THINK LEARN BE MORE TOGETHER

POCATELLO/CHUBBUCK SCHOOL DISTRICT 25

LEARNING TODAY FOR THE POSSIBILITIES OF TOMORROW

Administration Office
3115 Pole Line Road
Pocatello, Idaho

SPECIFICATIONS FOR

2024 HVAC REVISIONS AT:

Irving Middle School
911 North Grant Avenue
Pocatello, ID

BIDS WITH CONDITIONS WILL NOT BE ACCEPTED

BID OPENING

April 10, 2024
9:00 AM

POCATELLO/CHUBBUCK SCHOOL DISTRICT NO. 25
INVITATION TO BID

Sealed bids will be received by the Pocatello/Chubbuck School District 25 Business Office, Bannock County, Idaho at 3115 Pole Line Road, Pocatello, Idaho, 83201 until **9:00 AM, MST on April 10, 2024** for the following:

2024 HVAC Revisions – Irving Middle School

A **mandatory** pre-bid conference and walk-thru to review the projects will be held at the District Maintenance Shop, 185 E Maple, Pocatello, Idaho, on **April 4, 2024 at 1:00 PM.**

Specifications and additional details, (including bid forms), may be secured at the Business Office, 3115 Pole Line Road, Pocatello, Idaho, 83201 and on the District website at:

https://www.sd25.us/departments/business-office

All bids must be on the forms furnished, all blank spaces filled in, and signed with the name and address of the Bidder. No unqualified bids will be read. All bids shall be in a sealed envelope and clearly marked: **2024 HVAC Revisions – Irving Middle School;** to be opened at 9:00 AM, MST on April 10, 2024.

Each bid shall be accompanied by a certified check, cashier's check, or a bidder's bond, (executed by a qualified surety company with the power to do business in the State of Idaho) in the sum of not less than five percent (5%) of the total bid, made payable to Pocatello/Chubbuck School District No. 25, Bannock County, Pocatello, Idaho. This surety shall be forfeited by the bidder in the event of failure to enter into a contract. Personal or company checks will not be accepted. Compliance with Idaho Public Works Law is required.

The Board of Trustees reserves the right to reject any or all bids or to waive any informalities, or to accept the bid or bids deemed best for Pocatello/Chubbuck School District No. 25, Bannock County, Pocatello, Idaho.

Renae Johnson, Clerk
Pocatello/Chubbuck School District No. 25

Publish dates:

March 30, 2024
April 6, 2024

IDAHO STATE JOURNAL

INSTRUCTIONS TO BIDDERS

VENDOR RESPONSIBILTY:

Sealed bids will be received on or before the time and date set forth under "Invitation to Bid".

The owner reserves the right to accept or reject any part or all bids.

Bidders submitting a bid on this work will be required to figure and furnish everything as called for by these specifications and the requirements of the bid proposal sheet.

All bids shall be in a sealed envelope addressed: Business Office, 3115 Pole Line Road, Pocatello, Idaho, 83201. The following shall be written on the exterior of the envelope:

"BID FOR HVAC REVISIONS AT IRVING MIDDLE SCHOOL
TO BE OPENED ON April 10, 2024 at 9:00 AM"

Bids not delivered by contractors at time of bid opening must be received in mail no later than 4:00 PM on April 9, 2024, the day before the bid opening.

EXAMINATION OF THE SITE AND DOCUMENTS:

Refer all questions to Brian Glenn, School Plant Coordinator, (208) 233-2604. Contact with other district staff, Board of Trustees, or Administration, will be by written permission only.

A **mandatory pre-bid conference** and walk-thru to review the projects will be held at 1:00 PM, MST on April 4, 2024 at Irving Middle School, 911 N. Grant Avenue, Pocatello, Idaho.

Before submitting a proposal, the bidder shall:

1. Carefully examine the specifications.
2. Visit the worksite.
3. Be fully informed of existing conditions and limitations.
4. Include in the bid, sums sufficient to cover all items required by the contract, and shall rely entirely upon his own examinations in making his proposal.

INTERPRETATIONS:

Should a bidder find discrepancies in or omissions from the specifications, or be in doubt as to their meaning, he should at once notify the Owner, who will send written instructions or addenda to all bidders. The owner will not be responsible for oral interpretations. Questions received less than 48 hours before time for bid opening cannot be answered. All addenda issued during the time of bidding will be incorporated in the contract.

BID GUARANTEE:

As a guarantee that, if awarded the contract, the bidder will execute same and furnish bond. Each bid will be accompanied by a Certified check, Cashier's Check, or Bid Bond for not less than five percent (5%) of the base bid payable to the Owner. NO PERSONAL OR COMPANY CHECKS WILL BE ACCEPTED.

OBJECTIONS:

Written objections to specifications or bid procedures must be received by the clerk, secretary, or other authorized official of the District at least one (1) business day before the date and time upon which bids are scheduled to be received, per Idaho Code Section 68-2806(c).

LAWS AND ORDINANCES:

The contractor hereby binds himself to protect and save harmless the owner from all damages arising from the violation of any and all Federal, State, County, City, and all other laws, rules, regulations, in the performance of the terms of the contract.

HOLD HARMLESS AGREEMENTS:

The District expects your work to conform to professional standards. The contractor is expected to hold the District harmless for all damages or claims arising out of the work performed by the contractor. The District will not agree to hold the contractor harmless for damages or claims.

EQUIPMENT:

The contractor shall provide all labor, materials, tools, and equipment, etc. necessary for the complete and substantial execution of everything described in the specifications.

STORAGE OF MATERIALS:

The contractor shall make arrangement and coordinate with the Maintenance Department for storage of materials. Any damages of life or property caused by storage of materials on the above indicated place shall be paid for by the contractor, who shall hold the owner harmless for any damages concerning the same.

SUPERVISION:

The supervision of this work will be done by Pocatello/Chubbuck School District #25 Maintenance Department.

EVIDENCE OF QUALIFICATIONS:

Upon request of the owner, a bidder whose bid is under consideration for award of the contract shall submit, promptly, satisfactory evidence of his financial resources, his experiences, and the organization and equipment he has available for performance of the contract.

EMPLOYMENT OF RESIDENTS OF IDAHO:

In compliance with Idaho Laws, Section 44-1001 and 44-1002 Idaho Code, the contractor must employ ninety-five percent 95% bona fide Idaho residents as employees on any such contracts except where under such contracts fifty (50) or less persons are employed the contractor may employ ten percent (10%) nonresidents, provided however, in all cases such employers must give preference to the employment of bona fide Idaho residents in the performance of such work.

CONTRACTOR'S LICENSE:

In compliance with Idaho Laws, the contractor must be registered with the State of Idaho, and hold the required *Public Works Contractor's License* before obtaining the contract documents and before submitting a bid for this work.

INSURANCE:

All contractors who provide goods or services to the District are required to provide the District with certificates of insurance for General Liability, Auto Liability, Workers Compensation, and Professional Liability if applicable.

The General Liability and/or Professional Liability certificate must name the District as an additional insured under the contractor's policy. Certificates are to be provided to the District prior to any work commencing on District property. This would include the placement of any equipment or materials at the work site

Minimum Insurance Limits

General Liability	$1,000,000 per occurrence $1,000,000 products and completed operations $1,000,000 annual aggregate
Auto Liability	$1,000,000 per occurrence
Worker' Compensation	Statutory
Professional Liability	$1,000,000 per occurrence $1,000,000 annual aggregate

OWNER/CONTRACTOR AGREEMENT:

The Agreement for the work will be written on a District provided Form of Agreement between Owner and Contractor where the basis of payment is a stipulated sum.

PERFORMANCE BOND:

The successful bidder will be required to furnish a 100% performance bond when entering into the contract work, per Idaho Code Section 54-1926, " ...conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof."

PAYMENT BOND:

The successful bidder will be required to furnish a 100% payment bond when entering into the contract work, per Idaho Code Section 54-1926, "solely for the protection of persons supplying labor or materials, or renting, leasing, or otherwise supplying equipment to the contractor or his subcontractors in the prosecution of the work provided for in such contract."

5% RETAINAGE:

The Owner will retain 5% of the Contractor's earned sum to ensure faithful performance. This 5% will be released to the Contractor upon receipt of approval from State of Idaho.

LIQUIDATED DAMAGES:

Contractor shall be required to pay Owner as liquidated damages the sum of $500 for each day, after the scheduled completion date, that the project is unfinished.

CHANGES IN THE WORK:

The owner, without invalidating the contract, may order extra work or make changes by altering, adding to, or deducting from the work; the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract, except that any claim for extension of the time caused thereby shall be adjusted at the time of ordering such change.

The total allowance for combined overhead and profit for changes shall be included in the total cost to the owner and shall be based on the following schedule:

a) For the Contractor, 10% over cost;
b) For the Sub-Contractor, 15% over cost to be divided 10% for Sub-Contractor and 5% for Contractor; and
c) For any Sub-Subcontractor, 15% over cost to be divided 5% for Contractor, 5% for Sub-Contractor, and 5% for Sub-Subcontractor.

FORM WH5:

Per Idaho Code Section 54-1904A, within thirty (30) days of award of bid, the contractor shall file with the State Tax Commission a form WH-5, Public Works Contract Report.

INSPECTION OF WORK:

The representative of the owner shall at all times have access to the work wherever it is in preparation or progress and the contractor shall provide facilities for such access and for inspection.

WARRANTY:

Manufacturer shall warrant products under normal use and service to be free from defects in materials and workmanship for a period of one year from date of delivery.

Warranty shall cover repair or replacement of such parts determined defective upon inspection. Warranty does not cover any product or part of a product subject to accident, negligence, alteration, abuse or misuse. Warranty does not cover any accessories or parts not supplied by the manufacturer.

Warranty shall not cover any labor expended or materials used to repair any equipment without manufacturer's prior written authorization. -

CLEAN UP:

The contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his employees or work, and at the completion of the work he shall remove all his rubbish from and about the building and all tools and surplus materials and shall leave his work clean. In case of dispute, the owner shall remove the rubbish and surplus materials and charge the cost to the contractor.

IDAHO EMPLOYER ALCOHOL AND DRUG-FREE WORKPLACE ACT: Include with your bid sheet a contractor's affidavit pursuant to Idaho Code Section 72-1717.

BIDDER CERTIFICATION FORM: All bidders must complete and submit the Bidder Certification Form included with this bid request.

PAYMENT:

Prices must remain firm as quoted by supplier until quantity awarded is received. Application for payment dated on or before the 25th of the month, shall be paid by the 15th of the following month. Application for payment dated after the 25th of the month, shall be paid within 30 days.

Delivery may be accepted any time, however, payment for the 2024-2025 fiscal year cannot be made until after July 1, 2024 when those funds have been released.

BID:

The following universal specifications are being used as a guideline. Alternate bids for equal equipment will be considered upon District approval two weeks prior to the bid due date. Substitutions or major alternations must be indicated upon the proposal sheet at the time of the bid submission. Bids must be based upon conditions at the site and these specifications. Bids shall be submitted in accordance with the requirements shown on the bid form.

BID EVALUATION CRITERIA:

Contractor selection on this project will be evaluated based on the following:

1) Price
2) Contractor reputation for quality of work with current customers or past performance with District 25. (please list all jobs/contracts greater than $10,000 performed in the past two years if contractor has not performed one for the District in past 5 years)
3) Vendor ability to best match the listed criteria as specified.

DELIVERY AND START OF WORK:

The time frame for the lighting replacement to be completed is between June 3, 2024 and August 2, 2024.

REQUIREMENT FOR REPLACEMENT OF LIGHT FIXTURES AT TYHEE AND CHUBBUCK ELEMENTARY:

TYHEE AND CHUBBUCK ELEMENTARY SCHOOLS - This work is to replace all interior and exterior light fixtures.

A. Removal and disposal of all existing fixtures.
B. Installation of approved fixtures as outlined in fixture inventory replacement sheet.
C. Removal of existing switches and plates and installation of new control switches as per manufactures recommendations in specified areas.
D. Cost for all permits and inspections
E. All abandoned wiring associated with this project is to be removed and recycled.
F. Contractor will be responsible for building cleaning associated with this project.
G. Pocatello/Chubbuck School District #25 will install necessary suspended ceiling t-rails and tiles to accommodate new classroom and office fixtures.

GENERAL NOTES THAT APPLY TO ALL OF THE ABOVE BID ITEMS:

1. Contractor will submit equipment, materials and/or design submittals to the District for approval prior to ordering equipment.

2. New installation shall meet all Federal, state and local code requirements. The contractor will be responsible for obtaining any required permits and/or jurisdictional approvals. The contractor is responsible for providing any and all drawings and specifications that are required by governmental agencies. The contractor will be required to provide proof of final approval from all governmental agencies having jurisdiction over this work once the installation is complete.

3. Contractor is responsible for verifying existing electrical loads and notifying the District if electrical service modifications might be required. The Contractor is responsible for making all electrical connections necessary unless directed differently in individual item descriptions.

4. The Contractor is responsible for providing any changes or modifications required to the building (drywall, painting, roofing, insulation, etc.) so as to provide a complete, finished product.

5. Contractor will provide industry standard warrantee for this application.

6. Contractor will provide operation and maintenance training of O&M personnel once the installation is complete. Completed operation & maintenance manuals are to be turned into the District Maintenance Department.

BID SHEET
2024 HVAC REVISIONS AT
IRVING MIDDLE SCHOOL

Board of Trustees
Pocatello/Chubbuck School District No. 25
3115 Pole Line Road
Pocatello, ID 83201

Date: _____

We, the undersigned, propose to furnish all labor, materials, tools, and equipment and complete all work called for by these specifications, under the supervision of the School Plant Coordinator and the Director of Business Operations, for the sum of:

PROJECT	**BID AMOUNT**
HVAC Revisions – Irving Middle School	$ _____

We further acknowledge Addendum(s) received. No. _____, dated _____.

Work can begin June 3, 2024 and must be completed by August 2, 2024.

The Board of Trustees reserves the right to reject any/or all bids or to waive any informalities, or to accept the bid or bids deemed best for Pocatello/Chubbuck School District No. 25, Bannock County, Pocatello, Idaho.

Respectfully submitted,

- Attached, if applicable, is a listing of sub-contractor's names and addresses for this project.
- Attached is our Affidavit of Alcohol and Drug-Free Worksite, as pursuant to Idaho Code 72-1717.
- Attached is Bidder Certification Form.

_____ _____
Company Name Authorized Signature / Date

_____ _____
Address Title

_____ _____
City, State, Zip Public Works License Number

_____ _____
Phone / Fax Number Worker's Comp & Liability Insurance Exp. Date

_____
Email if applicable

CONTRACTOR'S AFFIDAVIT
CONCERNING ALCOHOL AND DRUG-FREE WORKPLACE

STATE OF _____

COUNTY OF _____

Pursuant to the Idaho Code, Section 72-1717, I, the undersigned, being duly sworn, depose and certify that named contractor is in compliance with the provisions of Idaho Code section 72-1717; that named contractor provides a drug-free workplace program that complies with the provisions of Idaho Code, title 72, chapter 17 and will maintain such program throughout the life of a state construction contract and that named contractor shall subcontract work only to subcontractors meeting the requirements of Idaho Code, section 72-1717(1)(a).

_____
Name of Contractor

_____
Address

_____
City and State

By: _____
(Signature)

Subscribed and sworn to before me this _____ day of _____, 2024.

Commission expires:

_____
NOTARY PUBLIC, residing at

_____

_____

BIDDER CERTIFICATION FORM

1. **Debarment and Suspension** – In submitting this bid proposal, we hereby certify that we have not been suspended or in any way excluded from Federal procurement actions by any Federal Agency. We fully understand that if information contrary to this certification subsequently becomes available, such evidence may be grounds for non-award or nullification of a bid contract.

2. **Anti-Collusion** – In submitting this bid proposal, we hereby certify this proposal was developed and prepared without any collusion with any competing bidder or District employee. The content of this proposal has not been disclosed to any competing or potentially competing bidder prior to the proposal due date and time. Furthermore, no action to persuade any person, partnership or corporation to submit or withhold a bid has been made.

3. **Anti-Lobbying** – In submitting this bid proposal, we hereby certify that to the best of our knowledge and belief, no appropriated Federal funds have been paid or will be paid by or on behalf of person associated with this proposal to any person for influencing or attempting to influence and officer or employee of any agency, a member of Congress, an office or employee of Congress or an employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan or cooperative agreement.

4. **National Sexual Offender Registry** – In submitting this bid proposal, you certify to the District that your company will prohibit any persons in your employ who are registered or required to register under the Idaho Sex Offender Registration Act from participation in company business with the District if such participation would require them to be present on school property. You certify further that you have cross checked such employees against the National Sex Offender Registry found at the following web link: http://www.nsopr.gov/

Signed: _____ Date: _____

Name & Title: _____

Company: _____ Phone: _____

Address: _____

City/State/Zip: _____

DIVISION 23: HEATING, VENTILATING, AND AIR-CONDITIONING

END TABLE OF CONTENTS

SECTION 23 0501 – COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.

B. It is the intent of these specifications that the systems specified herein are to be complete and operational before being turned over to the owner. During the bidding process, the contractor is to ask questions or call to the engineer's attention any items that are not shown or may be required to make the system complete and operational. Once the project is bid and the contractor has accepted the contract, it is his responsibility to furnish and install all equipment and parts necessary to provide a complete and operational system without additional cost to the owner.

C. Furnish and install fire stopping materials to seal penetrations through fire rated structures and draft stops.

D. Includes But Not Limited To:
   1. General procedures and requirements for HVAC.

E. Related Sections:
   1. Section 23 0593: Testing, Adjusting, and Balancing for HVAC.

1.3 SUBMITTALS

A. Substitutions: By specific designation and description, standards are established for specialties and equipment. Other makes of specialties and equipment of equal quality will be considered provided such proposed substitutions are submitted to the Architect for his approval, complete with specification data showing how it meets the specifications, at least 5 working days prior to bid opening. A list of approved substitutions will be published as an addendum.
   1. Submit a single copy of Manufacturer's catalog data including Manufacturer's complete specification for each proposed substitution.
   2. The Architect or Engineer is to be the sole judge as to the quality of any material offered as an equal.

B. Product Data, Shop Drawings: Within 30 days after award of contract, submit Manufacturer's catalog data for each manufactured item.
   1. Literature shall include enough information to show complete compliance with Contract Document requirements.
   2. Mark literature to indicate specific item with applicable data underlined.
   3. Information shall include but not be limited to capacities, ratings, type of material used, guarantee, and such dimensions as are necessary to check space requirements.
   4. When accepted, submittal shall be an addition to Contract Documents and shall be in equal force. No variation shall be permitted.
   5. Even though the submittals have been accepted by the Engineer, it does not relieve the contractor from meeting all of the requirements of the plans and specifications and providing a complete and operational system.

C. Drawings of Record: One complete sets of blue line mechanical drawings shall be provided for the purpose of showing a complete picture of the work as actually installed.
   1. These drawings shall serve as work progress report sheets. Contractor shall make notations neat and legible therein daily as the work proceeds.

2. The drawings shall be kept at the job at a location designated by the Mechanical Engineer.
3. At completion of the project these "as-built" drawings shall be signed by the Contractor, dated, and returned to the Architect.

D. Operating Instructions and Service Manual: The Mechanical Contractor shall prepare 2 copies of an Operation and Maintenance Manual for all mechanical systems and equipment used in this project. Manuals shall be bound in hard-backed binders and the front cover and spine of each binder shall indicate the name and location of the project. Use plastic tab indexes for all sections. Provide a section for each different type of equipment item. The following items shall be included in the manual, together with any other pertinent data. This list is not complete and is to be used as a guide.
1. Provide a master index at the beginning of the manual showing all items included.
2. The first section of the manual shall contain:
   a. Names, addresses, and telephone numbers of Architect, Mechanical Engineer, Electrical Engineer, General Contractor, Plumbing Contractor, Sheet Metal Contractor, and Temperature Control Contractor.
   b. List of Suppliers which shall include a complete list of each piece of equipment used with the name, address, and telephone number of the vendor.
   c. General Description of Systems including –
      1) Location of all major equipment
      2) Description of the various mechanical systems
      3) Description of operation and control of the mechanical systems
      4) Suggested maintenance schedule
   d. Copy of contractor's written warranty
3. Provide a copy of approved submittal literature for each piece of equipment.
4. Provide maintenance and operation literature published by the manufacturer for each piece of equipment which includes: oiling, lubrication and greasing data; belt sizes, types and lengths; wiring diagrams; step-by-step procedure to follow in putting each piece of mechanical equipment in operation.
5. Include parts numbers of all replaceable items.
6. Provide control diagram and operation sequence, along with labeling of control piping and instruments to match diagram.
7. Include a valve chart indicating valve locations.

E. Include air balance and/or water balance reports.

1.4 SUBMITTALS FOR COMMON HVAC REQUIREMENTS

A. Samples: Sealer and gauze proposed for sealing ductwork.

B. Quality Assurance / Control:
1. Manufacturer’s installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.
2. Specification data on sealer and gauze proposed for sealing ductwork.

C. Quality Assurance
1. Requirements: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA HVAC Duct Construction Standards.
2. Pre-Installation Conference: Schedule conference immediately before installation of ductwork.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
1. Perform work in accordance with applicable provisions of local and state Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Architect in writing of such differences.

B. Applicable Specifications: Referenced specifications, standards, and publications shall be of the issues in effect on date of Advertisement for Bid.
   1. "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Air Conditioning Engineers.
   2. "Engineering Standards" published by the Heating, Piping, and Air Conditioning Contractors National Association.
   3. "2018 International Building Code", "2018 International Mechanical Code", “2018 International Plumbing Code” and "2018 International Fire Code" as published by the International Conference of Building Officials.
   4. "National Electrical Code" as published by the National Fire Protection Association.
   5. "2018 International Energy Conservation Code ".

C. Identification: Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when Project is turned over to Owner.

1.6 INSPECTIONS AND PERMITS

A. Pay for permits, fees, or charges for inspection or other services. Local and state codes and ordinances must be properly executed without expense to Owner and are considered as minimum requirements. Local and state codes and ordinances do not relieve the Contractor from work shown that exceeds minimum requirements.

1.7 ADDITIONAL WORK:

A. Design is based on equipment as described in the drawing equipment schedule. Any change in foundation bases, electrical wiring, conduit connections, piping, controls and openings required by alternate equipment submitted and approved shall be paid for by this division. All work shall be in accordance with the requirements of the applicable sections.

PART 2 - PRODUCTS FOR COMMON HVAC REQUIREMENTS

A. Finishes, Where Applicable: Colors as selected by Architect.

B. Duct Hangers:
   1. One inch 25 mm by 18 ga 1.27 mm galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches 2 400 mm apart. Do not use wire hangers.
   2. Attaching screws at trusses shall be 2 inch 50 mm No. 10 round head wood screws. Nails not allowed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Inspection:
   1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.
   2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

B. Drawings:
   1. Mechanical drawings show general arrangement of piping, ductwork, equipment, etc, and do not attempt to show complete details of building construction which affect installation. This Contractor shall refer to architectural, structural, and electrical drawings for additional building detail which affect installation of his work.
      a. Follow mechanical drawings as closely as actual building construction and work of other trades will permit.
      b. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work or where minor changes are necessary to facilitate installation.

c. Everything shown on the mechanical drawings shall be the responsibility of Mechanical Contractor unless specifically noted otherwise.

2. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over mechanical drawings.

3. Because of small scale of mechanical drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions. Do not scale drawings for locations of equipment or piping. Refer to large scale dimensioned drawings for exact locations.

C. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.

1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.

2. If non-specified equipment is used and it will not fit job site conditions, this Contractor assumes responsibility for replacement with items named in Contract Documents.

3.2 PREPARATION

A. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.

1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.

2. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.

3. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

3.3 INSTALLATION

A. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

3.4 STORAGE AND PROTECTION OF MATERIALS:

A. Provide storage space for storage of materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare.

B. Protect completed work, work underway, and materials against loss or damage.

C. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt, or injury caused by water, chemical, or mechanical accident.

3.5 EXCAVATION AND BACKFILL

A. Perform necessary excavation of whatever substance encountered for proper laying of all pipes and underground ducts.

1. Excavated materials not required for fill shall be removed from site as directed by Engineer.

2. Excavation shall be carried low enough to allow a minimum coverage over underground piping of 5'-0" or to be below local frost level.

3. Excess excavation below required level shall be backfilled at Contractor's expense with earth, sand, or gravel as directed by Engineer. Tamp ground thoroughly.

4. Ground adjacent to all excavations shall be graded to prevent water running into excavated areas.

B. Backfill pipe trenches and allow for settlement.

1. Backfill shall be mechanically compacted to same density as surrounding undisturbed earth.

2. Cinders shall not be used in backfilling where steel or iron pipe is used.
3. No backfilling shall be done until installation has been approved by the Engineer.

3.6 COOPERATION

A. Cooperate with other crafts in coordination of work. Promptly respond when notified that construction is ready for installation of work under Division 23000. Contractor will be held responsible for any delays which might be caused by his negligence or failure to cooperate with the other Contractors or crafts.

3.7 SUPERVISION

A. Provide a competent superintendent in charge of the work at all times. Anyone found incompetent shall be removed at once and replaced by someone satisfactory, when requested by the Architect.

3.8 INSTALLATION CHECK:

A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedule shall visit the project to inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the project as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Engineer.

B. Each equipment supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying the following:
1. Equipment has been properly installed and lubricated.
2. Equipment is in accurate alignment.
3. Equipment is free from any undue stress imposed by connecting piping or anchor bolts.
4. Equipment has been operated under full load conditions.
5. Equipment operated satisfactorily.

C. All costs for this installation check shall be included in the prices quoted by equipment suppliers.

3.9 CLEANING EQUIPMENT AND PREMISES

A. Properly lubricate equipment before Owner's acceptance.

B. Clean exposed piping, ductwork, equipment, and fixtures. Repair damaged finishes and leave everything in working order.

C. Remove stickers from fixtures and adjust flush valves.

D. At date of Substantial Completion, air filters shall be new, clean, and approved by Owner's representative.

E. Trap elements shall be removed during cleaning and flushing period. Replace trap elements and adjust after cleaning and flushing period.

3.10 TESTS

A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the inspector. Notify inspector when the work is ready for inspection.

B. All work shall be completely installed, tested as required by Contract Documents and the city and county ordinances and shall be leak-tight before the inspection is requested.

C. Tests shall be repeated to the satisfaction of those making the inspections.

D. Water piping shall be flushed out, tested at 100 psi and left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

3.11 WARRANTEE

A. Contractor shall guarantee work under Division 23 to be free from inherent defects for a period of one year from acceptance.
   1. Contractor shall repair, revise or replace any and all such leaks, failure or inoperativeness due to defective work, materials, or parts free of charge for a period of one year from final acceptance, provided such defect is not due to carelessness in operation or maintenance.
   2. In addition, the Contractor shall furnish all refrigeration emergency repairs, emergency service and all refrigerant required due to defective workmanship, materials, or parts for a period of one year from final acceptance at no cost to the Owner, provided such repairs, service and refrigerant are not caused by lack of proper operation and maintenance.

B. In addition to warrantee specified in General Conditions, heating, cooling, and plumbing systems are to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

3.12 SYSTEM START-UP, OWNER'S INSTRUCTIONS

A. Off-Season Start-up
   1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
   2. Notify Owner 7 days minimum before scheduled start-up.
   3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
   4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

B. Owner's Instructions
   1. Instruct building maintenance personnel and Owner Representative in operation and maintenance of mechanical systems utilizing Operation & Maintenance Manual when so doing.
   2. Minimum instruction periods shall be as follows –
      a. Mechanical - Four hours.
      b. Temperature Control - Four hours.
      c. Refrigeration - Two hours.
   3. Instruction periods shall occur after Substantial Completion inspection when systems are properly working and before final payment is made.
   4. None of these instructional periods shall overlap another.

3.13 PROTECTION

A. Do not run furnaces, condensing units, air handling units, fan coil units, or other pieces of equipment used for moving supply air without proper air filters installed properly in system.

B. The mechanical systems are not designed to be used for temporary construction heat. If any equipment is to be started prior to testing and substantial completion, such equipment will be returned to new condition with full one-year warranties, from date of substantial completion after any construction use. This includes, but is not necessarily limited to: Equipment, filters, ductwork, fixtures, etc.

3.14 COMMON HVAC REQUIREMENTS:

A. INSTALLATION
   1. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
   2. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
   3. Hangers And Supports:

a. Install pair of hangers close to each transverse joint and elsewhere as required by spacing indicated in table on Drawings.
b. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
c. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
d. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
e. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

B. CLEANING
1. Clean interior of duct systems before final completion.

END OF SECTION 23 0501

SECTION 23 0502 - DEMOLITION AND REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Under this section remove obsolete piping and mechanical equipment and relocate, reconnect or replace existing piping affected by demolition or new construction. Remove concealed piping abandoned due to demolition or new construction, or cap piping flush with existing surfaces.

1.3 DRAWINGS AND EXISTING CONDITIONS

A. All relocations, reconnections and removals are not necessarily indicated on the drawings. As such, the Contractor shall make adequate allowance in his proposal for this work as no extra charges will be allowed for these items.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 TEMPORARY CONNECTIONS

A. Where existing piping must remain in service to supply occupied areas during construction, provide temporary piping, connections, and equipment to maintain service to such areas. All shall be performed in a neat and safe manner to prevent injury to the building or its occupants.

3.2 EXISTING TO BE ABANDONED

A. All required drilling, cutting, block-outs and demolition work required for the removal and/or installation of the mechanical system is the responsibility of this Contractor.

B. No joists, beams, girders, trusses or columns shall be cut by any Contractor without written permission from the Architect.

C. The patching, repair, and finishing to existing or new surfaces is the responsibility of this Contractor, unless specifically called for under sections of specifications covering these materials.

D. Disconnect all equipment that is to be removed or relocated. Relocate any existing equipment that obstructs new construction.

3.3 EXISTING TO REMAIN IN USE

A. Where affected by demolition or new construction, relocate, replace, extend, or repair piping and equipment to allow continued use of same. Use methods and materials as specified for new construction.

3.4 MATERIALS AND EQUIPMENT REMOVED

A. All obsolete materials, piping, and equipment shall become the property of the Contractor and be removed from the site promptly.

END OF SECTION 23 0502

SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install identification of equipment and piping as described in Contract Documents.

B. Mechanical Contractor shall touch-up equipment where factory paint has been damaged. Repaint entire item where more than 20 percent of the surface is involved.

C. Primary painting of walls, ceilings, ductwork, piping and plenums is covered in the general painting section of these Contract Documents.

PART 2 - PRODUCTS

2.1 LABELS

A. Black Formica with white reveal on engraving.

2.2 EQUIPMENT IDENTIFICATION

A. Provide an engraved plastic plate for each piece of equipment stating the name of the item, symbol number, area served, and capacity. Label all control components with plastic embossed mechanically attached labels. Sample:
   1. Supply Fan SF-1 - North Classrooms
   2. 10,000 CFM @ 2.5"

PART 3 - EXECUTION

3.1 APPLICATION

A. Engraved Plates:
   1. Identify thermostats and control panels in mechanical rooms, furnaces, boilers and hot water heating specialties, duct furnaces, air handling units, electric duct heaters, and condensing units with following data engraved and fastened to equipment with screws –
      a. Equipment mark noted on Drawings (i.e., SF-1)
      b. Area served (i.e., North Classrooms)
      c. Capacity (10,000 CFM @ 2.5)

END OF SECTION 23 0553

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Division 23 0501 - Common HVAC Requirements and Basic Mechanical Materials and Methods Sections apply to work of this section.

1.2 SUMMARY SCOPE

A. This Section includes TAB to produce design objectives for the following:
   1. Air Systems.
      a. Furnaces.
      b. Exhaust Fans.
      c. Kitchen Hood.
      d. Laboratory Fume Hoods
   2. Hydronic Piping Systems.
      a. Primary - Secondary Systems
      b. Chiller
      c. Cooling Tower
      d. Pumps

1.3 SUBMITTALS

A. Agency Data:
   1. Submit proof that the proposed testing, adjusting, and balancing agency meets the qualifications specified below. The firm or individuals performing the work herein specified may not be the installing firm.

B. Engineer and Technicians Data:
   1. Submit proof that the Test and Balance Engineer assigned to supervise the procedures, and the technicians proposed to perform the procedures meet the qualifications specified below.

C. Procedures and Agenda: Submit a synopsis of the testing, adjusting, and balancing procedures and agenda proposed to be used for this project.

D. Sample Forms: Submit sample forms, if other than those standard forms prepared by the AABC or NEBB are proposed.

E. Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Follow the procedures and format specified below.
   1. Draft Reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports in the same manner specified for the final reports. Submit 2 complete sets of draft reports. Only 1 complete set of draft reports will be returned.
   2. Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 4 complete sets of final reports.
   3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data. Divide the contents of the binder into the below listed divisions, separated by divider tabs:

a. General Information and Summary
b. Air Systems
c. Temperature Control System Verification.

F. Report Contents: Provide the following minimum information, forms, and data:
1. General information and Summary: Inside cover sheet to identify testing, adjusting, balancing agency, Contractor, Owner, Engineer, and Project. Include addresses and contact names and telephone numbers. Also include a certification sheet containing the seal and name, address, telephone number, and signature of the Certified Test and Balance Engineer. Include in this division a listing of the instrumentation used for the procedures along with the instrument calibration sheet.
2. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC or NEBB, for each respective item and system. Prepare a schematic diagram for each item of equipment and system to accompany each respective report form. The report shall contain the following information, and all other data resulting from the testing, adjusting, and balancing work:
a. All nameplate and specification data for all air handling equipment and motors.
b. Actual metered running amperage for each phase of each motor on all pumps and air handling equipment.
c. Actual metered voltage at air handling equipment (phase-to-phase for all phases).
d. Fan RPM for each piece of air handling equipment.
e. Total actual CFM being handled by each piece of air handling equipment.
f. Actual CFM of systems by rooms.
3. Certify that all smoke and fire dampers operate properly and can be reset under actual system operating conditions.

G. Calibration Reports:
1. Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

1.4 CERTIFICATION

A. Agency Qualifications:
1. Employ the services of a certified testing, adjusting, and balancing agency meeting the qualifications specified below, to be the single source of responsibility to test, adjust, and balance the building mechanical systems identified above, to produce the design objectives. Services shall include checking installations for conformity to design, measurement, and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, recording and reporting the results, and operation of all systems to demonstrate satisfactory performance to the owner.
2. The testing, adjusting, and balancing agency certified by National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this project, and having at least one person certified by NEBB or AABC as a Test and Balance supervisor, and a registered professional mechanical engineer, licensed in the state where the work will be performed.

B. Codes and Standard:
1. NEBB: “Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.”
2. AABC: “National Standards for Total System Balance.”
3. ASHRAE: ASHRAE Handbook, 1984 Systems Volume, Chapter 37, Testing, Adjusting, and Balancing.

1.5 PROJECT CONDITIONS

A. Systems Operation: Systems shall be fully operation and clean prior to beginning procedures.

1.6 SEQUENCING AND SCHEDULING

A. Test, adjust, and balance the air systems before hydronic, steam, and refrigerant systems within +10% to -

5% of contract requirements.

B. The report shall be approved by the Engineer. Test and balance shall be performed prior to substantial completion.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 PRELIMINARY PROCEDURES FOR AIR SYSTEM BALANCING

A. Before operating the system, perform these steps.
1. Obtain design drawings and specifications and become thoroughly acquainted with the design intent.
2. Obtain copies of approved shop drawings of all air handling equipment, outlets (supply, return, and exhaust) and temperature control diagrams.
3. Compare design to installed equipment and field installations.
4. Walk the system from the system air handling equipment to terminal units to determine variations of installation from design.
5. Check filters for cleanliness and to determine if they are the type specified.
6. Check dampers (both volume and fire) for correct and locked position. Check automatic operating and safety controls and devices to determine that they are properly connected, functioning, and at proper operating setpoint.
7. Prepare report test sheets for both fans and outlets. Obtain manufacturer's outlet factors and recommended procedures for testing. Prepare a summation of required outlet volumes to permit a cross-check with required fan volumes.
8. Determine best locations in main and branch ductwork for most accurate duct traverses.
9. Place outlet dampers in the full open position.
10. Prepare schematic diagrams of system "As-Built" ductwork and piping layouts to facilitate reporting.
11. Lubricate all motors and bearings.
12. Check fan belt tension.
13. Check fan rotation.

3.2 MEASUREMENTS

A. Provide all required instrumentation to obtain proper measurements, calibrated to the tolerances specified in the referenced standards. Instruments shall be properly maintained and protected against damage.

B. Provide instruments meeting the specifications of the referenced standards.

C. Use only those instruments which have the maximum field measuring accuracy and are best suited to the function being measured.

D. Apply instrument as recommended by the manufacturer.

E. Use instruments with minimum scale and maximum subdivisions and with scale ranges proper for the value being measured.

F. When averaging values, take a sufficient quantity of readings which will result in a repeatability error of less than 5%. When measuring a single point, repeat readings until 2 consecutive identical values are obtained.

G. Take all readings with the eye at the level of the indicated value to prevent parallax.

H. Use pulsation dampeners where necessary to eliminate error involved in estimating average of rapidly fluctuation readings.

I. Take measurements in the system where best suited to the task.

3.3 PERFORMING TESTING, ADJUSTING, AND BALANCING

A. Perform testing and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards. Balancing of the air systems and hydronic systems shall be achieved by adjusting the automatic controls, balancing valves, dampers, air terminal devices, and the fan/motor drives within each system.

B. Cut insulation, ductwork, and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.

C. Patch insulation, ductwork, and housings, using materials identical to those removed.

D. Seal ducts and piping, and test for and repair leaks.

E. Seal insulation to re-establish integrity of the vapor barrier.

F. Adjust timing relays of environmental equipment motor reduced voltage starters to the optimum time period for the motor to come up to the maximum reduced voltage speed and then transition to the full voltage speed to prevent damage to motor, and to limit starting current spike to the lowest possible and practical.

G. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.

H. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

3.4 RECORD AND REPORT DATA

A. Record all data obtained during testing, adjusting, and balancing in accordance with, and on the forms recommended by the referenced standards, and as approved on the sample report forms.

B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

C. Report shall be certified and stamped by a registered professional mechanical engineer employed by the agency and licensed in the state where the work will be performed.

D. Engineer is to provide a floor plan and test and balance contractor to include the plan in test and balance report and identify actual cfm on drawing or number the diffusers to match report.

3.5 DEMONSTRATION

A. If requested, testing, adjusting, and balancing agency shall conduct any or all of the field tests in the presence of the engineer.

B. Agency shall include a maximum of one (1) call back to the project within the one-year warranty period to make additional adjustments if requested by the engineer.

END OF SECTION 23 0593

SECTION 23 0716 - DUCTWORK INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install insulation on air ducts outside building insulation envelope as described in Contract Documents.

B. Furnish and install insulation on fresh air ducts and combustion air ducts within building insulation envelope as described in Contract Documents.

C. Furnish and install insulation on other air ducts where indicated on Drawings.

PART 2 - PRODUCTS

2.1 INSULATION

A. 1-1/2-inch thick fiberglass with aluminum foil scrim kraft facing and have a density of one lb/cu ft.

B. Approved Manufacturers:
1. Manville Microlite FSK
2. CSG Type IV standard duct insulation
3. Owens-Corning FRK
4. Knauf (Duct Wrap FSK)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct wrap in accordance with Manufacturer's recommendations.

B. Do not compress insulation except in areas of structural interference.

C. Completely seal joints.

END OF SECTION 23 0716

SECTION 23 0718 - DUCT LINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install acoustic lining in following above ground metal ductwork as described in Contract Documents unless detailed otherwise:
   1. Supply air
   2. Return air
   3. Elbows, fittings, and diffuser drops greater than 12 inches in length.
   4. Casings
   5. Plenums

B. Furnish and install lining in concrete underfloor boxes.

1.3 SYSTEM DESCRIPTION

A. Duct dimensions shown on Drawings are for free area inside insulation. Allowance must be made for insulation, where applicable.

1.4 RATINGS:

A. Material shall have maximum air friction correction factor of 1.10 at 1000 FPM velocity and have a minimum sound absorption coefficient NRC of .60.

PART 2 - PRODUCTS

2.1 DUCT LINER

A. One inch thick, 1-1/2 lb density fiberglass, factory edge coated.

B. Duct lining materials are to meet the requirements of UL 181 for mold, humidity, and erosion resistance.

C. Approved Manufacturers:
   1. Certainteed Ultralite 150 Certa Edge Coat
   2. Knauf - Type M
   3. Manville - Lina-Coustic
   4. Owen Corning Fiberglas - Aeroflex

2.2 ADHESIVE

A. Water Base Type:
   1. Cain - Hydrotak
   2. Duro Dyne - WSA
   3. Kingco - 10-568
   4. Miracle - PF-101
   5. Mon-Eco - 22-67
   6. Techno Adhesive - 133

B. Solvent Base (non-flammable) Type:
   1. Cain - Safetak
   2. Duro Dyne - FPG

3. Kingco - 15-137
4. Miracle - PF-91
5. Mon-Eco - 22-24
6. Techno Adhesive - 'Non-Flam' 106

C. Solvent Base (flammable) Type:
1. Cain - HV200
2. Duro Dyne - MPG
3. Kingco - 15-146
4. Miracle - PF-96
5. Mon-Eco - 22-22
6. Techno Adhesive - 'Flammable' 106

2.3 FASTENERS

A. Adhesively secured fasteners not allowed.

B. Approved Manufacturers:
1. AGM Industries Inc - "DynaPoint" Series DD-9 pin
2. Cain
3. Duro Dyne
4. Omark dished head "Insul-Pins"
5. Grip nails may be used if each nail is installed by "Grip Nail Air Hammer" or by "Automatic Fastener Equipment" in accordance with Manufacturer's recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mat finish surface on air stream side. Secure insulation to cleaned sheet metal duct with continuous 100% coat of adhesive and with ¾- inch long mechanical fasteners 12 inches on center maximum unless detailed otherwise on Drawings. Pin all duct liner.

B. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.

C. In casings and plenums further contain insulation with wire mesh.

3.2 FIELD QUALITY CONTROL

A. If insulation is installed without longitudinal and end joints butted together, installation will be rejected and work removed and replaced with work that conforms to this Specification.

B. Insulation shall be installed in accordance with Duct Liner Application Standard SMACNA Manual 15.

3.3 ADJUSTING, CLEANING

A. Keep duct liner clean and free from dust. At completion of project, vacuum duct liner if it is dirty or dusty.

END OF SECTION 23 0718

SECTION 23 0720 - REFRIGERANT PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install insulation on above ground refrigerant suction piping and fittings, including thermal bulb, from thermal expansion valve as described in Contract Documents.

1.3 QUALITY ASSURANCE

A. Insulation shall have flame-spread rating of 25 or less and a smoke density rating of 50 or less as tested by ASTM E-84 method.

B. Ratings:
1. Upper rating of =210 deg. F.
2. Lower rating of -110 deg. F.
3. UV stabilized for ten-year life.
4. Thermal conductivity of 0.24.
5. Water vapor transmission of .03 perms per inch.
6. Material to be polyolefin food grade.

PART 2 - PRODUCTS

2.1 FLEXIBLE FOAMED PIPE INSULATION

A. Thickness:
1. 1/2 inch for one inch outside diameter and smaller pipe.
2. 3/4 inch for 1-1/8 through 2 inch outside diameter pipe.
3. One inch for 2-1/8 inches outside diameter and larger pipe (two layers of 1/2 inch).
4. One inch sheet for fittings as recommended by Manufacturer.

B. Approved Manufacturers:
1. Armaflex
2. Halstead "Insul-tube"
3. Rubatex
4. Therma-Cel

2.2 JOINT SEALER

A. Approved Manufacturers:
1. Armaflex 520
2. BFG Construction Adhesive #105
3. Therma-Cel 950.

2.3 MANUFACTURED UNITS

A. Nominal 3/4" wall thickness

B. Approved Manufacturers:
1. ImcoLock Pipe Insulation
2. or approved equal

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install insulation in snug contact with pipe and in accordance with Manufacturer's recommendations.

B. Insulation shall be slipped onto pipe prior to connection or applied after pipe is installed, at contractor's option.

C. Close butt joints and miter joints.
   1. Approved Manufacturers:
      a. IMCOA's Fuse-Seal joining system
      b. or factory approved contact adhesive

D. Insulation shall be installed according to manufacturer's recommended procedures.

E. Exterior exposed Insulation shall be finished with two coats of factory approved finish. Color shall be selected by the Owner's representative.

F. Stagger joints on layered insulation.

G. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.

H. Seal joints in insulation.

I. Insulate flexible pipe connectors.

J. Insulate thermal expansion valves with insulating tape.

K. Insulation exposed outside building shall have "slit" joint seams placed on bottom of pipe.

L. Insulate fittings with sheet insulation and as recommended by Manufacturer.

END OF SECTION 23 0720

SECTION 23 0935 – TEMPERATURE CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SCOPE

A. The automatic controls contractor (ATC) shall be contracted directly with the school district.

B. Coordinate wall work with controls contractor.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION 23 0953

SECTION 23 1123 – NATURAL GAS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install gas piping and fittings within building including connection to meter.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Welders shall be certified and bear evidence of certification 30 days prior to commencing work on project. If there is doubt as to proficiency of welder, Owner's Representative may require welder to take another test. This shall be done at no cost to Owner. Certification shall be by Pittsburgh Testing Laboratories or other approved authority.

PART 2 - PRODUCTS

2.1 PIPE

A. Meet requirements of ASTM A 53-89a, "Specification for Pipe, Steel, Black & Hot-Dipped Zinc-Coated Welded & Seamless".

B. Carbon steel, butt welded, Schedule 40 black steel pipe.

2.2 FITTINGS

A. Black Pipe:
   1. Welded forged steel fittings meeting requirements of ASTM A 234-89a, "Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures", or standard weight malleable iron screwed.

2.3 VALVES

A. 125 psi bronze body ball valve, UL listed

B. Approved Manufacturers & Models:
   1. ConBraCo - "Apollo" series 80-100
   2. Jenkins - FIG-30-A
   3. Jomar - Model T-204
   4. McDonald - 3410
   5. PGL Corp - "Red Cap" gas ball valve
   6. Watts - Model B-6000-UL

2.4 PRESSURE REDUCING REGULATORS

A. Corrosion Resistant Brass Body.

B. 1/2" to 4" Threaded NPT

C. 2" and Above Flanged.

D. Max Inlet Pressure 10 psi.

E. Max Outlet Pressure 0.5 psi.

F. Temperature Capabilities - ~20 to 180° F.

G. Approved Manufactures and Models.
   1. Emerson Process Management.
   2. Maxitrol 3UP33
   3. Or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Pipe installed underground, through air plenums, in walls, and pipes 2-1/2 inches and larger shall have welded fittings and joints. Other pipe may have screwed or welded fittings.

B. Wrap and lay underground pipe in accordance with local gas utility company regulations and specifications.

C. Install gas cocks on lines serving boilers, furnaces, duct heaters, and water heaters adjacent to boiler, furnace, or heater on outside of boiler, furnace, or heater cabinet and easily accessible.

D. Do not use flexible pipe connections to boilers, furnaces, duct heaters, or hot water heaters.

E. Install dirt leg with pipe cap, 6 inches long minimum, on each vertical gas drop to heating equipment.

F. Use fittings for changes of direction in pipe and for branch runouts.

G. Paint exterior exposed gas piping with grey paint to match gas meter.

END OF SECTION 23 1123

SECTION 23 2300 - REFRIGERANT PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0100 apply to this Section.

1.2 SUMMARY

A. Furnish and install piping for refrigeration systems as described in Contract Documents.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Refrigerant piping shall be installed by a refrigeration contractor licensed by State.

PART 2 - PRODUCTS

2.1 REFRIGERANT PIPING

A. Meet requirements of ASTM B 280-88, "Specification for Seamless Copper Tube for Air Conditioning & Refrigeration Field Service", hard drawn straight lengths.

B. Do not use pre-charged refrigerant lines.

2.2 REFRIGERANT FITTINGS

A. Wrought copper with long radius elbows.

B. Approved Manufacturers:
   1. Mueller Streamline
   2. Nibco Inc
   3. Grinnell
   4. Elkhart Products Corp

2.3 SUCTION LINE TRAPS

A. Manufactured standard one-piece traps.

2.4 CONNECTION MATERIAL

A. Brazing Rods:
   1. Copper to Copper Connections:
   2. AWS Classification BCuP-4 Copper Phosphorus (6% silver).
   3. AWS Classification BCuP-5 Copper Phosphorus (15% silver).
   4. Copper to Brass or Copper to Steel Connections:
   5. AWS Classification BAg-5 Silver (45% silver).
   6. Do not use rods containing Cadmium.

2.5 FLUX

A. Approved Manufacturers:
   1. "Stay-Silv white brazing flux" by J W Harris Co
   2. High quality silver solder flux by Handy & Harmon

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install refrigerant piping underground or in tunnels.

B. Slope suction lines down toward compressor one inch/10 feet. Locate traps at vertical rises against flow in suction lines.

C. Refrigeration system connections shall be copper-to-copper, copper-to-brass, or copper-to-steel type properly cleaned and brazed with specified rods. Use flux only where necessary.
   1. No soft solder (tin, lead, antimony) connections will be allowed in system.

D. Braze valve, sight glass, and flexible connections.

E. Circulate dry nitrogen through tubes being brazed to eliminate formation of copper oxide during brazing operation.

3.2 FIELD QUALITY CONTROL

A. Make evacuation and leak tests in presence of Architect's Engineer after completing refrigeration piping systems. Positive pressure test will not suffice for procedure outlined below.
   1. Draw vacuum on each entire system with vacuum pump to 200 microns using vacuum gauge calibrated in microns. Do not use cooling compressor to evacuate system nor operate it while system is under high vacuum. Isolate compressor from system piping using shut-off valves prior to pulling vacuum.
   2. Break vacuum with freon to be used and re-establish vacuum test. Vacuum shall hold for 24 hours at 200 microns without compressor running.
   3. Conduct tests at 70 deg F ambient temperature minimum.
   4. Do not run systems until above tests have been made and systems started up as specified. Inform Owner's Representative of status of systems at time of final inspection and schedule start-up and testing if prevented by outdoor conditions before this time.
   5. After testing, fully charge system with refrigerant and conduct test with Halide Leak Detector.

END OF SECTION 23 2300

SECTION 23 2310 - REFRIGERANT SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0100 apply to this Section.

1.2 SUMMARY

A. Furnish and install refrigeration specialties as described in Contract Documents except for expansion valves on 2 through 5 ton condensing units.

PART 2 - PRODUCTS

2.1 EXPANSION VALVES

A. For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.

B. Size valves to provide full rated capacity of cooling coil served. Coordinate selection with evaporator coil and condensing unit.

C. Approved Manufacturers:
1. Alco
2. Henry
3. Mueller
4. Parker
5. Singer
6. Sporlan

2.2 FILTER-DRIER

A. On lines 3/4 inch outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.

B. On lines smaller than 3/4 inch outside diameter, filter-drier shall be sealed type using flared copper fittings.

C. Size shall be full line size.

D. Approved Manufacturers:
1. Alco
2. Mueller
3. Parker
4. Sporlan
5. Virginia

2.3 SIGHT GLASS

A. Combination moisture and liquid indicator with protection cap.

B. Sight glass shall be full line size.

C. Sight glass connections shall be solid copper or brass, no copper-coated steel sight glasses allowed.

D. Approved Manufacturers:

1. Alco
2. Mueller
3. Parker
4. Superior
5. Virginia

2.4 MANUAL REFRIGERANT SHUT-OFF VALVE

A. Ball valves designed for refrigeration service and full line size.

B. Valve shall have cap seals.

C. Valves with hand wheels are not acceptable.

D. Provide service valve on each liquid and suction line at compressor.

E. If service valves come as integral part of condensing unit, additional service valves shall not be required.

F. Approved Manufacturers:
1. ConBraCo (Apollo)
2. Henry
3. Mueller
4. Superior
5. Virginia

2.5 FLEXIBLE CONNECTORS

A. Provide in each liquid line and suction line at both condensing unit and evaporator on systems larger than five tons.

B. Anchor pipe near each flexible connector.

C. Connectors shall be for refrigerant service with bronze seamless corrugated hose and bronze braiding.

D. Approved Manufacturers:
1. Anaconda "Vibration Eliminators" by Anamet
2. Vibration Absorber Model VAF by Packless Industries
3. Vibration Absorbers by Superior Valve Co
4. Style "BF" Spring-flex freon connectors by Vibration Mountings

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install valves and specialties in accessible locations. Install refrigeration distributors and suction outlet at same end of coil.

END OF SECTION 23 2310

SECTION 23 2311 - REFRIGERANT PIPE COVER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0100 apply to this Section.

PART 2 - PRODUCTS

2.1 BASIC COVER

A. Basic refrigerant line cover shall be 18-gauge steel, hot-dipped galvanized steel meeting the requirements of ASTM<A361-85.

B. Pop rivet attachments will not be allowed.

C. All fastening devices shall be plated screws. Arrange covers so they may be taken apart for service.

2.2 MANUFACTURED OUTER COVER

A. Refrigerant line covers at exterior walls shall be 24 ga steel, hot-dipped galvanized meeting requirements of ASTM<A361-85, "Specification for Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process for Roofing and Siding", 1.25 oz/sq ft and complete with accessories recommended by Manufacturer for proper installation.
   1. Approved Manufacturers –
      a. AEP / Span, Dallas, TX or San Diego, CA
      b. Idose Aluminum Products, Allentown, PA
      c. Berridge Manufacturing Co., Houston, TX
      d. Copper Sales Inc., Minneapolis, MN
      e. Engineered Components Inc., Stafford (Houston), TX
      f. Fashion Inc., Lenaxa, KS
      g. Alumax Building Specialties, Mesquite, TX
      h. MM Systems Corp., Tucker, GA
      i. Merchant & Evans Industries Inc., Burlington, NJ
      j. Reynolds Metals Company, Richmond VA

B. Finish:
   1. Fluoropolymer Resin-base finish for coil coating components. Thermo cured two coat system consisting of primer and top coat factory applied over properly pretreated metal.
   2. Color as selected by Engineer from Manufacturer's standard colors.
   3. Approved Manufacturers –
      a. Equal to Duranar 200 by PPG or Fluropon by Desoto containing 70% minimum Kynar 500 by Pennwalt Corp.

PART 3 - INSTALLATION

3.1 Do not use pop rivets. All fastening devices shall be plated screws and arranged so covers may be taken off for service.

3.2 Provide access opening for viewing the sight glass on the refrigerant line.

END OF SECTION 23 2311

SECTION 23 2600- CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install condensate drain piping as described in Contract Documents.

B. Related Requirements:
   1. Section 23 0501: Common HVAC Requirements.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM B 88-03, 'Standard Specification for Seamless Copper Water Tube.'

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Materials:
   1. Condensate Drains:
      a. Schedule 40 PVC for condensate drains from furnace combustion chambers and furnace cooling coils, and auxiliary drain pans.

B. Manufactured Units
   1. Condensate Pump
      a. Rated at 225 gph at 15 feet total head. Complete with one-gallon polystyrene tank with pump and automatic float control. 1/5 hp, 120 V, one phase, 60 Hertz.
      b. Condensate piping shall be Type M copper or Schedule 40 PVC.
      c. Approved Manufacturers -
         1) No. CU551UL by Beckett Pumps, (888) 232-5388
         2) No. VCL45S by Little Giant Pump Co, Oklahoma City, OK (405) 947-2511

PART 3 - EXECUTION

3.1 INSTALLATION

A. Condensate Drains:
   1. Support piping and protect from damage.
   2. Do not combine PVC condensate drain piping from furnace combustion chamber with copper condensate drain piping from cooling coil.
   3. Do not combine auxiliary drain pan piping with furnace / Cooling Coil Condensate drain piping.

END OF SECTION 23 2600

SECTION 23 3114 - LOW-PRESSURE STEEL DUCTWORK

PART 1 - GENERAL

2.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0100 apply to this Section.

2.2 SUMMARY

A. Furnish and install above-grade ductwork and related items as described in Contract Documents.

PART 2 - PRODUCTS

2.1 DUCTS

A. Fabricate of zinc-coated lockforming quality steel sheets meeting requirements of ASTM 653A/653M, "Specification for Sheet Steel Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock Forming Quality", with G 60 coating.

B. Use of aluminum, non-metallic, or round ducts is not permitted. [Specification writer: Use of aluminum ducts in areas with high chlorine content (eg.: ventilation for pools, spas, etc.) should be considered on a per job basis.]

2.2 DUCT JOINTS

A. Ducts with sides up to and including 36 inches shall be as detailed in the SMACNA manual.

B. Duct sizes over 36 inches shall be fabricated using SMACNA T-24 flange joints or pre-fabricated systems as follows:
   1. Ducts with sides over 36 inches to 48 inches:
      a. transverse duct joint system by Ductmate/25, Nexus, Ward, or WDCI (Lite) (SMACNA "E" or "G" Type connection).
   2. Ducts 48 inches & larger:
      a. Ductmate/35, Nexus, or WDCI (Heavy) (SMACNA "J" Type connection).
   3. Approved Manufacturers:
      a. Ductmate Industries Inc, 10760 Bay Meadows Drive, Sandy, UT 84092 (801) 571-5308
      b. Nexus, Exanno Corp, P O Box 729, Buffalo, NY 14206 (716) 849-0545
      c. Ward Industries Inc, 1661 Lebanon Church Road, Pittsburg, PA 15236 (800) 466-9374
      d. WDCI, P O Box 10868, Pittsburg, PA 15236 (800) 245-3188

2.3 ACCESS DOORS IN DUCTS

A. At each manual outside air damper and at each motorized damper, install factory built insulated access door with hinges and sash locks. Locate doors within 6 inches of installed dampers. Construction shall be galvanized sheet metal, 24 ga minimum.

B. Fire and smoke damper access doors shall have a minimum clear opening of 12" x 12" or as specified on Drawings to easily service fire or smoke damper. Doors shall be within 6 inches of fire and smoke dampers and in Mechanical Room if possible.

C. Identify each door with 1/2" high letters reading “smoke damper” or “fire damper”.

D. Approved Manufacturers:
   1. AirBalance - Fire/Seal #FSA 100
   2. Air Control Products - HAD-10
   3. Cesco-Advanced Air - HAD-10

4. Elgen - Model 85 A
5. Kees Inc - ADH-D.
6. Louvers & Dampers - #SMD-G-F
7. Nailor-Hart Industries Inc - Series 0831
8. National Controlled Air Inc - Model AD-FL-1

2.4 FLEXIBLE EQUIPMENT CONNECTIONS

A. 30 oz closely woven UL approved glass fabric, double coated with neoprene.

B. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 250 deg F.

C. Approved Manufacturers:
1. Cain - N-100
2. Duro Dyne - MFN
3. Elgen - ZLN
4. Ventfabrics - Ventglas

2.5 CONCEALED CEILING DAMPER REGULATORS

A. Approved Manufacturers:
1. Cain
2. Duro Dyne
3. Metco Inc
4. Vent-Lock - #666
5. Young - #303
6. Pottorff

2.6 VOLUME DAMPERS

A. In Main Ducts:
1. 16-gauge galvanized steel, opposed blade type with 3/8-inch pins and end bearings. Blades shall have 1/8-inch clearance all around.
2. Damper shall operate within acoustical duct liner.
3. Provide channel spacer equal to thickness of duct liner.
4. Approved Manufacturers:
   a. Air Balance - Model AC-2
   b. Air Control Products - CD-OB
   c. American Warming - VC-2-AA
   d. Greenheck - VCD-1100
   e. NCA, Safe Air
   f. Vent Products - 5100

B. In Sheet Metal Branch Ducts:
1. Extruded aluminum, opposed blade type. When in open position, shall not extend beyond damper frame.
2. Maximum blade length 12 inches.
3. Damper Regulator shall be concealed type with operation from bottom or with 90 deg miter gear assembly from side.
4. Approved Manufacturers:
   a. Air Control Products - TCD-OB
   b. Air Guide - OB
   c. Arrow - OBDAF-207
   d. CESCO - CDA
   e. Reliable Metals - OBD-RO
   f. Tuttle & Bailey - A7RDDM
   g. Safe Air
   h. Young - 820-AC

C. Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, provide concealed ceiling damper regulator and cover plate.

2.7 MOTORIZED OUTSIDE AIR DAMPERS

A. Damper Blades:
1. 18-gauge galvanized steel or equivalent aluminum with replaceable rubber blade edges, 9 inches wide maximum.
2. End seals shall be flexible metal compression type.
3. Opposed blade type.

B. Make provision for damper actuators and actuator linkages to be mounted external of air flow.

C. Approved Manufacturers & Models:
1. Air Balance - AC-2
2. American Warming - VC-2-AAVA
3. Arrow - OBDAF-207
4. Greenheck - VCD-2100
5. Honeywell - D641
6. Johnson - D1300
7. Louvers & Dampers - TSD400
8. Ruskin - CD36 or CD60
9. Safe Air - 610
10. Vent Products - 5800
11. Pottorff

2.8 BACKDRAFT DAMPER

A. Backdraft blades shall be nonmetallic and shall be neoprene coated fiberglass.

B. Stop shall be galvanized steel screen or expanded metal, ½-inch mesh.

C. Frame shall be galvanized steel or extruded aluminum alloy.

D. Approved Models & Manufacturers:
1. Air Control Products - FBD
2. American Warming - BD-15
3. CESCO - FBD 101
4. Ruskin - NMS2
5. Safe Air
6. Pottorff

2.9 DUCT HANGERS

A. 1" x 18-gauge galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 8 feet apart. Do not use wire hangers.

B. Attaching screws at trusses shall be 1-1/2-inch No. 10 round head wood screws. Nails not allowed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Ducts:
1. Straight and smooth on inside with joints neatly finished unless otherwise directed.
2. Duct panels through 48-inch dimension having acoustic duct liner need not be crossbroken or beaded.
3. Crossbreak unlined ducts and duct panels larger than 48 inch or bead 12 inches on center.

4. Securely anchor ducts to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger.
5. Brace and install ducts so they shall be free of vibration under all conditions of operation.
6. Ducts shall not bear on top of structural members.
7. Make duct take-offs to branches, registers, grilles, and diffusers as detailed on Drawings.
8. Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
9. Properly flash where ducts protrude above roof.
10. Install internal ends of slip joints in direction of flow. Make joints air tight using specified duct sealer.
11. Cover horizontal and longitudinal joints on exterior ducts with two layers of Hardcast tape installed with Hardcast HC-20 adhesive according to Manufacturer's recommendations.
12. Paint ductwork visible through registers, grilles, and diffusers flat black.

B. Install flexible inlet and outlet duct connections to each furnace, fan, fan coil unit, and air handling unit.

C. Install concealed ceiling damper regulators.
1. Paint cover plates to match ceiling tile.
2. Damper regulators will not be required for dampers located directly above removable ceilings or in Mechanical Rooms.

D. Provide each take-off with an adjustable volume damper to balance that branch.
1. Anchor dampers securely to duct.
2. Install dampers in main ducts within insulation.
3. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
4. Where concealed ceiling damper regulators are installed, provide a cover plate.

E. Install grilles, registers, and diffusers. Level floor registers and anchor securely into floor.

F. Air Turns:
1. Permanently installed, consisting of single thickness curved metal blades with one inch straight trailing edge to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
2. 4-1/2-inch wide minimum vane rail. Do not use junior vane rails.
3. Double thickness vanes not acceptable.
4. Quiet and free from vibration when system is in operation. See SMACNA Manual

G. Dirty Filter Manometer or Magnehelic Gauge:
1. Install on each air-handling unit housing adjacent to filters.
2. Provide pressure sensing tips with connecting tubing on each side of filter.
3. Provide required oil for manometer.

H. Install motorized dampers

END OF SECTION 23 3114

SECTION 23 4145 – FURNACE AIR PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0100 apply to this Section.

1.2 SUMMARY

A. Furnish and install furnace vent piping and combustion air intake piping as described in Contract Documents.

PART 2 - PRODUCTS

2.1 AIR PIPING

A. Schedule 40 pipe and fittings meeting requirements of one of following:
   1. ASTM D 1785-89, "Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120."
   2. ASTM D 2661-89, " Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Drain, Waste, and Vent Pipe and fittings."
   3. ASTM D 2665-89a, "Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings."

2.2 PRIMER & CEMENT

A. Meet requirements of ASTM D 2564-88, "Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not combine furnace drain piping with cooling coil drain piping.

B. Run individual vent and individual combustion intake piping from each furnace to outdoors with location and formation recommended by Furnace Manufacturer. Slope lines downward toward furnaces.

C. Slope combustion chamber drain downward to funnel drain. Anchor to wall with wall clamps, allowing free movement through clamp for expansion.

D. Use vent terminal kit or clamping system provided by Furnace Manufacturer. Install vent and combustion air intake piping at clearance and distances required by Furnace Manufacturer.

E. Attach factory-supplied neoprene coupling to furnace combustion-air inlet connection and secure with clamp.

F. Ensure that factory-supplied perforated metal disc is installed in flexible coupling, unless its removal is required.

END OF SECTION 23 4145

SECTION 23 5417 – HIGH EFFICIENCY NATURAL GAS FURNACE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install gas fired condensing high efficiency furnace as described in Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Fabrication:
   1. Furnaces shall be factory assembled units certified by AGA complete with blower section, furnace section, condensing coil, steel casing, piped, and wired.
   2. Blower section shall consist of cabinet, blower, and motor.
   3. Cabinet shall be of 22-gauge minimum cold rolled steel and have finish coat of baked-on enamel.
   4. Blower shall be Class 1, full DIDW, statically and dynamically balanced.
   5. Filters shall be one-inch thick pleated throw-away type as furnished by furnace manufacturer.
   6. Provide furnace with accessory side mounted filter box frame and factory available bottom closure.
   7. Automatic controls:
      a. 100% cut-off safety pilot
      b. Manual gas shut-off valve
      c. 0perating automatic gas valve
      d. Solid state type fan and thermal limit controls
      e. 24-volt transformer
      f. Electronic ignition system
      g. Pressure switch safety for induced draft fan

B. Units:
   1. Blower shall be driven by motor with adjustable pitch V-belt drive or by a multi-speed direct driven motor.
   2. Furnace section shall be enclosed in 22-gauge minimum enameled steel casing lined with foil covered insulation.
   3. Heat exchanger shall be ceramic or glass coated, stainless steel, or 18-gauge aluminized steel with 20-year minimum limited warranty.
   4. Units shall be rated at 93% minimum AFUE (Annual Fuel Utilization Efficiency) calculated in accordance with DOE test procedures.
   5. 2" or 3" intake and exhaust lines to outside with factory furnished combination flue/intake assembly for roof or sidewall.

C. Provide with Web enabled 7-day programmable thermostat equal to Honeywell Prestige.

D. Approved Manufacturers:
   1. Lennox
   2. Carrier
   3. York
   4. Trane

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Quality Assurance: Furnace manufacturer's representative shall start up and check out furnace equipment as follows:
   1. Verify proper gas orifice sizing for altitude.
   2. Clock gas meter for rated input.
   3. Verify and set gas pressure at furnace.
   4. Check and measure temperature rise.
   5. Check safety controls for proper operation.

END OF SECTION 23 5417

SECTION 23 5723 - WALL HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install wall heaters as described in Contract Documents.

1.3 QUALITY ASSURANCE

A. Units shall be UL listed and comply with NEC.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS – WALL HEATERS

A. Fan type for recess mounting in wall.

B. 20-gauge minimum sheet metal casing.

C. Heating element shall be encased in steel finned casting and protected by thermal switch.

D. Fan motor shall be heavy duty enclosed and permanently lubricated.

E. Fan shall be precision balanced and fan-motor assembly mounted to be vibration free.

F. Units shall be controlled automatically by integral thermostat when heater is in "ON" position.

G. Heater shall have built-in fan delay.

H. Finish - Baked-on enamel.

I. Approved Manufacturers:
   1. Q' Mark AWH-4000 or equal by
   2. Berko
   3. Thermador
   4. Markel

2.2 PROPELLER UNIT HEATERS

A. Propeller unit heaters with capacity as shown.

B. Mounting bracket.

C. Enameled steel housing with adjustable louvers

D. Automatic reset thermal cutout switch

E. Heat dissipation switch

F. Control transformer and magnetic contactors for remote thermostat control, mounted and prewired.

G. Provide thermostats and any necessary branch circuit fusing.

H. Approved Manufacturers:
   1. Q' Mark
   2. Electricmode

END OF SECTION 23 5723

SECTION 23 6213 - AIR-COOLED CONDENSING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Furnish and install condensing units as described in Contract Documents.

1.3 WARRANTY

A. Five-year warranty on compressors.
   1. Warranty time frame shall be five years from date of "start-up". "Start-up" date shall be recorded on warranty certificate for each unit.

PART 2 - PRODUCTS

2.1 TWO TON THROUGH FIVE TON UNITS

A. Condenser coil shall have aluminum plate fins mechanically bonded to seamless copper tubes.
   1. Provide coil guard for unit.

B. Fans shall be direct driven propeller upflow type.
   1. Fan motor shall be single or two speed, thermostatically controlled, permanently lubricated, and designed with permanent protection and ball bearings.
   2. Motors shall be resiliently mounted.
   3. Each fan shall have a safety guard.

C. Units shall be operable down to 0 deg F outdoor temperature.

D. Compressor shall be of hermetic design with the following features. Each condenser unit shall have only one compressor.
   1. Externally mounted brass service valves with charging connections.
   2. Crankcase heater.
   3. Resilient rubber mounts.
   4. Compressor motor overload protection.
   5. Single speed

E. Controls:
   1. Factory wired and located in separate enclosure.
   2. Safety devices shall consist of high and low pressure cutout and condenser fan motor overload devices.
   3. Unit shall have anti-cycle timers to prevent units from starting up again for five minutes after any power interruption.

F. Casing:
   1. Fully weatherproof for outdoor installation. Finish shall be weather resistant.
   2. Openings shall be provided for power and refrigerant connections.
   3. Panels shall be removable for servicing.

G. Expansion Valves:
   1. Stainless steel diaphragm and same refrigerant in thermostatic elements as in system. Externally or internally equalized as required by evaporator/condensing system.
   2. Size valves to provide full rated capacity of cooling coil served.

3. Furnished by evaporator coil/condensing unit supplier and coordinated to provide bleed holes for system pressure equalization, if required.

H. Condensing units shall use R-410A refrigerant. Only one liquid line, one suction line, and one power connection shall be made to each compressor. Provide charging valves.

I. SEER rating as defined by ARI shall be not less than 13.0.

J. Set each unit on neoprene isolation pads located at each corner and sized 4" x 4" x 3/4" high minimum.

K. Approved Manufacturers:
1. York
2. Carrier
3. Lennox
4. Trane

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set condensing units as detailed on the drawings.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service:

B. Condensing units shall be started up, checked out, and adjusted by Condensing Unit Manufacturer's authorized factory trained service mechanic.

C. Mechanic shall use check-out sheet provided by Manufacturer, complete and sign all items on sheet, and submit to Architect.

END OF SECTION 23 6213

SECTION 23 6320 - COOLING COILS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 TESTING

A. All standard coils shall be leak tested at 250 psig air under water.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNIT

A. Fins shall be continuous aluminum configurated plate-fin type with full fin collars for accurate spacing and maximum fin-tube contact.

B. Tubes shall be copper expanded into the fin collars for a permanent fin-tube bond and expanded into the header for a leak-tight joint at 250 psig air pressure under water.

C. Headers shall be gray cast iron hydrostatically tested to 400 psi before assembly.

D. Casings shall be constructed of 16-gauge, continuous coated galvanized steel with fins recessed into the channels to minimize air bypass. Top and bottom channels shall have 3/8" holes on 3" centers for mounting purposes.

E. Approved Manufacturers:
   1. Trane
   2. Dunham-Bush
   3. Bohn

F. Cooling Coil:
   1. Cooling coil shall consist of heavy gauge steel cabinet with baked-on enamel finish to match furnace.
      a. Coil shall have aluminum fins bonded to seamless copper or aluminum tubing.
      b. Coil shall be ARI rated. Provide drain pans with connections at one end.
      c. Use thermal expansion valve.
      d. Cooling coil for use with R410a refrigerant.
   2. Approved Products
      a. Horizontal:
         1) Carrier: CNPHP.
         2) Lennox: CH33.
         3) Trane: 4TXC.
         4) York: MC.
      b. Vertical:
         1) Carrier: CNPVP.
         2) Lennox: CX34.
         3) Trane: 4TXC.
         4) York: FC.

END OF SECTION 23 6320

SECTION 23 7413 - PACKAGED ROOFTOP AIR CONDITIONING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 REFERENCES

A. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems. (all)

B. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration. (all)

C. ARI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard. (g/e, c/e above 135,000 btuh)

D. ARI 340 - Commercial and Industrial Unitary Heat pump Equipment.(hp above 135,000 btuh)

E. ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment. (all)

F. ANSI/ASHRAE/IESNA 90.1-1999 - Energy Standard for New Buildings Except Low-Rise Residential Buildings.

G. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.

H. California Energy Commission Administrative Code - Title 20/24 - Establishes the minimum efficiency requirements for HVAC equipment installed in new buildings in the State of California. (all)

I. ARI 210/240 - Unitary Air-Conditioning Equipment and Air- Source Heat Pump Equipment. (all under 135,000 btuh)

J. ARI 270 - Sound Rating of Outdoor Unitary Equipment. (all below 135,000)

K. ARI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.(all above 135,000 Btuh)

L. ANSI/NFPA 70-1995 - National Electric Code. (all)

1.3 SUBMITTALS

A. Submit unit performance data including: capacity, nominal and operating performance.

1.4 DELIVERY, STORAGE and HANDLING

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

1.5 WARRANTY

A. Provide parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.

B. Provide five-year extended warranty for compressors.

C. Provide five-year heat exchanger limited warranty.

1.6 REGULATORY REQUIREMENTS

A. Unit shall conform to ANSI Z21.47/UL1995 for construction of packaged air conditioner.
   1. In the event the unit is not UL approved, the manufacturer must, at his expense, provide for a field inspection by a UL representative to verify conformance to UL standards. If necessary, contractor shall perform modifications to the unit to comply with UL, as directed by the UL representative, at no additional expense to the Owner.

PART 2 - PRODUCTS

2.1 SUMMARY

A. The contractor shall furnish and install package rooftop unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

B. APPROVED MANUFACTURERS
   1. Trane
   2. Carrier
   3. Lennox
   4. Substitutions: As indicated under the general and/or supplemental conditions of these specifications. Mechanical contractor shall be responsible for electrical and mechanical changes to the structure when using a product other than the specified product. As built drawing changes are the responsibility of the mechanical contractor.

2.2 GENERAL UNIT DESCRIPTION

A. Unit(s) furnished and installed shall be packaged rooftop (s) as scheduled on contract documents and these specifications. Cooling capacity ratings shall be based on ARI Standard. Unit(s) shall consist of insulated weather-tight casing with compressor(s), air-cooled condenser coil, condenser fans, evaporator coil, return-air filters, supply motors and unit controls.

B. Unit(s) shall be 100% factory run tested and fully charged.

C. Units shall be dedicated downflow airflow as manufactured.

2.3 UNIT CASING

A. Cabinet: Galvanized steel, phosphatized, and finished with an air-dry paint coating with removable access panels. Structural members shall be 16 gauge with access doors and removable panels of minimum 20 gauge.

B. Units cabinet surface shall be tested 1000 hours in salt spray test in compliance with ASTM B117.

C. Cabinet top cover shall be one-piece construction or where seams exits, it shall be double-hemmed and gasket-sealed.

D. Access Panels: Water- and air-tight panels with handles shall provide access to filters, heating section, return air fan section, supply air fan section, evaporator coil section, and unit control section.

E. Downflow unit's base pans shall have a raised 1 1/8-inch high lip around the supply and return openings for water integrity.

F. Insulation: Provide ½-inch thick coated fiberglass insulation on all exterior panels in contact with the return and conditioned air stream.

G. Provide openings either on side of unit or thru the base for power, control and gas connections.

2.4 FANS AND MOTORS

A. Provide evaporator fan section with forward curved, double width, double inlet, centrifugal type fan.

B. Provide self-aligning, grease lubricated, ball or sleeve bearings with permanent lubrication fittings.

C. Provide units 5 tons and above with belt driven, supply fans with adjustable motor sheaves.

D. Outdoor and Indoor Fan shall be permanently lubricated and have internal thermal overload protection.

E. Outdoor fans shall be direct drive, statically and dynamically balanced, draw through in the vertical discharge position.

F. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

2.5 FILTER SECTION

A. Provide Merv 11 pleated filters.

2.6 CONDENSER SECTION

A. Provide vertical discharge, direct drive fans with aluminum blades. Fans shall be statically balanced. Motors shall be permanently lubricated, with integral thermal overload protection in a weather tight casing.

2.7 REFRIGERATION SYSTEM

A. Compressor(s): Provide direct drive, hermetic type, scroll compressor with centrifugal type oil pump. Motor shall be suction gas cooled and have internal spring isolation. Compressors shall include crankcase heaters, internal pressure relief, temperature and current sensitive overloads.

B. Units shall have cooling capabilities down to 0 degree F as standard for field-installed low ambient accessory, the manufacturer shall provide a factory-authorized service technician that will assure proper installation and operation.

C. Provide each unit with refrigerant circuit(s) factory-supplied completely piped with liquid line filter-drier, suction and liquid line pressure ports.

2.8 OUTDOOR AIR SECTION

A. Provide 100% return air.

B. Provide economizer with.

C. Provide adjustable minimum position control located in the economizer section of the unit.

D. Provide spring return motor for outside air damper closure during unit shutdown or power interruption.

2.9 OPERATING CONTROLS

A. Provide factory-wired roof top units with 24-volt control circuit with control transformers, contactor pressure lugs or terminal block for power wiring. Contractor to provide new disconnect device. Units shall have single point power connections. Field wiring of zone controls to be NEC Class II.

B. Provide microprocessor unit-mounted control which when used with an electronic zone sensor provides proportional integral room control. This UCM shall perform all unit functions by making all heating, cooling and ventilating decisions through resident software logic.

C. Provide factory-installed indoor evaporator defrost control to prevent compressor slugging by interrupting compressor operation.

D. Provide a anti-cycle timing and minimum on/off between stages timing in the microprocessor.

E. Economizer Preferred Cooling - Compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements. Compressors are enabled if space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute. Compressor low ambient lockout overrides this function.

2.10 STAGING CONTROLS

A. Provide NEC Class II, electronic, adjustable zone control to maintain zone temperature setting, with new DDC controls. See specification Section 23 0933.

2.11 UNIT SOUND RATING NUMBER

A. SHALL BE MAXIMUM 80db BASED ON ARI 270 AND ARI 370.

2.12 OPTIONS REQUIRED

A. Condenser hail guard.

B. Internal condensate drain shall have water level monitoring device installed inside the primary drain pan and shall shut down unit in the event that the primary drain becomes restricted.

C. Convenient outlet.

D. Smoke detector (see specification Section 23 3318)

E. Unit electrical service disconnect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall verify that exiting curb is ready to receive work and opening dimensions with fit new unit.

B. Contractor shall verify that proper power supply is available.

3.2 INSTALLATION

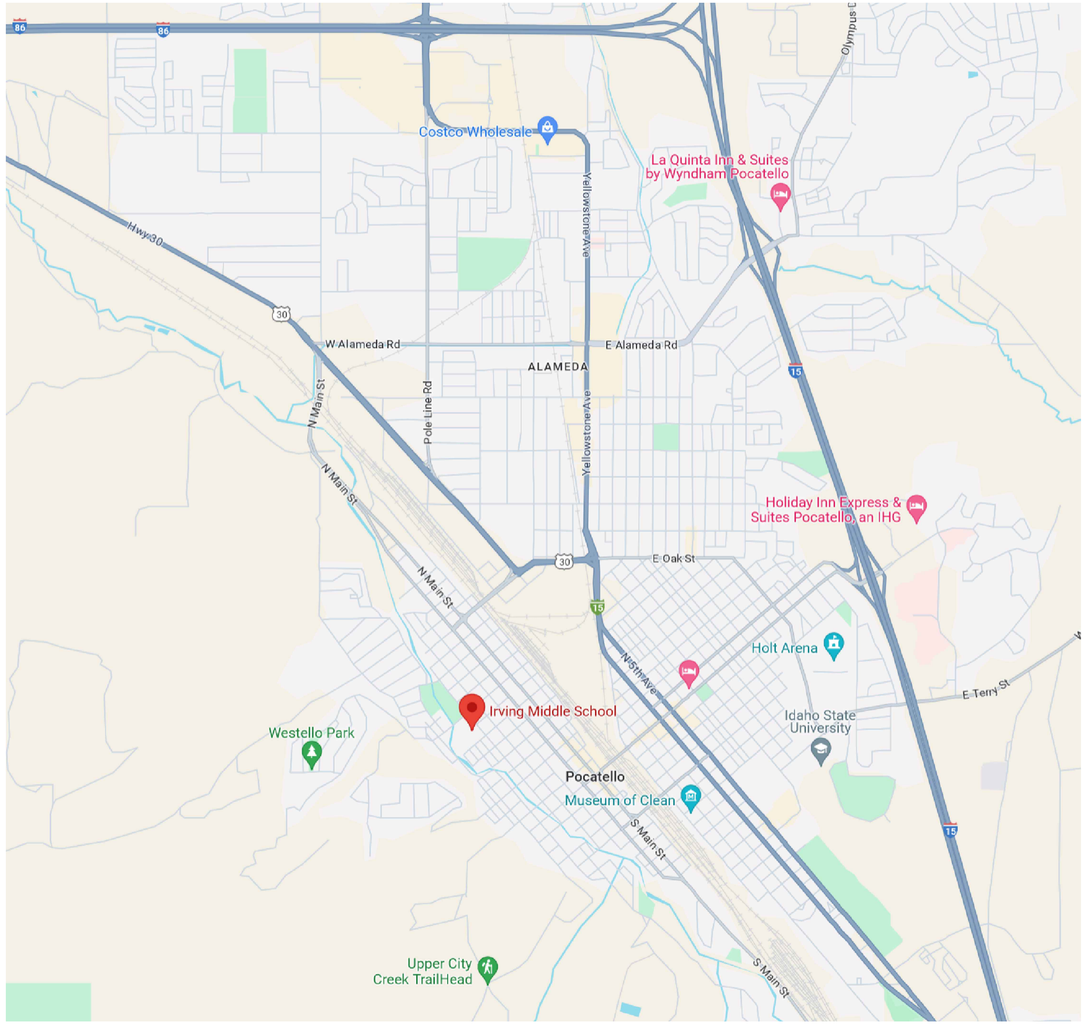
A. Contractor shall install in accordance with manufacturer's instructions.

B. Mount units on existing built roof mounting curb or new curb as specified providing watertight enclosure to protect ductwork and utility services.

END OF SECTION 23 7413

END OF DIVISION 23

2024 HVAC REVISIONS AT
IRVING MIDDLE SCHOOL
POCATELLO-CHUBBUCK SCHOOL DISTRICT #182



IRVING MIDDLE SCHOOL
911 N GRANT AVE
POCATELLO, IDAHO

SHEET INDEX	
C1.1	COVER SHEET AND SHEET INDEX
M1.1	MECHANICAL DEMOLITION FLOOR PLANS
M1.2	MECHANICAL DEMOLITION FLOOR PLAN
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E0.0	ELECTRICAL SYMBOLS & DETAILS
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E1.1	EXISTING ELECTRICAL PLAN - MEZZANINE LEVEL
E2.0	NEW ELECTRICAL PLAN - MAIN LEVEL
E2.1	NEW ELECTRICAL PLAN - MEZZANINE LEVEL

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PROJECT:
ENGINEERING SERVICE FOR
IRVING MS HVAC REPLACEMENT
911 N GRANT AVE, POCATELLO, ID 83204

SHEET TITLE:
COVER SHEET AND SHEET INDEX

PROFESSIONAL ENGINEER
REGISTERED
P-18184
Mar 26, 2024
STATE OF IDAHO
DAVID L. HANSEN

DRWN. BY:	CKD. BY:
SR	DH
JOB NO.	DATE:
23197	MARCH 2024

SHEET: C1.1
OF:

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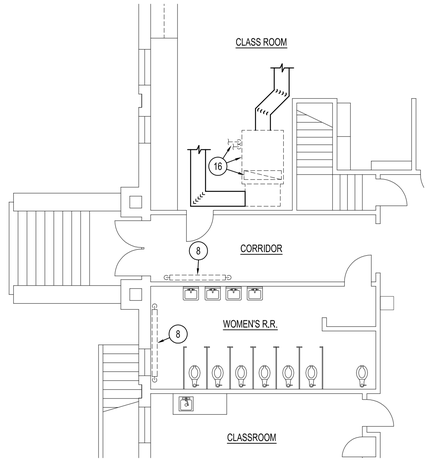
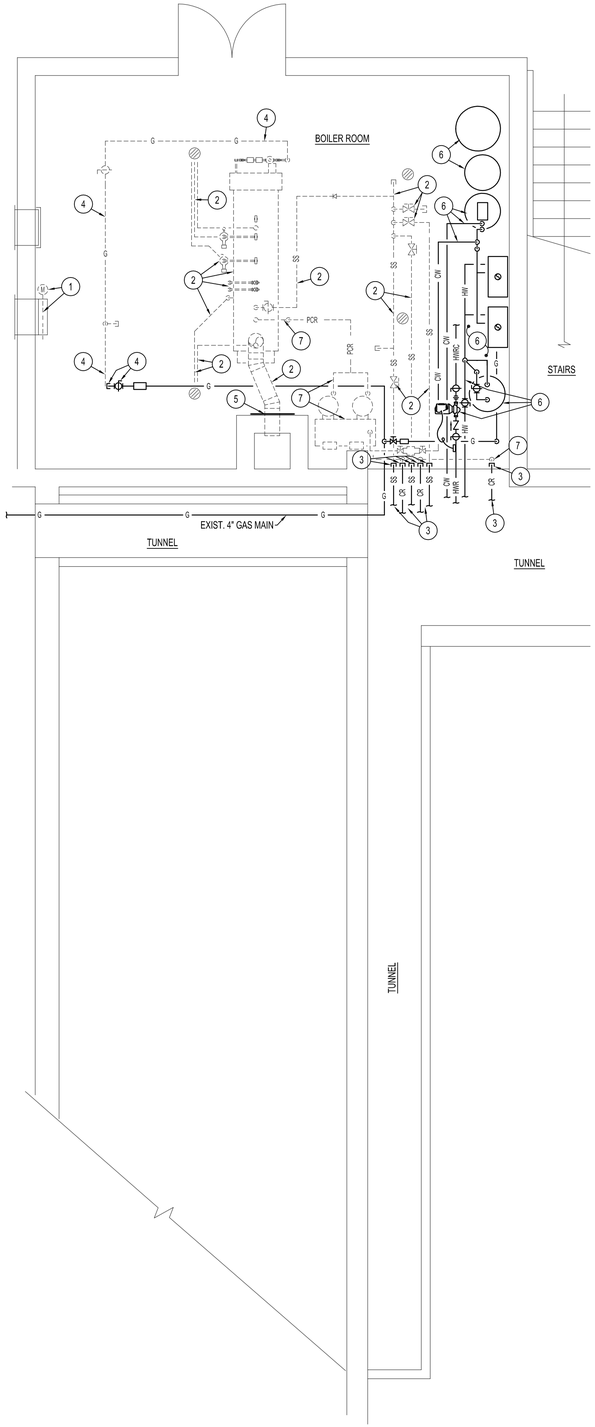


MAIN LEVEL WOMEN'S RESTROOM MECHANICAL DEMOLITION PLAN

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

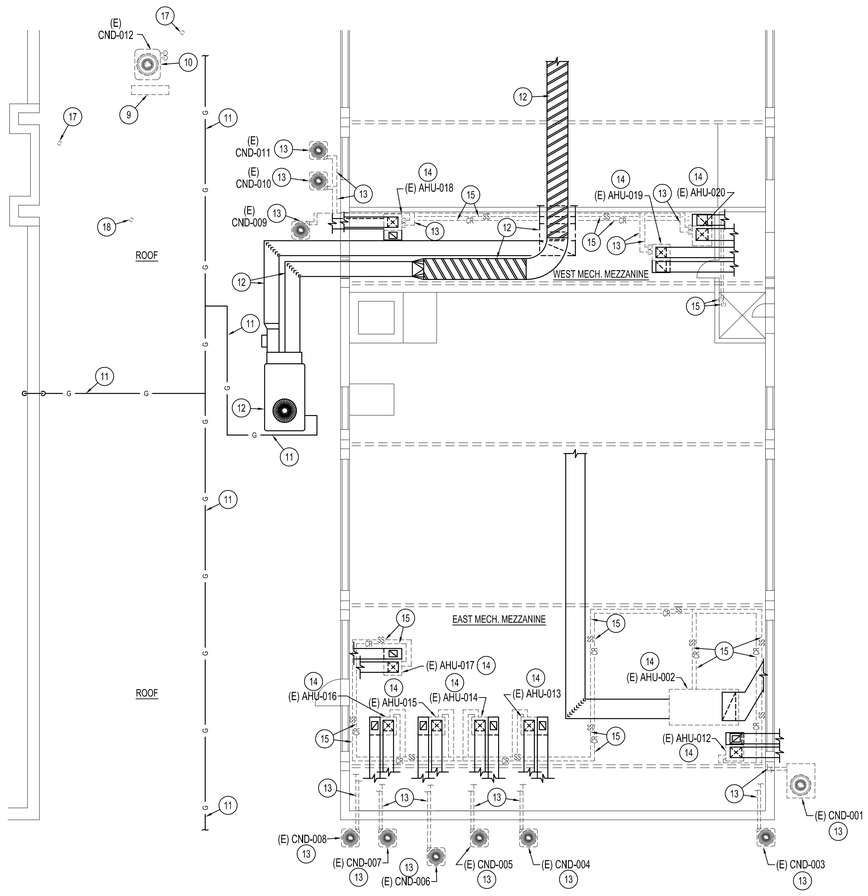
North



LARGE SCALE BOILER ROOM MECHANICAL DEMOLITION PLAN

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

North



MEZZANINE LEVEL MECHANICAL DEMOLITION PLAN

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

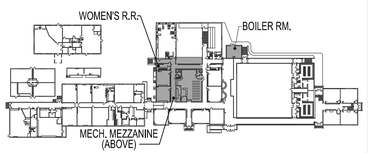
North

PLAN NOTES:

1. DISCONNECT AND REMOVE LINKAGE FROM MOTORIZED DAMPER AND LOCK DAMPER IN CLOSED POSITION. BLANK OFF INTERIOR SIDE OF DAMPER WITH SHEET METAL AND SEAL AIRTIGHT.
2. REMOVE EXISTING GAS FIRED STEAM BOILER AND ALL ASSOCIATED CONTROLS, PIPING AND FLUES WITHIN THE EXTENTS OF THE BOILER ROOM.
3. CAP AND ABANDON ALL EXISTING STEAM SUPPLY PIPING AND CONDENSATE RETURN PIPING AT TUNNEL ENTRANCE.
4. REMOVE EXISTING PORTION OF GAS PIPING SERVING BOILER BACK TO REGULATOR. INSTALL GAS SHUT-OFF VALVE ON DOWNSTREAM SIDE OF REGULATOR AND CAP PIPING AS SHOWN.
5. CAP OPENING IN CHIMNEY WHERE FLUE(S) WERE REMOVED WITH SHEET METAL AND SEAL AIRTIGHT.
6. ALL EXISTING WATER HEATERS, WATER SOFTENER, DOMESTIC HW AND CW PIPING AND PUMPS TO REMAIN IN BOILER ROOM. PROTECT DURING DEMOLITION AND NEW CONSTRUCTION.
7. REMOVE EXISTING CONDENSATE HOLDING TANK, PUMPS, PUMP CONTROLS AND PIPING WITHIN THE EXTENTS OF THE BOILER ROOM.
8. REMOVE EXISTING STEAM RADIATOR AND ALL ASSOCIATED CONTROLS AND PIPING. CAP PIPING BELOW FLOOR LEVEL AND PATCH EXISTING FLOOR TO MATCH EXISTING.
9. REMOVE EXISTING GOOSENECK ASSEMBLY THRU ROOF. UTILIZE EXISTING OPENING IN ROOF FOR NEW ROOFTOP UNIT DUCTWORK DROPPING THRU ROOF. PATCH AND SEAL ROOF AS REQUIRED.
10. REMOVE EXISTING CONDENSING UNIT LOCATED ON ROOF AND ALL ASSOCIATED REFRIGERANT PIPING AND CONTROLS.
11. EXISTING GAS PIPING ON ROOF TO REMAIN. PROTECT DURING CONSTRUCTION.
12. EXISTING ROOFTOP UNIT AND ALL ASSOCIATED DUCTWORK, PIPING AND CONTROLS TO REMAIN. PROTECT DURING CONSTRUCTION.
13. REMOVE EXISTING CONDENSING UNIT AND ALL ASSOCIATED REFRIGERANT PIPING BACK TO FAN COIL UNIT. MAINTAIN EXISTING CONTROL WIRING AND CONDUIT FOR INSTALLATION OF NEW CONDENSING UNIT AND FURNACE.
14. REMOVE EXISTING STEAM FAN COIL UNIT AND ALL ASSOCIATED STEAM PIPING. MAINTAIN EXISTING SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK AND PLENUM FOR INSTALLATION OF NEW GAS FURNACE. SEE SHEET M2.1 FOR ANY MODIFICATIONS TO DUCTWORK.
15. REMOVE ALL EXISTING STEAM SUPPLY AND STEAM CONDENSATE RETURN PIPING LOCATED ON MEZZANINE. CAP AND ABANDON PIPING RUNNING INTO INACCESSIBLE LOCATIONS.
16. REMOVE EXISTING STEAM FAN COIL UNIT AND ALL ASSOCIATED STEAM PIPING, REFRIGERANT PIPING AND OUTSIDE AIR DUCTWORK UP TO GOOSENECK ASSEMBLY ON ROOF. MAINTAIN EXISTING SUPPLY AND RETURN AIR DUCTWORK FOR INSTALLATION OF NEW GAS ROOFTOP UNIT. SEE SHEET M2.1 FOR ANY MODIFICATIONS TO DUCTWORK AND INSTALLATION OF NEW ROOFTOP UNIT.
17. CAP EXISTING VENT THRU ROOF ABOVE ROOF LEVEL AND 1'-0" BELOW ROOF DECK. SEE SHEET M2.1 FOR VENT PIPING MODIFICATIONS.
18. REMOVE EXISTING 2" VENT THRU ROOF. SEE SHEET M2.1 FOR VENT PIPING MODIFICATIONS AND NEW 4" VENT THRU ROOF.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
	POINT OF CONNECTION BETWEEN NEW AND EXISTING PIPING, DUCTWORK..ETC.
FC 1	EQUIPMENT SYMBOL
M	MOTORIZED DAMPER IN DUCT
	TURNING VANES
	DUCT TRANSITION
	INSULATED FLEXIBLE DUCT
	HORIZONTAL GAS FIRED FURNACE
	VERTICAL GAS FIRED FURNACE
	AIR COOLED CONDENSING UNIT
	EQUIPMENT, PIPING OR DUCTWORK TO BE REMOVED
G	GAS PIPING
SS	STEAM SUPPLY PIPING
CR	STEAM CONDENSATE RETURN PIPING
CD	FURNACE & DX COOLING CONDENSATE DRAIN PIPING



KEY PLAN

SCALE: N.T.S.

North

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PROJECT:

ENGINEERING SERVICE FOR
IRVING MS HVAC REPLACEMENT
911 N GRANT AVE, POCATELLO, ID 83204

SHEET TITLE:

MECHANICAL DEMOLITION FLOOR PLANS

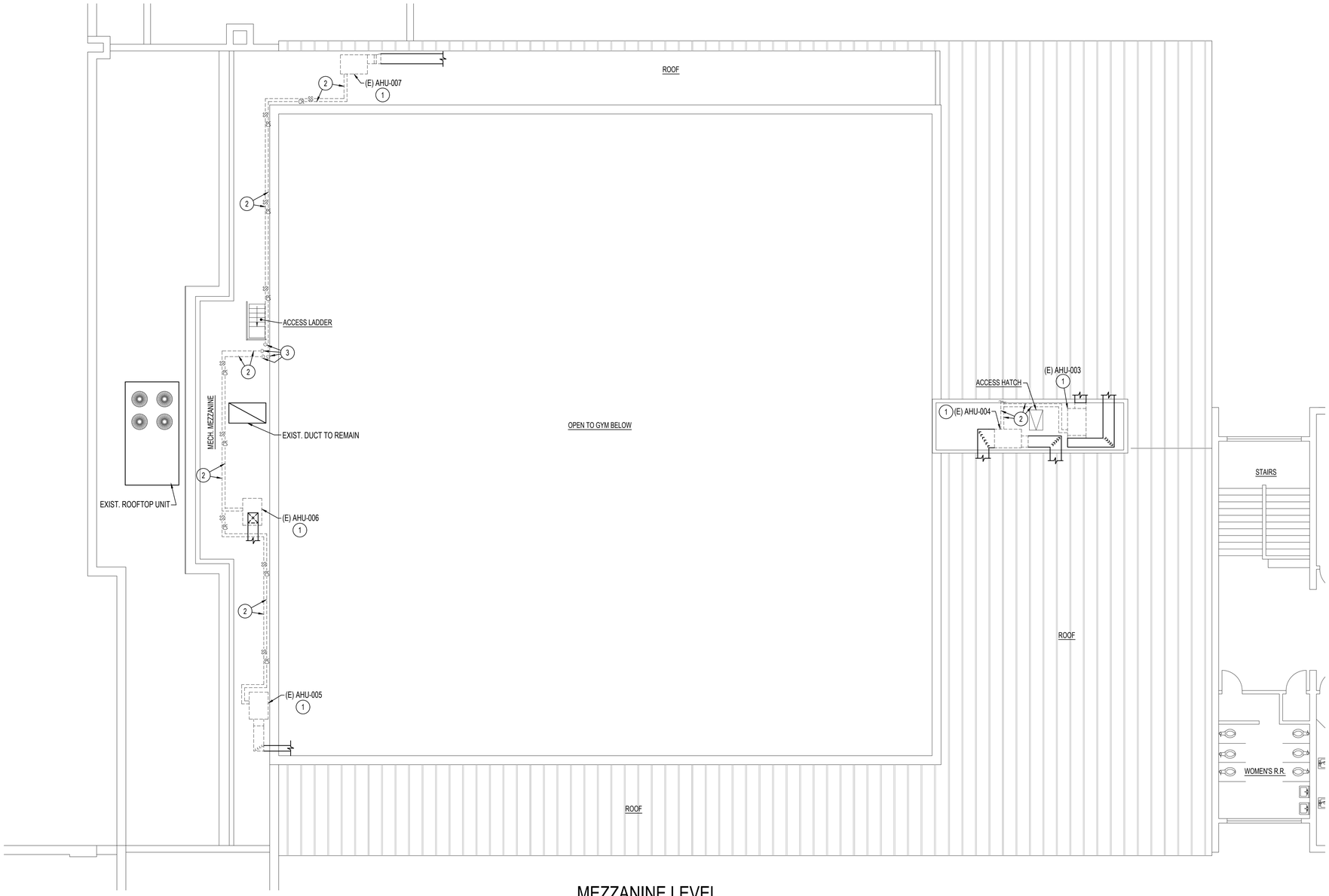
PROFESSIONAL ENGINEER
DAVID L. HANSEN
No. 18184
Mar 26, 2024
STATE OF IDAHO

DRWN. BY:	CKD. BY:
SR	DH
JOB NO.	DATE:
23197	MARCH 2024

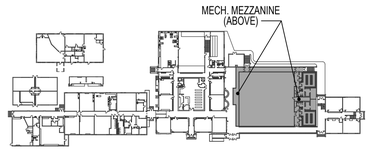
SHEET:
M1.1
OF:

PLAN NOTES:

1. REMOVE EXISTING STEAM FAN COIL UNIT AND ALL ASSOCIATED STEAM PIPING. MAINTAIN EXISTING SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK AND PLENUM FOR INSTALLATION OF NEW GAS FURNACE. SEE SHEET M2.1 FOR ANY MODIFICATIONS TO DUCTWORK.
2. REMOVE ALL EXISTING STEAM SUPPLY AND STEAM CONDENSATE RETURN PIPING LOCATED ON MEZZANINE. CAP AND ABANDON PIPING RUNNING INTO INACCESSIBLE LOCATIONS.
3. REMOVE ALL EXISTING STEAM SUPPLY AND STEAM CONDENSATE RETURN PIPING DROPPING THRU MEZZANINE FLOOR AND BELOW TO STEAM TUNNEL.



MEZZANINE LEVEL
MECHANICAL DEMOLITION PLAN
SCALE: 1/8" = 1'-0"



KEY PLAN
SCALE: N.T.S.

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PROFESSIONAL ENGINEER REGISTERED
PE-18184
Mar 26, 2024
STATE OF IDAHO
DAVID L. HANSEN

DRWN. BY:	CKD. BY:
SR	DH
JOB NO.	DATE:
23197	MARCH 2024

SHEET:
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OF:

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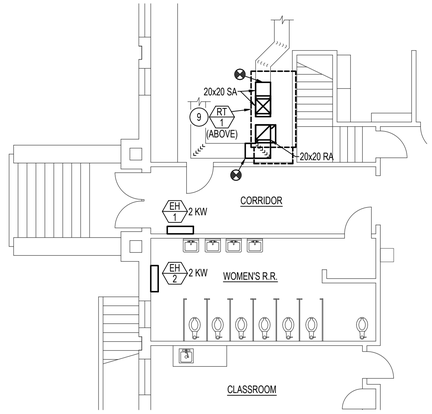
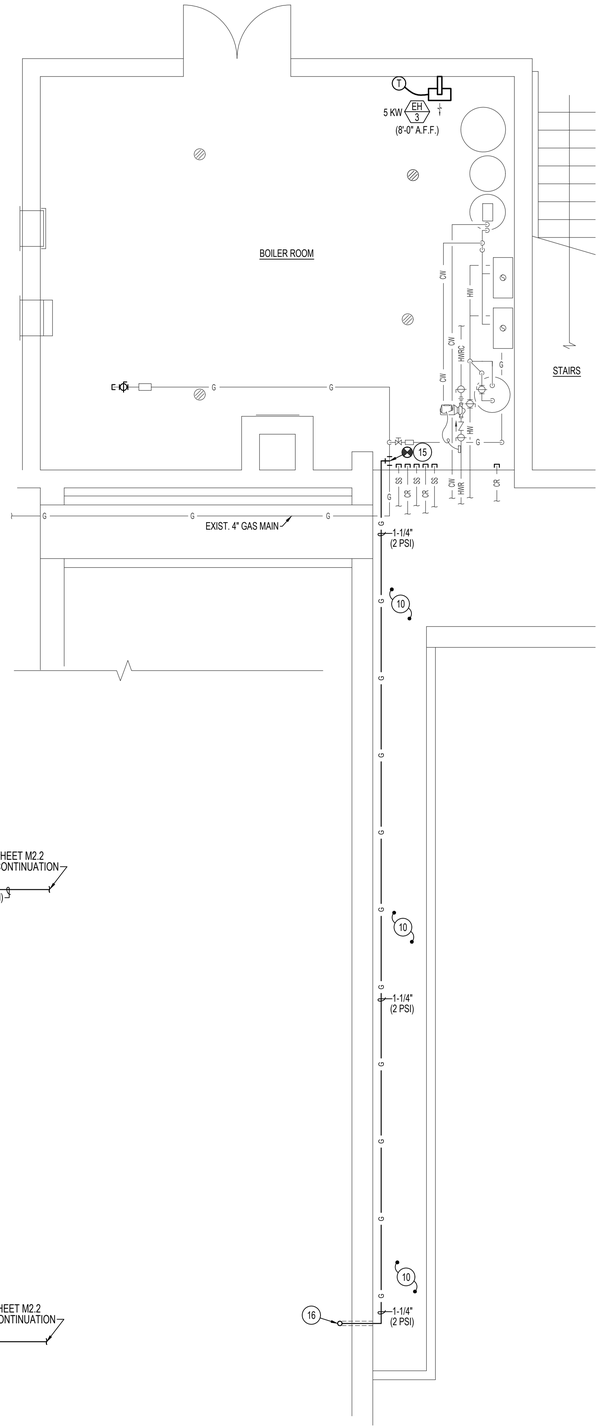
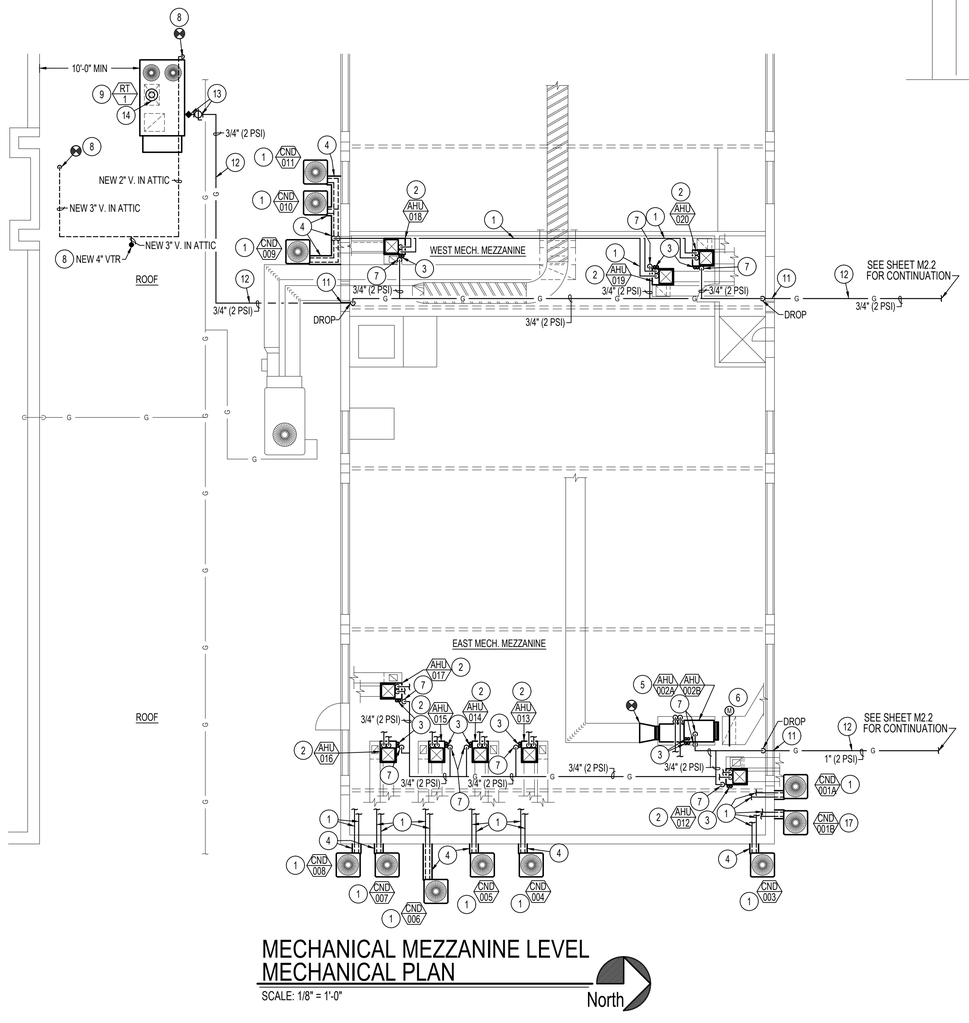


MAIN LEVEL WOMEN'S RESTROOM MECHANICAL PLAN

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

North





MECHANICAL MEZZANINE LEVEL MECHANICAL PLAN

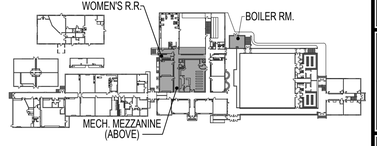
SCALE: 1/8" = 1'-0"

North

LARGE SCALE BOILER ROOM & TUNNEL MECHANICAL PLAN

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

North



KEY PLAN

SCALE: N.T.S.

North

PLAN NOTES:

1. INSTALL NEW CONDENSING UNIT ON EXISTING RAILS ON ROOF. INSTALL NEW REFRIGERANT PIPING FROM NEW CONDENSING UNIT TO NEW DX COOLING COIL LOCATED ON NEW GAS FURNACE. CONTRACTOR TO FIELD ROUTE NEW REFRIGERANT PIPING USING EXISTING REFRIGERANT PIPE ROUTING OR SHORTEST ROUTE POSSIBLE. SEAL WALL PENETRATIONS WEATHERTIGHT.
2. INSTALL NEW GAS FIRED FURNACE AIR HANDLING UNIT ON EXISTING RETURN AIR PLENUM AND RECONNECT TO EXISTING SUPPLY AND RETURN AIR DUCTWORK, CONTROLS AND CONDENSATE DRAIN PIPING. CONTRACTOR TO PROVIDE AND INSTALL ANY DUCTWORK TRANSITIONS AND FLEXIBLE CONNECTIONS AS REQUIRED.
3. INSTALL NEW FURNACE FLUES UP THRU EXISTING ROOF TO VERTICAL VENT TERMINATION ASSEMBLY. SEAL ROOF PENETRATION WEATHERTIGHT. SIZE OF FLUES AND TERMINATION KIT TO BE DETERMINED BY MANUFACTURER INSTRUCTIONS.
4. COVER EXPOSED REFRIGERANT PIPING WITH 18 GA GALVANIZED SHEET METAL COVER FROM CONDENSING UNIT TO WALL. PAINT COVERS WHITE TO MATCH MEMBRANE ROOF. SUPPORT PIPING AND COVER USING MIRO STRUT SUPPORTS OR APPROVED EQUAL.
5. INSTALL (2) NEW TWINNED HORIZONTAL GAS FIRED FURNACE AIR HANDLING UNITS IN PLACE OF EXISTING STEAM AIR HANDLING UNIT. INSTALL NEW UNITS ON ANGLE IRON RACK COMPLETE WITH CONDENSATE DRAIN PANS UNDER ENTIRE UNIT. (SEE DETAIL ON SHEET M3.1). CONNECT NEW 3/4" CONDENSATE DRAIN LINES FROM UNITS AND DRAIN PANS TO EXISTING CONDENSATE DRAIN LINES. CONTRACTOR TO PROVIDE AND INSTALL BACKDRAFT DAMPERS AND ANY SUPPLY AIR DUCTWORK TRANSITIONS AND FLEXIBLE CONNECTIONS AS REQUIRED. LEAVE RETURN AIR OPENINGS ON NEW UNITS OPEN TO MECHANICAL ROOM.
6. CONTRACTOR TO INSTALL 38x18 MOTORIZED DAMPER ON BOTTOM OF OUTSIDE AIR DUCT AND INTERLOCK DAMPER MOTOR WITH NEW TWINNED FURNACE OPERATION. CONTRACTOR TO VERIFY ACTUAL SIZE OF DUCT OPENING WHERE MOTORIZED DAMPER IS TO BE INSTALLED PRIOR TO ORDERING DAMPER ASSEMBLY.
7. DROP 3/4" (2 PSI) GAS LINE DOWN TO SERVE NEW GAS FURNACE. INSTALL 2 PSI TO 0.5 PSI GAS PRESSURE REGULATOR IN 3/4" GAS LINE SIZED FOR ACTUAL BTU LOAD OF FURNACE SUPPLIED. VENT REGULATOR TO THE EXTERIOR IF REQUIRED. CONNECT 3/4" (0.5 PSI) GAS LINE TO FURNACE COMPLETE WITH SHUT-OFF VALVE, DIRT LEG AND FLEXIBLE CONNECTION. SEE DETAIL ON SHEET M3.1.
8. CONNECT NEW VENT PIPING TO EXISTING VENT PIPING LOCATED IN ATTIC AND CONNECT TO NEW 4" VENT RUNNING UP THRU ROOF TO NEW 4" VTR. FIELD VERIFY EXISTING CONDITIONS. MAINTAIN 10'-0" FROM INTAKE ON NEW ROOFTOP UNIT TO NEW 4" VTR.
9. INSTALL NEW ROOFTOP UNIT ON NEW ROOF CURB ASSEMBLY. PROVIDE CURB ADAPTER KIT AS REQUIRED, COORDINATE OPENINGS IN ROOF WITH EXISTING STRUCTURE. PATCH AND SEAL ROOF TO MEET MANUFACTURER'S WARRANTY. CONNECT NEW 20x20 SUPPLY AND 20x20 RETURN AIR DUCTS TO EXISTING ASSOCIATED DUCTWORK ABOVE CEILING.
10. CONTRACTOR TO REMOVE EXISTING ABANDON STEAM AND CONDENSATE RETURN PIPING IN TUNNEL AND THRU TUNNEL WALL AS REQUIRED TO INSTALL NEW GAS PIPING. FIELD VERIFY EXISTING CONDITIONS.
11. RUN NEW GAS PIPING THRU WALL AS SHOWN. SEAL WALL PENETRATION WEATHERTIGHT.
12. ALL GAS PIPING ON ROOF TO BE SUPPORTED AT 10'-0" ON CENTER USING PIPE SUPPORTS SIMILAR TO ERICO PIPE PIERS OR APPROVED EQUAL.
13. RUN 3/4" (2 PSI) GAS LINE ACROSS ROOF TO SERVE NEW GAS ROOFTOP UNIT. INSTALL 2 PSI TO 0.5 PSI GAS PRESSURE REGULATOR IN 3/4" GAS LINE SIZED FOR ACTUAL BTU LOAD OF UNIT SUPPLIED. CONNECT 3/4" (0.5 PSI) GAS LINE TO UNIT COMPLETE WITH SHUT-OFF VALVE, DIRT LEG AND FLEXIBLE CONNECTION. SEE DETAIL ON SHEET M3.1.
14. INSTALL UL LISTED SMOKE DETECTOR IN THE SUPPLY AIR DUCT OF NEW ROOFTOP UNIT FOR EMERGENCY FAN SHUT-DOWN OF UNIT.
15. CONNECT NEW 1-1/4" (2 PSI) GAS LINE TO EXISTING 4" (2 PSI) GAS LINE IN BOILER ROOM NEAR TUNNEL AS SHOWN.
16. INSTALL NEW 1-1/4" (2 PSI) GAS LINE THRU EXISTING TUNNEL WALL AND RISE UP THRU FLOOR ABOVE INTO JANITOR AREA. UTILIZE EXISTING STEAM PIPE ROUTE TO RUN NEW PIPING. REMOVE EXISTING STEAM SUPPLY LINE AS REQUIRED TO INSTALL NEW GAS LINE. SEE SHEET M2.2 FOR CONTINUATION OF GAS LINE ABOVE.
17. INSTALL NEW CONDENSING UNIT ON RAIL SIMILAR TO MIRO HD SUPPORTS OR APPROVED EQUAL.

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PROJECT:

IRVING MS HVAC REPLACEMENT

ENGINEERING SERVICE FOR

911 N GRANT AVE, POCATELLO, ID 83204

SHEET TITLE: MECHANICAL FLOOR PLANS

PROFESSIONAL ENGINEER REGISTERED
PE-18184
Mar 26, 2024
STATE OF IDAHO
DAVID L. HANSEN

DRWN. BY:	CKD. BY:
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SHEET: M2.1

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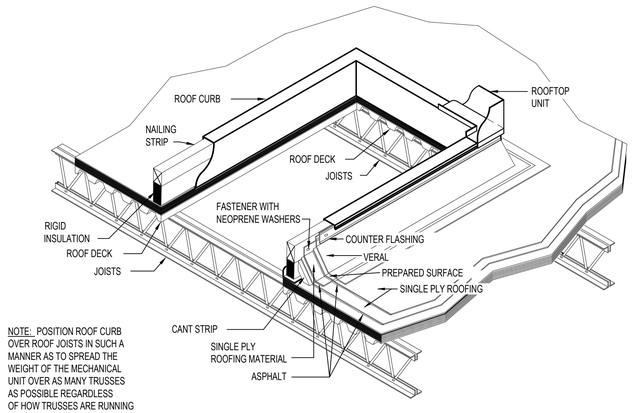
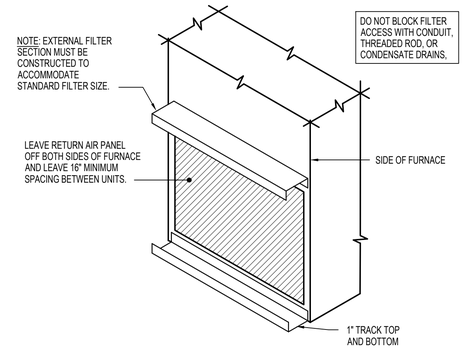


NOTE: POSITION ROOF CURB OVER ROOF JOISTS IN SUCH A MANNER AS TO SPREAD THE WEIGHT OF THE MECHANICAL UNIT OVER AS MANY TRUSSES AS POSSIBLE REGARDLESS OF HOW TRUSSES ARE RUNNING

TYPICAL ROOFTOP MOUNTING DETAIL
NO SCALE



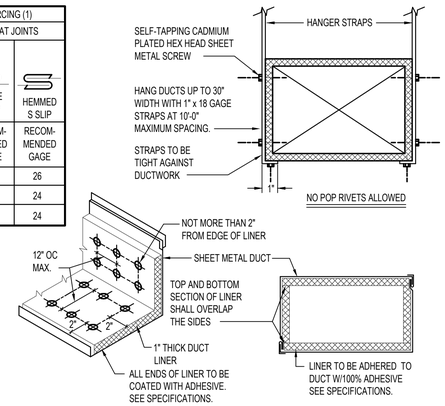
NON-DUCTED HORIZONTAL FURNACE FILTER RACK DETAIL
NO SCALE

DIMENSION OF LONGEST SIDE, INCHES	SHEET METAL GAGE (ALL FOUR SIDES)	TRANSVERSE REINFORCING (1)		
		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS &/OR INTERMEDIATE REINFORCING	AT JOINTS	
			DRIVE SLIP	HEMMED S SLIP
			RECOM-MENDED GAGE	RECOM-MENDED GAGE
UP THRU 12	26	NONE REQUIRED	26	26
13 - 18	24	NONE REQUIRED	24	24
19 - 30	24	1"x1"x1/8" @ 60 IN	-	24

(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.

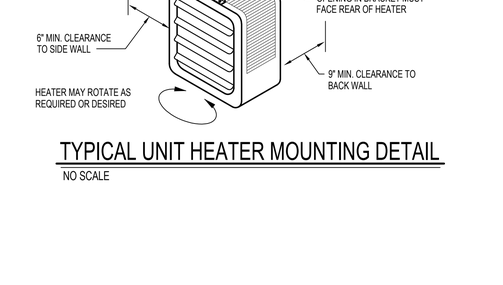
METAL FASTENERS - OMARK INSULPINS, DURO DYNE FASTENERS OR GRIPNAILS.

GRIP NAILS SHALL BE INSTALLED BY GRIPNAIL AIR HAMMER OR BY AUTOMATIC FASTENER EQUIP.



ENDS OF LINER SHALL BE BUTTED FIRMLY TOGETHER

DUCT CONSTRUCTION AND HANGER DETAIL
NO SCALE



CONCENTRIC VENT TERMINATION DETAIL
NO SCALE

HORIZONTAL FURNACE DETAIL
NO SCALE

TYPICAL UNIT HEATER MOUNTING DETAIL
NO SCALE

SUSPENDED PIPE SUPPORT
NO SCALE

REFRIGERANT PIPING DIAGRAM
NO SCALE (5 TON AND SMALLER)

ESA
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PROJECT:
ENGINEERING SERVICE FOR
IRVING MS HVAC REPLACEMENT
911 N GRANT AVE, POCATELLO, ID 83204

SHEET TITLE:
MECHANICAL DETAILS

PROFESSIONAL ENGINEER REGISTERED
PE 16184
Mar 26, 2024
STATE OF IDAHO
DAVID L. HANSEN

DRWN. BY:	CKD. BY:
SR	DH
JOB NO.	DATE:
23197	MARCH 2024

SHEET:
M2.1
OF:

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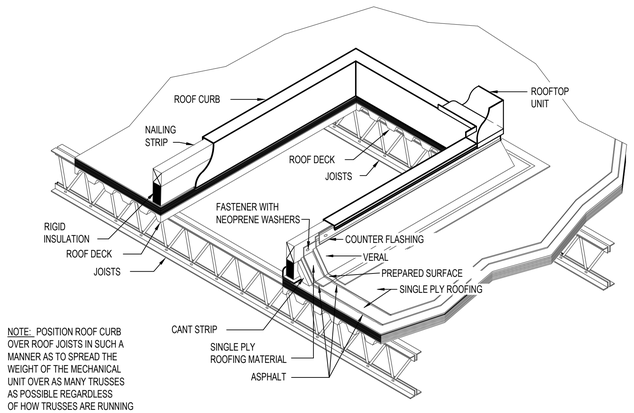
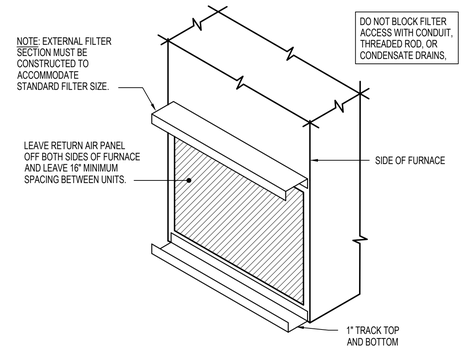


TYPICAL ROOFTOP MOUNTING DETAIL

NO SCALE



NON-DUCTED HORIZONTAL FURNACE FILTER RACK DETAIL

NO SCALE

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		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS &/OR INTERMEDIATE REINFORCING	AT JOINTS	
			DRIVE SLIP	HEMMED S SLIP
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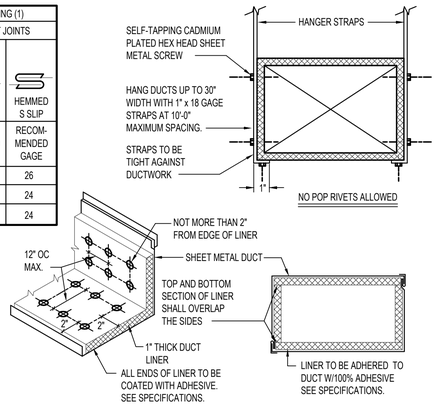

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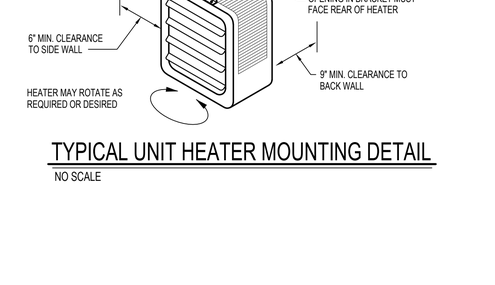
DUCT CONSTRUCTION AND HANGER DETAIL

NO SCALE

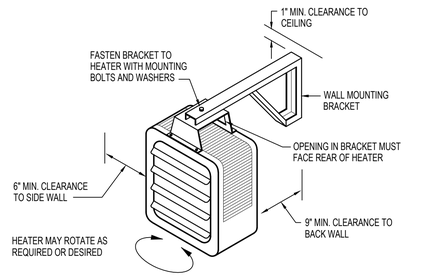


CONCENTRIC VENT TERMINATION DETAIL

NO SCALE

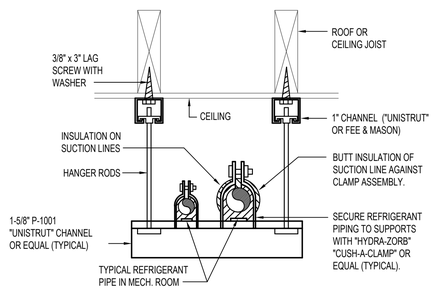
HORIZONTAL FURNACE DETAIL

NO SCALE



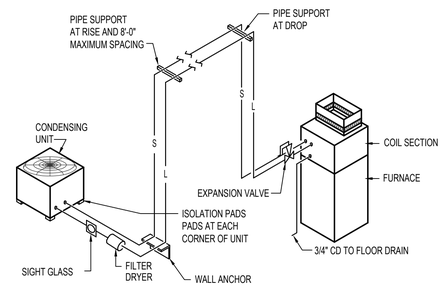
TYPICAL UNIT HEATER MOUNTING DETAIL

NO SCALE



SUSPENDED PIPE SUPPORT

NO SCALE



REFRIGERANT PIPING DIAGRAM

NO SCALE (5 TON AND SMALLER)

Engineered Systems Associates
Mechanical Engineers
Dwayne Sudweeks P.E., Dave Hansen P.E., Tanner Davis P.E.
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GAS FIRED AIR HANDLING UNIT AND DX COOLING COIL SCHEDULE

SYM.	TYPE	C.F.M.	O.A. C.F.M.	SP_E	SPEED	H.P.	CHAR.	A.G.A. INPUT	A.G.A. OUTPUT	A.G.A. @ ELEV.	E.A.T.	L.A.T.	GAS TYPE	DX COOLING COIL B.T.U.	DX COOLING COIL E.A.T.	DX COOLING COIL L.A.T.	DX COOLING COIL MAX. P.D.	PIPING SIZES LIQUID	PIPING SIZES SUCTION	PIPING SIZES C.D.	PIPING SIZES NAT GAS	PIPING SIZES INTAKE	PIPING SIZES EXHAUST	REMARKS
*AHU 002A	HORIZ.	1,600	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	40,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE48C WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
*AHU 002B	HORIZ.	1,600	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	40,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE48C WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 003	HORIZ.	1,400	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	-	-	-	-	-	-	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE48C WITH VERTICAL VENT TERMINAL ASSEMBLY.
AHU 004	HORIZ.	1,400	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	-	-	-	-	-	-	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE48C WITH VERTICAL VENT TERMINAL ASSEMBLY.
AHU 005	HORIZ.	1,600	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	-	-	-	-	-	-	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE48C WITH VERTICAL VENT TERMINAL ASSEMBLY.
AHU 006	HORIZ.	1,995	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	-	-	-	-	-	-	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE60C WITH VERTICAL VENT TERMINAL ASSEMBLY.
AHU 007	HORIZ.	1,600	EXIST.	.60"	M-HIGH	3/4	120/60/1	88,000	86,000	72,240	65°F	105°F	NAT	-	-	-	-	-	-	3/4"	3/4"	3" PVC	3" PVC	LENNOX ML196UH090XE48C WITH VERTICAL VENT TERMINAL ASSEMBLY.
AHU 012	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 013	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 014	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 015	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 016	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 017	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 018	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 019	UPFLOW	1,200	EXIST.	.60"	M-HIGH	1/2	120/60/1	66,000	64,000	53,760	65°F	105°F	NAT	36,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	2" PVC	2" PVC	LENNOX ML196UH070XE36B WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.
AHU 019	UPFLOW	1,995	EXIST.	.60"	M-HIGH	3/4	120/60/1	110,000	107,000	89,880	65°F	105°F	NAT	54,000	75°F	55°F	.25"	SEE C. UNIT SCHED.	SEE C. UNIT SCHED.	3/4"	3/4"	3" PVC	3 PVC	LENNOX ML196UH110XE60C WITH FULLY CASED R-410A DX COOLING COIL TO MATCH FURNACE & VERTICAL VENT TERMINAL ASSEMBLY.

*FURNACES AHU-002A & AHU-002B TO HAVE TWINNING KIT PROVIDED BY MANUFACTURER

ROOF TOP HEATING & AIR CONDITIONING UNIT SCHEDULE

SYM.	CFM	OUTSIDE AIR REQUIRED	OUTSIDE AIR PROVIDED	SP_s	BLOWER H.P.	CHAR	MCA	MOCP	WEIGHT	GAS CONN	HEATING BTU IN	HEATING BTU OUT	HEATING EAT	HEATING LAT	COOLING MBH	COOLING EAT	COOLING WB	SEER / IEER	REMARKS
RT 1	3,000	400 CFM	400 CFM	0.6"	2.0	208/60/3	39.0	45.0	1239#	3/4"	180,000	144,000	65°F	104°F	93.0	80°F	62°F	13.0 IEER	LENNOX MODEL LGH092H4B WITH FACTORY ROOF CURB AND ECONOMIZER

ALL ROOFTOP UNITS TO HAVE INTEGRAL FACTORY MOUNTED POWER DISCONNECTS AND 120/60/1 GFCI CONVENIENCE OUTLET
* UL LISTED SMOKE DETECTOR REQUIRED ON UNIT(S) 2,000 CFM AND ABOVE

CONDENSING UNIT SCHEDULE

SYM.	BTU	EAT	CHAR.	MCA	MOCP	SEER	REFR.	PIPE SIZING LIQUID	PIPE SIZING SUCTION	REMARKS
CND 001A	48,000	95°F	208/60/3	18.8	30.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA048S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 001B	48,000	95°F	208/60/3	18.8	30.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA048S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 003	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 004	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 005	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 006	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 007	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 008	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 009	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 010	36,000	95°F	208/60/3	14.2	20.0	14.5	R-410A	3/8"	7/8"	LENNOX MODEL TSA036S4 WITH 0°F LOW AMBIENT HARD START KIT.
CND 011	54,000	95°F	208/60/3	21.3	35.0	14.5	R-410A	3/8"	1-1/8"	LENNOX MODEL TSA060S4 WITH 0°F LOW AMBIENT HARD START KIT.

ELECTRIC HEATER SCHEDULE

SYM.	TYPE	BTU	KW	CHAR	CONTROL	REMARKS
EH 1	WALL MOUNTED	10,239	3.0	208/60/1	INTEGRAL T-STAT	QMARK MODEL AWH-4404 SURFACE MOUNT HEATER WITH INTEGRAL T-STAT
EH 2	WALL MOUNTED	10,239	3.0	208/60/1	INTEGRAL T-STAT	QMARK MODEL AWH-4404 SURFACE MOUNT HEATER WITH INTEGRAL T-STAT
EH 3	WALL MOUNTED	17,075	5.0	208/60/1	WALL T-STAT	QMARK MODEL MUH05-81 WALL MOUNTED UNIT HEATER WITH WALL T-STAT

CONDENSATE PUMP SCHEDULE

SYM.	TYPE	H.P.	CHAR	REMARKS
CP 1	FLOOR MOUNTED WITH 1/2 GALLON TANK	1/30	120/60/1	LITTLE GIANT MODEL VCMA-15UL WITH 1/2 GALLON TANK AND 6'-0" POWER CORD
CP 2	FLOOR MOUNTED WITH 1/2 GALLON TANK	1/30	120/60/1	LITTLE GIANT MODEL VCMA-15UL WITH 1/2 GALLON TANK AND 6'-0" POWER CORD

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PROJECT:
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IRVING MS HVAC REPLACEMENT
911 N GRANT AVE, POCATELLO, ID 83204

SHEET TITLE:
MECHANICAL SCHEDULES

PROFESSIONAL ENGINEER REGISTERED
DAVID L. HANSEN
PE-18184
STATE OF IDAHO
Mar 26, 2024

DRWN. BY:	CKD. BY:
SR	DH
JOB NO.	DATE:
23197	MARCH 2024

SHEET:
M3.2
OF:

POWER SYMBOL SCHEDULE

NOTE: ALL SYMBOLS MAY NOT BE USED

SYMBOL	DESCRIPTION
"MSB"	ELECTRICAL SWITCHBOARD EQUIPMENT, (SEE POWER RISER AND PANEL SCHEDULES FOR ADDITIONAL INFORMATION)
"T##"	DRY-TYPE TRANSFORMER, (SEE POWER RISER FOR ADDITIONAL INFORMATION)
"LA"	ELECTRICAL PANELBOARD, (SEE POWER RISER AND PANEL SCHEDULES FOR ADDITIONAL INFORMATION)
	DISCONNECT SWITCH, SIZE/POLES/TYPE AS INDICATED TYPES: 1=NEMA 1, 3R=NEMA 3R, 4X=NEMA 4X
	FUSED DISCONNECT SWITCH, SIZE/POLES/TYPE AS INDICATED TYPES: 1=NEMA 1, 3R=NEMA 3R, 4X=NEMA 4X
	COMBINATION STARTER & FUSED DISCONNECT SWITCH, SIZE/POLES/TYPE AS INDICATED, TYPES: 1=NEMA 1, 3R=NEMA 3R, 4X=NEMA 4X
J	JUNCTION BOX CR = CORD REEL; SEE DRAWINGS FOR INFORMATION CD = CORD DROP; SEE DRAWINGS FOR INFORMATION
	EQUIPMENT CONNECTION; COORDINATE CONNECTION WITH EQUIPMENT PRIOR TO ROUGH-IN
M	MOTOR CONNECTION
F	EXHAUST FAN CONNECTION
	POWER AND/OR DATA SERVICE POLE
FB#	FLOORBOX (SEE FLOORBOX SCHEDULE FOR ADDITIONAL INFORMATION)
	PUSHBUTTON STATION
	SPECIAL RECEPTACLE (COORDINATE NEMA TYPE WITH EQUIP.) (REFER TO PANEL SCHEDULES FOR AMPS)
	CEILING MOUNTED DUPLEX RECEPTACLE (COORDINATE PLACEMENT WITH CEILING EQUIPMENT PRIOR TO ROUGH-IN)
	DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT
	GFCI-TYPE DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT
	SPLIT-WIRED RECEPTACLE, HALF OF RECEPT. SHALL BE SWITCHED OTHER HALF SHALL HAVE CONSTANT POWER.
	DOUBLE-DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT
	GFCI-TYPE DOUBLE-DUPLEX RECEPTACLE, UL TAMPER-RESISTANT WHERE MOUNTED BELOW 5FT.

RECEPTACLE AND EQUIPMENT SUBSCRIPTS

AC	ABOVE COUNTER	D	CLOTHES DRYER (NEMA 14-30R)
WP	WEATHERPROOF (UL LISTED WEATHER-RESISTANT)	R	ELECTRIC RANGE (NEMA 14-50R)
42"	MOUNTING HEIGHT AFF OR AFG	W	WELDER RECEPTACLE
REF	REFRIGERATOR		208/240V - NEMA 6-50R
M	MICROWAVE		
M/R	MICROWAVE/RANGE HOOD (LOCATE ABOVE RANGE)		
USB	DUPLEX RECPT. WITH (2) USB CHARGING PORTS		
DW	DISHWASHER, INSTALL PER NEC 422.16(B)(2)		
D/DW	DISPOSAL/DISHWASHER, INSTALL PER NEC 422.16(B)(2)		
TV	RECEPT. DEDICATED TO TV; FIELD VERIFY HEIGHT W/ TV PRIOR TO ROUGH-IN.		
EWC	ELECTRIC WATER COOLER; PROVIDE GFCI PROTECTION PER NEC 422.5(A)		

T OR S	HVAC THERMOSTAT OR SENSOR; PROVIDE & INSTALL BACKBOX,3/4" CONDUIT AND CONDUCTORS TO ASSOCIATED HVAC UNIT. COORDINATE EXACT LOCATION & SIZE AND NUMBER OF CONDUCTORS WITH M.C.

GENERAL SPECIAL SYSTEM NOTES:

A. ALL DEVICES SHOWN AT OR NEAR MILLWORK/CASEWORK SHALL BE COORDINATED WITH THE ARCHITECTURAL ELEVATION DRAWINGS AND MILLWORK INSTALLER TO INSURE PROPER MOUNTING HEIGHTS. CONTRACTOR SHALL ADJUST DEVICES AS NECESSARY IN ORDER TO POSITION DEVICES SUCH THAT THEY WILL NOT FALL BEHIND MILLWORK, CABINETS OR BE DIRECTLY ABOVE SINKS OR MIDWAY BETWEEN TILEWORK/WALL OR WAINSCOATING, ETC.

B. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL A GFCI TYPE RECEPTACLE FOR ALL RECPTACLES SHOWN IN TOILET RMS, BATHROOMS, KITCHENS/SERVING AREAS, ROOFTOP, OUTDOORS OR WITHIN 6FT OF ANY SINK, BASIN, TUB OR FLOOR SINK AND ALL OTHER AREAS DEFINED BY THE NEC.

CIRCUITING & GENERAL SYMBOL SCHEDULE

NOTE: ALL SYMBOLS MAY NOT BE USED

SYMBOL	DESCRIPTION
1	KEYED NOTE REFERENCE
1 / ES101	DETAIL # / SHEET REFERENCE
A-1,3,5 3/4"C.-6#12,1#12G	BRANCH CIRCUIT HOME-RUN TO PANEL INDICATED A-1,3,5 — PANEL AND CIRCUIT DESIGNATIONS 3/4"C.-6#12,1#12G QTY & SIZE OF EQUIPMENT GROUND CONDUCTOR QTY & SIZE OF NEUTRAL AND PHASE CONDUCTOR(S) SIZE OF CONDUIT
	TICK MARKS EQUIPMENT GROUNDING CONDUCTOR NEUTRAL CONDUCTOR(S) PHASE AND/OR SWITCH-LEG CONDUCTOR(S)
*25,000A	CALCULATED AVAILABLE FAULT CURRENT AT EQUIPMENT(SEE POWER RISER)
	BRANCH CIRCUIT/FEEDER CONCEALED IN CEILING OR WALL
	BRANCH CIRCUIT/FEEDER CONCEALED UNDERGROUND OR FLOOR
	NEW EQUIPMENT, DEVICES, ETC.
	EXISTING EQUIPMENT, DEVICES, ETC.
	DEMOLITION EQUIPMENT, DEVICES, ETC.

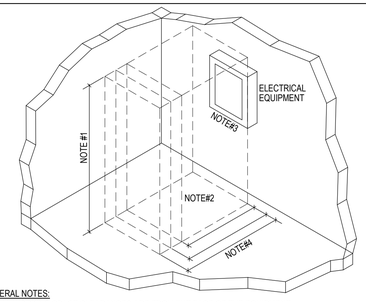
PROJECT GENERAL NOTES:

A. E.C. SHALL REFER TO THE MECHANICAL DRAWINGS FOR EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT AND ELECTRICAL CONNECTIONS.
B. E.C. SHALL PROVIDE MINIMUM WORKING CLEARANCE AS PER NEC BEFORE INSTALLING ANY ELECTRICAL PANELS OR CABINETS. SEE ELECTRICAL EQUIPMENT CLEARANCE DETAIL.
C. INSTALL ALL LIGHT FIXTURES IN MECHANICAL ROOM AFTER THE MECHANICAL EQUIPMENT IS IN PLACE. ADJUST AS NECESSARY. PROVIDE CHAIN SUSPENSION KITS AS REQUIRED.
D. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN(S) FOR EXACT FIXTURE LOCATIONS, CEILING TYPES, ETC.
E. E.C. SHALL PROVIDE ALL CONCRETE PADS AS REQUIRED FOR ALL ELECTRICAL EQUIPMENT.
F. CONFIRM EXACT LOCATIONS OF ALL TELEPHONE/DATA OUTLETS WITH OWNER PRIOR TO ROUGH-IN.
G. LOCATE SWITCHES, OUTLETS, ETC., SHOWN AT ROOM ENTRY DOORWAYS, AS CLOSE TO DOOR FRAME AS POSSIBLE, SO AS NOT RO INTERFERE WITH ROOM CABINETS, ETC.
H. SUPPORT ALL LIGHT FIXTURES INDEPENDENT OF CEILING.
I. ELECTRICAL CONTRACTOR SHALL OBTAIN ALL APPLICABLE PERMITS FOR WORK AND PAY ASSOCIATED FEES.
J. MAINTAIN 24" MIN. CLEARANCE FROM ALL COMMUNICATIONS CABLING AND ELECTRONIC BALLASTS.
K. UNLESS SPECIFICALLY INDICATED OTHERWISE, E.C. SHALL COORDINATE WITH ANY SPECIAL SYSTEMS SUPPLIER/SHOP DRAWINGS; DENTAL, MEDICAL, KITCHEN, SPECIALIZED EQUIPMENT, ETC. FOR THE EXACT ROUGH-IN REQUIREMENTS FOR THEIR EQUIPMENT. ALSO UNLESS INDICATED OTHERWISE, THE E.C. TO BE RESPONSIBLE FOR FINAL ELECTRICAL CONNECTIONS TO ALL SPECIAL EQUIPMENT.
L. ALL CONDUIT/RACEWAY/CABLES TO BE CONCEALED IN WALLS OR ABOVE CEILINGS. IF ANY SURFACE WORK IS NECESSARY, IT SHALL BE APPROVED BY THE ARCHITECT/ENGINEER PRIOR TO INSTALLATION.
M. ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND THOROUGHLY INVESTIGATE THE EXISTING CONDITIONS, AS THEY RELATE TO THE SCOPE OF WORK DESCRIBED. MAKE NECESSARY PROVISIONS IN THE BASE BID TO ADEQUATELY ACCOMMODATE THESE CONDITIONS.
N. DATA CABLING SYSTEM PRE-INSTALLATION CONFERENCE:
   1. E.C. SHALL SCHEDULE A MEETING A MINIMUM OF FIVE CALENDAR DAYS PRIOR TO BEGINNING DATA CABLING INSTALLATION. ATTENDEES SHOULD INCLUDE OWNER'S REP., ENGINEER, GC, EC AND CABLING SUB. REFER TO SECTION 26 6210(1.4)(E) FOR ADDITIONAL INFORMATION.

ABBREVIATIONS

P	SINGLE POLE
1PH	SINGLE-PHASE
2/C	TWO-CONDUCTOR
3/C	THREE-CONDUCTOR
3P	THREE POLE
3PH	THREE-PHASE
3W	THREE-WIRE
4W	FOUR-WIRE
AC	ABOVE COUNTER
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
A or AMP	AMPERE
ANN	ANNUNCIATOR
ANP	ACCESS POINT
AP	(WIRELESS DATA)
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAGE
BFG	BELOW FINISHED GRADE
C	CEILING MOUNTED
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
C	CONDUIT
CP	CONTROL PANEL
CT	CURRENT TRANSFORMER
CU	COPPER
DS	DISCONNECT SWITCH
EA	EACH
E.C.	ELECTRICAL CONTRACTOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NONMETALLIC TUBING
EPO	EMERGENCY POWER OFF
EQUIP	EQUIPMENT
EX	EXISTING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FLA	FULL LOAD AMPS
FMC	FLEXIBLE METAL CONDUIT
GND	GROUND
G.C.	GENERAL CONTRACTOR
GEN	GENERATOR
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HD	HEAVY DUTY
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTOMATIC
HP	HORSE POWER
HPS	HIGH PRESSURE SODIUM
HV	HIGH VOLTAGE
HZ	HERTZ
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
J-BOX	JUNCTION BOX
V	KILOVOLT
KVA	KILOVOLT AMPERE
kW	KILOWATT
kWh	KILOWATT HOUR
LED	LIGHT EMITTING DIODE
LFMC	LIQUID TIGHT FLEXIBLE METAL CONDUIT
LFNC	LIQUID TIGHT FLEXIBLE NONMETALLIC CONDUIT
LTG	LIGHTING
LV	LOW VOLTAGE
MAX	MAXIMUM
M.C.	MECH. CONTRACTOR
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OCP	OVERCURRENT PROTECTION SIZE
OL	OVERLOAD
PB	PUSHBUTTON
P	PHASE
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PTZ	PAN/TILT/ZOOM
QTY	QUANTITY
RCP	REFLECTED CEILING PLAN
RMC	RIGID METAL CONDUIT
RNC	RIGID NONMETALLIC CONDUIT
SCA	SHORT CIRCUIT AMPS
SCBA	STANDARD COLOR BY ARCHITECT
SF	SQUARE FOOT (FEET)
SPD	SURGE PROTECTION DEVICE
SPEC	SPECIFICATION
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TL	TWIST LOCK
TP	TWISTED PAIR
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TYP	TYPICAL
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT AMPERE
V.I.F.	VERIFY IN FIELD
VFD	VARIABLE FREQUENCY DRIVE
WAP	WIRELESS ACCESS POINT
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
XFMR	TRANSFORMER

ELECTRICAL EQUIP. CLEARANCE



GENERAL NOTES:

A. ALL WORKING SPACE CLEARANCES ARE FROM THE FACE OF THE EQUIPMENT.

NOTES:

1. THE MINIMUM HEADROOM OF WORKING SPACE SHALL BE 6 1/2FT.
2. THE WIDTH OF THE WORKING SPACE SHALL BE THE WIDTH OF THE EQUIPMENT OR 30", WHICHEVER IS GREATER. THE PANEL DOOR SHALL OPEN AT LEAST 90 DEGREES.
3. ALL CIRCUIT BREAKERS, WHEN IN THIER HIGHEST POSITION, SHALL NOT BE MORE THAN 6FT 7 IN. ABOVE THE FINISHED FLOOR.
4. 3FT CLEARANCE IF 0-150V TO GROUND, 3.5FT CLEARANCE IF 151-600V TO GROUND. 4FT IF EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORKING SPACE.

ELECTRICAL SPECIFICATIONS

1. INTENT:
   Provide and install complete and operable electrical systems including but not not limited to; lighting, power, receptacles, data, fire alarm ande etc.
   Provide all required connections to all Mechanical and Plumbing equipment, as indicated and required, including all conduits, wiring and controls. Coordinate with mechanical contractor and drawings.
2. COMPLIANCE WITH CODES:
   All work and material shall comply with all applicable codes, safety orders, laws, ordinances and regulations of governing authorities and other agencies having jurisdiction including regulations of the State and Local Fire Marshall, unless detailed as specified to a more restrictive standard or higher requirement.
3. INTERPRETATION OF DRAWINGS:
   The electrical drawings are essentially diagrammatic in that all provisions necessary to conform to structural, architectural, mechanical and plumbing systems can not be shown. All installations shall be adjusted as necessary to conform and to avoid obstructions, without additional cost to the owner.
   All work, material and equipment called for by notes, schedules or otherwise indicated on the drawings shall be furnished and isntalled as though fully set forth in these specifications.
4. VISITING THE SITE:
   Contractor shall visit the site and become acquainted with conditions to be encountered. Extra funds will not be allowed due to failuer to examine the site and to included existing conditions in bid price.
5. COORDINATION WITH UTILITIES:
   These plans have been prepared without utility company comments. The contractor shall verify exact requirements for the electrical, telephone and communication services with the utility company representatives and provide all work and pay all costs for a complete and operating systems, as directed by the governing utilities.
6. MATERIALS AND WORKMANSHIP:
   All workmanship shall be performed by skilled electricians using the best standard practives of the trade. All materials shall, unless otherwise noted, be new and in perfect condition and working order. All material for similar uses shall be of the same type, material and manufacturer for ease of future maintaenance.
   All equipment shall be readily accessible for maintenance and repairs. All materials, fixtures and equipment shall be covered or sealed upon installation so as to provide for safety and to insure that operation and appearance will be maintained after subsequent construction operations.
7. EXECUTION:
   Raceway installation: Seperate underground conduits in a common trench 4" minimum horizontally, 12" minimum from other utility lines. Minimum conduit depth shall be 18".
   Coordinate conduit installation with pipes, steel, footings and ducts installed by other trades. Install conduit runs exposed to view parallel or at right angles to structural members, walls or building lines. Support conduit with one-hole malleable factory made pipe straps, fastended with screws.
8. OPERATING AND ADJUSTING:
   The owner reserves the right to operate any systems of equipment prior to final comletion and acceptance of the work. Such perliminary operation shall not be construed as an acceptance of any work.
   Each piece of equipment and all of the systems shall be adjusted to insure proper functioning and shall be left in first class operating condition.
9. CUTTING AND PATCHING:
   Do all drilling and cutting as necessary for installation of equipment or conduit. Cutting or drilling of structure is only permitted with prior approval of the owner and structural engineer.
   Where cutting and patching of work is necessary, use the same materials, workmanship and finish to neatly match all surrounding work.
10. CONDUIT:
    All conduit material and installation methods shall be as allowed by the NEC, local AHJ and as directed by the owner.
11. CONDUCTORS:
    Type THWN or THHN copper wire insulated for 600V.
    Smallest wire shall be #14 AWG unless noted otherwise.
    All wiring shall be Copper unless indicated otherwise.

    Use "Ideal Yellow" pulling compound for all wire pulls.
    Use Scotchlock connectors for all splices in #12 wire and tape bolted pressure connectors for larger wire.
12. GROUNDING:
    All conduit, branch circuits, feeders and etc. shall be provided with a grounding conductor. All grounding conductors shall be insulated and green in color, size as shown.
13. WIRING DEVICES:
    Devices shall be Standard type, Specification grade, color as selected by owner. Decora style devices are prohibited. Utilize GFCI and Tamper-proof devices in all locations as defined by the NEC.
    Wiring devices shall be as installed as allowed by the NEC, local AHJ.
14. DEVICE PLATES:
    Devices plate type and color shall be as directed by owner and as required by the NEC.
15. LIGHTING FIXTURES:
    As selected by owner and/or indicated in schedules. All light fixtures shall be installed and connected by the Electrical Contractor.
16. SERVICE EQUIPMENT & PANELBOARDS:
    Service Equipment: Shall be rated as such and shall comply with local utility co. requirments. .
    Panelbards: Shall be provided with typed writtend directories indicating loads being served.
    Maintain all required clearances around equipment as required by the NEC.
    All equpment dimensions to be field verified.
17. CLEAN-UP:
    Upon completion of the work, prior to final inspection, thoroughly clean all exposed fixtures, trim and equipment and leave the entire installation in a neat, clean and usable condition. Remove all cement, paint, grease, oil and other foreign substances.
18. TEST:
    Test all conductors for shorts, opens, grounds or other defects. Correct any defective work and re-test.
    Demonstrate continuous satisfactory operation of all electrical systems and equipment.
    Provide training to the owner on electrical systems as needed for owner operation and maintenance of building.
19. GUARANTEE:
    Prior to final acceptacne of the project, deliver to the owner a written one year guarantee on all workmanship, materials and equipment and agree to repair or replace all such defective items promptly that may occure during the warranty period; including repair or replacement of the premises that may be damaged due to faulty work and materials furnished under contract.

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PROJECT:
ENGINEERING SERVICE FOR:
IRVING MS HVAC REPLACEMENT
911 G GRAND AVE, POCATELLO, ID 83204

SHEET TITLE:
ELECTRICAL SYMBOLS & DETAILS

DRWN. BY:	CKD. BY:
BP	SAM
JOB NO.	DATE:
23197	MARCH 2024

PROFESSIONAL ENGINEER REGISTERED 13053 3/26/24 STATE OF IDAHO SHAWN A. MEADOR

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SHEET:
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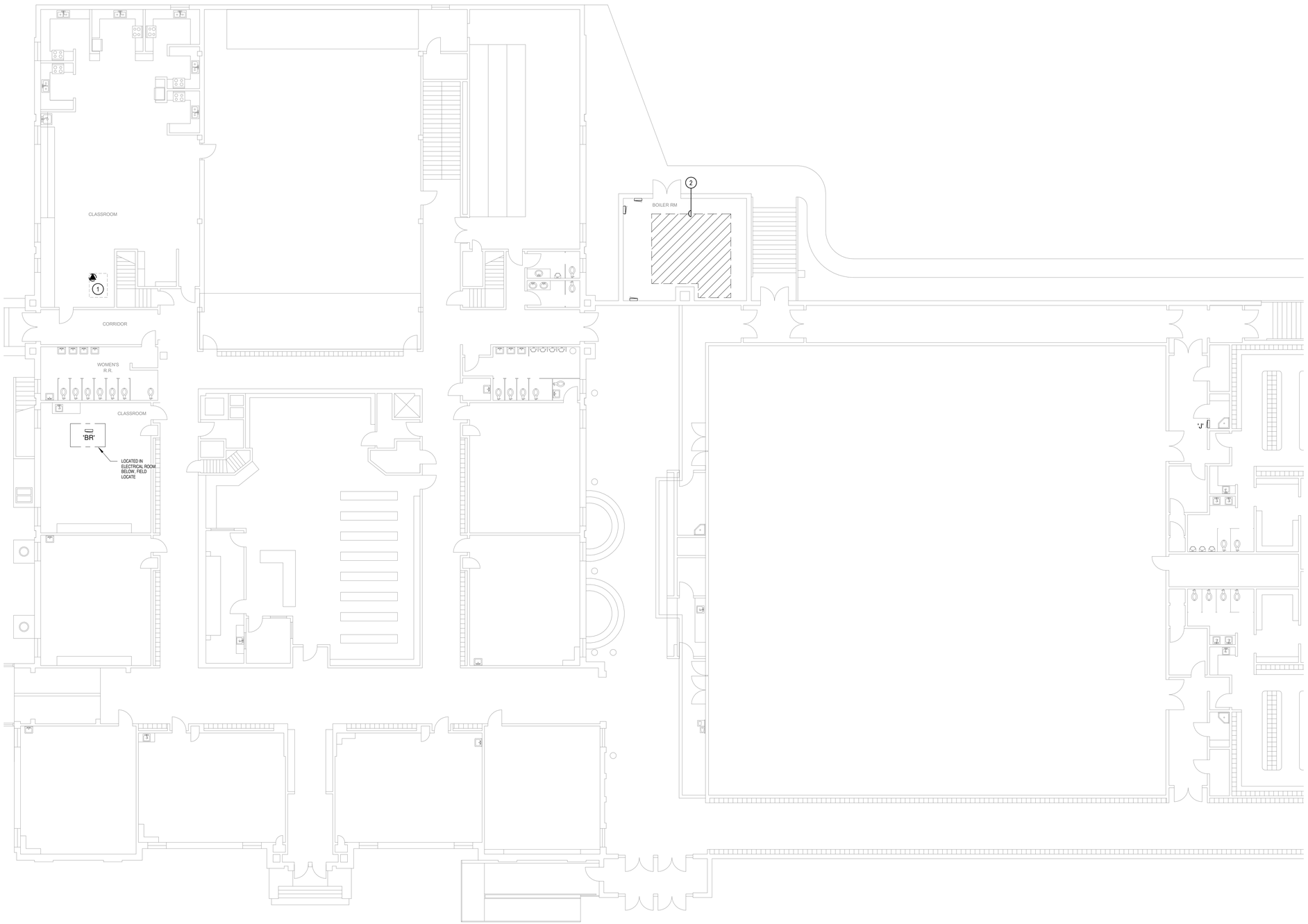
OF: FIVE



1 EXISTING ELECTRICAL PLAN - MAIN LEVEL
SCALE: 3/32" = 1'-0"

0" 8' 16'
NORTH

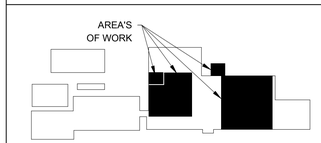
GENERAL NOTES:

A. ALL EXISTING ELECTRICAL MAY NOT APPEAR ON THESE PLANS, HOWEVER THE ABOVE INFORMATION APPLIES.
B. PROVIDE AND INSTALL BLANK COVERS ON ALL UNUSED SWITCH/OUTLET/J-BOXES WHERE REQUIRED.
C. ALL WALL DEVICES THAT ARE EXISTING TO REMAIN, SHALL BE ADAPTED TO NEW WALL COVERINGS, REFER TO ARCHITECTURAL DRAWINGS FOR EXACT WALL LOCATIONS, THICKNESS, ETC.
D. PRIOR TO THE START OF ANY DEMOLITION WORK, DISCONNECTING ANY POWER AND OR TELE/DATA SYSTEMS, THE CONTRACTOR SHALL COORDINATE DOWN-TIME WITH THE OWNER.
E. REFER TO ARCHITECTURAL PLANS FOR EXTENT OF DEMOLITION, DETAILS, ETC.
F. REMOVE OR RELOCATE ELECTRICAL AS NECESSARY FOR NEW WORK.
G. WHERE EXISTING CIRCUITS ARE TO BE RE-USED, EXTEND AS NECESSARY. MAINTAIN ELECTRICAL CONTINUITY TO DOWNSTREAM EQUIPMENT TO REMAIN.
H. EXISTING SHOWN TO REMAIN, MAY NEED TO BE REMOVED AND RE-INSTALLED ONLY AS NECESSARY FOR EXTENDING OR MODIFICATION OF EXISTING CIRCUITS OR WIRING.
I. REFER TO MECHANICAL PLANS FOR EXTENT OF MECHANICAL EQUIPMENT TO BE REMOVED OR RELOCATED.
J. REMOVE ALL UNUSED EQUIPMENT WIRING, CONDUIT AND BOXES IN ALL AREAS. ABANDON ONLY IN CONCEALED AREAS.
K. CONTRACTOR MY UTILIZE ANY EXISTING CONDUIT WHERE COMPATIBLE WITH NEW DESIGN, AND IF IN GOOD CONDITION AND COMPLIES WITH SPECIFICATIONS.
L. WHEN ANY MODIFICATIONS ARE MADE TO ANY EXISTING ELECTRICAL PANEL TO REMAIN, CONTRACTOR TO PROVIDE NEW TYPE WRITTEN INDEX TO REFLECT ALL NEW AND EXISTING LOADS.
M. REMOVE ALL EQUIPMENT, RACEWAYS, CABLES,ETC. NOT USED IN FINISHED AREAS.

(#) KEY NOTES:

1 E.C. SHALL ELECTRICALLY DISCONNECT EXISTING HVAC EQUIPMENT FOR REMOVAL BY M.C. REMOVE ALL ASSOCIATED CONDUIT/CONDUCTORS BACK TO SOURCE WHERE POSSIBLE. RE-ESTABLISH/MAINTAIN CONTINUITY TO ALL DOWNSTREAM DEVICES THAT ARE TO REMAIN. COORDINATE WITH M.C.
2 E.C. SHALL ELECTRICALLY DISCONNECT EXISTING GAS BOILER AND ASSOCIATED EQUIPMENT FOR REMOVAL BY M.C. REMOVE ALL ASSOCIATED CONDUIT/CONDUCTORS BACK TO SOURCE WHERE POSSIBLE. RE-ESTABLISH/MAINTAIN CONTINUITY TO ALL DOWNSTREAM DEVICES THAT ARE TO REMAIN. COORDINATE WITH M.C.

KEY PLAN



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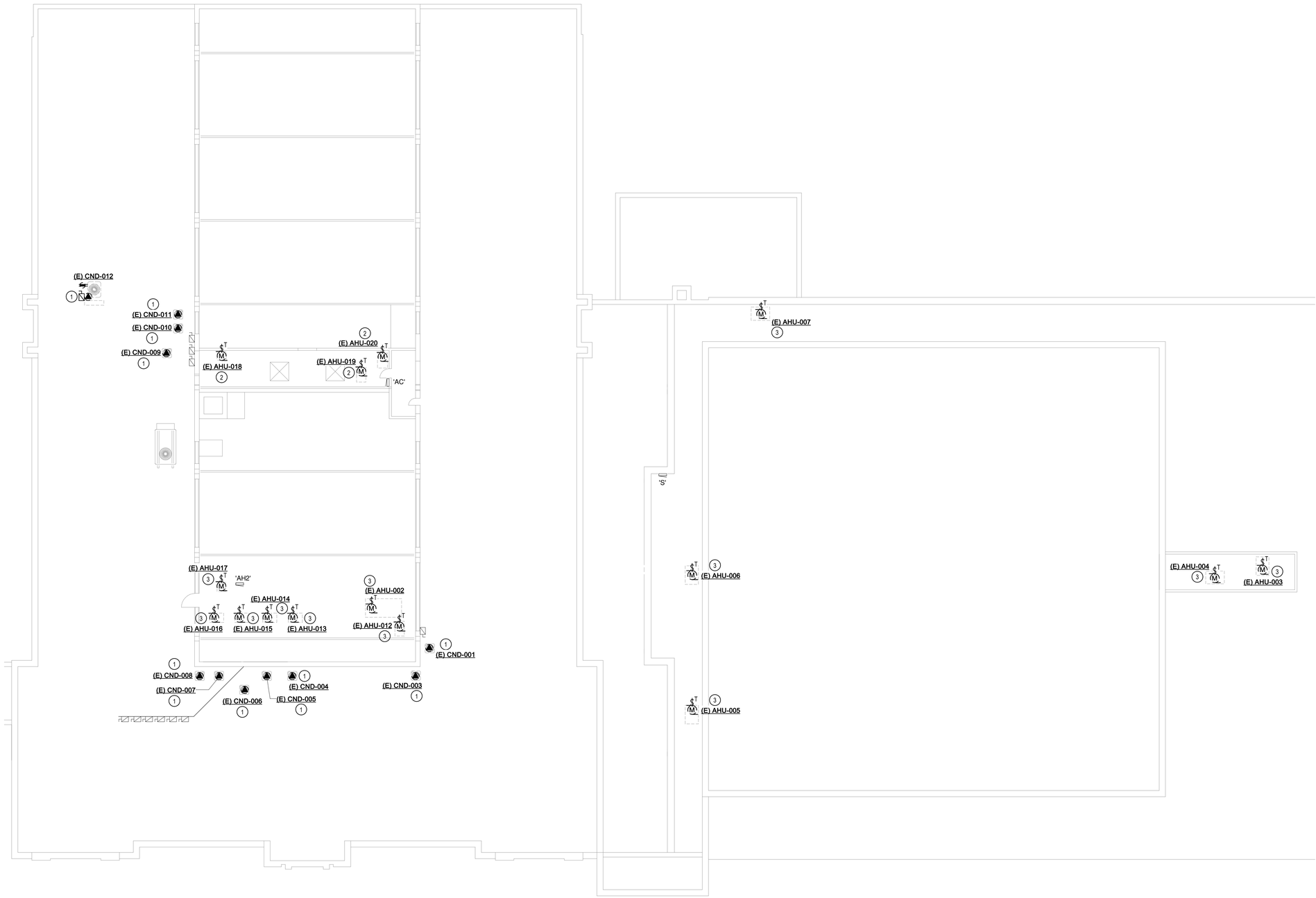
PROJECT:
ENGINEERING SERVICE FOR:
IRVING MS HVAC REPLACEMENT
911 G GRAND AVE, POCATELLO, ID 83204

SHEET TITLE:
EXISTING ELECTRICAL PLAN - MAIN LEVEL

DRWN. BY:	CKD. BY:
BP	SAM
JOB NO.	DATE:
23197	MARCH 2024

SHEET:
E1.0
OF: FIVE



1 EXISTING ELECTRICAL PLAN - MEZZANINE LEVEL
SCALE: 3/32" = 1'-0"

0" 8' 16'
NORTH

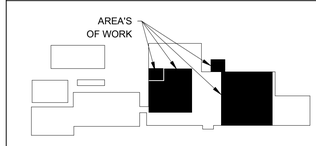
GENERAL NOTES:

A. ALL EXISTING ELECTRICAL MAY NOT APPEAR ON THESE PLANS, HOWEVER THE ABOVE INFORMATION APPLIES.
B. PROVIDE AND INSTALL BLANK COVERS ON ALL UNUSED SWITCH/OUTLET/J-BOXES WHERE REQUIRED.
C. ALL WALL DEVICES THAT ARE EXISTING TO REMAIN, SHALL BE ADAPTED TO NEW WALL COVERINGS, REFER TO ARCHITECTURAL DRAWINGS FOR EXACT WALL LOCATIONS, THICKNESS, ETC.
D. PRIOR TO THE START OF ANY DEMOLITION WORK, DISCONNECTING ANY POWER AND OR TELE/DATA SYSTEMS, THE CONTRACTOR SHALL COORDINATE DOWN-TIME WITH THE OWNER.
E. REFER TO ARCHITECTURAL PLANS FOR EXTENT OF DEMOLITION, DETAILS, ETC.
F. REMOVE OR RELOCATE ELECTRICAL AS NECESSARY FOR NEW WORK.
G. WHERE EXISTING CIRCUITS ARE TO BE RE-USED, EXTEND AS NECESSARY. MAINTAIN ELECTRICAL CONTINUITY TO DOWNSTREAM EQUIPMENT TO REMAIN.
H. EXISTING SHOWN TO REMAIN, MAY NEED TO BE REMOVED AND RE-INSTALLED ONLY AS NECESSARY FOR EXTENDING OR MODIFICATION OF EXISTING CIRCUITS OR WIRING.
I. REFER TO MECHANICAL PLANS FOR EXTENT OF MECHANICAL EQUIPMENT TO BE REMOVED OR RELOCATED.
J. REMOVE ALL UNUSED EQUIPMENT WIRING, CONDUIT AND BOXES IN ALL AREAS. ABANDON ONLY IN CONCEALED AREAS.
K. CONTRACTOR MY UTILIZE ANY EXISTING CONDUIT WHERE COMPATIBLE WITH NEW DESIGN, AND IF IN GOOD CONDITION AND COMPLIES WITH SPECIFICATIONS.
L. WHEN ANY MODIFICATIONS ARE MADE TO ANY EXISTING ELECTRICAL PANEL TO REMAIN, CONTRACTOR TO PROVIDE NEW TYPE WRITTEN INDEX TO REFLECT ALL NEW AND EXISTING LOADS.
M. REMOVE ALL EQUIPMENT, RACEWAYS, CABLES,ETC. NOT USED IN FINISHED AREAS.

(#) KEY NOTES:

1 EXISTING HVAC EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW. E.C. SHALL ELECTRICALLY DISCONNECT FOR REMOVAL BY M.C. REMOVE ALL ASSOCIATED, MAINTAIN EXISTING CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT AND MAINTAIN EXISTING RECPT. CIRCUIT FOR CONNECTION TO NEW. REFER TO NEW ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
2 EXISTING FAN COIL UNIT TO BE REMOVED AND REPLACED WITH NEW. E.C. SHALL ELECTRICALLY DISCONNECT FOR REMOVAL BY M.C. MAINTAIN EXISTING CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT. MAINTAIN EXISTING DISCONNECT AND PROVIDE NEW CONDUIT/CONDUCTORS FROM DISC. TO UNIT. REFER TO NEW ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
3 EXISTING FAN COIL UNIT TO BE REMOVED AND REPLACED WITH NEW. E.C. SHALL ELECTRICALLY DISCONNECT FOR REMOVAL BY M.C. REMOVE ASSOCIATED CIRCUIT AND PROVIDE NEW CIRCUIT AS INDICATED ON NEW ELECTRICAL PLAN.

KEY PLAN



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PROJECT:
ENGINEERING SERVICE FOR:
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911 G GRAND AVE, POCATELLO, ID 83204

SHEET TITLE:
EXISTING ELECTRICAL PLAN - MEZZANINE LEVEL

DRWN. BY:	CKD. BY:
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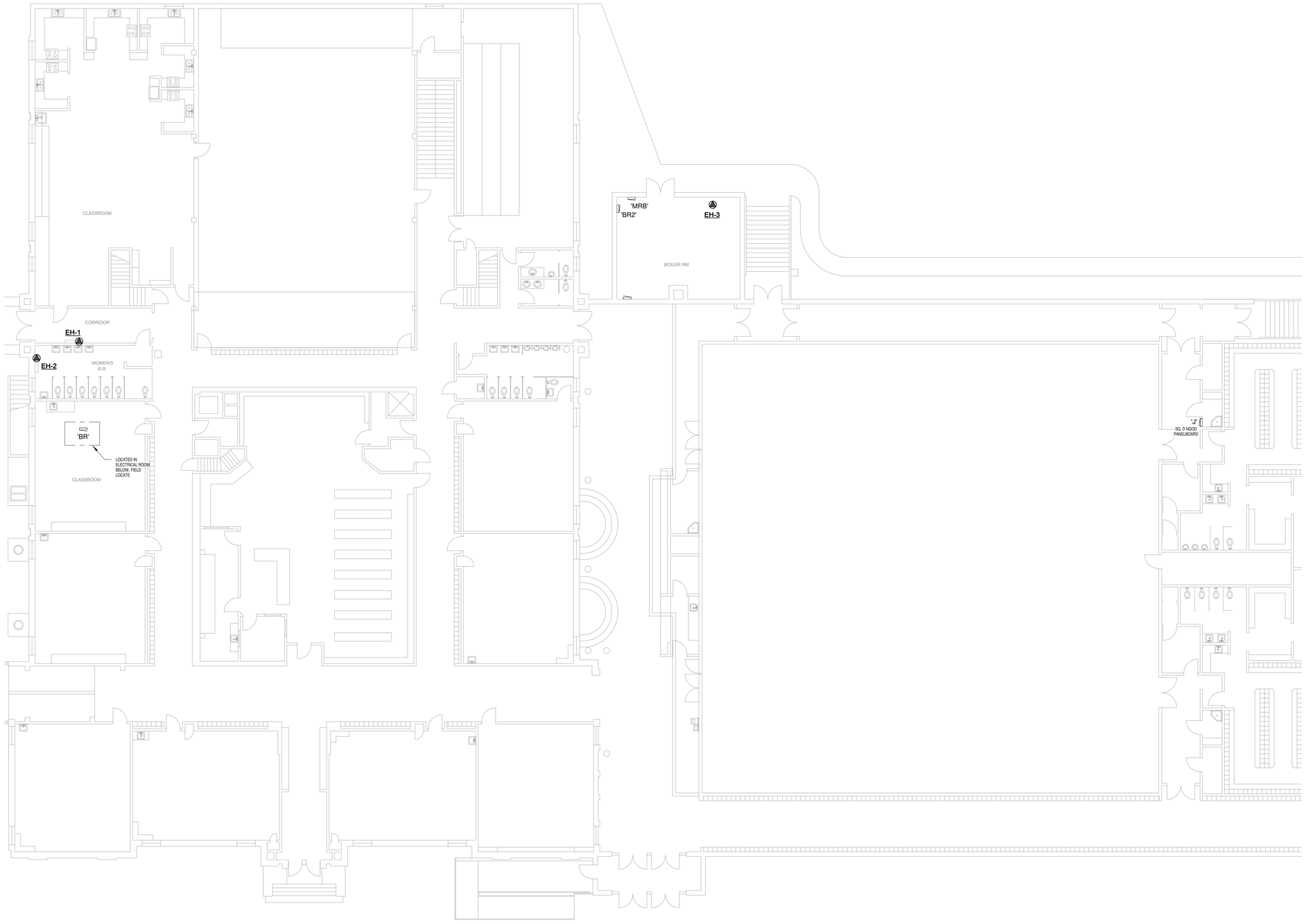
SHEET:
E1.1
OF: FIVE

MECH. - ELECTRIC HEATER SCHEDULE

EQUIP. ID	VOLTS / PH.	WATTS	FLA	OCP	CIRCUIT	FEEDER	NOTES	EXISTING PANEL
EH-1	208 V / 1 PH.	2000 W	9.6 A	15 A	BR - 35,37	1/2"C, 2#12, #12G	PROVIDE NEW BREAKER IN PANEL	SIEMENS TYPE S1
EH-2	208 V / 1 PH.	2000 W	9.6 A	15 A	BR - 39,41	1/2"C, 2#12, #12G	PROVIDE NEW BREAKER IN PANEL	SIEMENS TYPE S1
EH-3	208 V / 1 PH.	5000 W	24.0 A	35 A	BR2 - 1,3	1/2"C, 2#8, #10G	PROVIDE NEW BREAKER IN PANEL	FIELD VERIFY



1 NEW ELECTRICAL PLAN - MAIN LEVEL
SCALE: 3/32" = 1'-0"

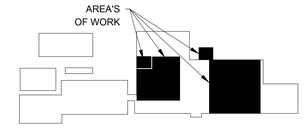
0" 8' 16'
NORTH

GENERAL NOTES:

A. REFER TO SYMBOL SCHEDULE SHEET FOR PROJECT GENERAL NOTES AND GENERAL NOTES ASSOCIATED WITH THE INSTALLATION OF EACH SYSTEM, INCLUDINB BUT NOT LIMITED TO; LIGHTING, POWER, FIRE ALARM, SPECIAL SYSTEMS, ETC.

(#) KEY NOTES:

KEY PLAN



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PROJECT:
ENGINEERING SERVICE FOR:
IRVING MS HVAC REPLACEMENT
911 G GRAND AVE, POCATELLO, ID 83204

SHEET TITLE:
NEW ELECTRICAL PLAN - MAIN LEVEL

DRWN. BY:	CKD. BY:
BP	SAM
JOB NO.	DATE:
23197	MARCH 2024

PROFESSIONAL ENGINEER REGISTERED 13053 3/26/24 STATE OF IDAHO SHAWN A. MEDDOR

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1823 E. Center
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SHEET:
E2.0
OF: FIVE

MECH. - ROOFTOP UNIT SCHEDULE

EQUIP. ID	VOLTS / PH.	MCA	MOCP	FEEDER	DISCONNECT	NOTES
RT-1	208 V / 3 PH.	39 A	45 A	3/4"C, 3#6, #10G	60 A - FUSED/3R	3

MECH. - CONDENSING UNIT SCHEDULE

EQUIP. ID	VOLTS / PH.	MCA	MOCP	DISC / PANEL	FEEDER	DISCONNECT	NOTES
CND-001A	208 V / 3 PH.	18.8 A	30 A	AH2	1/2"C, 3#10, #10G	30A - FUSED/3R	2,4
CND-001B	208 V / 3 PH.	18.8 A	30 A	DISC:CND-001B	1/2"C, 3#10, #10G	EXISTING	3
CND-003	208 V / 3 PH.	14.2 A	20 A	DISC:CND-003	1/2"C, 3#12, #12G	EXISTING	3
CND-004	208 V / 3 PH.	14.2 A	20 A	DISC:CND-004	1/2"C, 3#12, #12G	EXISTING	3
CND-005	208 V / 3 PH.	14.2 A	20 A	DISC:CND-005	1/2"C, 3#12, #12G	EXISTING	3
CND-006	208 V / 3 PH.	14.2 A	20 A	DISC:CND-006	1/2"C, 3#12, #12G	EXISTING	3
CND-007	208 V / 3 PH.	14.2 A	20 A	DISC:CND-007	1/2"C, 3#12, #12G	EXISTING	3
CND-008	208 V / 3 PH.	14.2 A	20 A	DISC:CND-008	1/2"C, 3#12, #12G	EXISTING	3
CND-009	208 V / 3 PH.	14.2 A	20 A	DISC:CND-009	1/2"C, 3#12, #12G	EXISTING	3
CND-010	208 V / 3 PH.	14.2 A	20 A	DISC:CND-010	1/2"C, 3#12, #12G	EXISTING	3
CND-011	208 V / 3 PH.	21.3 A	35 A	DISC:CND-011	3/4"C, 3#8, #10G	EXISTING	3

MECH. - AIR HANDLER UNIT SCHEDULE

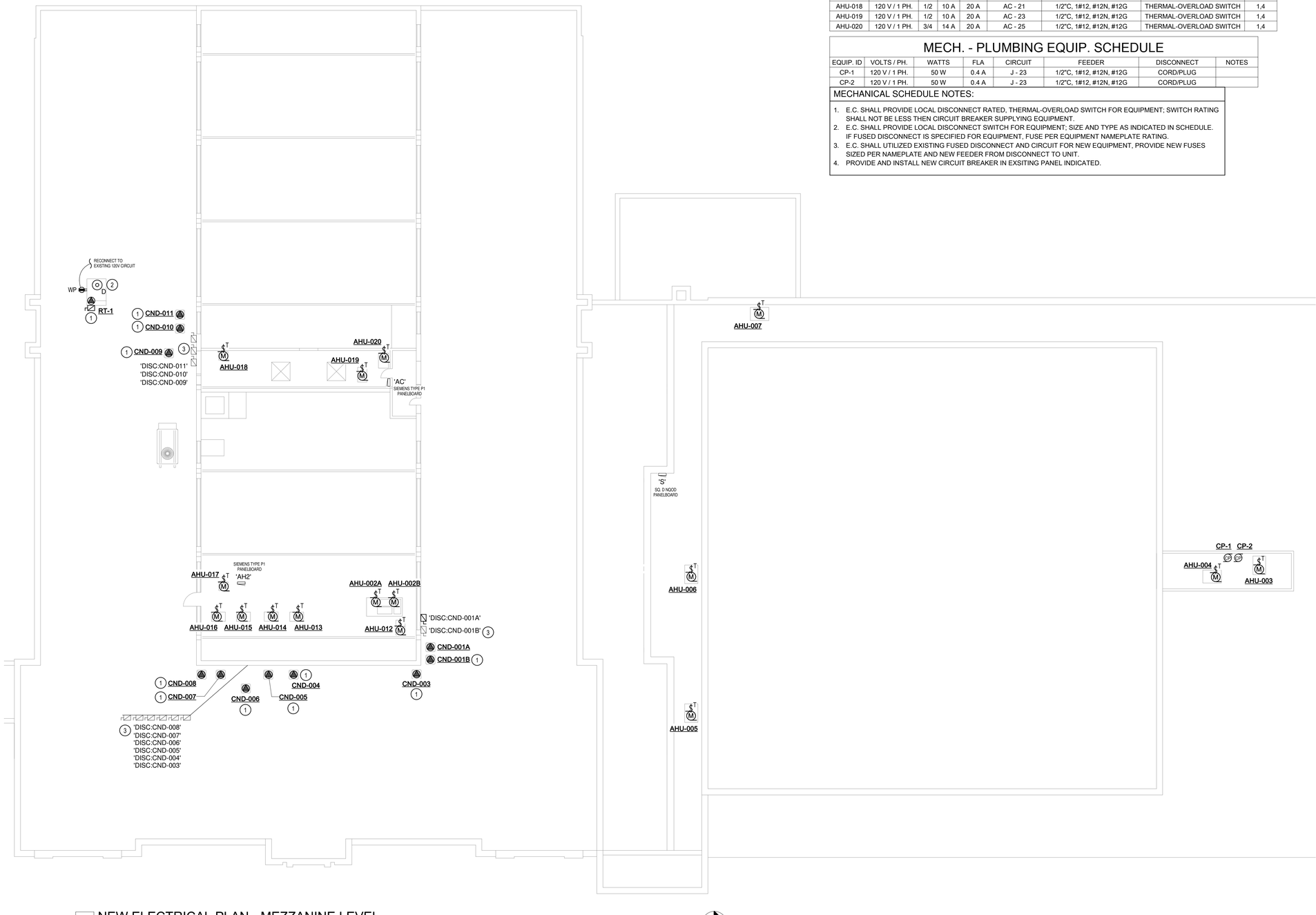
EQUIP. ID	VOLTS / PH.	HP	FLA	OCP	CIRCUIT	FEEDER	DISCONNECT	NOTES
AHU-002A	120 V / 1 PH.	3/4	14 A	20 A	AH2 - 1	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-002B	120 V / 1 PH.	3/4	14 A	20 A	AH2 - 3	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-003	120 V / 1 PH.	3/4	14 A	20 A	J - 19	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-004	120 V / 1 PH.	3/4	14 A	20 A	J - 21	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-005	120 V / 1 PH.	3/4	14 A	20 A	S - 14	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-006	120 V / 1 PH.	3/4	14 A	20 A	S - 16	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-007	120 V / 1 PH.	3/4	14 A	20 A	S - 18	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-012	120 V / 1 PH.	1/2	10 A	20 A	AH2 - 9	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-013	120 V / 1 PH.	1/2	10 A	20 A	AH2 - 5	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-014	120 V / 1 PH.	1/2	10 A	20 A	AH2 - 2	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-015	120 V / 1 PH.	1/2	10 A	20 A	AH2 - 4	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-016	120 V / 1 PH.	1/2	10 A	20 A	AH2 - 6	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-017	120 V / 1 PH.	1/2	10 A	20 A	AH2 - 7	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-018	120 V / 1 PH.	1/2	10 A	20 A	AC - 21	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-019	120 V / 1 PH.	1/2	10 A	20 A	AC - 23	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4
AHU-020	120 V / 1 PH.	3/4	14 A	20 A	AC - 25	1/2"C, 1#12, #12N, #12G	THERMAL-OVERLOAD SWITCH	1,4

MECH. - PLUMBING EQUIP. SCHEDULE

EQUIP. ID	VOLTS / PH.	WATTS	FLA	CIRCUIT	FEEDER	DISCONNECT	NOTES
CP-1	120 V / 1 PH.	50 W	0.4 A	J - 23	1/2"C, 1#12, #12N, #12G	CORD/PLUG	
CP-2	120 V / 1 PH.	50 W	0.4 A	J - 23	1/2"C, 1#12, #12N, #12G	CORD/PLUG	

MECHANICAL SCHEDULE NOTES:

1. E.C. SHALL PROVIDE LOCAL DISCONNECT RATED, THERMAL-OVERLOAD SWITCH FOR EQUIPMENT; SWITCH RATING SHALL NOT BE LESS THEN CIRCUIT BREAKER SUPPLYING EQUIPMENT.
2. E.C. SHALL PROVIDE LOCAL DISCONNECT SWITCH FOR EQUIPMENT; SIZE AND TYPE AS INDICATED IN SCHEDULE. IF FUSED DISCONNECT IS SPECIFIED FOR EQUIPMENT, FUSE PER EQUIPMENT NAMEPLATE RATING.
3. E.C. SHALL UTILIZED EXISTING FUSED DISCONNECT AND CIRCUIT FOR NEW EQUIPMENT, PROVIDE NEW FUSES SIZED PER NAMEPLATE AND NEW FEEDER FROM DISCONNECT TO UNIT.
4. PROVIDE AND INSTALL NEW CIRCUIT BREAKER IN EXSITING PANEL INDICATED.



1 NEW ELECTRICAL PLAN - MEZZANINE LEVEL
SCALE: 3/32" = 1'-0"

0" 8' 16' NORTH

GENERAL NOTES:

A. REFER TO SYMBOL SCHEDULE SHEET FOR PROJECT GENERAL NOTES AND GENERAL NOTES ASSOCIATED WITH THE INSTALLATION OF EACH SYSTEM, INCLUDINB BUT NOT LIMITED TO; LIGHTING, POWER, FIRE ALARM, SPECIAL SYSTEMS, ETC.

FIRE ALARM EXPANSION NOTES:

A. PROVIDE ALL EQUIPMENT, MATERIALS AND LABOR NECESSARY TO EXPAND THE EXISTING BUILDING FIRE ALARM SYSTEM. THE SYSTEM ADDITION SHALL BE CONNECTED DIRECTLY TO THE EXISTING MAIN FIRE ALARM PANEL.
THE INSTALLATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND ACCEPTED BY THE LOCAL AHJ. WHEN THE SYSTEM IS COMPLETE, A FACTORY REPRESENTATIVE SHALL TEST THE SYSTEM, MAKE ADJUSTMENTS AND PLACE THE SYSTEM IN OPERATING ORDER.

B. WITHIN 30 DAYS AFTER THE CONTRACT AWARD AND PRIOR TO THE PURCHASE OF ANY EQUIPMENT, THE FIRE ALARM SYSTEM CONTRACTOR SHALL SUBMIT FOR APPROVAL SIX (6) COPIES OF THE FOLLOWING:
   a. A LIST OF MATERIALS THAT ARE TO BE USED ON THE PROJECT, INCLUDING MANUFACTURER, MODEL NUMBER AND TECHNICAL INFORMATION.
   b. PRELIMINARY CIRCUIT DIAGRAMS SHOWING INTERCONNECTION OF ALL MONITORING, NOTIFICATION AND ANNUNCIATION DEVICES, PANELS AND WIRING COUNTS. DIAGRAMS ARE TO BE 11"X17", DONE IN A GOOD WORKMAN LIKE MANNER.
   c. TECHNICAL MANUALS FOR ALL OF THE EQUIPMENT THAT IS TO BE USED ON THE PROJECT.
   d. SUBMIT SHOP DRAWINGS AND REQUIRED CALCULATIONS TO THE LOCAL AHJ.
   e. OBTAIN A WRITTEN LETTER OF ACCEPTANCE OF THE PROPOSED SYSTEM AND INCLUDE WITH THE SHOP DRAWING SUBMITTAL TO THE ENGINEER.

C. CONTRACTOR SHALL PROVIDE AND INSTALL ALL REQUIRED POWER SUPPLIES, ELECTRONICS AND CONNECTIONS TO MODIFY EXISTING SYSTEM TO ACCEPT NEW ADDITION. THE COMPLETE SYSTEM SHALL MAINTAIN A UL LISTING.

D. ELECTRICAL CONTRACTOR SHALL INCLUDE A $2,000.00 CASH ALLOWANCE IN THE BID FOR MISCELLANEOUS ADDITIONS AND/OR REQUIREMENTS IMPOSED BY THE LOCAL AHJ.

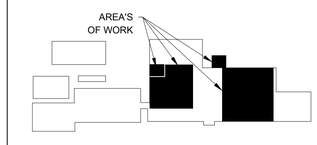
(#) KEY NOTES:

1 RECONNECT EQUIPMENT TO EXISTING CIRCUIT MADE AVAILABLE FROM DEMOLITION. EXTEND/MODIFY EXISTING CONDUIT/CONDUCTORS AS REQUIRED.

2 DUCT-SMOKE DETECTOR PROVIDED AND CONNECT BY ELECTRICAL CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR. DETECTOR SHALL BE CONNECTED TO FIRE ALARM SYSTEM AND SHALL SHUT-DOWN ASSOCIATED HVAC UNIT UPON ACTIVATION. ELECT. CONTRACTOR SHALL ALSO PROVIDE AND INSTALL REMOTE TEST SWITCH, INSTALL FLUSH IN CEILING NEAR LOCATION OF DUCT-SMOKE DETECTOR.

3 EXISTING COND. UNIT DISCONNECT(S), INSTALL NEW FUSES PER EQUIPMENT NAMEPLATE AND NEW CONDUIT/CONDUCTORS BETWEEN DISCONNECT AND UNIT. REFER TO COND. UNIT SCHEDULE. RE-LABEL DISCONNECT WITH UPDATED UNIT NAME.

KEY PLAN



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SHEET: E2.1
OF: FIVE