCH APRON IN ALL STAINLESS STEEL ON ALL UNITS MOUNTED WITH A CLEAR KNEE SPACE GREATER THAN 27" HIGH.
HALSEY TAYLOR #HTHB-HVRBBL-NF WITH APRON #98324C.
P-TRAP: 1-1/4" CHROME PLATED CAST BRASS TRAP WITH CLEANOUT AND EXTENSION TO WALL WITH ESCUTCHEON. MCGUIRE #8872.
SUPPLIES: 1/2" I.P.S. X 3/8" O.D.CHROME PLATED LOOSE KEY STOP VALVE WITH ESCUTCHEON AND 3/8" COMPRESSION CHROME PLATED FLEXIBLE RISERS. MCGUIRE #2165LK.
CARRIER: RECTANGULAR STEEL TUBING UPRIGHTS WITH WELDED 3" X 4-1/2" BASE ANCHORED TO CONCRETE SLAB WITH (4) 1/2" BOLTS. ADJUSTABLE SLEEVE FOR CONNECTION TO HANGER PLATE PROVIDED BY FIXTURE MANUFACTURER. WADE #403-BL-BFS.
ROUGH-IN: 2" WASTE, 2" VENT, 1/2" COLD WATER. REFER TO ARCHITECTURAL DRAWINGS FOR HEIGHT REQUIREMENTS.

TYPE: EDF-2 (T.A.S. COMPLIANT) - INTERIOR WITH BOTTLE FILLER
DESCRIPTION: WALL HUNG, BARRIER FREE, SELF-CONTAINED,VANDAL RESISTANT BOTTLE FILLING STATION AND SINGLE ADA COOLER, NON-FILTERED REFRIGERATED STAINLESS. CHILLING CAPACITY OF 8.0 GPH (GALLONS PER HOUR) OF 50F DRINKING WATER, BASED ON 80F INLET WATER AND 90F AMBIENT, PER ASHRAE 18 TESTING. FEATURES SHALL INCLUDE GREEN COUNTER, LAMINAR FLOW, REAL DRAIN, VANDAL RESISTANT. FURNISHED WITH VANDAL RESISTANT BUBBLER. ELECTRONIC BOTTLE FILLER BUTTON WITH MECHANICAL FRONT BUBBLER BUTTON ACTIVATION. PROVIDE CANE TOUCH APRON IN ALL STAINLESS STEEL ON ALL UNITS MOUNTED WITH A CLEAR KNEE SPACE GREATER THAN 27" HIGH.
HALSEY TAYLOR #HTHB-HVRBNF WITH APRON #98324C.
P-TRAP: 1-1/4" CHROME PLATED CAST BRASS TRAP WITH CLEANOUT AND EXTENSION TO WALL WITH ESCUTCHEON. MCGUIRE #8872.
SUPPLIES: 1/2" I.P.S. X 3/8" O.D.CHROME PLATED LOOSE KEY STOP VALVE WITH ESCUTCHEON AND 3/8" COMPRESSION CHROME PLATED FLEXIBLE RISERS. MCGUIRE #2165LK.
CARRIER: RECTANGULAR STEEL TUBING UPRIGHTS WITH WELDED 3" X 4-1/2" BASE ANCHORED TO CONCRETE SLAB WITH (4) 1/2" BOLTS. ADJUSTABLE SLEEVE FOR CONNECTION TO HANGER PLATE PROVIDED BY FIXTURE MANUFACTURER. WADE #403-BFS.
ROUGH-IN: 2" WASTE, 2" VENT, 1/2" COLD WATER. REFER TO ARCHITECTURAL DRAWINGS FOR HEIGHT REQUIREMENTS.

1
TYPE: FCO
DESCRIPTION: FLOOR CLEANOUT, PAINTED CAST IRON ADJUSTABLE FLOOR CLEANOUT WITH ABS THREADED ADJUSTABLE HOUSINGS, FLANGED CAST IRON FERRULE, INTEGRAL CLAMPING COLLAR, GASKETED ABS THREADED PLUG AND SCORIATED STAINLESS STEEL TOP. WADE #6000-85. FOR CARPETED FLOORS PROVIDE WADE #6000-85-CM. FOR TERRAZO TILES #6000-85-U, FOR RECESSED TILE #6000-85-T. FOR VCT TILES COORDINATE WITH MANUFACTURER FOR INSTALLATION INSTRUCTIONS.

TYPE: ECO
DESCRIPTION: EXTERIOR CLEANOUT TO GRADE, PAINTED CAST IRON BODY WITH ANCHOR FLANGE ADJUSTABLE TOP ASSEMBLY, AND ROUND SCORIATED VANDAL RESISTANT DUCTILE IRON TRACTOR TYPE COVER. IF LOCATED IN ASPHALT OR DIRT PROVIDE 18"X18"X12" CONCRETE PAD. WADE #6000-Z.

TYPE: RD-1
DESCRIPTION: ROOF DRAIN. CAST IRON BODY WITH FLANGE, FLASHING RING WITH GRAVEL STOP. ALUMINUM DOME, UNDERDECK CLAMP AND ADJUSTABLE EXTENSION AS REQUIRED FOR ROOF CONSTRUCTION. WADE 3000-46-52-53 FOR 8" AND SMALLER, WADE 3001-46-52-53 FOR 10" AND LARGER.
ROUGH-IN: REFER TO FLOOR PLANS FOR SIZES.

TYPE: RD-2
DESCRIPTION: OVERFLOW ROOF DRAIN. CAST IRON BODY WITH FLANGE, FLASHING RING WITH GRAVEL STOP. ALUMINUM DOME, 2" HIGH WATER DAM, BEARING PAN, UNDERDECK CLAMP AND ADJUSTABLE EXTENSION AS REQUIRED FOR ROOF CONSTRUCTION. WADE #3000-D2-46-52-53 FOR 8" AND SMALLER, WADE #3001-D2-46-52-53 FOR 10" AND LARGER.
ROUGH-IN: REFER TO FLOOR PLANS FOR SIZES.

GENERAL NOTES

ALL LAVATORIES AND SINKS SHALL BE SUPPLIED WITH HOT AND COLD WATER (UNLESS NOTED TO BE COLD WATER ONLY) TO FAUCETS AS INDICATED ON PLANS AND FIXTURE SCHEDULE. PROVIDE CHROME PLATED BRASS SUPPLY STOPS WITH LOOSE KEYS AND WALL ESCUTCHEONS. PROVIDE CHROME PLATED FLEXIBLE RISERS OF SIZE REQUIRED TO PROPERLY CONNECT FIXTURES. PROVIDE 17 GAUGE CHROME PLATED CAST BRASS P-TRAP WITH CLEANOUT AND EXTENSION TO WALL WITH ESCUTCHEON (UNLESS NOTED TO BE AN ACID WASTE FIXTURE). REFER TO FIXTURE SCHEDULE FOR MINIMUM SIZES OF PLUMBING FIXTURE ROUGH-INS.

INSULATION KITS AT ALL LAVATORIES AND SINKS REQUIRED TO BE T.A.S. ACCESSIBLE (MCGUIRE OR TRUEBRO). ALL SUCH FIXTURES AND FINAL INSTALLATIONS SHALL COMPLY WITH THE STATE ACCESSIBILITY STANDARDS REQUIREMENTS.

INSERT TRAP GUARDS AFTER FINAL RODDING OF DRAINS. INSTALL TRAP GUARD WITH CLEAR SILICONE CAULK FOR GAS-TIGHT SEAL. FOR DRAIN RODDING AFTER INSTALLATION. INSERT SEWER TAPE THROUGH LIGHTLY GREASED 1-1/2" PVC PIPE TO PROTECT TRAP GUARD.

PLUMBING PIPING LEGEND

SYMBOLS	DESCRIPTION
SAN	SANITARY OR WASTE PIPING ABOVE GRADE (SAN)
SAN	SANITARY OR WASTE PIPING BELOW GRADE (SAN)
GW	GREASE WASTE PIPING (GW)
GW	GREASE WASTE PIPING BELOW GRADE (GW)
SD	STORM DRAIN PIPING (SD)
SD	STORM DRAIN PIPING BELOW GRADE (GW)
SSD	SUB-SOIL DRAIN OR FOOTING DRAIN (SSD)
AW	ACID WASTE PIPING (AW)
AW	ACID WASTE PIPING BELOW GRADE (AW)
PD	PUMPED DISCHARGE (PD)
CD	CONDENSTATE DRAIN PIPING (CD)
D	CONDENSTATE - INDIRECT DRAIN PIPING (D)
	VENT PIPING (V)
CW	COLD WATER PIPING (CW)
HW	HOT WATER PIPING (HW)
HWR	HOT WATER RETURN PIPING (HWR)
SCW	SOFT COLD WATER PIPING (SCW)
CDW	CHILLED DRINKING WATER PIPING (CDW)
TP	TRAP PRIMER LINE (TP)
F	FIRE PROTECTION PIPING (F)
AS	AUTOMATIC SPRINKLER PIPING (AS)
GAS	NATURAL GAS PIPING (G)
GV	GAS VENT PIPING (GV)
AIR	COMPRESSED AIR PIPING (A)
	FLOW DIRECTIONAL ARROW
	SHUT-OFF VALVE
	BALANCING VALVE (BV)
	SOLENOID VALVE (SV)
	BALL VALVE (BV)
	BUTTERFLY VALVE
	LUBRICATED PACKED PLUG STOP STOP COCK (PC)
	HORIZONTAL SWING CHECK
	UNION
	HORIZONTAL SWING CHECK
	REDUCER OR INCREASER
	ECCENTRIC REDUCER
	REDUCED PRESSURE BACKFLOW PREVENTER (RPBFP)
	PIPING DOWN
	RISE OR DROP PIPING
	PIPING UP -OR- PIPING UP & DOWN
	CAP ON END OF PIPE
	CLEANOUT (WALL OR CEILING) (CO)
	FLOOR CLEANOUT (FCO)
	EXTERIOR CLEANOUT WITH 18"x18"x4" CONCRETE PAD (ECO)
	TWO-WAY CLEANOUT (PROVIDE 18"x24"x4" CONCRETE PAD OUTSIDE)
	FIRE DEPARTMENT VALVE AT RISER
	FIRE HYDRANT
	FIRE DEPARTMENT CONNECTION
	PRESSURE REDUCING VALVE (PRV)
	BRANCH CONNECTION OUT OF TOP
	BRANCH CONNECTION OUT OF BOTTOM
	BRANCH CONNECTION OUT OF SIDE
	WYE & 1/8TH BEND BRANCH CONNECTION
	WYE BRANCH CONNECTION
	HOSE BIBB
	PRESSURE GAUGE WITH COCK
	THERMOMETER
	GAS PRESSURE REGULATOR
	TEST COCK
	GAS METER
	WALL HYDRANT
	VALVE IN RISE
	ASME TEMPERATURE & PRESSURE RELIEF VALVE
	VACUUM RELIEF VALVE
	ANGLE VALVE
	OS&Y VALVE
	ROOF DRAIN
1	REFER TO KEYED NOTE
FS	FLOW SWITCH
	FLOOR SINK (FS)
	FLOOR DRAIN (FD)
	FLOOR DRAIN WITH P-TRAP (FD)
	FLOOR DRAIN WITH P-TRAP AT 45° ANGLE (FD)
	HUB DRAIN (HD)
	ACCESS PANEL FOR TRAP PRIMER OR SHOCK ABSORBER
AP	ACCESS PANEL LOCATION SYMBOL
A	SHOCK ABSORBER
	AIR CHAMBER
(E)	EXISTING
(N)	NEW
N.C.	NORMALLY CLOSED
VTR	VENT THRU ROOF
B.F.F.	BELOW FINISHED FLOOR
A.F.F.	ABOVE FINISHED FLOOR
	NEW CONNECTION
IE=100.00'	INVERT ELEVATION
1	DELTA CHANGE SYMBOL
P 1	RISER FLAG

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BRADLEY KALMANS 138814 LICENSED PROFESSIONAL ENGINEER
02-18-2026

ISSUED: JANUARY 27, 2026

REVISIONS

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1	Addendum 02	02/18/2026

Project Director:	MR
Designed By:	AA
Checked By:	EH
Drawn By:	AA

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SHEET TITLE
PLUMBING SCHEDULES AND DETAILS - NISTCH

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