Project Manual
ISSUED for CONSTRUCTION

HVAC Recapitalization at the Sequim High School

OWNER:
SEQUIM SCHOOL DISTRICT NO. 323
503 N SEQUIM AVE, SEQUIM, WA 98382.

PREPARED BY:

design2 LAST inc.

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November 14, 2023

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DIVISION 00

Bidding Requirements, Contract Forms, & Conditions of the Contract

DOCUMENT 000101 - PROJECT TITLE PAGE

1.1 PROJECT MANUAL VOLUME 1

A. HVAC Recapitalization at Sequim High School

B. Sequim School District No. 323

C. 601 N Sequim Ave, Sequim, WA 98382

D. Owner Project No. 1005

E. Architect Project No. 2022-017

F. design2 last, Inc. Lauri Strauss, AIA LEED AP BD&C.

G. 543 Main Street, Suite 101

H. Edmonds, WA 98020

I. Phone: 425-673-7269

J. Web Site: http://design2last.com/

K. Issued: 11-14-2023

END OF DOCUMENT 000101

DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Lauri Strauss, AIA LEED AP BD&C
2. Design2 LAST, inc.
3. 543 Main Street, Suite 101
4. Edmonds, WA 98020
5. lauri@deisgn2LAST.com
6. 425-673-7269
7. Responsible for Divisions 01-49 Sections except where indicated as prepared by other design professionals of record.

B. Structural Engineer:

1. Brian Moll, PE, SE
2. SCBC Engineering PLLC
3. 543 Main Street, Suite 106
4. Edmonds, WA 98020
5. Brian.moll.se@gmail.com
6. 425-745-9926

C. Electrical Engineer:

1. Leo Maya, PE, LEED AP BD&C
2. Design West Engineering
3. 110 James Street, Suite 106
4. Edmonds, WA 98020
5. LMaya@designwesteng.com
6. 425-458-9700

D. Mechanical Engineer:

1. Reid Herron, PE
2. Design West Engineering
3. 110 James Street, Suite 106
4. Edmonds, WA 98020
5. Rherron@designwesteng.com
6. 425-458-9700

END OF DOCUMENT 000107

DOCUMENT 000115 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled HVAC RECAPITALIZATION AT THE SEQUIM HIGH SCHOOL, dated Nov 14 , 2023, as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

Sheet Number	Sheet Name
G-0.0	COVER SHEET, INDEX & SCOPE OF WORK
A-1.1D	BLDG D COMPUTER LAB PLANS AND DETAILS
M-0.1	MECHANICAL LEGENDS NOTES & SCHEDULES
M-0.2	MECHANICAL SCHEDULES CONT.
M-0.3	MECHANICAL SCHEDULES CONT.
M-0.4	MECHANICAL SCHEDULES CONT.
MD-1.1	MECHANICAL BUILDING A & B DEMO FLOOR PLAN
MD-1.2	MECHANICAL BUILDING C & D DEMOLITION PLAN
MD-1.3	MECHANICAL BUILDING E DEMOLITION FLOOR PLAN
MD-1.4	MECHANICAL BUILDING H SECTION 1 DEMOLITION PLAN
MD-1.5	MECHANICAL BUILDING H SECTION 2 DEMOLITION PLAN
MD-1.6	MECHANICAL BUILDING H SECTION 3 DEMOLITION PLAN
MD-1.7	MECHANICAL BUILDING H ATTIC DEMOLITION PLAN
MD-1.8	MECHANICAL GYMNASIUM DEMOLITION PLAN
MD-1.9	MECHANICAL CAFETERIA DEMOLITION PLAN
MD-1.10	MECHANICAL BUILDING AUDITORIUM DEMO FIRST FLOOR PLAN
MD-1.11	MECHANICAL BUILDING AUDITORIUM DEMO SECOND FLOOR PLAN
M-2.1	MECHANICAL BUILDING A & B REMODEL FLOOR PLAN
M-2.2	MECHANICAL BUILDING C & D REMODEL FLOOR PLAN
M-2.3	MECHANICAL BUILDING E REMODEL FLOOR PLAN
M-2.4	MECHANICAL BUILDING H SECTION 1 REMODEL PLAN
M-2.5	MECHANICAL BUILDING H SECTION 2 REMODEL PLAN
M-2.6	MECHANICAL BUILDING H SECTION 3 REMODEL PLAN
M-2.7	MECHANICAL BUILDING H ATTIC REMODEL PLAN
M-2.8	MECHANICAL GYMNASIUM REMODEL LOW ROOF PLAN
M-2.9	MECHANICAL CAFETERIA REMODEL FLOOR PLAN
M-2.10	MECHANICAL BUILDING AUDITORIUM REMODEL FIRST FLOOR PLAN
M-2.11	MECHANICAL BUILDING AUDITORIUM REMODEL SECOND FLOOR PLAN
M-3.1	MECHANICAL DETAILS
MR-4.1	MECHANICAL BUILDING A & B REFERENCE
MR-4.2	MECHANICAL BUILDING C & D REFERENCE
MR-4.3	MECHANICAL BUILDING E REFERENCE
MR-4.4	MECHANICAL BUILDING H SECTION 1 REFERENCE
MR-4.5	MECHANICAL BUILDING H SECTION 2 REFERENCE
MR-4.6	MECHANICAL BUILDING H SECTION 3 REFERENCE
MR-4.7	MECHANICAL BUILDING H ATTIC REFERENCE
MR-4.8	MECHANICAL GYMNASIUM REFERENCE
MR-4.9	MECHANICAL CAFETERIA REFERENCE
MR-4.10	MECHANICAL BUILDING AUDITORIUM FLOOR 1 REFERENCE
MR-4.11	MECHANICAL BUILDING AUDITORIUM FLOOR 2 REFERENCE
E-0.1	ELECTRICAL LEGENDS & NOTES
E-0.2	SINGLE LINE DIAGRAMS
E-0.3	SINGLE LINE DIAGRAM & LOAD SUMMARIES
E-0.4	PANEL SCHEDULES
E-0.5	PANEL SCHEDULES
E-0.6	PANEL SCHEDULES
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E-1.13	BUILDING H SECTION 1 ELECTRICAL FLOOR PLAN
E-1.14	BUILDING H SECTION 2 ELECTRICAL FLOOR PLAN
E-1.15	BUILDING H SECTION 3 ELECTRICAL FLOOR PLAN
E-1.16	BUILDING H ATTIC ELECTRICAL FLOOR PLAN
E-2.1	ELECTRICAL DETAILS

END OF DOCUMENT 000115

DOCUMENT 001116 - INVITATION TO BID

PART 1 - GENERAL

1.01 PROJECT INFORMATION

A. Notice to Bidders: Qualified Bidders are invited to submit Bids for Project as described in this Document and Instructions to Bidders.

A. Project Identification: HVAC Recapitalization at Sequim High School

A. Project Location: 601 N Sequim Ave, Sequim, WA 98382

B. Owner: Sequim School District No. 323.

1. Owner's Representative: Wenaha Group, Yue Chen, Project Manager, Wenaha.Y.Chen@sequimschools.org, (206) 556-9576.

C. Architect Identification: design2 LAST, Inc., Lauri Strauss, AIA LEED AP BD&C, President.

D. Project Overview: The Project consists of a HVAC equipment replacement and recapitalization. The Project is more thoroughly described in the Specifications, Bidding Documents, and Contract Documents.

E. Bids will be received for the following Work: General Contract (all trades).

1.02 BID SUBMITTAL AND OPENING

A. Owner will consider Bids prepared in compliance with Instructions to Bidders issued by Owner and delivered as described herein.

B. The Bid, the Bid Security, and any other documents required to be submitted with the Bid, shall be enclosed in a sealed, non-transparent envelope sufficient in size to contain all required bidding documents.

C. Owner will receive sealed Bids no later than 2:00 PM on December 12, 2023, followed with public opening and reading of the Bids at the below-referenced address. Owner reserves the right to postpone the Bid opening. To be considered responsive, each Bid must contain completed versions of each of the following:
1. Bid Form
2. Attachment 1 - Bid Price Form
3. Attachment 2 - Bid Alternates Form
4. Attachment 3 - Insurance Binder
5. Attachment 4 - Bid Security
6. Attachment 5 - Non-Collusion Affidavit

7. Attachment 6 - Statement of Non-Segregated Facilities
8. Attachment 7 - Certification of Compliance with Wage Payment Statutes

D. All sealed Bid envelopes shall contain the following information (typed or written) on the FRONT FACE of the envelope:
   a. "HVAC Recapitalization at Sequim High School."
   b. Bidder Name.
   c. Bidder Contractor License Number.
   d. Bidder Contact Information.

E. All sealed Bid envelopes shall contain the following information on the BACK FACE of the envelope (printed off & affixed):
   a. Completed Section 00 43 93 ("Bid Submittal Checklist").

F. If the Bid is sent by mail: The sealed envelope shall be enclosed in a separate mailing USPS-approved envelope with the notation "SEALED BID ENCLOSED" on the face there of. Envelope should also note "Attn: Business Manager"

G. Bids shall only be accepted at: The Sequim School District Office, located at: 503 North Sequim Avenue, Sequim, Washington 98382

H. Receipt of Bids:

1. All sealed bidding envelopes will be received by "Project Coordinator" and then marked with a time/date stamp.
2. Please note: The office designated in 1.02.G will only be open to receive hand-delivered bids from 8AM-4PM. (Pacific) on the following days:
   a. Monday-Friday
3. Bids received after the date and hour stated above will not receive consideration.

I. Bids shall be typewritten or written legibly in ink on forms provided herein with all provided spaced completed. Unsigned Bids will not be considered.

J. Bids shall be opened publicly, and the results will be read aloud. An abstract of submitted Bids may be made available to Bidders.

K. Additional instructions for submission of Bids are contained in the Instructions to Bidders, which should be reviewed in full in conjunction with this Invitation to Bid.

1.03 VIRTUAL BID OPENING

A. A virtual Bid opening via Zoom will be held on the date and time specified above. Access credentials for the Zoom meeting will be provided at the front desk at the Sequim School District Office and online at https://www.sequimschools.org/our_district/project_bid_opportunities. All parties interested in attending are invited. A tabulation of the Base Bids and Alternate Bids will be made available to Bidders, upon request.

1.04 BID SECURITY

A. Submit Bid Security in the form required in the Bidding Documents and equal to five (5) percent of the Bidder's Base Bid (and excluding Washington State sales tax), as further described in the Instructions to Bidders. No Bid may be modified, withdrawn, or canceled for a period of sixty (60) after opening of Bids. Owner reserves the right to reject any and all Bids and to waive informalities and irregularities.

B. The successful Bidder will be required to furnish Performance Bond and Payment Bond, as specified in the Contract Documents and Bidding Documents.

1.05 PREBID MEETING

A. Architect will conduct prebid meetings as indicated below:

1. Meeting 1: November 21, 2023, 10:30 AM

B. Bidders' Questions: Architect will provide responses at Prebid meeting to Bidders' questions received up to two (2) business days prior to meeting.

Location: 601 North Sequim Avenue, Sequim, Washington 98382

C. Attendance:

1. Prime Bidders: Prospective prime Bidders are required to attend.
2. Subcontractors: Prospective Subcontractors are encouraged to attend.
3. Notice: A sign-in sheet for potential prime Bidders and Subcontractors will be made available.

1.06 OBTAINING BIDDING AND CONTRACTING DOCUMENTS

A. Online Access to Bidding and Contracting Documents: Obtain access after November 14th, 2023, online at https://www.sequimschools.org/our_district/project_bid_opportunities. **Bid ID #2023-02-1005** Online access will be provided to all registered Bidders and suppliers.

B. Within ten (10) days after notification in writing of the Owner's intent to award Contract, selected Bidder will be required to enter into a Contract with Owner using the form of contract included in the Bidding Documents.

1.07 TIME OF COMPLETION AND LIQUIDATED DAMAGES

A. Bidders shall begin pre-construction Work on receipt of "Limited" Notice to Proceed, and "Full" Notice to Proceed will apply to on-site construction Work; this will commence as indicated on Project schedule. Contractor must complete the Work within Contract Time. This Project is subject to liquidated damages of $250 for each calendar day that Substantial Completion is not timely achieved.

1.08 BIDDER'S QUALIFICATIONS

A. Bidders shall meet those requirements in the Instructions to Bidders and the Bidding Documents. A Performance Bond, separate Payment Bond, and insurance in a form acceptable to Owner will be required of the successful Bidder.

1.09 METHOD OF CONTRACTING AND PROPOSED SCHEDULE

A. Work will be constructed under a single stipulated, lump-sum, cost-plus-fee contract by Contractor, as described by Contract Documents.

B. The proposed scheduled for the Project is as follows (all dates after the Bid Opening are subject to change at the discretion of Owner, other than the dates of Substantial Completion and Final Completion):
   1. November 14, 2023 - Plans Available to Public/Contractors
   2. November 21, 2023 - Prebid Walkthrough #1
   3. December 1, 2023 - Post Addenda #1 (if applicable)
   4. December 12, 2023 - Bid Opening (2:15 PM)
   5. December 19, 2023 - Intent to Award
   6. February 1, 2024 – Mobilization
   7. May 23, 2024 – Substantial Completion
   8. June 30, 2024 – Final Completion

C. Calendar Day Contract Time to Substantial Completion: 160 calendar days. (Calendar Day Calculation is from Notice to Proceed through Substantial Completion.)

1.10 SITE REVIEW

A. Prior to submitting Bid for Work, Contractor is required and expected to have examined Project site and premises and be thoroughly familiarized with existing conditions under which Contractor will be obligated to operate or which will in any way affect Work under this Contract.

B. Bidders and potential Subcontractors to Bidders are further cautioned to become familiar with contents, alternates, revisions, Addenda, General Conditions, Special Conditions, Technical Provisions of Specifications, Drawings, and Work of other contractors. Should Bidder find discrepancies or omissions in Bidding Documents, or should there be doubt as to intent, notify Owner and Architect at once, who may, if necessary, issue written instructions to Bidders.

C. Notify Owner and Architect of apparent variances in Bidding Documents from conditions as they exist at Project site. Failure to comply with above requirements does not relieve Contractor of requirements of Contract Documents.

D. No extras will be allowed because of Bidder’s misunderstanding as to amount of Work involved, Contractor's own error or negligence, or failure to examine Project site. Lack of knowledge of conditions pertaining to Work shall not relieve Contractor from performing Work required to complete performance of Contract.

- END OF SECTION -

DOCUMENT 002113 - INSTRUCTIONS TO BIDDERS

1.01 DEFINITIONS

A. All definitions set forth in the General Conditions or in other proposed Contract Documents are applicable to the Bidding Documents.

B. "Addenda" are written or graphic instruments issued by the Sequim School District prior to the execution of the Contract that modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections. The contents of Addenda are issued in no particular order and therefore should be carefully and completely reviewed. Addenda relating to administrative matters, such as, for example, the date or time of meetings or Bid receipt, may be issued in writing by fax, mail, or other delivery.

C. An "Alternate Bid" (or "Alternate") is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if a corresponding change in the Work, as described in the Bidding Documents, is accepted by the Sequim School District.

D. "Award" means the formal decision by the Sequim School District notifying a responsible Bidder with the lowest Responsive Bid of the Sequim School District's acceptance of the Bid and intent to enter into a contract with the Bidder. A contract is only formed upon execution of the Contract, and not simply by Award.

E. A "Bid" is a complete and properly signed proposal to perform the Work or designated portion thereof, submitted in accordance with the Bidding Documents, for the sums therein stipulated and supported by any data called for by the Bidding Documents.

F. The "Base Bid" is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base to which work may be added or from which work may be deleted for sums stated in Alternate Bids.

G. A "Bidder" is a person or entity who submits a Bid for a prime contract with the Sequim School District for the Work described in the Contract Documents.

H. The "Bidding Documents" include the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid form, any other sample Bidding and contract forms, the Bid Bond, and the Contract Documents, including any Addenda issued prior to receipt of Bids.

I. The "Contract Documents" for the Work consist of the Advertisement for Bids; Instructions for Bidders; completed Bid Form; General Conditions; Supplemental Conditions; Public Works Contract; other Special Forms; Drawings, and Specifications; and all addenda and modifications thereof.

J. The "Owner" is the Sequim School District, a Washington quasi-municipal corporation.

K. To be considered "Responsible" or meet "Responsibility" requirements, a Bidder must meet the criteria established in RCW 39.04.350 (as it exists at the time of advertisement for bids). That statute requires that the Bidder:

1. At the time of Bid submittal, have a certificate of registration in compliance with Chapter 18.27 RCW;

2. Have a current state unified business identifier (UBI) number;

3. If applicable, have industrial insurance coverage for the Bidder's employees working in Washington as required in Title 51 RCW;

4. Have an Employment Security Department (ESD) number as required in Title 50 RCW;

5. Have a state excise tax registration number as required in Title 82 RCW;

6. Not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations);

7. If bidding on a public works project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington State Apprenticeship and Training Council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under Chapter 49.04 RCW for the one-year period immediately preceding the date of the Bid solicitation;

8. Have received training on the requirements related to public works and prevailing wage under Chapter 39.04 RCW and Chapter 39.12 RCW and designated a person or persons to be trained on those requirements in a manner meeting requirements of the Department of Labor and Industries ("Department"), except that Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this requirement; and

9. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the Department or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapters 49.46, 49.48, or 49.52 RCW.

10. In addition, a Bidder must meet the following supplemental responsible bidder criteria applicable to this Project adopted by the Owner to the satisfaction of the Owner:

    a. The ability, capacity, and skill to perform the Contract;

    b. The character, integrity, reputation, judgment, experience, and efficiency of the Bidder;

    c. Whether the Bidder can perform the Contract within the time specified;

    d. The previous and existing compliance by the Bidder with laws relating to the Contract;

    e. The quality of performance of previous contracts, including demonstration of successful completion of similar projects in the last three (3) years;

f. The designated Project Manager shall have a minimum of three (3) years of successful experience in project management and scheduling of projects of similar scope and complexity.

g. The designated Superintendent shall have a minimum of five (5) years of successful supervision of projects of similar scope and complexity;

h. The Bidder's principals shall not be excluded or disqualified from Covered Transactions under 2 C.F.R. Part 180 and 2 C.F.R. Part 3000;

i. Any other qualifications required by the Contract Documents or Bidding Documents; and

j. Such other information as may be secured having a bearing on the decision to award the contract.

L. A "Sub-bidder" is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

M. A "Unit Price" is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services as described in the Bidding Documents or in the Contract Documents. The Owner reserves the right to reject at any time, without impairing the balance of the proposal, any or all such predetermined unit prices.

N. The term "day" as used in the Bidding Documents means a calendar day unless otherwise specifically defined.

1.02 BIDDER'S REPRESENTATIONS

A. By making its Bid, each Bidder represents that:

1. **BIDDING DOCUMENTS.** The Bidder has read and understands the Bidding Documents, and its Bid is made in accordance with them.

2. **POSSIBLE SELF-PERFORMED WORK REQUIREMENT.** The Bidder will perform with its own forces at least that percentage (if any) of the Work required by the Bidding Documents or the Contract Documents.

3. **PRE-BID MEETING.** The Bidder has attended any pre-bid meeting(s) required by the Bidding Documents.

4. **BASIS.** Its Bid is based upon the materials, systems, services, and equipment required by the Bidding Documents, without exception.

5. **EXAMINATION.** The Bidder has carefully examined and understands the Bidding Documents, the Contract Documents (including, without limitation, any liquidated damages, indemnification, and insurance provisions), the Project site, including any existing buildings; has familiarized itself with the local conditions under which the Work is to be performed and has correlated its observations with the requirements of the Contract

Documents; and has satisfied itself as to the nature, location, character, quality, and quantity of the Work and the labor, materials, equipment, goods, supplies, work, services, and other items to be furnished, as well as all other requirements of the Contract Documents. The Bidder has also satisfied itself as to the conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof, including but not limited to those conditions and matters affecting: transportation, access, disposal, handling, and storage of materials, equipment, and other items; availability and quality of labor, water, electric power, and utilities; availability and condition of roads; climatic conditions and seasons; physical conditions at the Project site and the surrounding locality; topography and ground surface conditions; and equipment and facilities needed preliminary to and at all times during the performance of the Work. The failure of the Bidder to fully acquaint itself with any applicable condition or matter shall not in any way relieve the Bidder from the responsibility for performing the Work in accordance with, and for the Contract Sum and within the Contract Time provided for in, the Contract Documents.

6. **PROJECT MANUAL.** The Bidder has checked its copies of the Project Manual with the Table of Contents bound therein to ensure the Project Manual is complete.

7. **SEPARATE WORK.** The Bidder has examined and coordinated all Drawings, Contract Documents, and Specifications for any other contracts to be awarded separately from, but in connection with, the Work being bid upon, so that the Bidder is fully informed as to conditions affecting the Work under the contract being bid upon.

8. **LICENSE REQUIREMENTS.** Bidders and their proposed Subcontractors shall be registered and shall hold such licenses as may be required by the laws of Washington, including Chapter 18.27 RCW, for the performance of the Work specified in the Contract Documents.

9. **NO EXCEPTIONS.** Bids must be based upon the materials, systems, and equipment described and required by the Bidding Documents, and terms and conditions in the Contract Documents, without exception.

1.03 BIDDING DOCUMENTS

A. COPIES

1. **Deposit.** Bidders may obtain complete sets of the Bidding Documents from the issuing office and other locations designated in the Advertisement or Invitation to Bid in the number and for the deposit amount, if any, stated. The deposit (if any) will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten (10) days after receipt of Bids. The cost of replacement of any missing or damaged documents will be deducted from the deposit. A Bidder awarded a Contract may retain the Bidding Documents, and its deposit will be refunded.

2. **Sub-bidders.** Bidding Documents will not be issued directly to Sub-bidders or others unless specifically offered in the Advertisement or Invitation to Bid.

3. **Complete Sets.** Bidders shall use complete sets of Bidding Documents in preparing Bids and are solely responsible for utilizing established plan holder identification processes to obtain updated bid information; the Owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete and/or superseded sets of Bidding Documents. Printed copies of plans take precedence over any online images.

4. **Conditions.** The Owner makes copies of the Bidding Documents available on the above terms only for the purpose of obtaining Bids on the Work and do not confer a license or grant permission for any other use.

5. **Legible Documents.** To the extent any Drawings, Specifications, or other Bidding documents are not legible, it is the Bidder's responsibility to notify the Owner and to obtain legible documents from the plan center.

B. INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

1. **Format.** The Contract Documents may be divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the Specification sections into Work performed by the various building trades, any Work by separate contractors, or any Work required for separate facilities in or phases of the Project.

2. **Notify Owner.** Bidders and Sub-bidders shall promptly notify the Owner in writing of any ambiguity, inconsistency, or error that they may discover upon examination of the Bidding Documents or of the site and local conditions. All Bidders and Sub- bidders shall thoroughly familiarize themselves with specified products and installation procedures and submit to the Owner any objections (in writing) no later than five (5) calendar days prior to the Bid Date. The submittal of the Bid constitutes acceptance of products and procedures specified as sufficient, adequate, and satisfactory for completion of the Contract.

3. **Written Request.** Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request, which must be received by the Owner at least five (5) calendar days prior to the date for receipt of Bids.

4. **Addenda.** Any interpretation, correction, or change of the Bidding Documents will be made by written Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections, and changes.

5. **Singular References.** Reference in the singular to an article, device, or piece of equipment shall include as many of such articles, devices, or pieces as are indicated in the Contract Documents or as are required to complete the installation.

6. **Utilities and Runs.** The Bidder should assume that the exact locations of any underground or hidden utilities, underground fuel tanks, and any plumbing and electrical runs may be somewhat different from any location indicated in the surveys or Contract Documents.

C. SUBSTITUTIONS

1. **Standard.** The materials, products, procedures, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality that must be met by any proposed substitution.

2. **Substitution Procedure.** No substitution will be considered prior to receipt of Bids unless the Owner receives a written request for approval on the Owner's Substitution Request form for the Project, with all data requested on the form completed, at least seven (7) days prior to the date for receipt of Bids. Each such request shall be submitted with a Request for Substitution form identical to or equivalent in content to the form found in the Project Manual, and shall include the name of the material or equipment proposed to be replaced and a complete description of the proposed substitute, including drawings, cuts, performance and test data, warranty information, and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute would require shall be included. The proposer has the burden to prove the merit of the proposed substitute; by proposing the substitution, the Bidder represents that it has personally investigated the proposed material or product and determined that it is equal or better in all respects to that specified, that the same or better warranty will be provided for the substitution, that complete cost data, including all direct and indirect costs of any kind, has been presented, that the Contract Time will not be increased, and that it will coordinate the installation of the substitute if accepted and make all associated changes in the Work. The Owner's decision to approve or disapprove a proposed substitution shall be final. Written requests for approval shall constitute a guarantee by the Bidder that the articles or materials are in all respects, including warranty and installation, equal or superior to those specified, unless otherwise noted.

3. **Addendum.** If the Owner approves a proposed substitution prior to receipt of Bids, the approval will be set forth in a written Addendum. Bidders shall not rely upon approvals made in any other manner. Substitution request forms returned by the Owner are a courtesy only, and Bidders/Sub- bidders shall rely solely on substitution approvals listed in an Addenda.

4. **Post-Bid Substitutions.** After the Contract has been executed, the Owner may consider a written request for the substitution of material or products in place of those specified in the Contract Documents only under the circumstances as specified therein.

D. ADDENDA

1. **Written.** All Addenda will be written. They will be mailed, emailed, faxed, delivered, and/or posted electronically with notice to those the Owner knows to have received a complete set of Bidding Documents.

2. **Copies.** Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3. **Verification and Acknowledgment of Receipt.** Prior to bidding, each Bidder shall ascertain that it has received all Addenda issued. Each Bidder shall acknowledge its receipt of all Addenda in its Bid.

1.04 BIDDING PROCEDURE

A. FORM AND STYLE OF BIDS

1. **Form.** Bids (including any required attachments) shall be submitted on forms identical to the form included with the Bidding Documents. Bids on different forms may be rejected. No oral, email, or telephonic responses or modifications will be considered to be Bids.

2. **Completion of Form.** All blanks on the Bid form shall be filled in by typewriter or manually in ink.

3. **Words and Figures.** Where so indicated by the makeup of the Bid form, sums shall be expressed in both words and figures; in case of discrepancy between the two, and regardless of any statement to the contrary on the Bid form, the amount written in figures shall govern and the words shall be used to determine any ambiguities in the figures. Portions of the Bid form may require the addition of component bids to a total or the identification of component amounts within a total. In case of discrepancy between component amounts listed and their sum(s), the component amounts listed shall govern.

4. **Initial Changes.** Any interlineation, alteration, or erasure must be initialed by an authorized representative of the Bidder.

5. **Alternates and Unit Prices.** All requested Alternates and unit prices should be bid. The Owner reserves the right, but is not obligated, to reject any Bid on which all requested Alternates or unit prices are not bid. If no change in the Base Bid is required for an Alternate, enter “No Change.” If there is no entry, it will be presumed that the Bidder has made no offer to accomplish this Alternate. If it is not otherwise clear from the Bid or nature of the Alternate, it will be presumed that the amount listed for an Alternate is an add rather than a deduct.

6. **No Conditions.** The Bidder shall make no conditions or stipulations on the Bid form nor qualify its Bid in any other manner.

7. **Identity of Bidder.** The Bidder shall include in the specified location on the Bid form the legal name of the Bidder and, if requested, a description of the Bidder as a sole proprietor, a partnership, a joint venture, a corporation (including the state of incorporation), or another described form of legal entity. The Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent’s authority to bind the Bidder, and provide other information requested.

8. **Taxes.** The Bid shall include in the sum stated all taxes imposed by law, EXCEPT STATE AND LOCAL SALES TAX ON THE CONTRACT SUM.

9. **Bid Breakdown.** The Bid form may contain, for the Owner's accounting purposes only, a breakdown of some or all of the components included in the Base Bid.

B. POTENTIAL LISTING OF SUBCONTRACTORS

1. **Procedure.** On certain projects of the Owner, the Bid form includes a requirement that certain Subcontractors be listed, and the list must be submitted to the Owner. In these circumstances, the Bidder must name the Subcontractor with whom the Bidder, if awarded the Contract, will subcontract directly (i.e., not lower-tier Subcontractors) for performance of the work of: HVAC (heating, ventilation, and air conditioning); plumbing as described in Chapter 18.106 RCW; electrical work as described in Chapter 19.28 RCW; structural steel installation and rebar installation; and any other categories of Work listed on the Subcontractor listing form.

    a. **SELF-PERFORMANCE:** If the Bidder intends to self-perform any of these categories of Work, it must name itself for each such category of Work.

    b. **IF NO SUBCONTRACTORS:** If there is no work to be performed by a HVAC, plumbing, electrical, or other Subcontractor category identified on the Bid form, the Bidder should insert "None" or "N/A" on the Bid form. If a category is left blank, that shall indicate that the Bidder believes that there is no Work to be performed by that trade.

    c. **MULTIPLE ENTRIES:** The Bidder shall not list more than one (1) entity for a particular category of Work identified, unless a Subcontractor varies with an Alternate Bid, in which case the Bidder shall identify the Subcontractor to be used for the Alternate and the affected portion of the Work and otherwise make its Bid clear as to which Subcontractor shall be utilized depending upon the selection of Alternates.

    d. **MULTIPLE SUBMITTAL TIMES:** In the event the Bidding Documents call for a second submittal time for receipt of Alternate Bids, and no additional Subcontractors are listed with such Alternate Bids, the Owner will consider that there is no change in the Subcontractors from those listed with the base Bid.

2. **Failure to Submit.** In accordance with RCW 39.30.060, failure of a Bidder to submit as part of the Bid the names of such proposed HVAC, plumbing, and electrical Subcontractors or to name itself to perform such Work or the naming of two or more Subcontractors to perform the same Work shall render the Bidder's Bid nonresponsive and, therefore, void.

3. **Requirement to Subcontract.** The Bidder, if awarded the Contract, will subcontract with the listed Subcontractor for performance of the portion of the Work designated on the Form of Proposal, subject to the provisions of the Contract for Construction and RCW 39.30.060. The Bidder shall not substitute a listed Subcontractor in furtherance of bid shopping or bid peddling.

4. **Replacement.** If a listed Subcontractor is unable to comply with any bondability, qualification, or other requirements of the Contract or Bidding Documents (including without limitation a finding of Subcontractor Non-Responsibility), the Owner may require

the Bidder to replace the Subcontractor with a Subcontractor acceptable to the Owner at no change in the Contract Sum or Contract Time.

5. **Subcontractor Standards.** Subcontractors shall meet contractual and technical qualifications standards, and provide specialized certification, licensing, and/or payment and performance bonding where specified.

C. BID SECURITY

1. **Purpose and Procedure.** Each Bid shall be accompanied by a bid security payable to the Owner in the form required in the Bidding Documents and equal to five percent (5%) of the Base Bid (and excluding Washington State sales tax). The bid security constitutes a pledge that the Bidder will enter into the Contract with the Owner in the form provided, in a timely manner, and on the terms stated in its Bid and will furnish in a timely manner the payment and performance bonds, certificates of insurance, Contractor's Construction Schedule, and all other documents required by the Contract Documents. Should the Bidder fail or refuse to enter into the Contract or fail to furnish such documents, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. By submitting its Bid and bid security, the Bidder agrees that any forfeiture is a reasonable prediction at the time of Bid submittal of future damages to the Owner.

2. **Form.** The bid security shall be in the form of a certified or bank cashier's check payable to the Owner or a bid bond executed by a bonding company acceptable to the Owner and licensed in Washington State on the form included with the Bidding Documents or on an acceptable and equivalent form. The Attorney-in-Fact who executes the bond on behalf of the surety shall be licensed to do business in Washington State and shall affix to the bond a certified and current copy of his or her Power of Attorney.

3. **Retaining Bid Security.** The Owner will have the right to retain the Bid Security of Bidders to whom an award is being considered until the earliest of either: (a) the Contract has been executed, and payment and performance bonds have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected.

4. **Return of Bid Security.** Within sixty (60) days after the Bid Date, the Owner will release or return Bid securities to Bidders whose Bids are not to be further considered in awarding the Contract. Bid securities of the three apparent low Bidders will be held until the Contract has been finally executed, after which time all Bid securities not forfeited will be returned.

D. SUBMISSION OF BIDS

1. **Procedure.** The Bid, the Bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party specified in the Advertisement or Invitation to Bidders and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

2. **Deposit.** Bids shall be deposited at the designated location prior to the time and date for receipt of Bids indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids may be opened, retained unopened, or returned (open or unopened), all at the discretion of the Owner.

3. **Responsibility.** The Bidder assumes full responsibility for timely delivery at the location designated for receipt of Bids.

4. **Form.** Oral, fax, telephonic, email, electronic, or telegraphic Bids are invalid and will not be considered.

E. MODIFICATION OR WITHDRAWAL OF BID

1. **After Receipt Deadline.** A Bid may not be modified, withdrawn, or canceled by the Bidder during a sixty (60) day period following the time and date designated for the receipt of Bids, and each Bidder so agrees by virtue of submitting its Bid.

2. **Before Receipt Deadline.** Prior to the time and date designated for receipt of Bids, any Bid submitted may be modified or withdrawn only by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder or by telegram or fax; if by telegram or fax, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of Bids. The notice shall be worded so as not to reveal the amount of the original Bid. Email notice shall not be considered. It shall be the Bidder's sole responsibility to verify that the notice has been received by the Owner in time to be withdrawn before the Bid opening.

3. **Resubmittal.** Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids, provided that they are then fully in conformance with these Instructions to Bidders.

4. **Bid Security with Resubmission.** Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

F. **NOTICE:** Notice or a request from a Bidder under these Instructions to Bidders must be in writing over the signature of the Bidder and delivered in person or by mail, express delivery, telegram, or fax. If the notice is by telegram or fax, written confirmation over the signature of the Bidder must be mailed and postmarked on or before the date and time set for the notice.

1.05 CONSIDERATION OF BIDS

A. **Opening of Bids.** Unless stated otherwise in the Advertisement or Invitation to Bid or any Addendum, the properly identified Bids received on time will be opened publicly and will be read aloud. An abstract of the Base Bids and Alternate Bids, if any, will be made available to Bidders and other interested parties.

B. **Rejection of Bids.** The Owner shall have the right, but not the obligation, to reject any or all Bids for any reason or for no reason, to reject a Bid not accompanied by required Bid security

or by other material or data required by the Bidding Documents, or to reject a Bid which is in any way incomplete or irregular.

C. **Acceptance of Bid (Award).**

1. **Owner.** The Owner intends (but is not bound) to award a Contract to the lowest Responsible and Responsive Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner has the right to waive any informality or irregularity in any Bid(s) received and to accept the Bid which, in its judgment, is in its own best interests.

2. **Alternates.** The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Contract Documents or Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates (if any) accepted. The Owner retains the right to accept Alternate Bid items at the price bid within sixty (60) days after the Agreement is executed.

3. **Requirements for Award.** Before the Award, the lowest Responsive Bidder shall meet the Award Requirements.

D. BID PROTEST PROCEDURES

1. **Request for Copies of Bids.** Within two (2) business days of the bid opening, the Owner will provide, if requested by a Bidder, copies of all the bids received for the Project. The Owner will allow at least two (2) business days after providing copies of the bids before executing a Contract. (Intermediate Saturdays, Sundays, and legal holidays are not counted.)

2. **Procedure.** A Bidder protesting for any reason the Bidding Documents; a bidding procedure; the Owner's objection to the Bidder or a person or entity proposed by the Bidder, including but not limited to a finding of Non-Responsibility; the rejection of a Bid; the award of the Contract; or any other aspect arising from or relating in any way to the bidding and award (or lack thereof), shall cause a written protest to be filed with the Owner within two (2) business days of the event giving rise to the protest and, in any event, no later than two (2) business days after either (a) the date upon which Bids are opened, or (b) when the Owner provides copies of the bids to those Bidders requesting bids under Paragraph 1.05(D)(1), above. (Intermediate Saturdays, Sundays, and legal holidays are not counted.) The written protest shall include the name of the protesting Bidder, a detailed description of the specific factual and legal grounds for the protest, copies of all supporting documents, and the specific relief requested. The written protest shall be delivered to: Darlene Apeland, Director of Business – Sequim School District, 503 North Sequim Avenue, Sequim WA 98382.

3. **Consideration.** Upon receipt of the written protest, the Owner will consider the protest. The Owner may, within three (3) business days of the Owner's receipt of the protest, provide any other affected Bidder(s) the opportunity to respond in writing to the protest. If the protest is not resolved by mutual agreement of the protesting Bidder and the Owner, the Superintendent of the Owner or his or her designee will review the issues and promptly

furnish a final and binding written decision to the protesting Bidder and any other affected Bidder(s) within six (6) business days of the Owner's receipt of the protest. (If more than one (1) protest is filed, the Owner's decision will be provided within six (6) business days of the Owner's receipt of the last protest.) If no reply is received from the Owner during the six (6) business-day period, the protest shall be deemed rejected.

4. **Waiver.** Failure to comply with these protest procedures will render a protest waived.

5. **Condition Precedent.** Timely and proper compliance with and exhaustion of these protest procedures shall be a condition precedent to any otherwise permissible judicial consideration of a protest.

1.06 POST-BID INFORMATION

A. INFORMATION FROM APPARENT LOW BIDDER

1. **Submittal.** Within twenty-four (24) hours of the Owner's request, the apparent low Bidder and any other Bidders so requested shall submit the following to the Owner:

   a. Additional information regarding the use of their own forces and the use of Subcontractors and suppliers;

   b. A properly executed Contractor's Qualification Statement on the form provided (unless otherwise required to be submitted at the time of the Bid);

   c. A letter or form from the Bidder's insurance company stating that the insurance required by the Contract Documents will become effective upon execution of the Contract;

   d. A letter or form from the Bidder's surety stating that the bond(s) required by the Contract Documents will become effective upon execution of the Contract;

   e. If requested by the Owner, a detailed breakdown of the Bid in a form acceptable to the Owner;

   f. The names of the persons or entities (including a designation of the Work to be performed with the Contractor's own forces, and the names of those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work;

   g. The proprietary names and the suppliers of the principal items or systems of materials and equipment proposed for the Work;

   h. An Office of Superintendent of Public Instruction (OSPI) Form D-9, if requested; and

   i. A signed statement in accordance with RCW 9A.72.085 verifying under penalty of perjury that the bidder is in compliance with the responsible bidder criteria of RCW 39.04.350(1)(g).

Failure to provide any of the above information in a timely manner may constitute an event of breach permitting forfeiture of the Bid security.

2. **Responsibility.** The Bidder will be required to establish to the satisfaction of the Owner the reliability and Responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents and the qualifications set forth in the sections of the Project Manual pertaining to such proposed Subcontractors' respective trades. The Responsibility of the Bidder may be judged in part by the Responsibility of these proposed entities. The following will be considered:

   a. The ability, capacity, and skill to perform the Contract;

   b. The character, integrity, reputation, judgment, experience, and efficiency of the Bidder;

   c. Whether the Bidder can perform the Contract within the time specified;

   d. The previous and existing compliance by the Bidder with laws relating to the Contract;

   e. The quality of performance of previous contracts, including demonstration of successful completion of similar projects in the last three (3) years;

   f. The designated Project Manager shall have a minimum of three (3) years of successful experience in project management and scheduling of projects of similar scope and complexity.

   g. The designated Superintendent shall have a minimum of five (5) years of successful supervision of projects of similar scope and complexity;

   h. Any other qualifications required by the Contract Documents or Bidding Documents; and

   i. Such other information as may be secured having a bearing on the decision to award the contract.

3. **Consideration.** In considering a Bidder's Responsibility, a Bidder shall be deemed to be unqualified to perform the Contract if, after review and verification of the representations included upon the Contractor's Qualification Statement submitted by the Bidder, conditions such as, but not limited to, the following appear:

   a. The Bidder does not have sufficient prior experience (or an acceptable substitute thereof, as described below) with projects of a similar nature in technical, managerial, and financial requirements to that in the present Contract being bid. In addition to such established contractors, a newly established contractor may be considered qualified if it has shown on the Contractor's Qualification Statement that it is staffed with sufficient technical, managerial, and financial personnel with prior experience in the nature of construction for which the Bids are invited.

   b. The Bidder does not have sufficient capability to undertake the obligations of the Contract. A determination will be made when the Owner's review of the probable cash

flow needs of the Bidder for this Project (including payroll, cost of material and supplies, equipment rental costs, and any other direct or incidental costs of the Contract), concludes that the Bidder does not have sufficient financial resources to enable it to satisfy its financial obligations under the Contract.

c. The Bidder has submitted unrealistic unit prices as determined by other Bidders' unit prices for this Project.

d. The Bidder does not have sufficient staff, equipment, or plant available to perform the Contract. The Owner's determination in this matter will be based upon that represented by Bidder in the Contractor's Qualification Statement.

e. The Bidder has a history of unsatisfactory performance of contracts of this or similar nature, regardless of whether such contracts existed between the Owner and the Bidder, or other parties.

i. A determination of this nature will be made if the Owner, after review of the Bidder's previous work experience, determines that the Bidder's unsatisfactory performance has resulted predominantly from the Bidder's failure rather than a failure to perform by another party. The Owner will give the Contractor an opportunity to explain such nonperformance's before any final determination is reached.

ii. A determination of failure to perform will be made if the Owner is satisfied, after review of the Bidder's prior experience, that the Bidder has failed to satisfy its obligations under past contracts, and the Owner cannot safely assume satisfactory performance of the Contract by the Bidder.

iii. In reaching its determination, the Owner may consider statements of other parties to the prior unperformed contracts, as well as the representations of the Bidder on its Contractor's Qualification Statement.

4. **Subcontractors.** The Responsibility of the Bidder may be judged in part by the Responsibility of its Subcontractors. Bidders must verify Responsibility criteria for each first-tier Subcontractor. A Subcontractor of any tier that hires other Subcontractors must verify Responsibility criteria for each of its next lower-tier Subcontractors. Verification shall include that each Subcontractor, at the time of subcontract execution, is Responsible and possesses an electrical contractor license, if required by Chapter 19.28 RCW, or an elevator contractor license, if required by Chapter 70.87 RCW, and can obtain any payment and performance bonds required by the Bidding or Contract Documents.

5. **Request to Modify Criteria.** No later than ten (10) days prior to the Bid Date, a potential Bidder may request in writing that the Owner modify the Responsibility criteria listed in Paragraph 1.06(A)(2), above, or elsewhere in the Contract Documents or the Bidding Documents. The Owner will evaluate the information submitted by the potential Bidder and respond before the Bid Date. If the evaluation results in a change of the criteria, the Owner will issue an Addendum identifying the new criteria.

6. **Objection.** Prior to the Award of the Contract, the Owner will notify the Bidder in writing if the Owner, after due investigation, has reasonable objection to the Bidder or a person or entity proposed by the Bidder, and the Owner will provide the reasons for the determination. The Bidder may appeal the determination within two (2) business days of its receipt of the objection by presenting additional information to the Owner, and the Owner will consider the additional information before issuing its final determination. The Bidder may, after the Owner's objection or determination, and at Bidder's option, (1) withdraw the Bid, (2) submit an acceptable substitute person or entity with no change in the Contract Time and no adjustment in the Base Bid or any Alternate Bid, even if there is a cost to the Bidder occasioned by the substitution, or (3) appeal by filing a protest in accordance with Paragraph 1.05(D). In the event of withdrawal, Bid security will not be forfeited.

7. **Change.** Persons and entities proposed by the Bidder and to whom the Owner has made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner.

8. **Right to Terminate.** The Bidder's representations concerning its qualifications will be construed as a covenant under the Contract. Should it appear that the Bidder has made a material misrepresentation on its Contractor's Qualification Statement, the Owner shall have the right to terminate the Contract for cause for the Contractor's breach, and the Owner may then pursue such remedies as exist elsewhere under the Contract, or as otherwise are provided at law or equity.

B. **INFORMATION FROM OTHER BIDDERS:** All other Bidders designated by the Owner as under consideration for award of a Contract shall also provide a properly executed Contractor's Qualification Statement, if so requested by the Owner.

C. **BIDDING MISTAKES:** The Owner will not be obligated to consider notice of claimed bidding mistakes received more than three (3) business days after the Bid opening. In accordance with Washington law, a low Bidder that claims error and fails to enter into the Contract is prohibited from bidding on the Project if a subsequent call for Bids is made for the Project.

1.07 PERFORMANCE BOND; LABOR AND MATERIAL PAYMENT BOND

A. **Bond Requirements.** Within twenty-four (24) hours after the issuance of the Owner's notice of intent to award the Contract, and prior to the date of execution of the Contract, the Bidder shall furnish evidence satisfactory to the Owner of its ability to obtain statutory bonds pursuant to Chapter 39.08 RCW covering the faithful performance of the Contract and the payment of all obligations arising thereunder in the form prescribed in the Contract Documents and in the full amount of the Contract Sum plus sales tax. The cost of such bonds shall be included in the Base Bid.

B. **Subcontractor Bonds.** The Owner reserves the right to require certain Subcontractors to furnish performance and labor and material payment bonds in form as set forth herein and as set forth under the Bidding Documents or Contract Documents. The Owner shall not, however, be responsible for any costs for any Subcontractor bonds unless the Owner, prior to the

execution of the Owner-Contractor Agreement, requires the Bidder, in writing, to furnish such bonds from designated Subcontractors. Should any bonds be furnished by subcontract bidders, or be required by any Bidder to be furnished by any subcontract bidder or Subcontractor, without the written request of the Owner prior to the execution of the Owner-Contractor Agreement, the costs for any such bonds shall be at the expense of the Bidder and shall not be added to the Contract Sum.

C. **Time of Delivery and Form of Bonds.** The Bidder shall deliver the bonds and other documents required by the Contract Documents (including, but not limited to, certificates of insurance) to the Owner pursuant to the Contract Documents, and in no event any later than seven (7) days after the date of execution of the Contract and prior to commencing operations at the site. The bonds shall be written in the form(s) approved by the Owner for public works, as specified in Bidding Documents, and as required by Chapter 39.08 RCW. The bonds shall be written by a surety firm licensed to do business in the State of Washington, with an A.M. Best rating of at least A/IX. The Bidder shall require the Attorney-in-Fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his/her Power of Attorney.

1.08 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. **Form to be Used:** The Agreement for the Work will be written on the form(s) contained in the Bidding Documents.

B. **Conflicts:** In case of conflict between the provisions of these Instructions and any other Bidding Document, these Instructions shall govern. In case of conflict between the provisions of the Bidding Documents and the Contract Documents, the Contract Documents shall govern.

1.09 CONTRACT DOCUMENTS

This paragraph contains descriptions of some, but not all, of the provisions of the Contract Documents.

A. **RETAINAGE.** The Contract Documents specify the statutory retainage requirements of Chapter 60.28 RCW for this Project.

B. **CONTRACT TIME.** The Contract Documents specify the Contract Time. Timely completion of this Project is essential to the Owner.

C. **PREVAILING WAGES.** The Contract Documents contain requirements regarding the payment of prevailing wages pursuant to Chapter 39.12 RCW.

D. **WRITTEN CLAIMS AND NOTICE.** The Contract Documents contain a number of provisions that require the Contractor to provide notice of Claims and to make and support Claims, in writing, within a specified time in order to maintain the Claim. The Owner is under no obligation to consider Claims that fail, in any respect, to meet such requirements.

E. **CHANGES IN CONTRACT SUM.** The Contract Documents contain provisions specifying requirements for and pricing of changes in the Contract Sum.

F. **DISPUTE RESOLUTION.** The Contract Documents contain provisions replacing the arbitration provisions of the form General Conditions with an alternative dispute resolution procedure which, among other things, requires non-binding mediation of all disputes.

G. **CONTRACTOR REGISTRATION.** Pursuant to Chapter 39.06 RCW, the Bidder shall be registered or licensed as required by the laws of the Washington State, including, but not limited to, Chapter 18.27 RCW.

H. **COMMISSIONING OF OPERATIONAL SYSTEMS.** Certain systems may be designated in the Contract Documents as "Operational Systems." If so, prior to the Date of Substantial Completion the Operational Systems must be up and running, ready for normal operation, and subject to a pre-commissioning inspection.

I. **TAXES.** The Contractor shall include in its Bid and pay for all applicable taxes, except Washington State sales tax and local sales tax on the Contract Sum, which shall be excluded in the preparation of its Bid. Such State and local sales taxes shall be added to the Contract Sum, paid by the Owner to the Contractor, and then paid by the Contractor as specified in the Contract Documents. Refer to General, Supplementary, or other conditions regarding further information.

J. **OTHER PROVISIONS.** The above paragraphs contain descriptions of some, but not all, of the provisions of the Contract Documents. Bidders should review in detail the Contract Documents themselves and not rely upon the above paragraphs in this Paragraph 1.09 as complete or inclusive.

1.10 POSSIBLE TRENCH EXCAVATION SAFETY PROVISIONS

A. To ensure that the Bidder agrees to comply with relevant trenching safety requirements of RCW 39.04.180 and Chapter 49.17 RCW, the Base Bid must include the cost of any required trench safety provisions. The Bidder shall enter in the blank provided on the Bid form the dollar amount the Bidder has included in its Base Bid for any trench safety provisions for trenching that will exceed a depth of four feet. If trench excavation safety provisions do not pertain to the Project, the Bidder may enter "N.A." or "Not Applicable" in the blank on the Bid form.

1.11 APPRENTICESHIP UTILIZATION

In accordance with RCW 39.04.350, if the successful Bidder has a history of receiving monetary penalties for not achieving the apprentice utilization requirements pursuant to RCW 39.04.320, or is habitual in utilizing the good faith effort exception process, the bidder must submit to the Owner an apprenticeship utilization plan within ten (10) business days immediately following the Notice to Proceed date.

- END OF DOCUMENT 002113 -

DOCUMENT 003100 - AVAILABLE PROJECT INFORMATION

1.1 AVAILABLE PROJECT INFORMATION

A. This Document and its referenced attachments are part of the Procurement and Contracting Requirements for Project. They provide Owner's information for the Bidder's convenience and are intended to supplement rather than serve in lieu of the Bidder's own investigations. They are made available for the Bidder's convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. Preliminary project schedule including design and construction milestones have been established by Owner and are scheduled for completion 160 days after notice to proceed.

1. For Project time requirements, see the Invitation to Bid, Public Works Contract, and General Conditions.

C. Existing drawings that include information on existing conditions including previous construction at Project site are available for viewing at the maintenance offices of the District.

D. Permit Application: Complete building or Labor and Industries permit application and file with authorities having jurisdiction within [five] days of the Notice of Award..

E. Related Requirements:

1. Review Document 002113, "Instructions to Bidders," for the Bidder's responsibilities on examination of Project site and existing conditions.

- END OF DOCUMENT 003100 -

DOCUMENT 004100 - BID FORM

BIDS WILL ONLY BE RECEIVED AT:

Owner:	Sequim School District 503 North Sequim Ave, Sequim, WA 98382
Bids Must Be Received By:	December 12th at 2:00 PM
Owner's Representative:	Wenaha Group, Yue Chen, Project Manager

BID IS FOR THE PROJECT REFERENCED:

Project No.	1005
Project Location:	601 N Sequim Ave, Sequim, WA 98382
Architect:	design2 LAST, Inc.

The undersigned Bidder acknowledges receipt of, and declares that it has examined and is fully familiar with, the Bidding Documents, the Project Manual, the Drawings, the Specifications, the Contract Documents, and the Addenda specified below.

The Bidder further declares that it has inspected the site and familiarized itself with local conditions that may affect the cost of the Work, the time for performance of the Work, and/or the difficulty thereof; that it has satisfied itself as to nature, location, character, quality, and quantity of the Work required by the Contract, including materials and equipment, and including the fact that the description of quantities of work and materials as included in the Bid is brief and is intended only to indicate the general nature of the work and to correlate said quantities with detailed requirements in the Contract Documents; that this Bid is made according to provisions and under terms of the Contract Documents, which are hereby made a part of this Bid; and that Bidder has carefully checked all of the words and figures that compose this Bid.

IN SUBMITTING THE BID, THE UNDERSIGNED AGREES:

1. To furnish all material, labor, tools, equipment, management, supervision, and utility and transportation services necessary to perform and complete, in a workmanlike manner, all of the Work required for construction of the Project in accordance with the Contract Documents and contained or referenced in the Bidding Documents. Bidder acknowledges that the Contract Documents consist of the Public Works Contract (Document 007200.01) and General Conditions (Document 007200.02); Supplemental Conditions; Drawings; Specifications; and Addenda.

2. The Base Bid reflected in Attachment 01 to this Bid Form, and the Alternatives reflected in Attachment 02 to this Bid Form, represent full compensation for satisfactory performance of all obligations under the Contract Documents.

3. Bidder has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by Owner, as well as from the Drawings and Specifications made a part of the Contract Documents.

4. The Owner may continue to occupy parts of the site and may employ, under separate contracts, other contractors at or near the site concurrently with the Work of the Contract. As a result, the Bidder will have limited use of the premises for work, storage, access, parking, and equipment, and Bidder will be required to coordinate the use of the premises under the direction of the Owner. Further, adjoining areas may be conducting normal operations during the Work, and Bidder should anticipate pedestrian and traffic congestion, limited parking, and the requirement that the Work be coordinated with ongoing operations. Bidder acknowledges that its Bid is based upon a schedule and assumptions that incorporate these conditions, and upon a schedule that complies with schedule requirements set forth in the Contract Documents.

5. To hold its Bid open for sixty (60) consecutive calendar days from the date designated for opening of bids.

6. To accept the provisions of the Instructions to Bidders, including the disposition of Bid Security.

7. Within ten (10) days of award, to execute and deliver the Contract, to furnish the Performance Bond and Payment Bond in accordance with the requirements of the Contract Documents, to deliver the required certificates of insurance, and to perform the other obligations specified in the Contract Documents.

8. To commence the Work of the Contract upon receipt of a written Notice to Proceed and complete all such Work by the dates for Substantial Completion and Final Completion, respectively, specified in the Contract Documents.

9. The requirements of Chapter 39.12 RCW ("Prevailing Wages") are included as a part of this Bid, and the undersigned agrees to comply with all of the provisions thereof.

10. The undersigned Bidder has enclosed the required Bid Security in the amount of five percent (5%) of the Base Bid in the form required by and otherwise in accordance with the Instructions to Bidders. The Bidder agrees to enter into the Contract with the Owner in the form provided, in a timely manner, and on the terms stated in its Bid and to furnish in a timely manner the Payment Bond and Performance Bond, certificates of insurance, Contractor's Construction Schedule, and all other documents required by the Contract Documents. Bidder agrees that, should it fail or refuse to enter into the Contract or fail to furnish such documents, the amount of the Bid Security will be forfeited to the Owner as liquidated damages, not as a penalty. By submitting its Bid and Bid Security, the Bidder agrees that any forfeiture is a reasonable prediction at the time of Bid submittal of future damages to the Owner.

11. It satisfies the Bidder responsibility criteria listed in RCW 39.04.350(1).

12. Failure to timely complete and submit this Bid Form, Attachments 1-7, or the inclusion of false information in any aspect of its Bid, will render this Bid nonresponsive.

13. The Owner reserves the right to reject any or all bids and to waive informalities and irregularities.

BIDDER SUBMISSION INFORMATION

Bidder Information	
Legal Name of Bidder:	
Type of Entity (e.g., corporation, partnership, joint venture, or sole proprietor):	
Business Address:	
Business Phone No:	
Website (if applicable):	
Email:	
Washington State Contractor's Registration No.: *NOTE: Failure to have required license at time of bid opening will result in rejection of the Bid.*	
Contractor's License Expiration Date:	
Federal Tax Identification Number (TIN):	
Unified Business Identifier Number (UBI):	
Bidder's Authorized Representative Information	
Name:	
Title:	
Phone No:	
Email:	
Bid Bonding Company Information	
Bonding Company Name:	
Bonding Company Address:	
Bonding Company Phone No:	
Bonding Agent Name:	
Bonding Agent Email:	

(Continued on next page)

ADDENDA ACKNOWLEDGEMENT

Bidder acknowledges receipt, review, and full consideration of those Addenda indicated below. *(If a given addendum number was not utilized, that row should be left blank.)*

Number:	**Addendum Dated:**	**Bidder Authorized Representative Initials**
Addendum #1		
Addendum #2		
Addendum #3		
Addendum #4		
Addendum #5		
Addendum #6		

ATTACHMENTS REQUIRED

Bidder has fully completed and included the following attachments to this Bid Form, which are required for the Bid to be considered responsive.

Number:	**Description:**	**Bidder Authorized Representative Initials**
Attachment 1	Bid Price Form	
Attachment 2	Bid Alternates Form	
Attachment 3	Insurance Binder	
Attachment 4	Bid Security	
Attachment 5	Non-Collusion Affidavit	
Attachment 6	Statement of Non-Segregated Facilities	
Attachment 7	Certification of Compliance with Wage Payment Statutes	

Dated: _____

_____ _____

Name of Authorized Representative **Signature of Authorized Representative**

END OF BID FORM

(Complete and include Attachments 1-7)

DOCUMENT 004100.01 - BID PRICE FORM
(Attachment 1 to Bid Form)

BID IS FOR THE PROJECT REFERENCED:

Project Name:	HVAC Recapitalization at Sequim High School
Project No.	1005
Project Location:	601 N Sequim Ave, Sequim, WA 98382
Architect:	design2 LAST, Inc.

SALES TAX

For all bid prices listed in this Bid Form, DO NOT INCLUDE applicable local and Washington State sales tax that will be applied to the Contract Sum.

BIDDER ACKNOWLEDGEMENT

By submitting this Bid, the undersigned Bidder acknowledges the following:

1. The below-listed Base Bid amount may be modified by amounts indicated by the Bidder on Document 004100.02 ("Alternates Form").

2. Owner reserves the right to reject any or all Bids, to waive any informality or irregularity in any Bid received, and to accept or reject any Alternates in any order or combination.

TOTAL BASE BID AMOUNT

The undersigned Bidder, in response to the Bidding Documents, having carefully examined the Contract Documents, having had the option to visit the site with the Owner-provided optional walkthroughs, and being familiar with all conditions and requirements of the Work, hereby offers to perform all the Work on the above-referenced Project in accordance with the Contract Documents for the total, combined fixed-price lump sum of:

_____ Dollars ($_____)
(Show amount in words and in figures. This amount does <u>not</u> include state/local sales tax.)

TRENCH EXCAVATION SAFETY PROVISIONS

In compliance with RCW 39.04.180, on public works projects in which trench excavation will exceed a depth of four feet, all costs for adequate safety systems for the trench excavation that meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW, must be included in the Base Bid. The cost of trench excavation safety provisions included in the lump-sum dollar amount stated above (even if the value is $0.00) must be listed below to be responsive.

Total amount of trench excavation safety included in the Base Bid (above):

_____ Dollars ($_____)
(Show amount in words and in figures. This amount does not include state/local sales tax.)

Dated: _____

_____ _____
Name of Authorized Representative **Signature of Authorized Representative**

- END OF ATTACHMENT 1 -

DOCUMENT 004100.02 - BID ALTERNATES FORM
(Attachment 2 to Bid Form)

BID IS FOR THE PROJECT REFERENCED:

Project Name:	HVAC Recapitalization at Sequim High School
Project No.	1005
Project Location:	601 N Sequim Avenue, Sequim, Washington 98382
Architect:	design2 LAST, Inc.

ALTERNATE BIDS

The following represents incremental differences to cost outlined in the Base Bid to incorporate alternates should they be accepted by the Owner. Amounts do not include state or local sales tax.

Alternate A - Bard Unit Replacement

Add / Deduct *(Please choose "Add" or "Deduct" by drawing a circle around the word)*

_____
Dollars
(amount in words)

$ _____
(amount in numbers)

Alternate B

Add / Deduct *(Please choose "Add" or "Deduct" by drawing a circle around the word)*

_____
Dollars
(amount in words)

$ _____
(amount in numbers)

Dated: _____

_____ _____
Name of Authorized Representative **Signature of Authorized Representative**

- END OF ATTACHMENT 2 -

DOCUMENT 004100.03 - INSURANCE BINDER
(Attachment 3 to Bid Form)

BID IS FOR THE PROJECT REFERENCED:

Project Name:	HVAC Recapitalization at Sequim High School
Project No.	1005
Project Location:	601 N Sequim Ave, Sequim, WA 98382
Architect:	design2 LAST, Inc.

The undersigned confirms that the Bidder has reviewed the insurance and bonding requirements stated in Part 2 of the General Conditions (and elsewhere in the Contract Documents) for the above-referenced Project with its insurance provider. If awarded the Contract, Bidder will provide the required insurance at no additional cost to the Owner.

Dated: _____

_____ **_____**

Name of Authorized Representative **Signature of Authorized Representative**

- END OF ATTACHMENT 3 -

SECTION 004100.04 - BID SECURITY
(Attachment 4 to Bid Form)

BID IS FOR THE PROJECT REFERENCED:

Project Name:	HVAC Recapitalization at Sequim High School
Project No.	1005
Project Location:	601 N Sequim Ave, Sequim, WA 98382
Architect:	design2 LAST, Inc.

BID SECURITY REQUIRED

1. To be considered responsive, the Bidder must provide the Bid Security in an amount constituting five percent (5%) of the Base Bid in accordance with the Instructions to Bidders.

2. Bid Security must be submitted to Owner in the form of a cashier's check, certified check, U.S. money order, or bid bond.

3. Bid bonds must be in the form of AIA-A310 or, in the alternative, the below Owner-provided form.

4. Bid bond must contain the notarized signature of the Principal and the Surety.

5. Taxes levied by federal, state, or municipal governments must be included in Base Bid unless indicated otherwise, with the exception that Washington State sales tax is not to be included in the Base Bid.

6. In the event Owner does not award a contract to Bidder within 60 calendar days after the Bid Date, Owner will return the Bid Security to the Bidder.

(Form of Bid Bond included on next page.)

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS: That we, _____

_____ (herein "Principal"),

as Principal, and _____ (herein "Surety"),

as Surety, are held firmly bound unto Sequim School District, Clallam County, Washington, in the full sum of

_____ Dollars ($_____) lawful money of the United States of America for the payment of which sum of money, well and truly to be made, said Principal and Surety bind themselves and each and every of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas, the above-named Principal has submitted a bid for the **HVAC Recapitalization at Sequim High School** in accordance with instructions in notice to contractors, prepared by Sequim School District, and are desirous of accompanying said bid with a proposal bond in the penalty of five (5) percent of said bid in lieu of certified check.

NOW THEREFORE, if said Principal, upon receipt of written notice of the acceptance of such bid, shall within ten (10) days enter into a written contract with Sequim School District upon the form of contract of said Sequim School District for the completion of such contract in accordance with the terms and conditions of said bid, and provide payment and performance bonds with good and sufficient sureties for the faithful and proper fulfillment of such contract, and provide all insurances as required by the contract, then this obligation shall be null and void; otherwise to remain in full force and effect.

SIGNED AND SEALED this _____ day of _____, 20____.

Principal: _____	**Surety:** _____
_____ Signature of Representative	_____ Signature of Representative
_____ Printed Name	_____ Printed Name
_____ Title	_____ Title
_____ Address	_____ Address
_____ Telephone No.	_____ Telephone No.
_____ Witness	_____ Witness

- END OF ATTACHMENT 4 -

DOCUMENT 004100.05 - NON-COLLUSION AFFIDAVIT
(Attachment 5 to Bid Form)

STATE OF WASHINGTON)
) ss.
COUNTY OF _____)

_____, being first duly sworn, deposes and says: that he/she is_____ (a partner or officer, etc.) of the party making the foregoing bid; that he/she certifies that such bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidder or person, to put in a sham proposal or to refrain from proposing, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the proposal price of affiant or of any other bidder, or to fix any overhead, profit, or cost element of said price, or that of any other bidder, or to secure any advantage against the Sequim School District or any person interested in the proposed contract; and that all statements in said bid are true.

_____
(Signature of Affiant)

_____
(Printed Name)

_____
(Title)

_____
(Company)

Subscribed and worn to before me this _____ day of _____, 20____.

_____
(Signature of Notary)

_____
(Print or stamp name of Notary)

_____
(Title of office)
My commission expires: _____

DOCUMENT 004100.06 – CERTIFICATION OF NON-SEGREGATED FACILITIES
(Attachment 6 to Bid Form)

BID IS FOR THE PROJECT REFERENCED:

Project Name:	HVAC Recapitalization at Sequim High School
Project No.	1005
Project Location:	601 N Sequim Avenue, Sequim, Washington 98382
Architect:	design2 LAST, Inc.

By submitting its Bid, the undersigned Bidder hereby certifies as follows:

(a) Segregated facilities, as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will—

(1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;

(2) Retain the certifications in the files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES
A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually). NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

(Signature on next page)

_____
(Signature)

_____
(Printed Name)

_____
(Title)

_____
(Company)

- END OF ATTACHMENT 6 -

DOCUMENT 004100 - CERTIFICATION OF COMPLIANCE WITH WAGE PAYMENT STATUTES
(Attachment 7 to Bid Form)

BID IS FOR THE PROJECT REFERENCED:

Project Name:	HVAC Recapitalization at Sequim High School
Project No.	1005
Project Location:	601 N Sequim Avenue, Sequim, Washington 98382
Architect:	design2 LAST, Inc.

The Bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date of November 14th, 2023, the Bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Washington State Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

_____
Bidder's Business Name

_____
Signature of Authorized Official*

_____
Printed Name

_____
Title

_____ _____ _____
Date City State or country

Check One:
Sole Proprietorship ☐ Partnership ☐ Joint Venture ☐ Corporation ☐

State of incorporation, or if not a corporation, state where business entity formed: _____

If a co-partnership, give firm name under which business is transacted: _____

** If a corporation, proposal must be executed in the corporate name by the president or vice-president (or any other corporate officer accompanied by evidence of authority to sign). If a co-partnership, proposal must be executed by a partner.*

- END OF ATTACHMENT 7 -

DOCUMENT 004393 - BID SUBMITTAL CHECKLIST

1.1 BID INFORMATION

A. Bidder: _____.

B. Prime Contract: _____.

C. Project Name: HVAC Recapitalization at Sequim High School

D. Project Location: 601 N Sequim Avenue, Sequim, Washington 98382.

E. Owner: Sequim School District No. 323.

F. Architect: design2 LAST, Inc.

G. Architect Project Number: 2022-017.

H. Construction Manager: Wenaha Group, Yue Chen, Project Manager.

1.2 BIDDER'S CHECKLIST

A. In an effort to assist the Bidder in properly completing all documentation required, the following checklist is provided for the Bidder's convenience. The Bidder is solely responsible for verifying compliance with bid submittal requirements.

B. Attach this completed checklist to the outside of the Submittal envelope.

1. Used the Bid Form provided in the Project Manual.
2. Prepared the Bid Form as required by the Instructions to Bidders.
3. Indicated on the Bid Form the Addenda received.
4. Attached to the Bid Form: Bid Price Form (Attachment 1)
5. Attached to the Bid Form: Bid Alternates Form (Attachment 2)
6. Attached to the Bid Form: Insurance Binder (Attachment 3)
7. Attached to the Bid Form: Bid Security (Attachment 4)
8. Attached to the Bid Form: Non-Collusion Affidavit (Attachment 5)
9. Attached to the Bid Form: Statement of Non-Segregated Facilities (Attachment 6)
10. Attached to the Bid Form: Certification of Compliance with Wage Payment Statutes (Attachment 7)
11. Attached to the Bid Form: Bid Bond OR a certified check for the amount required.

12. Verified that the Bidder can provide executed Performance Bond and separate Payment Bond as required by the Bidding Documents.

13. Verified that the Bidder can provide Certificates of Insurance in the amounts indicated.

14. Verified that Bidder signed the Bid Form.

15. Verified that the Bid Bond has the notarized signatures of both the Bidder and the Surety.

- END OF DOCUMENT 004393 -

DOCUMENT 00 43 95 - BIDDER QUALIFICATION STATEMENT

1. Introduction

1.1. Pursuant to section 1.06 of the Instructions to Bidders, the Sequim School District is requesting the following information. Failure to provide any of the following information in a timely manner may constitute an event of breach permitting forfeiture of the bid security. *Please attach additional pages where necessary.*

1.2. This Bidder Qualification Statement is submitted with respect to the following project:

HVAC Recapitalization at Sequim High School

2. General Information

2.1. Name of Bidder: _____

2.2. Address of Bidder: _____

2.3. Telephone No. of Bidder: _____

3. Bidder's Forces, Use of Subcontractors, and Suppliers

3.1. What portions of the work included in the proposed contract will be performed by the Bidder's own forces?

_____

_____

_____

3.2. What portions of the work included in the proposed contract will be performed by Subcontractors?

_____

_____

_____

3.3. Attach or list the names of the persons or entities (including a designation of the work to be performed with the Bidder's own forces, and the names of those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work.

_____

_____

_____

3.4. List the proprietary names and the suppliers of the principal items or systems of materials and equipment proposed for the Work.

_____

_____

_____

4. Bid Breakdown

4.1. Attach an itemized breakdown of the Bid, including labor tasks, labor costs, materials, material costs, and delivery charges.

5. Work History

5.1. Attach or list the following information on similar projects that your organization has completed in the past three (3) years: name and type of project, owner (include name and telephone number of the contact person), contract amount, expected date of completion, and date of completion.

_____

_____

_____

5.2. Describe your organization's experience with remodeling of and/or additions to K-12 school buildings.

_____

_____

_____

5.3. Attach or list the following information on all projects that your organization now has in progress: name and type of project, owner, architect/engineer (include name and telephone number of contact person), contract amount, and scheduled date of completion.

_____

_____

_____

5.4. Has your organization ever defaulted on or otherwise failed to complete any work under contract? If so, describe each such circumstance:

_____

_____

_____

_____

5.5. Has any officer, partner, or principal of your organization ever been an officer, partner, or principal of another organization that defaulted on or otherwise failed to complete any work under contract? If so, describe each such circumstance:

_____

_____

_____

5.6. Provide the construction experience (length, project type, scope, complexity) of the Project Manager and Superintendent that would be assigned to perform the Work under this proposed contract.

_____

_____

_____

6. Additional Letters and Forms

6.1. Attach a letter or form from the Bidder's insurance company stating that the insurance required by the Bidding Documents (see the General Conditions) will become effective upon execution of the proposed Contract.

6.2. Attach a letter or form from the Bidder's surety stating that the Payment Bond and Performance Bond will become effective upon execution of the proposed Contract.

6.3. [If applicable, see Owner for questions:] Attach a completed copy of page 2 of the Office of Superintendent of Public Instruction (OSPI) Form D-9. The applicable form may be found at: Form D-9 (www.k12.wa.us).

- END OF SECTION -

DOCUMENT 005100 - NOTICE OF INTENT TO AWARD

1.1 BID INFORMATION

A. Bidder: <**Insert successful bidder name**>.

B. Bidder's Address: <**Insert street address, city, state, zip, and telephone**>.

C. Project Name: HVAC Recapitalization at Sequim High School

D. Project Location: 601 N Sequim Avenue, Sequim, Washington 98382.

E. Owner: Sequim School District No. 323.

F. Architect: design2 LAST, Inc.

G. Architect Project Number: 2022-017.

1.2 NOTICE OF INTENT TO AWARD CONTRACT

A. Notice: The above Bidder is hereby notified that its bid, dated <**Insert date**>, for the above Contract has been considered and the Bidder is hereby awarded a contract for <**Insert brief description of Work or sections of Work awarded**>.

B. Alternates Accepted: The following alternates have been accepted by Owner and have been incorporated in the Contract Sum:

1. Alternate No. 1: <**Insert alternate title**>.
2. Alternate No. 2: <**Insert alternate title**>.

C. Contract Sum: The Contract Sum is <**Insert written amount**> dollars ($<**Insert numeric amount**>).

1.3 EXECUTION OF CONTRACT

A. Contract Documents: Copies of the Contract Documents will be made available to the Bidder immediately. The Bidder must comply with the following conditions precedent within ten (10) days of the above date of issuance of the Notice:

1. Deliver to Owner three (3) sets of fully executed copies of the Contract Documents.

B. Delivery of Bonds and Certificates of Insurance: Within seven (7) days after Bidder's execution of the Contract, and prior to commencing operations at the site, the Bidder must deliver the executed Payment Bond, Performance Bond, and Certificates of Insurance required by the Contract Documents to the Owner per the Instructions to Bidders.

C. Compliance: Failure to comply with conditions of this Notice within the time specified will entitle Owner to consider the Bidder in default, annul this Notice, and declare the Bidder's Bid security forfeited.

D. Execution by Owner: Within thirty (30) days after the Bidder complies with the conditions of this Notice, Owner will return to the Bidder one fully executed copy of the Contract Documents.

1.4 NOTIFICATION

A. This Notice is issued by:

1. Sequim School District No. 323
2. Date: _____
3. Authorized Signature: _____
4. Name of Signatory: _____
5. Title of Signatory: _____

- END OF DOCUMENT 005100 -

DOCUMENT 006000 - PROJECT FORMS

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:

1. The Public Works Contract as specified in Document 007200.01.

2. The General Conditions as specified in Document 007200.02.

3. The Supplementary Conditions for the Project, if any, are as separately prepared and included in the Project Manual.

1.2 ADMINISTRATIVE FORMS

A. Administrative Forms: Additional administrative forms may be specified in Division 01 General Requirements Sections.

B. Copies of AIA standard forms may be obtained from the following:

1. The American Institute of Architects: www.aia.org/contractdocs/purchase/index.htm; docspurchases@aia.org; (800) 942-7732.

C. Preconstruction Forms:

1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, “Performance Bond and Payment Bond.”

2. Form of Certificate of Insurance: AIA Document G715, “Supplemental Attachment for ACORD Certificate of Insurance 25-S.”

D. Information and Modification Forms:

1. Form for Requests for Information (RFIs): AIA Document G716, “Request for Information (RFI).”

2. Form of Request for Proposal: AIA Document G709, “Work Changes Proposal Request.”

3. Change Order Form: AIA Document G701, “Change Order.”

4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G707, “Architect's Supplemental Instructions.”

5. Form of Change Directive: AIA Document G714, “Construction Change Directive.”

E. Payment Forms:

1. Schedule of Values Form: AIA Document G703, “Continuation Sheet.”

2. Payment Application: AIA Document G702/703, “Application and Certificate for Payment and Continuation Sheet.”

3. Form of Contractor's Affidavit: AIA Document G706, “Contractor's Affidavit of Payment of Debts and Claims.”

4. Form of Affidavit of Release of Liens: AIA Document G706A, “Contractor's Affidavit of Payment of Release of Liens.”

5. Form of Consent of Surety: AIA Document G707, “Consent of Surety to Final Payment.”

- END OF DOCUMENT 006000 -

DOCUMENT 007200.01 – PUBLIC WORKS CONTRACT

SEQUIM SCHOOL DISTRICT NO. 323
PUBLIC WORKS CONTRACT

Project Name: HVAC Recapitalization at Sequim High School

Project Number: 1005

Project Description: The Project consists of a HVAC Recapitalization and replacement of existing equipment. The Project is more thoroughly described in the Specifications, Bidding Documents, and Contract Documents.

Project Location: 601 N Sequim Avenue, Sequim, Washington 98382.

THIS PUBLIC WORKS CONTRACT ("Contract") is made and entered into by and between the Sequim School District No. 323, a Washington quasi-municipal corporation ("Owner"), and NAME, a _____ _____ ("Contractor"). Contractor and Owner may hereinafter be referred to as "Parties."

A. Effective Date: This Contract shall be effective on the last date set forth on the signature page ("Effective Date").

B. Contract Work: This Contract shall be the agreed basis of performing the Work identified and defined in the Contract Documents. The Contractor agrees to furnish all material, labor, tools, equipment, apparatus, facilities, etc. necessary to perform and complete in a workmanship like manner the Work called for in the Contract Documents for the Project noted above, according to the terms of this Contract and the Contract Documents, which documents are incorporated herein by reference, as if set forth herein in full.

C. Enumeration of Contract Documents: The Contract Documents include the Advertisement for Bids, Instructions for Bidders, completed Bid Form, Payment and Performance Bonds, General Conditions, Supplemental Conditions to the General Conditions, other Special Forms, this Public Works Contract, and the following Drawings, Specifications, and Addenda:

Drawings dated: _____ Specifications dated: _____

Addendum No.	Dated:	Addendum No.	Dated:
Addendum No.	Dated:	Addendum No.	Dated:
Addendum No.	Dated:	Addendum No.	Dated:
Addendum No.	Dated:	Addendum No.	Dated:

D. Time for Completion: The Work to be performed under this Contract shall commence as soon as the Contractor has been officially notified to proceed and shall be substantially complete within 160 calendar days of the Notice to Proceed.

E. Liquidated Damages: The Contractor further agrees that, from the compensation otherwise to be paid, the Owner may retain the sum of $250 for each calendar day thereafter that the Work remains uncompleted, which sum is agreed upon as the liquidated damages, and the Parties agree this sum is not to be construed as in any sense a penalty.

F. Apprenticeship Utilization: The Contractor acknowledges that apprenticeship utilization goals should be met, and that the Owner has determined monetary incentives for meeting the goals, and monetary penalties for not meeting the goals. The Contractor further agrees that, from the compensation otherwise to be paid, the Owner may retain the sum of $N/A as a monetary penalty for not meeting the apprenticeship utilization goals. The Contractor further agrees, that in addition to the compensation otherwise to be paid, the Owner will pay by issuance of a Change Order $N/A as an incentive for meeting the apprenticeship utilization goals.

G. Contract Award Amount: Owner hereby agrees to pay the Contractor the Contract Award Amount indicated below, not including State Sales Tax, as consideration for the agreements set forth above, including but not limited to, Contractor's completion of all Work, in strict accord with the Contract Documents, as follows:

Base Bid:
Alternates Awarded:
Alternate Bid No. ___
Alternate Bid No. ___
CONTRACT AWARD AMOUNT:

H. Project Representatives: The parties designated the following persons to administer this Contract and receive notices pursuant to the Contract Documents.

1. The Owner's designated representative is as follows: Wenaha Group, Yue Chen, Project Manager, Wenaha.Y.Chen@sequimschool.org.

2. The Contractor's designated representative is as follows: NAME, TITLE, ADDRESS, EMAIL.

I. Governing Law: This Contract shall be construed and governed by the laws and statutes of the State of Washington.

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IN WITNESS WHEREOF, the Parties hereto have executed this Contract by having their authorized representatives affix their signatures below.

OWNER:	**CONTRACTOR:**
Sequim School District No. 323	**INSERT**
By: _____	By: _____
Signature Date	Signature Date
Name: _____	Name: _____
Title: _____	Title: _____

Washington Contractor's Registration No.: _____

Contractor's Federal Tax ID No.: _____

PART 1 – GENERAL CONDITIONS

1.01 DEFINITIONS

A. "Application for Payment" means a written request submitted by Contractor to the Owner (or A/E, if applicable) for payment of Work completed in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Owner or A/E may require.

B. "Architect," "Engineer," or "A/E" means a person or entity lawfully entitled to practice architecture or engineering, representing Owner within the limits of its delegated authority, if applicable to the Project. Owner may choose not to contract with an A/E for certain projects, in which event all references to the A/E shall be construed to reference the Owner.

C. "Change Order" means a written instrument signed by Owner and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any, and (3) the extent of the adjustment in the Contract Time, if any.

D. "Claim" means Contractor's exclusive remedy for resolving disputes with Owner regarding the terms of a Change Order or a request for equitable adjustment, as more fully set forth in Part 8.

E. "Contract Award Amount" is the sum of the Base Bid and any accepted Alternates.

F. "Contract Documents" means the Advertisement for Bids, Instructions for Bidders, completed Bid Form, General Conditions, Supplemental Conditions, Public Works Contract, other Special Forms, Drawings, and Specifications, and all addenda and modifications thereof.

G. "Contract Sum" is the total amount payable by Owner to Contractor, for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the Work, except Washington State sales tax.

H. "Contract Time" is the number of calendar days allotted in the Contract Documents for achieving Substantial Completion of the Work.

I. "Contractor" means the person or entity who has agreed with Owner to perform the Work in accordance with the Contract Documents.

J. "Day" means a calendar day, unless otherwise specified.

K. "Drawings" are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.

L. "Final Acceptance" means the written acceptance issued to Contractor by Owner after Contractor has completed the requirements of the Contract Documents, as more fully set forth in Section 6.09 B.

M. "Final Completion" means that the Work is fully and finally complete in accordance with the Contract Documents, as more fully set forth in Section 6.09A.

N. "Force Majeure" means those acts entitling Contractor to request an equitable adjustment

in the Contract Time, as more fully set forth in Section 3.05A.

O. "Notice" means a written notice which has been delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended or, if delivered or sent by registered or certified mail, to the last business address known to the party giving notice.

P. "Notice to Proceed" means a notice from Owner to Contractor that defines the date on which the Contract Time begins to run.

Q. "Owner" means the Sequim School District or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.

R. "Person" means a corporation, partnership, business association of any kind, trust, company, or individual.

S. "Prior Occupancy" means Owner's use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.08A.

T. "Progress Schedule" means a schedule of the Work, in a form satisfactory to Owner, as further set forth in Section 3.02.

U. "Project" means the total construction of which the Work performed in accordance with the Contract Documents, which may be the whole or a part and which may include construction by Owner or by separate contractors.

V. "Project Record" means the separate set of Drawings and Specifications as further set forth in Section 4.02A.

W. "Schedule of Values" means a written breakdown allocating the total Contract Sum to each principal category of Work, in such detail as requested by Owner.

X. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, and workmanship for the Work, and performance of related services.

Y. "Subcontract" means a contract entered into by Subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind for or in connection with the Work.

Z. "Subcontractor" means any person, other than Contractor, who agrees to furnish or furnishes any supplies, materials, equipment, or services of any kind in connection with the Work.

AA. "Substantial Completion" means that stage in the progress of the Work when the construction is sufficiently complete, as more fully set forth in Section 6.07.

AB. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

1.02 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents shall be resolved by giving the

documentsprecedence in the following order:

A. Signed Public Works Contract, including any Change Orders.

B. Supplemental Conditions.

C. General Conditions.

D. Specifications.

E. Drawings. In case of conflict within the Drawings, large-scale drawings shall take precedenceover small-scale drawings.

F. Signed and Completed Bid Form.

G. Instructions to Bidders.

H. Advertisement for Bids.

1.03 EXECUTION AND INTENT

Contractor makes the following representations to Owner:

A. Contract Sum reasonable: The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;

B. Contractor familiar with Project: Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality, and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services, and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof;

C. Contractor financially capable: Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor's obligations required by the Contract Documents; and

D. Contractor can complete Work: Contractor is able to furnish the plant, tools, materials, supplies, equipment, and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

PART 2 – INSURANCE AND BONDS

2.01 CONTRACTOR'S LIABILITY INSURANCE

A. Prior to commencement of the Work, the Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Owner that such insurance has been procured. Review of the Contractor's insurance by Owner or the specification or approval of the insurance in this Contract or of its coverage or amount shall not relieve or decrease the liability of the Contractor under the Contract Documents or otherwise. The Contractor shall include in its bid the cost of all insurance and bonds

required to complete the Base Bid Work and accepted alternates.

B. The Contractor shall purchase and maintain in full force and effect the following insurance coverage without interruption from the date of commencement of the Work through the date of Final Acceptance and termination of any coverage required to be maintained after final payment, including, but not limited to, during the performance of any corrective Work required by Section 5.16. Completed Operations coverage shall remain in force for three (3) years after Final Acceptance. All coverages shall be written on an occurrence basis, reasonably acceptable to the Owner, and written for at least the minimum limits specified in this Section 2.01 or required by law, whichever coverage is greater.

1. Commercial General Liability (CGL):

a. The Contractor shall procure an occurrence-based Commercial General Liability (CGL) insurance policy, written on an ISO-based occurrence form or its equivalent. Such insurance shall provide coverage for personal injury, bodily injury, and property damage liability arising from the Contractor's operations in connection with the Work, whether such operations are by the Contractor or Subcontractors and suppliers of any tier; owned, non-owned, and hired vehicles; work the Contractor may subcontract or sublet to others; and the indemnity provisions of this Contract. Without limiting the foregoing, such insurance shall protect the Contractor and additional insureds required by this Section 2.01 from claims set forth below that may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor or the additional insureds may be legally liable, whether such operations are by the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

(1) Claims under workers' compensation (industrial insurance), disability benefit, and other similar employee benefit acts that are applicable to the Work to be performed in the form of Stop Gap Liability Insurance (Employer's Contingent Liability Insurance);

(2) Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

(3) Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

(4) Claims for damages insured by usual personal injury liability coverage;

(5) Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

(6) Claims for bodily injury or property damage arising out of completed operations;

(7) Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 5.22 ("Indemnification"); and

(8) Claims for bodily injury and property damage resulting from mold and fungus.

b. Without limiting the foregoing, this CGL insurance shall be on a comprehensive basis and include all major divisions of coverage, including, but not limited to:

(1) Premises and Operations;

(2) Products and Completed Operations;

(3) Explosion, Collapse, and Underground (XCU);

(4) The Owners and Contractors Protective;

(5) Personal and Advertising Injury, with employment exclusion deleted;

(6) Blanket contractual, including specific provision for Contractor's obligation under the indemnity provisions of this Contract; and

(7) Broad Form Property Damage.

2. Automobile Liability: Such insurance shall provide coverage for all owned, non-owned, and hired automobiles. It shall cover claims for damages because of bodily injury, death of a person, or property damage arising out of ownership, maintenance, or use of a motor vehicle (including loss of use thereof arising out of operation of automobiles), including Comprehensive Automobile Liability, Bodily Injury, and Property Damage Combined Single Limit.

3. Umbrella Policy: For projects with a Contract Sum of $1 million or more, the Contractor shall procedure a true umbrella policy that provides excess limits over the primary layer.

4. Employer's Liability: The Contractor shall provide an employer's liability policy providing coverage for liability to employees for work-related bodily injury or disease, other than liability imposed by workers' compensation law.

5. Workers' Compensation: The Contractor shall provide, and require Subcontractors of any tier to provide, workers' compensation insurance as required by the industrial insurance laws of the State of Washington.

C. The Contractor's insurance obtained under this Section 2.01 will:

1. Name the Owner, the Owner's consultants, as well as their directors, officers, employees, and agents, as additional insureds under CG 2010 and CG 2037 or their equivalent.

2. Include a severability of interest (cross-liability clause) in favor of the Owner for Work performed under this Contract.

3. Be designated and endorsed as primary coverage for both defense and indemnity, and any Owner's policies shall be excess and non-contributory.

4. Provide a waiver of any rights of subrogation against the Owner.

5. Have per-project general aggregate provisions in accordance with the limits set forth in Section 2.01J, which provisions may be modified in the Special Conditions. The insurance shall be endorsed to have the general aggregate apply to this Project only.

6. Without limiting the foregoing, the insurance described above shall include coverage for underground collapse and explosion exposures.

D. Any company writing the insurance to be obtained pursuant to this Section 2.01 shall be authorized to do business in the State of Washington. Insurance carriers providing insurance in accordance with the Contract Documents must be acceptable to Owner and shall possess an A.B. Best's policyholder's rating of "A" or better and a financial rating of no less than "VIII."

E. Losses up to the deductible amount of any insurance under this part shall be the responsibility of the Contractor.

F. The Contract Sum includes an amount to pay the premium for insurance required under the Contract Documents and to name the Owner and others listed in the Contract Documents as additional insureds on all insurance policies required by Section 2.01.

G. There shall be no self-insured retention without the prior written approval of the Owner.

H. If the Owner is damaged by the failure of the Contractor to maintain any of the insurance in this Section 2.01 or to so notify the Owner, the Contractor shall bear all costs attributable thereto. The Owner may withhold payment pending receipt of all certificates of insurance. Failure to withhold payment shall not constitute a waiver.

I. The Contractor shall comply with the Washington State Industrial Insurance Act and, if applicable, the Federal Longshoremen's and Harbor Workers' Act and the Jones Act.

J. Coverage Limits: The minimum coverage limits for Contractor's liability insurance shall be as follows:

1. Commercial General Liability (CGL):

   a. At least $3,000,000 General Aggregate Limit (Other than Products-Completed Operations).

   b. At least $1,000,000 Each Occurrence Limit.

   c. At least $1,000,000 Products-Completed Operations Aggregate Limit.

   d. At least $1,000,000 Personal Injury and Advertising Liability Limit, each occurrence.

2. Automobile Liability: At least $1,000,000 Combined Single Limit for Automobile Bodily Injury and Property Damage Liability, each accident or loss.

3. Umbrella Policy: Where applicable, the umbrella policy will have excess limits over the primary layer in an amount not less than $2,000,000.

4. Employer's Liability: At least $1,000,000 each occurrence limit.

5. Workers' Compensation: The Contractor shall provide workers' compensation insurance in the amounts required by the industrial insurance laws of the State of Washington. For any employees not subject to the Washington State workers' compensation statute, the Contractor shall provide, and cause each Subcontractor to provide workers' compensation insurance with a private company in an amount equivalent to that provided by the workers' compensation statute, but no less than a $1,000,000 limit of liability for the protection of its employees not otherwise protected. Stop Gap Liability Insurance (Employer's Contingent Liability Insurance) shall be at least $1,000,000 Each Occurrence.

K. Proof of Insurance:

1. Prior to commencement of the Work, any presence on the site, or exposure to loss can occur, and in any event within seven (7) Days after the Owner has issued its Notice to Proceed, the Contractor shall furnish the Owner with the following:

   a. Two (2) copies of Certificates of Insurance evidencing all insurance required by the Contract Documents;

   b. A written statement of the actual costs (expressed as a percentage) of the Contractors' liability insurance under 2.01;

   c. Endorsements for additional insureds as listed in Section 2.01C.1;

   d. Two (2) copies of Department of Labor & Industries statements for state workers' compensation coverage.

2. All insurance policies and certificates must be signed copies. Edition dates of endorsements on policies obtained under this Section 2.01 shall be consistent.

3. All policies shall include the premium percentage to be paid by the Contractor for increases in the Contract Sum.

4. The Contractor shall furnish to the Owner copies of any subsequently issued endorsements amending, modifying, altering, or restricting coverage or limits.

5. Policies or certificates obtained under this part shall verify that the policy contains coverage for blanket contractual liability, including both oral and written contracts, and acknowledge the indemnification provisions and liability coverages called for by this Contract.

6. Upon written request, the Contractor shall provide a copy of its policies obtained under this part to the Owner within five (5) business days.

7. All insurance certificates obtained pursuant to this part will:

   a. Name Owner's Project number and Project title.

   b. State the insurance carrier's A.B. Best rating.

   c. Evidence full compliance with the requirements of Section 2.01.

d. Specifically require written notice by certified mail must be provided to the Owner at least forty-five (45) Days before the policies expire, are cancelled, or are reduced; the limits are decreased; or the additional insureds removed, except that thirty (30) Days' notice shall be required for surplus line insurance.

8. Notwithstanding anything herein to the contrary, the Contractor shall provide all bonding, insurance, and permit documentation as required by governmental entities for all portions of the Project.

9. The Contractor shall ensure and require that Subcontractors of any tier have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors of all tiers in the minimum amount of $1,000,000 per occurrence with a $2,000,000 general aggregate limit. Also, the Subcontractors shall name the Contractor and the Owner and cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, as an additional insured for claims caused in whole or in part by the Subcontractor's negligent acts or omissions during the Subcontractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Subcontractor's negligent acts or omissions during the Subcontractor's completed operations.

10. The Owner may withhold payment pending receipt of all certificates of insurance meeting the requirements of Section 2.01K. Failure to withhold payment shall not constitute a waiver of any provision of the Contract.

2.02 PAYMENT AND PERFORMANCE BONDS

A. In accordance with Chapter 39.08 RCW ("Contractor's Bond"), the Contractor will furnish to the Owner bonds, with a surety company admitted and licensed in the State of Washington and acceptable to the Owner, conditioned that the Contractor will: (1) faithfully perform all provisions of this Contract (the "Performance Bond"); and (2) pay all laborers, mechanics, Subcontractors, and materialmen, and all persons who supply such person, persons, or Subcontractors, with provisions and supplies for carrying out the Project and pay the taxes, increases, and penalties incurred on the Project under state law (the "Payment Bond"). Each of the Performance Bond and Payment Bond will be in the full amount of the Contract Sum. Such surety company will possess an A.M. Best rating of "A" or better and a financial rating of no less than "IX."

B. Bond forms must be deemed acceptable and approved by Owner. Owner shall deem acceptable and approve payment and performance bonds that use the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. Separate bonds for payment and performance must be provided to Owner. Provision of payment and performance bonds by Contractor to Owner is a condition precedent to performance by Owner.

C. Prior to execution of a Change Order that, cumulatively with previous Change Orders, increases the Contract Award Amount by ten (10) percent or more, the Contractor shall provide either new payment and performance bonds for the revised Contract Sum, or riders to the existing payment and performance bonds increasing the amount of the bonds. The Contractor shall likewise provide additional bonds or riders when subsequent Change Orders increase the Contract Sum by ten (10) percent or more.

D. No payment or performance bonds are required if the Contract Sum is $150,000 or less and Owner and Contractor agree that Owner may, in lieu of the bond, retain 10 percent of the Contract Sum for the period allowed by RCW 39.08.010.

E. All reinsurers that may be called upon to support or share in a surety's obligations specified in connection with the performance and payment bond obligations required of the Contractor by this Contract must also have an A.M. Best rating of "A" or better and financial rating of not less than "IX."

F. Within seven (7) days of the issuance of Owner's Notice of Intent to Award the Contract, the Contractor will deliver evidence of its bondability to the Owner. Within seven (7) days after its execution of the Contract, the Contractor will deliver copies of the bonds to the Owner.

G. THE OWNER MAY DECLINE TO ENTER INTO THE CONTRACT IF THE REQUESTED EVIDENCE OF BONDABILITY IS NOT RECEIVED. THE CONTRACTOR WILL NOT PROCEED WITH THE WORK UNTIL SUCH SURETY BOND IS RECEIVED. Evidence of bondability shall include the percentage to be paid by the Contractor for increases in the Contract Sum.

H. Upon request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor will promptly furnish a copy of the bond(s) or will authorize a copy to be furnished.

I. Additional Bond Security: The Contractor will promptly furnish additional security required to protect Owner and persons supplying labor or materials required by this Contract if: (1) Owner has a reasonable objection to the surety; or (2) any surety fails to furnish reports on its financial condition if required by Owner.

J. Potential Subcontractors' Payment and Performance Bonds: Within ten (10) days after the issuance of the Notice to Proceed, any Subcontractors so required in the Bidding or Contract Documents or Special Conditions shall deliver evidence of their payment and performance bondability to the Owner through the Contractor. The evidence shall include a letter from the bonding company that includes the price of payment and performance bonds to be issued during the thirty (30) day period after the Notice to Proceed. The surety company must be acceptable to the Owner and admitted and licensed in the State of Washington, with an A.M. Best rating of "A" or better and a financial rating of no less than "VIII." The bonds shall be in an amount equal to the full contract sum of the Subcontract between the Subcontractor and the Contractor but shall not include sales tax. The bonds shall be conditioned that the Subcontractor shall faithfully perform all the provisions of its subcontract, payment of all obligations arising thereunder, and for one year's maintenance for correction of defective work. If the Owner elects to require payment and performance bonds from one or more of the Subcontractors, it will so notify the Contractor in writing within fourteen (14) days of receipt of the evidence of bondability from the respective Subcontractor, in which case the Contract Sum shall be increased by a Change Order in the amount specified in the letter, unless otherwise agreed by the parties. The Owner shall not be responsible for the costs of any Subcontractor bonds it requires until the Owner receives a copy of the bond. THE OWNER MAY DECLINE TO ENTER INTO THE CONTRACT OR MAY REQUIRE A CHANGE OF SUBCONTRACTOR AT NO INCREASE IN THE CONTRACT SUM OR CONTRACT TIME IF THIS EVIDENCE OF BONDABILITY IS NOT RECEIVED. THE OWNER MAY WITHHOLD PAYMENT TO THE CONTRACTOR UNTIL SUCH SURETY BONDS ARE RECEIVED. Upon the request of any person or entity

appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made. The Subcontractors responsible to the Contractor for the work listed in the Instructions to Bidders must comply with this paragraph to the extent directed by the Owner.

K. If the Owner is damaged by the failure of the Contractor to maintain any of the bonds or insurance in this Section 2.02 or elsewhere in the Contract Documents or to so notify the Owner, then the Contractor will bear all costs attributable thereto. The Owner may withhold payment pending receipt of all certificates of insurance and bonds. Failure to withhold payment will not constitute a waiver.

2.03 ALTERNATIVE SURETY

A. When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety as required to protect Owner and persons supplying labor or materials required by the Contract Documents if:

1. Owner has a reasonable objection to the surety; or

2. Any surety fails to furnish reports on its financial condition if required by Owner.

2.04 BUILDER'S RISK

A. Contractor to buy Property Insurance: Contractor shall purchase and maintain property insurancein the amount of the Contract Sum, including all Change Orders for the Work, on a replacement-cost basis until Substantial Completion. For projects not involving New Building Construction, "Installation Floater" is an acceptable substitute for the Builder's Risk Insurance. The insurance shall cover the interest of Owner, Contractor, and any Subcontractors, as their interests may appear.

B. Losses covered: Contractor property insurance shall be placed on an "all risk" basis and insure against the perils of fire and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, temporary buildings, and debris removal (including demolition occasioned by enforcement of any applicable legal requirements), and shall cover reasonable compensation for A/E's services and expenses required as a result of an insured loss.

C. Waiver of subrogation rights: Owner and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/E's subconsultants, separate contractors described herein, if any, and any of their subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this section or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Owner as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

PART 3 – TIME AND SCHEDULE

3.01 PROGRESS AND COMPLETION

Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within a reasonable period thereafter.

3.02 CONSTRUCTION SCHEDULE

A. Preliminary Progress Schedule: Contractor shall, within 14 Days after issuance of the Notice to Proceed, submit a preliminary Progress Schedule. The Progress Schedule shall show the sequence in which Contractor proposes to perform the Work and the dates on which Contractor plans to start and finish major portions of the Work, including dates for Shop Drawings and other submittals, and for acquiring materials and equipment.

B. Form of Progress Schedule: The Progress Schedule shall be in the form of a bar chart, or a critical path method analysis, as specified by Owner. The preliminary Progress Schedule may be general, showing the major portions of the Work, with a more detailed Progress Schedule submitted as directed by Owner.

C. Owner comments on Progress Schedule: Owner shall return comments on the preliminary Progress Schedule to Contractor within 14 Days of receipt. Review by Owner of Contractor's schedule does not constitute an approval or acceptance of Contractor's construction means, methods, or sequencing, or its ability to complete the Work within the Contract Time. Contractor shall revise and resubmit its schedule, as necessary. Owner may withhold a portion of progress payments until a Progress Schedule has been submitted which meets the requirements of this section.

D. Monthly updates and compliance with Progress Schedule: Contractor shall utilize and comply with the Progress Schedule. On a monthly basis, or as otherwise directed by Owner, Contractor shall submit an updated Progress Schedule at its own expense to Owner indicating actual progress. If, in the opinion of Owner, Contractor is not in conformance with the Progress Schedule for reasons other than acts of Force Majeure as identified in Section 3.05, Contractor shall take such steps as are necessary to bring the actual completion dates of its work activities into conformance with the Progress Schedule, and if directed by Owner, Contractor shall submit a corrective action plan or revise the Progress Schedule to reconcile with the actual progress of the Work.

E. Contractor to notify Owner of delays: Contractor shall promptly notify Owner in writing of any actual or anticipated event which is delaying or could delay achievement of any milestone or performance of any critical path activity of the Work. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.03 OWNER'S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE

A. Owner may suspend Work: Owner may, at its sole discretion, order Contractor, in writing, to suspend all or any part of the Work for up to 90 Days, or for such longer period as mutually agreed.

B. Compliance with suspension; Owner's options: Upon receipt of a written notice suspending the Work, Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of cost of performance directly attributable to such suspension. Within a period up to 90 Days after the notice is delivered to Contractor,

or within any extension of that period to which the parties shall have agreed, Owner shall either:

1. Cancel the written notice suspending the Work; or

2. Terminate the Work covered by the notice as provided in the termination provisions ofPart 9.

C. Resumption of Work: If a written notice suspending the Work is cancelled or the period of the notice or any extension thereof expires, Contractor shall resume Work.

D. Equitable adjustment for suspensions: Contractor shall be entitled to an equitable adjustment in the Contract Time, or Contract Sum, or both, for increases in the time or cost of performance directly attributable to such suspension, provided Contractor complies with all requirements set forth in Part 7.

3.04 OWNER'S RIGHT TO STOP THE WORK FOR CAUSE

A. Owner may stop Work for Contractor's failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Owner may order Contractor, in writing, to stop the Work, or any portion thereof, until satisfactory corrective action has been taken.

B. No equitable adjustment for Contractor's failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor's failure or refusal to perform or from any reasonable remedial action taken by Owner based upon such failure.

3.05 DELAY

A. Force Majeure actions not a default; Force Majeure defined: Any delay in or failure of performance by Owner or Contractor, other than the payment of money, shall not constitute a default hereunder if and to the extent the cause for such delay or failure of performance was unforeseeable and beyond the control of the party ("Force Majeure"). Acts of Force Majeure include, but are not limited to:

1. Acts of God or the public enemy;

2. Acts or omissions of any government entity;

3. Fire or other casualty for which Contractor is not responsible;

4. Quarantine or epidemic;

5. Strike or defensive lockout;

6. Unusually severe weather conditions which could not have been reasonably anticipated;and

7. Unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Owner was available. The pandemic of the disease COVID-19 and the consequences thereof do not constitute a Force Majeure Event.

B. Contract Time adjustment for Force Majeure: Contractor shall be entitled to an equitable

adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it makes a request for equitable adjustment according to Section 7.03. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.

C. Contract Time or Contract Sum adjustment if Owner at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in Contract Sum, if the cost or time of Contractor's performance is changed due to the fault or negligence of Owner, provided the Contractor makes a request according to Sections 7.02 and 7.03.

D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, provided it makes a request for equitable adjustment according to Section 7.03, but shall not be entitled to an adjustment in Contract Sum.

F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise.

3.06 NOTICE TO OWNER OF LABOR DISPUTES

A. Contractor to notify Owner of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Owner.

B. Pass through notification provisions to Subcontractors: Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages

1. Reason for Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.

2. Calculation of Liquidated Damages amount: The liquidated damage amounts set

forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from periodic payments to the Contractor.

3. Contractor responsible even if Liquidated Damages assessed: Assessment of liquidated damages shall not release Contractor from any further obligations or liabilities pursuant to the Contract Documents.

B. Actual Damages

Calculation of Actual Damages: Actual damages will be assessed for failure to achieve Final Completion within the time provided. Actual damages will be calculated on the basis of direct architectural, administrative, and other related costs attributable to the Project from the date when Final Completion should have been achieved, based on the date Substantial Completion is actually achieved, to the date Final Completion is actually achieved. Owner may offset these costs against any payment due Contractor.

C. Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes, without limitation:

1. Damages incurred by Owner for rental expenses, for income, profit, financing, business, and reputation, and for loss of management or employee productivity or of the services of such persons; and

2. Damages incurred by the Contractor for principal and home office overhead and expenses including, without limitation, the compensation of personnel stationed there, for losses of financing, business and reputation, for losses on other projects, for interest or financing costs, and for loss of profit, except as explicitly allowed under the Contract Documents.

PART 4 – SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW

A. Specifications and Drawings are basis of the Work: The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.

B. Parts of the Contract Documents are complementary: The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study

and compare the Contract Documents with each other and with information furnished by Owner. If, during the performance of the Work, Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to the Owner (and A/E, if applicable) in writing.

D. Contractor knowledge of discrepancy in documents – responsibility: Contractor shall do no Work without applicable Drawings, Specifications, or written modifications, or Shop Drawings where required, unless instructed to do so in writing by Owner. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.

E. Contractor to perform Work implied by Contract Documents: Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.

F. Interpretation questions: Questions regarding interpretation of the requirements of the Contract Documents shall be referred to the Owner (and A/E, if applicable).

4.02 PROJECT RECORD

A. Contractor to maintain Project Record Drawings and Specifications: Contractor shall legibly mark in ink on a separate set of the Drawings and Specifications all actual construction, including depths of foundations, horizontal and vertical locations of internal and underground utilities, and appurtenances referenced to permanent visible and accessible surface improvements, field changes of dimensions and details, actual suppliers, manufacturers and trade names, models of installed equipment, and Change Order Proposals (COP). This separate set of Drawings and Specifications shall be the "Project Record."

B. Update Project Record weekly and keep on site: The Project Record shall be maintained on the project site throughout the construction and shall be clearly labeled "PROJECT RECORD." The Project Record shall be updated at least weekly noting all changes and shall be available to Owner at all times.

C. Final Project Record before Final Acceptance: Contractor shall submit the completed and finalized Project Record to the Owner (and A/E, if applicable) prior to Final Acceptance.

4.03 SHOP DRAWINGS

A. Definition of Shop Drawings: "Shop Drawings" means documents and other information required to be submitted to the Owner (or A/E, if applicable) by Contractor pursuant to the Contract Documents, showing in detail: the proposed fabrication and assembly of structural elements; and the installation (i.e., form, fit, and attachment details) of materials and equipment. Shop Drawings include, but are not limited to, drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed,

Contractor shall submit all samples at its own expense. Owner may duplicate, use, and disclose Shop Drawings provided in accordance with the Contract Documents.

B. Approval of Shop Drawings: Contractor shall coordinate all Shop Drawings, and review them for accuracy, completeness, and compliance with the Contract Documents and shall indicate its approval thereon as evidence of such coordination and review. Where required by law, Shop Drawings shall be stamped by an appropriate professional licensed by the state of Washington. Shop Drawings submitted to the Owner (or A/E, if applicable) without evidence of Contractor's approval shall be returned for resubmission. Contractor shall review, approve, and submit Shop Drawings with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or separate contractors. Contractor's submittal schedule shall allow a reasonable time for the Owner (or A/E, if applicable) to review. The Owner (or A/E, if applicable) will review, approve, or take other appropriate action on the Shop Drawings. Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed and the A/E, if applicable, or Owner has approved or taken other appropriate action. The A/E and/or Owner, as applicable, shall respond to Shop Drawing submittals with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed Shop Drawings. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.

C. Contractor not relieved of responsibility when Shop Drawings approved: Approval, or other appropriate action with regard to Shop Drawings, by Owner or A/E shall not relieve Contractor of responsibility for any errors or omissions in such Shop Drawings, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Owner or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor's means or methods of construction. If Contractor fails to obtain approval before installation and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.

D. Variations between Shop Drawings and Contract Documents: If Shop Drawings show variations from the requirements of the Contract Documents, Contractor shall describe such variations in writing, separate from the Shop Drawings, at the time it submits the Shop Drawings containing such variations. If the Owner (or A/E, if applicable) approves any such variation, an appropriate Change Order will be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be recorded upon the Project Record.

E. Contractor to submit copies of Shop Drawings: Contractor shall submit to A/E and Owner for approval five (5) copies of all Shop Drawings. Unless otherwise indicated, three (3) sets of all Shop Drawings shall be retained by A/E, if applicable, or the Owner and two (2) sets shall be returned to Contractor.

4.04 ORGANIZATION OF SPECIFICATIONS

Specification organization by trade: Specifications may be prepared in sections which conform generally with trade practices. These sections are for Owner and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS

A. A/E, not Contractor, owns Copyright of Drawings and Specifications: The Drawings, Specifications, and other documents prepared by A/E, if any, are instruments of A/E's service through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, if any, and A/E shall be deemed the author of them and will, along with any rights of Owner, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor's set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.

B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, if any, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner (and A/E, if applicable). Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E, if any, appropriate to and for use in the execution of their Work.

C. Shop Drawing license granted to Owner: Contractor and all Subcontractors grant a non-exclusive license to Owner, without additional cost or royalty, to use for its own purposes (including reproduction) all Shop Drawings, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing Shop Drawings, Contractor and all Subcontractors warrant that they have authority to grant to Owner a license to use the Shop Drawings, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Owner pursuant to the indemnity provisions in Section 5.03 and 5.22 from any violations of copyright or other intellectual property rights arising out of Owner's use of the Shop Drawings hereunder, or to secure for Owner, at Contractor's own cost, licenses in conformity with this section.

D. Shop Drawings to be used only for this Project: The Shop Drawings and other submittals prepared by Contractor, Subcontractors of any tier, or its or their equipment or material suppliers, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor of any tier, or material or equipment supplier, on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner. The Contractor, Subcontractors of any tier, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Shop Drawings and other submittals appropriate to and for use in the execution of their Work under the Contract Documents.

PART 5 – PERFORMANCE

5.01 CONTRACTOR CONTROL AND SUPERVISION

A. Contractor responsible for means and methods of construction: Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the Work in a skillful manner. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for

coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner.

B. Compliance with laws: The Contractor shall abide by the provisions of all applicable Washington statutes and regulations and all those provisions of the county and city municipal codes that apply in the jurisdiction where the Project is located. Although a number of statutes are referenced in the Contract Documents, these references are not meant to be a complete list and should not be relied upon as such.

C. WSSP compliance: The Parties acknowledge and agree that to the extent this Project receives Washington State funds for school construction, design and construction of the Project must meet at least the Washington Sustainable Schools Protocol (WSSP) requirements in accordance with Chapter 39.35D RCW. The Contractor will provide all services, including, but not limited to, labor and materials, required to construct the Project such that it fully meets all WSSP requirements in effect at the time the Project, or any portion thereof, is completed. The Contractor will fully participate in any and all activities required by state law or regulations or the WSSP to achieve WSSP compliance and approval, including, but not limited to, providing all applications, documentation, and reports (annual or otherwise) requested by Owner or mandated by the WSSP. The Contractor will manage environmental issues and implement and document the Project's WSSP requirements, including but not limited to: monitoring the submittal process to ensure WSSP compliance, training Subcontractors in WSSP requirements, reviewing design changes during construction for WSSP impacts and informing the Owner of said impacts, ensuring installed products are WSSP compliant, and assembling, maintaining, and submitting all records to document WSSP compliance, including but not limited to annual reports.

D. Competent superintendent required: Performance of the Work shall be directly supervised by a competent superintendent who has authority to act for Contractor. The superintendent must be satisfactory to the Owner and shall not be changed without the prior written consent of Owner. Owner may require Contractor to remove the superintendent from the Work or Project site, if Owner reasonably deems the superintendent incompetent, careless, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition.

E. Contractor responsible for acts and omissions of self and agents: Contractor shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.

F. Unemployment Compensation: Pursuant to Chapter 50.24 RCW ("Contributions by Employers") in general and RCW 50.24.130 in particular, the Contractor shall pay contributions for wages for personal services performed under this Contract or arrange for a bond acceptable to the Commissioner of the ESD.

G. Contractor to employ competent and disciplined workforce: Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Work, including observance of badging, drug testing, and all smoking, tobacco, drug, alcohol, parking, safety, weapons, background checks, sexual harassment, and other rules governing the conduct of personnel at Owner's property and at the Project site.

1. Copies of the Owner's policies and procedures applicable to the Project are available at https://www.sequimschools.org/School_Board/policies-_procedures.

2. Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

3. No employees of either Contractor or any of its Subcontractors of any tier shall harass, intimidate, have physical contact with, or engage in other verbal or physical conduct or communication of a sexual, intimidating, or harassing nature with students, parents, volunteers, or Owner's directors, officers, or employees, nor create an intimidating, hostile, or offensive environment.

4. Without limiting the foregoing, Contractor shall remove from the Work and Project site any employee, agent, or other person who has violated Owner's policies and/or procedures or otherwise engaged in actions that Owner reasonably considers objectionable without change in the Contract Sum or Contract Time.

5. Contractor shall also ensure by appropriate provisions in each subcontract agreement that Contractor may remove from the Work and Work site any Subcontractor or Subcontractor's employee who has violated District policies/procedures or engaged in such action without change in the Contract Sum or Contract Time.

G. Drug-Free Workplace: The Contractor and all Subcontractors of any tier shall fully comply with all applicable federal, state, and local laws and regulations regarding maintaining a drug-free workplace, including the Drug-Free Workplace Act of 1988. Any person not fit for duty for any reason, including the use of alcohol, controlled substances, or drugs, shall immediately be removed from the Work.

H. Tobacco-Free Environment: Pursuant to RCW 28A.210.310, smoking or use of any kind of lighted pipe, cigar, cigarette, vaping device, or any other lighted smoking equipment, tobacco material, or smokeless tobacco product is prohibited on all District property.

I. Weapons-Free Environment: The Contractor and its employees, agents, and Subcontractors of any tier shall not bring onto the Project site or onto any Owner property any firearm or any other type of weapon described in either RCW 9.41.280(1) or RCW 9.41.250. Any person violating this Section shall immediately be removed from the Work, and such a violation shall be grounds for termination of this Contract for cause at the Owner's discretion.

J. Background checks: All employees of Contractor and Subcontractors of any tier who may have unsupervised access to students shall undergo a record check through the Washington State Patrol criminal investigation system under RCW 43.43.830-.834, RCW 10.97.030, and RCW 10.97.050, and through the Federal Bureau of Investigation, before working at the Project site. The record check will include a fingerprint check using a complete Washington State criminal identification fingerprint card. Contractor will provide the results of the record check to the subject of the records and to Owner. Contractor will pay all costs of the requirements set forth in this provision. When necessary, applicants may be employed on a conditional basis pending completion of the background check. In addition, any agreements between the Contractor and Subcontractors of any tier who will perform services for Owner will include this provision requiring the Subcontractor to comply with RCW 28A.400.303.

K. Crimes Against Children: The Contractor will prohibit any employee of the Contractor from working at the Project site who has pleaded guilty to or been convicted of any crime enumerated in RCW 28A.400.322, as now or hereafter amended. Any failure to comply

with this Section 5.01K will be grounds for the Owner to immediately terminate the Contract. In addition, any agreements between the Contractor and Subcontractors of any tier who will perform services for the Owner will include this provision requiring the Subcontractor to prohibit any employee of said Subcontractor from working at a public school or the Project site who has pleaded guilty to or been convicted of any crime enumerated in RCW 28A.400.322.

L. Contractor to keep Project documents on site: Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed Shop Drawings, and permits and permit drawings.

M. Work during off hours: When work is to be performed during other than normal working hours or on Sequim School District holidays, Contractor shall give Owner prior notice. Any construction activity between the hours of 10:00 p.m. to 6:00 a.m. is subject to approval of Owner.

N. Without limiting Section 9.01, failure to comply with these requirements in Section 5.01 is grounds for immediate termination of the Contract for cause.

5.02 PERMITS, FEES, AND NOTICES

A. Contractor to obtain and pay for permits: Unless otherwise provided in the Contract Documents, Contractor shall pay for and obtain all permits, licenses, and inspections necessary for proper execution and completion of the Work. Prior to Final Acceptance, the approved, signed permits shall be delivered to Owner.

B. Allowances for permit fees: If allowances for permits or utility fees are called for in the Contract Documents and set forth in Contractor's bid, and the actual costs of those permits or fees differ from the allowances in the Contract Documents, the difference shall be adjusted by Change Order.

C. Contractor to comply with all applicable laws: Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

5.03 PATENTS AND ROYALTIES

Payment, indemnification, and notice: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Owner harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it shall promptly notify Owner of such potential infringement.

5.04 PREVAILING WAGES

A. Contractor to Pay Prevailing Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with Chapter 39.12 RCW and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and

Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate.

B. Statement of Intent to Pay Prevailing Wages: Before payment is made by the Owner to the Contractor for any work performed by the Contractor and Subcontractors whose work is included in the application for payment, the Contractor shall submit, or shall have previously submitted to the Owner for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the Department of Labor and Industries, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.

C. Affidavit of Wages Paid: Prior to release of retainage, the Contractor shall submit to the Owner an Affidavit of Wages Paid, approved by the Department of Labor and Industries, for the Contractor and every Subcontractor, of any tier, that performed work on the Project.

D. Disputes: Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of the Department of Labor and Industries. The arbitration decision shall be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.

E. Statement with Pay Application; Post Statements of Intent at Jobsite: Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the pre-filed statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

F. Contractor to Pay for Statements of Intent and Affidavits: In compliance with Chapter 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.

G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any Subcontractor shallsubmit a certified copy of payroll records if requested.

5.05 HOURS OF LABOR

A. Overtime: Contractor shall comply with all applicable provisions of Chapter 49.28 RCW, which are incorporated herein by reference. Pursuant to that statute, no laborer, worker, or mechanic employed by Contractor, any Subcontractor, or any other person performing or contracting to do the whole or any part of the Work, shall be permitted or required to work more than eight (8) hours in any one calendar day, provided, that in cases of extraordinary emergency, such as danger to life or property, the hours of work may be extended, but in such cases the rate of pay for time employed in excess of eight (8) hours of each calendar day shall be not less than one and one-half (1.5) times the rate allowed for this same amount of time during eight (8) hours of service.

B. 4-10 Agreements: Notwithstanding the preceding paragraph, Chapter 49.28 RCW permits the Contractor or a Subcontractor subject to those provisions to enter into an agreement with its employees in which the employees work up to ten (10) hours in a calendar day. No such agreement may provide that the employees work ten (10) hour days for more than four (4) calendar days a week. Any such agreement is subject to approval by the employees. The overtime provisions of Chapter 49.28 RCW shall not apply to the hours,

up to forty (40) hours per week, worked pursuant to any such agreement.

5.06 NONDISCRIMINATION

A. Discrimination prohibited by applicable laws: Discrimination in all phases of employment is prohibited by, among other laws and regulations, Title VII of the Civil Rights Act of 1964, the Vietnam Era Veterans Readjustment Act of 1974, Sections 503 and 504 of the Vocational Rehabilitation Act of 1973, the Equal Employment Act of 1972, the Age Discrimination Act of 1967, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, Presidential Executive Order 11246, Executive Order 11375, the Washington State Law Against Discrimination, RCW 49.60, and Gubernatorial Executive Order 85-09. These laws and regulations establish minimum requirements for affirmative action and fair employment practices which Contractor must meet.

B. During performance of the Work:

1. Protected Classes: Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, ordisabled veteran status, nor commit any other unfair practices as defined in Chapter 49.60 RCW.

2. Advertisements to state nondiscrimination: Contractor shall, in all solicitations or advertisements for employees placed by or for it, state that all qualified applicants will be considered for employment, without regard to race, creed, color, national origin, sex, age,marital status, or the presence of any physical, sensory, or mental disability.

3. Contractor to notify unions and others of nondiscrimination: Contractor shall send to each labor union, employment agency, or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice advising the labor union, employment agency, or workers' representative of Contractor's obligations according to the Contract Documents and Chapter 49.60 RCW.

4. Owner and State access to Contractor records: Contractor shall permit access to its books, records, and accounts, and to its premises by Owner, and by the Washington State Human Rights Commission, for the purpose of investigation to ascertain compliance with this section of the Contract Documents.

5. Passthrough provisions to Subcontractors: Contractor shall include the provisions of thissection in every Subcontract.

C. Provisions for Aged and Handicapped Persons: The Contractor shall comply with applicable statutory provisions relating to public works of Chapter 70.92 RCW ("Provisions in Buildings for Aged and Handicapped Persons") and the federal Americans with Disabilities Act (ADA) and federal implementing regulations.

5.07 SAFETY PRECAUTIONS

A. Contractor responsible for safety: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work. The Contractor shall comply with pertinent provisions of Chapter 49.17 RCW ("Washington Industrial Safety and Health Act") and Chapter 296-155 WAC ("Safety

Standards for Construction Work").

B. Contractor safety responsibilities: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

C. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.

D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information. At a minimum, Contractor shall inform persons working on the Project site of:

   a. WAC: The requirements of Chapter 296-62 WAC, General Occupational Health Standards;

   b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and

   c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by Chapter 296-62 WAC.

2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:

   a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

   b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area;

   c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment

to be used; and

d. Hazard communications program: The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanationof the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

E. Hazardous, toxic, or harmful substances: Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:

1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state, or local law, regulation, statute or ordinance (hereinafter collectively referred to as "hazardous substances"), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 Days on the Project site.

2. Contractor notifications of spills, failures, inspections, and fines: Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

F. Public safety and traffic: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor's responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

G. Contractor to act in an emergency: In an emergency affecting the safety of life, the Work, or adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened lossor injury, and Contractor shall so act if so authorized or instructed.

H. No duty of safety by Owner or A/E: Nothing provided in this section shall be construed as imposing any duty upon Owner (or A/E if applicable) with regard to, or as constituting any express or implied assumption of control or responsibility over, Project site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

I. In order to receive a Notice to Proceed, the Contractor must submit the following to Owner:

1. A copy of its company Safety Program. The Safety Program shall contain, at a minimum, the following:

a. Organization, including names of individuals who will perform safety duties, titles, work assignments, authority and reporting relationships.

b. Training Program. Who, how and when training is provided; method of

employee training concerning safety rules and procedures; training in use of protective equipment.

c. Protective Equipment. List of personal protective equipment to be provided to employees.

d. Accident Prevention and Loss Control Plan. Work site inspection and hazard correction procedures; disciplinary procedures for safety infractions; accident response, investigation and reporting procedures.

e. Regular Safety Meetings. On-site weekly or other frequency as appropriate, safety meetings mandatory for all employees.

J. Prior to commencing any Work onsite, Contractor shall submit an appropriate site specific safety plan for Owner's acceptance. The plan must be tailored to the needs of the particular project and to the types of hazards involved, and be in compliance with WISHA requirements. Contractor shall not begin any on-site Work until the site-specific safety plan has been accepted by Owner.

K. COVID-19 Safety Compliance: Contractor shall comply with Owner's COVID-19 safety and mitigation protocols, as they may be revised from time to time and ensure that its owner(s) and employees, and those of its Subcontractors, comply with such mitigation protocols. Contractor shall also comply with and ensure its owner(s) and employees, and those of its Subcontractors, comply with Proclamation 21-14.1 *et seq*.

5.08 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

A. Limited storage areas: Contractor shall confine all operations, including storage of materials, to Owner-approved areas.

B. Temporary buildings and utilities at Contractor expense: Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Owner and without expense to Owner. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.

C. Roads and vehicle loads: Contractor shall use only established roadways or temporary roadways authorized by Owner. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation.

D. Ownership and reporting by Contractor of demolished materials: Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Owner with a copy of all manifests and receipts evidencing proper disposal when required by Owner or applicable law.

E. Contractor responsible for care of materials and equipment on-site: Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to approval of Owner. When Contractor uses any portion of the Project site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

F. Contractor responsible for loss of materials and equipment: Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Substantial Completion, and shall repair or replace without cost to Owner any damage or loss that may occur, except damages or loss caused by the acts or omissions of Owner. Contractor shall also protect and be responsible for any damage or loss to the Work, or to the materials or equipment, after the date of Substantial Completion, and shall repair or replace without cost to Owner any such damage or loss that might occur, to the extent such damages or loss are caused by the acts or omissions of Contractor, or any Subcontractor.

5.09 PRIOR NOTICE OF EXCAVATION

A. Excavation defined; Use of locator services: "Excavation" means an operation in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means, except the tilling of soil less than 12 inches in depth for agricultural purposes, or road ditch maintenance that does not change the original road grade or ditch flow line. Before commencing any excavation, Contractor shall provide notice of the scheduled commencement of excavation to all owners of underground facilities or utilities, through locator services.

5.10 UNFORESEEN PHYSICAL CONDITIONS

A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than seven (7) Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.

B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 7.

C. Mold: If Contractor encounters mold in the course of its work, it shall notify Owner to evaluate what action might be necessary. Contractor shall ensure that all building materials used during the work are dry prior to incorporation into the Work. If Contractor encounters water intrusion from any source it shall take immediate steps to ensure that any effected material is dry according to generally accepted industry standards

5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES AND IMPROVEMENTS

A. Contractor to protect and repair property: Contractor shall protect from damage all existing structures, equipment, improvements, utilities, and vegetation: at or near the Project site; and on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor.

B. Tree and vegetation protection: Contractor shall only remove trees when specifically authorized to do so, and shall protect vegetation that will remain in place.

5.12 LAYOUT OF WORK

A. Advanced planning of the Work: Contractor shall plan and lay out the Work in advance ofoperations so as to coordinate all work without delay or revision.

B. Layout responsibilities: Contractor shall lay out the Work from any Owner-established baselines and benchmarks indicated on the Drawings, and shall be responsible for all field measurements in connection with the layout. Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the Work. Contractor shall be responsible for executing the Work to the lines and grades that may be established. Contractor shall be responsible for maintaining or restoring all stakes and other marks established.

5.13 MATERIAL AND EQUIPMENT

A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by tradename, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Owner (or A/E if applicable), is equal to that named in the specifications, unless otherwise specifically provided in the Contract Documents. Contractor shall ensure that all equipment, materials, and articles incorporated into the Work shall be free of asbestos.

B. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonably implied by, the Contract Documents. Contractor shall not endanger any work by cutting, excavating, or otherwise altering the Work and shall not cut or alter the work of any other contractor unless approved in advance by Owner.

C. Owner may reject defective Work: Should any of the Work be found defective, or in any way not in accordance with the Contract Documents, this work, in whatever stage of completion, may be rejected by Owner.

5.14 AVAILABILITY AND USE OF UTILITY SERVICES

A. Owner to provide and charge for utilities: Owner shall make all reasonable utilities available to Contractor from existing outlets and supplies, as specified in the Contract Documents. Unless otherwise provided in the Contract Documents, the utility service consumed shall be charged to or paid for by Contractor at prevailing rates charged to Owner or, where the utility is produced by Owner, at reasonable rates determined by Owner. Contractor will carefully conserve any utilities furnished.

B. Contractor to install temporary connections and meters: Contractor shall, at its expense and in a skillful manner satisfactory to Owner, install and maintain all necessary temporary connections and distribution lines, together with appropriate protective devices, and all meters required to measure the amount of each utility used for the purpose of determining charges. Prior to the date of Final Acceptance, Contractor shall remove all temporary

connections, distribution lines, meters, and associated equipment and materials.

5.15 TESTS AND INSPECTIONS

A. Contractor to provide for all testing and inspection of Work: Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. Contractor shall give Owner timely notice of when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Owner.

B. Owner may conduct tests and inspections: Owner may, at any reasonable time, conduct such inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Owner shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Owner, such Owner inspection and tests are for the sole benefit of Owner and do not:

1. Constitute or imply acceptance;
2. Relieve Contractor of responsibility for providing adequate quality control measures;
3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;
4. Relieve Contractor of its responsibility to comply with the requirements of the ContractDocuments; or
5. Impair Owner's right to reject defective or nonconforming items, or to avail itself of anyother remedy to which it may be entitled.

C. Inspections or inspectors do not modify Contract Documents: Neither observations by an inspector retained by Owner, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

D. Contractor responsibilities on inspections: Contractor shall promptly furnish, without additional charge, all facilities, labor, material, and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Owner. Owner may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. Owner shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.16 CORRECTION OF NONCONFORMING WORK

A. Work covered by Contractor without inspection: If a portion of the Work is covered contrary to the requirements in the Contract Documents, it must, if required in writing by Owner, be uncovered for Owner's observation and be replaced at the Contractor's

expense and without change in the Contract Time.

B. Payment provisions for uncovering covered Work: If, at any time prior to Final Completion, Owner desires to examine the Work, or any portion of it, which has been covered, Owner may request to see such Work and it shall be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and, if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes such a request as provided in Part 7. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.

C. Contractor to correct and pay for non-conforming Work: Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor shall bear all costs of correcting such nonconforming Work, includingadditional testing and inspections.

D. Contractor's compliance with warranty provisions: If, within one (1) year after the date of Substantial Completion of the Work or designated portion thereof, or within one year after the date for commencement of any system warranties established under Section 6.08, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found by the Owner to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written notice from Owner to do so. Owner shall give such notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor's duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or replacement. Obligations under this paragraph shall survive Final Acceptance.

E. Contractor to remove non-conforming Work: Contractor shall remove from the Project site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Owner.

F. Owner may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

G. Contractor to pay for damaged Work during correction: Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

H. No Period of limitation on other requirements: Nothing contained in this section shall be construed to establish a period of limitation with respect to other obligations which Contractor might have according to the Contract Documents. Establishment of the time period of one year as described in Section 5.16D relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced.

I. Owner may accept non-conforming Work and charge Contractor: If Owner prefers to

accept Work which is not in accordance with the requirements of the Contract Documents, Owner may do so instead of requiring its removal and correction, in which case the Contract Sum may be reduced as appropriate and equitable.

5.17 CLEAN UP

Contractor to keep site clean and leave it clean: Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Contractor.

5.18 ACCESS TO WORK

Owner and A/E access to Work site: Contractor shall provide Owner (and A/E if applicable) access to the Work in progress wherever located.

5.19 OTHER CONTRACTS

Owner may award other contracts; Contractor to cooperate: Owner may undertake or award other contracts for additional work at or near the Project site. Contractor shall reasonably cooperate with the other contractors and with Owner's employees and shall carefully adapt scheduling and perform the Work in accordance with these Contract Documents to reasonably accommodate the other work.

5.20 SUBCONTRACTORS AND SUPPLIERS

A. Subcontractor Responsibility: The Contractor shall include the language of this paragraph in each of its first-tier subcontracts and shall require each of its Subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the Subcontractor meets the subcontractor responsibility criteria below. The requirements of this paragraph apply to all Subcontractors regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first-tier Subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a contractor in compliance with Chapter 18.27 RCW, which must have been in effect at the time of Subcontract bid submittal;

2. Have a current Washington Unified Business Identifier (UBI) number;

3. If applicable, have:

   a. Industrial Insurance (workers' compensation) coverage for the Subcontractor's employees working in Washington, as required in Title 51 RCW;

   b. A Washington Employment Security Department number, as required in Title 50 RCW;

   c. A Washington Department of Revenue state excise tax registration

number, asrequired in Title 82 RCW;

d. An electrical contractor license, if required by Chapter 19.28 RCW;

e. An elevator contractor license, if required by Chapter 70.87 RCW.

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or RCW 39.12.065(3).

5. On a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under Chapter 49.04 RCW for the one-year period immediately preceding the date of the Owner's first advertisement of the project.

B. Provide names of Subcontractors and use qualified firms: Before submitting the first Application for Payment, Contractor shall furnish in writing to Owner the names, addresses, and telephone numbers of all Subcontractors, as well as suppliers providing materials in excess of $2,500. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified and meet the requirements of the Contract Documents, if any. Contractor shall not utilize anySubcontractor or supplier to whom the Owner has a reasonable objection, and shall obtain Owner's written consent before making any substitutions or additions.

C. Subcontracts in writing and passthrough provision: All Subcontracts must be in writing. By appropriate written agreement, Contractor shall require each Subcontractor, so far as applicable to the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with Sub-Subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.

D. Coordination of Subcontractors; Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

E. Automatic assignment of subcontracts: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Owner provided that:

1. Effective only after termination and Owner approval: The assignment is effective only after termination by Owner for cause pursuant to Section 9.01 and only for those Subcontracts which Owner accepts by notifying the Subcontractor in writing; and

2. Owner assumes Contractor's responsibilities: After the assignment is effective,

Owner will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract.

3. Impact of bond: The assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

5.21 WARRANTY OF CONSTRUCTION

A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.

B. Contractor responsibilities: With respect to all warranties, express or implied, for Work performedor materials furnished according to the Contract Documents, Contractor shall:

1. Obtain warranties: Obtain all warranties that would be given in normal commercial practice;

2. Warranties for benefit of Owner: Require all warranties to be executed, in writing, for the benefit of Owner;

3. Enforcement of warranties: Enforce all warranties for the benefit of Owner, if directed by Owner; and

4. Contractor responsibility for subcontractor warranties: Be responsible to enforce any subcontractor's, manufacturer's, or supplier's warranties should they extend beyond the period specified in the Contract Documents.

C. Warranties beyond Final Acceptance: The obligations under this section shall survive Final Acceptance.

5.22 INDEMNIFICATION

A. To the fullest extent permitted by law and subject to the conditions of this Section 5.22, the Contractor shall defend, indemnify, and hold harmless the Owner, its directors, officers, employees, consultants, project manager, students, and volunteers, the A/E, the A/E's consultants, agents and employees of any of them, and the successors and assigns of any of them ("Indemnified Parties") from and against all claims, damages, losses, and expenses, direct and indirect, or consequential, including but not limited to costs, design professional and consultant fees, and attorneys' fees incurred on such claims and in proving the right to indemnification ("Claims"), arising out of or resulting from performance of the Work, provided that such Claim is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor of any tier, their agents, or anyone directly or indirectly employed by them, or anyone for whose acts they may be liable ("Indemnitor"), regardless of whether or not such Claim is caused in part by a party indemnified hereunder.

1. The Contractor shall fully defend, indemnify, and hold harmless the Indemnified Parties for the sole negligence of the Indemnitor.

2. If such claims are caused by or are resulting from the sole negligence of the Indemnified Parties or their agents or employees, then the Contractor shall have no duty to defend, indemnify, and hold harmless the Indemnified Parties.

3. If such claims are caused by or are resulting from the concurrent negligence of (a) the Indemnified Parties or the Indemnified Parties' agents or employees, and (b) the Contractor or the Contractor's agents or employees, then the Contractor shall be obligated to defend, indemnify, and hold harmless the Indemnified Parties only to the extent of the Indemnitor's negligence.

B. The Contractor agrees to being added by the Owner as a party to any arbitration or litigation with third parties in which the Owner alleges indemnification or contribution from the Contractor, any of its Subcontractors of any tier, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable. The Contractor agrees that all of its Subcontractors of any tier shall, in their subcontracts, similarly stipulate; in the event any does not, the Contractor shall be liable in place of such Subcontractor(s) of any tier.

C. To the extent any portion of this 5.22 is stricken by a court of competent jurisdiction for any reason, all remaining provisions shall retain their vitality and effect.

D. The obligations of the Contractor under this Section 5.22 shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity which would otherwise exist as to any party or person described in this Section 5.22. To the extent the wording of this Section 5.22 would reduce or eliminate an available insurance coverage of the Contractor or the Owner, this Section 5.22 shall be considered modified to the extent that such insurance coverage is not affected.

E. In claims against any person or entity indemnified under this Section 5.22 by an employee of the Contractor, a Subcontractor of any tier, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 5.22 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor of any tier under workers' compensation acts, disability benefit acts, or other employee benefit acts. After mutual negotiation of the parties, the Contractor waives immunity as to the Owner and its consultants only under Title 51 RCW ("Industrial Insurance)." IF THE CONTRACTOR DOES NOT AGREE WITH THIS WAIVER, IT MUST PROVIDE A WRITTEN NOTICE TO THE OWNER PRIOR TO THE DATE FOR THE RECEIPT OF BIDS, OR THE CONTRACTOR WILL BE DEEMED TO HAVE NEGOTIATED AND WAIVED THIS IMMUNITY.

F. Contractor will immediately report to the Owner any failure by the Contractor, a Subcontractor of any tier, or any third party observed by the Contractor to comply with applicable laws, regulations, or ordinances while performing the Work or upon the Project, including, but not limited to, those related to environmental compliance, spills, unauthorized fill in waters of the State (including wetlands), water quality standards, noise, and air quality.

PART 6 – PAYMENTS AND COMPLETION

6.01 CONTRACT SUM

Owner shall pay Contract Sum: Owner shall pay Contractor the Contract Sum plus state sales tax for performance of the Work, in accordance with the Contract Documents.

6.02 SCHEDULE OF VALUES

Contractor to submit Schedule of Values: Before submitting its first Application for Payment,

Contractor shall submit to Owner for approval a breakdown allocating the total Contract Sum to each principal category of work, in such detail as requested by Owner ("Schedule of Values"). The approved Schedule of Values shall include appropriate amounts for demobilization, record drawings, O&M manuals, and any other requirements for Project closeout, and shall be used by Owner as the basis for progress payments. Payment for Work shall be made only for and in accordance with those items included in the Schedule of Values.

6.03 APPLICATION FOR PAYMENT

A. Monthly Application for Payment with substantiation: At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an itemized Application for Payment for Work completed in accordance with the Contract Documents and the approved Schedule of Values. Each application shall be supported by such substantiating data as Owner may require.

B. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.011, as their interests appeared in the last preceding certificate of payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.03, are true and correct, to the best of Contractor's knowledge, as of the date of the Application for Payment.

C. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Owner, the actual progress of the Work with the Progress Schedule.

D. Payment for material delivered to site or stored off-site: If authorized by Owner, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:

1. Suitable facility or location: The material will be placed in a facility or location that is structurally sound, dry, lighted and suitable for the materials to be stored;

2. Facility or location within 10 miles of Project: The facility or location is located within a 10-mile radius of the Project. Other locations may be utilized, if approved in writing, by Owner;

3. Facility or location exclusive to Project's materials: Only materials for the Project are stored within the facility or location (or a secure portion of a facility or location set asidefor the Project);

4. Insurance provided on materials in facility or location: Contractor furnishes Owner a certificate of insurance extending Contractor's insurance coverage for damage, fire, and theft to cover the full value of all materials stored, or in transit;

5. Facility or location locked and secure: The facility or location (or secure portion thereof) is continuously under lock and key, and only Contractor's authorized personnel shall have access;

6. Owner right of access to facility or location: Owner shall at all times have the right of access in company of Contractor;

7. Contractor assumes total responsibility for stored materials: Contractor and its surety assume total responsibility for the stored materials; and

8. Contractor provides documentation and Notice when materials moved to site: Contractor furnishes to Owner certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Owner when materials are moved from storage to the Project site.

6.04 PROGRESS PAYMENTS

A. Owner to pay within 30 Days: Owner shall make progress payments, in such amounts as Owner determines are properly due, within 30 Days after receipt of a properly executed Application for Payment. Owner shall notify Contractor in accordance with Chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

B. Withholding retainage; Options for retainage: Owner shall retain five (5) percent of the amount of each progress payment until forty-five (45) Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including, at Owner's request, consent of surety to release of the retainage. In accordance with Chapter 60.28 RCW, Contractor may request that monies reserved be retained in a fund by Owner, deposited by Owner in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Owner may authorize in writing Contractor to provide an appropriate bond in lieu of the retained funds.

C. Title passes to Owner upon payment: Title to all Work and materials covered by a progress payment shall pass to Owner at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Owner to insist on full compliance by Contractor with the Contract Documents.

D. Interest on unpaid balances: Payments due and unpaid in accordance with the Contract Documents shall bear interest as specified in Chapter 39.76 RCW.

6.05 PAYMENTS WITHHELD

A. Owner's right to withhold payment: Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Owner from loss or damage for reasons including but not limited to:

1. Non-compliant Work: Work not in accordance with the Contract Documents;

2. Remaining Work to cost more than unpaid balance: Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum;

3. Owner correction or completion Work: Work by Owner to correct defective Work or complete the Work in accordance with Section 5.16;

4. Contractor's failure to perform: Contractor's failure to perform in accordance with the Contract Documents; or

5. Contractor's negligent acts or omissions: Cost or liability that may occur to Owner

as the result of Contractor's fault or negligent acts or omissions.

B. Owner to notify Contractor of withholding for unsatisfactory performance: In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Owner shall notify Contractor in accordance with Chapter 39.76 RCW.

6.06 RETAINAGE AND BOND CLAIM RIGHTS

Chapters 39.08 RCW and 60.28 RCW incorporated by reference: Chapters 39.08 RCW and 60.28 RCW, concerning the rights and responsibilities of Contractor and Owner with regard to the performance and payment bonds and retainage, are made a part of the Contract Documents by reference as though fully set forth herein.

6.07 SUBSTANTIAL COMPLETION

Substantial Completion defined: Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so Owner has full and unrestricted use and benefit of the facilities (or portion thereof designated and approved by Owner) for the use for which it is intended. All Work other than incidental corrective and incidental punch list work shall be completed. Substantial Completion shall not have been achieved if all systems and parts are not functional, if utilities are not connected and operating normally, if all required occupancy permits have not been issued, or if the Work is not accessible by normal vehicular and pedestrian traffic routes. The date Substantial Completion is achieved shall be established in writing by Owner. Contractor may request an early date of Substantial Completion which must be approved by Change Order. Owner's occupancy of the Work or designated portion thereof does not necessarily indicate that Substantial Completion has been achieved.

6.08 PRIOR OCCUPANCY

A. Prior Occupancy defined; Restrictions: Owner may, upon written notice thereof to Contractor, take possession of or use any completed or partially completed portion of the Work ("Prior Occupancy") at any time prior to Substantial Completion. Unless otherwise agreed in writing, Prior Occupancy shall not: be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Owner provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.

B. Damage; Duty to repair and warranties: Notwithstanding anything in the preceding paragraph, Owner shall be responsible for loss of or damage to the Work resulting from Prior Occupancy. Contractor's one (1) year duty to repair any system warranties shall begin on building systems activated and used by Owner as agreed in writing by Owner and Contractor.

6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

A. Final Completion defined: Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved shall be established by Owner in writing, but in no case shall Final Completion constitute Final Acceptance, which is a subsequent, separate, and distinct action.

B. Final Acceptance defined: Final Acceptance shall be achieved when the Contractor has

completed the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Owner in writing. Prior to Final Acceptance, Contractor shall, in addition to all other requirements in the Contract Documents, submit to Owner a written notice of any outstanding disputes or claims between Contractor and any of its Subcontractors, including the amounts and other details thereof. Neither Final Acceptance, nor final payment, shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Owner arising from Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Final payment waives Claim rights: Acceptance of final payment by Contractor, or any Subcontractor, shall constitute a waiver and release to Owner of all claims by Contractor, or any such Subcontractor, for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Part 8.

PART 7 – CHANGES

7.01 CHANGE IN THE WORK

A. Changes in Work, Contract Sum, and Contract Time by Change Order: Owner may, at any time and without notice to Contractor's surety, order additions, deletions, revisions, or other changes in the Work. These changes in the Work shall be incorporated into the Contract Documents through the execution of Change Orders. If any change in the Work ordered by Owner causes an increase or decrease in the Contract Sum or the Contract Time, an equitable adjustment shall be made as provided in Section 7.02 or 7.03, respectively, and such adjustment(s) shall be incorporated into a Change Order.

B. Owner may request COP from Contractor: If Owner desires to order a change in the Work, it may request a written Change Order Proposal (COP) from Contractor. Contractor shall submit a Change Order Proposal within fourteen (14) Days of the request from Owner, or within such other period as mutually agreed. Contractor's Change Order Proposal shall be full compensation for implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time, and including compensation for all delays in connection with such change in the Work and for any expense or inconvenience, disruption of schedule, or loss of efficiency or productivity occasioned by the change in the Work.

C. COP negotiations: Upon receipt of the Change Order Proposal, or a request for equitable adjustment in the Contract Sum or Contract Time, or both, as provided in Sections 7.02 and 7.03, Owner may accept or reject the proposal, request further documentation, or negotiate acceptable terms with Contractor. Pending agreement on the terms of the Change Order, Owner may direct Contractor to proceed immediately with the Change Order Work. Contractor shall not proceed with any change in the Work until it has obtained Owner's approval. All Work done pursuant to any Owner-directed change in the Work shall be executed in accordance with the Contract Documents.

D. Change Order as full payment and final settlement: If Owner and Contractor reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, such agreement shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of all claims for time and for direct, indirect, and consequential costs, including costs of delays, inconvenience,

disruption of schedule, or loss of efficiency or productivity, related to any Work either covered or affected by the Change Order, or related to the events giving rise to the request for equitable adjustment.

E. Failure to agree upon terms of Change Order; Final offer and Claims: If Owner and Contractor are unable to reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, Contractor may at any time in writing, request a final offer from Owner. Owner shall provide Contractor with its written response within thirty (30) Days of Contractor's request. Owner may also provide Contractor with a final offer at any time. If Contractor rejects Owner's final offer, or the parties are otherwise unable to reach agreement, Contractor's only remedy shall be to file a Claim as provided in Part 8.

F. Field Authorizations: The Owner may direct the Contractor to proceed with a change in the work through a written Field Authorization (also referred to as a Field Order) when the time required to price and execute a Change Order would impact the Project.

The Field Authorization shall describe and include the following:

1. The scope of work;

2. An agreed upon maximum not-to-exceed amount;

3. Any estimated change to the Contract Time;

4. The method of final cost determination in accordance with the requirements of Part 7 ofthe General Conditions;

5. The supporting cost data to be submitted in accordance with the requirements of Part 7of the General Conditions;

Upon satisfactory submittal by the Contractor and approval by the Owner of supporting cost data, a Change Order will be executed. The Owner will not make payment to the Contractor for Field Authorization work until that work has been incorporated into an executed Change Order.

7.02 CHANGE IN THE CONTRACT SUM

A. General Application

1. Contract Sum changes only by Change Order: The Contract Sum shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Sum in its Change Order Proposal.

2. Owner fault or negligence as basis for change in Contract Sum: If the cost of Contractor's performance is changed due to the fault or negligence of Owner, or anyone for whose acts Owner is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Sum in accordance with the following procedure. No change in the Contract Sum shall be allowed to the extent: Contractor's changed cost of performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible; the change is concurrently caused by Contractor and Owner; or the change is caused by an act of Force Majeure as defined in Section 3.05.

a. Notice and record keeping for equitable adjustment: A request for an

equitable adjustment in the Contract Sum shall be based on written notice delivered to Owner within seven (7) Days of the occurrence of the event giving rise to the request. For purposes of this part, "occurrence" means when Contractor knew, or in its diligent prosecution of the Work should have known, of the event giving rise to the request. If Contractor believes it is entitled to an adjustment in the Contract Sum, Contractor shall immediately notify Owner and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Owner access to any such records and, if requested shall promptly furnish copies of such records to Owner.

b. Content of notice for equitable adjustment; Failure to comply: Contractor shall not be entitled to any adjustment in the Contract Sum for any occurrence of events or costs that occurred more than seven (7) Days before Contractor's written notice to Owner. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Sum; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and to the extent possible the amount of the adjustment in Contract Sum requested. Failure to properly give such written notice shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

c. Contractor to provide supplemental information: Within thirty (30) Days of the occurrence of the event giving rise to the request, unless Owner agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with Subsection (a), above, with additional supporting data. Such additional data shall include, at a minimum: the amount of compensation requested, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the damages claimed, but that the damages claimed were actually a result of the act, event, or condition complained of and that the Contract Documents provide entitlement to an equitable adjustment to Contractor for such act, event, or condition; and documentation sufficiently detailed to permit an informed analysis of the request by Owner. When the request for compensation relates to a delay, or other change in Contract Time, Contractor shall demonstrate the impact on the critical path, in accordance with Section 7.03C. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

d. Contractor to proceed with Work as directed: Pending final resolution of any request made in accordance with this paragraph, unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.

e. Contractor to combine requests for same event together: Any requests by Contractor for an equitable adjustment in the Contract Sum and in the Contract Time that arise out of the same event(s) shall be submitted together.

3. Methods for calculating Change Order amount: The value of any Work covered by a Change Order, or of any request for an equitable adjustment in the Contract Sum, shall be determined by one of the following methods:

   a. Fixed Price: On the basis of a fixed price as determined in Section 7.02B.

   b. Unit Prices: By application of unit prices to the quantities of the items involved as determined in Section 7.02C.

   c. Time and Materials: On the basis of time and material as determined in Section 7.02D.

   d. Fixed price method is default; Owner may direct otherwise: When Owner has requested Contractor to submit a Change Order Proposal, Owner may direct Contractor as to which method in the paragraph immediately above to use when submitting its proposal. Otherwise, Contractor shall determine the value of the Work, or of a request for an equitable adjustment, on the basis of the fixed price method.

B. Change Order Pricing – Fixed Price

Procedures: When the fixed price method is used to determine the value of any Work covered by a Change Order, or of a request for an equitable adjustment in the Contract Sum, the following procedures shall apply:

1. Breakdown and itemization of details on COP: Contractor's COP, or request for adjustment in the Contract Sum, shall be accompanied by a complete itemization of the costs, including labor, material, Subcontractor costs, and overhead and profit. The costs shall be itemized in the manner set forth below, and shall be submitted on breakdown sheets in a form approved by Owner.

2. Use of industry standards in calculating costs: All costs shall be calculated based upon appropriate industry standard methods of calculating labor, material quantities, and equipment costs.

3. Costs contingent on Owner's actions: If any of Contractor's pricing assumptions are contingent upon anticipated actions of Owner, Contractor shall clearly state them in the proposal or request for an equitable adjustment.

4. Markups on additive and deductive Work: The cost of any additive or deductive changes in the Work shall be calculated as set forth below, except that overhead and profit shall not be included on deductive changes in the Work. Where a change in the Work involves additive and deductive work by the same Contractor or Subcontractor, small tools, overhead, profit, bond, and insurance markups will apply to the net difference.

5. Breakdown not required if change less than $1,000: If the total cost of the change in the Work or request for equitable adjustment does not exceed $1,000, Contractor shall not be required to submit a breakdown if the description of the change in the Work or request for equitable adjustment is sufficiently definitive for Owner to determine fair value.

6. Breakdown required if change between $1,000 and $2,500: If the total cost of the change in the Work or request for equitable adjustment is between $1,000 and

$2,500, Contractor may submit a breakdown in the following level of detail if the description of the change in the Work or if the request for equitable adjustment is sufficiently definitive to permit the Owner to determine fair value:

a. Lump sum labor;

b. Lump sum material;

c. Lump sum equipment usage;

d. Overhead and profit as set forth below; and

e. Insurance and bond costs as set forth below.

7. Components of increased cost: Any request for adjustment of Contract Sum based upon the fixed price method shall include only the following items:

a. Craft labor costs: These are the labor costs determined by multiplying the estimated or actual additional number of craft hours needed to perform the change in the Work by the hourly labor costs. Craft hours should cover direct labor, as well as indirect labor due to trade inefficiencies. When estimating labor hours for electrical work, such hours shall be no greater than the Labor Units for specific items included in the "Normal" project conditions column of the NECA Manual of Labor Units, most recent edition. When estimating labor hours for mechanical work, such hours shall be no greater than 75% of the Labor Units for specific items included in the MCAA Web-Based Estimating Manual (WebLEM), subject to the assumptions and notes in the WebLEM, except that the Labor Units for "Hangers, Sleeves, & Inserts" shall be no greater than 50% of the WebLEM Labor Units. Special exceptions for electrical and mechanical work may be made for work having to be performed under extraordinary conditions. Such exceptions shall be identified and explained in any applicable pricing proposals and shall be subject to approval by Owner. The hourly costs shall be based on the following:

(1) Basic wages and benefits: Hourly rates and benefits as stated on the Department of Labor and Industries approved "statement of intent to pay prevailing wages" or a higher amount if approved by the Owner. Direct supervision shall be a reasonable percentage not to exceed fifteen (15) percent of the cost of direct labor. No supervision markup shall be allowed in a Change Order that contains direct labor costs for a working supervisor's hours (including any category of foreman).

(2) Worker's insurance: Direct contributions to the State of Washington for industrial insurance; medical aid; and supplemental pension, by the class and rates established by the Department of Labor and Industries.

(3) Federal insurance: Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.

(4) Travel allowance: Travel allowance and/or subsistence, if

applicable, not exceeding those allowances established by regional labor union agreements, which are itemized and identified separately.

(5) Safety: Cost incurred due to the Washington Industrial Safety and Health Act, which shall be a reasonable percentage not to exceed two (2) of the sum of the amounts calculated in (1), (2), and (3) above.

b. Material costs: This is an itemization of the quantity and cost of materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs, including, but not limited to, Contractor's supplier(s)' actual cost(s) available from the standard industry pricing guide "Trade Service." If those are not available, material costs shall be developed second from supplier quotations. If those are not available, material costs shall be developed third from other standard industry pricing guides. Material costs shall include all available discounts. Freight costs, express charges, or special delivery charges shall be itemized.

c. Equipment costs: This is an itemization of the type of equipment and the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work. Costs will be allowed for construction equipment only if used solely for the changed Work, or for additional rental costs actually incurred by the Contractor. The Contractor's cost for utility vehicles and other items such as pickup trucks, vans, flatbed trucks, storage trailers, containers, etc., that are already in use or planned for use on the Project will not be compensated in Change Order work except for the time that, in the opinion of the Owner, such items: (1) are directly and necessarily used for the performance of the change work; and (2) the cost of using such items has not been included within the Contractor's total project overhead costs. Equipment charges shall be computed on the basis of actual invoice costs or if owned, from the current edition of one of the following sources:

(1) Associated General Contractors Washington State Department of Transportation (AGC-WSDOT) Equipment Rental Agreement current edition, on the Contract execution date.

(2) The National Electrical Contractors Association for equipment used on electrical work. Equipment pricing shall be no greater than seventy-five (75) percent of NECA monthly rates.

(3) The Mechanical Contractors Association of America for equipment used on mechanical work.

The EquipmentWatch Rental Rate Blue Book shall be used as a basis for establishing rental rates of equipment not listed in the above sources. The maximum rate for standby equipment shall not exceed that shown in the AGC-WSDOT Equipment Rental Agreement, current edition on the Contract execution date.

d. Allowance for small tools, expendables & consumable supplies: Small tools consist of tools which cost $1,000 or less and are normally furnished by the performing Contractor. The maximum rate for small tools shall not exceed

the following:

(1) For Contractor: three (3) percent of direct labor costs.

(2) For Subcontractors: five (5) percent of direct labor costs.

Expendables and consumables supplies directly associated with the change in Work must be itemized.

e. Subcontractor costs: This is defined as payments Contractor makes to Subcontractors for change Work performed by Subcontractors of any tier. The Subcontractors' cost of Work shall be calculated and itemized in the same manner as prescribed herein for Contractor.

f. Allowance for overhead: This is defined as costs of any kind attributable to direct and indirect delay, acceleration, or impact, added to the total cost to Owner of any change in the Contract Sum. If the Contractor is compensated under Section 7.03D, the amount of such compensation shall be reduced by the amount Contractor is otherwise entitled to under this Subsection (f). This allowance shall compensate Contractor for all non-craft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B&O taxes, office engineering, estimating costs, additional overhead because of extended time, and any other cost incidental to the change in the Work. It shall be strictly limited in all cases to a reasonable amount, mutually acceptable, or if none can be agreed upon to an amount not to exceed the rates below:

(1) Projects less than $3 million: For projects where the Contract Award Amount is under $3 million, the following shall apply:

(a) Contractor markup on Contractor Work: For Contractor, for any Work actually performed by Contractor's own forces, sixteen (16) percent of the first $50,000 of the cost, and four (4) percent of the remaining cost, if any.

(b) Subcontractor markup for Subcontractor Work: For each Subcontractor (including lower-tier Subcontractors), for any Work actually performed by its own forces, sixteen (16) percent of the first $50,000 of the cost, and four (4) percent of the remaining cost, if any.

(c) Contractor markup for Subcontractor Work: For Contractor, for any work performed by its Subcontractor(s), six (6) percent of the first $50,000 of the amount due each Subcontractor, and four (4) percent of the remaining amount, if any.

(d) Subcontractor markup for lower-tier Subcontractor Work: For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, four (4) percent of the first $50,000 of the amount due the Sub-Subcontractor, and two (2) percent of the remaining amount, if any.

(e) Basis of cost applicable for markup: The cost to which

overhead is to be applied shall be developed in accordance with Sections 7.02B.7.a-.e.

(2) Projects more than $3 million: For projects where the Contract Award Amount is equal to or exceeds $3 million, the following shall apply:

(f) Contractor markup on Contractor Work: For Contractor, for any Work actually performed by Contractor's own forces, twelve (12) percent of the first $50,000 of the cost, and four (4) percent of the remaining cost, if any.

(g) Subcontractor markup for Subcontractor Work: For each Subcontractor (including lower-tier Subcontractors), for any Work actually performed by its own forces, twelve (12) percent of the first $50,000 of the cost, and four (4) percent of the remaining cost, if any.

(h) Contractor markup for Subcontractor Work: For Contractor, for any Work performed by its Subcontractor(s), four (4) percent of the first $50,000 of the amount due each Subcontractor, and two (2) percent of the remaining amount, if any.

(i) Subcontractor markup for lower tier Subcontractor Work: For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, four (4) percent of the first $50,000 of the amount due the Sub-Subcontractor, and two (2) percent of the remaining amount, if any.

(j) Basis of cost applicable for markup: The cost to which overhead is to be applied shall be developed in accordance with Section 7.02B.7.a-.e.

g. Allowance for profit: Allowance for profit is an amount to be added to the cost of any change in Contract Sum, but not to the cost of change in Contract Time for which Contractor has been compensated pursuant to the conditions set forth in Section 7.03. It shall be limited to a reasonable amount, mutually acceptable, or if none can be agreed upon, to an amount not to exceed the rates below:

(1) Contractor / Subcontractor markup for self-performed Work: For Contractor or Subcontractor of any tier for work performed by their forces, six (6) percent of the cost developed in accordance with Sections 7.02B.7.a-.e.

(2) Contractor / Subcontractor markup for Work performed at lower tier: For Contractor or Subcontractor of any tier for work performed by a Subcontractor of a lower tier, four (4) percent of the subcontract cost developed in accordance with Section 7.02B.7.a-.h.

h. Insurance and bond premiums: Cost of change in insurance or bond premium: This is defined as:

(1) Contractor's liability insurance: The cost of any changes in Contractor's liability insurance arising directly from execution of the Change Order; and

(2) Payment and Performance Bond: The cost of the additional premium for Contractor's bond arising directly from the changed Work.

The cost of any change in insurance or bond premium shall be added after overhead and allowance for profit are calculated in accordance with Subsections f.-.g, above.

C. Change Order Pricing – Unit Prices

1. Content of Owner authorization: Whenever Owner authorizes Contractor to perform Work on a unit-price basis, Owner's authorization shall clearly state:

   a. Scope: Scope of work to be performed;

   b. Reimbursement basis: Type of reimbursement including pre-agreed rates for material quantities; and

   c. Reimbursement limit: Cost limit of reimbursement.

2. Contractor responsibilities: Contractor shall:

   a. Cooperate with Owner and assist in monitoring the Work being performed. As requested by Owner, Contractor shall identify workers assigned to the Change Order Work and areas in which they are working;

   b. Leave access as appropriate for quantity measurement; and

   c. Not exceed any cost limit(s) without Owner's prior written approval.

3. Cost breakdown consistent with Fixed Price requirements: Contractor shall submit costs in accordance with Section 7.02B and satisfy the following requirements:

   a. Unit prices must include overhead, profit, bond, and insurance premiums: Unit prices shall include reimbursement for all direct and indirect costs of the Work, including overhead, profit, bond, and insurance costs; and

   b. Owner verification of quantities: Quantities must be supported by field measurement statements signed by Owner.

D. Change Order Pricing – Time-and-Material Prices

1. Content of Owner authorization: Whenever Owner authorizes Contractor to perform Work on a time-and-material basis, Owner's authorization shall clearly state:

   a. Scope: Scope of Work to be performed;

   b. Reimbursement basis: Type of reimbursement, including pre-agreed rates, if any,for material quantities or labor; and

c. Reimbursement limit: Cost limit of reimbursement.

2. Contractor responsibilities: Contractor shall:

a. Identify workers assigned: Cooperate with Owner and assist in monitoring the Work being performed. As requested by Owner, identify workers assigned to the Change Order Work and areas in which they are working;

b. Provide daily timesheets: Identify on daily time sheets all labor performed in accordance with this authorization. Submit copies of daily time sheets within two (2) working days for Owner's review.

c. Allow Owner to measure quantities: Leave access as appropriate for quantity measurement;

d. Perform Work efficiently: Perform all Work in accordance with this section as efficiently as possible; and

e. Not exceed Owner's cost limit: Not exceed any cost limit(s) without Owner's prior written approval.

3. Cost breakdown consistent with Fixed Price requirements: Contractor shall submit costs in accordance with Section 7.02B and additional verification supported by:

a. Timesheets: Labor detailed on daily time sheets; and

b. Invoices: Invoices for material.

7.03 CHANGE IN THE CONTRACT TIME

A. COP requests for Contract Time: The Contract Time shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Time in its Change Order Proposal.

B. Time extension permitted if not Contractor's fault: If the time of Contractor's performance is changed due to an act of Force Majeure, or due to the fault or negligence of Owner or anyone for whose acts Owner is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Time in accordance with the following procedure. No adjustment in the Contract Time shall be allowed to the extent Contractor's changed time of performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible.

1. Notice and record keeping for Contract Time request: A request for an equitable adjustment in the Contract Time shall be based on written notice delivered within seven (7) Days of the occurrence of the event giving rise to the request. If Contractor believes it is entitled to adjustment of Contract Time, Contractor shall immediately notify Owner and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Owner access to any such record and if requested, shall promptly furnish copies of such record to Owner.

2. Timing and content of Contractor's Notice: Contractor shall not be entitled to an adjustment in the Contract Time for any events that occurred more than seven (7) Days before Contractor's written notice to Owner. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Time; the nature of the impacts to

Contractor and its Subcontractors of any tier, if any; and to the extent possible the amount of the adjustment in Contract Time requested. Failure to properly give such written notice shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

3. Contractor to provide supplemental information: Within thirty (30) Days of the occurrence of the event giving rise to the request, unless Owner agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with Section 7.03B.2 with additional supporting data. Such additional data shall include, at a minimum: the amount of delay claimed, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the delay claimed, but that the delay claimed was actually a result of the act, event, or condition complained of, and that the Contract Documents provide entitlement to an equitable adjustment in Contract Time for such act, event, or condition; and supporting documentation sufficiently detailed to permit an informed analysis of the request by Owner. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

4. Contractor to proceed with Work as directed: Pending final resolution of any request in accordance with this Section 7.03C unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.

C. Contractor to demonstrate impact on critical path of schedule: Any change in the Contract Time covered by a Change Order, or based on a request for an equitable adjustment in the Contract Time, shall be limited to the change in the critical path of Contractor's schedule attributable to the change of Work or event(s) giving rise to the request for equitable adjustment. Any Change Order Proposal or request for an adjustment in the Contract Time shall demonstrate the impact on the critical path of the schedule. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event: had a specific impact on the critical path, and except in case of concurrent delay, was the sole cause of such impact; and could not have been avoided by resequencing of the Work or other reasonable alternatives.

D. Cost of change in Contract Time: Contractor may request compensation for the cost of a change in Contract Time in accordance with this Section 7.03D, subject to the following conditions:

1. Must be solely fault of Owner or A/E: The change in Contract Time shall solely be caused by the fault or negligence of Owner (or A/E, if applicable);

2. Procedures: Contractor shall follow the procedure set forth in Section 7.03B;

3. Demonstrate impact on critical path: Contractor shall establish the extent of the change in Contract Time in accordance with Section 7.03C; and

4. Limitations on daily costs: The daily cost of any change in Contract Time shall be limited to the items below, less the amount of any change in the Contract Sum the Contractor may otherwise be entitled to pursuant to Section 7.02B.7.f for any change in the Work that contributed to this change in Contract Time:

a. Non-productive supervision or labor: cost of nonproductive field supervision

or labor extended because of delay;

b. Weekly meetings and indirect activities: cost of weekly meetings or similar indirect activities extended because of the delay;

c. Temporary facilities or equipment rental: cost of temporary facilities or equipment rental extended because of the delay;

d. Insurance premiums: cost of insurance extended because of the delay;

e. Overhead: general and administrative overhead in an amount to be agreed upon, but not to exceed three (3) percent of the Contract Award Amount divided by the originally specified Contract Time for each Day of the delay.

PART 8 – CLAIMS AND DISPUTE RESOLUTION

8.01 CLAIMS PROCEDURE

A. Claim is Contractor's remedy: If the parties fail to reach agreement on the terms of any Change Order for Owner-directed Work as provided in Section 7.01, or on the resolution of any request for an equitable adjustment in the Contract Sum as provided in Section 7.02 or the Contract Time as provided in Section 7.03, Contractor's only remedy shall be to file a Claim with Owner as provided in this section.

B. Claim filing deadline for Contractor: Contractor shall file its Claim within sixty (60) Days from Owner's final offer made in accordance with Section 7.01E, or by the date of Final Acceptance,whichever occurs first.

C. Claim must cover all costs and be documented: The Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor may beentitled. It shall be fully substantiated and documented. At a minimum, the Claim shall contain the following information:

1. Factual statement of Claim: A detailed factual statement of the Claim for additional compensation and time, if any, providing all necessary dates, locations, and items of Work affected by the Claim;

2. Dates: The date on which facts arose which gave rise to the Claim;

3. Owner and A/E employee's knowledgeable about Claim: The name of each employee of Owner (or A/E, if applicable) knowledgeable about the Claim;

4. Support from Contract Documents: The specific provisions of the Contract Documents which support the Claim;

5. Identification of other supporting information: The identification of any documents and the substance of any oral communications that support the Claim;

6. Copies of supporting documentation: Copies of any identified documents, other than the Contract Documents, that support the Claim;

7. Details on Claim for Contract Time: If an adjustment in the Contract Time is sought: the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted; and

Contractor's analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time;

8. Details on Claim for adjustment of Contract Sum: If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories set forth in, and in the detail as required by Section 7.02; and

9. Statement certifying Claim: A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Owner is liable.

D. Owner's response to Claim filed: After Contractor has submitted a fully documented Claim that complies with all applicable provisions of Parts 7 and 8, Owner shall respond, in writing, to Contractor as follows:

1. Response time for Claim less than $50,000: If the Claim amount is less than $50,000, with a decision within sixty (60) Days from the date the Claim is received; or

2. Response time for Claim of $50,000 or more: If the Claim amount is $50,000 or more, with a decision within sixty (60) Days from the date the Claim is received, or with notice to Contractor of the date by which it will render its decision. Owner will then respond with a written decision in such additional time.

E. Owner's review of Claim and finality of decision: To assist in the review of Contractor's Claim, Owner may visit the Project site, or request additional information, in order to fully evaluate the issues raised by the Claim. Contractor shall proceed with performance of the Work pending final resolution of any Claim. Owner's written decision as set forth above shall be final and conclusive as to all matters set forth in the Claim, unless Contractor follows the procedure set forth in Section 8.02.

F. Continuing Contract performance: Pending final resolution of a Claim, and except as otherwise agreed in writing, Contractor shall proceed diligently with performance of the Contract and maintain Contractor's Construction Schedule, and the Owner shall continue to make payments in accordance with the Contract Documents.

G. Waiver of Contractor rights for failure to comply with this Section: Any Claim of the Contractor against the Owner for damages, additional compensation, or additional time, shall be conclusively deemed to have been waived by the Contractor unless made in accordance with the requirements of this Section.

8.02 LITIGATION

A. If Contractor disagrees with Owner's decision rendered in accordance with Section 8.01D, Contractor shall serve and file a lawsuit in an appropriate court within one-hundred and twenty (120) Days of Owner's decision. This requirement cannot be waived except by an explicit waiver signed by Owner. The failure to file a lawsuit within said one-hundred and twenty (120) Day period shall result in Owner's decision rendered in accordance with Section 8.01D being final and binding on Contractor and all of its Subcontractors.

B. At any time, either before or after a lawsuit has been commenced by Contractor in

accordance with Section 8.02A, Owner may require Contractor to participate in further mediation or arbitration, or both, in any forum or format as determined by Owner.

C. Claims between Owner and Contractor, Contractor and its Subcontractors, Contractor (and A/E, if applicable), and Owner (and A/E, if applicable) shall, upon demand by Owner, be submitted in a single forum, or Owner may consolidate such Claims or join any of the above-named parties in the same forum.

8.03 CLAIMS AUDITS

A. Owner may audit Claims: All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim or to permit Owner access to the books and records of Contractor, or Subcontractors of any tier, shall constitute a waiver of the Claim and shall bar any recovery.

B. Contractor to make documents available: In support of Owner audit of any Claim, Contractor shall, upon request, promptly make available to Owner the following documents:

1. Daily time sheets and supervisor's daily reports;
2. Collective bargaining agreements;
3. Insurance, welfare, and benefits records;
4. Payroll registers;
5. Earnings records;
6. Payroll tax forms;
7. Material invoices, requisitions, and delivery confirmations;
8. Material cost distribution worksheet;
9. Equipment records (list of company equipment, rates, etc.);
10. Vendors', rental agencies', Subcontractors', and agents' invoices;
11. Contracts between Contractor and each of its Subcontractors, and all lower-tier Subcontractor contracts and supplier contracts;
12. Subcontractors' and agents' payment certificates;
13. Cancelled checks (payroll and vendors);
14. Job cost report, including monthly totals;
15. Job payroll ledger;
16. Planned resource loading schedules and summaries;
17. General ledger;
18. Cash disbursements journal;

19. Financial statements for all years reflecting the operations on the Work. In addition, the Owner may require, if it deems it appropriate, additional financial statements for three (3) years preceding execution of the Work;

20. Depreciation records on all company equipment, whether these records are maintained bythe company involved, its accountant, or others;

21. If a source other than depreciation records is used to develop costs for Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;

22. All nonprivileged documents which relate to each and every Claim together with all documents which support the amount of any adjustment in Contract Sum or Contract Time sought by each Claim;

23. Work sheets or software used to prepare the Claim establishing the cost components for items of the Claim including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, all documents that establish the time periods, individuals involved, the hours for the individuals, and the rates for the individuals; and

24. Work sheets, software, and all other documents used by Contractor to prepare its bid.

C. Contractor to provide facilities for audit and shall cooperate: The audit may be performed by employees of Owner or a representative of Owner. Contractor, and its Subcontractors, shall provide adequate facilities acceptable to Owner, for the audit during normal business hours. Contractor, and all Subcontractors, shall make a good faith effort to cooperate with Owner's auditors.

PART 9 – TERMINATION OF THE WORK

9.01 TERMINATION BY OWNER FOR CAUSE

A. Notice to Terminate for Cause: Owner may, upon seven (7) Days' written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:

1. Contractor fails to prosecute Work: Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;

2. Contractor bankrupt: Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;

3. Contractor fails to correct Work: Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;

4. Contractor fails to supply workers or materials: Contractor repeatedly fails to supply skilled workers or proper materials or equipment;

5. Contractor failure to pay Subcontractors or labor: Contractor repeatedly fails to make prompt payment due to Subcontractors or for labor;

6. Contractor violates laws: Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or

7. Contractor in material breach of Contract: Contractor is otherwise in material breach of any provision of the Contract Documents.

B. Owner's actions upon termination: Upon termination, Owner may at its option:

1. Take possession of Project site: Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;

2. Accept assignment of Subcontracts: Accept assignment of subcontracts pursuant to Section 5.20; and

3. Finish the Work: Finish the Work by whatever other reasonable method it deems expedient.

C. Surety's role: Owner's rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

D. Contractor's required actions: When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in Section 9.02B and shall not be entitled to receive further payment until the Work is accepted.

E. Contractor to pay for unfinished Work: If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work (including compensation for A/E's services, if applicable) and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of Contractor's actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. These obligations for payment shall survive termination.

F. Contractor and Surety still responsible for Work performed: Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

G. Conversion of "Termination for Cause" to "Termination for Convenience": If Owner terminates Contractor for cause and it is later determined that none of the circumstances set forth in Section 9.01A exist, then such termination shall be deemed a termination for convenience pursuant to Section 9.02.

9.02 TERMINATION BY OWNER FOR CONVENIENCE

A. Owner Notice of Termination for Convenience: Owner may, upon written notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.

B. Contractor response to termination Notice: Unless Owner directs otherwise, after receipt of a written notice of termination for either cause or convenience, Contractor shall promptly:

1. Cease Work: Stop performing Work on the date and as specified in the

notice of termination;

2. No further orders or Subcontracts: Place no further orders or Subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;

3. Cancel orders and Subcontracts: Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

4. Assign orders and Subcontracts to Owner: Assign to Owner all of the right, title, and interest of Contractor in all orders and subcontracts;

5. Take action to protect the Work: Take such action as may be necessary or as directed by Owner to preserve and protect the Work, Project site, and any other property relatedto this Project in the possession of Contractor in which Owner has an interest; and

6. Continue performance not terminated: Continue performance only to the extent not terminated.

C. Terms of adjustment in Contract Sum if Contract terminated: If Owner terminates the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for anequitable adjustment for its reasonable direct costs incurred prior to the effective date of the termination, plus reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages, whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7.

D. Owner to determine whether to adjust Contract Time: If Owner terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Owner.

PART 10 – MISCELLANEOUS PROVISIONS

10.01 GOVERNING LAW

Applicable law and venue: The Contract Documents and the rights of the parties herein shall be governed by the laws of the State of Washington. Venue shall be in the county in which Owner's administrative office is located, unless otherwise specified.

10.02 SUCCESSORS AND ASSIGNS

Bound to successors; Assignment of Contract: Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party shall assign the Work without written consent of the other, except that Contractor may assign the Work for security purposes, to a bank or lending institution authorized to do business in the State of Washington. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations set forth in the Contract Documents.

10.03 MEANING OF WORDS

Meaning of words used in Specifications: Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority, whether such reference be specific or by implication, shall be to the latest standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in these Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference shall apply to as many such articles as are shown on the Drawings or required to complete the installation.

10.04 RIGHTS AND REMEDIES

No waiver of rights: No action or failure to act by Owner (or A/E, if applicable) shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall action or failure to act constitute approval or an acquiescence in a breach therein, except as may be specifically agreed in writing.

10.05 CONTRACTOR REGISTRATION

Contractor must be registered or licensed: Pursuant to Chapter 39.06 RCW, Contractor shall be registered or licensed as required by the laws of the State of Washington, including but not limited to Chapter 18.27 RCW.

10.06 TIME COMPUTATIONS

Computing time: When computing any period of time, the day of the event from which the period of time begins shall not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day that is not a weekend or holiday. When the period of time allowed is less than seven (7) days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation.

10.07 RECORDS RETENTION

Six-year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit in accordance with Section 8.03, shall be retained for a period of not less than six (6) years after the date of Final Acceptance.

10.08 THIRD-PARTY AGREEMENTS

No third-party relationships created: The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons other than Owner and Contractor.

10.09 ANTITRUST ASSIGNMENT

Contractor assigns overcharge amounts to Owner: Owner and Contractor recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, Contractor hereby assigns to Owner any and all claims for such overcharges as to goods, materials, and equipment purchased in connection with the Work performed in accordance with the Contract Documents, except as to overcharges which result from antitrust violations commencing after the Contract Sum is established and which are not passed on to Owner under a Change Order. Contractor shall put a similar clause in its Subcontracts, and require a similar clause in its Sub-Subcontracts, such that all claims for such

overcharges on the Work are passed to Owner by Contractor.

10.10 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the designated representative as identified in the Contract Documents, or to an officer of the corporation for which it was intended if the designated representative no longer works for that party; or if delivered at, or sent by facsimile, email, registered or certified mail, or courier service providing proof of delivery to, the last business address known to the party giving notice. The date of written notice shall be the earlier of the date of personal delivery, actual receipt by facsimile or email, or three (3) calendar days after the date of postmark.

10.11 PUBLIC RECORDS ACT COMPLIANCE

The Contractor understands that the Owner is bound by the Washington Public Records Act, Chapter 42.56 RCW. The Contractor agrees to fully cooperate with the Owner in responding to public records requests. The Contractor shall promptly provide such records to the Owner as requested by the Owner or required by law for the Owner to fulfill its obligations in responding to public records requests. Such records shall be provided at no cost to the Owner. The Contractor shall cause any subcontract to contain this provision. This section shall survive expiration or termination of this Contract for any reason.

10.12 SUBSTITUTION OF PERSONNEL

The Contractor and the Owner have no present intention to substitute personnel, and the parties shall endeavor to minimize substitutions and maintain continuity of personnel, but each reserves the right to substitute its personnel for the purpose of carrying out its responsibilities under this Contract. Such substitution by the Contractor shall be subject to the approval of the Owner, which approval shall not be unreasonably withheld. If the Contractor substitutes personnel, it shall not charge the Owner for any extra costs incurred thereby, including, without limitation, costs incurred to familiarize new personnel with the Project. If requested by the Owner, the Contractor shall remove from performing the Work, without cost to the Owner or delay to the Work, any person whose removal the Owner reasonably requests. Nothing in this provision shall be construed to alter the independent contractor status of the Contractor.

10.13 SEVERABILITY

If, for any reason, any part, term or provision of this Agreement is held by a court of competent jurisdiction to be illegal, void, or unenforceable, the validity of the remaining provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular provision held to be invalid; provided, however, that if it should appear that any provision of the Contract Documents is in conflict with any statutory provision of the State of Washington, the provision shall be deemed modified to conform to such statutory provision.»

10.14 HEADINGS AND CAPTIONS

Headings for convenience only: All headings and captions used in these General Conditions are only for convenience of reference, and shall not be used in any way in connection with the meaning, effect, interpretation, construction, or enforcement of the General Conditions, and do not define the limit or describe the scope or intent of any provision of these General Conditions.

- END OF GENERAL CONDITIONS –

Last Revised: May 7, 2023.

DIVISION 01
General Requirements

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. HVAC Recapitalization at Sequim High School

B. Project Location: 601 N Sequim Ave, Sequim, WA 98382

C. Owner: Sequim School District No. 323

D. Architect: design2 last, Inc. Lauri Strauss, AIA LEED AP BD&C.

E. Architect's Consultants: Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Listed on the drawing cover sheet

F. The Work consists of replacing HVAC system elements at the Sequim High School, detailed further in the specifications and drawings.

1.2 WORK RESTRICTIONS

A. Contractor's Use of Premises: During construction, Contractor will have full use of building indicated. Contractor's use of premises is limited only by Owner's right to perform work or employ other contractors on portions of Project and as follows:

1. Owner may occupy premises for various after-school activities at the high school. The Contractor is expected to work collaboratively with the Owner to plan construction activities around these after-school events. The Contractor shall coordinate with the Owner to obtain the high school's activity schedule and plan construction activities accordingly. Perform construction during night working hours **4 PM to 6 AM** Monday thru Friday, other than holidays), unless otherwise agreed to in advance by Owner. There may arise occasions where daytime work becomes a possibility. The Contractor shall coordinate such activities with the Owner to guarantee the uninterrupted flow of operations. Clean up work areas and return to usable condition at the end of each work period.

2. In the event that work must be carried out while the owner occupies the premises, Contractor shall cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner’s operations. Maintain existing exits where they are not affected by the construction. Provide temporary egress and enclosures from portions of the building where existing exits are affected by the new construction, comply with authorities have jurisdiction for safe egress paths of occupants to public way.
    a. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or

used facilities without written permission from Owner and authorities having jurisdiction.

b. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operation.

c. Coordinate with Owner all access and egress requirements for the conduction of school activities concurrent with construction activities.

3. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet (12.2 m) beyond building perimeter; 10 feet (3 m) beyond surface walkways, patios, surface parking, and utilities less than 12 inches (300 mm) in diameter; 15 feet (4.5 m) beyond primary roadway curbs and main utility branch trenches; and 25 feet (7.6 m) beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas to limit compaction in the constructed area.

4. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet (12.2 m) beyond building perimeter; 15 feet (4.6 m) beyond surface walkways, patios, surface parking, and utilities; and 25 feet (7.6 m) beyond constructed areas with permeable surfaces that require additional staging areas to limit compaction in the constructed areas.

5. Driveways, Walkways, and Entrances: Keep parking lots and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

B. On-Site Work Hours: Work hours are not limited for work and the contractor is authorized to work extended hours or weekends as determined by the contractor to meet the schedule needs. For testing and/or work where district staff are needed to coordinate work, this work will be limited to 8 AM TO 5 PM, (Monday thru Friday, other than holidays) unless agreed to in advance by Owner to schedule staff.

C. Nonsmoking Campus: Smoking is not permitted on the premises of the school campuses. No smoking is allowed within the property lines of the buildings. This restriction includes vaping.

D. School property Restrictions: All workers are bound by the restrictions for school property regarding allowable activities and actions. Profanity, harassment, or other forms of unprofessional behavior will warrant removal from the project at the discretion of the district.

E. Weapon Fre Zone Restriction: School Properties are weapon free zones. Adherence to this restriction is mandatory. Use of any tools or equipment which mimic or can be misinterpreted as discharging of weapons sounds (such as powder actuated fasteners) are prohibited without prior approval by the district.

F. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.

2. Obtain Construction Manager's written permission before proceeding with disruptive operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012000 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 ALLOWANCES

A. Advise Architect of the date when selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

D. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

E. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight and delivery to Project site.

F. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.2 UNIT PRICES

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

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

C. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

1.3 ALTERNATES

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

B. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

C. Notification: Immediately following award of the Contract, notify each party involved, in writing, whether alternates have been accepted, rejected, or deferred for later consideration.

1.4 PAYMENT PROCEDURES

A. Submit a Schedule of Values at least [seven] days before the initial Application for Payment. Break down the Contract Sum into at least one line item for each Specification Section in the Project Manual table of contents. Coordinate the schedule of values with Contractor's construction schedule.

1. Arrange schedule of values consistent with format of **AIA Document G703**
2. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
4. Provide separate line items in the schedule of values for initial cost of materials and for total installed value of that part of the Work.
5. Provide a separate line item in the schedule of values for each allowance.

B. Application for Payment Forms: Use forms which convey the same information and break down as the **AIA Document G702 and AIA Document G703** as forms for Applications for Payment.

C. Submit [one] copies of each application for payment according to the schedule established in Owner/Contractor Agreement.

1. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor.
2. With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
3. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

    a. Include insurance certificates, proof that taxes, fees, and similar obligations were paid, and evidence that claims have been settled.
    b. Include affidavit of payment of debts and claims[**on AIA Document G706**].

c. Include affidavit of release of liens
d. Include consent of surety to final payment
e. Submit final meter readings for utilities, a record of stored fuel, and similar data as of the date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES (Not Used)

END OF SECTION 012000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUBSTITUTION PROCEDURES

A. Substitutions include changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use **CSI Form 13.1A** or similar form which provides relevant information.
2. Submit requests within 5 days after the Notice of Award.
3. Identify product to be replaced and show compliance with requirements for substitutions. Include a detailed comparison of significant qualities of proposed substitution with those of the Work specified, a list of changes needed to other parts of the Work required to accommodate proposed substitution, and any proposed changes in the Contract Sum or the Contract Time should the substitution be accepted.

C. Architect will review proposed substitutions and notify Contractor of their acceptance or rejection. If necessary, Architect will request additional information or documentation for evaluation.

1. Architect will notify Contractor of acceptance or rejection of proposed substitution within 5 days of receipt of request, or 5 days of receipt of additional information or documentation, whichever is later.

D. Do not submit unapproved substitutions on Shop Drawings or other submittals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 CONTRACT MODIFICATION PROCEDURES

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions.".

B. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work.

1. Proposal Requests are not instructions either to stop work in progress or to execute the proposed change.
2. Within 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time.

C. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

D. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor, for all changes to the Contract Sum or the Contract Time.

E. Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

F. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT MANAGEMENT AND COORDINATION

A. Subcontract List: Submit a written summary identifying individuals or firms proposed for each portion of the Work.

B. Key Personnel Names: Within ten (10) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. List e-mail addresses and telephone numbers.

C. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.

D. Requests for Information (RFIs): On discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI.

E. Schedule and conduct progress meetings at Project site at weekly. Notify Owner and Architect of meeting dates and times. Require attendance of each subcontractor or other entity concerned with current progress or involved in planning, coordination, or performance of future activities.

1. Contractor will record minutes and distribute to everyone concerned, including Owner and Architect.

1.2 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.

a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

B. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

1. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
2. Submit one [1] electronic copy of each action submittal to architect or Owner’s representative.
3. Submit one [1] electronic copy of each informational submittal to architect or Owner’s representative.
4. Architect will discard submittals received from sources other than Contractor.

C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with unique identifier, including project identifier, Specification Section number, and revision identifier.
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

D. Identify options requiring selection by Architect.

E. Identify deviations from the Contract Documents on submittals.

F. Contractor's Construction Schedule Submittal Procedure:

1. Submit required submittals in the following format:

a. Working electronic copy of schedule file, where indicated.
b. PDF electronic file.

2. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

a. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

3. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Architect.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Submit electronic submittals via email as PDF electronic files.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2.2 ACTION SUBMITTALS

A. Submit one (1) electronic copy of each submittal unless otherwise indicated.

B. Product Data: Mark each copy to show applicable products and options. Include the following:

1. Manufacturer's written recommendations, product specifications, and installation instructions.
2. Wiring diagrams showing factory-installed wiring.
3. Printed performance curves and operational range diagrams.
4. Testing by recognized testing agency.
5. Compliance with specified standards and requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Submit on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches Include the following:

1. Dimensions and identification of products.
2. Fabrication and installation drawings and roughing-in and setting diagrams.
3. Wiring diagrams showing field-installed wiring.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.

D. Samples: Submit Samples for review of kind, color, pattern, and texture and for a comparison of these characteristics between submittal and actual component as delivered and installed. Include name of manufacturer and product name on label.

1. If variation is inherent in material or product, submit at least three (3) sets of paired units that show variations.

2.3 INFORMATIONAL SUBMITTALS

A. Informational Submittals: Submit one (1) electronic copy of each submittal unless otherwise indicated. Architect will not return copies.

B. Qualification Data: Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

2.4 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit [**three**] copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type schedule within ten (10) days of date established for Notice of Award.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

C. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

D. Recovery Schedule: When periodic update indicates the Work is fourteen (14) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and indicate date by which recovery will be accomplished.

PART 3 - EXECUTION

3.1 SUBMITTAL REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Architect will review each action submittal, make marks to indicate corrections or modifications required, will stamp each submittal with an action stamp, and will mark stamp appropriately to indicate action.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

3.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribute copies of approved schedule to Owner, Architect, subcontractors, testing and inspecting agencies, and parties identified by Contractor with a need-to-know schedule responsibility. When revisions are made, distribute updated schedules to the same parties.

END OF SECTION 013000

SECTION 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Preliminary Conference for Alteration Work: Conduct a conference via electronic conference, record conference results; and distribute record copies.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each specialist shall be represented.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

    a. Fire prevention.
    b. Areas where existing construction is to remain and the required protection.
    c. Hauling routes.
    d. Sequence of alteration work operations.
    e. Storage, protection, and accounting for salvaged and specially fabricated items.
    f. Existing conditions and structural loading limitations.
    g. Collection of waste, protection of occupants and the public, and condition of other construction that affects or will affect the Work.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals; record meeting results; and distribute record copies.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress of alteration work activities shall be represented.
2. Agenda: Review items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

C. Specialist Qualifications: A firm regularly engaged in specialty work similar in nature and extent to work as specified in each Section and that has completed a minimum of three (3) recent projects with a record of successful in-service performance Supervisors shall be experienced in specialty work similar in nature and extent to that indicated for this Project.

D. Alteration Work Program: Prepare a written plan for Project, including protection of surrounding materials during operations. Include dust and noise control, means of egress, debris-hauling routes, and temporary protective barriers.

E. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire-control devices during each phase or process.

F. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

G. Salvaged Materials: Clean loose dirt and debris from salvaged items; crate and cushion items against damage during handling; and label contents of containers. Store and transport items to Owner's designated storage area.

H. Salvaged Materials for Reinstallation: Repair and clean items for reuse and reinstall items in locations indicated.

I. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work or spillage.

1. Provide temporary barricades, barriers, directional signage, and covers over walkways to protect and exclude the public from areas where alteration work is being performed.
2. Erect temporary barriers to form and maintain fire-egress routes.
3. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
4. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
5. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
6. Collect and dispose of runoff in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

B. Protect existing materials, including floors along hauling routes, with temporary protections and construction.

1. Use covering materials and masking agents that will not stain or leave residue on surfaces. When no longer needed, promptly remove protective materials.

C. Comply with each product manufacturer's written instructions for protections and precautions.

D. Utility and Communications Services: Notify Owner; Architect; authorities having jurisdiction; and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations. Disconnect and cap pipes and services as required by authorities having jurisdiction, and provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, verify that drainage system is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work until the drainage system is functioning properly.

1. Prevent solids or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked from alteration work.

3.2 PROTECTION FROM FIRE

A. Comply with NFPA 241 requirements unless otherwise indicated.

B. Fire Watch: When working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B and NFPA 241.

C. Fire-Control Devices: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids.

D. Sprinklers: Maintain sprinkler protection without interruption. While operations are performed close to sprinklers, shield them temporarily with guards and remove guards when nearby work is paused or completed.

3.3 GENERAL ALTERATION WORK

A. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs and/or video recordings.

B. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

C. Notify Architect of visible changes in the integrity of material or components, including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

B. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Architect for a decision.

C. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum. The actual installation may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision.

D. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

E. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

F. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, notices, receipts for fee payments, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

G. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

H. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated; and where required by authorities having jurisdiction, that is acceptable to authorities.

I. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

J. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor of irregularities or deficiencies in the Work observed during performance of its services.
2. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
3. Do not perform any duties of Contractor.

K. Associated Services: Cooperate with testing agencies and provide reasonable auxiliary services as requested. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Security and protection for samples and for testing and inspecting equipment.

L. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

B. Abbreviations and Acronyms: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
10. AF&PA - American Forest & Paper Association; www.afandpa.org.
11. AGA - American Gas Association; www.aga.org.
12. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
14. AI - Asphalt Institute; www.asphaltinstitute.org.
15. AIA - American Institute of Architects (The); www.aia.org.
16. AISC - American Institute of Steel Construction; www.aisc.org.
17. AISI - American Iron and Steel Institute; www.steel.org.
18. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
19. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
20. ANSI - American National Standards Institute; www.ansi.org.
21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
22. APA - APA - The Engineered Wood Association; www.apawood.org.
23. APA - Architectural Precast Association; www.archprecast.org.
24. API - American Petroleum Institute; www.api.org.
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
28. ASCE - American Society of Civil Engineers; www.asce.org.
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.

31. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
32. ASSE - American Society of Safety Engineers (The); www.asse.org.
33. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
34. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
36. AWEA - American Wind Energy Association; www.awea.org.
37. AWI - Architectural Woodwork Institute; www.awinet.org.
38. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
39. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
40. AWS - American Welding Society; www.aws.org.
41. AWWA - American Water Works Association; www.awwa.org.
42. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
43. BIA - Brick Industry Association (The); www.gobrick.com.
44. BICSI - BICSI, Inc.; www.bicsi.org.
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
46. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
47. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bwfbadminton.org.
48. CDA - Copper Development Association; www.copper.org.
49. CEA - Canadian Electricity Association; www.electricity.ca.
50. CEA - Consumer Electronics Association; www.ce.org.
51. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
52. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
53. CGA - Compressed Gas Association; www.cganet.com.
54. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
55. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
56. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
57. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
58. CPA - Composite Panel Association; www.pbmdf.com.
59. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
60. CRRC - Cool Roof Rating Council; www.coolroofs.org.
61. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
62. CSA - Canadian Standards Association; www.csa.ca.
63. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
64. CSI - Construction Specifications Institute (The); www.csinet.org.
65. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
66. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
67. CWC - Composite Wood Council; (See CPA).
68. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
69. DHI - Door and Hardware Institute; www.dhi.org.
70. ECA - Electronic Components Association; (See ECIA).
71. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
72. ECIA ? Electronic Components Industry Association; www.eciaonline.org
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; www.eima.com.

75. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
76. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
77. ESTA - Entertainment Services and Technology Association; (See PLASA).
78. EVO - Efficiency Valuation Organization; www.evo-world.org.
79. FIBA - F?d?ration Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
80. FIVB - F?d?ration Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
81. FM Approvals - FM Approvals LLC; www.fmglobal.com.
82. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
84. FSA - Fluid Sealing Association; www.fluidsealing.com.
85. FSC - Forest Stewardship Council U.S.; www.fscus.org.
86. GA - Gypsum Association; www.gypsum.org.
87. GANA - Glass Association of North America; www.glasswebsite.com.
88. GS - Green Seal; www.greenseal.org.
89. HI - Hydraulic Institute; www.pumps.org.
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
93. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
94. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
95. IAS - International Accreditation Service; www.iasonline.org.
96. IAS - International Approval Services; (See CSA).
97. ICBO - International Conference of Building Officials; (See ICC).
98. ICC - International Code Council; www.iccsafe.org.
99. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
100. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
101. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
102. IEC - International Electrotechnical Commission; www.iec.ch.
103. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
104. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
105. IESNA - Illuminating Engineering Society of North America; (See IES).
106. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
107. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
108. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
109. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
110. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
111. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
112. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
113. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
114. ISO - International Organization for Standardization; www.iso.org.
115. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
116. ITU - International Telecommunication Union; www.itu.int/home.
117. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.

118. LMA - Laminating Materials Association; (See CPA).
119. LPI - Lightning Protection Institute; www.lightning.org.
120. MBMA - Metal Building Manufacturers Association; www.mbma.com.
121. MCA - Metal Construction Association; www.metalconstruction.org.
122. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
123. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
124. MHIA - Material Handling Industry of America; www.mhia.org.
125. MIA - Marble Institute of America; www.marble-institute.com.
126. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
127. MPI - Master Painters Institute; www.paintinfo.com.
128. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
129. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
130. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
131. NADCA - National Air Duct Cleaners Association; www.nadca.com.
132. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
133. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
134. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
135. NCMA - National Concrete Masonry Association; www.ncma.org.
136. NEBB - National Environmental Balancing Bureau; www.nebb.org.
137. NECA - National Electrical Contractors Association; www.necanet.org.
138. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
139. NEMA - National Electrical Manufacturers Association; www.nema.org.
140. NETA - InterNational Electrical Testing Association; www.netaworld.org.
141. NFHS - National Federation of State High School Associations; www.nfhs.org.
142. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.
143. NFPA - NFPA International; (See NFPA).
144. NFRC - National Fenestration Rating Council; www.nfrc.org.
145. NHLA - National Hardwood Lumber Association; www.nhla.com.
146. NLGA - National Lumber Grades Authority; www.nlga.org.
147. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
148. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
149. NRCA - National Roofing Contractors Association; www.nrca.net.
150. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
151. NSF - NSF International; (National Sanitation Foundation International); www.nsf.org.
152. NSPE - National Society of Professional Engineers; www.nspe.org.
153. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
154. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
155. NWFA - National Wood Flooring Association; www.nwfa.org.
156. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
157. PDI - Plumbing & Drainage Institute; www.pdionline.org.
158. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
159. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
160. RFCI - Resilient Floor Covering Institute; www.rfci.com.
161. RIS - Redwood Inspection Service; www.redwoodinspection.com.
162. SAE - SAE International; (Society of Automotive Engineers); www.sae.org.
163. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.

164. SDI - Steel Deck Institute; www.sdi.org.
165. SDI - Steel Door Institute; www.steeldoor.org.
166. SEFA - Scientific Equipment and Furniture Association; www.sefalabs.com.
167. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
168. SIA - Security Industry Association; www.siaonline.org.
169. SJI - Steel Joist Institute; www.steeljoist.org.
170. SMA - Screen Manufacturers Association; www.smainfo.org.
171. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
172. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
173. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
174. SPIB - Southern Pine Inspection Bureau; www.spib.org.
175. SPRI - Single Ply Roofing Industry; www.spri.org.
176. SRCC - Solar Rating and Certification Corporation; www.solar-rating.org.
177. SSINA - Specialty Steel Industry of North America; www.ssina.com.
178. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
179. STI - Steel Tank Institute; www.steeltank.com.
180. SWI - Steel Window Institute; www.steelwindows.com.
181. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
182. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
183. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
184. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
185. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
186. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
187. TMS - The Masonry Society; www.masonrysociety.org.
188. TPI - Truss Plate Institute; www.tpinst.org.
189. TPI - Turfgrass Producers International; www.turfgrasssod.org.
190. TRI - Tile Roofing Institute; (Formerly: National Tile Roofing Manufacturing Association); www.tileroofing.org.
191. UBC - Uniform Building Code; (See ICC).
192. UL - Underwriters Laboratories Inc.; www.ul.com.
193. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
194. USAV - USA Volleyball; www.usavolleyball.org.
195. USGBC - U.S. Green Building Council; www.usgbc.org.
196. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
197. WASTEC - Waste Equipment Technology Association; www.wastec.org.
198. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
199. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
200. WDMA - Window & Door Manufacturers Association; www.wdma.com.
201. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
202. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
203. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
204. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

1. DIN - Deutsches Institut f?r Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Use Charges: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated.

B. Water and Electric Power: Available from Owner's existing system without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Erosion- and Sedimentation-Control Plan: Submit plan showing compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

D. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

E. Accessible Temporary Egress: Comply with applicable provisions in ICC A117.1.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts and top and bottom rails.

B. Wood Enclosure Fence: Plywood, **6 feet** high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.

2.2 TEMPORARY FACILITIES

A. Provide field offices, storage and fabrication sheds, and other support facilities as necessary for construction operations. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of **8** at each return-air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

C. Heating and Cooling: Provide temporary heating and cooling required for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

D. Isolation of Work Areas in Occupied Facilities when there are active personnel: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate HVAC system in area where work is to be performed according to coordination drawings.
    a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partition is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filer-equipped vacuum equipment.

E. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.2 SUPPORT FACILITIES INSTALLATION

A. Install project identification and other signs in locations indicated approved by Owner to inform the public and persons seeking entrance to Project.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

C. Temporary Elevator Use: [**Use of elevators is not permitted**] [**See Section 142400 "Hydraulic Elevators" for temporary use of new elevators**].

D. Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

E. Furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

H. Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

I. Install and maintain temporary fire-protection facilities. Comply with NFPA 241.

3.4 MOISTURE AND MOLD CONTROL

A. Before installation of weather barriers, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

1. Protect stored and installed material from flowing or standing water.
2. Remove standing water from decks.
3. Keep deck openings covered or dammed.

B. After installation of weather barriers but before full enclosure and conditioning of building, protect as follows:

1. Do not load or install drywall or porous materials into partially enclosed building.
2. Discard water-damaged material.
3. Do not install material that is wet.
4. Discard, replace, or clean stored or installed material that begins to grow mold.
5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion.

C. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

B. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced.

1. Show compliance with requirements for comparable product requests.
2. Architect will review the proposed product and notify Contractor of its acceptance or rejection.

C. Basis-of-Design Product Specification Submittal: Show compliance with requirements.

D. Compatibility of Options: If Contractor is given option of selecting between two or more products, select product compatible with products previously selected.

E. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Deliver products to Project site in manufacturer's original sealed container or packaging, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
3. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
4. Store materials in a manner that will not endanger Project structure.
5. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
6. Comply with product manufacturer’s written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.

F. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. Provide products that comply with the Contract Documents, are undamaged, and, unless otherwise indicated, are new at the time of installation.

1. Provide products complete with accessories, trim, finish, and other devices and components needed for a complete installation and the intended use and effect.
2. Where products are accompanied by the term "as selected," Architect will make selection.
3. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Where the following headings are used to list products or manufacturers, the Contractor's options for product selection are as follows:

1. Products:

a. Where requirements include "one of the following," provide one of the products listed that complies with requirements.
b. Where requirements do not include "one of the following," provide one of the products listed that complies with requirements or a comparable product.

2. Manufacturers:

a. Where requirements include "one of the following," provide a product that complies with requirements by one of the listed manufacturers.
b. Where requirements do not include "one of the following," provide a product that complies with requirements by one of the listed manufacturers or another manufacturer.

3. Basis-of-Design Product: Provide the product named, or indicated on the Drawings, or a comparable product by one of the listed manufacturers.

C. Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

D. Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Architect will consider Contractor's request for comparable product when the following conditions are satisfied:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications.
3. List of similar installations for completed projects, if requested.
4. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 EXECUTION REQUIREMENTS

A. Cutting and Patching:

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.2 CLOSEOUT SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

C. Operation and Maintenance Data: Submit one copy (1) of manual.

D. PDF Electronic File: Assemble manual into a composite electronically indexed file. Submit on digital media.

E. Record Drawings: Submit one set (1) of marked-up record prints.

F. Record Digital Data Files: Submit data file and one set (1) of plots.

G. Record Product Data: Submit one copy (1) of each submittal.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

A. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.

B. Submittals Prior to Substantial Completion: Before requesting Substantial Completion inspection, complete the following:

1. Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other sections, including project record documents, operation and maintenance manuals, property surveys, similar final record information, warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
3. Submit maintenance material submittals specified in other sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect.
4. Submit test/adjust/balance records.
5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Before requesting Substantial Completion inspection, complete the following:

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Advise Owner of changeover in heat and other utilities.
6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
7. Remove temporary facilities and controls.
8. Complete final cleaning requirements, including touchup painting.
9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will proceed with inspection or advise Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.

1.4 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting inspection for determining final completion, complete the following:

1. Submit a final Application for Payment.
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare final Certificate for Payment after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

2.2 OPERATION AND MAINTENANCE DOCUMENTATION

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Unless otherwise indicated, organize manual into separate sections for each system and subsystem, and separate sections for each piece of equipment not part of a system.

C. Organize data into three-ring binders with identification on front and spine of each binder, and envelopes for folded drawings. Include the following:

1. Manufacturer's operation and maintenance documentation.
2. Maintenance and service schedules.
3. Maintenance service contracts. Include name and telephone number of service agent.
4. Emergency instructions.
5. Spare parts list and local sources of maintenance materials.
6. Wiring diagrams.
7. Copies of warranties. Include procedures to follow and required notifications for warranty claims

2.3 RECORD DRAWINGS

A. Record Prints: Maintain a set of prints of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued. Mark to show actual installation where installation varies from that shown originally. Accurately record information in an acceptable drawing technique.

1. Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings.

1. Format: Annotated PDF electronic file.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

B. Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Verify compatibility with and suitability of substrates.
2. Examine roughing-in for mechanical and electrical systems.
3. Examine walls, floors, and roofs for suitable conditions.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Take field measurements as required to fit the Work properly. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.

E. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

F. Surface and Substrate Preparation: Comply with manufacturer's written recommendations for preparation of substrates to receive subsequent work.

3.2 CONSTRUCTION LAYOUT AND FIELD ENGINEERING

A. Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks.

3.3 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
3. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations.

C. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

D. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

E. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed.

F. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Provide temporary support of work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

D. Cutting: Cut in-place construction using methods least likely to damage elements retained or adjoining construction.

1. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

E. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction in a manner that will minimize evidence of patching and refinishing.
2. Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance.

3. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

3.5 CLEANING

A. Clean Project site and work areas daily, including common areas. Dispose of materials lawfully.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
3. Remove debris from concealed spaces before enclosing the space.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
2. Sweep paved areas broom clean. Remove spills, stains, and other foreign deposits.
3. Remove labels that are not permanent.
4. Clean transparent materials, including mirrors. Remove excess glazing compounds.
5. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Sweep concrete floors broom clean.
6. Vacuum carpeted surfaces and wax resilient flooring.
7. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and foreign substances. Clean plumbing fixtures. Clean light fixtures, lamps, globes, and reflectors.
8. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

3.6 OPERATION AND MAINTENANCE MANUAL PREPARATION

A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are unavailable and where the information is necessary for proper operation and maintenance of equipment or systems.

C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams.

3.7 DEMONSTRATION AND TRAINING

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Include a detailed review of the following:

1. Include instruction for basis of system design and operational requirements, review of documentation, emergency procedures, operations, adjustments, troubleshooting, maintenance, and repairs.

END OF SECTION 017000

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Action Submittals:

1. Waste Management Plan: Submit plan within seven (7) days of date established for commencement of the Work.

B. Informational Submittals:

1. Waste Reduction Progress Reports: Submit concurrent with each Application for Payment. Include total quantity of waste, total quantity of waste salvaged and recycled, and percentage of total waste salvaged and recycled.
2. Records of Donations and Sales: Receipts for salvageable waste donated or sold to individuals and organizations. . Indicate whether organization is tax exempt.
3. Recycling and Processing Facility Records: Manifests, weight tickets, receipts, and invoices.
4. Landfill and Incinerator Disposal Records: Manifests, weight tickets, receipts, and invoices.
5. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations.

C. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013000 "Administrative Requirements." Review methods and procedures related to waste management.

E. Waste Management Plan: Develop a waste management plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

1. Salvaged Materials for Reuse: Identify materials that will be salvaged and reused.
2. Salvaged Materials for Sale: Identify materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: Identify materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Achieve end-of-Project rates for salvage/recycling of 50% percent by weight of total nonhazardous solid waste generated by the Work.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Clean salvaged items and install salvaged items to comply with installation requirements for new materials and equipment.

B. Salvaged Items for Not permitted on Project site.

C. Salvaged Items for Owner's Use: Clean salvaged items and store in a secure area until delivery to Owner.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs.

F. Plumbing Fixtures: Separate by type and size.

G. Lighting Fixtures: Separate lamps by type and protect from breakage.

3.3 RECYCLING WASTE

A. General: Recycle paper and beverage containers used by on-site workers.

B. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum **4-inch (100-mm)** size.

D. Wood Materials:

1. Sort and stack reusable members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
2. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
3. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

E. Metals: Separate metals by type.

F. Asphalt Shingle Roofing: Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

I. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

J. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

L. Conduit: Reduce conduit to straight lengths and store by type and size.

3.4 DISPOSAL OF WASTE

A. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

B. Do not burn waste materials.

END OF SECTION 017419

DIVISION 02
Existing Conditions

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Items indicated to be removed and salvaged remain Owner's property. Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

B. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements. Submit before Work begins.

C. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

D. It is not expected that hazardous materials will be encountered in the Work. If hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with EPA regulations and with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 DEMOLITION

A. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Before proceeding with demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the building.

B. Locate, identify, shut off, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

D. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

E. Protect walls, ceilings, floors, and other existing finish work that are to remain. Erect and maintain dustproof partitions. Cover and protect furniture, furnishings, and equipment that have not been removed.

F. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

G. Provide temporary weather protection to prevent water leakage and damage to structure and interior areas.

H. Requirements for Building Reuse:

1. Maintain existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and nonstructural roofing material) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.
2. Maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.

I. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.

J. Remove demolition waste materials from Project site. Do not burn demolished materials.

K. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

DIVISION 09
Finishes

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing and inspecting agency.

2.2 METAL FRAMING AND SUPPORTS

A. Steel Framing Members, General: ASTM C 754.

1. Steel Sheet Components: ASTM C 645. Thickness specified is minimum uncoated base-metal thickness.
2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.

B. Framing Systems:

1. Studs and Runners: In depth indicated and 0.027 inch thick unless otherwise indicated.
2. Flat Strap and Backing: 0.027 inch thick.
3. Hat-Shaped, Rigid Furring Channels: In depth indicated and 0.018 inch thick.
4. Resilient Furring Channels: 1/2 inch deep, with single- or double-leg configuration.
5. Cold-Rolled Furring Channels: 0.053 inch thick, 3/4 inch deep.
6. Z-Furring: In depth required by insulation, 1-1/4-inch face flange, 7/8-inch wall-attachment flange, and 0.018 inch thick.

C. Suspension Systems:

1. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch diameter, or double strand of 0.048-inch-diameter wire.
2. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, and 0.162-inch diameter.
3. Carrying Channels: Cold-rolled steel, 0.053 inch thick, 2 inches deep.
4. Furring Channels: Steel, rigid hat-shaped channels; 7/8 inch deep,
5. Grid Suspension System for Gypsum Board Ceilings: Interlocking, direct-hung system.

2.3 ACCESSORIES

A. General: Comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: foam gasket.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install steel framing to comply with ASTM C 754."
1. Gypsum Board Assemblies: Also comply with ASTM C 840.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Isolate steel framing from building structure, except at floor, to prevent transfer of loading imposed by structural movement.

1. Where studs are installed directly against exterior walls, install isolation strip between studs and wall.

D. Fire-Resistance-Rated Assemblies: Comply with requirements of listed assemblies.

E. Install suspension systems level to within 1/8 inch in 12 feet.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing and inspecting agency.

2.2 PANEL PRODUCTS

A. Provide in maximum lengths available to minimize end-to-end butt joints.

B. Interior Gypsum Board: ASTM C 1396/C 1396M, in thickness indicated, with manufacturer's standard edges. Type X.
   1. USG
   2. Georgia Pacific
   3. CertainTeed
   4. Other manufacturers complying with requirements

C. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C 1178/C 1178M, of thickness indicated. Regular type unless otherwise indicated.

   1. Georgia Pacific
   2. Other manufacturers complying with requirements

D. Cementitious Backer Units: ANSI A118.9, ASTM C 1288, or ASTM C 1325.
   1. James Hardi
   2. Georgia Pacific
   3. USG
   4. Other manufacturers complying with requirements

2.3 ACCESSORIES

A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet. For exterior trim, use accessories formed from hot-dip galvanized-steel sheet, plastic, or rolled zinc.

1. Provide cornerbead at outside corners unless otherwise indicated.
2. Provide LC-bead (J-bead) at exposed panel edges.
3. Provide control joints where indicated.

B. Aluminum Accessories: Extruded-aluminum accessories indicated with manufacturer's standard corrosion-resistant primer.

1. Same as Gypsum Board Manufacturer

C. Joint-Treatment Materials: ASTM C 475/C 475M.

1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
2. Joint Compounds: Drying-type, ready-mixed, all-purpose compounds.
3. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
4. Cementitious Backer Unit Joint-Treatment Materials: Products recommended by cementitious backer unit manufacturer.

D. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834.

1. Low-Emitting Materials: Comply with ASHRAE 189.1.

E. Sound-Attenuation Blankets: ASTM C 665, Type I (unfaced).

F. Textured Finish: Acoustical finish where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install gypsum board to comply with ASTM C 840.

1. Isolate gypsum board assemblies from abutting structural and masonry work. Provide edge trim and acoustical sealant.
2. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.

B. Install cementitious backer units to comply with ANSI A108.11.

C. Finishing Gypsum Board: ASTM C 840.

1. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
2. At substrates for tile, provide Level 2 finish: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.

3. Unless otherwise indicated, provide Level 4 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.
4. Where indicated, provide Level 5 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Apply skim coat to entire surface.

D. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

F. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Standard: Acoustical panel ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

2.2 ACOUSTICAL PANELS

A. Match Existing.

B. Classification: As follows, per ASTM E 1264:
   1. Pattern: Match Existing.
   2. Surface-Burning Characteristics: Class A.

C. Color: White.

D. Edge Detail: Square.

E. Thickness: 5/8 inch

F. Modular Size: 24 by 48 inches.

2.3 CEILING SUSPENSION SYSTEM

A. Match Existing

B. Ceiling Suspension System: Wide-face, direct-hung system; ASTM C 635, intermediate-duty structural classification.

   1. Face Design: Flat, flush.
   2. Face Finish: Painted white.

C. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated. Comply with seismic design requirements.

D. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

1. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.106-inch diameter wire.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install acoustical ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

C. Arrange directionally patterned acoustical units to match existing.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product data and Samples.

B. Extra Materials: Deliver to Owner at least 10 linear feet of each type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Thermoset Rubber Base: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
   1. Forbo
   2. Roppe
   3. Other manufactures complying with requirements.

B. Style: Cove (base with toe).

C. Minimum Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: coils in manufacturer's standard lengths.

F. Outside Corners preformed.

G. Inside Corners: preformed.

2.2 INSTALLATION ACCESSORIES

A. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.

   1. Low-Emitting Materials: Comply with ASHRAE 189.1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare horizontal surfaces according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

B. Adhesively install resilient wall base and accessories.

C. Install wall base in maximum lengths possible. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms or areas where base is required.

D. Install stair-tread-nose filler to nosing substrates that do not conform to tread contours.

E. Install reducer strips at edges of floor coverings that would otherwise be exposed.

END OF SECTION 096513

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data:
2. Samples.

B. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.

C. Extra Materials: Deliver to Owner 1 gal. of each color and type of finish-coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 PAINT

A. Sherwin Williams
B. Behr
C. Miller
D. Rodda

E. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."

1. Primer Sealer, Latex: MPI #50.
2. Latex, Institutional Low Odor/VOC, (Gloss Level 2): MPI #144.

F. Material Compatibility: Provide materials that are compatible with one another and with substrates.

1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

G. Low-Emitting Materials: Comply with ASHRAE 189.1.

H. Colors: As scheduled.

PART 3 - EXECUTION

3.1 PREPARATION

A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.

C. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

3.2 APPLICATION

A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Paint exposed surfaces**,** new and existing, unless otherwise indicated.

1. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces.
2. Paint the back side of access panels.
3. Color-code mechanical piping in accessible ceiling spaces.
4. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

C. Apply paints according to manufacturer's written instructions.

1. Use brushes only where the use of other applicators is not practical.
2. Use rollers for finish coat on interior walls and ceilings.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

3.3 INTERIOR PAINT APPLICATION SCHEDULE

A. Gypsum Board:

1. Gloss Level 2 Latex Two coats over latex primer/sealer: MPI INT 9.2A.

END OF SECTION 099123

DIVISION 23

Heating, Ventilating, and Air Conditioning (HVAC)

SECTION 230500 – COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 DESCRIPTION

A. The requirements of this Section apply to all sections of Division 23.

B. Definitions:

1. Exposed: Piping, ductwork, and equipment exposed to view in finished rooms.
2. Option or optional: Contractor's choice of an alternate material or method.

1.2 RELATED WORK

A. Division 26, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

1.3 QUALITY ASSURANCE

A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable and maintainable, easily and safely accessible, and in compliance with applicable codes as specified. The systems shall be comprised of high quality institutional-class and industrial-class products of manufacturers that are experienced specialists in the required product lines. All construction firms and personnel shall be experienced and qualified specialists in industrial and institutional HVAC, as applicable.

B. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. The design, model and size of each item shall have been in satisfactory and efficient operation on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, and instruments shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years. See other specification sections for any exceptions.
2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.
3. Conform to codes and standards as required by the specifications. Conform to local codes, if the local codes are more stringent then those specified. Refer any conflicts to the Engineer.
4. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

5. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.
6. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.
7. Asbestos products or equipment or materials containing asbestos shall not be used.

C. Equipment Service Organizations:

1. HVAC: Products and systems shall be supported by service organizations that maintain a complete inventory of repair parts and are located reasonably close to the site.

D. Execution (Installation, Construction) Quality:

1. Apply and install all items in accordance with manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Engineer for resolution.
2. All items that require access, such as for operating, cleaning, servicing, maintenance, and calibration, shall be easily and safely accessible by persons standing at floor level, or standing on permanent platforms, without the use of portable ladders. Examples of these items include, but are not limited to: all types of valves, filters and strainers, transmitters, control devices. Prior to commencing installation work, refer conflicts between this requirement and contract drawings to the Engineer for resolution.

1.4 SUBMITTALS

A. Submit in accordance with Division 01, and with requirements in the individual specification sections.

B. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

C. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.

D. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.

E. Upon request by the Owner, provide lists of previous installations for selected items of equipment. Include contact persons who will serve as references, with telephone numbers and e-mail addresses.

F. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation. Final review and approvals will be made only by groups.

G. Samples: Samples will not be required, except for insulation or where materials offered differ from specification requirements. Samples shall be accompanied by full description of characteristics different from specification. The Contractor may submit samples of additional material at the Contractor's option.

H. Layout Drawings:

1. The drawings shall include plan views, elevations and sections of all systems and shall be on a scale of not less than 1/4-inch equal to one foot. Clearly identify and dimension the proposed locations of the principal items of equipment. The drawings shall clearly show locations and adequate clearance for all equipment, piping, valves, control panels and other items. Show the access means for all items requiring access for operations and maintenance. Provide detailed layout drawings of all piping and duct systems.
2. Do not install equipment foundations, equipment or piping until layout drawings have been approved.
3. In addition, for HVAC systems, provide details of the following:
    a. Mechanical equipment rooms.
    b. Hangers, inserts, supports, and bracing.
    c. Pipe sleeves.
    d. Duct or equipment penetrations of floors, walls, ceilings, or roofs.

I. Manufacturer's Literature and Data: Submit under the pertinent section rather than under this section.

1. Submit belt drive with the driven equipment. Submit selection data for specific drives when requested by the Engineer.
2. Submit electric motor data and variable speed drive data with the driven equipment.
3. Equipment and materials identification.
4. Fire-stopping materials.
5. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
6. Wall, floor, and ceiling plates.

J. HVAC Maintenance Data and Operating Instructions:

1. Maintenance and operating manuals in accordance with Division 01, GENERAL REQUIREMENTS,
2. Provide a listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American National Standard Institute (ANSI): B31.1-2004 - Power Piping

C. Air Movement and Control Association (AMCA):
410-96 - Recommended Safety Practices for Air Moving Devices

D. American Society for Testing and Materials (ASTM):
A36/A36M-05 - Carbon Structural Steel
A575-96(2002) - Steel Bars, Carbon, Merchant Quality, M-Grades R (2002)
E84-07 - Standard Test Method for Burning Characteristics of Building Materials
E119-07 - Standard Test Method for Fire Tests of Building Construction and Materials

E. National Electrical Manufacturers Association (NEMA):
MG-1-2006 - Motors and Generators

F. National Fire Protection Association (NFPA):
70-08 - National Electrical Code
90A-02 - Installation of Air Conditioning and Ventilating Systems
101-06 - Life Safety Code

1.6 DELIVERY, STORAGE AND HANDLING

A. Protection of Equipment:

1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.
2. Place damaged equipment in first class, new operating condition; or, replace same as determined and directed by the Owner or Owner's Representative. Such repair or replacement shall be at no additional cost to the Owner.
3. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

B. Cleanliness of Piping and Equipment Systems:

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.
2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.
3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

PART 2 - PRODUCTS

2.1 FACTORY-ASSEMBLED PRODUCTS

A. Provide maximum standardization of components to reduce spare part requirements.

B. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for final assembled unit.

1. All components of an assembled unit need not be products of same manufacturer.
2. Constituent parts that are alike shall be products of a single manufacturer.
3. Components shall be compatible with each other and with the total assembly for intended service.
4. Contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.

C. Components of equipment shall bear manufacturer's name and trademark, model number, serial number and performance data on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.

D. Major items of equipment, which serve the same function, must be the same make and model. Exceptions will be permitted if performance requirements cannot be met.

2.2 COMPATIBILITY OF RELATED EQUIPMENT

A. Equipment and materials installed shall be compatible in all respects with other items being furnished and with existing items so that the result will be a complete and fully operational plant that conforms to contract requirements.

2.3 ELECTRIC MOTORS

A. Provide all electrical wiring, conduit, starters, disconnects, and devices necessary for the proper connection, protection and operation of the systems. Provide special energy efficient motors as scheduled. Unless otherwise specified for a particular application use electric motors with the following requirements.

B. Single-phase Motors: Capacitor-start type for hard starting applications. Motors for centrifugal fans and pumps may be split phase or permanent split capacitor (PSC).

C. Poly-phase Motors: NEMA Design B, Squirrel cage, induction type. Each two-speed motor shall have two separate windings. Provide a time- delay (20 seconds minimum) relay for switching from high to low speed.

D. Rating: Continuous duty at 100 percent capacity in an ambient temperature of 104 degrees F; minimum horsepower as shown on drawings; maximum horsepower in normal operation not to exceed nameplate rating without service factor.

E. Special Requirements:

1. Where motor power requirements of equipment furnished deviate from power shown on plans, provide electrical service designed under the requirements of NFPA 70 without additional time or cost to the Owner.
2. Assemblies of motors, starters, controls and interlocks on factory assembled and wired devices shall be in accordance with the requirements of this specification.
3. Wire and cable materials specified in the electrical division of the specifications shall be modified as follows:
   a. Wiring material located where temperatures can exceed 160 degrees F shall be stranded copper with Teflon FEP insulation with jacket.
   b. Other wiring to control panels shall be NFPA 70 designation THWN.
   c. Provide shielded conductors or wiring in separate conduits for all instrumentation and control systems where recommended by manufacturer of equipment.
4. Select motor sizes so that the motors do not operate into the service factor at maximum required loads on the driven equipment. Motors on fans shall be sized for non-overloading at all points on the fan performance curves.

F. Motor Efficiency and Power Factor: All motors, when specified as “high efficiency” by the project specifications on driven equipment, shall conform to “NEMA premium efficient” standards, the requirements generally exceed those of the Energy Policy Act of 1992 (EPACT). Motors not specified as “high efficiency” shall comply with EPACT.

G. Insulation Resistance: Not less than one-half meg-ohm between stator conductors and frame, to be determined at the time of final inspection.

2.4 VARIABLE SPEED MOTOR CONTROLLERS

A. Refer to Section 260500, COMMON WORK RESULTS FOR ELECTRICAL INSTALLATIONS and Section 262910, MOTOR STARTERS for specifications.

B. The combination of controller and motor shall be provided by the manufacturer of the driven equipment, such as pumps and fans, and shall be rated for 100 percent output performance. Multiple units of the same class of equipment, i.e. air handlers, fans, pumps, shall be product of a single manufacturer.

C. Motors shall be premium efficiency type and be approved by the motor controller manufacturer. The controller-motor combination shall be guaranteed to provide full motor nameplate horsepower in variable frequency operation. Both driving and driven motor/fan sheaves shall be fixed pitch.

D. Controller shall not add any current or voltage transients to the input AC power distribution system, DDC controls, sensitive medical equipment, etc., nor shall be affected from other devices on the AC power system.

E. Controller shall be provided with the following operating features and accessories:

1. Suitable for variable torque load.
2. Provide thermal magnetic circuit breaker or fused switch with external operator and incoming line fuses. Unit shall be rated for minimum 30,000 AIC. Provide AC input filters on incoming power line. Provide output line reactors on line between drive and motor where the distance between the breaker and motor exceeds 50 feet.

2.5 EQUIPMENT AND MATERIALS IDENTIFICATION

A. Use symbols, nomenclature and equipment numbers specified, shown on the drawings and shown in the maintenance manuals.

B. Interior (Indoor) Equipment: Engraved nameplates, with letters not less than 3/16-inch high of brass with black-filled letters, or rigid black plastic with white letters permanently fastened to the equipment. Identify unit components such as coils, filters, fans, etc.

C. Exterior (Outdoor) Equipment: Brass nameplates, with engraved black filled letters, not less than 3/16-inch high riveted or bolted to the equipment.

D. Control Items: Label all temperature and humidity sensors, controllers and control dampers. Identify and label each item as they appear on the control diagrams.

E. Identification for ductwork:

1. Acceptable Manufacturers: W. H. Brady, Seton, Marking Systems, Inc. (MSI), or equal.
2. Duct shall be labeled with all-vinyl, self-sticking labels or letters. Use 2-inch letters. The markers shall be identified and color coded as follows with directional arrows:

2.6 FIRESTOPPING

A. Section 078413, FIRESTOPPING specifies an effective barrier against the spread of fire, smoke and gases where penetrations occur for piping and ductwork.

2.7 GALVANIZED REPAIR COMPOUND

A. Zinc dust conforming to type I of ASTM D 520, either ready-mixed or in a two-compartment container; in paint form.

2.8 HVAC EQUIPMENT SUPPORTS AND RESTRAINTS

A. Attachment to Concrete Building Construction:

1. Concrete insert: MSS SP-58, Type 18.

2. Self-drilling expansion shields and machine bolt expansion anchors: Permitted in concrete not less than 102 mm (four inches) thick when approved by the Engineer for each job condition.
3. Power-driven fasteners: Permitted in existing concrete or masonry not less than 102 mm (four inches) thick when approved by the Engineer for each job condition.

B. Attachment to Steel Building Construction:

1. Welded attachment: MSS SP-58, Type 22.
2. Beam clamps: MSS SP-58, Types 20, 21, 28 or 29. Type 23 C-clamp may be used for individual copper tubing up to 7/8-inch outside diameter.

C. Attachment to Wood Construction: Wood screws or lag bolts.

D. Hanger Rods: Hot-rolled steel, ASTM A36 or A575 for allowable load listed in MSS SP-58. For piping, provide adjustment means for controlling level or slope. Types 13 or 15 turn-buckles shall provide 1-1/2 inches minimum of adjustment and incorporate locknuts. All-thread rods are acceptable.

E. Trapeze Hangers: Galvanized, cold formed, lipped steel channel horizontal member, not less than 1-5/8 inches by 1-5/8 inches, No. 12 gage, designed to accept special spring held, hardened steel nuts. Not permitted for steam supply and condensate piping.

1. Allowable hanger load: Manufacturers rating less 200 pounds.

F. Seismic Restraint of Ductwork: Refer to Section 130541, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS. Comply with MSS SP-127.

2.9 SPECIAL TOOLS AND LUBRICANTS

A. Furnish, and turn over to the Owner, special tools not readily available commercially, that are required for disassembly or adjustment of equipment and machinery furnished.

B. Grease Guns with Attachments for Applicable Fittings: One for each type of grease required for each motor or other equipment.

C. Tool Containers: Hardwood or metal, permanently identified for intended service and mounted, or located, where directed by the Owner.

D. Lubricants: A minimum of one quart of oil, and one pound of grease, of equipment manufacturer's recommended grade and type, in unopened containers and properly identified as to use for each different application.

2.10 ASBESTOS

A. Materials containing asbestos are not permitted.

PART 3 - EXECUTION

3.1 ARRANGEMENT AND INSTALLATION OF EQUIPMENT AND PIPING

A. Coordinate location of inserts, hangers, ductwork and equipment. Locate inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Where there are changes in layout from these documents, prepare equipment layout drawings to coordinate proper location and personnel access of all facilities. Submit the drawings for review as required by Part 1. Follow manufacturer's published recommendations for installation methods not otherwise specified.

B. Operating Personnel Access and Observation Provisions: Select and arrange all equipment and systems to provide clear view and easy access for maintenance and operation of all devices including, but not limited to: all equipment items, valves, filters, strainers, transmitters, sensors, control devices. All gages and indicators shall be clearly visible by personnel. Do not reduce or change maintenance and operating space and access provisions that are shown on the drawings.

C. Equipment Support: Coordinate structural systems necessary for equipment support with equipment locations to permit proper installation.

D. Cutting Holes:

1. Cut holes through concrete and masonry by rotary core drill. Pneumatic hammer, impact electric, and hand or manual hammer type drill will not be allowed, except as permitted by Owner/Engineer where working area space is limited.
2. Locate holes to avoid interference with structural members such as beams or grade beams. Holes shall be laid out in advance and drilling done only after approval by
3. Owner/Engineer. If the Contractor considers it necessary to drill through structural members, this matter shall be referred to Owner for approval.
4. Do not penetrate membrane waterproofing.

E. Interconnection of Instrumentation or Control Devices: Generally, electrical interconnections are not shown but must be provided.

F. Minor Piping: Generally, small diameter pipe runs from equipment are not shown but must be provided.

G. Electrical or Pneumatic Interconnection of Controls and Instruments: This generally is not shown but must be provided. This includes interconnections of sensors, transmitters, transducers, control devices, control and instrumentation panels, instruments and computer workstations. Comply with NFPA-70.

H. Protection and Cleaning:

1. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the

manufacturer's recommendations and as approved by the Engineer. Damaged or defective items in the opinion of the Engineer shall be replaced.

2. Protect all finished parts of equipment, such as shafts and bearings where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water, chemical, or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.

I. Install gages, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gages to be easily read by operator or staff. Servicing shall not require dismantling adjacent equipment or pipe work.

J. Inaccessible Equipment:

1. Where the Owner or his representative determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.
2. The term "conveniently accessible" is defined as capable of being reached without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

3.2 TEMPORARY PIPING AND EQUIPMENT

A. The Contractor shall provide all required facilities in accordance with the requirements of phased construction and maintenance of service. All piping and equipment shall be properly supported, sloped to drain, operate without excessive stress, and shall be insulated where injury can occur to personnel by contact with operating facilities. The requirements of Paragraph. 3.1 apply.

B. Temporary facilities and piping shall be completely removed and any openings in structures sealed. Provide necessary blind flanges and caps to seal open piping remaining in service.

3.3 DUCT AND EQUIPMENT SUPPORTS

A. Where hanger spacing does not correspond with joist or rib spacing, use structural steel channels secured directly to joist and rib structure that will correspond to the required hanger spacing, and then suspend the equipment and piping from the channels. Drilling or burning holes in structural steel will only be permitted with the prior approval of the Owner and the Engineer.

B. Use of chain, wire or strap hangers; wood for blocking, stays and bracing; or, hangers suspended from piping above will not be permitted. Replace or thoroughly clean rusty products and paint with zinc primer.

C. Use hanger rods that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. Provide a minimum of 1/2-inch clearance between pipe or piping covering and adjacent work.

D. Overhead Supports: The basic structural system of the building is designed to sustain the loads imposed by equipment and piping to be supported overhead.

3.4 CLEANING AND PAINTING

A. Prior to final inspection and acceptance of the facility for beneficial use by the Owner, the, equipment and systems shall be thoroughly cleaned and painted.

B. In addition, the following special conditions apply:

1. Cleaning shall be thorough. Use solvents, cleaning materials and methods recommended by the manufacturers for the specific tasks. Solvents and cleaning materials shall be approved for use by the owner. Remove all rust prior to painting and from surfaces to remain unpainted. Repair scratches, scuffs, and abrasions prior to applying prime and finish coats.
2. Material And Equipment Not To Be Painted Includes:
    a. Motors, controllers, control switches, and safety switches.
    b. Control and interlock devices.
    c. Regulators.
    d. Pressure reducing valves.
    e. Control valves and thermostatic elements.
    f. Lubrication devices and grease fittings.
    g. Copper, brass, aluminum, stainless steel and bronze surfaces.
    h. Valve stems and rotating shafts.
    i. Pressure gauges and thermometers.
    j. Glass.
    k. Name plates.
3. Control and instrument panels shall be cleaned, damaged surfaces repaired, and shall be touched-up with matching paint obtained from panel manufacturer.
4. Motors, steel and cast iron bases, and coupling guards shall be cleaned, and shall be touched-up with the same color as utilized by the manufacturer
5. Temporary Facilities: Apply paint to surfaces that do not have existing finish coats.
6. Paint shall withstand the following temperatures without peeling or discoloration:
    a. 100 degrees F on insulation jacket surface and 250 degrees F on metal pipe surface.
7. Final result shall be smooth, even-colored, even-textured factory finish on all items. Completely repaint the entire piece of equipment if necessary to achieve this.

3.5 IDENTIFICATION SIGNS

A. Provide laminated plastic signs, with engraved lettering not less than 3/16-inch high, designating functions, for all equipment, switches, motor controllers, relays, meters, control devices, including automatic control valves. Nomenclature and identification symbols shall correspond to that used in maintenance manual, and in diagrams specified elsewhere. Attach by chain, adhesive, or screws.

B. Factory Built Equipment: Metal plate, securely attached, with name and address of manufacturer, serial number, model number, size, performance.

C. Pipe and Duct Identification:

1. Apply labels or letters after completion of cleaning, insulation, painting, or other similar work, as follows:
   a. Every 20 feet along continuous exposed lines.
   b. Every 10 feet along continuous concealed lines.
   c. Adjacent to each valve and stubout for future.
   d. Where pipe or duct passes through a wall, into and out of concealed spaces.
   e. On each riser.
   f. On each leg of a "T."
   g. Locate conspicuously where visible.
2. Further, apply labels or letters to lower quarters of the pipe or duct on horizontal runs where view is not obstructed or on the upper quarters when pipe or duct is normally viewed from above. Apply arrow labels indicating direction of flow. Arrows to be the same colors and sizes as identification labels.

3.6 LUBRICATION

A. Lubricate all devices requiring lubrication prior to initial operation. Field-check all devices for proper lubrication.

B. Equip all devices with required lubrication fittings or devices. Provide a minimum of one quart of oil and one pound of grease of manufacturer's recommended grade and type for each different application; also provide 12 grease sticks for lubricated plug valves. Deliver all materials to Owner in unopened containers that are properly identified as to application.

C. Provide a separate grease gun with attachments for applicable fittings for each type of grease applied.

D. All lubrication points shall be accessible without disassembling equipment, except to remove access plates.

3.7 STARTUP AND TEMPORARY OPERATION

A. Start up equipment as described in equipment specifications. Verify that vibration is within specified tolerance prior to extended operation.

3.8 OPERATING AND PERFORMANCE TESTS

A. Per Section 23 08 00 – Mechanical Commissioning.

3.9 OPERATION AND MAINTENANCE MANUALS

A. Provide three (3) bound copies. Deliver to the Engineer not less than 30 days prior to completion of a phase or final inspection.

B. Include all new and temporary equipment and all elements of each assembly.

C. Data sheet on each device listing model, size, capacity, pressure, speed, horsepower, impeller size, other data.

D. Manufacturer's installation, maintenance, repair, and operation instructions for each device. Include assembly drawings and parts lists. Include operating precautions and reasons for precautions.

END OF SECTION 230500

SECTION 230513 – COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.02 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with NEMA MG 1 unless otherwise indicated.

B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

C. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLY-PHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

D. Efficiency: Energy efficient, as defined in NEMA MG 1.

E. Service Factor: 1.15.

F. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

G. Multispeed Motors: Separate winding for each speed.

H. Rotor: Random-wound, squirrel cage.

I. Bearings: Greasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

J. Temperature Rise: Match insulation rating.

K. Insulation: Class F

L. Code Letter Designation:

1. Motors 5HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15HP: Manufacturer's standard starting characteristic.

M. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLY-PHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

C. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.

1. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
2. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
3. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

D. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 HP shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

E. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

F. Bearings: Pre-lubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

G. Motors 1/20 HP and Smaller: Shaded-pole type.

H. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230513

SECTION 230529 – HANGERS & SUPPORTS FOR HVAC PIPING & EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.
5. Equipment supports.

B. Related Sections:

1. Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.

1.2 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following: include Product Data for components:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Pipe stands.
4. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. Non-MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Anvil International; a subsidiary of Mueller Water Products Inc.
   b. NIBCO INC.
2. Description: Shop- or field-fabricated pipe-support assembly made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Coating: Zinc.

2.5 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.7 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

C. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Non-staining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturers. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:

1. Attach clamps and spacers to piping.
   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

C. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 Painting Sections.

D. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports metal trapeze pipe hangers and metal framing systems and attachments for general service applications.

F. Use padded hangers for piping that is subject to scratching.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated, stationary pipes NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated, stationary pipes NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of non-insulated, stationary pipes NPS 1/2 to NPS 8.
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated, stationary pipes NPS 1/2 to NPS 8.
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of non-insulated, stationary pipes NPS 3/8 to NPS 8.
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated, stationary pipes NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.

15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.

5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 230529

SECTION 230548 – VIBRATION & SEISMIC CONTROLS FOR HVAC PIPING & EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Spring hangers.
2. Pipe riser resilient supports.
3. Resilient pipe guides.
4. Seismic snubbers.
5. Restraining braces and cables.

1.2 DEFINITIONS

A. IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
    a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES.
    b. Annotate to indicate application of each product submitted and compliance with requirements.
3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

B. Delegated-Design Submittal: Typical support and bracing of “non-structural” architectural, mechanical, and electrical items has been shown on the contract drawings. Further, the “minimum” equipment anchorage of mechanical and electrical equipment has been indicated. The contractor shall review these details and develop shop drawings all respective support and bracing details. If the contractor desires to use alternate support or bracing details than are shown on the contract drawings or if a unique support or a unique detail is needed, the

contractor shall submit his proposed details to the engineer for review and submit calculations of these proposed connections for the engineer to review. For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. See 01 46 00 for additional information.

1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators, seismic restraints, and for designing vibration isolation bases.
   a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
2. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system has been examined for excessive stress and that none will exist.
3. Vibration Isolation Base Details: Detail overall dimensions, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.
4. Seismic-Restraint Details:
   a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
   b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
   c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
   d. Preapproval and Evaluation Documentation: By an evaluation service member of ICC-ES, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings (Shop Drawings): Show coordination of seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and seismic restraints.

B. Qualification Data: For professional engineer.

C. Welding certificates.

D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. When unique or alternate details are required, seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIRMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: D.
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: IV.
   a. Component Importance Factor: 1.5.
   b. Component Response Modification Factor: 6.0.
   c. Component Amplification factor: 2.5
3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 0.939.
4. Design Spectral Response Acceleration at 1.0-Second Period: 0.528.
5. Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of ICC-ES.
6. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they are subjected.

2.2 VIBRATION ISOLATORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide a comparable product by one of the following, or approved equal:

1. Amber/Booth Company, Inc.
2. Mason Industries.

D. Pads: Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.

1. Resilient Material: Oil- and water-resistant neoprene.

E. Mounts: Double-deflection type, with molded, oil-resistant rubber, hermetically sealed compressed fiberglass, or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range.

1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.

F. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.

1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
7. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

2.3 FACTORY FINISHES

A. Finish: Manufacturer's standard prime-coat finish ready for field painting.

B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

1. Powder coating on springs and housings.
2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
3. Baked enamel or powder coat for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES.

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Comply with requirements in Section 07 72 00 "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.

B. Equipment Restraints:

1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.

2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
3. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES providing required submittals for component.

C. Piping Restraints: - see typical details for additional information.

1. Comply with requirements in MSS SP-127 and see typical details
2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
3. Brace a change of direction longer than 12 feet.

D. Install cables so they do not bend across edges of adjacent equipment or building structure.

E. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES providing required submittals for component.

F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

I. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.

2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.

4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

5. Set anchors to manufacturer's recommended torque, using a torque wrench.

6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Section 23 21 13 "Hydronic Piping" for piping flexible connections.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. Air-Mounting System Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
10. Air-Mounting System Operational Test: Test the compressed-air leveling system.
11. Test and adjust air-mounting system controls and safeties.
12. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust air-spring leveling mechanism.

D. Adjust active height of spring isolators.

E. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-mounting systems. Refer to Section 01 79 00 "Demonstration and Training."

END OF SECTION 230548

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Stencils.

D. Ceiling tacks.

1.2 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.4 SUBMITTALS

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

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification. Organize as directed. Provide Excel spreadsheet.

C. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 - PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Automatic Controls: Tags. Key to control schematic.

B. Control Panels: Nameplates.

C. Dampers: Ceiling tacks, where located above lay-in ceiling.

D. Instrumentation: Tags.

E. Duct Cleanout Access Doors: Nameplates.

2.2 NAMEPLATES

A. Manufacturers:

1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com.
2. Brimar Industries, Inc: www.pipemarker.com/#sle.
3. Seton Identification Products, a Tricor Direct Company: www.seton.com.

B. Letter Color: Black.

C. Letter Height: 1/4 inch.

D. Background Color: Yellow.

E. Plastic: Conform to ASTM D709.

F. Match previous completed pods.

2.3 TAGS

A. Manufacturers:

1. Advanced Graphic Engraving: www.advancedgraphicengraving.com.
2. Brimar Industries, Inc: www.pipemarker.com/#sle.
3. Seton Identification Products, a Tricor Company: www.seton.com.

B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

2.4 STENCILS

A. Manufacturers:

1. Brady Corporation: www.bradycorp.com.
2. Seton Identification Products, a Tricor Company: www.seton.com.

B. Stencils: With clean cut symbols and letters of following size:

1. Ductwork and Equipment: 2-1/2 inch high letters.

C. Stencil Paint: As specified in Section 09 91 23, semi-gloss enamel, colors conforming to ASME A13.1.

2.5 CEILING TACKS

A. Manufacturers:

1. Craftmark: www.craftmarkid.com.

B. Description: Steel with 3/4 inch diameter color coded head.

C. Color code as follows:

1. HVAC Equipment: Yellow.
2. Fire Dampers and Smoke Dampers: Red.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install tags with corrosion resistant chain.

B. Locate ceiling tacks to locate dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

3.03 EXAMINATION

A. Examine previously completed work and determine style of nameplates used.

3.04 SCHEDULE

A. Equipment Type: Control Damper

1. Identification: Nameplate or Stencils.

B. Equipment Type: Manual Damper

1. Identification: Tag.

C. Equipment, dampers, etc. above ceiling.

1. Identification: Ceiling tack in addition to Identification above ceiling.

END OF SECTION 230553

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.

B. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016.

C. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.

D. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, with Errata (2017).

E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.2 SUBMITTALS

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

B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.

1. Submit six weeks prior to starting the testing, adjusting, and balancing work.

2. Include certification that the plan developer has reviewed the contract documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.

3. Include at least the following in the plan:
   a. List of all air flow, measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
   b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
   c. Discussion of what notations and markings will be made on the duct drawings during the process.
   d. Final test report forms to be used.
   e. Detailed step-by-step procedures for TAB work for each system and issue, including:
      1) Diffuser proportioning.
      2) Branch/submain proportioning.
      3) Total flow calculations.

4) Diversity issues.

f. Expected problems and solutions, etc.

g. Details of how TOTAL flow will be determined; for example:

1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.

h. Specific procedures that will ensure that systems are operating at the lowest possible pressures and methods to verify this.

i. Time schedule for TAB work to be done in phases (by floor, etc.).

j. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

E. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Submit under provisions of Section 01 40 00.

2. Revise TAB plan to reflect actual procedures and submit as part of final report.

3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.

4. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side for approval. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations. Provide PDF copy of the final approved report on CD.

5. Include actual instrument list, with manufacturer name, serial number, and date of calibration.

6. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.

7. Units of Measure: Report data in I-P (inch-pound) units only.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Certified by one of the following:
   a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
   b. TABB
   c. NEBB

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

E. Pre-Qualified TAB Agencies:

1. United Test & Balance, Inc..
2. Substitutions: See Section 01 60 00 - Product Requirements.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Fire and volume dampers are in place and open.
4. Access doors are closed and duct end caps are in place.
5. Air outlets are installed and connected.

3.3 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.

1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.

C. Provide additional balancing devices as required.

3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 5 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 5 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 5 percent of design.

3.5 RECORDING AND ADJUSTING

A. Field Logs: Maintain written or computer logs including:

1. Running log of events and issues.
2. Discrepancies, deficient or uncompleted work by others.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on the as-built drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 SCOPE

A. Test, adjust, and balance the following:

1. Air Handling Units.
2. Air Terminal Units.
3. Air Inlets and Outlets.

3.7 MINIMUM DATA TO BE REPORTED

A. Electric Motors:

B. Air Moving Equipment:

1. Location.
2. Manufacturer.
3. Air flow, specified and actual.
4. Return air flow, specified and actual.
5. Outside air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Fan RPM.

C. Air Distribution Tests:

1. Air terminal number.
2. Room number/location.
3. Design air flow.
4. Test (initial) air flow.
5. Test (final) air flow.
6. Percent of design air flow.

END OF SECTION 230593

SECTION 230713 – DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply.
2. Indoor, exposed supply

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application of field-applied jackets.
4. Detail application at linkages of control devices.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by the manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in Duct Insulation Schedule, for where insulating materials shall be applied.

B. Provide materials with low Volatile Organic Compound (VOC) content, regionally sourced, containing high post-consumer recycled content. Adhesives and coatings shall be low or zero VOC waterborne, of 100% acrylic latex formulation.

C. Products shall not contain asbestos, lead, mercury, or mercury compounds.

D. Products that encounter stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

E. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

F. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type II with factory-applied vinyl jacket, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: or approved equal:
   a. Johns Manville; a Berkshire Hathaway company.
   b. Knauf Insulation.

H. Mineral-Fiber, Pipe Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Johns Manville; a Berkshire Hathaway company.
   b. Knauf Insulation.
   c. CertainTeed.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:

a. Childers Brand; H. B. Fuller Construction Products.
b. Eagle Bridges - Marathon Industries.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Eagle Bridges - Marathon Industries.
2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

4. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Knauf Insulation.
2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Childers Brand; H. B. Fuller Construction Products.

b. Eagle Bridges - Marathon Industries.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

6. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Childers Brand; H. B. Fuller Construction Products.
   b. Foster Brand; H. B. Fuller Construction Products.
8. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
9. Service Temperature Range: 0 to plus 180 deg F.
10. Color: White.

2.5 SEALANTS

A. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

11. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal:
    a. Childers Brand; H. B. Fuller Construction Products.
12. Materials shall be compatible with insulation materials, jackets, and substrates.
13. Fire- and water-resistant, flexible, elastomeric sealant.
14. Service Temperature Range: Minus 40 to plus 250 deg F.
15. Color: White.
16. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
17. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

F. Metal Jacket:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. ITW Insulation Systems; Illinois Tool Works, Inc.
   b. RPR Products, Inc.
2. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.
   a. Sheet and roll stock ready for shop or field sizing.
   b. Finish and thickness are indicated in field-applied jacket schedules.
   c. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.

C. Self-Adhesive Outdoor Jacket: 60-mil- (1.5-mm-) thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross laminated polyethylene film covered with white aluminum-foil facing.

3. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal:
   a. Polyguard Products, Inc.

2.7 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

4. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Avery Dennison Corporation, Specialty Tapes Division.
   b. Knauf Insulation.
5. Width: 3 inches.
6. Thickness: 11.5 mils.
7. Adhesion: 90 ounces force/inch in width.
8. Elongation: 2 percent.
9. Tensile Strength: 40 lbf/inch in width.
10. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

G. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. Avery Dennison Corporation, Specialty Tapes Division.
   b. Knauf Insulation.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.08 SECUREMENTS

A. Bands:

7. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
   a. ITW Insulation Systems; Illinois Tool Works, Inc.
   b. RPR Products, Inc.
8. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or.
9. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal.
10. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

PART 2 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
   a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

6. Seal penetrations with flashing sealant.
7. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
8. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
9. Seal jacket to roof flashing with flashing sealant.

L. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

M. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Section 07 84 13 "Penetration Firestopping" and fire-resistive joint sealers.

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

2. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.

3. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
4. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    c. Do not over compress insulation during installation.
    d. Impale insulation over pins and attach speed washers.
    e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
5. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
6. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
7. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
8. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 09 91 23 "Interior Painting."

9. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    a. Finish Coat Material: Interior, flat, latex-emulsion size.

N. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

O. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

P. Do not field paint aluminum or stainless-steel jackets.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

Q. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.08 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed and exposed return located in unconditioned space.

R. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.

3.09 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Rectangular, round and flat-oval, supply duct insulation (in conditioned space) shall be the following:

7. Mineral-Fiber Blanket: R-3.3.

S. Rectangular, round and flat-oval, supply and return duct insulation (not in conditioned space) shall be the following:

1. Mineral-Fiber Blanket: R-7.

END OF SECTION 230713

SECTION 230800 – MECHANICAL COMMISSIONING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers the Mechanical Contractor's responsibilities, and that of his subcontractors, for commissioning; each subcontractor or installer is responsible for the installation of a particular system or equipment item to be commissioned and is responsible for the commissioning activities relating to that system or equipment item.

B. On “Large” (new or remodel) work, the Washington State Department of Enterprise Services (DES) shall hire an independent Commissioning Agent who will provide the following services:

1. Review the Design Documents and all major submittals and provide written comments noting issues and or concerns.
2. Prepare Commissioning Specifications to be included in the Contract Documents. These Specifications shall include definitions of the Commissioning process, Contractor’s responsibilities, sample Pre-Functional Test Checklist Forms and sample Functional Test Forms.
3. Coordinate with the Mechanical Engineer to ensure that the proper information is incorporated in the Mechanical Technical Specifications.
4. Prepare the Commissioning documentation and perform commissioning procedures.
5. Review all Contractor submittals.
6. Provide a complete Commissioning Plan.
7. Perform site visits during construction to verify installation per the specifications.
8. Perform installation verification and witnessing to verify Contractor start-up procedures.
9. Monitor the TAB work performed by the Contractor’s TAB Agency.
10. Schedule, coordinate and participate in the completion of all functional performance testing including the completion of all data forms.
11. Document all issues related to deviations from project specifications and best industry practices.
12. Prepare a final Commissioning Report.

C. The entire HVAC system is to be commissioned, including commissioning activities for the following specific items:

1. Control system.
2. Major and minor equipment items.
3. Piping systems and equipment, including plumbing systems.
4. Ductwork and accessories.
5. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
6. Indoor Air Quality Procedures: The CA will coordinate, and Contractor will execute; see Section 01 57 21.

D. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.2 RELATED REQUIREMENTS

A. Section 01 91 00 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.

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

1.3 REFERENCE STANDARDS

A. ASHRAE Guideline 1 - The HVAC Commissioning Process; 1996

1.4 SUBMITTALS

A. HVAC Control System Documentation: Submit detailed sequences of operation, control system drawings, and points list, as specified on the drawings.

1. Incorporate the sequence of operation information specified in other HVAC specification sections.
2. Incorporate the shop drawing submittal information specified in the HVAC control system section.
3. Submittals prepared for other sections may be used in the preparation of this documentation.

B. Updated Submittals: Keep the CA informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

C. DRAFT Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled.

D. System name.

E. List of devices.

F. Step-by-step procedures for testing each controller after installation, including:

1. Process of verifying proper hardware and wiring installation.
2. Process of downloading programs to local controllers and verifying that they are addressed correctly.
3. Process of performing operational checks of each controlled component.
4. Plan and process for calibrating valve and damper actuators and all sensors.
5. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
6. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space

to specifically indicate when a sensor or controller has "passed" and is operating within the contract parameters.

7. Description of the instrumentation required for testing.
8. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the CA and TAB contractor for this determination.

G. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of CA.

H. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:

1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
2. Full as-built set of control drawings.
3. Full as-built sequence of operations for each piece of equipment.
4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room:
    a. Floor.
    b. Room number.
    c. Room name.
    d. Air handler unit ID.
    e. Reference drawing number.
    f. Air terminal unit tag ID.
    g. Heating and/or cooling valve tag ID.
    h. Minimum air flow rate.
    i. Maximum air flow rate.
5. Full print out of all schedules and set points after testing and acceptance of the system.
6. Full as-built print out of software program.
7. Electronic copy on disk of the entire program for this facility.
8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
10. Control equipment component submittals, parts lists, etc.
11. Warranty requirements.
12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
    a. Sequences of operation.
    b. Control drawings.
    c. Points lists.
    d. Controller and/or module data.
    e. Thermostats and timers.
    f. Sensors and DP switches.
    g. Valves and valve actuators.
    h. Dampers and damper actuators.
    i. Program setups (software program printouts).

I. Project Record Documents: See Section 01 78 00 for additional requirements.

1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and airflow stations on project record drawings.

J. Draft Training Plan: In addition to requirements specified in Section 01 79 00, include:

1. Follow the recommendations of ASHRAE Guideline 1.
2. Control system manufacturer's recommended training.
3. Demonstration and instruction on function and overrides of any local packaged controls not controlled by the HVAC control system.

K. Training Manuals: See Section 01 79 00 for additional requirements.

1. Provide three extra copies of the controls training manuals, to be include in the O & M manuals.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup, initial checkout, and required functional performance testing. Unless noted otherwise, such testing equipment will not become the property of the Owner.

PART 3 - EXECUTION

3.1 PREPARATION

A. Cooperate with the Commissioning Authority (CA) to develop the Prefunctional Checklists and Functional Test Procedures.

B. Furnish additional information requested by the CA.

C. Prepare a preliminary schedule for HVAC and domestic water piping, duct systems testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the CA; update the schedule as it changes.

D. Notify the CA when piping and duct systems testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur. Inform the CA when commissioning

activities not yet performed or not yet scheduled will delay construction. Notify ahead of time and be proactive in seeing that the CA has the scheduling information needed to efficiently execute the commissioning process.

E. Put all equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.

F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.

G. Provide temperature and pressure taps in accordance with the contract documents.

1. Provide a pressure/temperature plug at each water sensor that is an input point to the control system.

3.2 INSPECTING AND TESTING - GENERAL

A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.

B. Perform the Functional Tests directed by the CA for each item of equipment or other assembly to be commissioned.

C. Valve/Damper Stroke Setup and Check:

1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
2. Set pump/fan to normal operating mode.
3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not reasonably correspond, replace actuator.

D. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.3 TAB COORDINATION

A. TAB: Testing, Adjusting, and balancing.

B. Coordinate commissioning schedule with TAB schedule.

C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.

D. Provide all necessary unique instruments and instruct the TAB technicians in their use. This includes handheld control system interface for setting terminal unit boxes, etc.

E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the CA prior to starting TAB.

F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.4 CONTROL SYSTEM FUNCTIONAL TESTING

A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of the Contract Documents and the detailed Sequences of Operation documentation submittal.

B. Do not start functional testing until all controlled components have themselves been successfully functionally tested in accordance with the contract documents.

C. Using a skilled technician who is familiar with this building, execute the functional testing of the control system as required by the CA.

D. Functional testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.

1. The scope of trend logging is partially specified; trend log up to 50% more points than specified at no extra cost to Owner.
2. Perform all trend logging specified in Prefunctional Checklists and Functional Test Procedures.

E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.

F. Demonstrate the following to the CA during testing of controlled equipment, coordinate with commissioning of equipment.

1. Setpoint changing features and functions.
2. Sensor calibrations.

G. Demonstrate to the CA:

1. That all specified functions and features are set up, debugged and fully operable.
2. That scheduling features are fully functional and set up, including holidays.
3. That all graphic screens and value readouts are completed.
4. Correct date and time setting in central computer.
5. That field panels read the same time as the central computer; sample 10% of field panels; if any of those fail, sample another 10%; if any of those fail, test all remaining units at no extra cost to Owner.
6. Power failure and battery backup and power-up restart functions.

7. Global commands features.
8. Security and access codes.
9. Occupant over-rides (manual, telephone, key, keypad, etc.).
10. Operation and maintenance schedules and alarms.
11. Communications to remote sites.
12. All control strategies and sequences not tested during controlled equipment testing.
13. Trend logging and graphing features that are specified.
14. Other integrated tests specified in the contract documents
15. That control system features that are included but not specified to be set up are actually installed.

H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

3.5 OPERATION AND MAINTENANCE MANUALS

A. See Section 01 78 00 and 23 00 10 for additional requirements.

B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

C. Submit manuals related to items that were commissioned to CA for review; make changes recommended by CA.

D. CA will add commissioning records to manuals after submission to Owner.

3.6 DEMONSTRATION AND TRAINING

A. Demonstrate operation and maintenance of HVAC system to Owner's personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.

B. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the CA during Functional Testing.

C. Provide classroom and hands-on training of Owner's designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the minimum durations of training, as called for in the individual equipment specifications.

D. TAB Review: Instruct Owner's personnel for minimum four (4) hours, after completion of TAB, on the following:

1. Review final TAB report, explaining the layout and meanings of each data type.
2. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.

3. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
4. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
5. Other salient information that may be useful for facility operations, relative to TAB.

E. HVAC Control System Training:

1. Phase 1 - Basic Control System: Provide minimum of 8 hours of actual training on the control system itself. Upon completion of training, each attendee, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.
   a. This training may be held on-site or at the manufacturer's facility.
2. Phase 2 - Integrating with HVAC Systems: Provide minimum of eight (8) hours of on-site, hands-on training after completion of Functional Testing. Include instruction on:
   a. The specific hardware configuration of installed systems in this facility and specific instruction for operating the installed system, including interfaces with other systems, if any.
   b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing setpoints and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
   c. Trend logging and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends; provide practice in setting up trend logging and monitoring during training session.
   d. Every display screen, allowing time for questions.
   e. Use of keypad or plug-in laptop computer at the zone level.
   f. Use of remote access to the system via phone lines or networks.
   g. Setting up and changing an air terminal unit controller.
   h. Graphics generation.
   i. Point database entry and modifications.

F. Provide the services of manufacturer’s representatives to assist instructors where necessary.

G. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

END OF SECTION 230800

SECTION 230993 - SEQUENCES OF OPERATION FOR HVAC CONTROLS

PART 1 - GENERAL

1.1 SCOPE

A. This section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other sections. These sequences are for use with an Energy Management Control System (EMCS), incorporating Direct Digital Control (DDC) for energy management, equipment monitoring, and control.

B. Sequence of operation for:

1. Alarm Reporting
2. Carbon Dioxide (CO2) Sensors
3. Day Cycle - see Occupied Mode
4. Duct Smoke Detectors
5. Ductless Split Systems
6. Economizer Cooling
7. Exhaust Fan - General Instructions
8. Exhaust Fan - General Use
9. Exhaust Fan - Switched
10. Exhaust Fan - Reverse-Acting Thermostat
11. Fan Coil Units
12. Fire Alarm Monitoring and Air Handling Equipment Shutdown
13. Global Controls
14. Heating and Ventilating Units - Single Zone
15. Kitchen Ventilation
16. Motorized Dampers on Outside Air Ducts
17. Occupancy Sensor
18. Occupied Mode
19. Optimum Start/Stop
20. Unit Heaters
21. Unoccupied Mode
22. Warm-Up Mode - Mechanical Equipment
23. Water Heaters - Domestic Water

1.2 RELATED SECTIONS

A. Section 01 91 00 – Commissioning.

B. Section 23 08 00 – Mechanical Commissioning

1.3 SUBMITTALS

A. Sequence of Operation Documentation: Submit written sequence of operation for entire HVAC system and each piece of equipment.

1. Preface: One or two paragraph overview narrative of the system describing its purpose, components, and function.

2. State each sequence in small segments, and give each segment a unique number for referencing in Functional Test procedures. Provide a complete description regardless of the completeness and clarity of the sequences specified in the contract documents.
3. Include at least the following sequences:

    a. Start-up.
    b. Warm-up mode.
    c. Occupied mode.
    d. Unoccupied mode.
    e. Shutdown.
    f. Capacity control sequences and equipment staging.
    g. Temperature and pressure control, such as setbacks, setups, resets, etc.
    h. Detailed sequences for all control strategies, such as economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
    i. Effects of power or equipment failure with all standby component functions.
    j. Sequences for all alarms and emergency shut downs.
    k. Seasonal operational differences and recommendations.
    l. Interactions and interlocks with other systems.

4. Include initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other control settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.
5. For packaged controlled equipment, include manufacturer's furnished sequence of operation amplified as required to describe the relationship between the packaged controls and the control system, indicating which points are adjustable control points and which points are only monitored.
6. Include schedules, if known.

B. Control System Diagrams: Submit graphic schematic of the control system showing each control component and each component controlled, monitored, or enabled.

1. Label with settings, adjustable range of control and limits.
2. Include flow diagrams for each control system, graphically depicting control logic.
3. Include the system and component layout of all equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
4. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
5. Include all monitoring, control and virtual points specified elsewhere.
6. Include a key to all abbreviations.

C. Points List: Submit list of all control points indicating at least the following for each point.

1. Name of controlled system.
2. Point abbreviation.

3. Point description; such as dry bulb temperature, airflow, etc.
4. Display unit.
5. Control point or setpoint (Yes/No); i.e. a point that controls equipment and can have its setpoint changed.
6. Monitoring point (Yes/No); i.e. a point that does not control or contribute to the control of equipment but is used for operation, maintenance, or performance verification.
7. Intermediate point (Yes/No); i.e. a point whose value is used to make a calculation which then controls equipment, such as space temperatures that are averaged to a virtual point to control reset.
8. Calculated point (Yes/No); i.e. a "virtual" point generated from calculations of other point values.

D. Project Record Documents: Record actual locations of components and setpoints of controls, including changes to sequences made after submission of shop drawings.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Design system under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the State in which the Project is located.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. Provide 5-degree adjustable deadband to meet requirements of Washington State Energy Code.

3.2 ALARM REPORTING

A. Report alarm conditions indicated on the Input/Output Summary to the Operator Station.

B. Provide high pressure alarms for all units operating at 3" S.P. or above. Alarm shall shut down fan or ramp down VFD.

3.3 CABINET HEATERS

A. Space temperature sensor set at 68 degrees F (adjustable) maintains constant space temperature by cycling unit fan motor and electric heating elements or heating system water supply valve. Integral thermostat or relay in electric cabinet heaters continues fan operation until element temperature falls below 100 degrees F (adjustable).

3.4 CARBON DIOXIDE (CO2) SENSORS

A. Provide CO2 sensors where scheduled and/or shown on Plans. The average range of the CO2 monitor and percentage of outside air override shall be adjustable at the EMCS.

B. When in the occupied mode, outside air damper/*zone damper* ~~on unit(s)~~ associated with space shall open to allow 10% minimum outside air. When the CO2 level rises above 1000 parts per million (PPM), the outside air /*zone* damper shall modulate to keep the CO2 level below 1000 PPM. Return air damper shall modulate closed inversely with the outside air damper. (ADD#2)

C. Provide a high CO2 alarm setpoint that will indicate economizer failure. The alarm point shall be adjustable and initially set at 1500 PPM.

D. Calibration: Monitor CO2 sensors for calibration. EMCS shall perform a sensor test measurement of CO2 levels of unoccupied rooms from 2:00 am to 3:00 am. Provide an alarm when readings are not between 300 PPM and 500 PPM (adjustable range) for more than 30 minutes; alarms during this period of time require EMCS to display "Calibrate CO2 Sensor".

3.5 DUCT SMOKE DETECTORS

A. Controlled by fire alarm systems and wired by Electrical Contractor. Provide monitoring through EMCS. Low voltage wiring and contactors for monitoring shall be provided by Controls Contractor.

3.6 DUCTLESS SPLIT SYSTEMS

A. Ductless split system heat pump shall maintain space temperature. Unit shall operate based on manufacture provided controls.

B. DDC to monitor room temperature and alarm for excessive temperature.

C. Unit shall run continuously; i.e. not shall not shut down for unoccupied mode.

3.7 ECONOMIZER COOLING (existing EMCS / new units)

A. Economizer Enthalpy Control

1. The economizer shall be enabled whenever:

   a. The outside air dry-bulb temperature is less than the return air dry-bulb temperature
   b. AND the fan status is on.

2. When the outside air dew point is less than the return air dew point by an adjustable dead band (3 degrees F), the outdoor air damper(s) shall be set for 100% outdoor air.
3. When the Outdoor Air temperature is less than the supply air temperature set point the outdoor air damper, exhaust air damper, and return air damper will modulate, as appropriate, between the adjustable minimum position and full open to maintain the Discharge Air Temperature that will meet the room thermostat demand.
4. When the return air dew point is greater than the outdoor air dew point OR the outdoor air temperature is greater than the return air temperature the exhaust air

damper, return air damper and outside air damper shall be positioned to the minimum outside air position.

5. The economizer shall close to 0% (outside air and exhaust dampers shall be closed and return air damper shall be open) whenever:

    a. Supply fan or return fan is off
    b. OR mixed air temperature is less than 40°F.
    c. OR on loss of fan status.
    d. OR the Discharge Air Temperature Sensor has failed
    e. OR the AHU is in the Morning Warm-up or Cool-down mode

6. The Outdoor Air Damper shall be set to its adjustable minimum position if the Economizer function is disabled.
7. Alarms shall be provided as follows:

    a. High Mixed Air Temp: If the mixed air temperature is 5°F greater than set point.
    b. Low Mixed Air Temp: If the mixed air temperature is 5°F less than set point.
    c. High or low supply air temperature

3.8 EXHAUST FAN - GENERAL INSTRUCTIONS

A. Provide control for each fan as scheduled on the drawings.

B. EMCS shall monitor status of each fan. Fans not listed to be interlocked or controlled via thermostat or switch shall be controlled directly from the EMCS (schedule shall be adjustable). Provide adjustable reverse-acting thermostats for all fans as scheduled. Refer to Schedule on Plans for additional control requirements.

3.9 EXHAUST FAN - GENERAL USE

A. When the associated air handling unit is in occupied mode, the zone's exhaust fan shall start. When the air handling unit is in unoccupied mode, the exhaust fan shall stop.

B. Typical Areas Where Used

1. Copy Room
2. Work Room
3. Storage Room (For Chemical Storage Room, see EXHAUST FAN - CONTINUOUS USE)

3.10 EXHAUST FANS - SWITCHED

A. When Exhaust Fan switch is energized, the return air damper located in the associated air handling unit shall close, and the outside air intake damper shall fully open.

B. Typical Areas Where Used

1. Art Room
2. Ceramic Room

3. Science Room General Exhaust Fan

3.11 EXHAUST FAN - REVERSE-ACTING THERMOSTAT

A. On rise in temperature to above 80 degree F (adjustable), the exhaust fan shall be energized, and any associated outside air damper shall open. On a drop in temperature, fan shall be de-energized, and associated damper closed. Fans shall not be de-energized for unoccupied mode.

B. Typical Areas Where Used

1. Electrical Main Gear Room
2. Telephone Room
3. MDF Room
4. IDF Room
5. Mechanical Room

3.12 FAN COIL UNITS

A. Each unit shall operate via direct digital controller. The occupied/unoccupied signal shall be received from the central control system optimal start program. Each unit shall have a room sensor with an override push button for after hours (adjustable). When override button is pushed, the unit shall operate in occupied mode. This function shall be enabled or disabled through the central operator station. The after-hours time and zone set points shall be set at the computer terminal.

1. Push button override will also enable the boiler and heating water circulating pumps sequence of operation.

B. The unit controller shall cycle the unit as required to maintain space temperature setpoint.

C. Unit shall modulate the coil control valves to provide a supply air temperature that will satisfy space conditions. The unit's controller shall use the room temperature deviation to determine the coil control valve modulation so as to satisfy room conditions.

D. Heating and cooling shall be properly sequenced using a five-degree dead band so that there is no overlap between the use of heat and cooling.

3.13 FIRE ALARM MONITORING

A. Monitor fire alarm system for alarm and trouble conditions such that either of these conditions will be communicated to the EMCS host computer equipment.

B. Upon signal from the fire alarm panel, stop all air-handling units, fan coil units, and exhaust fans through software.

3.14 FREEZE PROTECTION

A. Air handling units with outside air shall have freezestats which shall stop unit operation if a discharge air temperature of 37 degrees F (adjustable) or less is sensed. The unit’s outside air damper shall close, and the unit shall cease operation until the freezestat resets

automatically for three cycles; then normal operation shall commence. After three automatic resets of the freezestats, manual reset shall be required.

3.15 GLOBAL CONTROLS

A. Global shutdown shall be through a software point easily located on the main page for the controls display. Global shutdown shall also be provided as a main switch located in the front office reception desk, principal's office, or where directed by Owner's representative.

B. Global variables for controls shall include master change for all setpoints together such as: heating/cooling setpoints and offsets, override time, nighttime setbacks, minimum and maximum room setpoints, heating and cooling lockouts, etc., as well as manual overrides for significant outputs such as coil control valves, dampers, heating and cooling modes, nighttime purge, etc.

3.16 HEATING AND VENTILATING UNITS - SINGLE ZONE (existing EMCS / new units)

A. Each unit shall operate via direct digital controller. The occupied/unoccupied signal shall be received from the central control system optimal start program. Each unit shall have a room sensor with an override push button for after hours (adjustable). When override button is pushed, the unit shall operate in occupied mode. This function shall be enabled or disabled through the central operator station. The after-hours time and zone set points shall be set at the computer terminal.

1. Push button override will also enable the boiler and heating water circulating pumps sequence of operation.

B. Occupied Mode: On an optimized signal to change from the unoccupied to the occupied mode, the supply fan shall be enabled, the outside air dampers remain closed, return air damper open, and the heating system shall modulate to maintain warm-up discharge air setpoint until the occupied start time. Upon reaching the occupied start time each coil shall maintain room setpoint temperature, and dampers shall modulate to minimum outside air position when the occupancy sensor detects occupants. The unit shall be placed into economizer mode or heating mode, whichever is required to maintain room set point. Upon being placed in the economizer mode, EMCS shall modulate the outside air dampers toward the open position or remain at minimum if the outside air temperature is above 70 degrees F (adjustable) to maintain the discharge air set point. At no time shall the outside air damper open beyond the minimum set point when in heating mode of operation.

1. Stage 1 Cooling: Cooling shall be the economizer cycle with the outside air damper fully open, supply fan operating at the low fan speed and the heating coil control valve closed.

C. Stand-By Mode: When the room is unoccupied as registered by the room occupancy sensor, the outside air damper closes and the return air damper opens.

1. Maintain a new Room "Stand-By" temperature setpoint.

D. Heating and Ventilating Unit for Variable Occupancy Areas With CO2 Sensors: See Paragraph CARBON DIOXIDE (CO2) SENSORS.

E. Unoccupied Mode: During the unoccupied mode, the unit fan shall be off with the outside air damper closed and return air damper open. Fan and heat shall cycle as required to maintain unoccupied mode setpoint.

3.17 KITCHEN VENTILATION

A. Interlock cooking hood exhaust fans with make-up air. Make-up air shall be derived from the adjacent zones. When exhaust fans are active the adjacent zone's outside air zone dampers shall override and open 100%.

B. Provide any additional wiring, controllers, sensors, relays and/or transformer to accomplish air control described in paragraphs above and below.

C. When kitchen dishwasher is started, the dishwasher hood exhaust fan and make-up air shall be energized. Make-up air shall be derived from the adjacent zones. When exhaust fans are active the adjacent zone's outside air zone dampers shall override and open 100%. When the dishwasher cycle is complete, the exhaust fan and make-up air from adjacent zones shall continue to operate for 30 minutes before shutting down unit.

3.18 MOTORIZED DAMPERS ON OUTSIDE AIR DUCTS

A. Motorized zone dampers shall be provided on the outside air ducts serving each ventilation zone and or mechanical unit. Dampers shall open when air handing units being served by that outside air source are energized and in an occupied or economizer mode.

3.19 NIGHT SETBACK

A. Apply to each heating and ventilation zone.

B. Night Setback shall be configured and interlocked with the building schedule.

C. Night Setback temperature shall be adjustable.

D. Building schedule shall be fully configurable allowing for each day and hour per year.

3.20 OCCUPIED MODE

A. Cooling and heating equipment are enabled as suitable for ambient conditions.

B. Fans run continuously. (existing units only, where spaces are not equipped with DOAS)

C. Modulate outside air damper position as required for minimum outside air flow as scheduled on the drawings and in conjunction with Testing and Balancing.

D. Sequence heat stages, dampers (on economizer cycle), and economizer cooling to maintain the discharge setpoint. Reset the discharge air temperature setpoint as needed to maintain the room temperature setpoint.

E. Modulate motorized relief air damper in proportion to the outside air damper (CFM) to maintain 0.08 - inches WC, differential pressure. Coordinate with Testing and Balance contractor.

F. Shut down fans on receipt of fire alarm condition.

3.21 OPTIMUM START/STOP

A. Apply the Optimized Start/Stop program to each heating and ventilation zone.

B. Optimized Start/Stop shall be fully configurable; provide all required hardware, sensors and programming to enable Optimum Start/Stop.

C. Optimized Start/Stop shall automatically adjust start time for each individual unit to achieve setpoint temperature 30 minutes prior to occupancy.

D. Building schedule shall be fully configurable allowing for each day and hour per year.

3.22 OUTSIDE AIR DUCT DAMPERS

A. Motorized dampers on the outside air ducts (see Plans for locations) shall open when air handing units being served by that outside air source are energized and in an occupied or economizer cooling mode.

3.23 RELIEF AIR SYSTEMS

A. Motorized dampers shall be provided on all relief ducts (see drawings for locations). Relief air damper actuators shall track with the outside air damper actuators serving the same area or as needed for pressure control. Coordinate with Test and Balance Contractor.

3.24 START-UP OF MECHANICAL EQUIPMENT

A. All mechanical equipment shall energize in a staged fashion. In case of loss of electricity due to power failure, holiday/weekend scheduling and morning warm-up shall require mechanical equipment to be staged "on" in a staggered fashion to prevent a large initial electrical load.

3.25 UNIT HEATERS

A. Maintain constant space temperature at 68 degrees F (adjustable) by cycling unit fan motor and energizing electric heating elements. Integral thermostat continues fan operation until element temperature falls below 100 degrees F (adjustable).

3.26 UNOCCUPIED CYCLE

A. Supply, return, and exhaust fans shall be de-energized.

B. Outside air and relief air dampers shall be closed.

C. Mixed air damper shall be open.

D. Heating system shall be off.

E. Cooling system shall be off.

F. DOAS system shall be off.

G. If a zone requires heating to maintain the minimum night setback temperature, the appropriate equipment, fans, pumps, etc. shall be energized. The cooling system shall remain off. The heating system shall bring the zone up to the night setback minimum temperature. The outside air and relief air dampers shall remain closed.

H. If a zone requires cooling to maintain the maximum night setback temperature, the appropriate equipment, fans, pumps, etc. shall be energized.

1. If conditions suit the use of economizer cooling, allow economizer cooling to commence, open outside air damper and relief air damper. The heating system shall remain off.
2. If economizer cooling is not appropriate, the mechanical cooling system shall operate to maintain night setback maximum temperature in the zone. The heating system shall remain off. The outside air and relief air dampers shall remain closed.

I. Revert to temporary Occupied Mode when space temperature sensor night override button is pushed; override initially set at 2 hours (adjustable).

3.27 WARM-UP MODE - MECHANICAL EQUIPMENT

A. Control system optimum-start controls shall provide warm-up switching for all items indicated as having a warm-up cycle. The outside air dampers shall remain fully closed during the warm-up cycle until the space temperature heating setpoint is reached or occupied period begins, whichever occurs first. After warm-up and 30 minutes prior to room occupancy, the outside air damper shall be opened to minimum outside air volume damper position as listed on Plans and as set by the Test and Balance subcontractor.

3.28 WATER HEATERS, DOMESTIC WATER SYSTEM

A. Water heater shall remain in continuous operation (24/7) in order to avoid allowing growth of Legionella. Set water temperature as shown in Schedule on Plans. If no temperature is shown, minimum water recirculation temperature shall be 120 degrees; tank storage shall be set for 140 degrees.

B. Occupied Mode: Water heater is enabled. Start hot water circulator before occupancy, initially set at 30 minutes (adjustable). EMCS shall monitor Hot Water Circulation Temperature using an aquastat. Provide aquastat to sense return water temperature and cycle the pump. Aquastat shall be capable of being overridden through the EMCS if the Owner decides to activate the pump continuously and bypass the aquastat.

C. Unoccupied Mode: Water heater is enabled and pump is off.

END OF SECTION 230993

SECTION 232300 – REFRIGERANT PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Piping

B. Refrigerant

C. Moisture and Liquid Indicators

D. Valves

E. Strainers

F. Check Valves

G. Pressure Regulators

H. Pressure Relief Valves

I. Filter-Driers

J. Solenoid Valves

K. Expansion Valves

L. Electronic Expansion Valves

M. Receivers

N. Flexible Connections

O. Insulation

P. Jackets

1.02 RELATED REQUIREMENTS

A. Section 01 91 00 – Commissioning.

B. Section 23 08 00 – Mechanical Commissioning

C. Section 23 09 93 - Sequence of Operations for HVAC Controls

D. Division 31 - Excavation, Fill, Trenching

1.03 REFERENCE STANDARDS

A. AHRI 495 - Performance Rating of Refrigerant Liquid Receivers; Air-Conditioning, Heating, and Refrigeration Institute.

B. AHRI 710 - Performance Rating of Liquid-Line Driers; Air-Conditioning, Heating, and Refrigeration Institute.

C. AHRI 730 - Flow-Capacity Rating and Application of Suction-Line Filters and Filter Driers; Air-Conditioning, Heating, and Refrigeration Institute.

D. AHRI 750 - Standard for Thermostatic Refrigerant Expansion Valves; Air-Conditioning, Heating, and Refrigeration Institute.

E. AHRI 760 - Standard for Performance Rating of Solenoid Valves for Use With Volatile Refrigerants; Air-Conditioning, Heating, and Refrigeration Institute.

F. ASHRAE Standard 15 - Safety Standard for Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; (ANSI/ASHRAE Standard 15).

G. ASHRAE Standard 34 - Designation and Safety Classification of Refrigerants; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

H. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers.

I. ASME B16.26 - Cast Copper Alloy Fittings For Flared Copper Tubes; The American Society of Mechanical Engineers.

J. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; The American Society of Mechanical Engineers.

K. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

L. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

M. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

N. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society; and errata.

O. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

P. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

Q. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

R. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes

S. UL 207 - Refrigerant-Containing Components and Accessories, Nonelectrical

T. Reference standards shall be the latest revision as accepted by the local Authority Having Jurisdiction.

1.04 SYSTEM DESCRIPTION

A. Liquid Indicators:

1. Use line size liquid indicators in main liquid line leaving condenser.

2. If receiver is provided, install in liquid line leaving receiver.

3. Use line size on leaving side of liquid solenoid valves.

B. Valves:

1. Use service valves on suction and discharge of compressors.

2. Use gauge taps at compressor inlet and outlet.

3. Use gauge taps at hot gas bypass regulators, inlet and outlet.

4. Use check valves on compressor discharge.

5. Use check valves on condenser liquid lines on multiple condenser systems.

C. Refrigerant Charging (Packed Angle) Valve: Use in liquid line between receiver shut-off valve and expansion valve.

D. Strainers:

1. Use line size strainer upstream of each automatic valve.

2. Where multiple expansion valves with integral strainers are used, use single main liquid line strainer.

3. On steel piping systems, use strainer in suction line.

4. Use shut-off valve on each side of strainer.

E. Pressure Relief Valves: Use on ASME receivers and pipe to outdoors.

F. Filter-Driers:

1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

2. Use a filter-drier on suction line just ahead of compressor.

3. Use sealed filter-driers in lines smaller than 1/2" outside diameters.

4. Use sealed filter-driers in low temperature systems.

5. Use sealed filter-driers in systems utilizing hermetic compressors.

6. Use replaceable core filter-driers in lines of 1/2" outside diameter or greater.

7. Use replaceable core liquid-line filter-driers in systems utilizing receivers.

G. Solenoid Valves:

1. Use in liquid line of systems operating with single pump-out or pump-down compressor control.

2. Use in liquid line of single or multiple evaporator systems.

3. Use in oil bleeder lines from flooded evaporators to stop flow of oil and refrigerant into the suction line when system shuts down.

H. Receivers:

1. Use on large systems, sized to accommodate pump down charge. See equipment schedule.

2. Use on systems with long piping runs.

I. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

1.05 SUBMITTALS

A. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.

B. Design Data: Submit design data indicating pipe sizing. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

C. Test Reports: Indicate results of leak test, acid test.

D. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.

E. Submit certifications of compliance with ASME (BPV IX) for each welder.

F. Project Record Documents: Record exact locations of equipment and refrigeration accessories on record drawings.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with a minimum of 5 years of documented experience.

C. Each shipping unit of aluminum refrigeration tube shall be marked with metal or alloy designation, temper, size, and name of supplier; with soft straight lengths identified with a tag indicating that the product was manufactured in accordance with ASTM B210 and complies with ASME B31.5; and each hard temper straight length identified throughout its length by a marking not less than 3/16" in height and a legend spaced not greater than 3' on center that includes the designation "ACR" and pipe outside diameter. Each hard temper straight length shall be manufactured in accordance with ASTM B210 and comply with ASME B31.5.

1.07 **REGULATORY REQUIREMENTS**

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

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

C. Provide Welder Certification in accordance with ASME (BPV IX).

D. Products Requiring Electrical Connection shall be listed and classified by UL as suitable for the purpose indicated.

1.08 **DELIVERY, STORAGE, AND HANDLING**

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

C. Dehydrate and charge components such as piping and receivers; seal prior to shipment and keep sealed until connected into system.

PART 2 PRODUCTS

2.01 **PIPING**

A. Copper Tube: ASTM B 280, H58 hard drawn cleaned, dehydrated and sealed marked ACR on hard tempered straight tubing.

1. Fittings: ASME B16.22 wrought copper.

2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy, with between 5% & 15% silver.

B. Mitsubishi VRF System

1. Standard ACR fittings rated for use with R410A are to be used for all connections. Proprietary manufacturer-specific appurtenances are not allowed.

2. Refrigerant pipe for CITY MULTI shall be made of phosphorus deoxidized copper, and has two types.

a. ACR Type-L “Annealed Temper”: Soft copper pipe, can be easily bent with human hand.

b. ACR Type L “Drawn Temper”: Hard copper pipe (straight pipe).

3. The maximum operation pressure of R410A air conditioner is 4.30 MPa [623psi] . The refrigerant piping should ensure the safety under the maximum operation pressure. Refer to recommend piping specifications in Mitsubishi Electric’s engineering manual. Pipes of radical thickness 0.7mm or less shall not be used.

4. Insulation: Refrigerant lines, as well as any valves, shall be insulated end to end with closed-cell pipe insulation, thickness as required by the Washington State Energy Code or local jurisdiction, whichever is more stringent. (ADD#3)

C. Seamless Aluminum Tube and Fittings:

1. Manufacturers:

a. Tubing:

1) Reflock

2) Approved equal.

b. Fittings

1) Reflock

2) Lokring

3) Approved equal.

2. ASTM B210 complying to ASME B31.5 Seamless Aluminum tubing and fittings may be substituted. If Aluminum tubing is substituted for copper, the joints must be made without the use of heat. Any joint fitting must be UL or ETL tested to UL 207 and listed for joining refrigeration tubing using either aluminum or copper tubing.

3. ETL tested to UL 207 and ETL listed copper to copper fittings for connecting copper-to-copper refrigerant piping.

4. ASTM B210 seamless drawn aluminum tubing, cleaned and capped in accordance with ASTM B280, and complying with ASME B31.5 for allowable strength, and wall thickness, with fittings tested to UL 207 and certified by ETL.

5. ETL tested to UL 207 and lETL listed aluminum-to-aluminum or copper-to-aluminum fittings for connection of refrigerant piping. Fittings shall have dielectric coating to allow connection of dissimilar metals. Fittings shall be certified to a working pressure of 600 psi.

D. Pipe Supports and Anchors:

1. Conform to ASME B31.5.

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

3. Hangers for Pipe Sizes 2" and Over: Carbon steel, adjustable, clevis.

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

5. Wall Support for Pipe Sizes to 3": Cast iron hook.

6. Wall Support for Pipe Sizes 4" and Over: Welded steel bracket and wrought steel clamp.

7. Vertical Support: Steel riser clamp.

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

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

10. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded. Zinc plated.

2.02 REFRIGERANT

A. Refrigerant: 410a, combination of difluoromethane (HFC-32) and pentafluoroethane (HFC-125) as defined in ASHRAE Standard 34. Verify with equipment manufacturer prior to charging.

B. Other refrigerants are not to be used unless prior approval is obtained from the Owner’s representative.

2.03 MOISTURE AND LIQUID INDICATORS

A. Manufacturers:

1. Sporlan Valve Company

2. Approved equal

B. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.04 VALVES

A. Manufacturers:

1. Sporlan Valve Company

2. Approved equal

B. Diaphragm Packless Valves:

1. UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, solder or flared ends, with positive backseating. Maximum working pressure of 500 psi and maximum temperature of 275 degrees F.

C. Packed Angle Valves:

1. Forged brass or nickel plated forged steel, forged brass seal caps with copper gasket, rising stem and seat with backseating, molded stem packing, solder or flared ends. Maximum working pressure of 500 psi and maximum temperature of 275 degrees F.

D. Ball Valves:

1. Two piece bolted forged brass body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals. Maximum working pressure of 500 psi and maximum temperature of 300 degrees F.

2.05 STRAINERS

A. Straight Line or Angle Line Type:

1. Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass. Maximum working pressure of 430 psi.

2.06 CHECK VALVES

A. Manufacturers:

1. Parker Hannifin/Refrigeration and Air Conditioning

2. Sporlan Valve Company

3. Approved equal

B. Globe Type:

1. Cast bronze or forged brass body, forged brass cap with neoprene seal, brass guide and disc holder, phosphor-bronze or stainless steel spring, teflon seat disc; for maximum temperature of 300 degrees F and maximum working pressure of 425 psi.

C. Straight Through Type:

1. Brass body and disc, phosphor-bronze or stainless steel spring, neoprene seat. Maximum working pressure of 500 psi and maximum temperature of 200 degrees F.

2.07 PRESSURE REGULATORS

A. Manufacturers:

1. Parker Hannifin/Refrigeration and Air Conditioning

2. Sporlan Valve Company

3. Approved equal

B. Brass body, stainless steel diaphragm, direct acting, adjustable over 0 to 80 psi range. Maximum working pressure of 450 psi.

2.08 PRESSURE RELIEF VALVES

A. Manufacturers:

1. Sporlan Valve Company

2. Approved equal

B. Straight Through or Angle Type: Brass body and disc, neoprene seat, factory sealed and stamped with ASME UV and National Board Certification NB, selected to ASHRAE Standard 15, with standard setting of 235 psi.

2.09 FILTER-DRIERS

A. Manufacturers:

1. Flow Controls Division of Emerson Electric
2. Parker Hannifin/Refrigeration and Air Conditioning
3. Sporlan Valve Company
4. Approved equal

B. Cores:

1. Molded or loose-fill molecular sieve desiccant compatible with refrigerant.
2. Activated alumina or activated charcoal
3. Filtration to 40 microns, with secondary filtration to 20 microns
4. Of construction that will not pass into refrigerant lines.
5. Construction: UL listed.
6. Replaceable Core Type: Steel shell with removable cap.
7. Sealed Type: Copper shell.
8. Connections: As specified for applicable pipe type.

2.10 SOLENOID VALVES

A. Manufacturers:

1. Flow Controls Division of Emerson Electric
2. Parker Hannifin/Refrigeration and Air Conditioning
3. Sporlan Valve Company
4. Approved equal

B. Valve: AHRI 760, pilot operated, copper or brass body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil failure), and integral strainer, with flared, solder, or threaded ends. Maximum working pressure of 500 psi.

C. Coil Assembly: UL 429, UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector, color coded lead wires, and integral junction box with pilot light.

D. Electrical Characteristics: 120 volts, single phase, 60 Hz.

2.11 EXPANSION VALVES

A. Manufacturers:

1. Flow Controls Division of Emerson Electric

2. Parker Hannifin/Refrigeration and Air Conditioning

3. Sporlan Valve Company

4. Approved equal

B. Angle or Straight Through Type: AHRI 750; design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with non-replaceable capillary tube and remote sensing bulb and remote bulb well.

C. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F superheat. Select to avoid being undersized at full load and excessively oversized at part load.

2.12 ELECTRONIC EXPANSION VALVES

A. Manufacturers:

1. Parker Hannifin/Refrigeration and Air Conditioning

2. Sporlan Valve Company

3. Approved equal

B. Valve:

1. Brass body with flared or solder connection, needle valve with floating needle and machined seat, stepper motor drive.

C. Evaporation Control System:

1. Electronic microprocessor based unit in enclosed case, proportional integral control with adaptive superheat, maximum operating pressure function, preselection allowance for electrical defrost and hot gas bypass.

D. Refrigeration System Control: Electronic microprocessor based unit in enclosed case, with proportional integral control of valve, on/off thermostat, air temperature alarm (high and low), solenoid valve control, liquid injection adaptive superheat control, maximum operating pressure function, night setback thermostat, timer for defrost control.

2.13 RECEIVERS

A. Manufacturers:

1. Parker Hannifin/Refrigeration and Air Conditioning

2. Sporlan Valve Company

3. Approved equal

B. Internal Diameter 6" and Smaller:

1. AHRI 495, UL listed, steel, brazed; 400 psi maximum pressure rating, with tappings for inlet, outlet, and pressure relief valve.

C. Internal Diameter Over 6":

1. AHRI 495, welded steel, tested and stamped in accordance with ASME (BPV VIII, 1); 400 psi with tappings for liquid inlet and outlet valves, pressure relief valve, and magnetic liquid level indicator.

2.14 FLEXIBLE CONNECTORS

A. Manufacturers:

1. Circuit Hydraulics, Ltd.

2. Flexicraft Industries

3. Penflex

4. Reflock

5. Approved equal

B. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9" long with copper tube ends; for maximum working pressure of 500 psi.

C. Double braided stainless steel flexible pipe connections with Reflock end connections.

2.15 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534 Grade 3; use molded tubular material wherever possible.

1. Minimum Service Temperature: -40 degrees F.

2. Maximum Service Temperature: 220 degrees F.

3. Connection: Waterproof vapor barrier adhesive.

B. Usage: Refrigeration Piping - Interior / Exterior.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

D. Interior pipe installations: No finish is required over concealed insulation indoors. Apply two coats of manufacturer's recommended finish, where insulation is exposed indoors.

E. Inserts: Provide inserts at all support locations; see Section 23 00 20.

F. Exterior pipe installations:

1. Apply one coat of manufacturer's recommended finish

2. Jacket
   a. Stainless steel jacket and fittings; make watertight.

   b. Zinc-coated sheetmetal ducting. SlimDuct RD-series or approved equal.

   c. UV-, fire-, and weather-resistant ivory-colored extruded PVC round duct; SlimDuct PD-Series or approved equal.

2.16 JACKETS

A. Aluminum Jacket: ASTM B209 (ASTM B209M) formed aluminum sheet.

1. Thickness: 0.040” sheet.

2. Finish: Smooth.

3. Joining: Longitudinal slip joints and 2” laps.

4. Fittings: 0.040” thick die shaped fitting covers with factory attached protective liner.

5. Metal Jacket Bands: 3/8” wide; 0.010” thick stainless steel.

B. Lineset Covers

1. Manufacturers

   a. Fortress

   b. SpeediChannel

   c. SlimDuct

   d. Approved equal

2. Sized to cover refrigerant piping and insulation.

3. UV-resistant fire-resistant rigid polyvinyl chloride, or zinc-coated sheetmetal

4. Standard color as selected by Architect

PART 3 EXECUTION

3.01 PREPARATION

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

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

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

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

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

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

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

F. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.5.

2. Support horizontal piping as scheduled.

3. Install hangers to provide minimum 1/2" space between finished covering and adjacent work.

4. Place hangers within 12" of each horizontal elbow.

5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.

6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

7. Provide copper plated hangers and supports for copper piping.

8. Provide vibration isolation hangers for all refrigeration piping. Refrigeration piping shall not be attached to the building structure.

G. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

H. Provide clearance for installation of insulation and access to valves and fittings.

I. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 08 31 00.

J. Flood copper piping system with nitrogen when brazing.

K. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

L. Prepare unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 90 00.

M. Insulate piping and equipment; refer to Section 23 07 19.

N. Follow ASHRAE Standard 15 procedures for charging and purging of systems and for disposal of refrigerant.

O. Provide replaceable cartridge filter-driers, with isolation valves and valved bypass. Use bi-directional units for heat pumps.

P. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.

Q. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.

R. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.

S. Fully charge completed system with refrigerant after testing.

T. Provide electrical connection to solenoid valves. Refer to Section 26 27 17.

U. Contractor may substitute Reflok or Lokring fittings (refer to Part 2 – Products) for brazing of copper tubing. If Reflok or Lokring fittings are used to join tubing (copper or aluminum), brazing and nitrogen purge are eliminated.

V. Exterior Insulation Applications: Cover with Aluminum jacket with seams located on side of horizontal piping, lapped so that water cannot enter; make watertight.

3.03 FIELD QUALITY CONTROL

A. Test refrigeration system in accordance with ASME B31.5.

B. Pressure test system with dry nitrogen according to manufacturer’s installation instructions and warranty requirements. Test to no leakage.

END OF REFRIGERANT PIPING AND SPECIALTIES SECTION

SECTION 233100 – HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Duct Materials

B. Ductwork Fabrication

C. Manufactured Metal Ductwork and Fittings

D. Duct Cleaning

1.2 RELATED REQUIREMENTS

A. Section 23 07 13 - Duct Insulation: Duct liner.

B. Section 23 33 00 - Air Duct Accessories.

C. Section 23 37 00 - Air Outlets and Inlets.

D. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC

E. Division 31 - Excavation, Fill, Trenching.

1.3 REFERENCE STANDARDS

A. ASTM A 36 - Standard Specification for Carbon Structural Steel.

B. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.

F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association.

G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association.

H. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association.

I. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

J. SMACNA (FGD) - Fibrous Glass Duct Construction Standards; Sheet Metal and Air Conditioning Contractors' National Association.

K. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication & Installation Guidelines.

L. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.

M. All codes and reference standards shall be the latest revision as accepted by the local Authority Having Jurisdiction.

1.4 PERFORMANCE REQUIREMENTS

A. No variation of duct configuration or sizes permitted except by written permission of the Architect and Engineer. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. Meet or exceed SMACNA requirements for all sheet metal systems.

B. Leakage Testing General Requirements: Maximum permissible leakage shall be as noted in the Washington State Energy Code, or as noted in these specifications, whichever is more stringent.

1.5 SUBMITTALS

A. Product Data: Provide data for all materials.

B. Shop Drawings: Indicate ducts, fittings, and particulars such as gage, sizes, welds, and configuration prior to starting work on systems. Duct design pressure rating is posted on contract drawings, shop drawings shall reflect pressure class as shown. Shop drawings are to clarify duct routing taking into consideration structural members, electrical equipment, and other mechanical equipment. Contractor to submit shop drawings for review.

C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.

D. Manufacturer's Installation Instructions.

E. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

1.7 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A, 90B, 96 and SMACNA standards.

1.8 FIELD CONDITIONS

A. Do not install lined ducts in wet locations. Contractor to keep ends of lined duct covered at all times. If lined duct becomes wet or dirty, remove from jobsite and replace with new duct. The General Contractor to provide weather protection if his schedule requires the sheet metal subcontractor to working ahead of the building being dried in.

B. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

C. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 - PRODUCTS

2.1 DUCT ASSEMBLIES

A. Provide duct assemblies as shown on Plans.

2.2 MATERIALS

A. Galvanized Steel Ducts: Hot-dipped galvanized steel sheet, ASTM A 653 FS Type B, with G60/Z180 coating.

B. Non-Galvanized Steel for Ducts: ASTM A 1008, Designation CS, cold-rolled commercial steel.

C. Aluminum Ducts: ASTM B 209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T6 or of equivalent strength.

D. Stainless Steel for Ducts: ASTM A 240/A 240M, Type 304.

E. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.

1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
2. VOC Content: Not more than 250 g/L, excluding water.
3. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E84.

F. Insulated Flexible Ducts:

1. Manufacturers:
   a. Thermaflex Model G-KM

b. Approved equal.

2. Chlorinated polyethylene core supported by helically wound coated spring steel wire; fiberglass insulation; black polyethylene vapor barrier film.
   a. Pressure Rating: 6" wg positive and 1" wg negative.
   b. Maximum Velocity: 5000 fpm
   c. Temperature Range: -20 degrees F to 200 degrees F continuous.
   d. R-4.2, meeting UL 181, & NFPA 90A - 90B fire codes, self-extinguishing.
   e. GREENGUARD certified for Children and Schools.
   f. Acoustically rated.
   g. Warranted for 10 years.
   h. Maximum length 6'.
   i. Install per manufacturer's recommendations.
   j. Run insulated flexible duct as straight as possible.

G. Stainless Steel Ducts: ASTM A 666, Type 304.

H. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.

2.3 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and SMACNA High Velocity Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

D. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.

E. T's, bends, and elbows: Construct according to SMACNA (DCS).

F. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

G. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

H. Provide standard 45-degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

I. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide minimum 12" long plenum same size as the louver, sloped to drain to the exterior. Line plenum with self-adhering rubberized asphalt flashing as shown on Plans; seal plenum to louver frame and duct. Connect duct to plenum with 45-degree divergence fittings.

J. Contractor may use the Ductmate connection system at his option. System consists of flanges with integral sealants, corner pieces, clips, bolts, cleats and gaskets.

2.4 MANUFACTURED METAL DUCTWORK AND FITTINGS

A. Manufacturers

1. Thermaduct
2. Metal-Fab, Inc.
3. SEMCO Incorporated
4. United McGill Corporation
5. Approved equal.

B. Manufacture in accordance with SMACNA HVAC Duct Construction Standards as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated on drawings.

C. Single Wall Round Duct And Fittings: Materials shall be per SMACNA HVAC Duct Construction Standards, Metal and Flexible, Galvanized Sheet Metal. Provide spiral duct.

D. Double Wall Insulated Round Ducts: Round spiral lockseam duct with galvanized steel outer wall, 1" thick fiberglass insulation, perforated galvanized steel inner wall; fitting with solid inner wall.

1. Manufacturers:
   a. Thermaduct
   b. United McGill Corporation Model K27.
   c. Approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. General:

1. Install in accordance with manufacturer's instructions.

2. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

4. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

5. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

6. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

7. Use crimp joints with or without bead for joining round duct sizes 8" and smaller with crimp in direction of air flow.

8. Use double nuts and lock washers on threaded rod supports. Cut rods flush with second nut.

9. Connect diffusers to low pressure ducts directly or with 6' maximum length of flexible duct held in place with strap or clamp.

10. The sheet metal contractor shall protect the fabric duct to assure that the system is clean on completion of installation and at project acceptance.

11. At exterior wall louvers, provide minimum of 12" long plenum same size as louver and sloped to the exterior. Plenum shall be lined with self-adhering rubberized flashing as detailed on Plans. Seal plenum to louver. Connect duct to plenum with 45 degree divergence.

3.2 CLEANING

A. Duct cleaning shall be required when contractor fails to protect the ductwork prior to installation and or keep ends covered once duct is installed.

B. Remove all labels from exposed ductwork, including ductwork in mechanical spaces. Labels may remain only on ducts in concealed locations only.

END OF SECTION 233100

SECTION 233300 – AIR DUCT ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Air Turning Devices/Extractors

B. Backdraft Dampers

C. Duct Access Doors

D. Duct Test Holes

E. Flexible Duct Connections

F. Motorized Dampers

G. Sleeves For Ducts Through Non-Fire-Rated Walls

H. Volume Control Dampers

1.2 RELATED REQUIREMENTS

A. Section 01 91 00 – Commissioning.

B. Section 23 08 00 – Mechanical Commissioning

C. Section 23 05 48 - Vibration and Seismic Controls for Piping and Equipment

D. Section 23 31 00 - HVAC Ducts and Casings

1.3 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.

B. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

C. Reference standards shall be the latest revision as accepted by the local Authority Having Jurisdiction.

1.4 SUBMITTALS

A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

C. Manufacturer's Installation Instructions: Provide instructions for fire dampers.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

1.7 EXTRA MATERIALS

A. Provide six (6) of each size and type of fusible link used on this project.

PART 2 - PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

A. Manufacturers:

1. Krueger
2. Ruskin Company
3. Approved equal.

B. Multi-blade device with blades aligned in short dimension, steel construction, with individually adjustable blades and mounting straps.

C. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with push-pull operator strap.

2.2 BACKDRAFT DAMPERS

A. Manufacturers:

1. Greenheck Fan Corporation
2. Nailor Industries Inc.
3. Ruskin Company
4. Approved equal.

B. Gravity Backdraft Dampers, Size 18” x 18” or smaller, furnished with air moving equipment shall be air moving equipment manufacturer's standard construction.

C. Multi-Blade, Parallel Action Backdraft Dampers - Vertical:

1. Maximum Leakage: 15 cfm @ 1". w.g. Tested in accordance with AMCA standard 500-D.
2. Maximum Differential Pressure Rating: 2.5" w.g.
3. Maximum Velocity Rating: 2000 feet per minute
4. Construction:
   a. Damper Frame: 0.063" extruded aluminum
   b. Blades: 0.050" extruded aluminum, 6" maximum blade width
   c. Blade Edge Seals: Vinyl, mechanically fastened to blade
   d. Linkage: Plated steel.
   e. Axles:. Aluminum
   f. Bearings: Synthetic polycarbonate
   g. Finish: Mill finish
5. Counter-Balance required for applications that do not include forced air (i.e. do not have a fan).
6. Similar to Greenheck ES series.

2.3 DUCT ACCESS DOORS

A. Manufacturers:

1. Ventfabrics
2. National Controlled Air
3. Approved equal.

B. Provide duct access doors in ductwork where indicated and at all automatic control dampers, backdraft dampers, barometric dampers, fire dampers, smoke dampers, combination smoke fire dampers, filters, thermostats, and other apparatus requiring service and inspection in the duct system.

C. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

D. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1" thick insulation with sheet metal cover.

1. Up to 18" Square: Provide two hinges and two sash locks.
2. Up to 24" x 48": Three hinges and two compression latches with outside and inside handles.
3. Larger Sizes: Provide an additional hinge.

2.4 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.5 FLEXIBLE DUCT CONNECTIONS

A. Wherever ducts make connection with any air-handling device such as supply fans, exhaust fans, etc., flexible connections shall be provided.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 ounces per square yard.
2. Net Fabric Width: Approximately 2" wide.

2.6 MOTORIZED DAMPERS

A. All motorized dampers shall be installed under this specification unless specified as a standard integral component of a particular piece of equipment, e.g., packaged kitchen heat recovery unit. Installation shall be under the supervision of the Automatic Temperature Control Contractor.

B. Dampers shall be full size of duct, be sealed between damper frame and duct, and shall operate without binding on duct wall. Provide access panels for motorized dampers, 12" x 12" minimum.

C. Where motorized dampers are installed in fiberglass ductwork, provide sheet metal sleeve that also contains the access noted above.

D. Belimo operators are the only electronic operators accepted.

2.7 REMOTE ACCESS FOR VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Ventlock
2. Young Regulator
3. Approved equal.

B. Provide Ventlock Model 666 concealed damper regulator, where required.

C. Provide Remote Power Balance System, damper and control, where shown.

2.8 SLEEVES FOR DUCTS THROUGH NON-FIRE-RATED WALL

A. Provide sheet metal sleeves around ducts, penetrating through walls or floors. Pack opening around duct with fiberglass and caulk with resilient acoustical caulk and then install 3" x 3" - 18

gage sheet metal closure angle all around duct, overlapping corners, secure to duct and wall. Caulk and install closure angle on both sides of wall. When insulated on the exterior, butt to closure angles. See Section 07 84 00 for Fire Caulking requirements, Fire Caulking installation by Section 07 84 00 Subcontractor or General Contractor.

2.9 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Ruskin Company
2. Greenheck Fan Corporation
3. Approved equal.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Volume Control Dampers shall be installed on all branch duct take-offs to diffusers, grilles and registers. Do not provide or use dampers at the face of the diffuser, grilles or registers for balancing.

D. Single Blade Dampers: Fabricated for duct sizes up to 6" x 30"

E. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8" x 72". Assemble center and edge crimped blades in galvanized channel frame with suitable hardware.

F. End Bearings: Except in round ducts 12" and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

G. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts, mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30", provide regulator at both ends.

PART 3 - EXECUTION

3.1 INSTA`LLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.

B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, and elsewhere as indicated. Provide minimum 8" x 8" size for hand access, 18" x 18" size for shoulder access, and as indicated. Provide 4" x4" for balancing dampers only. Review locations prior to fabrication.

C. Provide duct test holes where indicated and required for testing and balancing purposes.

D. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent the equipment.

E. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

F. Provide balancing/volume dampers on all branch duct take-offs to diffusers, grilles, and registers. These will be used in addition to dampers at the face of the devices.

END OF SECTION 233300

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof Exhausters.

B. Wall Exhausters.

C. Cabinet and Ceiling Exhaust Fans.

D. Centrifugal Fans.

E. Stratification Fans.

1.02 RELATED REQUIREMENTS

A. Section 01 91 00 – Commissioning.

B. Section 23 08 00 – Mechanical Commissioning

C. Section 23 05 48 - Vibration and Seismic Controls for Piping and Equipment.

1.03 REFERENCE STANDARDS

A. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc.

B. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; (ANSI/AMCA 210, same as ANSI/ASHRAE 51).

C. AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program; Air Movement and Control Association International, Inc.

D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; Air Movement and Control Association International, Inc.

E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; Air Movement and Control Association International, Inc.

F. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association.

G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association.

H. UL 705 - Power Ventilators; Underwriters Laboratories Inc.

I. Reference standards shall be the latest revision as accepted by the local Authority Having Jurisdiction.

1.04 SUBMITTALS

A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

B. Manufacturer's Instructions: Indicate installation instructions.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Kitchen Range Hood Exhaust Fans: Comply with requirements of NFPA 96.

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

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect motors, shafts, and bearings from weather and construction dust.

1.07 FIELD CONDITIONS

A. Permanent ventilators may be used for ventilation during construction only after ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Greenheck

B. Loren Cook

C. Approved equal.

2.02 ROOF EXHAUSTERS

A. Product Requirements:

1. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.

2. Sound Ratings: AMCA 301, tested to AMCA 300, and bearing AMCA Certified Sound Rating Seal.

3. Fabrication: Conform to AMCA 99.

4. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

B. Performance Ratings:

1. See Schedule on Plans.

C. Fan Unit: V-belt or direct-driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2" mesh, 0.062" thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.

D. Roof Curb: Self-flashing galvanized steel with continuously welded seams and built-in cant strips. Curb is to bear on roof deck, with top minimum 12" above finished roof level. See Plans for details.

E. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor .

F. Solid-state speed controller.

G. Variable speed motor - electronically commutated motor (ECM)

1. Greenheck Vari-Green

2. Approved equal

H. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

I. Motorized Damper: Line-voltage or low-voltage motor drive, power open and spring return.

J. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.03 WALL EXHAUSTERS

A. Performance Ratings:

1. See Schedule on Plans.

2. Fan Unit: V-belt or direct driven with spun aluminum housing; resiliently mounted motor; 1/2" mesh, 0.062" thick aluminum wire bird screen.

B. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

C. Solid-state speed controller.

D. Variable speed motor - electronically commutated motor (ECM)

1. Greenheck Vari-Green

2. Approved equal

E. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

F. Motorized Damper: Line-voltage or low-voltage motor drive, power open and spring return.

G. Sheaves: For V-belt drives, provide cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid adjustment. Fan shaft with self-aligning pre-lubricated ball bearings.

2.04 CABINET AND CEILING EXHAUST FANS

A. Performance Ratings:

1. See Schedule on Plans.

B. Centrifugal Fan Unit: Direct driven with galvanized steel housing lined with acoustic insulation, resilient mounted motor, gravity backdraft damper in discharge.

C. Disconnect Switch: Cord and plug in housing for thermal overload protected motor and wall mounted switch.

D. Grille: Molded white plastic.

E. Speed Controller: Provide speed controllers for all direct drive cabinet and ceiling exhaust fans. Speed controllers are for the purpose of balancing exhaust air quantities and shall be factory mounted on the fan housing.

F. Variable speed motor - electronically commutated motor (ECM)

1. Greenheck Vari-Green

2. Approved equal

G. Backdraft Damper: Gravity actuated, aluminum construction, felt edged with offset hinge pin, nylon bearings.

2.05 CENTRIFUGAL FANS

A. Wheel and Inlet

1. Backward Inclined: Steel or aluminum construction with smooth curved inlet flange, heavy back plate, backwardly curved blades welded or riveted to flange and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

2. Forward Curved: Galvanized steel construction with inlet flange, back plate, shallow blades with inlet and tip curved forward in direction of airflow,

mechanically secured to flange and back plate; steel hub swaged to back plate and keyed to shaft with set screw.

3. Airfoil Wheel: Steel construction with smooth curved inlet flange, heavy back plate die formed hollow airfoil shaped blades continuously welded at tip flange, and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

B. Housing

1. Heavy gage steel, spot welded for AMCA 99 Class I and II fans, and continuously welded for Class III, adequately braced, designed to minimize turbulence with spun inlet bell and shaped cut

2. Factory finish before assembly to manufacturer's standard. For fans handling air downstream of humidifiers, fabricate of galvanized steel.

C. Bearings and Drives

1. Bearings: Heavy duty pillow block type, self-greasing roller bearings, or ABMA 11 life at 120,000 hours.

2. Shafts: Hot rolled steel, ground and polished, with keyway, protectively coated with lubricating oil, and shaft guard.

3. Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 horsepower and under, selected so required rpm is obtained with sheaves set at mid adjustment. Fixed sheave for 20 horsepower and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

4. Belt Guard: Fabricate to SMACNA Duct Construction Standards - Metal and Flexible; 0.106 inch thick, 3/4" diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

D. Accessories:

1. Fixed Inlet Vanes: Steel construction with fixed cantilevered inlet guide vanes welded to inlet bell.

2. Adjustable Inlet Vanes: Steel construction with blades supported at both ends with two permanently lubricated bearings, variable mechanism out of air stream terminating in single control lever with control shaft for double width fans and locking quadrant.

3. Discharge Dampers: Parallel blade heavy duty steel damper assembly with blades constructed of two plates formed around and welded to shaft, channel frame, sealed ball bearings, with blades linked out of air stream to single control lever.

4. Inlet/Outlet Screens: Galvanized steel welded grid.

5. Provide speed controllers for ALL direct-drive ceiling exhaust fans. Speed controllers are for the purpose of balancing exhaust air quantities and shall be factory mounted on the fan housing.

2.06 HIGH-VOLUME, LOW-SPEED FANS

A. Manufacturers

1. Big Ass Fans

2. Big Ass Fans; “Big Fan” package which eliminates the word “Ass” from ALL BRANDING AND IMAGING.

3. Approved equal.

B. Performance:

1. See Schedule on Plans.

C. Complete Unit: The fan shall be ETL certified and built pursuant to construction guidelines set forth by UL standards 507 and CSA standard C22.2 No. 113-08. The fan shall be designed to move an effective amount of air for cooling and de-stratification. The fan, in operation, shall not disturb other hanging objects 2’ (61 cm) outside of its circumference to a distance of 3’ below its airfoils. The fan shall incorporate a direct drive system designed specifically for high volume, low speed fans. The sound levels from the fan operating at maximum speed shall not exceed 40 dBA (measured 20’ below the blades and 20’ horizontally from the center of the fan).

D. Airfoils: The fan shall be equipped with high-volume, low-speed airfoils of precision extruded aluminum alloy. The airfoils shall be connected by means of two (2) sets of bolts and lock washers per airfoil. The airfoils shall be connected to the hub and interlocked with zinc-plated steel retainers.

E. Winglets: The fan shall be equipped with winglets designed to redirect outward airflow into downward airflow. The winglets shall be molded polyethylene terephthalate thermoplastic polyester resin. A winglet shall be attached at the tip of each airfoil.

F. Motor: The fan motor shall be a permanent magnet brushless motor rated for continuous operation at maximum speed with the capability of modulating the fan speed from 0-100% without the use of a gearbox or other mechanical means of control. The motor shall operate from any voltage ranging from 100-130 VAC, 1-phase, and 60Hz, without requiring adapters or customer selection. The motor shall be a non-ventilated, heat sink design with the capability of continuous operation in -40 degrees F to 131 degrees F ambient conditions. Complete with VFD.

G. Hub: The fan hub shall be constructed of steel. The hub shall incorporate five (5) safety retaining clips made of 1/8” thick steel that shall restrain the hub/airfoil assembly in case of shaft failure.

H. Mounting System: The fan mounting system shall be designed for quick and secure installation from the structure. All components in the mounting system shall be of welded construction using low carbon steel no less than 3/16” (0.5 cm) thick and powder coated or plated for corrosion resistance and appearance. All mounting bolts shall be SAE Grade 8 or equivalent.

I. Safety Cable: The fan shall be equipped with a safety cable that provides an additional means of securing the fan assembly to the building structure. The safety cable shall be 3/16” (0.5 cm) diameter and fabricated out of 7 x 19 stranded galvanized steel. The loops shall be secured with swaged Nicopress fittings, pre-loaded and tested to 3,000 lb·f (13,345 N). Field construction of safety cables is not permitted.

J. Controller: The fan controller shall be incorporated into the fan assembly. The controller shall be factory programmed to minimize starting and braking torques. The controller shall be equipped with a simple diagnostic program and an LED light to identify and relay faults in the system. The controller shall be housed in an enclosure independent of the motor to prevent overheating or electrical interference.

K. Wall Control: The fan shall be equipped with a remote wall control. The wall control shall be capable of mounting to a standard electrical box and shall include operator controls and display for controlling the fan’s power and speed. Communication with the fan drive and controller shall be by a standard (14 Gage-3 wire with ground), line voltage cable that is field installed and provided by the installer.

L. Accessories:

1. Controller: Solid-state speed controller.

2. Explosion-proof motor.

3. Epoxy PVC coating on fan blades.

4. "Alum-Glass" coating on steel members.

5. Disconnect switch.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with stainless steel lag screws to roof curb.

C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

D. Hung Fans:

1. Install fans with vibration mounts and with flexible electrical leads. Refer to Section 23 05 48 for specific requirements.

2. Install flexible connections specified in Section 23 33 00 between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

E. Install backdraft dampers on inlet to roof and wall exhausters.

F. Provide safety screen where inlet or outlet is exposed.

G. Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

H. Provide access to adjustable blade axial fan wheels for varying blade angle setting. Adjust blades for varying range of volume and pressure.

I. Provide floor mounted axial fans with reinforced legs. Provide ceiling suspended units with support brackets bolted to casing flange.

J. High-Volume, Low-Speed Fans:

1. The fan shall be mounted to an angle iron or I-beam structure. Consult Manufacturer's Installation Guide for proper sizing and placement of angle iron for a span mount. A structural engineer shall be consulted for installation methods outside the manufacturer's recommendation and a certification submitted prior to installation.

2. The fan shall be installed so that the airfoils are at least 10' above the floor. The fan installation area shall be free of obstructions such as lights, cables, sprinklers or other building structures; with the airfoils at least 2' clear of all obstructions. The fan should not be installed where it will be continuously subjected to wind gusts or in close proximity to the outputs of HVAC systems.

3. If the fan is hung from an extension tube that measures 5' or longer, it may be necessary to provide guy cables or struts to limit potential lateral movement of the fan. A stiffening strut braced against an additional beam may be required if there is a close clearance situation.

4. The design criteria for the fan mounting system shall be capable of handling 40 ft·lbs of torque.

5. In order to comply with the National Fire Protection Association (NFPA) guidelines for sprinkler systems (NFPA 13), all HVLS fans shall incorporate a means of automatic shutdown upon detection of water flow in the sprinkler system. Big Ass Fans installed in buildings in the United States that are equipped with sprinkler systems, including Early Suppression Fast Response (ESFR) sprinklers, shall comply with the following guidelines to adhere to the National Fire Protection Association (NFPA) standards:
   a. Each fan shall be centered between four (4) adjacent sprinklers.

3.02 SYSTEM STARTUP

A. Provide the services of manufacturer's field representative for starting and testing unit.

B. Prepare a manufacturer's startup report and turn over to the Owner and Commissioning Agent.

END OF HVAC POWER VENTILATORS – CENTRIFUGAL AND AXIAL FANS SECTION

SECTION 233700 – AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rectangular Ceiling Diffusers.

B. Ceiling Grid Core Exhaust and Return Registers/Grilles.

C. Wall Supply Registers/Grilles.

D. Wall Exhaust and Return Registers/Grilles.

1.2 REFERENCE STANDARDS

A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.

B. ARI 890 - Standard for Air Diffusers and Air Diffuser Assemblies; Air-Conditioning and Refrigeration Institute.

C. ASHRAE Standard 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.

D. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

E. Reference standards shall be the latest revision as accepted by the local Authority Having Jurisdiction.

1.3 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, throw, drop, terminal velocity and noise level.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Test and rate air outlet and inlet performance in accordance with ASHRAE Standard 70.

C. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Grilles/Registers/Diffusers

1. Titus
2. Price Industries
3. Approved equal.

2.2 RECTANGULAR CEILING DIFFUSERS

A. Type: Square, stamped, multi-core diffuser to discharge air in 360-degree pattern with sectorizing baffles where indicated.

B. Frame: Surface mount type.

C. Accessories: Provide radial opposed-blade, butterfly, and combination splitter volume control damper; removable core, sectorizing baffle, equalizing grid, operating rod extension, anti-smudging device, and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

D. Fabrication: Steel with baked enamel off-white finish.

2.3 CEILING EGG CRATE EXHAUST AND RETURN GRILLES

A. Type: Egg crate style face consisting of 1/2” x 1/2” x 1/2” grid core.

B. Fabrication: Grid core consists of aluminum with mill aluminum finish.

C. Frame: 1-1/4” margin with countersunk screw mounting.

D. Frame: Channel lay-in frame for suspended grid ceilings.

E. Accessories:

1. Provide integral gang and face operated opposed-blade damper.
2. Provide with filter frame.

2.4 WALL SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille with deflection as listed in the schedule.

B. Frame: 1-1/4" margin with countersunk screw mounting and gasket.

C. Fabrication: Aluminum extrusions with factory off-white enamel finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Air Terminals

1. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
2. Terminals installed in suspended ceiling systems shall be attached or supported as required by the latest appropriate Building Code for "Suspended Acoustical Ceilings."
3. Install diffusers to ductwork with airtight connections.
4. Install insulated diffuser boxes as detailed on the contract drawings.
5. Install grilles and registers to ductwork with airtight connections. Use screws and foil tape only; do not use duct tape.
6. Provide balancing/volume dampers on all branch duct take-offs to diffusers, grilles and registers.
7. Paint ductwork visible behind air outlets and inlets matte black.

Duct Openings: Where no grille, register, or diffuser is called out at duct openings, provide 1/2" hardware cloth over openings.

END OF SECTION 23 37 00

SECTION 238101 - TERMINAL HEAT TRANSFER UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Heat Recovery Units

B. Fan Coil (Blower) Units

C. Electric Unit Heaters.

D. Cabinet Unit Heaters

E. Electric Wall Heaters

1.2 RELATED REQUIREMENTS

A. Section 01 91 00 – Commissioning.

B. Section 23 08 00 – Mechanical Commissioning

C. Section 23 09 93 - Sequence of Operations for HVAC Controls.

1.3 SUBMITTALS

A. Product Data: Provide typical catalog of information including arrangements.

B. Shop Drawings:

1. Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
2. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
3. Indicate mechanical and electrical service locations and requirements.

C. Manufacturer's Instructions: Indicate installation instructions and recommendations.

D. Operation and Maintenance Data: Include manufacturer’s descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

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

1.5 WARRANTY

A. Provide two (2) year manufacturer's warranty on units, covering parts and labor.

PART 2 - PRODUCTS

2.1 HEAT RECOVERY UNITS (HRU'S)

A. Manufacturers:

1. Valent Air Corporation, LLC
2. Innovent, LLC
3. Approved equal.

B. GENERAL:

1. Unit shall be fully assembled at the factory and consist of an insulated metal cabinet, downturn outdoor air intake with 2" aluminum mesh filter assembly, exhaust air blower, energy wheel, phase and brownout protection, motorized dampers, curb assembly, filter assembly intake air, supply air blower assembly, exhaust/relief blower assembly, filter assembly for exhaust air, and an electrical control center. All specified components and internal accessories factory installed are tested and prepared for single-point high voltage connection.

C. CABINET

1. Materials: Formed, double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.

a. Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.

2. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.

a. Materials: Rigid urethane injected foam. Foam board not acceptable.

1) Thickness: 2 inch (50.8 mm)
2) Thermal Resistance R13
3) Thermally broken
4) Meets UL94HF-1 flame requirements.
5) Location and application: Full coverage of entire cabinet exterior to include walls, roof of unit, unit base, and doors.

b. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.

1) Thickness: 2 inch (50.8 mm)

2) Thermal Resistance R8.
3) Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
4) Location and application: Divider panels between outdoor air and return air/exhaust air streams.

3. Roof Insulation: 2 inch (50.8 mm) fiberglass located above the 1 inch (25.4 mm) foam panel..
4. Access panels / doors: Unit shall be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components. Doors and access panels shall be fabricated of 18 gauge galvanized G90 steel or painted galvannealed steel.
5. Supply Air blower assemblies: Blower assembly shall consist of an electric motor and direct-drive fans. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motors shall be capable of continuous speed modulation and controlled by a VFD.
6. Exhaust Air blower assemblies: Blower assembly shall consist of an electric motor and a direct-drive fan. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor shall be capable of continuous speed modulation and controlled by a VFD.
7. Control panel / connections: Units shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections. RTU shall be equipped with a Unit Disconnect Switch. Electric heater shall have single point power.
8. Energy wheel: Unit energy wheel shall be sized for the full volume of outdoor and exhaust air without an energy wheel bypass damper(s). Energy wheel shall be of total enthalpy, rotary air-to-air type and shall be an element of a removable energy wheel cassette. The cassette shall consist of a galvanized steel framework (designed to produce laminar air flow through the wheel), an energy wheel as specified and a motor and drive assembly. The cassette shall incorporate a pre-tensioned urethane drive belt or a link style belt with a five-year warranty. The wheel media shall be a polymer film matrix in a stainless-steel framework and be comprised of individual segments that are removable for servicing. Non-segmented energy wheels are not acceptable. Silica gel desiccant shall be permanently bonded to the polymer film and is designed and constructed to permit cleaning and servicing. The energy wheel is to have a five-year warranty. Performance criteria are to be as specified in AHRI Standard 1060, complying with the Combined Efficiency data in the submittal.
9. Modulating frost control. Control system shall include an outdoor air thermostat and pressure sensor on the wheel assembly to initiate frost control sequence.
10. Electric Post-heater: Post-heater shall be SCR control and shall include a temperature sensor with field adjustable set point, located in the outdoor air stream. Heat output of the post-heater shall be infinitely variable.
11. Phase and brownout protection: Unit shall have a factory-installed phase monitor to detect electric supply phase loss and voltage brown-out conditions. Upon detection of a fault, the monitor shall disconnect supply voltage to all motors.

12. Motorized dampers / Intake Air, Motorized dampers of low leakage type shall be factory installed.
13. Curb Assembly: A curb assembly made of 14 gauge galvanized steel shall be provided by the factory for assembly and installation as part of this division. The curb assembly shall provide perimeter support of the entire unit and shall have duct adapter(s) for supply air and return air. Curb assembly shall enclose the underside of the unit and shall be sized to fit into a recess in the bottom of the unit. Contractor shall be responsible for coordinating with roofing contractor to ensure curb unit is properly flashed to provide protection against weather/moisture penetration. Contractor shall provide and install appropriate insulation for the curb assembly. The curb shall be the height of 24 in.
14. Service receptacle: 120 VAC GFCI service outlet shall be factory-provided and installed by this contractor in a location designated by the A / E. Service outlet requires a dedicated single phase electric circuit. Unit contains a 120 VAC transformer to provide power to service outlet.

D. BLOWER:

1. Blower section construction, Supply Air: direct drive motor and blower shall be assembled on a 14 gauge galvanized steel platform and shall be equipped with 1.125 inch thick neoprene vibration isolation devices.
2. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.
3. Fan: Direct drive, airfoil plenum fan with aluminum wheel statically and dynamically balanced. Prop or belt-drive fan not acceptable due to low static capabilities.
4. Blades: Welded aluminum blades only.
5. Blower section motor source quality control: Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating".

E. MOTORS:

1. General: Blower motors greater than 1/2 horsepower shall be "NEMA Premium" unless otherwise indicated. Compliance with EPAct minimum energy-efficiency standards for single speed ODP and TE enclosures is not acceptable. Motors shall be heavy-duty, permanently lubricated type to match the fan load and furnished at the specified voltage, phase and enclosure.
2. Motors shall be 60 cycle, 3 phase 460 volts.

F. UNIT CONTROLS

1. The unit shall be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and sensors or it can be operated as a heating and cooling system controlled by a Building Management System (BMS). This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors.

2. Unit shall incorporate a DDC controller with integral LCD screen that provides text readouts of status. DDC controller shall have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software. DDC controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable. Owner-specified ventilating conditions can be input by means of pushbuttons.
3. Unit supply fan shall be configured for network control.
4. Unit exhaust fan shall be configured for network control.
5. Outside Air / Return Air damper control shall be.
6. Dirty filter sensor shall be factory installed.
7. Operating protocol: The DDC shall be factory-programmed for BACNetMSTP.
8. Variable Frequency Drive (VFD): unit shall have factory installed variable frequency drive for modulation of the supply and exhaust air blower assemblies. The VFD shall be factory-programmed for unit-specific requirements and shall not require additional field programming to operate.

G. FILTERS:

1. Unit shall have permanent 2-inch (50.8 mm) aluminum filters located in the outdoor air intake and shall be accessible from the exterior of the unit. MERV 8 disposable pleated filters shall be provided in the supply air stream. MERV 13 disposable pleated filters shall be provided in the supply final air stream and MERV 8 filters in the exhaust air stream. See schedule for sizes and quantities.

H. ELECTRIC COIL HEATING:

1. General: All coils shall meet or exceed all capacities specified on the mechanical schedule for the project. All water coil performances shall be certified by the manufacturer to be in accordance with ARI Standard 410. Coil air face velocities shall not exceed the specified velocities of the mechanical schedule.

2.2 FAN COIL (BLOWER) UNITS

A. Manufacturers:

1. Johnson Controls
2. York International
3. Approved Equal

B. GENERAL:

1. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions for each model and size shall be considered maximums.
2. All units shall be of “draw-thru” design with coils, fans, motor, and drain pan completely contained within the unit cabinet.
3. Electric heat to be in the blow-thru configuration.
4. Units shall be cETL listed in compliance with UL/ANSI Std. 1995.
5. All unit coils shall meet or exceed the scheduled cooling and heating capacity, selected and rated in accordance with AHRI 410.

C. CONSTRUCTION:

1. All units shall be fabricated of minimum 18 gauge galvanized steel, able to withstand a 125 hour salt spray test per ASTM B-117. Panels shall be die-formed "multibend" construction for optimum strength and rigidity.
2. All exterior panels shall be single wall insulated with 1 inch thick fiberglass insulation, rated for a maximum air velocity of 5000 fpm.
3. Insulation must meet all requirements of ASTM C1071 (including C665), UL181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL723 and NFPA 90A. In addition to using adhesive complying with NFPA 90A, the insulation shall incorporate a secondary mechanical fastener attached to the unit casing wall. Adhesive as the only method of fastening the insulation to the casing is not acceptable.
4. All access panels shall be fully insulated and attached with standard fasteners on at least two opposite sides. No single access panel shall be larger than 30" x 36" for safety and ease of handling. No coil or drain piping or electrical connections shall pass through any access panel.
5. Each unit shall be furnished with a one-piece heavy gauge G90 steel or optional IAQ stainless steel drain pan with welded corner construction. Drain pan shall be insulated with minimum 1/8" closed cell foam. All units shall be provided with 9/16" diameter hanger rod holes in the top and bottom panels for "through-bolt" type suspension installation.
6. All units shall have a minimum 1" duct collar on both the discharge and return.

D. FAN & MOTOR ASSEMBLY:

1. All units shall be furnished with double inlet forward curved centrifugal blowers statically and dynamically balanced for smooth operation. Blower wheels shall be mounted directly on the motor shaft. Belt driven blowers are not acceptable.
2. Fan motors shall be electronically commutated with thermal overload protection and a constant torque operation. RPM control shall not be acceptable. Motors shall feature permanently lubricated ball bearings and operate on three or single phase power.
3. All motors to be installed, factory programmed and wired to the control panel.
4. All motors shall be isolated, depending on motor size, via belly band or torsion flex mount to the blower housing.
5. All motor wiring is to be terminated in a junction box, external to the unit casing.
6. All motors to be operated by single-speed or multi-speed local or remote controller.

E. ELECTRIC HEAT SECTION

1. Where shown on the plans, the unit manufacturer shall furnish an electric resistance heating assembly with the heating capacity, voltage and stages as shown in the schedule. The heater assembly shall be designed and rated for installation to the blower coil unit in the blow thru configuration without the use of duct extensions or transitions between the unit and the heater assembly. The heater assembly shall be factory assembled to the air handling unit and completely factory wired. The heater/unit assembly shall be listed for zero clearance meeting all N.E.C. requirements and be cETL listed in compliance with UL/ANSI Std. 1995.

2. All heating elements shall be open coil design using Ni-Chrome wire mounted in ceramic insulators and housed in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware. The element support brackets shall be spaced no greater than 3-1/2" on center. All internal wiring shall be rated for 105°C minimum.
3. All heaters shall include over temperature protection. All heaters shall include a non-adjustable airflow switch.
4. An incoming line power distribution block shall be provided. The power distribution block shall be designed to accept incoming power wiring capable of carrying 125% of the calculated load current.
5. In addition to the above, electric heaters shall include the following options:

    a. Main incoming power disconnect (non-fused)
    b. Main fusing.
    c. Magnetic contactors wired for disconnecting operation.

F. FILTER RACK ASSEMBLY

1. All units shall be furnished with a flat filter rack with hinged access on both sides designed to accept a 2" nominal standard sized filters. All units shall be provided with nominal 2" throwaway filters factory installed. One complete set of spare throwaway filters shall be provided for each unit.
2. Unit shall have a High Efficiency filter rack suitable for a pleated 2" MERV 8 and a pleated 4" MERV 11, MERV 13 or MERV 14 filter.

G. INLET DAMPER SECTION

1. Where shown on the plans, the unit manufacturer shall furnish a fully insulated mixing box section (factory assembled and installed inlet damper section) to be mounted next to the unit on base rail (unit & mixing box).
2. The mixing box section shall include heavy gauge formed steel blade dampers in a heavy gauge steel frame with extruded vinyl blade seals and flexible metal jamb seals. Damper drive linkage shall be factory furnished and installed by the unit manufacturer. Furnish and install damper Belimo actuator and mount directly to the damper shaft.

H. ELECTRICAL CONTROL

1. The unit fan motor shall be completely factory wired to an external electrical enclosure. Each unit shall include fan control package with 24 volt control voltage. Each unit shall include a motor control board, motor circuit fusing, control circuit transformer and terminal strip for connection of field wiring.
2. Provide **Motor Control Board Option 1:** Motor control shall be provided by a single speed or proportional speed controller mounted on the exterior surface of the control box. Opening the control box to adjust the fan speed shall not be required.
3. Calibrated airflow curves shall be provided near the control box to aid in testing and balancing.

4. A main incoming power non-fused disconnect switch with lock-out-tag-out ready feature shall be factory furnished and wired by the unit manufacturer for single point power connection.

2.3 ELECTRIC UNIT HEATERS

A. Manufacturers:

1. QMARK
2. INDEECO (Industrial Engineering and Equipment Company)
3. Marley Engineered Products

B. Assembly: UL listed and labeled assembly with terminal box and cover, and built-in controls.

C. Heating Elements: Enclosed copper tube, aluminum finned element of coiled nickel-chrome resistance wire centered in tubes and embedded in refractory material.

D. Cabinet: 18 gage steel with easily removed front panel with integral air outlet and inlet grilles.

E. Fan: Direct drive propeller type, statically and dynamically balanced, with fan guard.

F. Motor: Permanently lubricated, sleeve bearings for horizontal models, ball bearings for vertical models.

G. Control: Separate fan speed switch and thermostat heat selector switch, factory wired, with switches built-in behind cover. Provide thermal overload.

H. Electrical Characteristics: See Schedule on Plans.

1. Disconnect Switch: Factory mount disconnect switch.

2.4 CABINET UNIT HEATERS

A. Manufacturers:

1. BRASCH
2. INDEECO (Industrial Engineering and Equipment Company)
3. Marley Engineered Products

B. Coils: Evenly spaced aluminum fins mechanically bonded to copper tubes, designed for 150 psi and 325 degrees F,

C. Cabinet: 16 gage steel with exposed corners and edges rounded, easily removed panels, glass fiber insulation and integral air outlet.

D. Finish: Factory applied baked primer coat on visible surfaces of enclosure or cabinet.

E. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.

F. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

G. Control: Multiple speed switch, factory wired, located in cabinet.

H. Filter: 1" thick glass fiber throw-away type, located to filter air before coil.

I. Mixing Dampers: Where indicated, mixing sections with dampers. Refer to Section 23 09 93 for operating sequence.

J. Capacity: See Schedule on Plans.

K. Electrical Characteristics: See Schedule on Plans.

2.5 ELECTRIC WALL HEATERS

A. Manufacturers:

1. QMARK
2. INDEECO (Industrial Engineering and Equipment Company)
3. Marley Engineered Products

B. Fan forced electric air heaters shall be UL listed, self-contained and completely separate from the wall mounting can.

C. Construction

1. Element: Nichrome-type wire wrapped on mica insulators with a 16 amp rated, at 240V, high temperature manual power reset limit switch, and a one-time over temperature thermal back-up fuse
2. Blower: Two-stage centrifugal blower isolated from the heating chamber.
3. Grille: One-piece, 20-gauge construction with powder coat paint.

D. Electrical Characteristics: See Schedule on Plans.

E. Options

1. Provide with wall can.
2. Provide with integral thermostat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Do not damage equipment or finishes.

C. Protection: Provide finished cabinet units with protective covers during balance of construction.

D. Fan-Coil Units: Install as indicated. Coordinate to assure correct recess size for recessed units.

E. Install electric heating equipment including devices furnished by manufacturer but not factory-mounted. Furnish copy of manufacturer's wiring diagram submittal. Install electrical wiring in accordance with manufacturer's submittals and Division 26.

3.2 SYSTEM STARTUP

A. Provide the services of manufacturer's field representative for starting and testing unit.

B. Prepare a manufacturer's startup report, and turn over to the Owner’s representative and commissioning agent.

3.3 CLEANING

A. After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.

B. Touch-up marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.

C. Install new filters.

END OF SECTION 238101

SECTION 238113 – PACKAGED TERMINAL AIR-CONDITIONERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Packaged Rooftop Unitary Air-Conditioners.

B. Operating Controls

1.2 RELATED REQUIREMENTS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

B. Section 23 23 00 - Refrigerant Piping

1.3 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air Conditioning and Air-Source Heat Pump Equipment; Air-Conditioning, Heating, and Refrigeration Institute.

B. AHRI 270 - Sound Rating of Outdoor Unitary Equipment; Air-Conditioning, Heating, and Refrigeration Institute.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilation Systems; National Fire Protection Association.

D. Reference standards shall be the latest revision as accepted by the local Authority Having Jurisdiction.

1.4 PERFORMANCE REQUIREMENTS

A. Electric Heating: See schedule.

B. Supply Air: See schedule.

C. Return Air: See schedule.

D. Heat Pump heating/cooling: See schedule.

1.5 SUBMITTALS

A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

B. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

C. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.

D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Products specified in this section shall be manufactured in the United States of America. Products shall be labeled with the manufacturer's logo and country of origin. This paragraph will be strictly enforced; contractors shall bid this project accordingly.

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

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

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect units from physical damage by storing them off site until roof mounting curbs are in place, ready for immediate installation of units.

1.8 WARRANTY

A. Provide a two (2) year manufacturer’s warranty on units, covering parts and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Johnson Controls

B. York International Corporation

C. Approved Equal

2.2 PACKAGED ROOFTOP UNITS

A. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic, suction gas cooled, direct drive compressor(s) for cooling duty and gas combustion or nickel chromium elements for heating duty.

B. Description: Factory assembled, single- piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start- up.

C. Unit shall use environmentally sound, R-410A refrigerant.

D. Unit shall be installed in accordance with the manufacturer's instructions.

E. Unit must be selected and installed in compliance with local, state, and federal codes.

F. Unit meets ASHRAE 90.1 minimum efficiency requirements.

G. Unit shall be rated in accordance with AHRI Standards 210/240 or 340/360.

H. Unit shall be designed to conform to ASHRAE 15.

I. Unit shall be CSA tested and certified in accordance with ANSI Z21.47 -2016/CSA 2.3-2016, and CSA C22.2 No. 60335-2-40.

J. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

K. Unit casing shall be capable of withstanding 750- hour salt spray exposure per ASTM B117 (scribed specimen).

L. Roof curb shall be designed to conform to NRCA Standards.

M. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.

N. Unit shall be designed in accordance with CSA C.22.2 NO.60335-2-40, including tested to withstand rain.

O. Unit shall be constructed to prevent intrusion of snow into the control

P. Electrical Characteristics: See schedule.

Q. Disconnect Switch: Factory mounted disconnect switch in control panel.

2.3 OPERATING CHARACTERISTICS:

A. Unit shall be capable of starting and running at 115°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at □□10% voltage.

B. Compressor with standard controls shall be capable of operation down to 45°F (7°C), ambient outdoor temperatures. Intermittent cooling shall be operational down 0° F (-17° C). Low ambient kit is necessary if mechanically cooling at ambient temperatures below 40°F (4°C).

C. Unit shall be factory configured for vertical supply & return configurations.

2.4 FABRICATION

A. Cabinet: Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at 750 hour salt spray test per ASTM-B117 standards.

B. Unit cabinet exterior paint shall be: film thickness, (dry) 3.0 MILS minimum, gloss (per ASTM D523, 60°F / 16°C): 80+/-5, Hardness: H- 2H Pencil hardness.

C. Unit cabinet shall have electric utility entry locations marked from the factory with a dimple for accuracy of field drilling. Entry locations shall be available for entry through the side of the unit or from the unit underside.

D. Base Rail:

1. Unit shall have base rails on all 4 sides.

2. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.

3. Holes shall be provided in the base rail for moving the unit by fork truck.

4. Base rail shall be a minimum of 15 gauge thickness.

E. Top Panel:

1. Shall be a multi piece top panel.

F. Supply Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch motor pulley, and rubber isolated hinge mounted high efficiency motor or direct drive as indicated. Isolate complete fan assembly. Refer to Section 23 05 48.

G. Air Filters: As noted on schedule.

H. Roof Mounting: Refer to drawings for mounting conditions and or types.

I. Electrical Connections:

1. All unit power wiring shall enter unit cabinet through a field drilled hole located by a factory provided dimple.

2. Standard unit shall have a through- the- base electrical location(s) using a raised, embossed portion of theunit base-pan.

2.5 ELECTRIC HEATING COIL

A. Finned tube heating elements easily accessible with automatic reset thermal cut-out, built-in magnetic contactors, galvanized steel frame, control circuit transformer and fuse, manual reset thermal cut-out, airflow proving device, toggle switch (pilot duty), load fuses.

1. Use nickel chromium elements for heating.

2. Shall have a single stage of capacity on 25 kW heaters and two stages of capacity for other heater capacities.

3. Shall have a primary limit control with automatic reset to prevent the heating element system from operating at an excessive temperature.

4. Shall have a non-resetting backup limit control to prevent the heating element system from operating at an excessive temperature in the event a primary limit control fails

5. Shall be wired for single point power supply with branch circuit fusing (where required).

2.6 COILS:

A. Evaporator Coils, Aluminum Fin - Copper Tube:

1. Standard evaporator coils shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.

2. Shall be leak tested to 150 psig, pressure tested to 250 psig, and burst qualified to CSA C22.2 No. 60335-2-40.

3. Assembled unit shall be pressure tested to 450 psig.

B. Condenser Coils, All Aluminum Microchannel:

1. Condenser coils shall have all aluminum microchannel design consisting of aluminum multiport flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.

2. Microchannel condenser coils shall be leak tested to 150 psig, pressure tested by supplier to 600 psig, and burst qualified to CSA C22.2 No. 60335-2-40.

3. Assembled unit shall be pressure tested to 450 psig.

2.7 REFRIGERANT CIRCUITS

A. Refrigerant circuit shall include the following control, safety, and maintenance features:

1. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range.

2. Refrigerant filter drier - Solid core design.

3. Service gauge connections on suction and discharge lines.

B. Compressors

1. Unit shall use fully hermetic scroll compressors for each independent refrigeration circuit.

2. Compressor motors shall be cooled by refrigerant gas passing through motor windings.

3. Compressors shall be internally protected from high discharge temperature conditions.

4. Compressors shall be protected from an over- temperature and over- amperage conditions by an internal, motor overload device.

5. Compressor shall be factory mounted on rubber grommets.

6. Crankcase heaters shall be installed in the factory as needed on tandem compressor sets.

2.8 EVAPORATOR FAN AND MOTOR

A. Evaporator fan motor:

1. Shall have permanently lubricated ball-bearings.

2. Shall have inherent automatic- reset thermal overload protection.

3. The job site selected brake horsepower shall be required to not exceed the motor's nameplate horsepower rating plus the service factor.

B. Evaporator Fan:

1. Fan shall be a belt drive assembly with an adjustable pitch motor pulley.

2. Blower bearings shall have an L10 life of 100,000 hrs

3. Shall use sealed, permanently lubricated ball-bearing type.

4. Shall use dual blower design consisting of two balanced blower fans on a single shaft.

5. Blower fan shall be double- inlet type with forward- curved blades.

6. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

2.9 CONDENSER FAN AND MOTORS

A. Condenser fan motors:

1. Shall be a totally enclosed motor.

2. Shall use permanently lubricated ball-bearings.

3. Shall have inherent thermal overload protection with an automatic reset feature.

4. Shall use a shaft- down design.

B. Condenser Fans:

1. Shall be a direct- driven propeller type fan.

2.10 MIXED AIR CASING

A. Dampers: Provide outside, return, and relief dampers with damper operator. To provide full modulating economizer operation.

B. Gaskets: Provide tight fitting dampers with edge gaskets and side seals, maximum leakage 5 percent at 2" pressure differential.

C. Damper Operator: 24 volt with gear train sealed in oil.

D. Controls: See Section 23 09 23.

2.11 OPERATING CONTROLS

A. Provide terminal strip on unit for connection of operating controls to remote panel by others. Control shall allow for two stages of heating and two stages cooling.

2.12 DELIVERY, STORAGE, AND HANDLING:

A. Unit shall be stored and handled per manufacturer’s recommendations.

B. Overhead crane can be used to place the units on a roof using rigging holes built into the unit base rails without any additions to the unit.

C. Unit shall only be stored or positioned in the upright position.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that the roof is ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that proper power supply is available.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NFPA 90A.

C. Condensate Drainage: provide PVC P-traps on unit condensate drains with trap depth so as to prevent unit sucking in air through condensate drain.

3.3 SYSTEM STARTUP

A. Provide the services of manufacturer's field representative for starting and testing unit.

1. Prepare a manufacturer’s startup report and turn over to the Owner and Commissioning Agent.

END OF SECTION 237413

DIVISION 26
Electrical Distribution

SECTION 260010
BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

A. This section supplements all sections of this division and shall apply to all phases of work hereinafter specified, shown on the drawings, or required to provide a complete installation of electrical systems for the Project. The work required under this division is not limited to the electrical specifications and drawings. Refer to all bid documents including Civil, Architectural, Structural, and Mechanical documents which may designate Work to be accomplished. The intent of the Specifications is to provide a complete and operable electrical system, which shall include all documents that are a part of the entire Project Contract.
   1. Work included: Furnish all labor, material, tools, equipment, facilities, transportation, skilled supervision necessary for, and incidental to, performing operations in connection with furnishing, delivery, and installation of the work in this division complete as shown or noted on the Drawings and specified herein.

B. Related Work Specified Elsewhere:
   1. Refer to all sections in the general contract conditions, Contract Requirements and Division 1, General Requirements.

C. Work Installed but Furnished by Others:
   1. The electrical work includes the installation or connection of certain materials and equipment furnished by others. Verify installation details. Foundations for apparatus and equipment will be furnished by others unless otherwise noted or detailed.

1.02 GENERAL REQUIREMENTS

A. Guarantee See General Conditions:
   1. Except as may be specified under other Sections in the specification, guarantee equipment furnished under the specifications for a period of one year, except for equipment required to have a longer guarantee period, from date of final completion. Guarantee all work against defective workmanship, material, and improper installation. Upon notification of failure, correct deficiency immediately and without additional cost to the Owner.
   2. Standard warranty of manufacturer shall apply for replacement of parts after expiration of the above period. Manufacturer shall furnish replacement parts to the Owner or his service agency as approved. Furnish to the Owner, through the Architect, printed manufacturer's warranties complete with material included and expiration dates, upon completion of project. Conform to Division 01.

B. Equipment Safety: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety.

C. Codes and Regulations:
1. Design, manufacturer, testing and method of installation of all apparatus and materials furnished under the requirements of these specifications shall conform to the latest publications or standard rules of the following:
   a. Institute of Electrical and Electronic Engineers - IEEE
   b. National Electrical Manufacturers' Association - NEMA
   c. Underwriters' Laboratories, Inc. - UL
   d. National Fire Protection Association - NFPA
   e. American Society for Testing and Materials - ASTM
   f. American National Standards Institute - ANSI
   g. State & Municipal Codes in Force in the Specific Project Area
   h. Occupational Safety & Health Administration - OSHA
   i. National Electrical Testing Association - NETA
   j. Washington State Building Codes
2. The term "Code", when used within the specifications, shall refer to the Publications, Standards, ordinances and codes, listed above. In the case where the codes have different levels of requirements the most stringent rules shall apply.

D. Requirements of Regulatory Agencies:
1. Codes, Permits, and Fees: Where the Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply. The most stringent condition shall be as interpreted by the Engineer.
   a. Comply with all requirements for permits, licenses, fees and Code. Permits, licenses, fees, inspections and arrangements required for the Contractor at his expense shall obtain the Work, unless otherwise specified.
   b. Comply with the requirements of the applicable utility companies serving the Project. Make all arrangements with the utility companies for proper coordination of the Work.

E. Shop Drawings:
1. See Division 01 for additional requirements.
2. Time Schedules for Submission and Ordering: The Contractor shall prepare, review and coordinate his schedule of submissions carefully, determining the necessary lead time for preparing, submitting, checking, ordering and delivery of materials and equipment for timely arrival. The Contractor shall be responsible for conformance with the overall construction schedule.
3. Submittals will be checked for general compliance with specifications only. The Contractor shall be responsible for deviations from the drawings or specifications and for errors or omissions of any sort in submittals.
4. Submit a complete list of materials and equipment proposed for the job, including manufacturers names and catalog numbers.
5. Shop drawings shall be submitted in completed groups of materials (i.e., lighting fixtures or switchgear). The Contractor shall add and sign the following paragraph on equipment and materials submitted for review. "It is hereby certified that the (equipment) (material) shown and marked in this submittal is that proposed to be incorporated into the project; is in compliance with the Contract Drawings and specifications and can be installed in the

allocated spaces". Failure to add the above written statement for compliance will result in return of submittals without review.

a. Bind catalog cuts, plate numbers, descriptive bulletins and drawings, 11" x 17" (275 mm x 435 mm) or smaller, in sets with covers neatly showing titles.
b. The Contractor shall verify dimensions of equipment and be satisfied as to Code compliance for fit prior to submitting shop drawings for approval.
c. Where current limiting devices are specified, submit technical data to substantiate adequate protection of equipment cascaded downstream. Submittals shall not be reviewed unless supporting calculations and data are submitted therewith.
d. Include complete catalog information such as construction, ratings, insulation systems, as applicable.
e. For any material specified to meet UL or trade standards, furnish the manufacturers or vendor's certification that the material furnished for the work does in fact equal or exceed such specifications.
f. Reference listings to the specifications' Sections and Article to which each is applicable.
g. Equipment Floor Plans: After approval of material is secured prepare a floor plan of each electrical and communication equipment space, room or yard, drawn to scale at 1/2 inch equals 1 foot and submit for approval in the same manner as for shop drawings. The layout drawings shall be exact scale.

6. Contractor shall prepare coordinated drawings when required by Division 01 or where noted otherwise.

F. Interpretations: The Contractor through the Architect must make Requests for interpretations of drawings and specifications. Any such requests made by equipment manufacturers or suppliers will be referred to the Contractor.

G. Standard of Quality

1. The contract Drawings and Specifications establish the “MINIMUM STANDARD OF QUALITY” each product and/or system must meet to be considered acceptable. Products of other manufactures will be considered if the product and/or system meet or exceed the “MINIMUM STANDARD OF QUALITY” established by this Contract Document.
2. Items for similar application shall be of the same manufacturer.
3. The label of listing by UL shall appear on all materials and equipment for which standards have been established by the agency.
4. Where codes as listed in Section General Requirement Section of the Specifications that establish label or approved requirements, furnish all materials and equipment with either the required labels affixed or the necessary written approval.
5. Provide the type and quantity of electrical materials and equipment necessary to complete Work and all systems in operation, tested and ready for use.
6. Provide and install all incidental items that belong to the Work described and which are required for complete systems.
7. All switchboards, distribution boards, panel boards and circuit breakers shall be of the same manufacturer.
8. All wiring devices such as switches and receptacles shall be of the same manufacturer.

H. Substitutions: Refer to Division 01

I. Submit comprehensive material list, shop drawings and complete technical data for the following equipment and materials:

1. General Requirements:
   a. Conduits
   b. Conductors, include all selected insulation types.
   c. Fuses
   d. Disconnect switches and Starters.
   e. Pullboxes, manholes and handholes.
   f. Control devices, standard and special receptacles, switches, outlets and finish device plates.
   g. Cabinets for signal and telephone system, special terminals and cabinets. Include all cabinet dimensions.
   h. Fire alarm system.

J. Record Drawings: Refer to Division 01, Contract Closeout.

K. Work Responsibilities:
1. The drawings indicate diagrammatically the desired locations or arrangement of conduit runs, outlets, junction boxes and equipment and are to be followed. Execute the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations. The Contractor is responsible for the correct placing of his work. Where conflicts occur in plans and/or specifications, the most stringent application shall apply and shall be part of the base bid.
2. Locations shown on architectural plan or on wall elevations shall take precedence over electrical plan locations, but where a major conflict is evident, notify the Architect.
3. In the event minor changes in the indicated locations or arrangement are necessary due to developed conditions in the building construction or rearrangement of furnishings or equipment or due to interference with other trades, such changes shall be made without extra cost.
4. Verify dimensions and the correct location of Owner-Furnished equipment before proceeding with the roughing-in of connections.
5. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with work carefully check and verify dimensions and sizes with the drawings to see that the furnished equipment will fit into the spaces provided without violation of applicable Codes.
6. Should any changes to the work indicated on the drawings or described in the specifications be necessary in order to comply with the above requirements, notify the Architect.
7. Contractor shall be responsible for coordination of coordinated drawings when required by the Architect.
8. Replace or repair, without additional compensation any work which does not comply with or which is installed in violation of any of these requirements.

L. Installation General: For special requirements, refer to specific equipment under these requirements.
1. Unless otherwise specified elsewhere in the specifications, do all excavating necessary for the proper installation of the electrical work.
2. Locations of Openings: Locate chases, shafts and openings required for the installation of the electrical work during framing of the structure. Do any additional cutting and patching required. Cutting or drilling in any structural member is prohibited without

approval of the Architect. Furnish all access panels to make all boxes, connections and devices accessible as required by CEC.

3. Location of Sleeves: Where conduits pass through concrete walls, suspended slabs or metal deck floors, install sleeves of adequate size to permit installation of conduit. Sleeves shall be installed prior to pouring of concrete and shall have ends flush with the wall or extend 2 inches above floor surfaces. Verify locations.
4. Wherever conduit extends through roof, install flashings in accordance with drawings and details.
5. Contractor shall be responsible for cutting and patching which may be required for the proper installation of the electrical work.
6. Protect work, materials and equipment and provide adequate and proper storage facilities during the progress of the work. Storage outdoors shall be weather protected and shall include space heaters to prevent condensation. Provide for the safety and good condition of all work until final acceptance of the work. Replace all damaged or defective work, materials and equipment before requesting final acceptance.
7. Conduit and Equipment to be Installed: Clean thoroughly to remove plaster, spattered paint, cement and dirt on both exterior and interior. All underground conduits shall be mandrelled prior to pulling wire.
8. Conduit and Equipment to be Painted: Clean conduit exposed to view in completed structure by removing plaster and dirt. Remove grease, oil and similar material from conduit and equipment by wiping with clean rags and suitable solvents in preparation for paint.
9. Items with Factory Finish: Remove cement, plaster, grease and oil, and leave surfaces, including cracks and corners, clean and polished. Touch up scratched or bare spots to match finish.
10. Site Cleaning: Remove from site all packing cartons, scrap materials and other rubbish on a weekly basis. Vacuum out all cabinets, switchgear and panels and junction boxes prior to pulling any conductors.
11. Electrical equipment and materials exposed to public and in finished areas shall be finish-painted after installation in accordance with the Painting Section. All exposed screw-type fasteners, exterior, or interior in restrooms, shall be vandal-resistant spanner type; include tool.

M. Excavation, Cutting and Patching:
   1. Verify openings indicated on the drawings. Provide all cutting, patching and reinforcement of the construction of the building as required to install electrical work.

N. Tests
   1. Equipment and systems for which the National Electrical Testing Association (NETA) has an approved or recommended procedure, shall be tested in accordance with that procedure. Test values shall equal values recommended by NETA. Copies of test reports shall be submitted as required under shop drawing submittals.
   2. Resistance to ground tests shall be accomplished by a qualified independent testing firm to measure resistance to ground at grounding electrodes. Make tests before slabs or affected areas are poured in order that corrective measures, if required, may be taken. Submit a report showing the results of these measurements. If the resistances exceed values specified elsewhere or NETA test procedure recommendations, perform corrective measures required to reduce resistance to acceptable values.

3. Prior to energizing any motor, measure the service voltage for phase balance and report if unbalance exceeds 1% from mean.
4. Measure the three-phase voltage at no load and at maximum load conditions and submit to the engineer a report showing the results of these measurements.
5. Upon completion of the work and adjustment of all equipment, conduct an operating test. Conduct the test in the presence of an authorized representative of the Owner's Representative. Demonstrate system and equipment to operate in accordance with requirements of the Contract Documents and to be free from electrical and mechanical defects. Provide systems free from short circuits and grounds and show an insulation resistance between phase conductors and ground not less than the requirements of the governing electric code. Test circuits for proper neutral connection.
6. Complete tests prior to final inspection of project, including corrective work based on the results of the tests.
7. Perform special tests on systems and equipment as specified herein using personnel qualified to perform such tests.

O. Protection: Protect finish parts of the materials and equipment against damage during the progress of the work and until final completion and acceptance. Cover materials and equipment in storage and during construction in such a manner that no finished surfaces will be damaged or marred. Keep moving parts clean, dry and lubricated.

P. Cleaning Up:
1. Upon completion of the work and at various time during the progress of the work, remove from the building all surplus materials, rubbish and debris resulting from the work of this Division.
2. Thoroughly clean switchgear including busses, apparatus, exposed conduit, metal work including the exterior and interior, and accessories for the work of this Division, of cement, plaster and other deleterious materials; remove grease and oil spots with cleaning solvent; carefully wipe surfaces and scrape cracks and corners clean.
3. Thoroughly polish chromium or plated work. Remove dirt and stains from lighting fixtures.
4. Leave the entire installation in a clean condition.

Q. Completion:
1. The work will not be reviewed for final acceptance until operating and maintenance data, manufacturer's literature, panel directories and nameplates specified herein have been approved and properly posted or installed and final cleaning of equipment and premises has been completed.
2. When the installation is complete and adjustments have been made, operate the system for a period of one week, during which time demonstrate that systems are completed and operating in conformance with the specifications.

R. Operating and Maintenance Data: Submit complete and at one time, prior to acceptance of the installation, 4 copies of manufacturer's instructions for operation and maintenance of electrical equipment, including replacement parts lists. As specified in Division 01

S. Inspection and Acceptance Procedures: The Architect will submit observation reports periodically during the construction phase detailing Contract deficiencies. The Contractor is responsible for making corrections immediately. Notice of Completion of the project will not be made until all items have been corrected.

T. Final Completion of Electrical Systems:
   1. Prior to Final Completion of operating electrical systems, the Contractor shall:
      a. Provide materials of the type and quality specified and as necessary for proper operation, tested and ready for use.
      b. Furnish the required Operating and Maintenance Data/Manuals.
      c. Clean up of the project pertaining to this Division of the work.
      d. After installation has been completed and adjustments made, operate the system for a period of one week, during which time, demonstrate to the Architect that systems are complete and operating in conformance with Contract Documents.
      e. Conduct tests required and as specified in this Division and submit test reports and corrective actions taken.
      f. Submission of warranties and guarantees.
   2. Final Completion of Work Shall be Contingent On:
      a. Contractor replacing defective materials and workmanship.
      b. Upon completion of work and adjustments made, Contractor shall conduct an operating test for each system for approval at such time as Architect directs. Conduct test in presence of authorized representative of Architect and demonstrate that systems and equipment do operate in accordance with requirements of the Contract Documents and are free from electrical and mechanical defects.
      c. Contractor shall provide the necessary training programs and instructions to the Owner's representative. Number of hours shall be a minimum of four (4) hours for each system or days as required under separate Sections of these Specifications. Complete operation and maintenance manuals shall be provided at least two (2) weeks prior to training.
      d. Submit copies of manufacturer's instructions and maintenance of electrical equipment including replacement parts lists. Each set shall include one set of shop drawings of equipment installed.

U. Submittals for Change Orders: When changes are made during the construction phase, deletions and additions shall be presented in a manner that will indicate the cost of each item of material and corresponding labor. Markup shall be then added in accordance with the requirements of the General Conditions as modified by the Supplementary Conditions.

V. The Contractor at a time convenient to the Owner shall provide instruction to the Owner's operating personnel in the proper operation and maintenance of all equipment and systems. The instructors shall have received factory training and shall be thoroughly familiar with the equipment installed. The operating personnel shall receive the number of days instruction as indicated in other sections.

1.03 PROJECT RECORD DOCUMENTS

A. Record Drawings: CAD: Use a computer aided drafting (CAD) system in the preparation of record drawings for this Project. Acceptable CAD systems shall be capable of producing files in AutoCAD Version 2016 compatible DWG or DXF format. Owner's consultant will furnish CAD backgrounds for use by the Contractor after construction is 85% complete except where prohibited by Contract.

B. Record Set During the Work: At site, maintain at least one set of Drawings as a Field Record Set. Also maintain at least one copy of all Addenda, Modifications, approved submittals, correspondence, and transmittals at site. Keep Drawings and data in good order and readily available to Architect and Owner.

C. Changes: Clearly and correctly mark Record Drawings to show changes made during the construction process at the time the changed work is installed. No such changes shall be made in the work unless authorized by the Architect.

D. Final Record Drawings: Conform to Division 01 requirements.

E. Preparation of Final Record Drawings: Contractor shall transfer recorded changes in the work indicated on the Field Record Set to the record set. Changes shall be neatly and clearly drawn and noted by skilled draftsmen, and shown technically correct.

F. Approval: Prior to Architect's inspection for Substantial Completion, submit the Final Record Drawings to the Architect for review, and make such revisions as may be necessary for Final Record Drawings to be a true, complete, and accurate record of the work.

G. Manuals: Obtain data from the various manufacturers and submit instruction, operation, and maintenance manuals as required and to the extent required under other Sections.

H. At all times when the work is in progress, maintain at the workplace, fabrication shop or Project Site as applies, a complete separate, clean, undamaged set of the latest stamped, actioned submittals. As work progresses, maintain records of "as installed" conditions on this set in suitable ink or chemical fluid. Update the set daily. After successful completion of Project Site testing specified herein, and after completion of Punch List corrections, copy all records of "as installed" conditions on to originals.

I. Quantity:
   1. Review sets: As for Shop and Field Drawings.
   2. Record set: Refer to Division 01.

J. Content: All drawings required under "Field and Shop Drawings". Show "as installed" condition. Where room designations according to Project permanent signage differ from construction designations in the Contract Documents, show both designations.

K. Warranty Certificates: Comply with Division 01.

PART 2 - NOT USED

END OF SECTION 260010

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Wiring connectors.

C. Electrical tape.

D. Heat shrink tubing.

E. Wire pulling lubricant.

F. Cable ties.

1.02 RELATED REQUIREMENTS

A. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes 2010, with Editorial Revision (2020).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).

E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape 2017.

F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes 2020.

G. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

H. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2021.

I. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.

J. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.

L. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.

M. UL 267 - Outline of Investigation for Wire-Pulling Compounds Current Edition, Including All Revisions.

N. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.

O. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.

P. UL 486D - Sealed Wire Connector Systems Current Edition, Including All Revisions.

Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

B. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

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

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. Armored cable is not permitted.

G. Metal-clad cable is not permitted.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. Conductor Material:
1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
3. Tinned Copper Conductors: Comply with ASTM B33.

I. Minimum Conductor Size:
1. Branch Circuits: 12 AWG.
   a. Exceptions:
      1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
      2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
      3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
      4) 20A exterior circuits: 10 AWG..

2. Control Circuits: 14 AWG.

J. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.
a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
3. Color Code:
a. 480Y/277 V, 3 Phase, 4 Wire System:
1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.
4) Neutral/Grounded: Gray.
b. 208Y/120 V, 3 Phase, 4 Wire System:
1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral/Grounded: White.
c. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
1. Copper Building Wire:
a. Cerro Wire LLC: www.cerrowire.com/#sle.
b. Encore Wire Corporation: www.encorewire.com/#sle.
c. Southwire Company: www.southwire.com/#sle.
d. Rome Wire and Cable.
e. Okonite Wire
f. Pirelli Wire and Cable
g. Carol Cable

B. Description: Single conductor insulated wire.

C. Conductor Stranding:
1. Feeders and Branch Circuits:
a. Size 10 AWG and Smaller: Solid.
b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:
1. Copper Building Wire: Type THHN/THWN-2, except as indicated below.
a. Size 4 AWG and Larger: Type XHHW-2.
b. Installed Underground: Type XHHW-2.

2.04 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
   2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

C. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
   4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

G. Mechanical Connectors: Provide bolted type or set-screw type.

H. Compression Connectors: Provide circumferential type or hex type crimp configuration.

2.05 ACCESSORIES

A. Electrical Tape:
   1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
   2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
   3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
   4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

5. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

C. Wire Pulling Lubricant:
1. Listed and labeled as complying with UL 267.
2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
3. Suitable for use at installation temperature.

D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated without specific routing, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is

not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
   1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
   2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

G. Install conductors with a minimum of 12 inches of slack at each outlet.

H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.

I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

K. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
   5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
   2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
      b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
   3. Wet Locations: Use heat shrink tubing.

M. Insulate ends of spare conductors using vinyl insulating electrical tape.

N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

O. Identify conductors and cables in accordance with Section 260553.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section Firestopping.

Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.

C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION 260519

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Ground bars.

1.02 RELATED REQUIREMENTS

A. Section 096500 - Resilient Flooring: Static control flooring.

B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

B. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.

C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 467 - Grounding and Bonding Equipment Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

B. Field quality control test reports.

C. Project Record Documents: Record actual locations of grounding electrode system components and connections.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

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

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
   4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
   a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
   b. Metal gas piping.
   c. Metal process piping.
8. Provide bonding for interior metal air ducts.
9. Provide bonding for metal building frame.
10. Provide bonding for metal siding not effectively bonded through attachment to metal building frame.

F. Communications Systems Grounding and Bonding:
1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.
2. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
   a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
   b. Raceway Size: 3/4 inch trade size unless otherwise indicated or required.
   c. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
1. Use insulated copper conductors unless otherwise indicated.
   a. Exceptions:
      1) Use bare copper conductors where installed underground in direct contact with earth.
      2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

D. Ground Bars:
   1. Description: Copper rectangular ground bars with mounting brackets and insulators.
   2. Size: As indicated.
   3. Holes for Connections: As indicated or as required for connections to be made.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION 260526

SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2023.

D. MFMA-4 - Metal Framing Standards Publication 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
   2. Coordinate work to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
   4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
   5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has cured; see Section 033000.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel/strut framing systems, nonpenetrating rooftop supports, and post-installed concrete/masonry anchors.

B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

1.05 QUALITY ASSURANCE

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Comply with the following. Where requirements differ, comply with most stringent.
      a. NFPA 70.
      b. Requirements of authorities having jurisdiction.
   2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
   3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.

D. Metal Channel/Strut Framing Systems:
   1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
   2. Comply with MFMA-4.

3. Channel Material:
   a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
   b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.

E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.

F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
2. New Concrete: Use preset concrete inserts.
3. Existing Concrete: Use expansion anchors.
4. Solid or Grout-Filled Masonry: Use expansion anchors.
5. Hollow Masonry: Use toggle bolts.
6. Hollow Stud Walls: Use toggle bolts.
7. Steel: Use welded threaded studs complying with AWS D1.1/D1.1M with lock washers and nuts or Beam clamps (MSS Type 19 21 23 25 or 27) complying with MSS SP-69.
8. Sheet Metal: Use sheet metal screws.
9. Wood: Fasten with lag screws or through bolts.
10. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
11. Plastic and lead anchors are not permitted.
12. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
    b. Comply with MFMA-4.
    c. Channel Material: Use galvanized steel.
13. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install hangers and supports in accordance with NECA 1.

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

H. Equipment Support and Attachment:
   1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
   2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

I. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

J. Secure fasteners in accordance with manufacturer's recommended torque settings.

K. Remove temporary supports.

3.03 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete or Cast-in-Place Concrete (Limited Applications)" as applicable.

C. Anchor equipment to concrete base.
   1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor bolts to elevations required for proper attachment to supported equipment.
   3. Install anchor bolts according to anchor-bolt manufacturers written instructions.

3.04 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION 260529

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. PVC-coated galvanized steel rigid metal conduit (RMC).

C. Flexible metal conduit (FMC).

D. Liquidtight flexible metal conduit (LFMC).

E. Galvanized steel electrical metallic tubing (EMT).

F. Reinforced thermosetting resin conduit (RTRC).

1.02 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2020.

B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2020.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2020.

E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.

F. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit 2018.

G. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series 2015.

H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.

J. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.

K. UL 360 - Liquid-Tight Flexible Metal Conduit Current Edition, Including All Revisions.

L. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.

M. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.

N. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

B. Project Record Documents: Record actual routing for conduits installed underground and conduits 2 inch (53 mm) trade size and larger.

1.05 QUALITY ASSURANCE

A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
1. Under Slab on Grade: Use rigid PVC conduit.
2. Exterior, Direct-Buried: Use rigid PVC conduit.

3. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), stainless steel intermediate metal conduit (IMC), or schedule 80 rigid PVC conduit where emerging from underground.
4. Where rigid polyvinyl (PVC) conduitlarger than 2 inch (53 mm) trade size is provided, use PVC-coated galvanized steel rigid metal conduit elbows for bends.
5. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth where soil has resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
6. Where galvanized rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) emerges from concrete into soil, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection for minimum of 4 inches on either side of where conduit emerges.

D. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).

E. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

F. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

G. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

H. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).

I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
1. Locations subject to physical damage include, but are not limited to:
a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

J. Exposed, Exterior: Use galvanized steel rigid metal conduit.

K. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.

L. Corrosive Locations Above Ground: Use stainless steel rigid metal conduit (RMC), stainless steel intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit (RMC), stainless steel electrical metallic tubing (EMT), or reinforced thermosetting resin conduit (RTRC).

M. Hazardous/Classified Locations: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), stainless steel intermediate metal conduit (IMC), or PVC-coated galvanized steel rigid metal conduit (RMC).

N. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
   1. Maximum Length: 6 feet.

O. Flexible Connections to Vibrating Equipment:
   1. Dry Locations: Use flexible metal conduit (FMC).
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
   3. Maximum Length: 6 feet unless otherwise indicated.
   4. Vibrating equipment includes, but is not limited to:
      a. Transformers.
      b. Motors.

P. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).

2.02 CONDUIT - GENERAL REQUIREMENTS

A. Comply with NFPA 70.

B. Provide conduit, fittings, supports, and accessories required for complete raceway system.

C. Provide products listed, classified, and labeled as suitable for purpose intended.

D. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4 inch (21 mm) trade size.
   2. Branch Circuit Homeruns: 3/4-inch trade size.
   3. Control Circuits: 1/2-inch trade size.
   4. Flexible Connections to Luminaires: 3/8-inch trade size.
   5. Underground, Exterior: 1-inch trade size.

E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil, 0.040 inch.

C. PVC-Coated Boxes and Fittings:
   1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
   2. Nonhazardous Locations: Use boxes and fittings listed and labeled as complying with UL 514A, UL 514B, or UL 6.
   3. Hazardous/Classified Locations: Use fittings listed and labeled as complying with UL 1203 for classification of installed location.
   4. Material: Use steel or malleable iron.
   5. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil, 0.040 inch.

D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil, 0.015 inch.

2.05 FLEXIBLE METAL CONDUIT (FMC)

A. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.07 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use compression/gland or set-screw type.
      a. Do not use indenter type connectors and couplings.

2.08 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

A. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).

B. Supports: As recommended by manufacturer.

C. Fittings: Same type and manufacturer as conduit to be connected.

2.09 ACCESSORIES

A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch.

B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.

C. Epoxy Adhesive for RTRC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

D. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in accordance with NECA 1.

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by manufacturer.

E. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal conduits unless specifically indicated to be exposed.
   4. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or

perpendicular to building structure and surfaces, following surface contours where practical.

5. Arrange conduit to maintain adequate headroom, clearances, and access.
6. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
7. Arrange conduit to provide no more than 150 feet between pull points.
8. Route conduits above water and drain piping where possible.
9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
10. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
11. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
    a. Heaters.
    b. Hot water piping.
    c. Flues.
12. Group parallel conduits in same area on common rack.

F. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
    a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
9. Use of spring steel conduit clips for support of conduits is not permitted.
10. Use of wire for support of conduits is not permitted.

G. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.

7. Secure joints and connections to provide mechanical strength and electrical continuity.

H. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 078400.

I. Underground Installation:
1. Minimum Cover, Unless Otherwise Indicated or Required:
a. Underground, Exterior: 18 inches.
b. Under Slab on Grade: 12 inches to bottom of slab.
2. Provide underground warning tape in accordance with Section 260553 along entire conduit length.

J. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section Concrete with minimum concrete cover of 3 inches on all sides unless otherwise indicated.

K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where calculated in accordance with NFPA 70 for reinforced thermosetting resin conduit (RTRC) conduit installed above ground to compensate for thermal expansion and contraction.
3. Where conduits are subject to earth movement by settlement or frost.

L. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
a. Where conduits pass from outdoors into conditioned interior spaces.
b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

M. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

N. Provide grounding and bonding; see Section 260526.

O. Identify conduits; see Section 260553.

3.03 FIELD QUALITY CONTROL

A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

B. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.

C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION 260533.13

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.

E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013 (Reaffirmed 2020).

F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.

H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.

I. UL 508A - Industrial Control Panels Current Edition, Including All Revisions.

J. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.

4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for floor boxes and underground boxes/enclosures.

B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
2. Keys for Lockable Enclosures: Two of each different key.

1.05 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled as suitable for the purpose intended.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use suitable concrete type boxes where flush-mounted in concrete.
4. Use suitable masonry type boxes where flush-mounted in masonry walls.
5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.

7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
12. Minimum Box Size, Unless Otherwise Indicated:
    a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
    b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
    c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
13. Wall Plates: Comply with Section 262726.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA 250 Environment Type, Unless Otherwise Indicated:
3. Junction and Pull Boxes Larger Than 100 cubic inches:
    a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
    b. Back Panels: Painted steel, removable.
    c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Box Locations:
1. Locate boxes to be accessible. Provide access panels in accordance with Section Access Panels as requiredwhere approved by the Architect.
2. Unless dimensioned, box locations indicated are approximate.
3. Locate boxes as required for devices installed under other sections or by others.
   a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
4. Locate boxes so that wall plates do not span different building finishes.
5. Locate boxes so that wall plates do not cross masonry joints.
6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
8. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
9. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
   a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
   b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
10. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
11. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
   a. Concealed above accessible suspended ceilings.
   b. Within joists in areas with no ceiling.
   c. Electrical rooms.
   d. Mechanical equipment rooms.

H. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

I. Install boxes plumb and level.

J. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

K. Install boxes as required to preserve insulation integrity.

L. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

N. Close unused box openings.

O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

P. Provide grounding and bonding in accordance with Section 260526.

3.02 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.03 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION 260533.16

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

E. Warning signs and labels.

1.02 RELATED REQUIREMENTS

A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

B. Section 262726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs 2011 (Reaffirmed 2017).

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels 2011 (Reaffirmed 2017).

C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 70E - Standard for Electrical Safety in the Workplace 2024.

E. UL 969 - Marking and Labeling Systems Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:
   1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.

2. Do not install identification products until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

B. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.07 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
a. Switchboards:
1) Identify ampere rating and name.
2) Identify voltage and phase.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Use identification nameplate to identify main overcurrent protective device.
5) Use identification nameplate to identify load(s) served for each branch device.Identify spares and spaces.
b. Panelboards:
1) Identify ampere rating and name.
2) Identify voltage and phase.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device.Identify spares and spaces.
c. Enclosed switches, circuit breakers, and motor controllers:
1) Identify voltage and phase.
2) Identify power source and circuit number. Include location when not within sight of equipment.

3) Identify load(s) served. Include location when not within sight of equipment.

2. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
   a. Service equipment.
   b. Industrial control panels.
   c. Motor control centers.
   d. Elevator control panels.
   e. Industrial machinery.
3. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
   a. Minimum Size: 3.5 by 5 inches.
   b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.

B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
   a. At each source and load connection.
   b. Within boxes when more than one circuit is present.
   c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
4. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

C. Identification for Raceways:
1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.
3. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
4. Use underground warning tape to identify underground raceways.

D. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.

2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
   a. For exposed boxes in public areas, use only identification labels.

E. Identification for Devices:
1. Wiring Device and Wallplate Finishes: Comply with Section 262726.
2. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
   a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.
3. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.

F. Identification for Luminaires:
1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Materials:
   a. Indoor Clean, Dry Locations: Use plastic nameplates.
   b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
   a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend:
   a. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
   a. Equipment Designation: 1/2 inch.

b. Other Information: 1/4 inch.

5. Color:

a. Normal Power System: White text on black background.

D. Format for Caution and Warning Messages:

1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

E. Format for Receptacle Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

F. Format for Control Device Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Load controlled or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch.

F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

C. Minimum Size:
   1. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
   2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
   3. Markers for Junction Boxes: 1/2 by 2 1/4 inches.

D. Legend:
   1. Markers for Voltage Identification: Highest voltage present.

E. Color: Black text on orange background unless otherwise indicated.

2.05 UNDERGROUND WARNING TAPE

A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

B. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.

C. Legend: Type of service, continuously repeated over full length of tape.

D. Color:

2.06 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
   1. Materials:
   2. Minimum Size: 7 by 10 inches unless otherwise indicated.

C. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Branch Devices: Adjacent to device.
   6. Interior Components: Legible from the point of access.
   7. Conduits: Legible from the floor.
   8. Boxes: Outside face of cover.
   9. Conductors and Cables: Legible from the point of access.
   10. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.

G. Mark all handwritten text, where permitted, to be neat and legible.

3.03 FIELD QUALITY CONTROL

A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION 260553

SECTION 260583
WIRING CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment.

1.02 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2020).

B. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2021.

C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
   2. Determine connection locations and requirements.

B. Sequencing:
   1. Install rough-in of electrical connections before installation of equipment is required.
   2. Make electrical connections before required start-up of equipment.

1.04 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
   1. Colors: Comply with NEMA WD 1.

2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION 260583

SECTION 262726
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Wall plates and covers.

1.02 RELATED REQUIREMENTS

A. Section 260533.16 - Boxes for Electrical Systems.

B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for 2014h, with Amendments (2017).

B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification) 2014g, with Amendment (2017).

C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

D. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.

E. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2020).

F. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2021.

G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 20 - General-Use Snap Switches Current Edition, Including All Revisions.

I. UL 498 - Attachment Plugs and Receptacles Current Edition, Including All Revisions.

J. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
1. Wall Dimmers: Include derating information for ganged multiple devices.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hubbell Incorporated: www.hubbell-wiring.com.

B. Leviton Manufacturing Company, Inc: www.leviton.com.

C. Lutron Electronics Company, Inc: www.lutron.com.

D. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

2.02 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

D. Provide GFCI protection for receptacles installed within 6 feet of sinks.

E. Unless noted otherwise, do not use combination switch/receptacle devices.

2.03 WIRING DEVICE FINISHES

A. Provide wiring device finishes as described below unless otherwise indicated.

B. Wiring Devices, Unless Otherwise Indicated: White with white nylon wall plate.

C. Wiring Devices Installed in Finished Spaces: White with white nylon wall plate.

D. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate.

E. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover.

2.04 WALL SWITCHES

A. Manufacturers:
1. Hubbell Incorporated: www.hubbell.com/#sle.
2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
3. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.

B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.05 RECEPTACLES

A. Manufacturers:
1. Hubbell Incorporated: www.hubbell-wiring.com.
2. Leviton Manufacturing Company, Inc: www.leviton.com.
3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

C. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

D. GFCI Receptacles:

1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
      a. Wall Switches: 48 inches above finished floor.
      b. Receptacles: 18 inches above finished floor or 6 inches above counter.
   2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   3. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.

4. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
5. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

I. Where split-wired duplex receptacles are indicated, remove tabs connecting top and bottom receptacles.

J. Install wiring devices plumb and level with mounting yoke held rigidly in place.

K. Install wall switches with OFF position down.

L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

O. Identify wiring devices in accordance with Section 260553.

3.04 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.05 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.06 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION 262726

SECTION 262813
FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fuses.

1.02 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses 2012.

B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements Current Edition, Including All Revisions.

D. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
   2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
   3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

1.05 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com.

B. Littelfuse, Inc: www.littelfuse.com.

C. Mersen: ep-us.mersen.com.

2.02 APPLICATIONS

A. Individual Motor Branch Circuits: Class RK1, time-delay.

2.03 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

G. Class R Fuses: Comply with UL 248-12.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION 262813

SECTION 262816.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.

C. Section 262813 - Fuses.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum) 2013.

D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.

E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.

4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

B. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
1. Include dimensioned plan and elevation views of enclosed switches and adjacent equipment with all required clearances indicated.

C. Project Record Documents: Record actual locations of enclosed switches.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

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

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ABB/GE: www.geindustrial.com/#sle.

B. Eaton Corporation: www.eaton.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

D. Siemens Industry, Inc: www.usa.siemens.com.

E. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

D. Horsepower Rating: Suitable for connected load.

E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:
   1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
   2. Minimum Ratings:
      a. Heavy Duty Single Throw Switches Protected by Class R, Class J, Class L, or Class T Fuses: 200,000 rms symmetrical amperes.

G. Provide with switch blade contact position that is visible when the cover is open.

H. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
   1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.

I. Conductor Terminations: Suitable for use with the conductors to be installed.

J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.

L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

M. Heavy Duty Switches:
   1. Comply with NEMA KS 1.
   2. Conductor Terminations:
      a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section 260529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 260526.

H. Provide fuses complying with Section 262813 for fusible switches as indicated or as required by equipment manufacturer's recommendations.

3.03 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 262816.16

DIVISION 28
ELECTRONIC SAFETY AND SECURITY

SECTION 283100
FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits 2002 (Corrigendum 2012).

D. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 72 - National Fire Alarm and Signaling Code Most Recent Edition Cited by Referring Code or Reference Standard.

F. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUMMARY

A. This Section includes Fire alarm system design and installation, including all components, wiring, and conduit.

1.04 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72, apply to fire alarm terms used in this Section.

1.05 SYSTEM DESCRIPTION

A. Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1. Interface with existing fire alarm system.

1.06 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72

B. Fire alarm signal initiation shall be by one or more of the following devices:
   1. Manual stations.
   2. Heat detectors.
   3. Flame detectors.
   4. Smoke detectors.
   5. Verified automatic alarm operation of smoke detectors.
   6. Automatic sprinkler system water flow.
   7. Fire extinguishing system operation.
   8. Fire standpipe system.

C. Fire alarm signal shall initiate the following actions:
   1. Alarm notification appliances shall operate continuously.
   2. Identify alarm at the FACP and remote annunciators.
   3. De-energize electromagnetic door holders.
   4. Transmit an alarm signal to the remote alarm receiving station.
   5. Unlock electric door locks in designated egress paths.
   6. Release fire and smoke doors held open by magnetic door holders.
   7. Activate voice/alarm communication system.
   8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
   9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
   10. Record events in the system memory.
   11. Record events by the system printer.

D. Supervisory signal initiation shall be by one or more of the following devices or actions:
   1. Operation of a fire-protection system valve tamper.

E. System trouble signal initiation shall be by one or more of the following devices or actions:
   1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
   2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
   3. Loss of primary power at the FACP.
   4. Ground or a single break in FACP internal circuits.
   5. Abnormal ac voltage at the FACP.
   6. A break in standby battery circuitry.
   7. Failure of battery charging.
   8. Abnormal position of any switch at the FACP or annunciator.
   9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
   10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

F. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciators. Record the event on system printer.

1.07 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:
   1. Shop Drawings shall be prepared by persons with the following qualifications:
      a. Trained and certified by manufacturer in fire alarm system design.
      b. Fire alarm certified by NICET, minimum Level III.
   2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
   3. Device Address List: Coordinate with final system programming.
   4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
   5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
   6. Batteries: Size calculations.
   7. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
   8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
   9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
   10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

C. Qualification Data: For Installer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.

F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 01 Section "Submittals," make an identical submittal to authorities having jurisdiction. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

G. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.
2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.
   a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.
   b. Electronic media may be provided to Architect and authorities having jurisdiction.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NEC Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.09 PROJECT CONDITIONS

A. Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
   1. Notify Architect no fewer than fourteen days in advance of proposed interruption of fire alarm service.
   2. Do not proceed with interruption of fire alarm service without Architect's and Owner's written permission.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Smoke, Fire, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
   2. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. FACP and Equipment:
      a. Compatible with existing FACP
   2. Wire and Cable:
      a. West Penn Wire/CDT; a division of Cable Design Technologies or equal.
   3. Audible and Visual Signals:
      a. Compatible with existing FACP

2.02 EXISTING FIRE ALARM SYSTEM

A. Compatibility with Existing Equipment: Fire alarm system and components shall operate as an extension of an existing system.

2.03 FACP

A. General Description:
   1. Modular, power-limited design with electronic modules, UL 864 listed.
   2. Addressable initiation devices that communicate device identity and status.
      a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at the FACP.
      b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
   3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
   1. Annunciator and Display: Liquid-crystal type, three line(s) of 80 characters, minimum.
   2. Keypad: Arranged to permit entry and execution of programming, display, and control commands; and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Circuits:
   1. Signaling Line Circuits: NFPA 72, Class A, Style 2.
   2. Signaling Line Circuits: NFPA 72, Class B, Style 0.5.
      a. System Layout: Install no more than 100 addressable devices on each signaling line circuit.
   3. Notification-Appliance Circuits: NFPA 72, Class A, Style Z.
   4. Notification-Appliance Circuits: NFPA 72, Class B, Style W.
   5. Actuation of alarm notification appliances, emergency voice communications, annunciation, smoke control, elevator recall, and actuation of suppression systems shall occur within 20 seconds after the activation of an initiating device.
   6. Electrical monitoring for the integrity of wiring external to the FACP for mechanical equipment shutdown and magnetic door-holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shut down.

D. Smoke-Alarm Verification:
   1. Initiate audible and visible indication of an "alarm verification" signal at the FACP.
   2. Activate a listed and approved "alarm verification" sequence at the FACP and the detector.
   3. Record events by the system printer.
   4. Sound general alarm if the alarm is verified.
   5. Cancel FACP indication and system reset if the alarm is not verified.

E. Notification-Appliance Circuit: Operation shall sound in a temporal pattern, complying with ANSI S3.41.

F. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.

G. Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual reset at the FACP and remote annunciators, after initiating devices are restored to normal.
   1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
   2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
   3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

H. Walk Test: A test mode to allow one person to test alarm and supervisory features of initiating devices. Enabling of this mode shall require the entry of a password. The FACP and annunciators shall display a test indication while the test is underway. If testing ceases while in walk-test mode, after a preset delay, the system shall automatically return to normal.

I. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and control of changes in those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and make a print-out of the final adjusted values on the system printer.

J. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, trouble, and supervisory signals to a remote alarm station through a digital alarm communicator transmitter and telephone lines.

K. Service Modem: Ports shall be RS-232 for system printer and for connection to a dial-in terminal unit.
   1. The dial-in port shall allow remote access to the FACP for programming changes and system diagnostic routines. Access by a remote terminal shall be by encrypted password algorithm.

L. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including the same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

M. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signal, supervisory and digital alarm communicator transmitter and digital alarm radio transmitter shall be powered by the 24-V dc source.
   1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.

2. Power supply shall have a dedicated fused safety switch for this connection at the service entrance equipment. Paint the switch box red and identify it with "FIRE ALARM SYSTEM POWER."

N. Secondary Power: 24-V dc supply system with batteries and automatic battery charger and an automatic transfer switch.
1. Batteries: Sealed lead calcium or Sealed, valve-regulated, recombinant lead acid.
2. Battery and Charger Capacity: Comply with NFPA 72.

O. Surge Protection:
1. Install surge protection on normal ac power for the FACP and its accessories.
2. Install surge protectors recommended by FACP manufacturer. Install on all system wiring external to the building housing the FACP.

P. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.04 SYSTEM SMOKE DETECTORS

A. General Description:
1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Multipurpose type, containing the following:
   a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
   b. Piezoelectric sounder rated at 88 dBA at 10 feet (3 m) according to UL 464.
   c. Heat sensor, combination rate-of-rise and fixed temperature.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
   a. Rate-of-rise temperature characteristic shall be selectable at the FACP for 15 or 20 deg F (8 or 11 deg C) per minute.
   b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at the FACP to operate at 135 or 155 deg F (57 or 68 deg C).
   c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:
1. Sensor: LED or infrared light source with matching silicon-cell receiver.

2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:
1. Photoelectric Smoke Detectors:
a. Sensor: LED or infrared light source with matching silicon-cell receiver.
b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status. Provide remote status and alarm indicator and test station where indicated.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.05 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NEC, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, No. 14 AWG or as indicated on drawings.
1. Circuit Integrity Cable: Twisted shielded pair, NEC Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

PART 3 - EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.
   1. Connect new equipment to the existing control panel in the existing part of the building.
   2. Connect new equipment to the existing monitoring equipment at the Supervising Station.
   3. Expand, modify, and supplement the existing control equipment as necessary to extend the existing control functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.

B. Duct Smoke Detectors: Comply with NFPA 72,NFPA 90A and CMC. Install sampling tubes so they extend the full width of the duct.

3.02 WIRING INSTALLATION

A. Install wiring according to the following:
   1. NECA 1.
   2. TIA/EIA 568-A.
   3. NEC

B. Wiring Method: Install wiring in metal raceway according to Section 260533.13 - Conduit for Electrical Systems
   1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

F. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum 1-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

G. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Section 260553 - Identification for Electrical Systems.

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.04 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

D. Perform the following field tests and inspections and prepare test reports:
1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
3. Include the existing system in tests and inspections.
4. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
5. Testing: Follow procedure and record results complying with requirements in NFPA 72.
    a. Detectors that are outside their marked sensitivity range shall be replaced.
6. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NEC.

3.06 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.

C. Work in two paragraphs below is normally the responsibility of Owner. Retain one or both paragraphs if Owner needs additional time for inspections required by NFPA 72.

D. Semiannual Test and Inspection: Six months after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

E. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 01 Section "Demonstration and Training."

3.08 DOCUMENTATION

A. Provide an NFPA Certificate of compliance to the School District, Local Fire Marshal, and Architect.

END OF SECTION 283100

HVAC RECAPITALIZATION @ THE SEQUIM HIGH SCHOOL

SEQUIM SCHOOL DISTRICT NO. 323 - 503 N SEQUIM AVE, SEQUIM, WA 98382

ELECTRICAL ENGINEER:
Leo Maya, PE, LEED AP BD&C
Design West Engineering
110 James Street, Suite 106
Edmonds, WA 98020
LMaya@designwesteng.com
425-458-9700

MECHANICAL ENGINEER:
Reid Herron, PE
Design West Engineering
110 James Street, Suite 106
Edmonds, WA 98020
RHerron@designwesteng.com
425-458-9700

ARCHITECT:
Lauri Strauss, AIA LEED AP BD&C
design2 LAST, inc
543 Main Street, Suite 101
Edmonds, WA 98020
lauri@design2LAST.com
425-673-7269

SCOPE OF WORK

REMOVE AND REPLACE EXISTING AHU'S ON THE ROOF OF THE IDENTIFIED HIGH SCHOOL BUIDINGS, WITH NEW AHU'S AS SPECIFIED AND DETAILED HEREIN. THE INTENT IS TO HAVE A FULLY FUNCTIONAL(TURN-KEY) HVAC SYSTEM IN EACH BUILDING UPON COMPLETION OF THIS PROJECT.

DURING THE REMOVAL AND REPLACEMENT OF THE HVAC UNITS, GC SHALL ENSURE HEATING AND COOLING IN THE SPACE REMAINS OPERATIONAL WHETHER WITH OTHER EXISTING UNITS OR TEMPORARY HEATING. TEMP HEATING WILL BWE ARRANGED AND PROVIDED BY THE OWNER - GC TO COORDINATE.

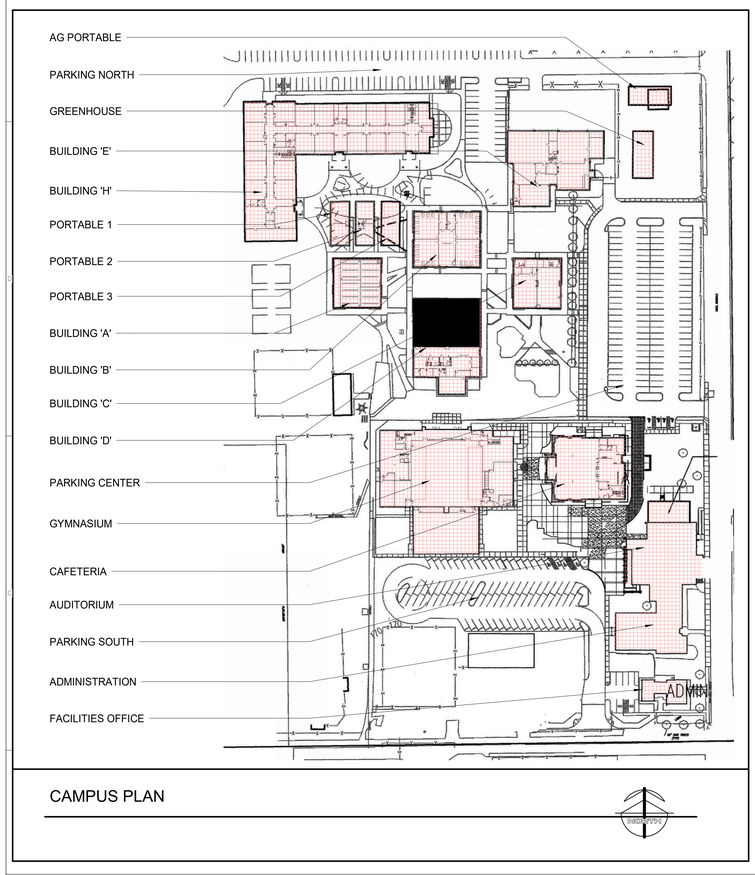
THE PROJECT INCLUDES ALL DEMOLITION REQUIRED TO PROVIDE OPENINGS AND SPACE FOR EACH OF THE NEW UNITS.

ALL ROOFING WILL BE PATCHED AND REPAIRED TO PRE-CONSTRUCTION CONDITION.

BUILDING 'D', LIBRARY AND MEZZANINE; ADD A PARTITION WALL ON THE MEZZANINE LEVEL TO SEPARATE THE COMPUTER LAB FROM THE LOWER LEVEL LIBRARY. SEE DETAILS SHEET A1.01.

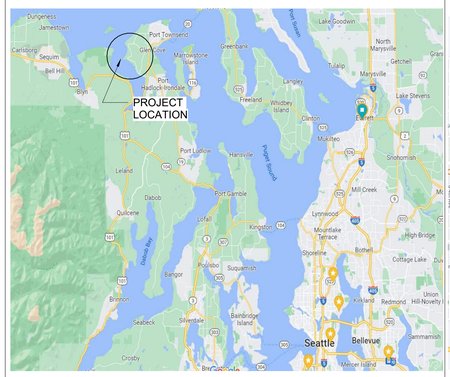
THE OWNER HAS PURCHASED EIGHT (8) BARD WALL HUNG PACKAGE UNITS FOR REPLACEMENT AT THE PORTABLE CLASSROOMS. THESE WILL BE INSTALLED BY ALTERNATE A.

NOTE:
DRAWINGS IN THIS SET USES BACKGROUND PLAN IMAGES FOR CLARITY OF CONTEXT OF WORK THAT ARE FOR INFORMATION ONLY. WORK UNDER THIS CONTRACT IS HIGHLIGHTED AND CLOUDED IN RED ON THOSE AS-BUILT SHEETS.

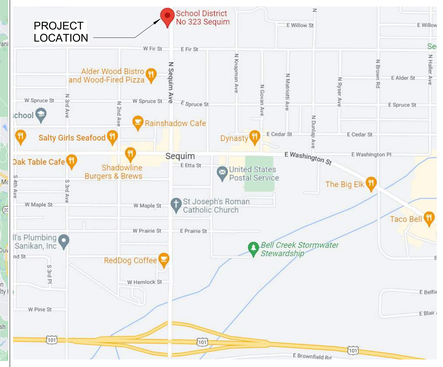


CAMPUS PLAN

VICINITY MAP



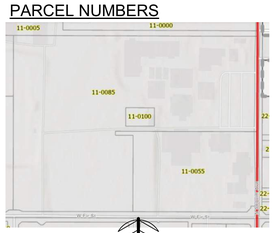
LOCATION MAP



ABBREVIATIONS

A		DISP	DISPENSER / DISPOSAL	HVAC	HEATING VENTILATION AIR CONDITIONING	OH	OVERHEAD	STL	STEEL
ACT	ACOUSTICAL CEILING TILE	DN	DOWN			OPNG	OPENING	STO	STORAGE
ADJ	ADJACENT	DWG	DRAWING(S)	I		OPP	OPPOSITE	STS	SELF TAPPING SCREW
AFF	ABOVE FINISH FLOOR	E		IBC	INTERNATIONAL BUILDING CODE	ORIG	ORIGINAL		
AFP	ACOUSTICAL FOAM PANELS	EA	EACH	ID	INTERIOR DESIGN	P		T	
ALT	ALTERNATE	ELEC	ELECTRIC	INFO	INFORMATION	PAF	POWER ACTIVATED FASTENERS	TB	TOWEL BAR
ALUM	ALUMINUM	EQ	EQUAL	INSUL	INSULATION	PLAM	PLASTIC LAMINATE	TEMP	TEMPORARY
ANOD	ANNODIZED	EQUIP	EQUIPMENT	INT	INTERIOR	PLWD	PLYWOOD	THK	THICK
APPROX	APPROXIMATE	EXG	EXISTING	J		PREFAB	PRE FABRICATED	THRU	THROUGH
B		EXP JT	EXPANSION JOINT	JAN	JANITOR	PREFIN	PRE FINISHED	TLT	TOILET
BD	BOARD	EXT	EXTERIOR	JT	JOINT	PT	PAINT	TO	TOP OF
BLDG	BUILDING	F		K		PTD	PAPER TOWEL DISPENSER	TPD	TOILET PAPER DISPENSER
BLKG	BLOCKING	FACP	FIRE ALARM CONTRL PANEL	KIT	KITCHEN	PTN	PARTITION	TPTN	TOILET PARTITION
BOD	BOTTOM OF DECK	FD	FLOOR DRAIN	L		Q		TR	TRASH RECEPTACLE
BOT	BOTTOM	FDN	FOUNDATION	LAM	LAMINATED	QT	QUARRY TILE	TYP	TYPICAL
C		FE	FIRE EXTINGUISHER	LAV	LAVATORY	R		TZO	TERRAZZO
CAB	CABINET(S)	FEC	FIRE EXTINGUISHER CABINET	LF	LINEAR FEEET	RAD	RADIUS	U	
CJ	CONROL JOINT	FF	FINISH FLOOR	M		RB	RUBBER	UC	UNDER COUNTER / UNDER CABINET
CL	CENTER LINE	FIN	FINISH	MATL	MATERIAL	RBB	RUBBER BASE	UNFIN	UNFINISHED
CLG	CEILING	FLR	FLOOR	MAX	MAXIMUM	RBT	RUBBER TILE	UON	UNLESS OTHERWISE NOTED
CLO	CLOSET	FOC	FACE OF CABINET	MBL	MARBLE	RCP	REFLECETED CEILING PLAN		
CLR	CLEAR	FOF	FACE OF FINISH	MDF	MEDIUM DENSITY FIBERBOARD	REF	REFERENCE	V	
COL	COLUMN	FOS	FACE OF STUD	MECH	MECHANICAL	REINF	REINFORCING	VAR	VARIES
CONC	CONCRETE	FOW	FACE OF WALL	MFG	MANUFACTURER	REQD	REQUIRED	VCT	VINYL COMPOSITION TILE
COR	CONTRACTING OFFICERS REPRESENTATIVE	G		MIN	MINIMUM	RESIL	RESILIENT	VERT	VERTICAL
CORR	CORRIDOR	GA	GAUGE	MIR	MIRROR	S		VEST	VESTIBULE
CPT	CARPET	GALV	GALVANIZED	MISC	MISCELLANEOUS	SAN	SANITARY	W	
CPTT	CARPET TILES	GB	GRAB BAR	MS	METAL STUD	SCHED	SCHEDULE	W/	WITH
CT	CERAMIC TILE	GEN	GENERAL	MTD	MOUNTED	SD	SOAP DISPENSER	WO	WITHOUT
D		GLU-LAM	GLUE LAM BEAM	MTL	METAL	SF	SQUARE FOOT	WC	WATER CLOSET
DBL	DOUBLE	GWB	GYPSUM WALL BOARD	N		SHT	SHEET	WD	WOOD
DEG	DEGREE	GYP	GUPSUM	NA	NOT APPLICABLE	SHWR	SHOWER	WR	WATER RESISTANT
DEMO	DEMOLITION	H		NAP	NAPKIN	SIM	SIMILAR	WWF	WELDED WIRE FABRIC
DF	DRINKING FOUNTAIN	HDWR	HARDWARE	NIC	NOT IN CONTRACT	SND	SANITARY NAPKIN DISPOSAL		
DIA	DIAMETER	HM	HOLLOW METAL	NOM	NOMINAL	SS	SOLID SURFACE		
DIFF	DIFFERENCE	HORIZ	HORIZONTAL	NTS	NOT TO SCALE	SST	STAINLESS STEEL		
DIM	DIMENSION			O		STD	STANDARD		
				OC	ON CENTER				
				OD	OUTSIDE DIAMETER				

PARCEL NUMBERS



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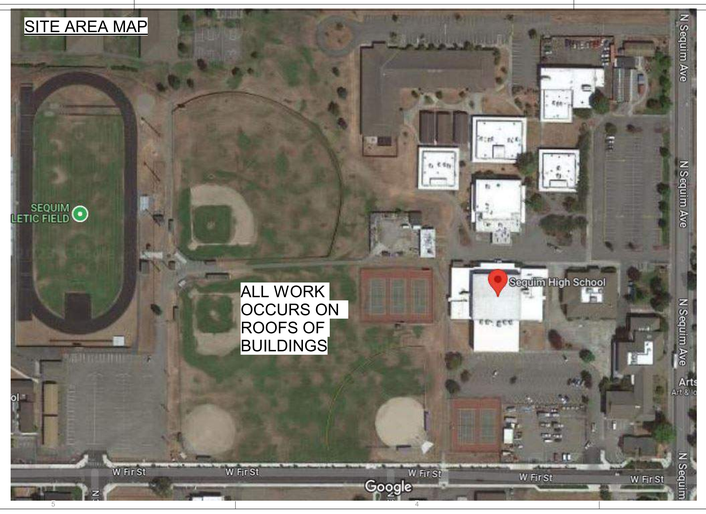
LINK TO PERMITS	More info
MAP ACRES	21.88
SURVEY ACRES	0.00
SITE ADDRESS	350
SITE DIRECTION	W
SITE ROAD	FIR ST
SITE EXTENSION	
SITE CITY	SEQUIM
MDOC_AFN	2018-1373299

PARCEL #	033019110100
PROP_ID	20805
LINK TO ASSESSORS INFO	More info
LINK TO PERMITS	More info
MAP ACRES	0.36
SURVEY ACRES	0.00
SITE ADDRESS	
SITE DIRECTION	N
SITE ROAD	SEQUIM AVE
SITE EXTENSION	
SITE CITY	SEQUIM
MDOC_AFN	

PARCEL #	033019110055
PROP_ID	85295
LINK TO ASSESSORS INFO	More info
LINK TO PERMITS	More info
MAP ACRES	6.76
SURVEY ACRES	0.00
SITE ADDRESS	601
SITE DIRECTION	N
SITE ROAD	SEQUIM AVE
SITE EXTENSION	
SITE CITY	SEQUIM
MDOC_AFN	2018-1373294

SITE AREA MAP



DRAWING SYMBOLS

- 1 / A101 — SECTION CALLOUT MARK
- 1 / A101 — DETAIL CALLOUT MARK
- A7.01 / 1 — ELEVATION CALLOUT MARK
- 4 / A7.02 / 2 / 3 — INTERIOR ELEVATION CALLOUT MARK
- Room Name / 101 — ROOM TITLE TAG
- DIMENSION TYPE — NOTE: DIMENSIONS OF THIS TYPE SHOWN ARE EXISTING, FIELD VERIFY
- 1010 — DOOR TAG
- 1t — WINDOW TAG
- XX — WALL TYPE TAG
- P1 — FINISH COLOR TAG REFERENCE COLOR SCHEDULE
- X — SHEET NOTE TAG: Sheet notes apply to all locations within the project scope. Notes indicated with sheet note tag apply to specific areas as indicated on the Plan
- REFERENCE NORTH ARROW
- EXIT PATH
- ACCESSIBLE ROUTE

DRAWING INDEX

Sheet Number	Sheet Name
G-0.0	COVER SHEET, INDEX & SCOPE OF WORK
A-1.1D	BLDG D COMPUTER LAB PLANS AND DETAILS
M-0.1	MECHANICAL LEGENDS NOTES & SCHEDULES
M-0.2	MECHANICAL SCHEDULES CONT.
M-0.3	MECHANICAL SCHEDULES CONT.
M-0.4	MECHANICAL SCHEDULES CONT.
MD-1.1	MECHANICAL BUILDING A & B DEMO FLOOR PLAN
MD-1.2	MECHANICAL BUILDING C & D DEMOLITION PLAN
MD-1.3	MECHANICAL BUILDING E DEMOLITION FLOOR PLAN
MD-1.4	MECHANICAL BUILDING H SECTION 1 DEMOLITION PLAN
MD-1.5	MECHANICAL BUILDING H SECTION 2 DEMOLITION PLAN
MD-1.6	MECHANICAL BUILDING H SECTION 3 DEMOLITION PLAN
MD-1.7	MECHANICAL BUILDING H ATTIC DEMOLITION PLAN
MD-1.8	MECHANICAL GYMNASIUM DEMOLITION PLAN
MD-1.9	MECHANICAL CAFETERIA DEMOLITION PLAN
MD-1.10	MECHANICAL BUILDING AUDITORIUM DEMO FIRST FLOOR PLAN
MD-1.11	MECHANICAL BUILDING AUDITORIUM DEMO SECOND FLOOR PLAN
M-2.1	MECHANICAL BUILDING A & B REMODEL FLOOR PLAN
M-2.2	MECHANICAL BUILDING C & D REMODEL FLOOR PLAN
M-2.3	MECHANICAL BUILDING E REMODEL FLOOR PLAN
M-2.4	MECHANICAL BUILDING H SECTION 1 REMODEL PLAN
M-2.5	MECHANICAL BUILDING H SECTION 2 REMODEL PLAN
M-2.6	MECHANICAL BUILDING H SECTION 3 REMODEL PLAN
M-2.7	MECHANICAL BUILDING H ATTIC REMODEL PLAN
M-2.8	MECHANICAL GYMNASIUM REMODEL LOW ROOF PLAN
M-2.9	MECHANICAL CAFETERIA REMODEL FLOOR PLAN
M-2.10	MECHANICAL BUILDING AUDITORIUM REMODEL FIRST FLOOR PLAN
M-2.11	MECHANICAL BUILDING AUDITORIUM REMODEL SECOND FLOOR PLAN
M-3.1	MECHANICAL DETAILS
MR-4.1	MECHANICAL BUILDING A & B REFERENCE
MR-4.2	MECHANICAL BUILDING C & D REFERENCE
MR-4.3	MECHANICAL BUILDING E REFERENCE

Sheet Number	Sheet Name
MR-4.4	MECHANICAL BUILDING H SECTION 1 REFERENCE
MR-4.5	MECHANICAL BUILDING H SECTION 2 REFERENCE
MR-4.6	MECHANICAL BUILDING H SECTION 3 REFERENCE
MR-4.7	MECHANICAL BUILDING H ATTIC REFERENCE
MR-4.8	MECHANICAL GYMNASIUM REFERENCE
MR-4.9	MECHANICAL CAFETERIA REFERENCE
MR-4.10	MECHANICAL BUILDING AUDITORIUM FLOOR 1 REFERENCE
MR-4.11	MECHANICAL BUILDING AUDITORIUM FLOOR 2 REFERENCE
E-0.1	ELECTRICAL LEGENDS & NOTES
E-0.2	SINGLE LINE DIAGRAMS
E-0.3	SINGLE LINE DIAGRAM & LOAD SUMMARIES
E-0.4	PANEL SCHEDULES
E-0.5	PANEL SCHEDULES
E-0.6	PANEL SCHEDULES
E-1.1	BUILDING A ELECTRICAL ROOF PLAN
E-1.2	BUILDING B ELECTRICAL FLOOR PLANS
E-1.3	BUILDING C ELECTRICAL FLOOR PLANS
E-1.4	BUILDING D ELECTRICAL FLOOR PLANS
E-1.5	BUILDING E ELECTRICAL ROOF PLAN
E-1.6	BUILDING E POWER & SIGNAL ROOF PLAN
E-1.7	CAFETERIA POWER & SIGNAL FLOOR PLAN
E-1.8	CAFETERIA POWER & SIGNAL ROOF PLAN
E-1.9	GYMNASIUM POWER & SIGNAL FIRST FLOOR PLAN
E-1.10	GYMNASIUM POWER & SIGNAL LOW ROOF PLAN
E-1.11	AUDITORIUM POWER & SIGNAL FIRST FLOOR PLAN
E-1.12	AUDITORIUM POWER & SIGNAL SECOND FLOOR PLAN
E-1.13	BUILDING H SECTION 1 ELECTRICAL FLOOR PLAN
E-1.14	BUILDING H SECTION 2 ELECTRICAL FLOOR PLAN
E-1.15	BUILDING H SECTION 3 ELECTRICAL FLOOR PLAN
E-1.16	BUILDING H ATTIC ELECTRICAL FLOOR PLAN
E-2.1	ELECTRICAL DETAILS

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o. 425-673-7269 c. 907-317-5040
www.design2LAST.com

SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

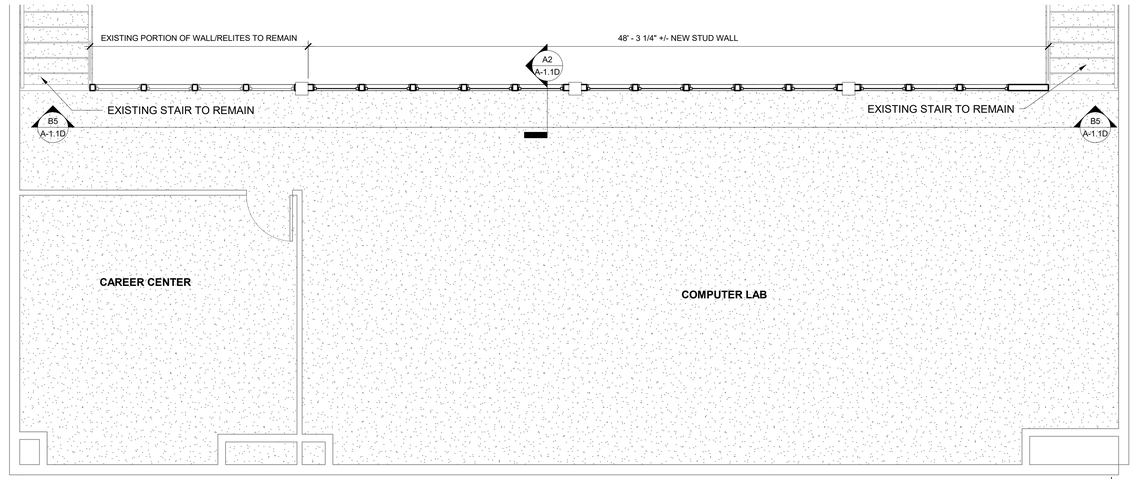
#	DESCRIPTION	DATE

JOB NO.	2022-017
DATE	14 NOV 2023
DRAWN	lms
REVIEWED	lms

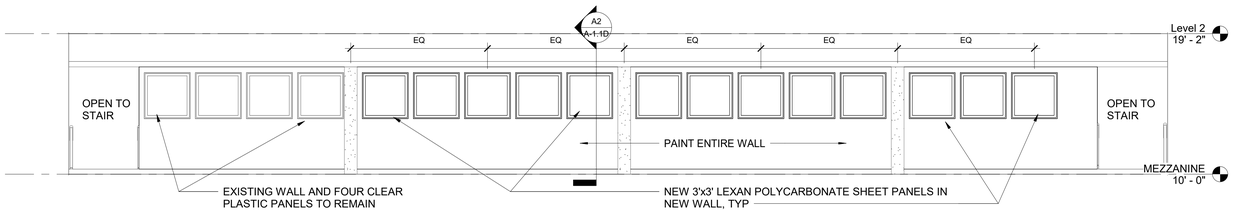
SHEET NAME
COVER SHEET, INDEX & SCOPE OF WORK

SHEET NO.
G-0.0

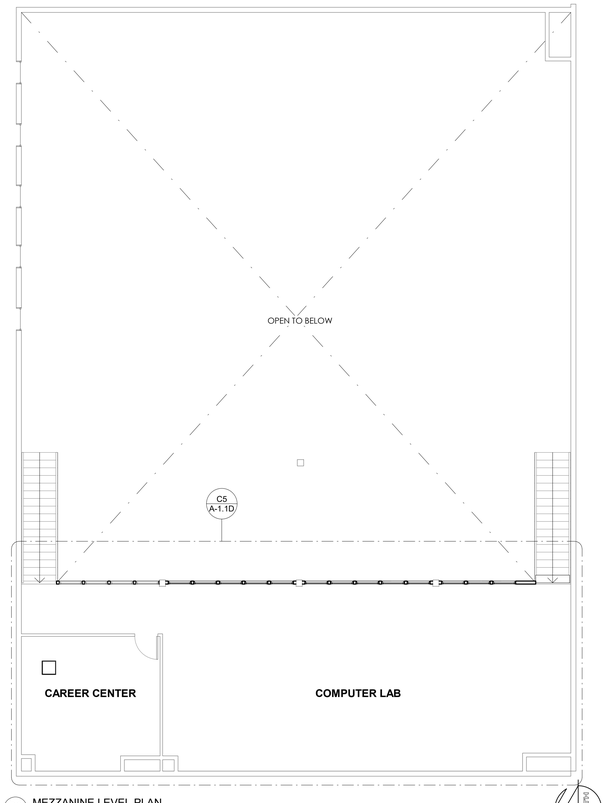
RESERVED FOR BUILDING DEPT STAMP



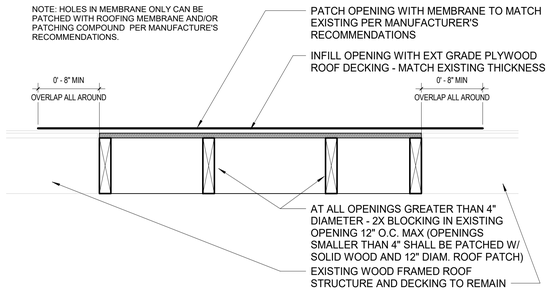
C5 COMPUTER LAB PLAN
1/4" = 1'-0"



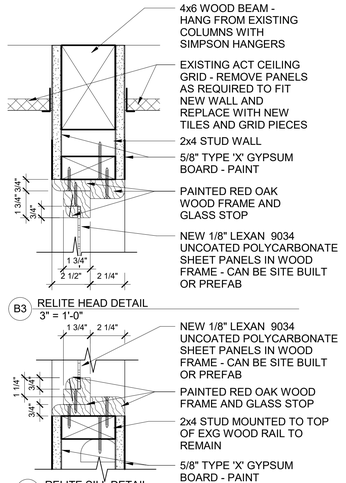
B5 COMPUTER ROOM WALL ELEVATIO
1/4" = 1'-0"



B2 MEZZANINE LEVEL PLAN
1/8" = 1'-0"

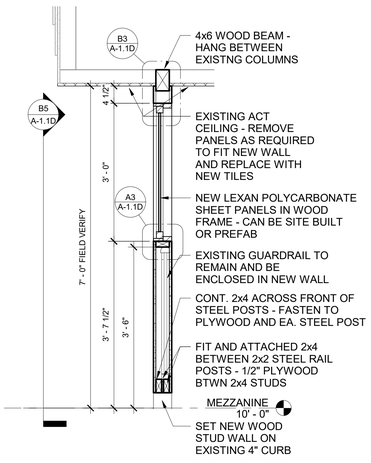


A5 ROOF PATCHING DETAIL - TYP
1 1/2" = 1'-0"

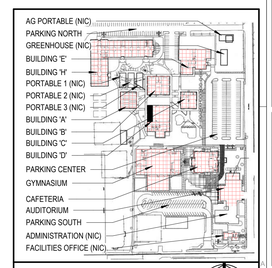


B3 RELITE HEAD DETAIL
3" = 1'-0"

A3 RELITE SILL DETAIL
3" = 1'-0"



A2 SECTION AT NEW WALL/RELITE
3/4" = 1'-0"



KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

10241 REGISTERED ARCHITECT
LAURA M. STRAUSS
STATE OF WASHINGTON
LAURI STRAUSS, AIA, LEED AP BD&C

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design2 LAST inc.

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REVISION SCHEDULE

#	DESCRIPTION	DATE

JOB NO.	2022-017
DATE	14 NOV 2023
DRAWN	LMS
REVIEWED	LMS

SHEET NAME
BLDG D COMPUTER LAB
PLANS AND DETAILS

SHEET NO.
A-1.1D

MECHANICAL GENERAL NOTES

1. THE TOTAL INSTALLATION SHALL COMPLY WITH ANY REQUIREMENTS OF THE LEGALLY CONSTITUTED AUTHORITIES HAVING JURISDICTION INCLUDING 2018 INTERNATIONAL BUILDING CODE (IBC), 2018 INTERNATIONAL MECHANICAL CODE (IMC), 2018 UNIFORM PLUMBING CODE (UPC) WITH WASHINGTON STATE AMENDMENTS AND THE 2018 WASHINGTON STATE ENERGY CODE.
2. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS UNDER WHICH THEY WILL BE REQUIRED TO WORK. INDICATED DIMENSIONS ARE APPROXIMATE AND ARE GIVEN FOR ESTIMATE PURPOSES ONLY. PRIOR TO PERFORMING ANY NEW WORK, THE CONTRACTOR SHALL CAREFULLY CHECK AND VERIFY DIMENSIONS, SIZES, REQUIRED CLEARANCES AND SHALL ASSUME FULL RESPONSIBILITY FOR THE FITTING OF EQUIPMENT AND MATERIALS HEREIN REQUIRED TO OTHER PARTS OF THE WORK OF OTHER TRADES. DUCT DIMENSIONS SHOWN ON PLANS ARE NET INSIDE CLEAR.
3. THE DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC TO THE EXTENT THAT OFFSETS, BENDS, SPECIAL FITTINGS AND LOCATIONS ARE NOT EXACTLY LOCATED. DUCTWORK DIMENSIONS SHOWN ON THE DRAWINGS ARE NET INSIDE DIMENSIONS. DO NOT FABRICATE DUCTWORK FROM THESE DRAWINGS. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SUPPLYING SHOP DRAWINGS WHICH REFLECT THE PROPOSED INSTALLATION. THE SHOP DRAWINGS MUST BE APPROVED BY THE ENGINEER PRIOR TO ANY SHEET METAL FABRICATION. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ACCURATE AS-BUILT DRAWINGS, IN AUTOCAD FORMAT, AT THE COMPLETION OF THE PROJECT AND SUBMITTING THEM TO THE ENGINEER AND OWNER.
4. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
5. ITEMS RELATED TO PLUMBING UTILITIES AND/OR OTHER SERVICE(S); MATERIALS, LABOR, PERMITS, FEES, ETC., SHALL BE VERIFIED WITH THE RESPECTIVE SERVING UTILITY COMPANY PRIOR TO SUBMISSION OF A BID. THE ACT OF SUBMITTING A BID SHALL CONSTITUTE FULL RESPONSIBILITY TO INSTALL SERVICE(S) IN COMPLIANCE WITH THE REQUIREMENTS OF THE SERVING UTILITY COMPANY AND THE MECHANICAL ENGINEER.
6. THE CONTRACTOR SHALL COMPLY WITH THE CONTRACT DOCUMENTS IN LAYING OUT THEIR WORK AND EQUIPMENT. THEY SHALL COORDINATE THE WORK OF THIS SECTION WITH THE WORK OF OTHER TRADES AND JOB CONDITIONS.
7. THE INSTALLATION OF ACCESS PANELS OR OTHER INDICATING EQUIPMENT OR SPECIALTIES REQUIRING READING, ADJUSTMENT, INSPECTION, REPAIRS, REMOVAL OR REPLACEMENT SHALL BE CONVENIENTLY LOCATED WITH REFERENCE TO THE FINISHED BUILDING.
8. EQUIPMENT AND FIXTURES INSTALLED UNDER THIS CONTRACT SHALL BE HUNG OR ANCHORED IN ACCORDANCE WITH 2018 (IBC) AND 2018 UPC. WHERE NOT SPECIFICALLY INDICATED OTHERWISE, DUCTWORK AND EQUIPMENT SHALL BE SUPPORTED PER THE SMACNA GUIDELINES FOR SEISMIC RESTRAINT AND CURRENT APPLICABLE UNIFORM MECHANICAL CODE.
9. PROVIDE MANUAL VOLUME DAMPERS AT UPSTREAM PORTION OF TERMINAL AIR BRANCHES. THESE SHALL BE OF THE LOCKING QUADRANT TYPE. WHERE LOCATED OVER SLOPED OR HARD CEILINGS, PROVIDE DURO-DYNE ANGLE GEAR DRIVE OR BOWDEN CABLE CONTROL SYSTEM OR PROVIDE UNITED ENERTECH POWER/BALANCE SYSTEM. REMOTE PLATE LOCATIONS TO BE LOCATED AS DETERMINED BY ARCHITECT.
10. PROVIDE MINIMUM 1" ACOUSTICAL LINING IN DUCTWORK WITHIN 10 FEET OF AIR MOVING EQUIPMENT. PROVIDE DURO-DYNE FLEXIBLE CONNECTION AT DUCT AT EQUIPMENT LOCATIONS.
11. DUCTS IN AN UNCONDITIONED SPACE OR EXTERIOR DUCT WORK SHALL BE INSULATED IN ACCORDANCE WITH THE WASHINGTON STATE ENERGY CODE (WSEC) AND THE DUCT INSULATION TABLE AS PROVIDED ON THIS SHEET.
12. TESTING, ADJUSTING, AND BALANCING (TAB) OF THE AIR CONDITIONING SYSTEMS AND RELATED ANCILLARY EQUIPMENT WILL BE PERFORMED BY A CERTIFIED, INDEPENDENT THIRD PARTY, AABC OR NEBB AGENCY PROCURED BY THE MECHANICAL CONTRACTOR. A COMPLETE AIR BALANCE REPORT TO BE SUBMITTED TO THE ADMINISTRATIVE AUTHORITY AND TO THE MECHANICAL ENGINEER AND APPROVED PRIOR TO OCCUPANCY.
13. AIR HANDLING DUCT SYSTEMS SHALL BE CONSTRUCTED, INSTALLED AND INSULATED AS DESCRIBED IN CHAPTER 6 OF THE 2018 IMC.
14. MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE FLAME SPREAD INDEX NOT GREATER THAN 25 AND A SMOKE DEVELOPED INDEX NOT GREATER THAN 50 (2018 IMC SECTION 602.2).
15. UNLESS OTHERWISE STATED, MAXIMUM LENGTH FOR FLEXIBLE DUCTWORK SHALL NOT EXCEED FIVE FEET (5'-0"). ALUMINUM FLEX DUCTWORK WILL NOT BE ALLOWED ON ANY PORTION OF THE DUCTWORK SYSTEM.
16. TEST SYSTEM(S) IN ACCORDANCE WITH REQUIREMENTS OF THE GOVERNING AUTHORITIES.
17. CONNECTIONS TO EXISTING SERVICES SHALL BE MADE SUCH THAT INTERRUPTION TIME WILL BE AS SHORT AS POSSIBLE. GIVE THE OWNERS REPRESENTATIVE A MINIMUM OF 72 HOURS NOTICE OF SUCH INTERRUPTIONS AND THE ACTUAL SHUT-DOWN TIME SHALL BE AT A TIME DESIGNATED BY THE OWNERS REPRESENTATIVE.
18. ANY SUBSTITUTION MADE THAT IS DIFFERENT FROM WHAT IS SPECIFIED ON THE DRAWINGS NEEDS TO BE APPROVED BY ENGINEER OF RECORD AND OWNER PRIOR TO BID AND SHALL BE CLEARLY INDICATED ON THE SUBMITTAL AS TO THAT IS BEING SUBSTITUTED.
19. FIXTURES, EQUIPMENT, PIPING, FITTINGS, AND MATERIALS SHALL BE UL LISTED.

MISCELLANEOUS DEMO/REMODEL NOTES

1. DEMOLITION: WORK REQUIRED IS NOTED ON PLANS. VERIFY WITH ON SITE CONDITION AND OWNER.
2. WHERE INDICATED, DUCTWORK AND PIPING OR PORTIONS OF DUCTWORK AND PIPING SHALL BE REUSED. REFER TO DRAWING PLANS FOR POINTS OF CONNECTIONS.
3. PROVIDE TEMPORARY SUPPORT OF EXISTING MECHANICAL SYSTEMS WHERE REQUIRED BY DEMOLITION OR ALTERATION OF EXISTING STRUCTURE DURING CONSTRUCTION. COORDINATE WITH GENERAL CONTRACTOR AND PROVIDE ALL NECESSARY PIPE, DUCT AND EQUIPMENT SUPPORTS AND HANGERS TO MAINTAIN INTEGRITY, SAFETY AND PROPER OPERATION OF EXISTING MECHANICAL SYSTEMS FOR THE DURATION OF THE WORK.

APPLICABLE CODES

MATERIALS, METHODS, AND INSTALLATION SHALL COMPLY WITH THE PROVISIONS OF THE LATEST EDITION OF THE FOLLOWING CODES AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION, CITY OF SEQUIM.

1. BUILDING CODE: 2018 INTERNATIONAL BUILDING CODE WITH WASHINGTON STATE AMENDMENTS
2. PLUMBING CODE: 2018 UNIFORM PLUMBING CODE WITH WASHINGTON STATE AMENDMENTS
3. MECHANICAL CODE: 2018 INTERNATIONAL MECHANICAL CODE WITH WASHINGTON STATE AMENDMENTS
4. ELECTRICAL CODE: 2020 NATIONAL ELECTRICAL CODE (NFPA 70 - 2020) INC. ANNEX A, B, AND C
5. FIRE/LIFE SAFETY: 2018 INTERNATIONAL FIRE CODE WITH WASHINGTON STATE AMENDMENTS
6. ENERGY: 2018 WASHINGTON STATE ENERGY CODE

SHUTOFF DAMPER REQUIREMENTS

OUTDOOR AIR SUPPLY, EXHAUST OPENINGS AND RELIEF OUTLETS AND STAIRWAY AND ELEVATOR HOISTWAY SHAFT VENTS SHALL BE PROVIDED WITH CLASS I MOTORIZED DAMPERS IN ACCORDANCE WITH WASHINGTON STATE ENERGY CODE (WSEC) SECTION C403.7.8.1. RETURN AIR OPENINGS USED FOR AIRSIDE ECONOMIZER SHALL BE EQUIPPED WITH CLASS I MOTORIZED DAMPERS IN ACCORDANCE WITH WSEC SECTION C403.7.8.2. CLASS I DAMPERS SHALL HAVE A MAXIMUM LEAKAGE RATE OF 4 CFM/SQ.FT. @ 1.0" W.C. WHEN TESTED IN ACCORDANCE WITH AMCA 500D AND SHALL BE LABELED BY AN APPROVED AGENCY FOR SUCH PURPOSE IN ACCORDANCE WITH WSEC SECTION C403.7.8.3.

EXISTING MECHANICAL CONDITIONS

1. EXISTING MATERIALS THAT ARE REMOVED SHALL NOT BE REUSED IN NEW SYSTEMS, EXCEPT WHERE INDICATED AS BEING RELOCATED.
2. WHERE INDICATED, DUCTWORK AND PIPING OR PORTIONS OF DUCTWORK AND PIPING SHALL BE REUSED. REFER TO DRAWING PLANS FOR POINTS OF CONNECTIONS.
3. PROVIDE TEMPORARY SUPPORT OF EXISTING MECHANICAL SYSTEMS WHERE REQUIRED BY DEMOLITION OR ALTERATION OF EXISTING STRUCTURE DURING CONSTRUCTION. COORDINATE WITH GENERAL CONTRACTOR AND PROVIDE ALL NECESSARY PIPE, DUCT AND EQUIPMENT SUPPORTS AND HANGERS TO MAINTAIN INTEGRITY, SAFETY AND PROPER OPERATION OF EXISTING MECHANICAL SYSTEMS FOR THE DURATION OF THE WORK.
4. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER AS TO PRIORITIZING WHICH AHU, RTU AND OR HRU UNITS SHALL INITIALLY BE REPLACED. IT IS THE INTENT TO REMOVE AND REPLACE THOSE UNITS WHICH ARE NO LONGER FUNCTIONING PROPERLY OR ARE NON-OPERATIONAL FIRST SO AS TO ENSURE THAT ZONES IMPACTED BY THE UNIT REPLACEMENTS SHALL HAVE PROPER AIR CIRCULATION.

HVAC MATERIALS & METHODS

1. DUCT SEALING SHALL MEET REQUIREMENTS LISTED IN CHAPTER 6 OF THE IMC. IN ADDITION, PROVIDE SEAL CLASS A FOR ALL DUCTWORK.
2. CONSTRUCT RECTANGULAR DUCTWORK TO MEET ALL FUNCTIONAL CRITERIA DEFINED IN CHAPTER 11, OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS. PROVIDE DIAGONAL CREASING OR BEADING ON ALL PANELS WIDER THAN 18-INCHES, AND PANELS LESS THAN 18 GAGE. CONSTRUCT ROUND AND FLAT OVAL DUCTWORK IN ACCORDANCE WITH CHAPTER 3 OF SMACNA HDCS.
3. DUCTMATE, METU, OR W.D.C.I. DUCT CONNECTION SYSTEMS ARE ACCEPTABLE. DUCTS CONSTRUCTED USING THESE SYSTEMS WILL REFER TO THE MANUFACTURER'S GUIDELINES FOR SHEET GAGE, INTERMEDIATE REINFORCEMENT SIZE AND SPACING, AND JOINT REINFORCEMENTS.
4. PROVIDE COLLARS WHEREVER AN EXPOSED DUCT PASSES THROUGH A WALL, SLAB, OR CEILING:1-INCH WIDE, 18-GAGE ANGLE WITH MITERED CORNERS & SEAL WITH FIBERGLASS AND MASTIC.
5. SPIN-IN FITTINGS SHALL BE CONICAL TYPE WITH VOLUME DAMPER, AND QUADRANT; FLEX MASTER ELGEN OR EQUIVALENT.
6. ELBOWS IN RECTANGULAR OR SQUARE DUCTWORK SHALL HAVE AN INSIDE RADIUS EQUAL TO DIMENSION OF ELBOW IN THE PLANE OF THE TURN.
7. ELBOWS IN ROUND DUCTWORK SHALL HAVE THE INSIDE RADIUS EQUAL TO DIMENSION OF ELBOW IN THE PLANE OF THE TURN. USE SEGMENTED, STANDING SEAM, PLEATED, OR STAMPED ELBOWS. ADJUSTABLE ELBOWS ARE ALLOWED IF RADIUS CONFORMS TO ABOVE.
8. SQUARE CORNER INSERTS (TURNING VANES) SHALL BE SMACNA FIG. 4.3 DOUBLE THICKNESS, RUNNER TYPE 2 WITH 2-1/8-INCH SPACING.
9. PROVIDE VOLUME DAMPERS IN THE DUCT TO EACH SUPPLY, EXHAUST, OR RETURN OPENING. LOCATE DAMPERS AT A POINT WHERE THE DUCT IS ACCESSIBLE; AS FAR FROM THE OUTLET AS POSSIBLE. DAMPERS SHALL BE RUSKIN MD25 OR MDRS25.
10. THOROUGHLY CLEAN ALL DEBRIS FROM THE INSIDE OF ALL DUCTWORK AND PLENUMS.
11. MECHANICAL DRAWINGS SHOW APPROXIMATE LOCATIONS FOR GRILLES AND DIFFUSERS. ENSURE THAT DIFFUSER AND GRILLE FRAMES MATCH CEILING TYPES AND FINISH PRIOR TO ORDERING.
12. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH A SLIP JOINT MADE USING FIRE RESISTANT MASTIC AND CLAMP, IDEAL "SNAP-LOCK" OR VENTLOCK "SURETIGHT NO. 670" AT EACH END. SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS. DO NOT INSTALL WITH ABRUPT BENDS OR OFFSETS. MAXIMUM LENGTH 5-FEET. LOW PRESSURE INSULATED FLEXIBLE DUCT SHALL BE THERMAFLEX MK-E.
13. AIR SYSTEMS SHALL BE BALANCED SO AS TO FIRST MINIMIZE THROTTLING LOSSES, THEN ADJUSTED TO MEET DESIGN FLOW CONDITIONS.
14. DIFFUSERS & GRILLES SHALL BE COORDINATED WITH THE EXISTING LOCATION OF LIGHT FIXTURES.
15. ALL SHEET METAL PRODUCTS SHALL COMPLY WITH SMACNA DUCT CONSTRUCTION STANDARDS, CURRENT EDITION.
16. ALL RECTANGULAR DUCTWORK SIZES SHOWN ARE GALVANIZED SHEET METAL UNLESS NOTED OTHERWISE. ROUND DUCT SHALL BE SHEET METAL. PROVIDE TURNING VANES IN ALL ROUND 2-PIECE AND RECTANGULAR 90 DEGREE ELBOWS.
17. ALL DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS.
18. PROVIDE FLEXIBLE CONNECTORS AT DUCT CONNECTIONS TO ALL AIR HANDLING EQUIPMENT.
19. ALL LONGITUDINAL AND TRANSVERSE JOINTS, SEAMS AND CONNECTIONS OF LOW-PRESSURE SUPPLY AND RETURN DUCTS SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS (ADHESIVES), MASTIC-PLUS-EMBEDDED-FABRIC SYSTEMS OR TAPES INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

WASHINGTON STATE ENERGY CODE NOTES

1. WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL PROVIDE A TEMPERATURE RANGE OR DEADBAND OF AT LEAST 5°F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS CAPABLE OF BEING SHUT OFF OR REDUCED TO A MINIMUM PER C403.2.4.1.2.
2. EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM. THERMOSTATIC SETBACK SHALL BE IN ACCORDANCE WITH C403.2.4.2.1
3. PROVIDE AUTOMATIC START CONTROLS FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CAPABLE OF AUTOMATICALLY ADJUSTING THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY IN ACCORDANCE WITH WSEC, C403.2.4.2.3.
4. OUTDOOR AIR SUPPLY, EXHAUST OPENINGS AND RELIEF OUTLETS SHALL BE EQUIPPED WITH NOT LESS THAN CLASS I MOTORIZED DAMPERS IN ACCORDANCE WITH WSEC, C403.2.4.3, AND SHALL BE INSTALLED WITH AUTOMATIC CONTROLS CONFIGURED TO CLOSE ALL OUTSIDE AIR, RELIEF AND EXHAUST DAMPERS WHEN EQUIPMENT IS NOT RUNNING.
5. PROVIDE COMMISSIONING OF THE MECHANICAL SYSTEM IN ACCORDANCE WITH C408. PROVIDE COMMISSIONING PLAN IN ACCORDANCE WITH C408.1.2. PROVIDE FUNCTIONAL TESTING CRITERIA INCLUDING SEQUENCE OF OPERATION, NEW AND EXISTING TO REMAIN INTERFACE & TEST PROCEDURES PER WASHINGTON STATE ENERGY CODE. SEE SPECIFICATIONS FOR SPECIFIC EQUIPMENT TESTING REQUIREMENTS. ITEMS TO BE COMMISSIONED ARE: HRU'S, CABINET HEATERS, UNIT HEATERS, DUCT HEATERS, EXHAUST FANS, STRATIFICATION FANS, INDOOR AIR HANDLING UNITS, CONDENSING UNITS, AND ROOF MOUNTED PACKAGED RTU'S. PROVIDE PRELIMINARY AND FINAL COMMISSIONING REPORTS. SUBMIT FIGURE C408.1.2.1 COMPLIANCE CHECKLIST FROM SEC TO AUTHORITY HAVING JURISDICTION UPON COMPLETION OF PRELIMINARY COMMISSIONING REPORT. PROVIDE CLOSEOUT DOCUMENTS IN COMPLIANCE WITH C103.6. ALL COMMISSIONING REPORTS SHALL BE COMPLETED BY A COMMISSIONING PROFESSIONAL AND SHALL BE COMPLETED PRIOR TO FINAL MECHANICAL INSPECTION.
6. PURSUANT TO SECTION C408.2.3, FUNCTIONAL PERFORMANCE TESTING, THE HVAC SYSTEM SHALL BE TESTED TO ENSURE THAT THE CONTROL DEVICES, EQUIPMENT AND SYSTEMS ARE CALIBRATED, ADJUSTED, AND OPERATE IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. SEQUENCES OF OPERATION SHALL BE FUNCTIONALLY TESTED TO ENSURE THEY OPERATE IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

NON-STRUCTURAL COMPONENT NOTES

1. THE FOLLOWING ITEMS ARE TAKEN DIRECTLY FROM THE 2018 INTERNATIONAL BUILDING CODE, 2018 INTERNATIONAL BUILDING CODE AND FROM THE AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD 7-10. THE CONTRACTOR SHALL REFER TO THE ABOVE FOR ADDITIONAL INFORMATION, EXCEPTIONS, AND FURTHER DESCRIPTIONS. THE CONTRACTOR SHALL ADHERE TO REQUIREMENTS AND AS SUCH, SHALL BE INCLUDED WITHIN BID.
2. 2018 IMC 301.18; WHERE EARTHQUAKE LOADS ARE APPLICABLE IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, MECHANICAL SYSTEM SUPPORTS SHALL BE DESIGNED AND INSTALLED FOR THE SEISMIC FORCES IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE.
3. 2018 IBC 1613.1; EVERY STRUCTURE, AND PORTION THEREOF, INCLUDING NON-STRUCTURAL COMPONENTS THAT ARE PERMANENTLY ATTACHED TO STRUCTURES AND THEIR SUPPORTS AND ATTACHMENTS, SHALL BE DESIGNED AND CONSTRUCTED TO RESIST THE EFFECTS OF EARTHQUAKE MOTIONS IN ACCORDANCE WITH CHAPTERS 11, 12, 13, 15, 17, AND 18 OF ASCE 7-10, AS APPLICABLE.
4. 2018 IBC 1704.3, STATEMENT OF SPECIAL INSPECTIONS: WHERE SPECIAL INSPECTIONS OR TESTS ARE REQUIRED BY SECTION 1705, THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE SHALL PREPARE A STATEMENT OF SPECIAL INSPECTIONS IN ACCORDANCE WITH SECTION 1704.3.1 FOR SUBMITTAL BY THE APPLICANT IN ACCORDANCE WITH SECTION 1704.2.3.
5. 2018 IBC 1704.4, CONTRACTOR RESPONSIBILITY: EACH CONTRACTOR RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF MAIN WIND OR SEISMIC FORCE-RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM, OR A WIND OR SEISMIC FORCE-RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER OR THE OWNER'S AUTHORIZED AGENT PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL CONTAIN ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS.
6. 2018 IBC 1705.12, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE. SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE SHALL BE REQUIRED AS SPECIFIED IN SECTIONS 1705.12.1 THROUGH 1705.12.9, UNLESS EXEMPTED BY THE EXCEPTIONS OF SECTION 1704.2.

OVERALL PROJECT DRAWING INFORMATION

ALL BACKGROUNDS PROVIDED ON THE DRAWINGS HAVE BEEN TAKEN FROM THE PROJECT RECORD DRAWINGS AND ARE IN PDF FORMAT. THE RECORD DRAWINGS SHALL BE MADE AVAILABLE TO THE CONTRACTOR BY THE OWNER FOR REFERENCE, INFORMATION, AND COORDINATION PURPOSES ONLY. ALL HAND DRAFTED NOTES THAT REMAIN ON THE PDF BACKGROUNDS ARE ORIGINAL TO THE RECORD DRAWINGS AND MAY NOT APPLY TO THE CURRENT SCOPE OF WORK. ALL NEW AND OR DEMOLITION WORK SHOWN IN RED FOR CLARITY.

TABLE C403.10.1.1 - OUTDOOR AIR DUCTWORK INSULATION

DUCT SYSTEM	DUCT LOCATION AND USE	CLIMATE ZONE	AIRFLOW	MINIMUM INSTALLED DUCT INSULATION R-VALUE a,b	NOTES
OUTDOOR AIR	INSIDE CONDITIONED SPACE AND UPSTREAM OF AN *AUTOMATIC* SHUTOFF DAMPER.	4C AND 5B	> 2800 CFM	R-16	SEE SECTION C403.10.1.1 FOR ADDITIONAL REQUIREMENTS
OUTDOOR AIR	INSIDE CONDITIONED SPACE AND DOWNSTREAM OF AN *AUTOMATIC* SHUTOFF DAMPER TO HVAC UNIT OR ROOM.	4C	> 2800 CFM	R-8	
OUTDOOR AIR	INSIDE CONDITIONED SPACE	4C AND 5B	< 2800 CFM	R-7	SEE EXCEPTION 1 TO SECTION C403.10.1.1 FOR ADDITIONAL DETAILS

FOOTNOTES:
a. INSULATION R-VALUES, MEASURED IN h-ft² °F/Btu, ARE FOR THE INSULATION AS INSTALLED AND DO NOT INCLUDE FILM RESISTANCE. THE REQUIRED MINIMUM THICKNESSES DO NOT CONSIDER WATER VAPOR TRANSMISSION AND POSSIBLE SURFACE CONDENSATION. INSULATION RESISTANCE MEASURED ON A HORIZONTAL PLANE IN ACCORDANCE WITH ASTM C518 AT A MEAN TEMPERATURE OF 75°F AT THE INSTALLED THICKNESS.
b. SEE INTERNATIONAL MECHANICAL CODE SECTIONS 603.12 AND 604 FOR FURTHER DETAILS ON DUCT INSULATION REQUIREMENTS.

TABLE C403.10.1.2 - SUPPLY, RETURN, EXHAUST, AND RELIEF AIR DUCTWORK INSULATION

DUCT SYSTEM	DUCT LOCATION AND USE	CLIMATE ZONE	MINIMUM INSTALLED DUCT INSULATION R-VALUE a,b	NOTES
SUPPLY AIR OR RETURN AIR	OUTSIDE THE BUILDING (OUTDOORS AND EXPOSED TO WEATHER) c	4C	R-8	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR OR RETURN AIR	UNCONDITIONED SPACE (ENCLOSED BUT NOT IN THE BUILDING CONDITIONED ENVELOPE)	4C AND 5B	R-6	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR OR RETURN AIR	UNCONDITIONED SPACE WHERE THE DUCT CONVEYS AIR THAT IS WITHIN 15°F OF THE AIR TEMPERATURE OF THE SURROUNDING UNCONDITIONED SPACE.	4C AND 5B	R-3.3	SEE IMC SECTION 603.12 FOR ADDITIONAL REQUIREMENTS FOR CONDENSATION CONTROL AT DUCTWORK
SUPPLY AIR OR RETURN AIR	WHERE LOCATED IN A BUILDING ENVELOPE ASSEMBLY	4C AND 5B	R-16	DUCT OR PLENUM IS SEPARATED FROM BUILDING ENVELOPE ASSEMBLY WITH THE MINIMUM INSULATION VALUE.
SUPPLY AIR	WITHIN CONDITIONED SPACE WHERE THE SUPPLY DUCT CONVEYS AIR THAT IS LESS THAN 55°F OR GREATER THAN 105°F.	4C AND 5B	R-3.3	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR	WITHIN CONDITIONED SPACE THAT THE DUCT DIRECTLY SERVES WHERE THE SUPPLY DUCT CONVEYS AIR THAT IS LESS THAN 55°F OR GREATER THAN 105°F.	4C AND 5B	NONE	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR	WITHIN CONDITIONED SPACE WHERE THE SUPPLY DUCT CONVEYS AIR THAT IS 55°F OR GREATER AND 105°F OR LESS.	4C AND 5B	NONE	
RETURN OR EXHAUST AIR	WITHIN CONDITIONED SPACE, DOWNSTREAM OF AN ENERGY RECOVERY MEDIA, UPSTREAM OF AN *AUTOMATIC* SHUTOFF DAMPER.	4C	R-8	
RETURN OR EXHAUST AIR	CONDITIONED SPACE AND DOWNSTREAM OF AN *AUTOMATIC* SHUTOFF DAMPER.	4C AND 5B	R-16	

FOOTNOTES:
a. INSULATION R-VALUES, MEASURED IN h-ft² °F/Btu, ARE FOR THE INSULATION AS INSTALLED AND DO NOT INCLUDE FILM RESISTANCE. THE REQUIRED MINIMUM THICKNESSES DO NOT CONSIDER WATER VAPOR TRANSMISSION AND POSSIBLE SURFACE CONDENSATION. INSULATION RESISTANCE MEASURED ON A HORIZONTAL PLANE IN ACCORDANCE WITH ASTM C518 AT A MEAN TEMPERATURE OF 75°F AT THE INSTALLED THICKNESS.
b. SEE INTERNATIONAL MECHANICAL CODE SECTIONS 603.12 AND 604 FOR FURTHER DETAILS ON DUCT INSULATION REQUIREMENTS.
c. INCLUDES ATTICS ABOVE INSULATED CEILINGS, PARKING GARAGES AND CRAWL SPACES.

DUCT CONSTRUCTION SCHEDULE

DUCT LOCATION	DUCT TYPE	DUCT SERVICE	PRESSURE CLASS (IN)	MIN SMACNA SEAL CLASS	DUCT MATERIAL	REMARKS
UNCONDITIONED	SUPPLY	FAN COIL, FURNACES, HEAT PUMPS AND TERMINAL UNITS	2	B	GA	
		CONSTANT VOLUME AIR HANDLING UNITS	2	B	GA	
	RETURN	FAN COIL, FURNACES, HEAT PUMPS AND TERMINAL UNITS	2	B	GA	
		AIR HANDLING UNITS	2	B	GA	
	OUTDOOR AIR	FAN COIL, FURNACES, HEAT PUMPS AND TERMINAL UNITS	2	C	GA	
		AIR HANDLING UNITS	2	C	GA	
CONDITIONED	SUPPLY	CONSTANT VOLUME AIR HANDLING UNITS	2	C	GA	
		VARIABLE VOLUME AIR HANDLING UNITS	4	A	GA	
	RETURN	FAN COIL, FURNACES, HEAT PUMPS AND TERMINAL UNITS	2	C	GA	
		AIR HANDLING UNITS	2	C	GA	
	OUTDOOR AIR	FAN COIL, FURNACES, HEAT PUMPS AND TERMINAL UNITS	2	C	GA	
		AIR HANDLING UNITS	2	C	GA	

DUCT SYSTEMS INSULATION SCHEDULE - CLIMATE ZONE 4

LOCATION OF DUCT	DUCT SYSTEM TYPE	DUCT CONFIGURATION	INSULATION TYPE	MINIMUM R-VALUE, INSULATION THICKNESS	REMARKS
DUCT NOT WITHIN CONDITIONED SPACE	SUPPLY, RETURN, EXHAUST MIXED, OUTSIDE, AND TRANSFER AIR DUCTS	RECTANGULAR - EXPOSED	RIGID BOARD	R-7, 1 LAYER, 2 INCH THICK	
		RECTANGULAR - CONCEALED	DUCT WRAP	R-7, 1 LAYER, 3 INCH THICK	
		ROUND AND OVAL	DUCT WRAP	R-7, 1 LAYER, 3 INCH THICK	
DUCT WITHIN CONDITIONED SPACE	SUPPLY, RETURN, EXHAUST GENERATOR EXHAUST, RELIEF AND TRANSFER AIR DUCTS	RECTANGULAR - EXPOSED	RIGID BOARD	R-3.3, 1 INCH THICK	
		RECTANGULAR - CONCEALED	DUCT WRAP	R-3.3, 1 LAYER, 1-1/2 INCH THICK	
		ROUND AND OVAL	DUCT WRAP	R-3.3, 1 LAYER, 1-1/2 INCH THICK	

NOTES:
1. INSULATE OUTSIDE, EXHAUST, AND RELIEF AIR DUCTS FROM BUILDING ENVELOPE TO BACKDRAFT/MOTORIZED DAMPER WITH R-VALUE EQUAL TO BUILDING ENVELOPE THICKNESS.
2. REQUIREMENTS APPLY TO THE DUCT TYPE LISTED, WHETHER HEATED OR MECHANICALLY COOLED DUCTS REQUIRING INSULATION SHALL HAVE A VAPOR RETARDER, WITH A PERM RATING NOT GREATER THAN 0.5 AND ALL JOINTS SEALED.
3. R-3.3; 1.0 INCH TO 3.0 LB/FT3 DUCT LINER, MINERAL OR GLASS FIBER BLANKET OF EQUIVALENT TO PROVIDE AND INSTALLED TOTAL THERMAL RESISTANCE OF AT LEAST R-3.3.
4. R-5.3; 2.0 INCH 0.75LB/FT3 MINERAL OR GLASS FIBER BLANKET, 1.5 INCH 1.5 TO 3.0 LB/FT3 DUCT LINER, MINERAL OR GLASS FIBER BLANKET, 1.5 INCH 3.0 TO 7.0 LB/FT3 MINERAL OR GLASS FIBER BOARD OR EQUIVALENT TO PROVIDE AN INSTALLED TOTAL THERMAL RESISTANCE OF AT LEST R-5.3.
5. R-7; 3.0 INCH 0.75LB/FT3 MINERAL OR GLASS FIBER BLANKET, 2.0 INCH 1.5 TO 3.0 LB/FT3 DUCT LINER, MINERAL OR GLASS FIBER BLANKET, 2.0 INCH 3.0 TO 7.0 LB/FT3 MINERAL OR GLASS FIBER BOARD OR EQUIVALENT TO PROVIDE AN INSTALLED TOTAL THERMAL RESISTANCE OF AT LEAST R-7.

TABLE C405.8(1) MINIMUM NOMINAL FULL-LOAD EFFICIENCY FOR NEMA DESIGN A, NEMA DESIGN B, AND IEC DESIGN N MOTORS (EXCLUDING FIRE PUMP) ELECTRIC MOTORS AT 60HZ a, b

MOTOR HP	MINIMUM NOMINAL FULL-LOAD EFFICIENCIES (%)						NOTES
	OPEN MOTORS			ENCLOSED MOTORS			
NUMBER POLES	2	4	6	2	4	6	1. NOMINAL EFFICIENCIES SHALL BE ESTABLISHED IN ACCORDANCE WITH NEMA STANDARD MG1. 2. DESIGNS A AND B ARE NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION (NEMA) DESIGN CLASS. 3. DESIGNATIONS FOR FIXED FREQUENCY SMALL AND MEDIUM AC SQUIRREL-CAGE INDU

PACKAGED ROOFTOP HEAT PUMP UNIT SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	AREA SERVED	LOCATION	(EXISTING) MAKE/MODEL	(NEW) MAKE/MODEL	SUPPLY FAN					MIN. OUTSIDE AIR FLOW (CFM)	AUXILIARY HEATING				HEATING				COOLING					ELECTRICAL			DIMENSIONS (LxWxHT) (INxINxIN)	WEIGHT (LBS)	REMARKS
						FLOW (CFM)	ESP (IN WC)	SPEED (RPM)	MOTOR RATING (BHP)	DRIVE TYPE		MAKE/MODEL	ORIGINAL CAPACITY (kW)	NEW CAPACITY (kW)	LAT (°F)	TOTAL CAP. (MBH)	EAT (°F)	LAT (°F)	COP 47 (°F) / 17(°F)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	EAT DB/WB (°F)	LAT DB/WB (°F)	SEER / EER	MCA (AMPS)	MOP (AMPS)	VOLTAGE/ PHASE V/Ø			
HP-A01	HP-01	CLASSROOM A-1	ROOF	TRANE WCD 036	JCI XYE04A4B1AA1B111A3	1200	0.75	1191	0.78	BELT	240	JC 2EK04510646	12.0	6.0	75.8	34.7	60.0	86.8	3.3/2.0	39.0	27.7	80.0/67.0	58.6/56.7	15.0/12.5	20.2	25.0	480/3	74x49x33	600.0	SEE NOTES
HP-A02	HP-02	CLASSROOM A-2	ROOF	TRANE WCD 048	JCI XYE05A4C1AA1B111A3	1520	0.75	1263	1.01	BELT	305	JC 2EK04510646	17.4	6.0	72.5	48.4	60.0	89.5	3.6/2.3	49.7	35.7	80.0/67.0	58.3/56.6	15.0/12.5	20.7	25.0	480/3	74x49x41	680.0	SEE NOTES
HP-A03	HP-03	CLASSROOM A-3	ROOF	TRANE WCD 036	JCI XYE04A4B1AA1B111A3	1200	0.75	1168	0.76	BELT	240	JC 2EK04511446	12.0	14.0	96.8	34.7	60.0	86.8	3.3/2.0	39.0	27.7	80.0/67.0	58.6/56.7	15.0/12.5	32.2	35.0	480/3	74x49x33	600.0	SEE NOTES
HP-A04	HP-04	CLASSROOM A-4	ROOF	TRANE WCD 048	JCI XYE05A4C1AA1B111A3	1520	0.75	1263	1.01	BELT	305	JC 2EK04510646	17.4	6.0	72.5	48.4	60.0	89.5	3.6/2.3	49.7	35.7	80.0/67.0	58.3/56.6	15.0/12.5	20.7	25.0	480/3	74x49x41	680.0	SEE NOTES
HP-B01	HP-05	CLASSROOMS B-1 & B7	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	2240	0.75	1379	1.60	BELT	675	JC 2EK04511446	23.0	14.0	79.7	57.2	60.0	83.6	3.6/2.3	65.1	49.9	80.0/67.0	59.4/57.8	15.0/12.5	36.2	40.0	480/3	74x49x41	720.0	SEE NOTES
HP-B02	HP-06	CLASSROOMS B-2 & B-5	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	2240	0.75	1379	1.60	BELT	675	JC 2EK04511446	23.0	14.0	79.7	57.2	60.0	83.6	3.6/2.3	65.1	49.9	80.0/67.0	59.4/57.8	15.0/12.5	36.2	40.0	480/3	74x49x41	720.0	SEE NOTES
HP-B03	HP-07	CLASSROOM B-3	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	1920	0.75	1294	1.29	BELT	575	JC 2EK04511446	23.0	14.0	83.0	57.3	60.0	87.6	3.6/2.3	62.6	45.6	80.0/67.0	58.0/56.6	15.0/12.5	36.2	40.0	480/3	74x49x41	720.0	SEE NOTES
HP-B04	HP-08	CLASSROOM B-4	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	1920	0.75	1285	1.27	BELT	575	JC 2EK04511146	23.0	11.5	78.9	57.3	60.0	87.6	3.6/2.3	62.6	45.6	80.0/67.0	58.0/56.6	15.0/12.5	32.5	35.0	480/3	74x49x41	720.0	SEE NOTES
HP-B05	HP-23	CLASSROOMS B-4 & B-7	ROOF	TRANE WCD 036	JCI XYE04A4C1AA1B111A3	1320	0.75	1222	0.87	BELT	265	JC 2EK04511446	12.0	14.0	93.5	35.0	60.0	84.6	3.3/2.0	40.4	29.3	80.0/67.0	59.4/57.4	15.0/12.5	32.2	35.0	480/3	74x49x33	600.0	SEE NOTES
HP-C01	HP-09	CLASSROOM C-1	ROOF	TRANE WCD 075	JCI XYEA7A4B3AA1B111A2	2430	0.75	824	1.28	BELT	485	JC 2EK04511746	27.0	16.5	81.4	65.1	60.0	84.8	3.4/2.4	74.9	52.5	80.0/67.0	60.0/57.3	14.8/12.0	44.5	45.0	480/3	87x62x41	945.0	SEE NOTES
HP-C02	HP-10	CLASSROOM C-2	ROOF	TRANE WCD 075	JCI XYEA7A4B3AA1B111A2	2640	0.75	824	1.28	BELT	485	JC 2EK04511746	27.0	16.5	81.4	65.1	60.0	84.8	3.4/2.4	74.9	52.5	80.0/67.0	60.0/57.3	14.8/12.0	44.5	45.0	480/3	87x62x41	945.0	SEE NOTES
HP-D01	HP-22	ADMINISTRATION	ROOF	TRANE WCD 036	JCI XYE04A4B1AA1B111A3	1200	0.75	1191	0.78	BELT	240	JC 2EK04510646	12.0	6.0	75.8	34.7	60.0	86.8	3.3/2.0	39.0	27.7	80.0/67.0	58.6/56.7	15.0/12.5	20.2	25.0	480/3	74x49x33	600.0	SEE NOTES
HP-D02	HP-23	STORAGE	ROOF	ABANDONED	ABANDONED	**UNIT ABANDONED IN PLACE**																								
HP-D03	HP-24	ADMIN WEST OFFICES	ROOF	DAIKIN DPS003A	DAIKIN DPS003A	**UNIT PROVIDED IN 2016. NO NEW WORK REQUIRED OTHER THAN RE-LABELING FOR CONTROLS UPGRADE/UNIT SEQUENCING**																								
HP-D04	HP-25	ADMIN EAST OFFICES	ROOF	DAIKIN DPS003A	DAIKIN DPS003A	**UNIT PROVIDED IN 2016. NO NEW WORK REQUIRED OTHER THAN RE-LABELING FOR CONTROLS UPGRADE/UNIT SEQUENCING**																								
HP-E01	HP-11	CLASSROOM E-1	ROOF	TRANE WCD 036	JCI XYE04A4B1AA1B111A3	1280	0.75	1202	0.84	BELT	260	JC 2EK04511446	12.0	14.0	94.5	34.9	60.0	85.2	3.3/2.0	40.0	28.8	80.0/67.0	59.2/57.1	15.0/12.5	32.2	35.0	480/3	74x49x33	600.0	SEE NOTES
HP-E02	HP-12	CLASSROOM E-2	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	1950	0.75	1301	1.31	BELT	390	JC 2EK04511446	23.0	14.0	82.7	57.3	60.0	87.2	3.6/2.3	62.8	46.0	80.0/67.0	58.1/56.8	15.0/12.5	36.2	40.0	480/3	74x49x41	720.0	SEE NOTES
HP-E03	HP-13	CLASSROOM E-17	ROOF	TRANE WCC 018	FRASER-JOHNSTON PHE6A2424	650	0.50	HIGH	0.25	DIRECT	130	S1-6HK06500506	3.7	5.0	81.4	23.2	60.0	93.0	4.0	24.7	17.2	80.0/67.0	55.4/54.7	16.0/12.5	42.2	50.0	208/1	51x36x45	370.0	SEE NOTES
HP-GYM01	HP-14	MAIN GYM - WEST	ROOF	TRANE WCD 180	JCI HD15E1CP4C1AAA12A2	5800	0.75	897	2.60	BELT	1160	JC 2EH04502546	36.0	25.0	72.5	163.6	60.0	86.1	3.3/2.1	187.2	131.9	80.0/67.0	58.9/56.8	13.5/10.9	74.9	80.0	480/3	144x89x49	2150.0	SEE NOTES
HP-GYM02	HP-15	MAIN GYM - WEST	ROOF	TRANE WCD 180	JCI HD15E1CP4C1AAA12A2	5800	0.75	897	2.60	BELT	1160	JC 2EH04502546	36.0	25.0	72.5	163.6	60.0	86.1	3.3/2.1	187.2	131.9	80.0/67.0	58.9/56.8	13.5/10.9	74.9	80.0	480/3	144x89x49	2150.0	SEE NOTES
HP-GYM03	HP-16	AUXILARY GYM	ROOF	TRANE WCD 240	JCI HD20E1CP4C1AAA12A2	8800	0.75	1000	4.06	BELT	1760	JC 2EH04505046	72.0	50.0	76.5	222.3	60.0	83.4	3.3/2.1	265.5	198.7	80.0/67.0	59.1/57.4	13.5/10.9	97.3	100.0	480/3	144x89x57	2500.0	SEE NOTES
HP-GYM04	HP-17	MAIN GYM - EAST	ROOF	TRANE WCD 180	JCI HD15E1CP4C1AAA12A2	5800	0.75	897	2.60	BELT	1160	JC 2EH04502546	36.0	25.0	72.5	163.6	60.0	86.1	3.3/2.1	187.2	131.9	80.0/67.0	58.9/56.8	13.5/10.9	74.9	80.0	480/3	144x89x49	2150.0	SEE NOTES
HP-GYM05	HP-18	MAIN GYM - EAST	ROOF	TRANE WCD 180	JCI HD15E1CP4C1AAA12A2	5800	0.75	897	2.60	BELT	1160	JC 2EH04502546	36.0	25.0	72.5	163.6	60.0	86.1	3.3/2.1	187.2	131.9	80.0/67.0	58.9/56.8	13.5/10.9	74.9	80.0	480/3	144x89x49	2150.0	SEE NOTES
HP-AUD01	HP-01	AUDITORIUM	ROOF	TRANE WSH240	JCI HD20E2CP4L1CCK12B2	8000	1.00	1011	3.82	BELT	1600	JC 2EH04505046	72.0	50.0	78.1	220.8	60.0	85.6	3.3/2.1	259.3	188.9	80.0/67.0	58.1/56.8	13.5/10.9	101.6	110.0	480/3	144x89x57	2600.0	SEE NOTES
HP-AUD02	HP-02	BALCONY	ROOF	TRANE WCD 090	JCI XYE08A4C3AA1B111A2	3000	1.50	995	2.12	BELT	600	JC 2EK04512846	27.0	27.8	89.3	84.6	60.0	86.1	3.5/2.4	92.3	70.4	80.0/67.0	58.3/57.3	16.0/12.1	63.3	70.0	480/3	87x62x55	1150.0	SEE NOTES
HP-AUD03	HP-03	CLASSROOM 202	ROOF	TRANE WCD 036	JCI XYE04A4B1AA1B111A3	1200	0.75	1191	0.78	BELT	420	JC 2EK04510646	12.0	6.0	75.8	34.7	60.0	86.8	3.3/2.0	39.0	27.7	80.0/67.0	58.6/56.7	15.0/12.5	20.2	25.0	480/3	74x49x33	600.0	SEE NOTES
HP-AUD04	HP-04	CLASSROOM 201	ROOF	TRANE WCD 048	JCI XYE05A4C1AA1B111A3	1600	0.75	1267	1.05	BELT	560	JC 2EK04511146	17.0	11.5	82.7	48.8	60.0	82.7	3.6/2.3	50.4	36.7	80.0/67.0	58.8/57.0	15.0/12.5	29.0	30.0	480/3	74x49x41	680.0	SEE NOTES
HP-AUD05	HP-05	FOYER	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	2000	0.75	1383	1.49	BELT	1000	JC 2EK04511446	17.0	14.0	82.1	57.3	60.0	86.5	3.6/2.3	63.2	46.7	80.0/67.0	58.4/57.0	15.0/12.5	36.2	40.0	480/3	74x49x41	720.0	SEE NOTES
HP-AUD06	HP-06	STAGE	ROOF	TRANE WCD 048	JCI XYE05A4C1AA1B111A3	1600	0.75	1267	1.05	BELT	400	JC 2EK04511146	17.0	11.5	82.7	48.8	60.0	82.7	3.6/2.3	50.4	36.7	80.0/67.0	58.8/57.0	15.0/12.5	29.0	30.0	480/3	74x49x41	680.0	SEE NOTES
HP-AUD07	HP-07	WAGON HOUSE	ROOF	TRANE WCD 048	JCI XYE05A4C1AA1B111A3	1600	0.75	1267	1.05	BELT	400	JC 2EK04511146	17.0	11.5	82.7	48.8	60.0	82.7	3.6/2.3	50.4	36.7	80.0/67.0	58.8/57.0	15.0/12.5	29.0	30.0	480/3	74x49x41	680.0	SEE NOTES
HP-CAF01	HP-08	CAFETERIA SERVING	ROOF	TRANE WCD 060	JCI XYE06A4C1AA1B111A3	2000	1.00	1383	1.49	BELT	700	JC 2EK04511446	17.0	14.0	82.1	57.3	60.0	86.5	3.6/2.3	63.2	46.7	80.0/67.0	58.4/57.0	15.0/12.5	36.2	40.0	480/3	74x49x41	720.0	SEE NOTES
HP-CAF02	HP-09	CAFETERIA DINING E	ROOF	TRANE WCD 180	JCI HD15E2DP4L1AAB12C2	6000	1.00	1000	3.30	BELT	1200	JC 2EH04502546	72.0	25.0	84.2	164.2	60.0	85.3	3.3/2.1	188.8	132.7	80.0/67.0	59.5/57.1	13.5/10.9	90.1	100.0	480/3	144x89x49	2300.0	SEE NOTES
HP-CAF03	HP-10	CAFETERIA DINING W	ROOF	TRANE WCD 240	JCI HD20E2CP4L1CCK12B2	8000	1.00	1011	3.82	BELT	1600	JC 2EH04505046	72.0	50.0	78.1	220.8	60.0	85.6	3.3/2.1	259.3	188.9	80.0/67.0	58.1/56.8	13.5/10.9	101.6	110.0	480/3	144x89x57	2600.0	SEE NOTES

NOTES:
1. COOLING PERFORMANCE BASED ON 95.0°F AMBIENT DRY BULB TEMPERATURE.
2. WEIGHT INCLUDES ADAPTER CURB. ADAPTER CURBS SHALL BE PROVIDED AT ALL REPLACED PACKAGED RTU'S UNLESS NEW UNITS ARE PROVIDED BY ORIGINAL MANUFACTURER.
3. MOTOR HORSEPOWER LISTED IS THE ACTUAL REQUIRED OPERATING BRAKE HORSEPOWER.
4. PROVIDE WITH ECONOMIZER FUNCTIONS UNLESS NOTED OTHERWISE. COORDINATE SETTING OF MINIMUM OUTSIDE AIRFLOW REQUIREMENTS WITH TAB CONTRACTOR.
5. PROVIDE WITH BACNET INTERFACE CARD SUITABLE FOR INTEGRATION TO ON-SITE EMS SYSTEM BY ALLERTON.

INDOOR AIR-HANDLING UNIT W/ELECTRIC HEAT

NEW UNIT NO.	EXISTING UNIT NO.	AREA SERVED	LOCATION	(EXISTING) MAKE/MODEL (REFERENCE PURPOSES ONLY)	NEW MAKE / MODEL	MIN. OUTSIDE AIR FLOW (CFM)	SUPPLY FAN				HEATING				ELECTRICAL				WEIGHT (LBS)	REMARKS
							AIRFLOW (CFM)	TSP (IN)	MOTOR (HP)	SPEED (RPM)	CAPACITY (kW)	# OF STAGES	EAT (°F)	LAT (°F)	FLA (AMPS)	MCA (AMPS)	MOP (AMPS)	VOLTAGE/ PHASE (V/Ø)		
AHU-H01	HV-101	ROOM 101	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1300	1.0	1.0	1512	14.0	2.0	60.0	94.0	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H02	HV-104	ROOM 104	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1300	1.0	1.0	1512	14.0	2.0	60.0	94.0	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H03	HV-109	ROOM 109	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1300	1.0	1.0	1512	14.0	2.0	60.0	94.0	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H04	HV-110	ROOM 110	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1400	1.0	1.0	1579	14.0	2.0	60.0	91.6	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H05	HV-111	ROOM 111	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1400	1.0	1.0	1579	14.0	2.0	60.0	91.6	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H06	HV-112	ROOM 112	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1100	1.0	1.0	1379	14.0	2.0	60.0	100.2	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H07	HV-113	ROOM 113	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1100	1.0	1.0	1379	14.0	2.0	60.0	100.2	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H08	HV-114	ROOM 114	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1100	1.0	1.0	1379	14.0	2.0	60.0	100.2	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H09	HV-115	ROOM 115	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	800	1.0	0.5	1216	12.0	2.0	60.0	91.6	11.0	13.8	15.0	480/3	350	SEE NOTES
AHU-H10	HV-117	ROOM 117	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1400	1.0	1.0	1579	14.0	2.0	60.0	91.6	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H11	HV-118	ROOM 118	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H12	HV-119	ROOM 119	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H13	HV-120	ROOM 120	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H14	HV-120A	ROOMS 120A, B & C	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1170	1.0	1.0	1579	14.0	2.0	60.0	91.6	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H15	HV-122	ROOM 122	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1400	1.0	1.0	1579	14.0	2.0	60.0	91.6	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H16	HV-123	ROOM 123	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H17	HV-125	ROOM 125	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H18	HV-130	ROOM 130	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H19	HV-131	ROOM 131	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H20	HV-132	ROOM 132	MECH. MEZZANINE	ENVIROTECH 12RH	JCI AHD	-	1400	1.0	1.0	1579	14.0	2.0	60.0	91.6	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H21	HV-134	ROOM 134	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1100	1.0	1.0	1379	12.0	2.0	60.0	94.5	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H22	HV-135	ROOM 135	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1300	1.0	1.0	1512	14.0	2.0	60.0	94.0	19.3	24.1	25.0	480/3	350	SEE NOTES
AHU-H23	HV-137	ROOM 137	MECH. MEZZANINE	ENVIRO-TECH 12LH	JCI AHD	-	1800	1.0	1.0	1183	12.0	2.0	60.0	81.1	16.8	21.0	25.0	480/3	350	SEE NOTES
AHU-H24	HV-143	ROOM 143	MECH. MEZZANINE	ENVIRO-TECH 12RH	JCI AHD	-	1300	1.0	1.0	1512	14.0	2.0	60.0	94.0	19.3	24.1	25.0	480/3	350	SEE NOTES

NOTES:
1. PROVIDE WITH 2-STAGE ELECTRIC HEATER, 2" MERV 13 FILTERS AND DIRECT DRIVE EC FAN.
2. PROVIDE WITH INTERNAL OUTSIDE AND RETURN AIR DAMPERS AT MIXING BOX WITH COMMON LINKAGE. BELIMO ACTUATORS BY DIVISION 23.
3. PROVIDE WITH FUSING PER STEP OF HEAT & 2-STEP DISCONNECTING MAGNETIC CONTACTORS.
4. PROVIDE WITH 2-10VDC SIGNAL FOR CONTROL BY DDC.

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL SCHEDULES CONT.

SHEET NO.
M-0.2

RESERVED FOR BUILDING DEPT STAMP

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FRONT - 2023-11-14 - COLIN GOULET

HEAT RECOVERY AIR-HANDLING UNIT SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	AREA SERVED	LOCATION	NEW MAKE / MODEL	SUPPLY FAN				RETURN/EXHAUST FAN				HEAT RECOVERY EXHAUST				HEAT RECOVER SUPPLY				HEATING				ELECTRICAL				SUPPLY FILTERS (# OF) (LxWxD)	RETURN FILTERS (# OF) (LxWxD)	DIMENSIONS (LxWxHT)	WEIGHT (LBS)	REMARKS
					AIRFLOW (CFM)	ESP (IN)	MOTOR (HP)	RPM	AIRFLOW (CFM)	ESP (IN)	MOTOR (HP)	RPM	SUMMER		WINTER		SUMMER		WINTER		EXISTING CAPACITY (kW)	NEW CAPACITY (kW)	EAT (°F)	LAT (°F)	FLA (AMPS)	MCA (AMPS)	MOP (AMPS)	VOLT / PHASE (V/Ø)					
													EAT (DB/RH%)	LAT (DB/WB°F)	EAT (DB/RH%)	LAT (DB/WB°F)	EAT (DB/WB°F)	LAT (DB/WB°F)	EAT (DB°F)	LAT (DB/WB°F)												
HRU-E01	HR-01	BUILDING E - WOOD SHOP	ROOF	VALENT VXE	6400	1.00	7.5	1760	6400	0.75	7.5	1770	75 / 50%	82.0 / 65.5	70 / 35%	41.6 / 36.1	86 / 67	78.9 / 64.2	24.0	53.4 / 43.6	160.0	50.0	53.4	78.1	83.4	88.5	90.0	460 / 3	(3) 16x20x2, (3) 20x20x2	(4) 16x25x2	163x68x73	3400	SEE NOTES
HRU-E02	HR-02	BUILDING E - METAL SHOP	ROOF	VALENT VXE	3600	1.00	5.0	1760	3600	0.75	5.0	1165	75 / 50%	82.0 / 65.5	70 / 35%	41.6 / 36.1	86 / 67	78.9 / 64.2	24.0	53.4 / 43.6	85.0	35.0	53.5	84.2	53.9	67.4	70.0	460 / 3	(4) x 20x20x2	(3) 16x25x2	149x52.5x60	2500	SEE NOTES
HRU-E03	HR-03	BUILDING E - AUTO SHOP	ROOF	VALENT VXE	5000	1.00	5.0	1760	5000	0.75	5.0	1760	75 / 50%	83.0 / 65.9	70 / 35%	36.7 / 31.8	86 / 67	77.9 / 63.8	24.0	58.5 / 47.3	66.0	35.0	58.5	80.6	58.1	72.7	80.0	460 / 3	(3) 16x20x2, (3) 20x20x2	(4) 16x25x2	163x68x73	3300	SEE NOTES
HRU-GYM01	HR-04	GYM - MEN'S LOCKER RM.	ROOF	VALENT VXE	5800	1.00	5.0	1760	5800	0.75	5.0	1760	75 / 50%	82.5 / 65.6	70 / 35%	39.2 / 33.5	86 / 67	78.5 / 64.0	24.0	56.8 / 46.5	35.0	35.0	56.8	75.8	57.4	71.8	80.0	460 / 3	(3) 16x20x2, (3) 20x20x2	(4) 16x25x2	163x68x73	3100	SEE NOTES
HRU-GYM02	HR-05	GYM - WOMEN'S LOCKER RM.	ROOF	VALENT VXE	7310	1.00	7.5	1760	7310	0.75	7.5	1760	75 / 50%	82.1 / 65.5	70 / 35%	41.1 / 35.0	86 / 67	78.9 / 64.2	24.0	55.1 / 45.3	44.0	50.0	55.1	76.7	82.6	87.6	90.0	460 / 3	(3) 16x20x2, (3) 20x20x2	(4) 16x25x2	163x68x73	3200	SEE NOTES

NOTES:
1) DAMPERS: PROVIDE MANUFACTURERS OUTSIDE & RELIEF MOTORIZED DAMPERS.
2) PROVIDE WITH 30" TALL, NON-ISOLATING, NON-SLOPED INSULATED PLENUM CURB WITH SIDE DISCHARGE DUCT CONNECTIONS FOR SUPPLY & RETURN
3) PROVIDE WITH BACNET INTERFACE CARD, SUITABLE FOR INTEGRATION TO EITHER AUTOMATED LOGIC AND OR ALERTON TECHNOLOGIES, INC. ENERGY MANAGEMENT SYSTEM.
4) PROVDE WITH FILTER LOADING SENSORS FOR ALL FILTERS
5) UNIT CAPACITIES DO NOT INCLUDE ALLOWANCES FOR HOOD INLETS / OUTLETS
6) PROVIDE 2" MERV13 FILTERS FOR SUPPLY; 2" MERV8 FILTERS FOR RETURN

INDOOR AIR-HANDLING UNIT W/DX COIL

NEW UNIT NO.	EXISTING UNIT NO.	AREA SERVED	LOCATION	(EXISTING) MAKE/MODEL	MANUFACTURER / MODEL	MIN. OUTSIDE AIR FLOW (CFM)	SUPPLY FAN				DX COIL (HEATING			DX COIL (COOLING			ELECTRICAL				FILTER SIZES (#-L"xW")	DIMENSIONS (LxWxHT) (INxINxIN)	WEIGHT (LBS)	REMARKS
							AIRFLOW (CFM)	ESP (IN)	MOTOR (HP)	SPEED (RPM)	CAPACITY (MBH)	EAT (°F)	LAT (°F)	CAPACITY (MBH)	EAT (°F)	LAT (°F)	FLA (AMPS)	MCA (AMPS)	MOP (AMPS)	VOLTAGE/ PHASE (V/Ø)				
AHU-D01	AHU-1	LIBRARY - MAIN	BLDG. D PENTHOUSE	TRANE CLCH 21	**UNIT UPDATED IN 2016 WITH NEW DX COIL, REFRIGERANT PIPING, AND REMOTE ROOF MOUNTED HEAT PUMP. NO NEW WORK**																			NOTE 1
AHU-D02	AHU-2	LIBRARY - MEZZANINE	BLDG. D PENTHOUSE	TRANE CLCH 06	**EXISTING UNIT SHALL REMAIN IN PLACE. EXISTING COIL, CONDENSING UNIT AND PIPING SHALL BE REPLACED. SEE DRAWINGS AND SCHEDULES FOR ADDITIONAL INFORMATION.**																			NOTE 2
AHU-D03	AHU-3	ADMIN - RMS. D-5, 6, & 7	BLDG. D PENTHOUSE	TRANE TWE 024	YORK SOLUTIONS	150	740	0.75	1	1765	24	65	85	24	75	55	1.5	1.9	5	480/3	(1) 20x20	96 x 30 x 30	1000	NOTE 3, 4, 5

NOTES:
1. MATCHED WITH CU-D01. BOTH AIRSIDE AND HEAT PUMP UNITS REPLACED IN 2016, NO NEW WORK EXCEPT RENAMING FOR NEW EMS SYSTEM INTEGRATION.
2. MATCHED WITH CU-D02. SEE SPLIT SYSTEM HEAT PUMP SCHEDULE FOR NEW UNIT INFORMATION. CONTRACTOR SHALL REMOVE THE EXISTING DX COIL, CONDENSING UNIT, REFRIGERANT PIPING AND REPLACE WITH NEW. SEE DX COIL SCHEDULE, AND DEMOLITION/NEW DRAWINGS.
3. MATCHED WITH CU-D03. SEE SPLIT SYSTEM HEAT PUMP SCHEDULE FOR NEW UNIT INFORMATION. UNIT SHALL REPLACE EXISTING, REUSE EXISTING HANGER ASSEMBLY.
4. PROVIDE WITH SCR ELECTRIC HEATER, 2" MERV13 FILTERS AND DIRECT DRIVE FAN

SPLIT-SYSTEM HEAT PUMP UNIT SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	UNIT SERVED	LOCATION	NEW MAKE/MODEL	HEATING			COOLING			ELECTRICAL			DIMENSIONS (LxWxH)	WEIGHT (LBS)	REMARKS
					CAPACITY (MBH)	OUTDOOR AIRTEMP (°F)	COP	TOTAL CAPACITY (BTU)	OUTDOOR AIRTEMP (°F)	EER	MCA (AMPS)	MAX FUSE (AMPS)	VOLTAGE/ PHASE (V/Ø)			
CU-D01	HP-19	AHU-D01	ROOF	**ROOF MOUNTED HEAT PUMP UNIT PROVIDED IN 2016. NO NEW WORK OTHER THAN RENAMING FOR DDC UPGRADES.**												
CU-D02	HP-20	AHU-D02	ROOF	SAMSUNG AM096	103,000	24.0	4.2	96,000	95.0	13.7	18.0	20.0	460/3	51x30x67	600	SEE NOTES
CU-D03	HP-21	AHU-D03	ROOF	SAMSUNG AM036	42,000	24.0	4.2	38,000	95.0	12.5	23.0	40.0	208/1	37x48x13	225	SEE NOTES

NOTES:
1. PROVIDE WITH FACTORY MOTOR STARTERS. SEE ELECTRICAL DRAWINGS FOR SEPARATE DISCONNECT SWITCH.
2. PROVIDE WITH INTEGRAL CRANKCASE HEATER, SINGLE POINT POWER CONNECTION, ALUMINUM FAN BLADES, AND LOW AMBIENT HOOD KIT FOR 100% LOW AMBIENT COOLING DOWN TO MINUS (-) 20 DEG. F.
3. PROVIDE ALL ASSOCIATED REFRIGERANT PIPING SIZED IN ACCORDANCE WITH MANUFACTURER'S LISTED RECOMMENDATIONS.
4. INSULATE ALL REFRIGERANT PIPING AND PROVIDE WATERPROOF ALUMINUM JACKETING ON ALL EXTERIOR MOUNTED/ROUTED PIPING.
5. PROVIDE CONTROL/POWER WIRING AND REFRIGERANT PIPING FROM OUTDOOR UNIT TO INDOOR UNIT PER MANUFACTURES LISTED RECOMMENDATIONS.

ROOF HOOD SCHEDULE

EQUIP. NO	LOCATION	SERVICE	MANUFACTURER/MODEL	AIRFLOW (CFM)	STATIC PRESSURE (IN WG)	THROAT SIZE (INxIN)	CURB CAP SIZE (INxIN)	THROAT VELOCITY (FPM)	OVERALL DIMENSIONS (LxWxH)	WEIGHT (LBS)	DAMPER TYPE	REMARKS
RH-A01	ROOF	RELIEF - CLASSROOM A1	GREENHECK FGR	1200	0.043	18x18	24x24	533	39x32x16	55	BAROMETRIC	SEE NOTES
RH-A02	ROOF	RELIEF - CLASSROOM A2	GREENHECK FGR	1520	0.06	18x18	24x24	675	39x32x16	55	BAROMETRIC	SEE NOTES
RH-A03	ROOF	RELIEF - CLASSROOM A3	GREENHECK FGR	1200	0.043	18x18	24x24	533	39x32x16	55	BAROMETRIC	SEE NOTES
RH-A04	ROOF	RELIEF - CLASSROOM A4	GREENHECK FGR	1520	0.06	18x18	24x24	675	39x32x16	55	BAROMETRIC	SEE NOTES
RH-B01	ROOF	RELIEF - CLASSROOM B1	GREENHECK FGR	2240	0.043	24x24	30x30	560	39x38x19	70	BAROMETRIC	SEE NOTES
RH-B02	ROOF	RELIEF - CLASSROOM B2	GREENHECK FGR	2240	0.043	24x24	30x30	560	39x38x19	70	BAROMETRIC	SEE NOTES
RH-B03	ROOF	RELIEF - CLASSROOM B3	GREENHECK FGR	1920	0.024	24x24	30x30	480	39x38x19	70	BAROMETRIC	SEE NOTES
RH-B04	ROOF	RELIEF - CLASSROOM B4	GREENHECK FGR	1920	0.024	24x24	30x30	480	39x38x19	70	BAROMETRIC	SEE NOTES
RH-C01N	ROOF	RELIEF - CLASSROOM C1 (NORTH)	GREENHECK FGR	1215	0.024	24x24	30x30	304	39x38x19	70	BAROMETRIC	SEE NOTES
RH-C01S	ROOF	RELIEF - CLASSROOM C1 (SOUTH)	GREENHECK FGR	1215	0.024	24x24	30x30	304	39x38x19	70	BAROMETRIC	SEE NOTES
RH-C02N	ROOF	RELIEF - CLASSROOM C2 (NORTH)	GREENHECK FGR	1320	0.024	24x24	30x30	330	39x38x19	70	BAROMETRIC	SEE NOTES
RH-C02S	ROOF	RELIEF - CLASSROOM C2 (SOUTH)	GREENHECK FGR	1320	0.024	24x24	30x30	330	39x38x19	70	BAROMETRIC	SEE NOTES
RH-D01	ROOF	RELIEF - ADMINISTRATION	GREENHECK FGR	2300	0.043	24x24	30x30	330	39x38x19	70	BAROMETRIC	SEE NOTES
RH-E01	ROOF	RELIEF - DRAFTING CLASSROOM	GREENHECK FGR	1280	0.043	18x18	24x24	569	39x32x16	55	BAROMETRIC	SEE NOTES
RH-E02	ROOF	RELIEF - ELECTRONICS CLASSROOM	GREENHECK FGR	1850	0.024	24x24	30x30	463	39x38x19	70	BAROMETRIC	SEE NOTES
RH-E03	ROOF	RELIEF - RESOURCE	GREENHECK FGR	660	0.06	12x12	18x18	660	27x26x14	40	BAROMETRIC	SEE NOTES

REMARKS:
1. PROVIDE WITH MANUFACTURER'S BIRD SCREENS FOR HOOD OPENINGS, ROOF CURB, AND CORRESPONDING BACKDRAFT DAMPER MOUNTED IN THROAT.

PROPELLER STRATIFICATION FAN SCHEDULE

TAG	AREA SERVED	MANUFACTURER / MODEL	FINISH	MOTOR			ELECTRICAL			BLADE DIAMETER (IN)	FAN HEIGHT (FT)	WEIGHT (LBS)	REMARKS
				SPEED (RPM)	TYPE	WATTS (W)	FLA (A)	MOP (A)	VOLT/PHASE (V/Ø)				
CF-1	LIBRARY NORTH	BAF - ESSENCE (AIRFOIL)	WHITE/SILVER	107	ECM	684	5.7	10.0	120/1	120	FIELD	85	SEE NOTES 1 THRU 5
CF-2	LIBRARY SOUTH	BAF - ESSENCE (AIRFOIL)	WHITE/SILVER	107	ECM	684	5.7	10.0	120/1	120	FIELD	85	SEE NOTES 1 THRU 5

NOTES:
1. PROVIDE HARD WIRED START/STOP AND SPEED CONTROL INPUTS FOR BAS INTERFACE.
2. PROVIDE WITH 0-10V DRIVER FOR FAN SPEED CONTROL. FAN SHALL BE PROVIDED WITH HARD WIRED SPEED CONTROL.
3. PROVIDE WITH WALL MOUNTED SPEED CONTROLLER AND MOUNTING HARDWARE FOR WOOD FRAMED TRUSSES.
4. PROVIDE "DAISY-CHAINING" OF CONTROL WIRING FOR CONTROL OF MULTIPLE FANS WITH SINGLE SWITCH.
5. FINAL MOUNTING FAN HEIGHTS FOR DOWNROD LENGTH SHALL BE FIELD VERIFIED AND COORDINATED WITH ARCHITECT AND BAF REPRESENTATIVE PRIOR TO ORDERING. (LOW PROFILE OR STANDARD)

ELECTRIC DUCT HEATER SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	LOCATION	MANUFACTURER / MODEL	CFM	ELECTRIC HEATING		ELECTRICAL			DIMENSIONS WxHxD	WEIGHT (LBS.)	REMARKS
					CAPACITY (kW)	STAGES	FLA	MOCP	VOLT/PHASE			
EDH-D01	DC-01	GYM - WEIGHT ROOM	BRASCH HUP	3400	33.0	SCR	39.7	50	480/3	30x16 DUCT	100	SEE NOTES
EDH-D02	DC-02	GYM - WOMEN'S LOCKER	BRASCH HUP	3300	45.0	SCR	54.1	75	480/3	34x16 DUCT	100	SEE NOTES
EDH-D03	DC-03	GYM - ROOM 8	BRASCH HUP	610	2.0	SCR	2.4	5	480/3	10x14 DUCT	50	SEE NOTES
EDH-D04	DC-04	GYM - ROOM 10	BRASCH HUP	200	2.0	SCR	2.4	5	480/3	10x10 DUCT	50	SEE NOTES
EDH-E01	DC-05	BUILDING E - ROOM E4	BRASCH HUP	980	4.5	SCR	5.4	7.5	480/3	16x14 DUCT	75	SEE NOTES
EDH-H01	DH-1	BUILDING H - ROOM 105	BRASCH HUP	300	4.0	SCR	14.4	15	277/1	12x8 DUCT	50	SEE NOTES
EDH-H02	DH-2	BUILDING H - ROOM 116	BRASCH HUP	300	4.0	SCR	14.4	15	277/1	12x8 DUCT	50	SEE NOTES
EDH-H03	DH-3	BUILDING H - ROOM 124	BRASCH HUP	300	4.0	SCR	14.4	15	277/1	12x8 DUCT	50	SEE NOTES
EDH-H04	DH-4	BUILDING H - ROOM 136	BRASCH HUP	300	4.0	SCR	14.4	15	277/1	12x8 DUCT	50	SEE NOTES
EDH-H05	DH-5	BUILDING H - ROOM 141	BRASCH HUP	200	2.0	SCR	7.2	10	277/1	10x10 DUCT	50	SEE NOTES
EDH-H07	DH-6	BUILDING H - ROOM 142	BRASCH HUP	200	3.0	SCR	10.8	12.5	277/1	10x10 DUCT	50	SEE NOTES
EDH-H07	DH-7	BUILDING H - ROOMS 137-140	BRASCH HUP	1400	15.0	SCR	18	20	480/3	16x16 DUCT	75	SEE NOTES

NOTES:
1. HEATERS SHALL BE PROVIDED WITH FULL SCR CONTROLS, AIRFLOW INTERLOCK SWITCH, 24V CONTROL TRANSFORMER, DISCONNECT & DUCT MOUNTED THERMOSTAT.
2. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DUCT SIZES AT ALL DUCT HEATER LOCATIONS PRIOR TO ORDERING EQUIPMENT.

DX COIL SCHEDULE

TAG	UNIT SERVED	LOCATION	MANUFACTURER / MODEL	COIL AIRFLOW (CFM)	COIL SIZE L x H (IN.xIN.)	SENSIBLE CAPACITY (MBH)	EAT DB/WB (F°)	LAT DB/WB (F°)	ROWS (#)	FINS PER INCH	COIL MAX. APD (IN WG)	WEIGHT	REMARKS
CC-02	AHU-02	BLDG. D PENTHOUSE	PRECISION DX	2780	34x24	74.6	80/67	55.4/53.9	4	12	0.6	70	SEE NOTES

NOTES:
1. COIL MODULE SHALL REPLACE THE EXISITNG COIL MODULE AT AHU-02.
2. COIL SHALL BE PAIRED WITH NEW CORRESPONDING SPLIT SYSTEM HEAT PUMP UNIT, HP-02. SEE SPLIT SYSTEM HEAT PUMP UNIT SCHEDULE FOR ADDITIONAL INFORMATION.
3. PROVIDE NEW TXV'S, DRAIN PAN, ISOLATION VALVES, LIQUID LINE FILTER DRIER, SUCTION LINE FILTER, EXPANSION VALVES, FROSTSTAT, MOISTURE AND LIQUID INDICATOR.
4. PROVIDE INSULATION AND ALUMINUM JACKETING ON ALL EXPOSED OUTDOOR REFRIGERANT PIPING. PROVIDE INSULATION ON INDOOR REFRIGERANT PIPING IN ACCORDANCE WITH CURRENT WSEC.
5. CONTRACTOR RESPONISBLE FOR FIELD INSTALLATION OF UNIVERSAL COIL KITS

COLIN L. GOULET
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SHEET NAME
MECHANICAL SCHEDULES CONT.

SHEET NO.
M-0.3

RESERVED FOR BUILDING DEPT STAMP

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FRONT - 2023-11-14 - COLIN GOULET

EXHAUST FAN SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	AREA SERVED	LOCATION	ORIGINAL MAKE/MODEL	FAN TYPE	MANUFACTURER / MODEL	FAN				ELECTRICAL			DRIVE TYPE	DIMENSIONS (LxWxHT) / (DIAxHT) (IN)	WEIGHT (LBS)	REMARKS
							FLOW (CFM)	ESP (IN WC)	SPEED (RPM)	MOTOR (HP/WATTS)	FLA (A)	MOCP (A)	VOLT/PHASE (V/Ø)				
EF-A01	EF-01	BUILDING A RESTROOMS	MECH. MEZZ.	PENN D-12	UTILITY SET	GREENHECK USF-12-B7	740	0.50	1,296	1/4	-		208/3	DIRECT	26x18x28	125.0	SEE NOTES
EF-B01	EF-02	BUILDING B - CLASSROOM B1	ROOF	PENN BT 53L	CENT. DOWNBLAST	GREENHECK G-140-VG	2100	0.375	1,285	3/4	-		120/1	DIRECT	29x24	60.0	SEE NOTES
EF-B02	EF-03	BUILDING B - CLASSROOM B2	ROOF	PENN BT 53L	CENT. DOWNBLAST	GREENHECK G-140-VG	2100	0.375	1,285	3/4	-		120/1	DIRECT	29x24	60.0	SEE NOTES
EF-B03	EF-04	BUILDING B - CLASSROOM B3	ROOF	PENN BT 53L	CENT. DOWNBLAST	GREENHECK G-140-VG	2100	0.375	1,285	3/4	-		120/1	DIRECT	29x24	60.0	SEE NOTES
EF-B04	EF-05	BUILDING B - CLASSROOM B4	ROOF	PENN BT 53L	CENT. DOWNBLAST	GREENHECK G-140-VG	2100	0.375	1,285	3/4	-		120/1	DIRECT	29x24	60.0	SEE NOTES
EF-B05	EF-06	BUILDING B - SCIENCE PREP N	ROOF	PENN AQ 10L	CENT. DOWNBLAST	GREENHECK G-90-D	520	0.375	1,550	1/15	-		120/1	DIRECT	22x15	30.0	SEE NOTES
EF-B06	EF-09	BUILDING B - SCIENCE PREP S	ROOF	PENN AQ 10L	CENT. DOWNBLAST	GREENHECK G-90-VG	640	0.375	1,681	1/10	-		120/1	DIRECT	22x15	30.0	SEE NOTES
EF-C01	EF-07	BUILDING C - STORAGE C4	ROOF	PENN XR82L	CENT. DOWNBLAST	GREENHECK G-80-D	250	0.375	1,550	1/20	-		120/1	DIRECT	22x15	30.0	SEE NOTES
EF-C02	EF-08	BUILDING C - REST ROOMS	MECH. MEZZ.	PENN D-12	UTILITY SET	GREENHECK USF-12-B7	740	0.50	1,296	1/4	-		208/3	DIRECT	26x18x28	125.0	SEE NOTES
EF-D01	N/A	BUILDING D - MEN'S RESTROOM	ROOF	N/A	CENT. DOWNBLAST	GREENHECK G-60-VG	100	0.38	1,725	1/15	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-D02	N/A	BUILDING D - WOMEN'S RESTROOM	ROOF	N/A	CENT. DOWNBLAST	GREENHECK G-60-VG	100	0.38	1,725	1/15	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-E01	EF-10	BUILDING E - WELDING EXHAUST	ROOF	PENN FX24B	CENT. UPBLAST	GREENHECK CUE-200HP-VG	4525	2.00	1,566	5.0	-		460/3	DIRECT	37x29	175.0	SEE NOTES
EF-E02	EF-11	BUILDING E - VEHICLE EXHAUST	AUTO SHOP	PENN XR94L	CENT. DOWNBLAST	GREENHECK G-099-VG	750	0.75	1,543	1/4	-		120/1	DIRECT	25x24	50.0	SEE NOTES
EF-E03	N/A	BUILDING E - RESTROOMS	ROOF	N/A	CENT. DOWNBLAST	GREENHECK G-60-VG	100	0.38	1,725	1/15	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-E04	N/A	BUILDING E - STORAGE/JANITOR	ROOF	N/A	CENT. DOWNBLAST	GREENHECK G-70-D	200	0.38	1,550	1/30	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-H01	EF-1	BUILDING H - GIRLS 106	ABOVE CEILING	GREENHECK SP-255	CEILING	GREENHECK SP-A410	400	0.125	1,000	121 W	-		120/1	DIRECT	18x15x15	35.0	SEE NOTES
EF-H02	EF-2	BUILDING H - BOYS107	ABOVE CEILING	GREENHECK SP-255	CEILING	GREENHECK SP-A410	400	0.125	1,000	121 W	-		120/1	DIRECT	18x15x15	35.0	SEE NOTES
EF-H03	EF-3	BUILDING H - ELECTRICAL 115C	ABOVE CEILING	GREENHECK SP-224	CEILING	GREENHECK SP-A200	200	0.125	900	54 W	-		120/1	DIRECT	14x12x12	25.0	SEE NOTES
EF-H04	EF-4	BUILDING H - ROOMS 115B, C & D	ABOVE CEILING	GREENHECK SQ-95-D	INLINE	GREENHECK SQ-95	300	0.375	1,300	1/15	-		120/1	DIRECT	16x15x15	55.0	SEE NOTES
EF-H05	EF-5	BUILDING H - ROOMS 120A, B, C, 125 & 126	ABOVE CEILING	GREENHECK SQ-130-B	INLINE	GREENHECK SQ-120	615	0.50	1,140	1/6	-		120/1	DIRECT	21x19x19	70.0	SEE NOTES
EF-H06	EF-6	BUILDING H - ROOM 128	ABOVE CEILING	GREENHECK SP-255	CEILING	GREENHECK SP-A410	430	0.125	1,000	121 W	-		120/1	DIRECT	18x15x15	35.0	SEE NOTES
EF-H07	EF-7	BUILDING H - ROOM 129	ABOVE CEILING	GREENHECK SP-255	CEILING	GREENHECK SP-A410	400	0.125	1,000	121 W	-		120/1	DIRECT	18x15x15	35.0	SEE NOTES
EF-H08	EF-8	BUILDING H - ROOMS 138, 139, & 140	ABOVE CEILING	GREENHECK SQ-130-B	INLINE	GREENHECK SQ-95	410	0.50	1,550	1/8	-		120/1	DIRECT	16x15x15	55.0	SEE NOTES
EF-GYM01	EF-12	FOOTBALL STORAGE	ROOF	PENN XR94L	CENT. DOWNBLAST	GREENHECK G-80-VG	250	0.50	1,580	1/10	-		120/1	DIRECT	22x15	30.0	SEE NOTES
N/A	EF-13	N/A	N/A	N/A	N/A	NOT USED											
EF-GYM02	EF-14	PE STORAGE	ROOF	PENN XR94L	CENT. DOWNBLAST	GREENHECK G-70-VG	300	0.375	1,725	1/15	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-GYM03	EF-15	RISER ROOM	ROOF	PENN	CENT. DOWNBLAST	GREENHECK G-70-VG	150	0.50	1,713	1/15	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-GYM04	EF-16	EQUIPMENT ROOM	ROOF	PENN	CENT. DOWNBLAST	GREENHECK G-70-VG	150	0.50	1,713	1/15	-		120/1	DIRECT	20x12	25.0	SEE NOTES
EF-AUD01	EF-01	AUDIT. MEN'S 116	CEILING	GREENHECK SP-210	CEILING	GREENHECK SP-A110	100	0.25	950	18 W	-		120/1	DIRECT	14x11x9	20.0	SEE NOTES
EF-AUD02	EF-02	AUDIT. WOMEN'S 117	CEILING	GREENHECK SP-210	CEILING	GREENHECK SP-A110	100	0.25	950	18 W	-		120/1	DIRECT	14x11x9	20.0	SEE NOTES
EF-AUD03	EF-03	AUDIT. MEN'S 102/WOMEN'S 105	MECH. RM. 106	GREENHECK BSQ-120-7	INLINE	GREENHECK SQ-95-VG	500	0.50	1,594	1/6	-		120/1	DIRECT	15x16x15	60.0	SEE NOTES
EF-AUD04	EF-10	AUDIT. CONTROL RM. 109	CEILING	N/A	INLINE	GREENHECK SQ-80	175	0.38	1,725	1/15	-		120/1	DIRECT	12x13x12	40.0	SEE NOTES
EF-AUD05	EF-11	MECHANICAL RM. 106	MECH. RM. 106	N/A	INLINE	GREENHECK SQ-90-VG	300	0.38	1,361	1/10	-		120/1	DIRECT	15x16x15	60.0	SEE NOTES
EF-CAF01	EF-04	CAFÉ. WOMEN'S 303/MEN'S 304	CEILING	GREENHECK BSQ-100-7	INLINE	GREENHECK SQ-120	870	0.50	1,140	1/6	-		120/1	DIRECT	19x21x19	70.0	SEE NOTES
EF-CAF02	EF-05	TYPE I RANGE HOOD	ROOF	GREENHECK CUBE 200HP	CENT. UPBLAST	GREENHECK CUBE-180-VGD	3750	1.50	1,496	2.0	-		460/3	BELT	37x29	135.0	SEE NOTES
EF-CAF03	EF-06	DISHWASHER HOOD	ROOF	GREENHECK CUBE 120-4	CENT. UPBLAST	GREENHECK CUBE-100	900	0.75	1,543	1/4	-		120/1	BELT	25x29	65.0	SEE NOTES
EF-CAF04	EF-07	TOILET 308, ASB 307 & MECH. 311	CEILING	GREENHECK BSQ-80-4	INLINE	GREENHECK SQ-90	350	0.50	1,550	1/10	-		120/1	DIRECT	15x16x15	55.0	SEE NOTES
EF-CAF05	EF-08	MECH./ELEC. 311	CEILING	GREENHECK SP-210	CEILING	GREENHECK SP-A110	100	0.25	950	18 W	-		120/1	DIRECT	14x11x9	20.0	SEE NOTES
EF-CAF06	EF-09	MAKE-UP - TYPE I HOOD	CEILING	GREENHECK BSQ-180-7	INLINE	GREENHECK SQ-160-VG	3000	0.50	1,208	1.0	-		208/3	DIRECT	26x26x26	150.0	SEE NOTES

NOTES:
1. FOR CEILING MOUNTED INLINE EXHAUST FANS, PROVIDE WITH ECM MOTOR, INTEGRATED 4" OR 6" ROUND DUCT ADAPTER, BACKDRAFT DAMPER, FACTORY GRILLE AND INSTALLATION BRACKETS.
2. FOR ABOVE CEILING INLINE EXHAUST FANS, PROVIDE WITH ECM MOTOR, DISCONNECT AND MOUNTING HARDWARE.
3. FOR ROOF MOUNTED EXHAUST FANS, PROVIDE WITH MANUFACTURER'S ROOF CURB, BACKDRAFT DAMPER, SOLID STATE SPEED CONTROL FOR DIRECT DRIVE UNITS AND LOCAL DISCONNECT.
4. REFER TO DIVISION 26 DRAWINGS FOR INTEGRATION WITH OCCUPANCY SENSOR/LIGHTING IF REQUIRED AND OR PROVIDED. FAN SHALL CONTINUE TO RUN FOR SET TIME (ADJ.) APPROXIMATELY 15 MINUTES.
5. DISHWASHER HOOD EXHAUST FAN, EF-CAF03, SHALL BE CONTROLLED VIA A LOCAL WALL SWITCH.
6. EF-CAF05, SHALL BE CONTROLLED VIA LINE VOLTAGE THERMOSTAT. THERMOSTAT SHALL BE SET FOR 75°F.
7. TYPE I HOOD MAKE UP AIR FAN, EF-CAF06, SHALL BE INTERLOCKED WITH THE TYPE I HOOD EXHAUST FAN, EF-CAF02.

CABINET HEATER SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	LOCATION	ORIGINAL MAKE / MODEL	NEW MAKE / MODEL	MIN. OSA (CFM)	FAN AIRFLOW (CFM)	EXISTING CAPACITY (kW)	ELECTRIC HEATING		ELECTRICAL			DIMENSIONS (LXHTXD) (INXINXIN)	WEIGHT (LBS)	REMARKS
								CAPACITY (KW)	STAGES	MAX AMPS	MOCP (AMPS)	VOLT./PHASE V/Ø			
CH-A01	CH-01	MECH. MEZZ. BLDG. A	TRANE FFCB040	BRASCH 922	150	250	6.00	5.7	1	8.6	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-A02	CH-02	MECH. MEZZ. BLDG. A	TRANE FFCB040	BRASCH 922	150	250	6.00	5.7	1	8.6	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-C01	CH-03	MECH. ROOM BLDG. C	TRANE FFCB040	BRASCH 922	150	250	6.00	5.7	1	8.6	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-C02	CH-04	MECH. ROOM BLDG. C	TRANE FFCB040	BRASCH 922	150	250	6.00	5.7	1	8.6	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-E01	CH-05	BUILDING E - RM. 15	TRANE FFCB040	BRASCH 922	150	250	6.00	5.7	1	8.6	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-E02	CH-06	BUILDING E - RM. 16	TRANE FFCB040	BRASCH 922	150	250	6.00	5.7	1	8.6	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-GYM01	CH-07	GYM - LOBBY WEST	TRANE FFJB100	BRASCH 922	400	750	18.00	18.0	1	25.9	30.0	480/3	66x26x10	210	SEE NOTES 2, 4, 5
CH-GYM02	CH-08	GYM - LOBBY EAST	TRANE FFJB100	BRASCH 922	400	750	18.00	18.0	1	25.9	30.0	480/3	66x26x10	210	SEE NOTES 2, 4, 5
CH-GYM03	CH-09	GYM - CONCESSIONS	TRANE FFDB020	BRASCH 922	N/A	250	1.50	1.5	1	11.0	15.0	208/1	28x26x10	115	SEE NOTES 2, 4, 5
N/A	CH-10	NOT USED													
CH-GYM04	CH-11	GYM - VESTIBULE (WEST)	TRANE FFDB020	BRASCH 922	100	250	1.50	1.5	1	11.0	15.0	208/1	28x26x10	115	SEE NOTES 2, 4, 5
CH-GYM05	CH-12	GYM - TRAINING RM.	TRANE FFCB020	BRASCH 922	100	250	3.00	3.0	1	5.0	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5
CH-GYM06	CH-13	GYM - VESTIBULE (EAST)	TRANE FFCB020	BRASCH 922	100	250	1.50	1.5	1	11.0	15.0	208/1	28x26x10	115	SEE NOTES 2, 4, 5
CH-GYM07	CH-14	GYM - PE INSTRUCTORS	TRANE FFCB020	BRASCH 922	100	250	3.00	3.0	1	5.0	10.0	480/3	28x26x10	115	SEE NOTES 1, 2, 3, 4, 5

NOTES:
1) PROVIDE WITH HIGH STATIC MOTORS. CONCEALED INSTALLATION.
2) PROVIDE WITH POWER OPERATED FRESH AIR INLETS, 2-SPEED MOTOR WITH HIGH & LOW SWITCH, 24V RELAY WITH TRANSFORMER
3) PROVIDE WITH RECESSED TRIM KIT
4) PROVIDE WITH PERMANENT WASHABLE AIR FILTERS
5) MAX AMPS INCLUDES HEATER + FAN LOAD

UNIT HEATER SCHEDULE

NEW UNIT NO.	EXISTING UNIT NO.	LOCATION	MANUFACTURER / MODEL	CFM	ELECTRIC HEATING		ELECTRICAL			DIMENSIONS WxHxD	WEIGHT (LBS.)	REMARKS
					CAPACITY (kW)	STAGES	FLA	MOCP	VOLT/PHASE			
UH-A01	UH-01	BUILDING A MEZZANINE	QMARK MUH0341	350	3.0	1.0	3.6	5.0	480/3	14x16x7.5	40.0	NOTE 1
UH-B01	UH-02	BUILDING B MEZZANINE	QMARK MUH0341	350	3.0	1.0	3.6	5.0	480/3	14x16x7.5	40.0	NOTE 1
UH-C01	UH-03	BUILDING C MEZZANINE	QMARK MUH0341	350	3.0	1.0	3.6	5.0	480/3	14x16x7.5	40.0	NOTE 1
UH-D01	UH-04	BUILDING D MEZZANINE	QMARK MUH0341	350	3.0	1.0	3.6	5.0	480/3	14x16x7.5	40.0	NOTE 1
UH-GYM01	UH-05	GYM - ROOM 16	QMARK MUH074	650	7.5	2.0	9.0	10.0	480/3	27x30x12	50.0	NOTE 2
UH-GYM02	UH-06	GYM - ROOM 17	QMARK MUH104	650	10.0	2.0	12.0	15.0	480/3	27x30x12	50.0	NOTE 2

NOTES:
1. WITH RADIAL DIFFUSER.
2. WITH LOUVER DIFFUSER.

ELECTRIC WALL HEATER SCHEDULE

EQUIP. NO	MANUFACTURER / MODEL	AREA SERVED	CFM	ELECTRIC HEATING		ELECTRICAL			DIMENSIONS WxHxD	WEIGHT (LBS.)	REMARKS
				CAPACITY (kW)	STAGES	FLA	MOCP	VOLT/PHASE			
EWH-1	QMARK CWH1207	AUDIT. VEST. 113	160	1.5	1	6.3	7.5	240/1	10.5x12x4	24	SEE NOTES
EWH-2	QMARK CWH1207	CAFÉ ACT. DIR.	160	1.5	1	6.3	7.5	240/1	10.5x12x4	24	SEE NOTES

NOTES:
1. PROVIDE WITH INTEGRAL THERMOSTAT. THERMOSTAT SHALL BE SET FOR 65°F.

RESERVED FOR BUILDING DEPT STAMP

STEVEN M. LARSON
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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

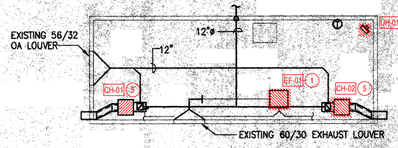
JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL SCHEDULES CONT.

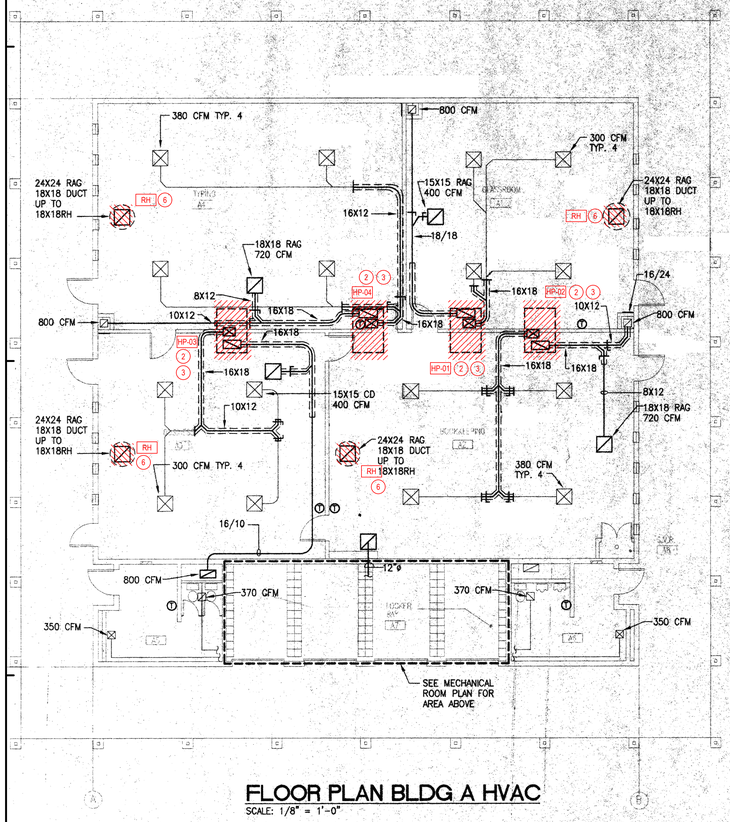
SHEET NO.
M-0.4

22-482

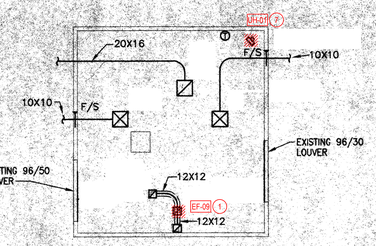
R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FRONT - 2023-11-14 - COLIN GOULET



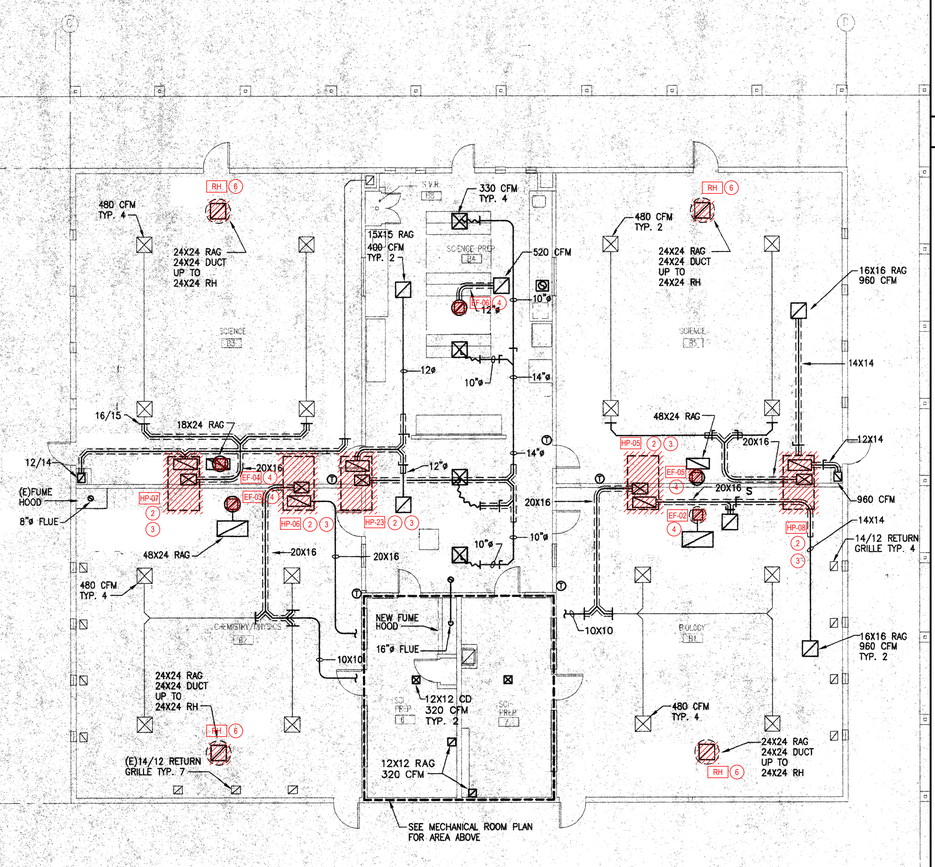
MECHANICAL ROOM PLAN BLDG A HVAC
SCALE: 1/8" = 1'-0"



FLOOR PLAN BLDG A HVAC
SCALE: 1/8" = 1'-0"



MECHANICAL ROOM PLAN BLDG B HVAC
SCALE: 1/8" = 1'-0"



FLOOR PLAN BLDG B HVAC
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET MR-4.1 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

1. REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.1, FOR EXISTING CONDITIONS AND SHEET M-2.1 FOR NEW WORK.
2. REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.1, FOR EXISTING CONDITIONS AND SHEET M-2.1 FOR NEW WORK.
3. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.
4. REMOVE EXISTING ROOF MOUNTED EXHAUST FAN AND CORRESPONDING ROOF CURB. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.1, FOR EXISTING CONDITIONS AND SHEET M-2.1 FOR NEW WORK.
5. REMOVE EXISTING ELECTRIC CABINET HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.1, FOR EXISTING CONDITIONS AND SHEET M-2.1 FOR NEW WORK.
6. REMOVE EXISTING ROOF MOUNTED RELIEF HOOD, CORRESPONDING ROOF CURB AND BACKDRAFT DAMPER. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF OPENINGS AND OR PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION. SEE MECHANICAL REFERENCE PLAN, MR-4.1, FOR EXISTING CONDITIONS AND SHEET M-2.1 FOR NEW WORK.
7. REMOVE EXISTING CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. EXISTING CONTROL WIRING, ELECTRICAL CIRCUIT AND WIRING SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.1, FOR EXISTING CONDITIONS AND SHEET M-2.1 FOR NEW WORK.

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING A & B DEMOLITION PLAN

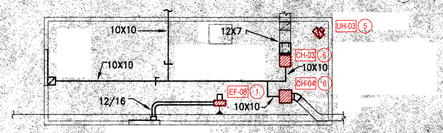
SHEET NO.
MD-1.1

RESERVED FOR BUILDING DEPT STAMP

MECHANICAL BUILDING A&B DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

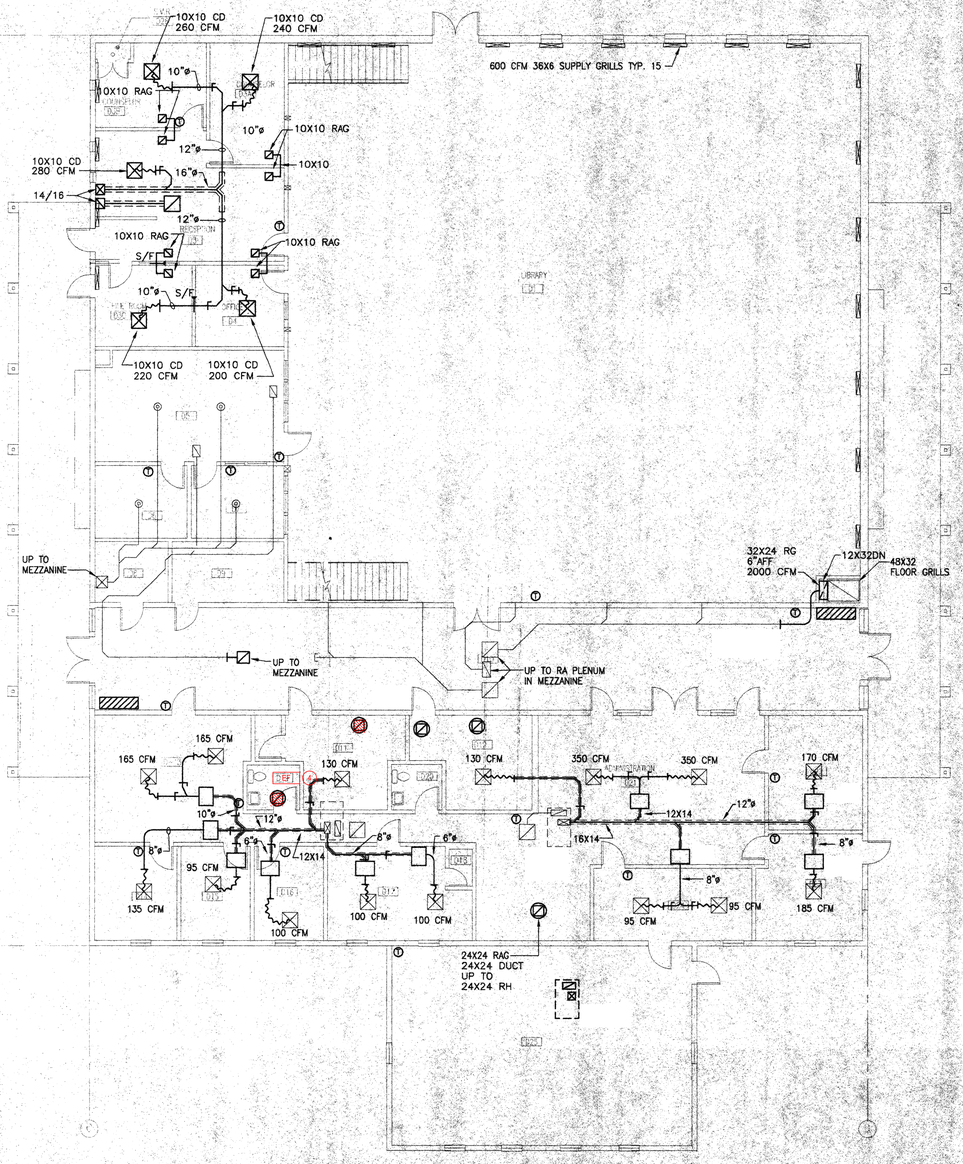
22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNA - 2023-11-14 - COLIN GOULET



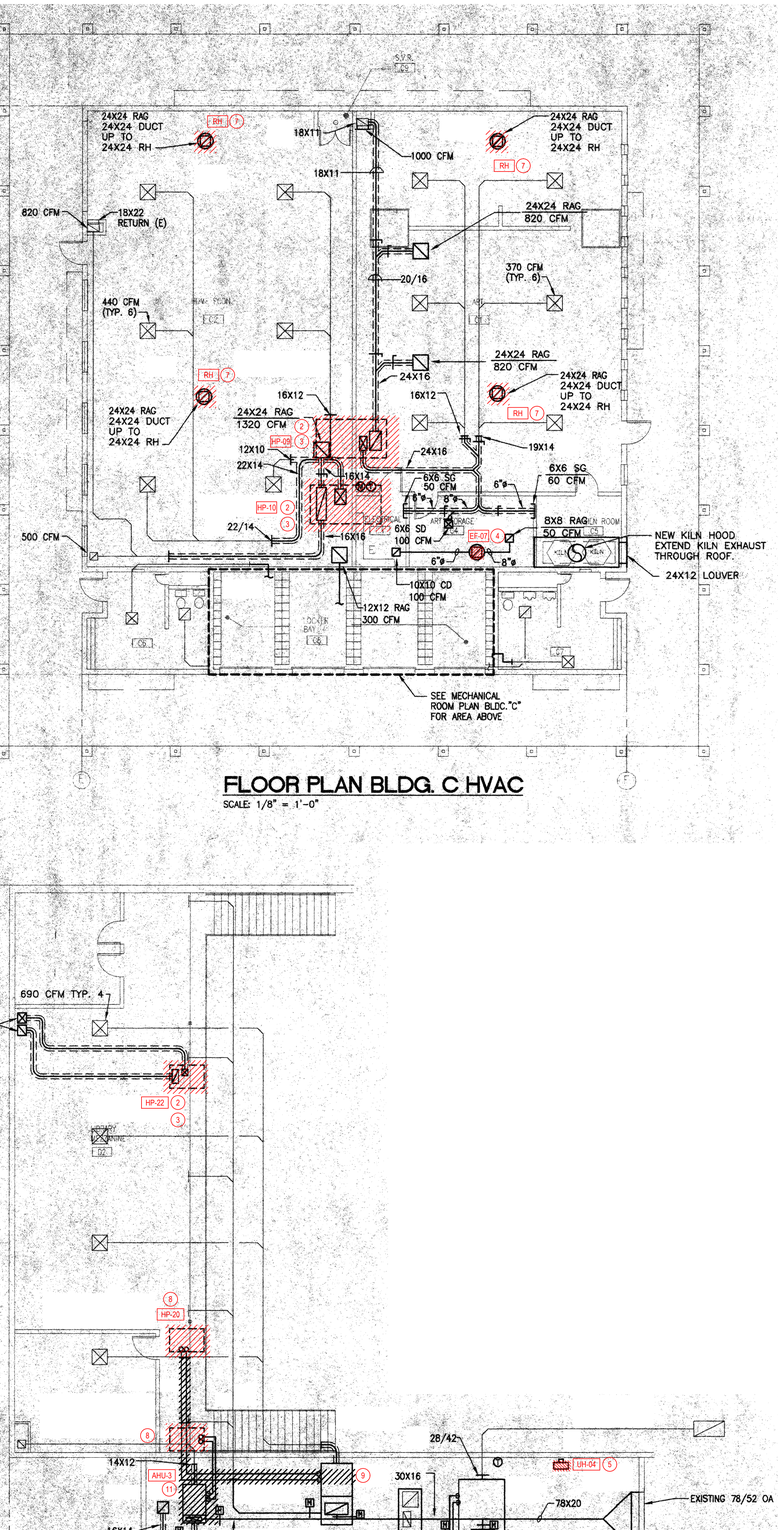
MECHANICAL ROOM PLAN BLDG. C

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



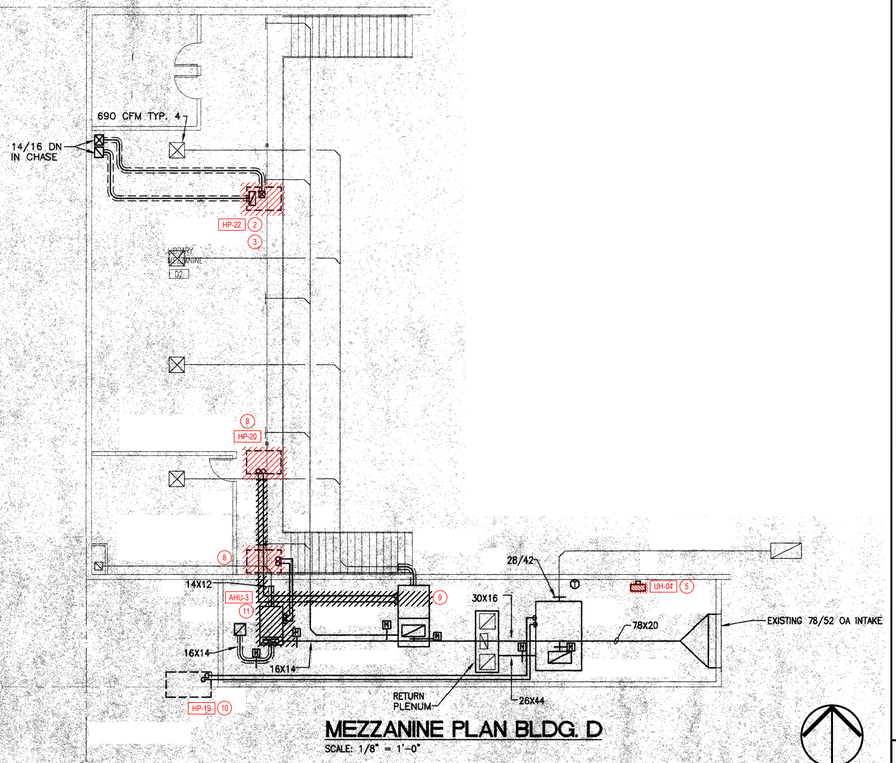
FLOOR PLAN BLDG. D HVAC

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



FLOOR PLAN BLDG. C HVAC

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



MEZZANINE PLAN BLDG. D

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

BUILDING C DEMOLITION FLOOR PLAN

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

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF-SITE.
5. REFER TO SHEET M-4.2 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

1. REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
2. REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
3. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.
4. REMOVE EXISTING ROOF MOUNTED EXHAUST FAN AND CORRESPONDING ROOF CURB. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
5. REMOVE EXISTING CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. EXISTING CONTROL WIRING, ELECTRICAL CIRCUIT AND WIRING SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
6. REMOVE EXISTING ELECTRIC CABINET HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
7. REMOVE EXISTING ROOF MOUNTED RELIEF HOOD, CORRESPONDING ROOF CURB AND BACKDRAFT DAMPER. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF OPENINGS AND OR PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
8. REMOVE EXISTING CONDENSING UNIT IN ITS ENTIRETY. REMOVE ALL ASSOCIATED REFRIGERANT PIPING AS SHOWN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
9. REMOVE EXISTING DX COIL AND ALL ASSOCIATED REFRIGERANT PIPING AND CONTROLS AT EXISTING AIR HANDLING UNIT. SEE MECHANICAL REFERENCE PLAN, MR-4.2, FOR EXISTING CONDITIONS AND SHEET M-2.2 FOR NEW WORK.
10. NO NEW WORK AT UNIT.
11. REMOVE EXISTING AIR HANDLER AND ALL ASSOCIATED REFRIGERANT PIPING. INLET AND OUTLET DUCTWORK SHALL REMAIN IN PLACE FOR RE-USE. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN,

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

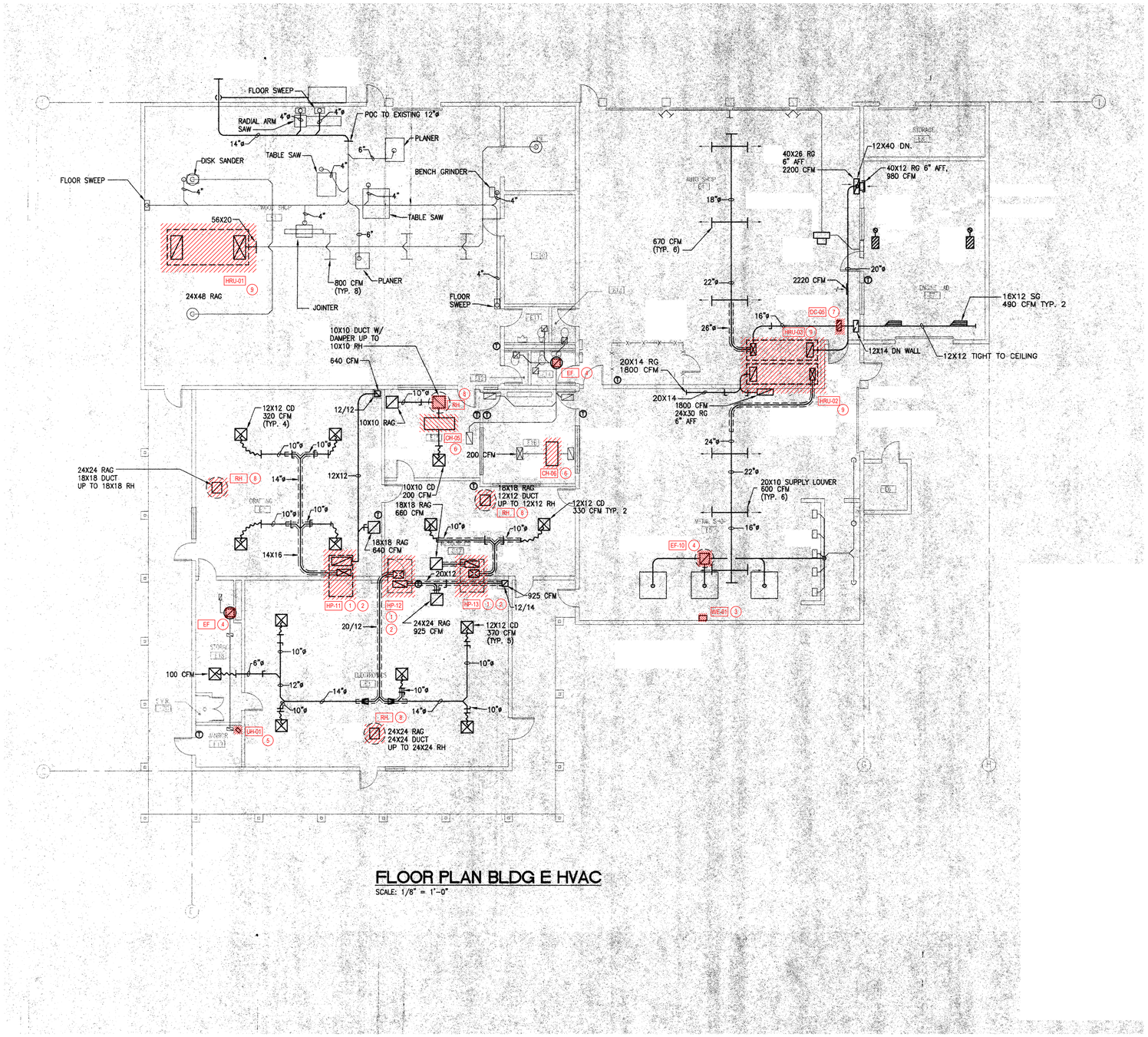
JOB NO. 2022-017
DATE 11-14-2023
DRAWN KN
REVIEWED RH

SHEET NAME
MECHANICAL BUILDING C & D DEMOLITION PLAN

SHEET NO.
MD-1.2

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482-M-FLRPLNC - 2023-11-14 - COLIN GOULET



FLOOR PLAN BLDG E HVAC

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

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET M-4.3 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

1. REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
2. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.
3. REMOVE EXISTING WALL MOUNTED ELECTRIC HEATER. EXISTING ELECTRICAL CIRCUIT AND WIRING SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
4. REMOVE EXISTING ROOF MOUNTED EXHAUST FAN AND CORRESPONDING ROOF CURB. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
5. REMOVE EXISTING CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. EXISTING CONTROL WIRING, ELECTRICAL CIRCUIT AND WIRING SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
6. REMOVE EXISTING ELECTRIC CABINET HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
7. REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
8. REMOVE EXISTING ROOF MOUNTED RELIEF HOOD, CORRESPONDING ROOF CURB AND BACKDRAFT DAMPER. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF OPENINGS AND OR PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.
9. REMOVE EXISTING ROOF MOUNTED HEAT RECOVERY UNIT AND CORRESPONDING ROOF CURB. PROVIDE TEMPORARY CAP OF EXISTING ROOF MOUNTED SUPPLY AND RETURN DUCT RISERS AS EXISTING DUCTWORK AND PENETRATIONS SHALL BE RE-USED. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR.XX, FOR EXISTING CONDITIONS AND SHEET M1.XX FOR NEW WORK.

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REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

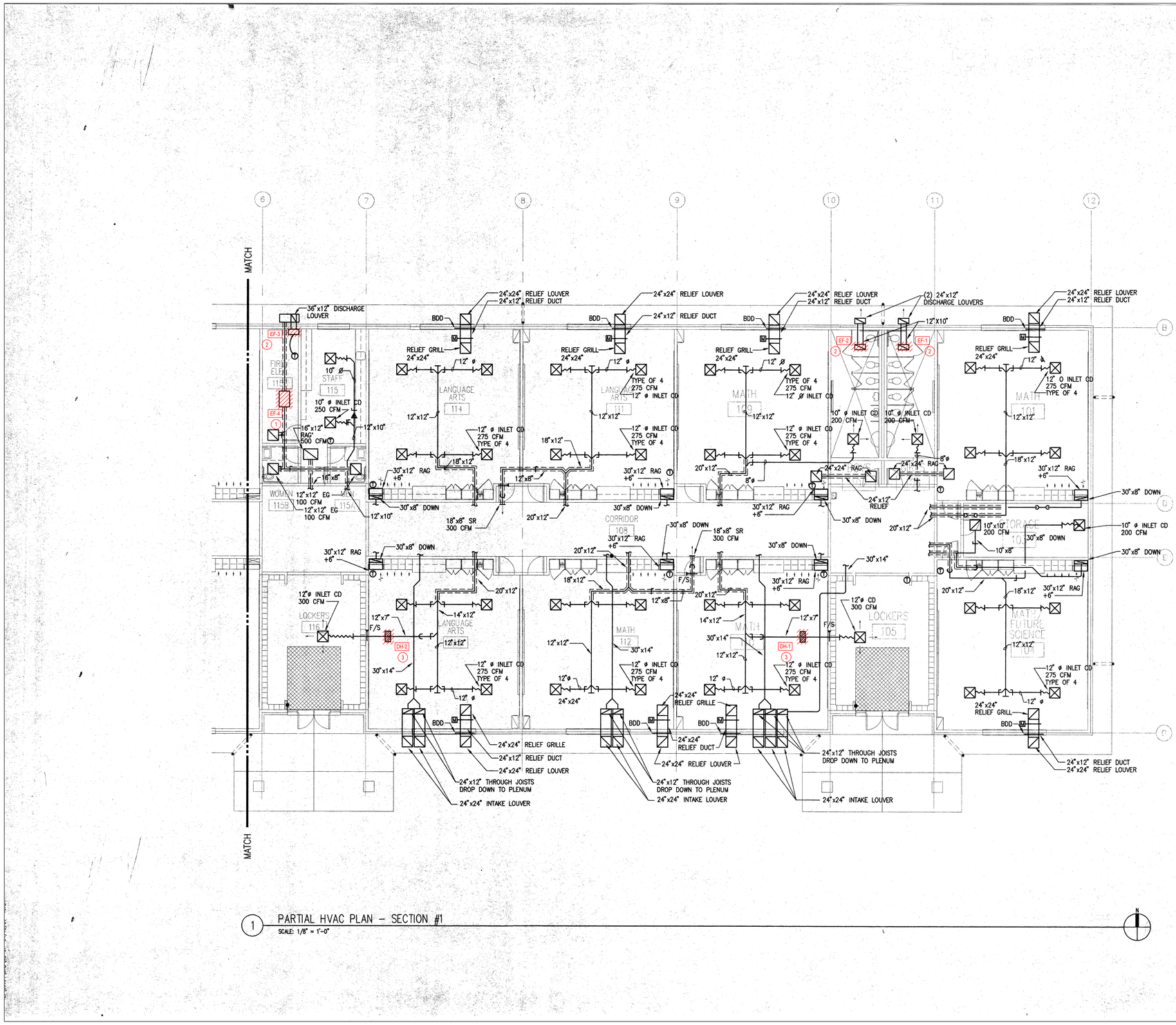
SHEET NAME
MECHANICAL BUILDING E DEMOLITION FLOOR PLAN

SHEET NO.
MD-1.3

BUILDING E DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNE - 2023-11-14 - COLIN GOULET



1 PARTIAL HVAC PLAN – SECTION #1

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

N

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET MR-4.4 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

1. REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.4, FOR EXISTING CONDITIONS AND SHEET M-2.4 FOR NEW WORK.
2. REMOVE EXISTING CEILING MOUNTED EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.4, FOR EXISTING CONDITIONS AND SHEET M-2.4 FOR NEW WORK.
3. REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.4, FOR EXISTING CONDITIONS AND SHEET M-2.4 FOR NEW WORK.

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SHEET NAME
MECHANICAL BUILDING H SECTION 1 DEMOLITION PLAN

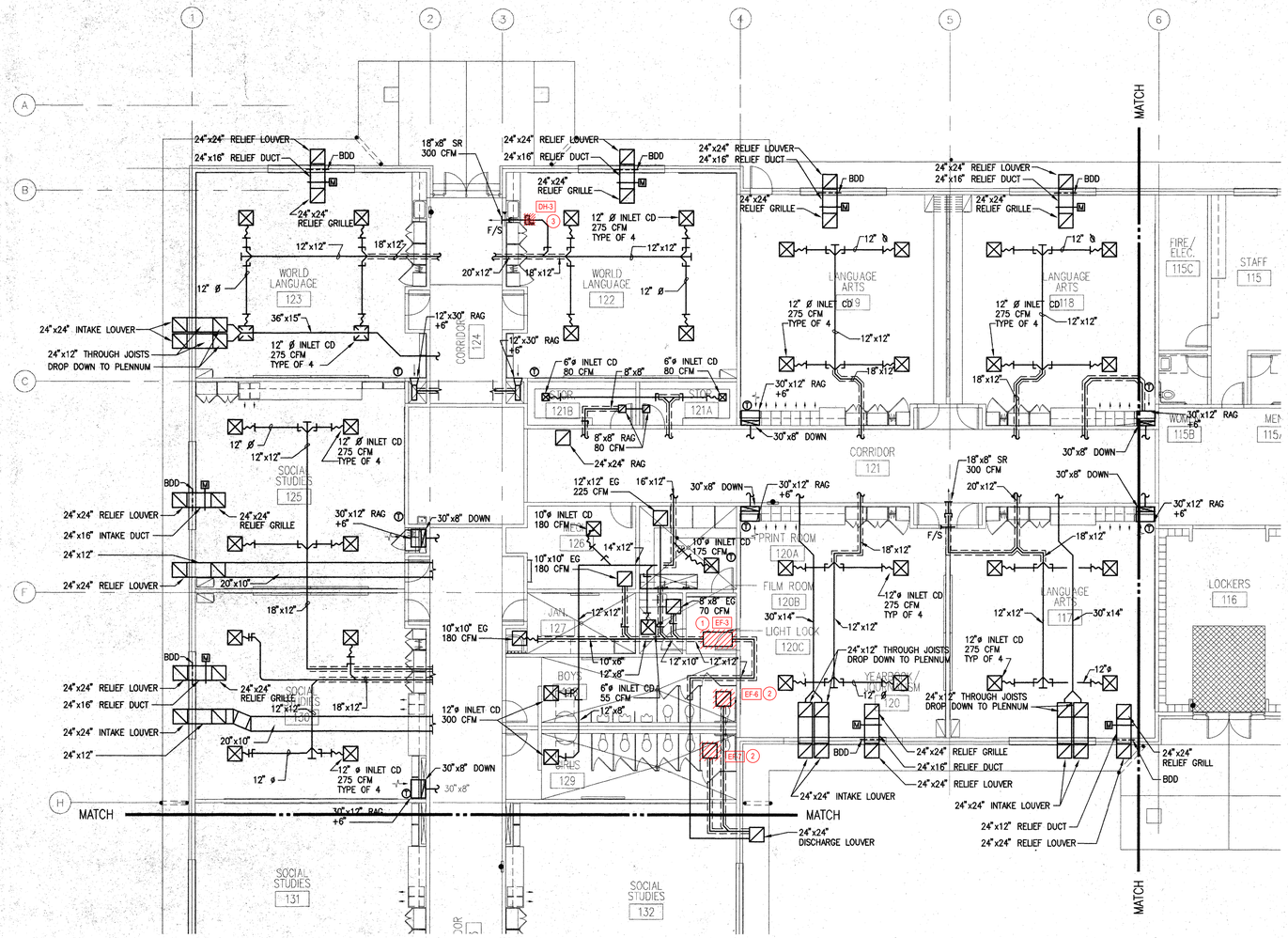
SHEET NO.
MD-1.4

BUILDING H SECTION 1 DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

RESERVED FOR BUILDING DEPT. STAMP

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 MFLRPLNH - 2023-11-14 - COLIN GOULET



1 PARTIAL HVAC PLAN – SECTION #2

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

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
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4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET MR-4.5 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

1. REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.5, FOR EXISTING CONDITIONS AND SHEET M-2.5 FOR NEW WORK.
2. REMOVE EXISTING CEILING MOUNTED EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.5, FOR EXISTING CONDITIONS AND SHEET M-2.5 FOR NEW WORK.
3. REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.5, FOR EXISTING CONDITIONS AND SHEET M-2.5 FOR NEW WORK.

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	ISSUED FOR CONSTRUCTION	11-14-23

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DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING H SECTION 2 DEMOLITION PLAN

SHEET NO.
MD-1.5

22-482

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BUILDING H SECTION 2 DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLR.RVH - 2023-11-14 - COLIN GOULET

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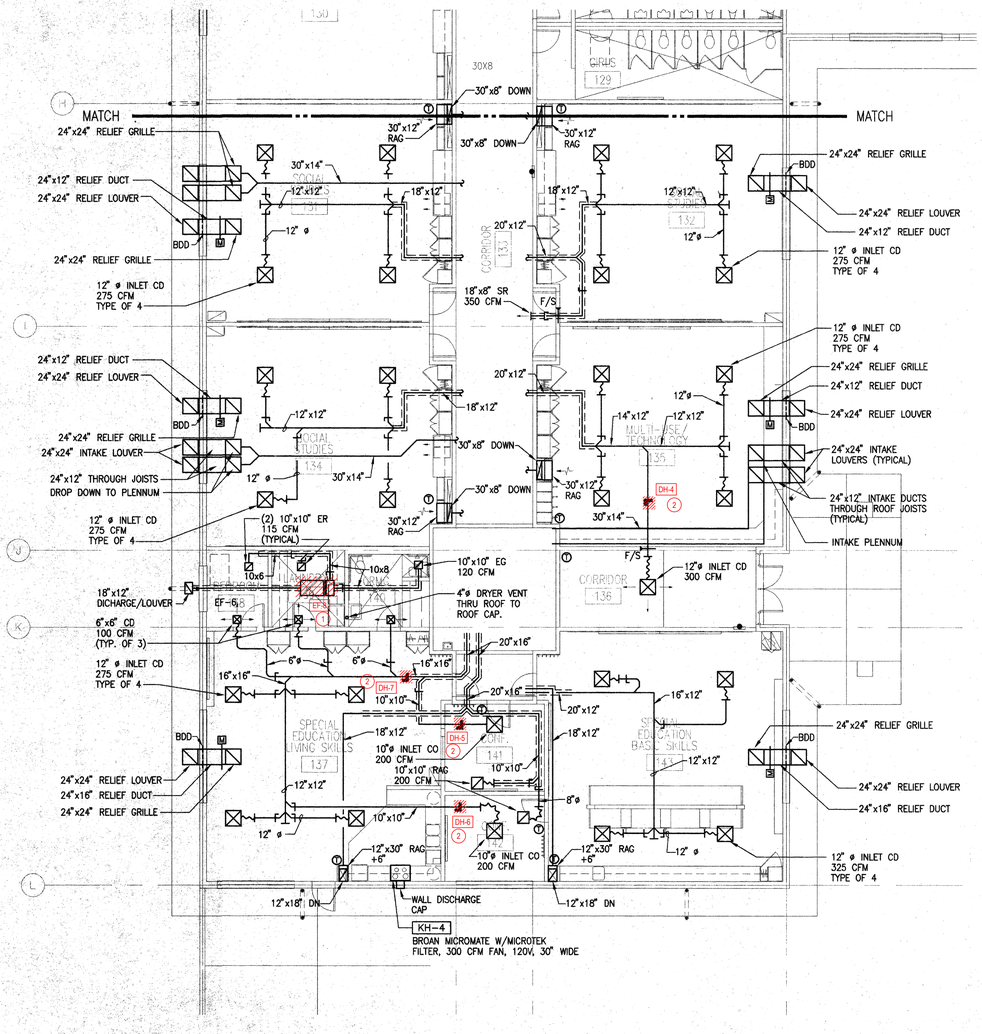

1 PARTIAL HVAC PLAN – SECTION #3

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

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET MR-4.6 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

(1) REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.6, FOR EXISTING CONDITIONS AND SHEET M-2.6 FOR NEW WORK.

(2) REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.6, FOR EXISTING CONDITIONS AND SHEET M-2.6 FOR NEW WORK.

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DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING H SECTION 3 DEMOLITION PLAN

SHEET NO.
MD-1.6

RESERVED FOR BUILDING DEPT STAMP

BUILDING H SECTION 3 DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

22-492

R:_PROJECT\2022\22-492 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-492 M-FLR.PLN H - 2023-11-14 - COLIN GOULET

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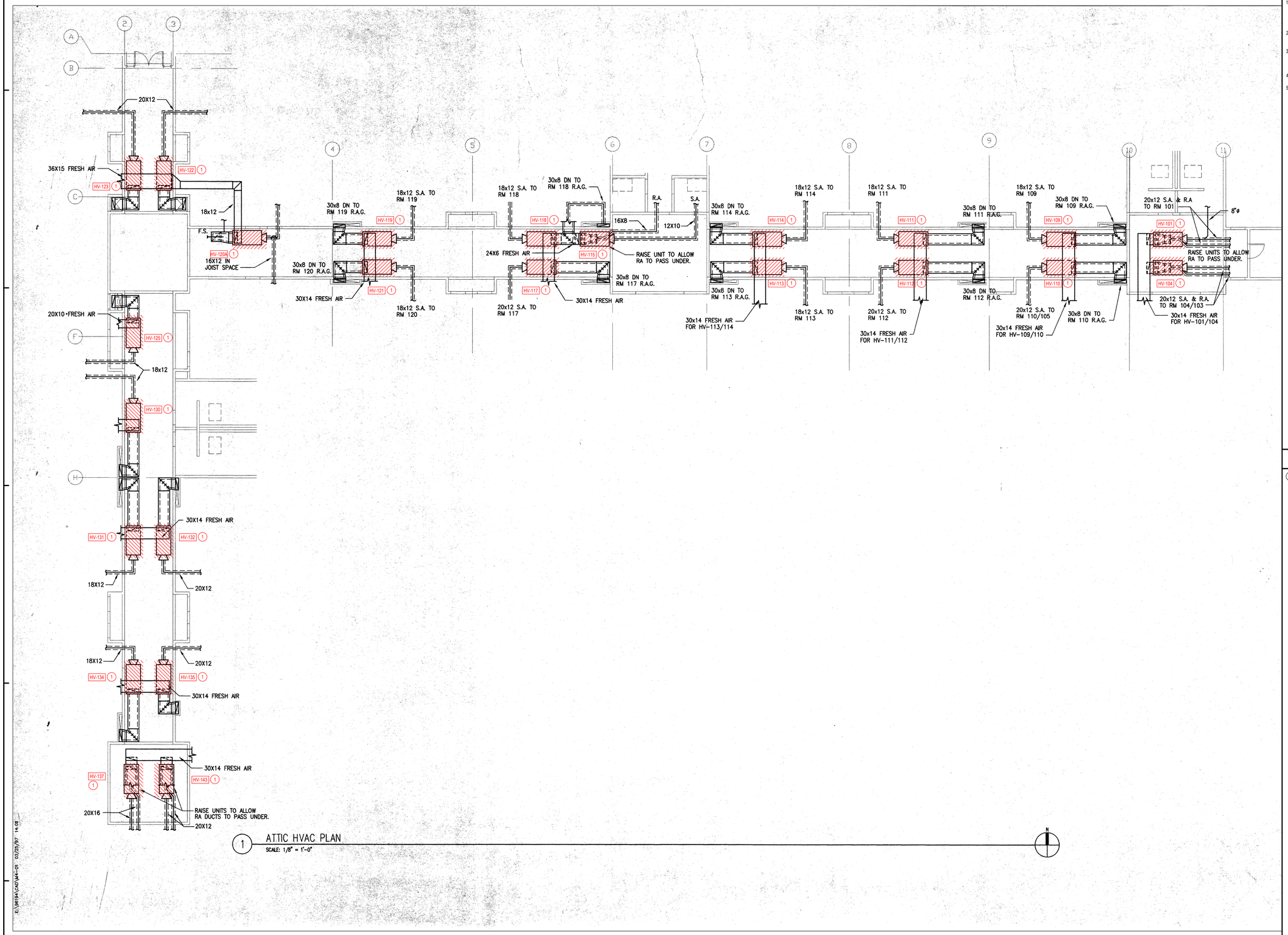

1 ATTIC HVAC PLAN
SCALE: 1/8" = 1'-0"

E:\JOBS\CAD\44-01 03/29/57 14:08

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLN1 - 2023-11-14 - COLIN GOULET

GENERAL NOTES

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4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF-SITE.
5. REFER TO SHEET MR-4.7 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

(1) REMOVE EXISTING ELECTRIC CABINET HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.7, FOR EXISTING CONDITIONS AND SHEET M-2.7 FOR NEW WORK.

BUILDING H ATTIC DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

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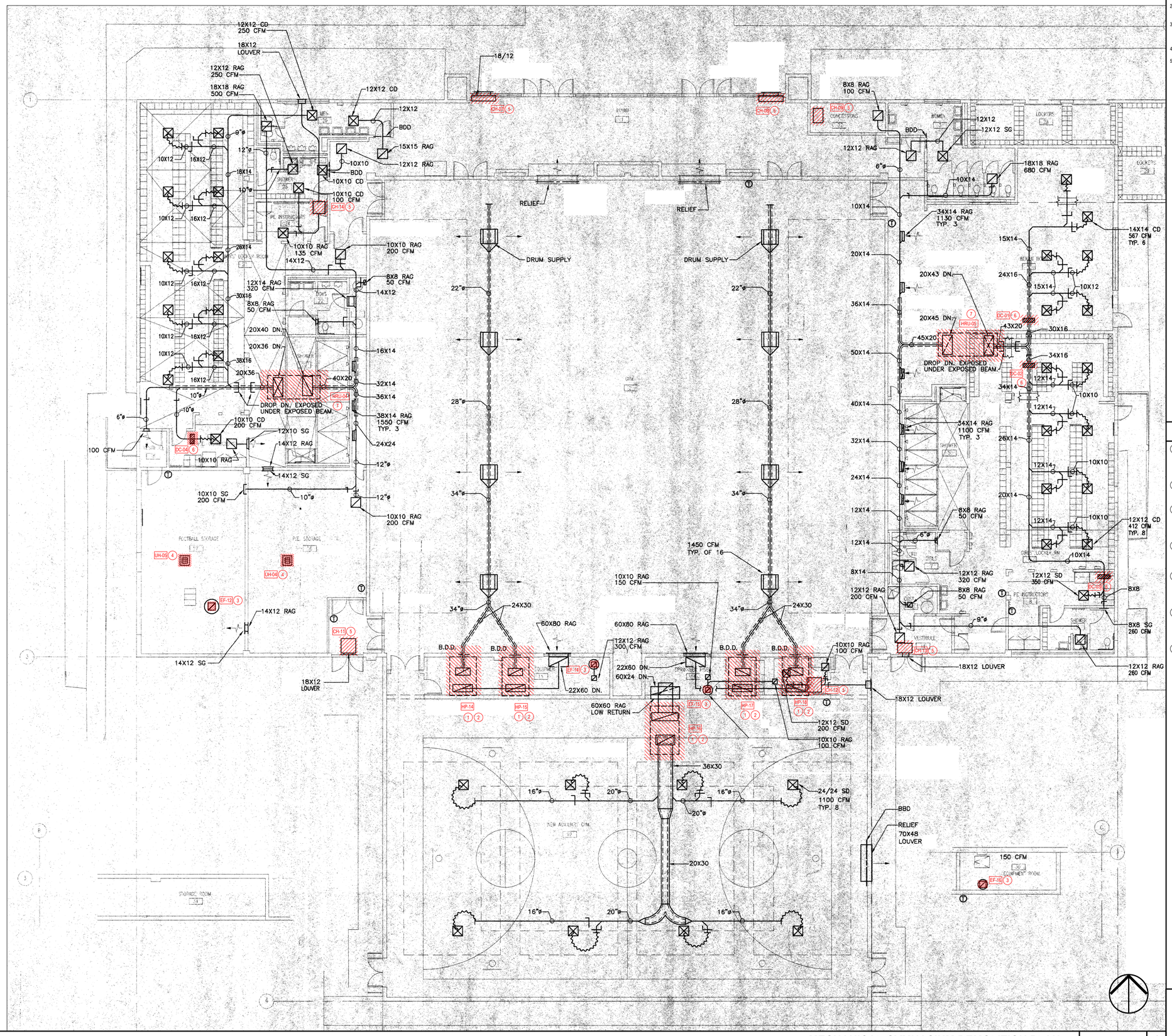
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING H ATTIC DEMOLITION PLAN

SHEET NO.
MD-1.7

22-482



GENERAL NOTES

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4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET M-4.8 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

(1) REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.8, FOR EXISTING CONDITIONS AND SHEET M-2.8 FOR NEW WORK.

(2) CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.

(3) REMOVE EXISTING ROOF MOUNTED EXHAUST FAN AND CORRESPONDING ROOF CURB. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.8, FOR EXISTING CONDITIONS AND SHEET M-2.8 FOR NEW WORK.

(4) REMOVE EXISTING CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. EXISTING CONTROL WIRING, ELECTRICAL CIRCUIT AND WIRING SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.8, FOR EXISTING CONDITIONS AND SHEET M-2.8 FOR NEW WORK.

(5) REMOVE EXISTING ELECTRIC CABINET HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.8, FOR EXISTING CONDITIONS AND SHEET M-2.8 FOR NEW WORK.

(6) REMOVE EXISTING ELECTRIC DUCT HEATER. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.8, FOR EXISTING CONDITIONS AND SHEET M-2.8 FOR NEW WORK.

(7) REMOVE EXISTING ROOF MOUNTED HEAT RECOVERY UNIT AND CORRESPONDING ROOF CURB. PROVIDE TEMPORARY CAP OF EXISTING ROOF MOUNTED SUPPLY AND RETURN DUCT RISERS AS EXISTING DUCTWORK AND PENETRATIONS SHALL BE RE-USED. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.8, FOR EXISTING CONDITIONS AND SHEET M-2.8 FOR NEW WORK.

MECHANICAL GYMNASIUM DEMOLITION PLAN

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

RESERVED FOR BUILDING DEPT STAMP

STEVEN M. NORMAN
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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

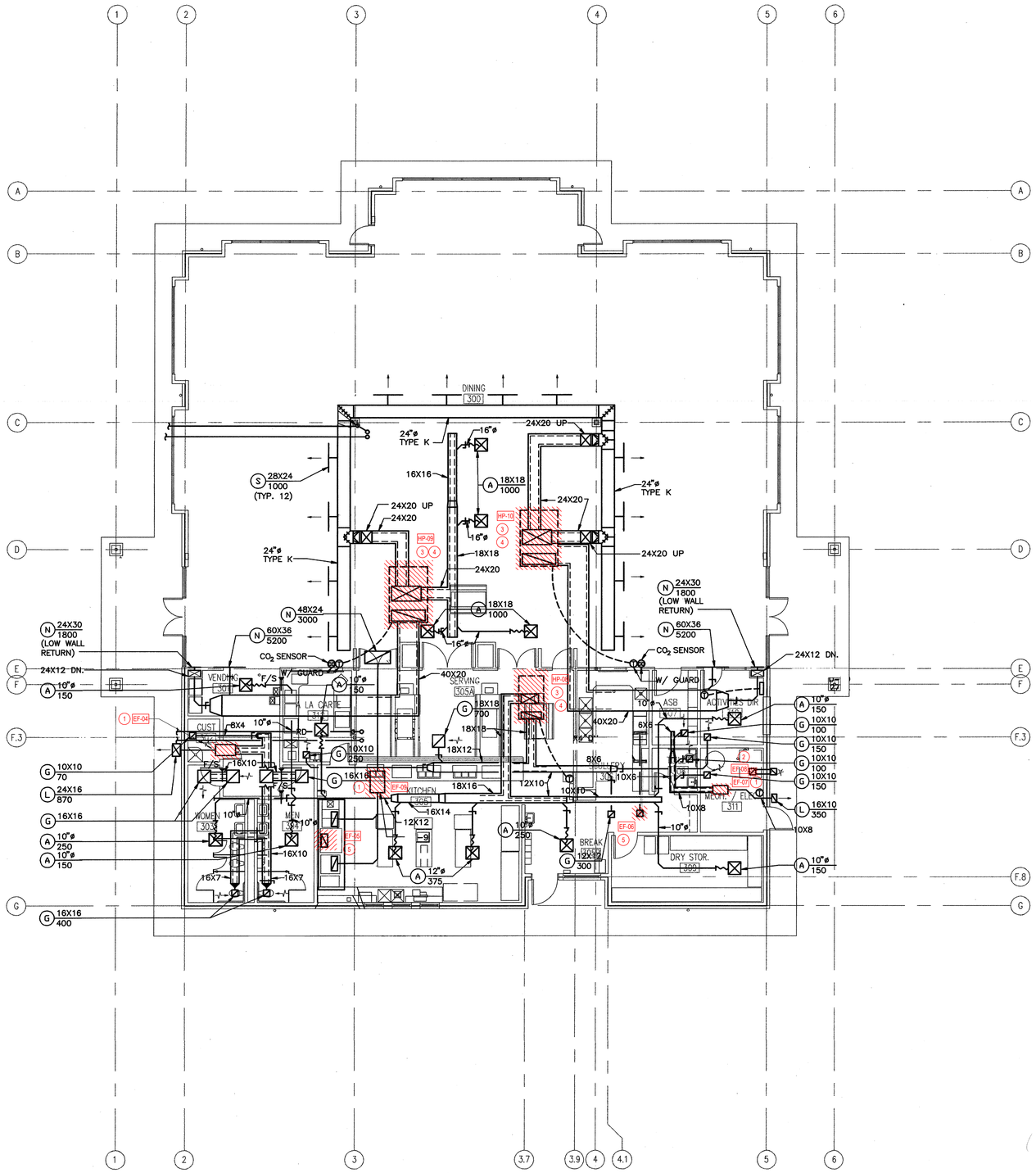
JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL GYMNASIUM DEMOLITION PLAN

SHEET NO.
MD-1.8

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLN(GYM) - 2023-11-14 - COLIN GOULET



GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.
5. REFER TO SHEET M-4.9 FOR AS-BUILT DRAWING REFERENCE.

DEMOLITION NOTES

1. REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.9, FOR EXISTING CONDITIONS AND SHEET M-2.9 FOR NEW WORK.
2. REMOVE EXISTING CEILING MOUNTED EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.9, FOR EXISTING CONDITIONS AND SHEET M-2.9 FOR NEW WORK.
3. REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.9, FOR EXISTING CONDITIONS AND SHEET M-2.9 FOR NEW WORK.
4. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.
5. REMOVE EXISTING ROOF MOUNTED EXHAUST FAN AND CORRESPONDING ROOF CURB. EXISTING CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.9, FOR EXISTING CONDITIONS AND SHEET M-2.9 FOR NEW WORK.

MECHANICAL CAFETERIA DEMOLITION PLAN

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

1

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STATE OF WASHINGTON · KEVIN M. NORTON · 46778 · REGISTERED PROFESSIONAL ENGINEER

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

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	ISSUED FOR CONSTRUCTION	11-14-23

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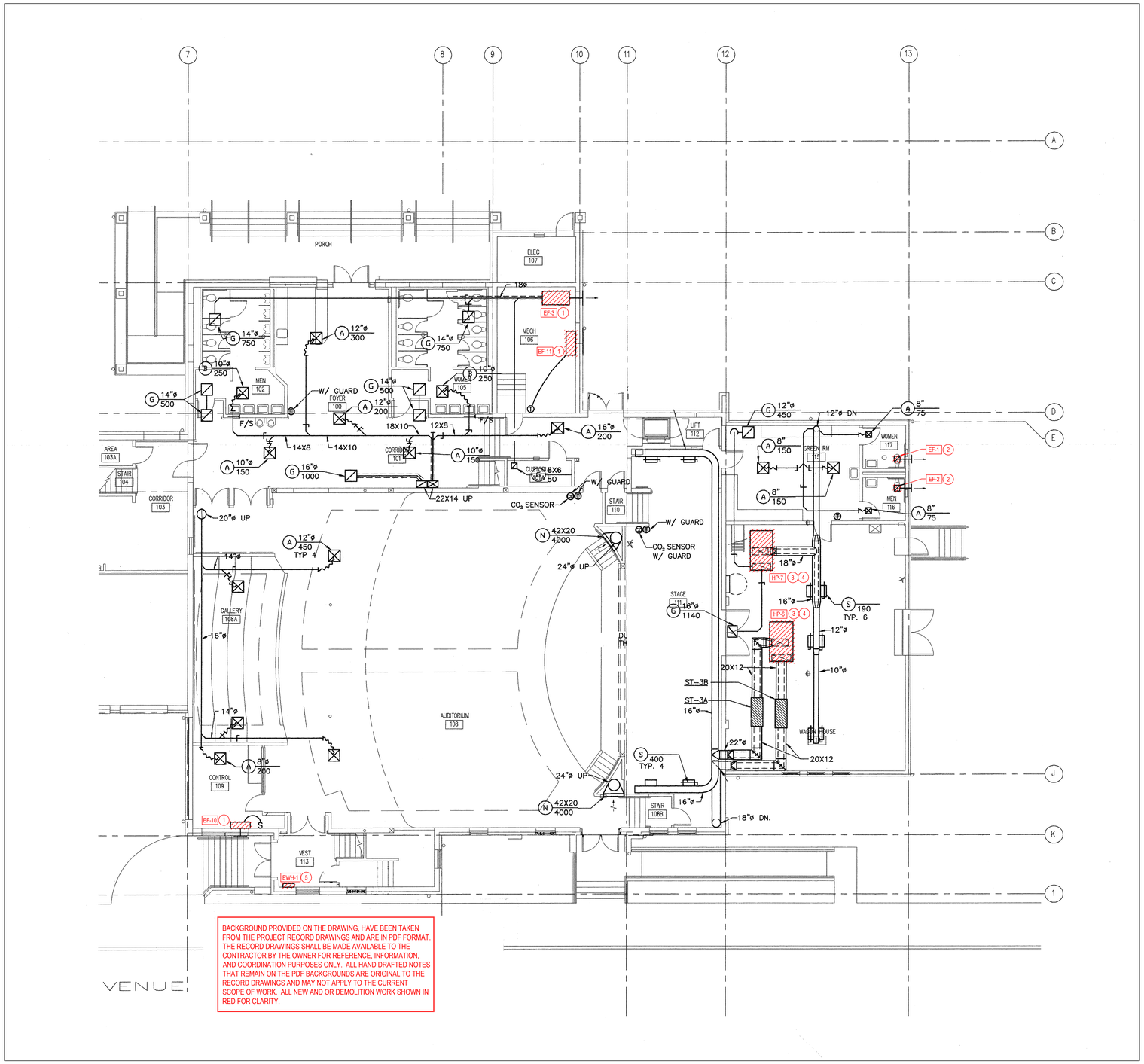
REVIEWED	RH

SHEET NAME
MECHANICAL CAFETERIA DEMOLITION PLAN

SHEET NO.
MD-1.9

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLN.CAF - 2023-11-14 - COLIN.GOULET



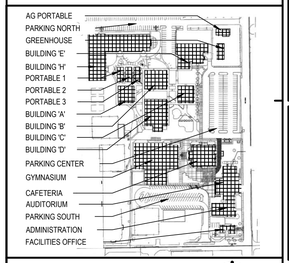
BACKGROUND PROVIDED ON THE DRAWING, HAVE BEEN TAKEN FROM THE PROJECT RECORD DRAWINGS AND ARE IN PDF FORMAT. THE RECORD DRAWINGS SHALL BE MADE AVAILABLE TO THE CONTRACTOR BY THE OWNER FOR REFERENCE, INFORMATION, AND COORDINATION PURPOSES ONLY. ALL HAND DRAFTED NOTES THAT REMAIN ON THE PDF BACKGROUNDS ARE ORIGINAL TO THE RECORD DRAWINGS AND MAY NOT APPLY TO THE CURRENT SCOPE OF WORK. ALL NEW AND OR DEMOLITION WORK SHOWN IN RED FOR CLARITY.

GENERAL NOTES

1. ALL EQUIPMENT, PIPING, DUCTWORK, CONTROLS AND OR WIRING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. UPON REMOVAL OF EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., THE CONTRACTOR SHALL PATCH ANY EXISTING ROOF, WALL, FLOOR AND OR CEILING ASSEMBLIES.
3. CONTRACTOR SHALL COORDINATE WITH OWNER ANY SHUTDOWN OF SERVICES, SUCH AS GAS AND WATER, PRIOR TO ANY WORK BEING PERFORMED. EXTENT OF SHUTDOWN SHALL BE COORDINATED WITH ARCHITECT, OWNER'S REP AND OCCUPANTS.
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.

DEMOLITION NOTES

1. REMOVE EXISTING INLINE EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.10, FOR EXISTING CONDITIONS AND SHEET M-2.10 FOR NEW WORK.
2. REMOVE EXISTING CEILING MOUNTED EXHAUST FAN. EXISTING CONTROL WIRING, ELECTRICAL WIRING AND CIRCUIT SHALL BE SALVAGED FOR RE-USE. EXISTING INLET AND DISCHARGE DUCTWORK SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.10, FOR EXISTING CONDITIONS AND SHEET M-2.10 FOR NEW WORK.
3. REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL WIRING AND ELECTRICAL CIRCUIT AND WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.10, FOR EXISTING CONDITIONS AND SHEET M-2.10 FOR NEW WORK.
4. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.
5. REMOVE EXISTING WALL MOUNTED ELECTRIC HEATER. EXISTING ELECTRICAL CIRCUIT AND WIRING SHALL BE SALVAGED FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.10, FOR EXISTING CONDITIONS AND SHEET M-2.10 FOR NEW WORK.



KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

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601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

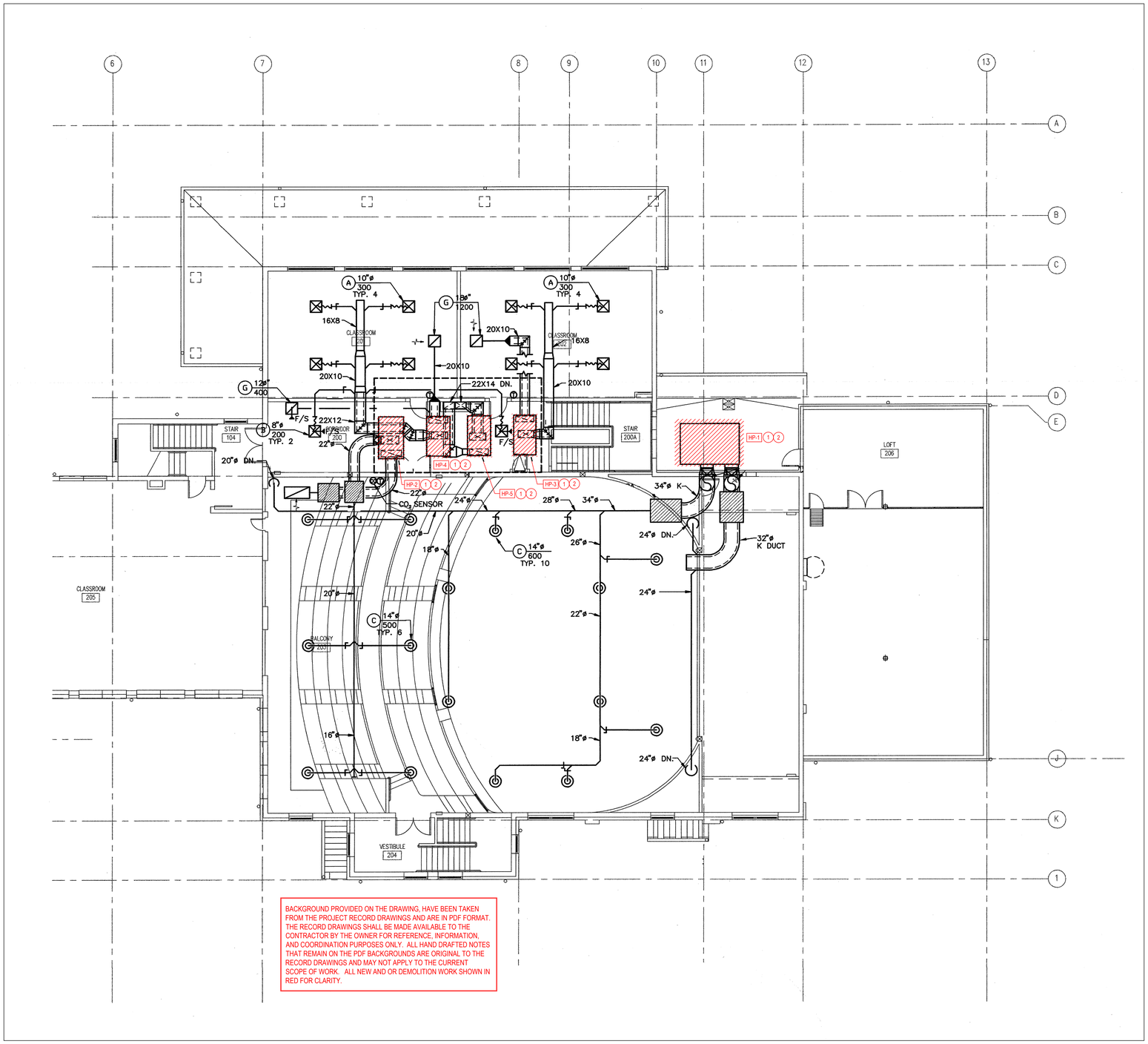
SHEET NAME
MECHANICAL BUILDING AUDITORIUM DEMO FIRST FLOOR PLAN

SHEET NO.
MD-1.10

22-482

BUILDING AUDITORIUM DEMOLITION FIRST FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLR(NAUD - 2023-11-14 - COLIN GOULET



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GENERAL NOTES

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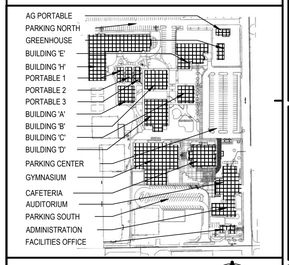
4. ALL MATERIALS REMOVED UNDER DEMOLITION PHASE SHALL BE DISPOSED OFF SITE.

DEMOLITION NOTES

1. REMOVE EXISTING ROOF MOUNTED PACKAGED ROOFTOP UNIT. EXISTING ROOF CURB, CONTROL AND ELECTRICAL WIRING SHALL BE LEFT IN PLACE FOR RE-USE. SEE MECHANICAL REFERENCE PLAN, MR-4.11, FOR EXISTING CONDITIONS AND SHEET M-2.11 FOR NEW WORK.
2. CONTRACTOR SHALL PROTECT ALL EXISTING ROOF AND WALL OPENINGS AND OR DUCTWORK PENETRATIONS EXPOSED TO OUTDOOR CONDITIONS AFTER DEMOLITION.



KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

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REVIEWED	RH

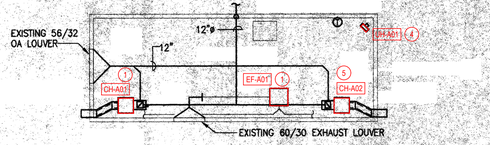
SHEET NAME
MECHANICAL BUILDING AUDITORIUM DEMO SECOND FLOOR PLAN

SHEET NO.
MD-1.11

22-482

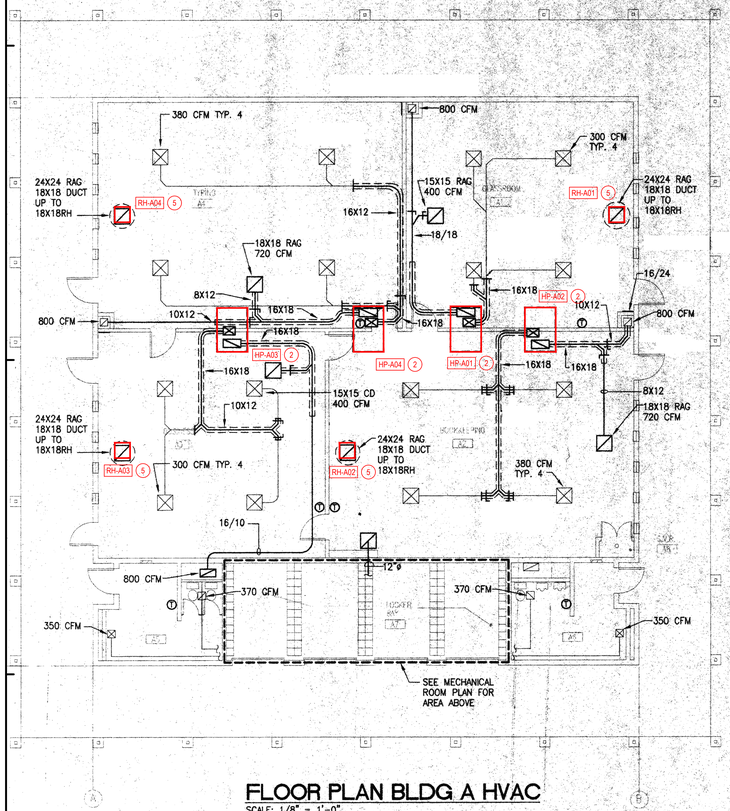
BUILDING AUDITORIUM DEMOLITION FIRST FLOOR PLAN SCALE: 1/8" = 1'-0" 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNAUD - 2023-11-14 - COLIN GOULET



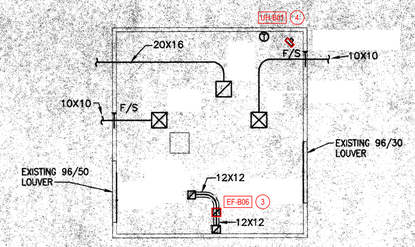
MECHANICAL ROOM PLAN BLDG A HVAC

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



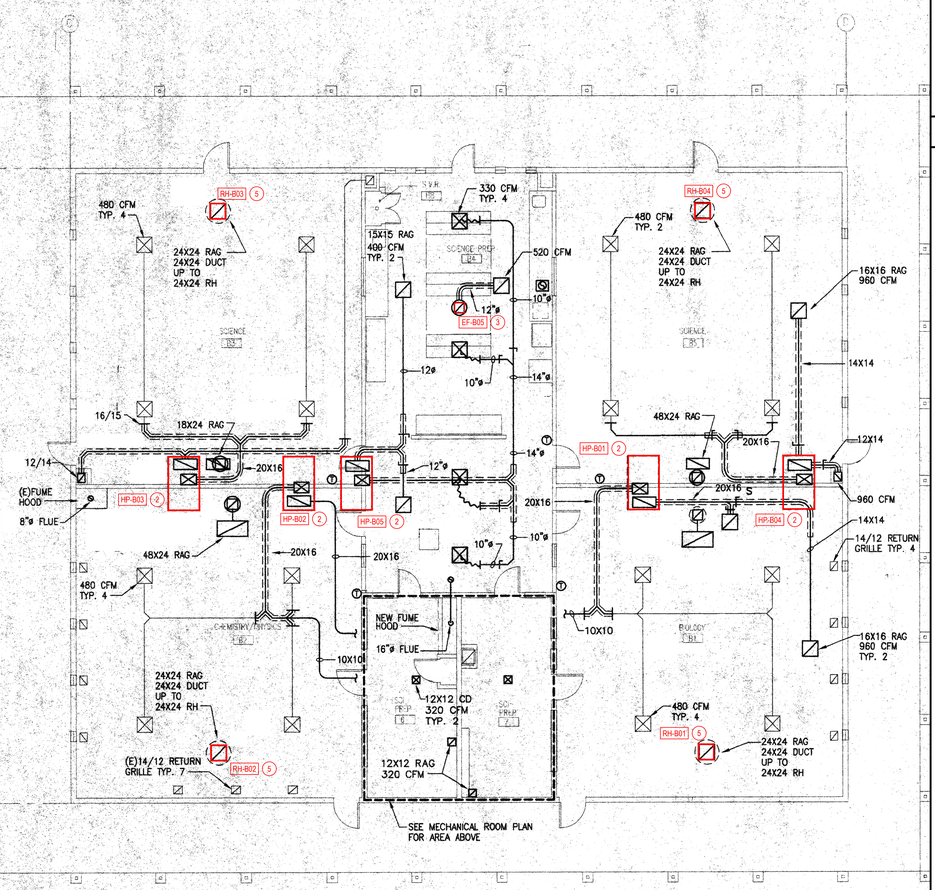
FLOOR PLAN BLDG A HVAC

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



MECHANICAL ROOM PLAN BLDG B HVAC

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



FLOOR PLAN BLDG B HVAC

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

GENERAL NOTES

1. ALL EQUIPMENT, AND OR PIPING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. COORDINATE ALL BUILDING WALL, CEILING FLOOR AND ROOF PENETRATIONS WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE NEW THERMOSTATS IN THE PRIOR (E) LOCATION; ALL CONTROLS TO BE INTEGRATED INTO NEW BMS.
4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET MR-4.1 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW INLINE EXHAUST FAN; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.1.
2. NEW PACKAGED ROOFTOP UNIT. PROVIDE CORRESPONDING ADAPTER CURB AS NOTED ON RTU SCHEDULE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR PROVIDE LOCAL CONTROL IF EMS UNAVAILABLE. RTU SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.1.
3. NEW ROOF MOUNTED EXHAUST FAN AND CURB. CONNECT TO EXISTING INLET DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MECHANICAL REFERENCE DRAWING, MR-4.1.
4. NEW ELECTRIC CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL
5. NEW ELECTRIC CABINET HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.
6. NEW ROOF MOUNTED RELIEF HOOD AND CORRESPONDING CURB/BACKDRAFT DAMPER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. VERIFY OPERATION OF GRAVITY BACKDRAFT DAMPER UPON INSTALLATION.

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SHEET NAME
MECHANICAL BUILDING A & B REMODEL FLOOR PLAN

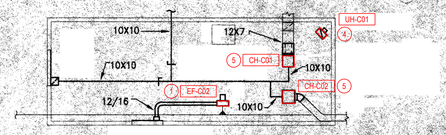
SHEET NO.
M-2.1

RESERVED FOR BUILDING DEPT STAMP

BUILDING B REMODEL FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

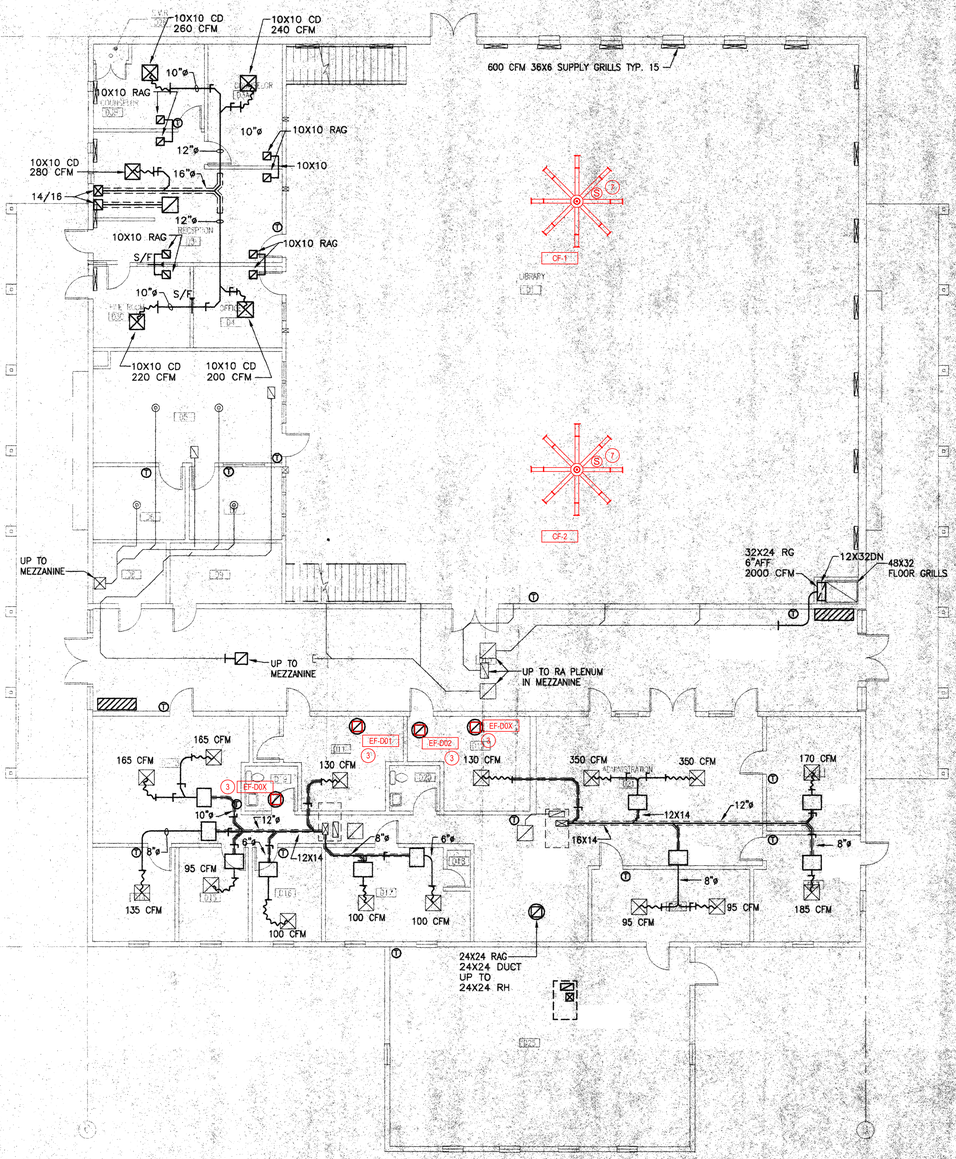
22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNA - 2023-11-14 - COLIN GOULET



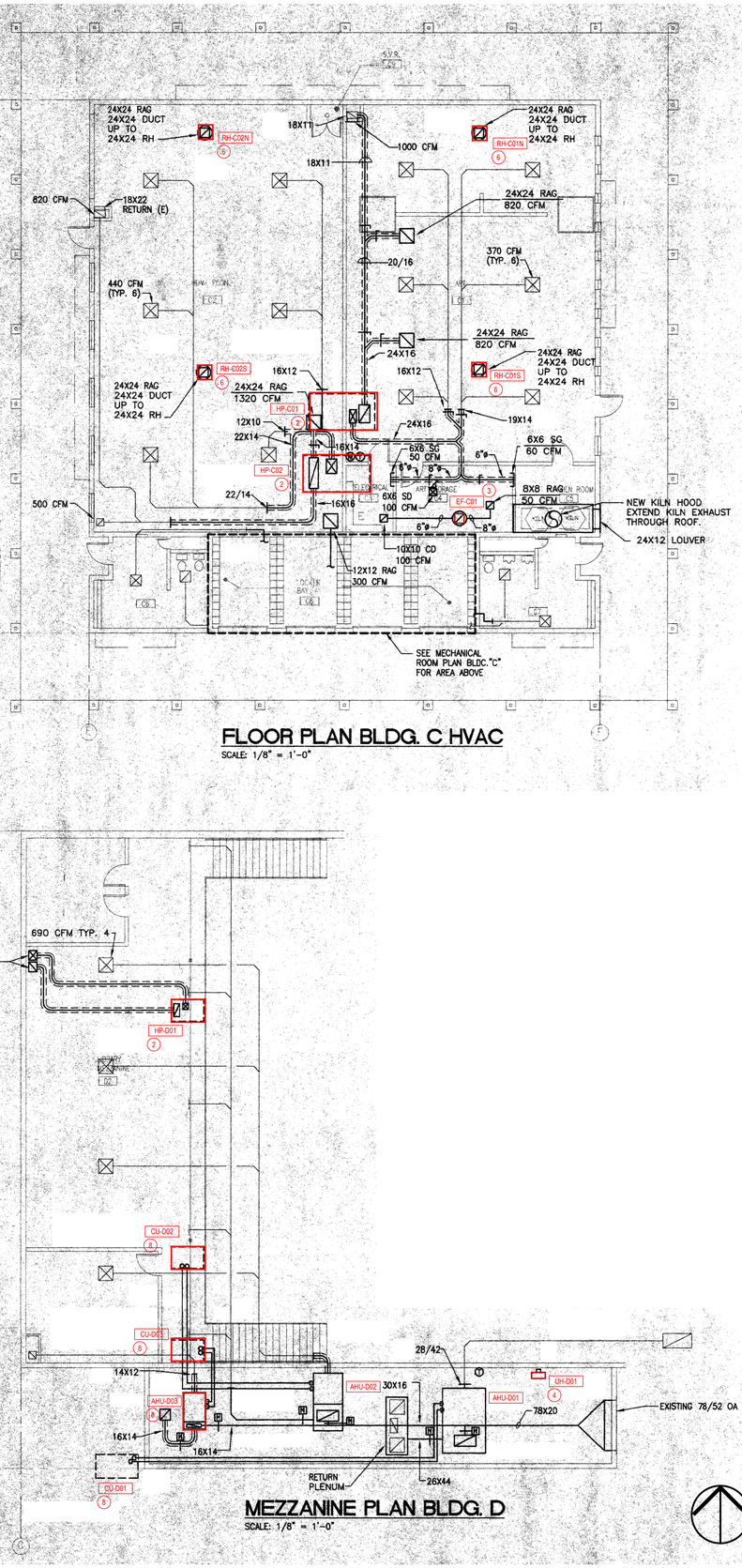
MECHANICAL ROOM PLAN BLDG. C

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



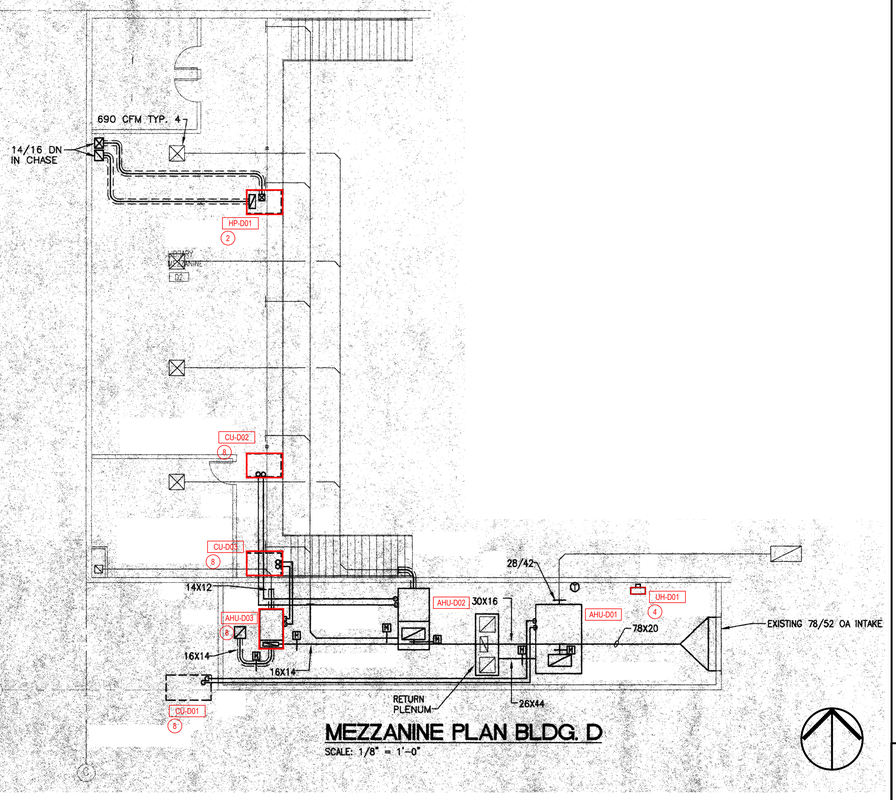
FLOOR PLAN BLDG. D HVAC

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



FLOOR PLAN BLDG. C HVAC

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



MEZZANINE PLAN BLDG. D

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

GENERAL NOTES

1. ALL EQUIPMENT, AND OR PIPING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. COORDINATE ALL BUILDING WALL, CEILING FLOOR AND ROOF PENETRATIONS WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE NEW THERMOSTATS IN THE PRIOR (E) LOCATION; ALL CONTROLS TO BE INTEGRATED INTO NEW BMS.
4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET M-4.2 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW INLINE EXHAUST FAN; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.2.
2. NEW PACKAGED ROOFTOP UNIT. PROVIDE CORRESPONDING ADAPTER CURB AS NOTED ON RTU SCHEDULE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR PROVIDE LOCAL CONTROL IF EMS UNAVAILABLE. RTU SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.2.
3. NEW ROOF MOUNTED EXHAUST FAN AND CURB. CONNECT TO EXISTING INLET DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MECHANICAL REFERENCE DRAWING, MR-4.2.
4. NEW ELECTRIC CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL
5. NEW ELECTRIC CABINET HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.
6. NEW ROOF MOUNTED RELIEF HOOD AND CORRESPONDING CURB/BACKDRAFT DAMPER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. VERIFY OPERATION OF GRAVITY BACKDRAFT DAMPER UPON INSTALLATION.
7. PROVIDE TEMPERATURE SENSOR, MOUNTED AT STRUCTURE FAN HUNG FROM. UNIT SHALL BE ENABLED UPON TEMPERATURE SETPOINT OF 78°F. TYPICAL OF 2.

RESERVED FOR BUILDING DEPT STAMP

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SEQUIM SD #323
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REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

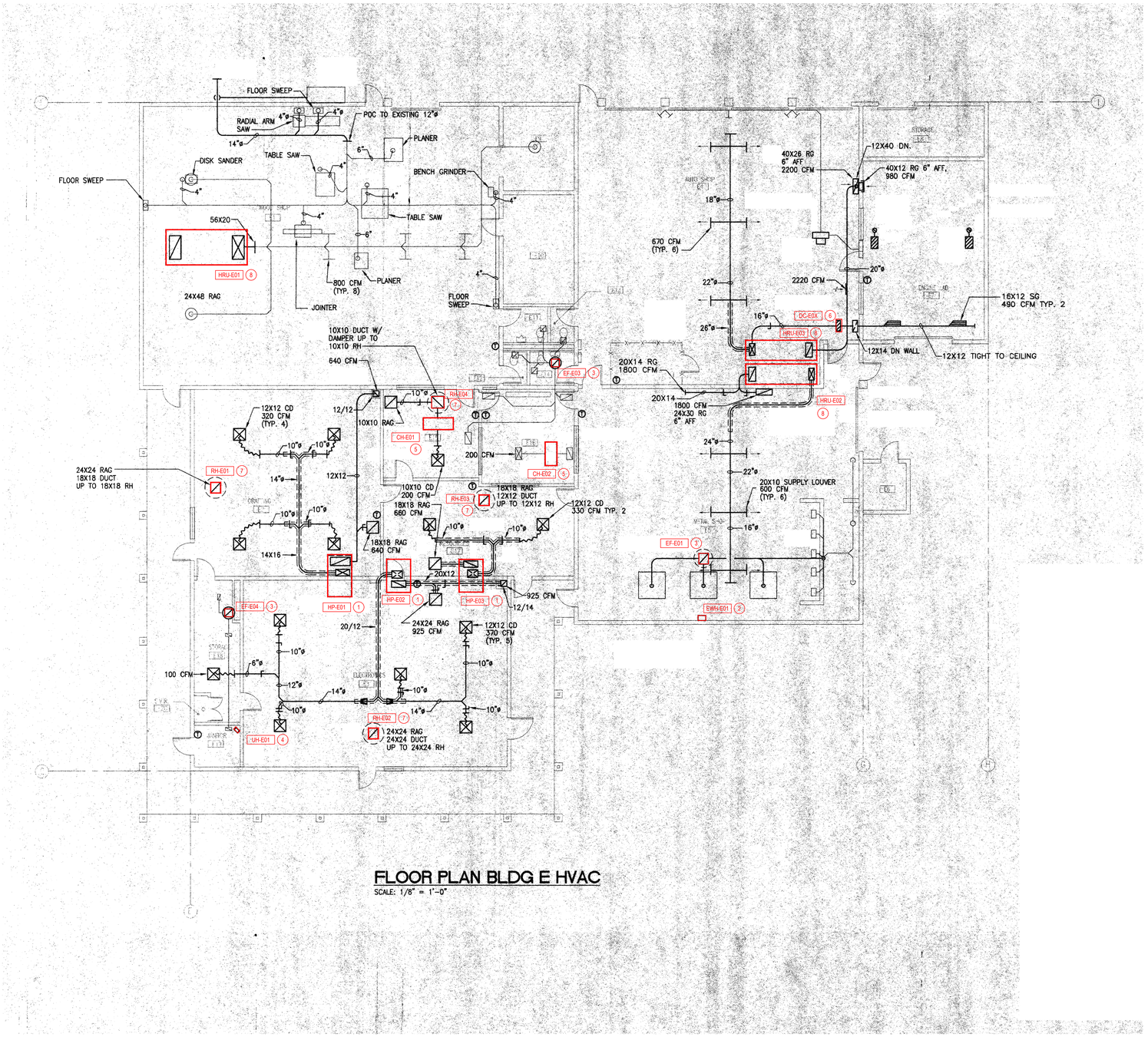
SHEET NAME
MECHANICAL BUILDING C & D REMODEL FLOOR PLAN

SHEET NO.
M-2.2

22-482

BUILDING C REMODEL FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNC - 2023-11-14 - COLIN GOULET



FLOOR PLAN BLDG E HVAC

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

GENERAL NOTES

1. ALL EQUIPMENT, AND OR PIPING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. COORDINATE ALL BUILDING WALL, CEILING FLOOR AND ROOF PENETRATIONS WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE NEW THERMOSTATS IN THE PRIOR (E) LOCATION; ALL CONTROLS TO BE INTEGRATED INTO NEW BMS.
4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET M-4.3 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW PACKAGED ROOFTOP UNIT. PROVIDE CORRESPONDING ADAPTER CURB AS NOTED ON RTU SCHEDULE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR PROVIDE LOCAL CONTROL IF EMS UNAVAILABLE. RTU SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR1.XX.
2. NEW ELECTRIC WALL HEATER. INSTALL AT SAME LOCATION OF REMOVED UNIT. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER.
3. NEW ROOF MOUNTED EXHAUST FAN AND CURB. CONNECT TO EXISTING INLET DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MECHANICAL REFERENCE DRAWING, MR.XX.
4. NEW ELECTRIC CEILING/WALL MOUNTED ELECTRIC UNIT HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL
5. NEW ELECTRIC CABINET HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.
6. NEW ELECTRIC DUCT HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE ANY CHANGE IN SIZE TO NEW HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.
7. NEW ROOF MOUNTED RELIEF HOOD AND CORRESPONDING CURB/BACKDRAFT DAMPER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. VERIFY OPERATION OF GRAVITY BACKDRAFT DAMPER UPON INSTALLATION.
8. NEW ROOF MOUNTED HEAT RECOVERY UNIT AND CORRESPONDING ROOF CURB. CONNECT TO EXISTING ROOF MOUNTED SUPPLY AND RETURN DUCT RISERS AS SHOWN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR PROVIDE LOCAL CONTROL IF EMS UNAVAILABLE. HRU SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR1.XX

BUILDING E REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

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REVISION SCHEDULE

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	ISSUED FOR CONSTRUCTION	11-14-23

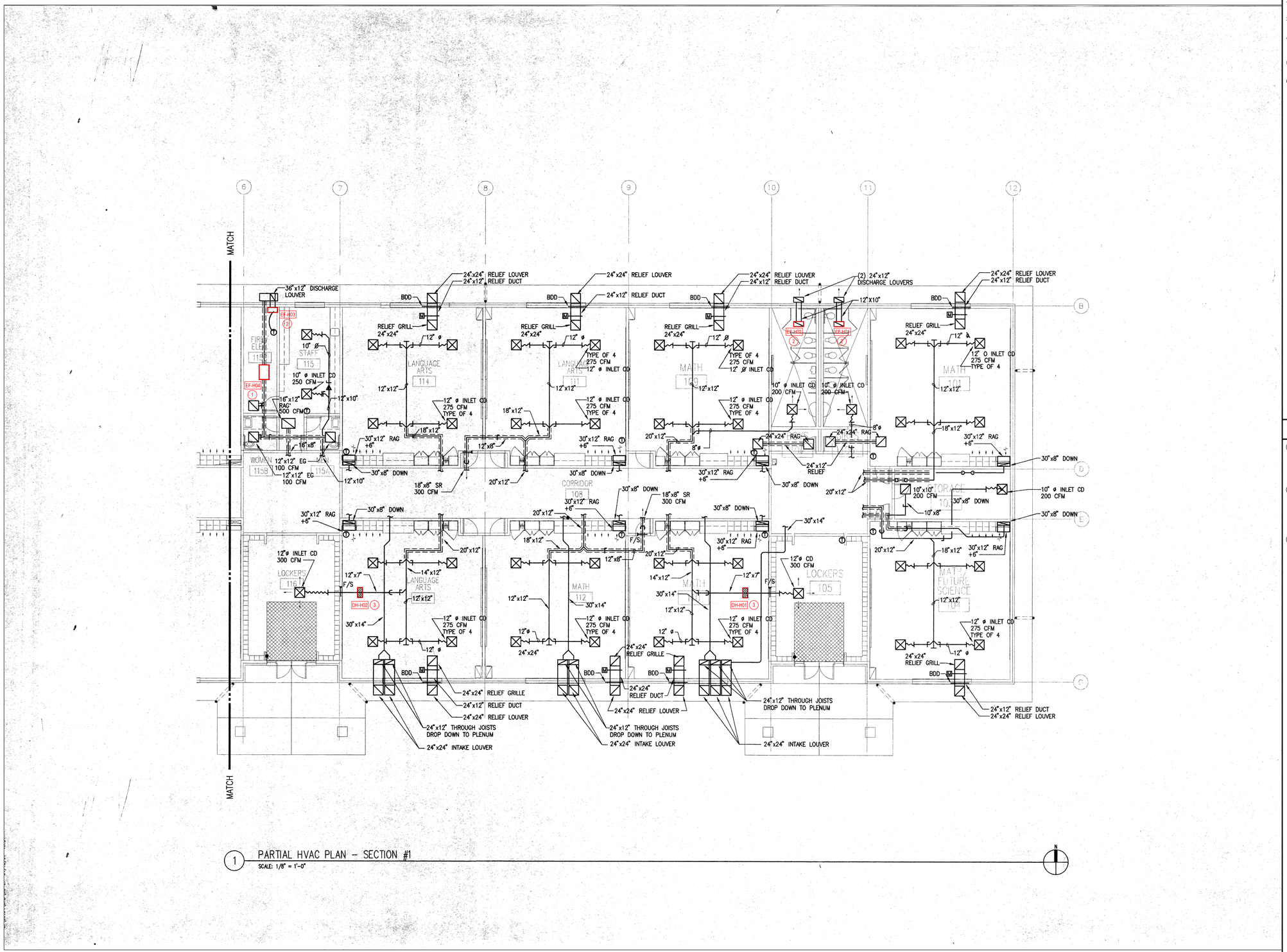
JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING E REMODEL FLOOR PLAN

SHEET NO.
M-2.3

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNE - 2023-11-14 - COLIN GOULET



1 PARTIAL HVAC PLAN – SECTION #1
SCALE: 1/8" = 1'-0"

N

GENERAL NOTES

1. ALL EQUIPMENT, AND OR PIPING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. COORDINATE ALL BUILDING WALL, CEILING-FLOOR AND ROOF PENETRATIONS WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE NEW THERMOSTATS IN THE PRIOR (E) LOCATION; ALL CONTROLS TO BE INTEGRATED INTO NEW BMS.
4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET MR-4.1 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW INLINE EXHAUST FAN; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.4.
2. NEW CEILING MOUNTED EXHAUST FAN; CONNECT TO EXISTING DISCHARGE DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. VERIFY OPERATION OF NEW BACKDRAFT DAMPER UPON INSTALLATION OF NEW FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM PROVIDED ON EXHAUST FAN SCHEDULE.
3. NEW ELECTRIC DUCT HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE ANY CHANGE IN SIZE TO NEW HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.

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STATE OF WASHINGTON · KEVIN N. NAKAMURA · 44776 · REGISTERED PROFESSIONAL ENGINEER

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DRAWN	KN
REVIEWED	RH

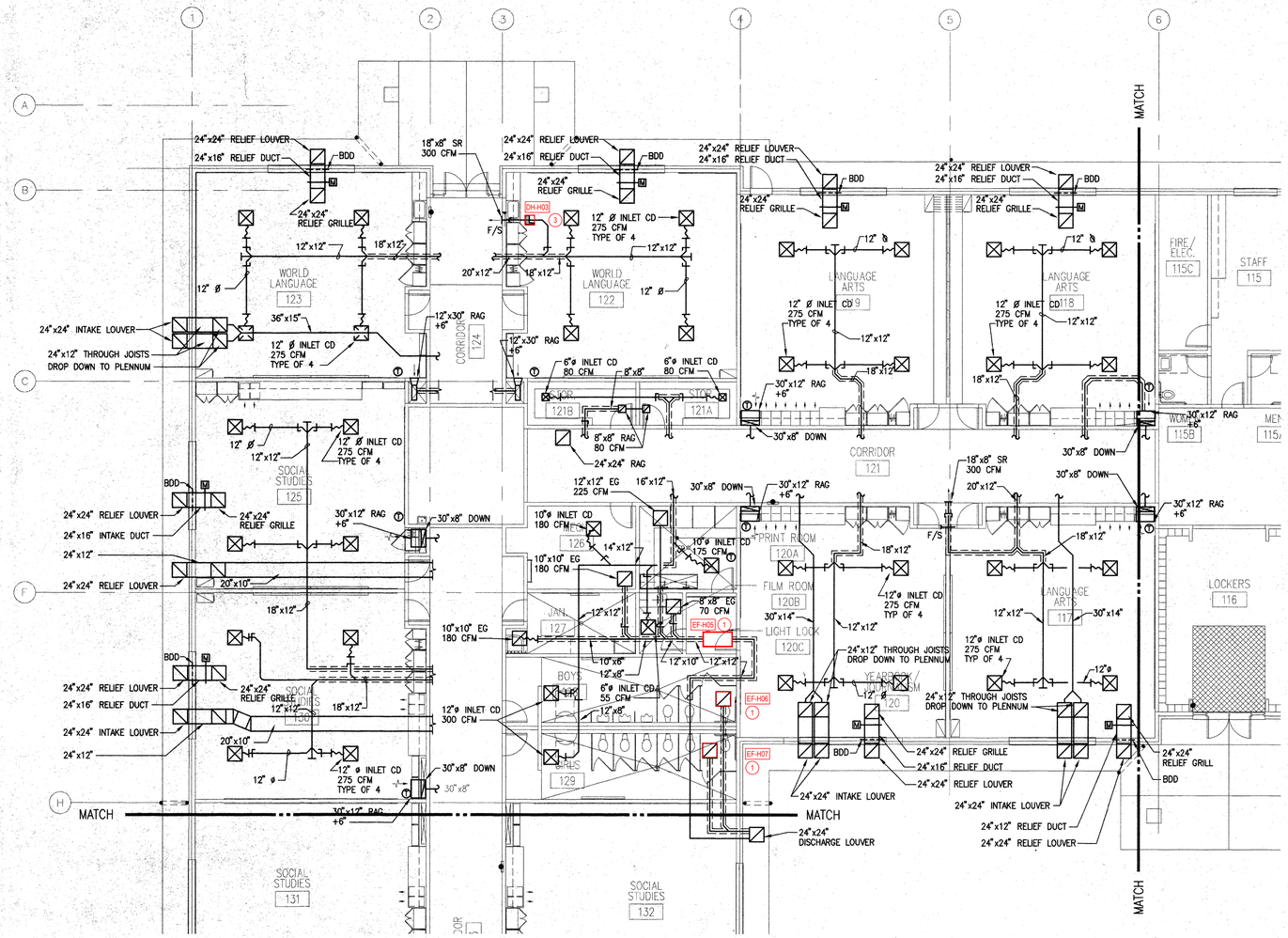
SHEET NAME
MECHANICAL BUILDING H SECTION 1 REMODEL PLAN

SHEET NO.
M-2.4

BUILDING H SECTION 1 REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNH - 2023-11-14 - COLIN GOULET



1 PARTIAL HVAC PLAN – SECTION #2

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

GENERAL NOTES

1. ALL EQUIPMENT, AND OR PIPING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
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4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET MR-4.1 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW INLINE EXHAUST FAN; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.5.
2. NEW CEILING MOUNTED EXHAUST FAN; CONNECT TO EXISTING DISCHARGE DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. VERIFY OPERATION OF NEW BACKDRAFT DAMPER UPON INSTALLATION OF NEW FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM PROVIDED ON EXHAUST FAN SCHEDULE.
3. NEW ELECTRIC DUCT HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE ANY CHANGE IN SIZE TO NEW HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.

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SHEET NAME
MECHANICAL BUILDING H SECTION 2 REMODEL PLAN

SHEET NO.
M-2.5

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BUILDING H SECTION 2 REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNH - 2023-11-14 - COLIN GOULET
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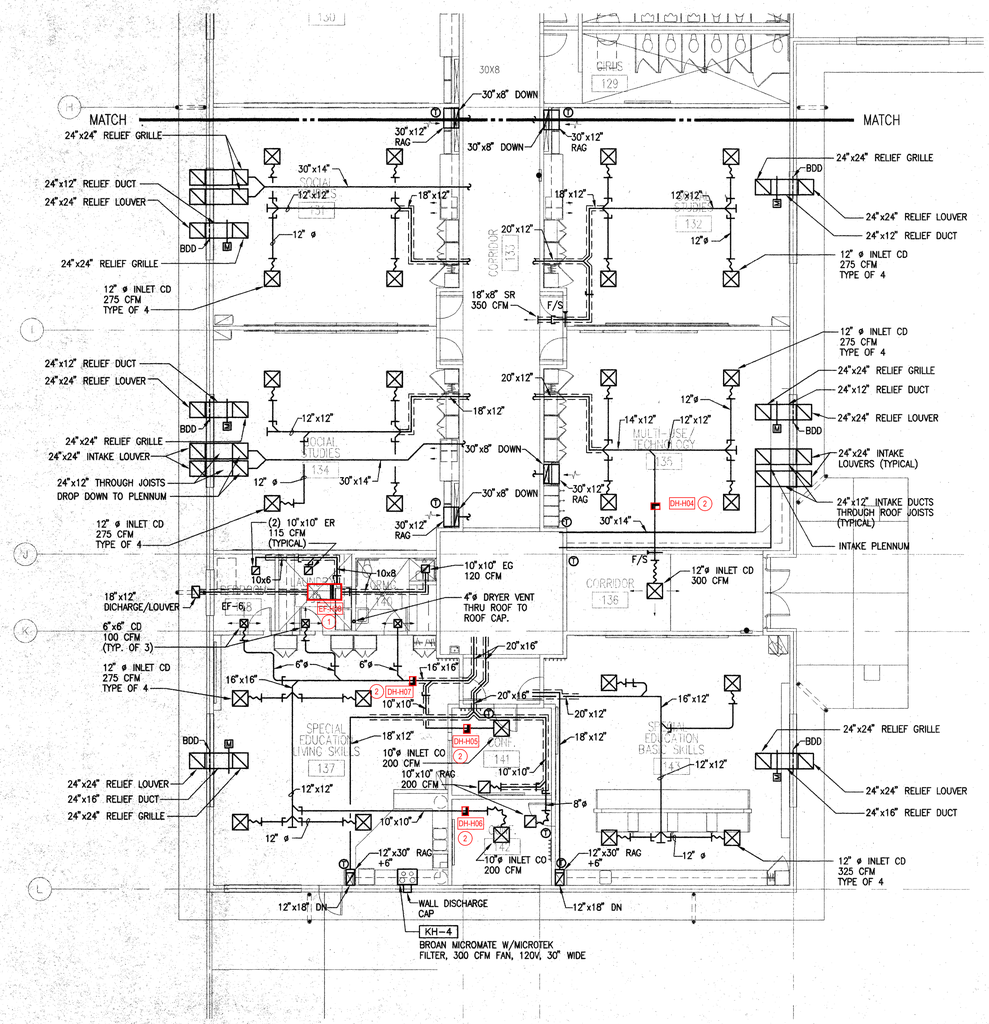

1 PARTIAL HVAC PLAN – SECTION #3

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

GENERAL NOTES

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3. PROVIDE NEW THERMOSTATS IN THE PRIOR (E) LOCATION; ALL CONTROLS TO BE INTEGRATED INTO NEW BMS.
4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET MR-4.1 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW INLINE EXHAUST FAN; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.6.
2. NEW ELECTRIC DUCT HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE ANY CHANGE IN SIZE TO NEW HEATER. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.

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SHEET NAME
MECHANICAL BUILDING H SECTION 3 REMODEL PLAN

SHEET NO.
M-2.6

22-482

BUILDING H SECTION 3 REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION, CAD\22-482 M FLRPLN H - 2023-11-14 - COLIN GOULET

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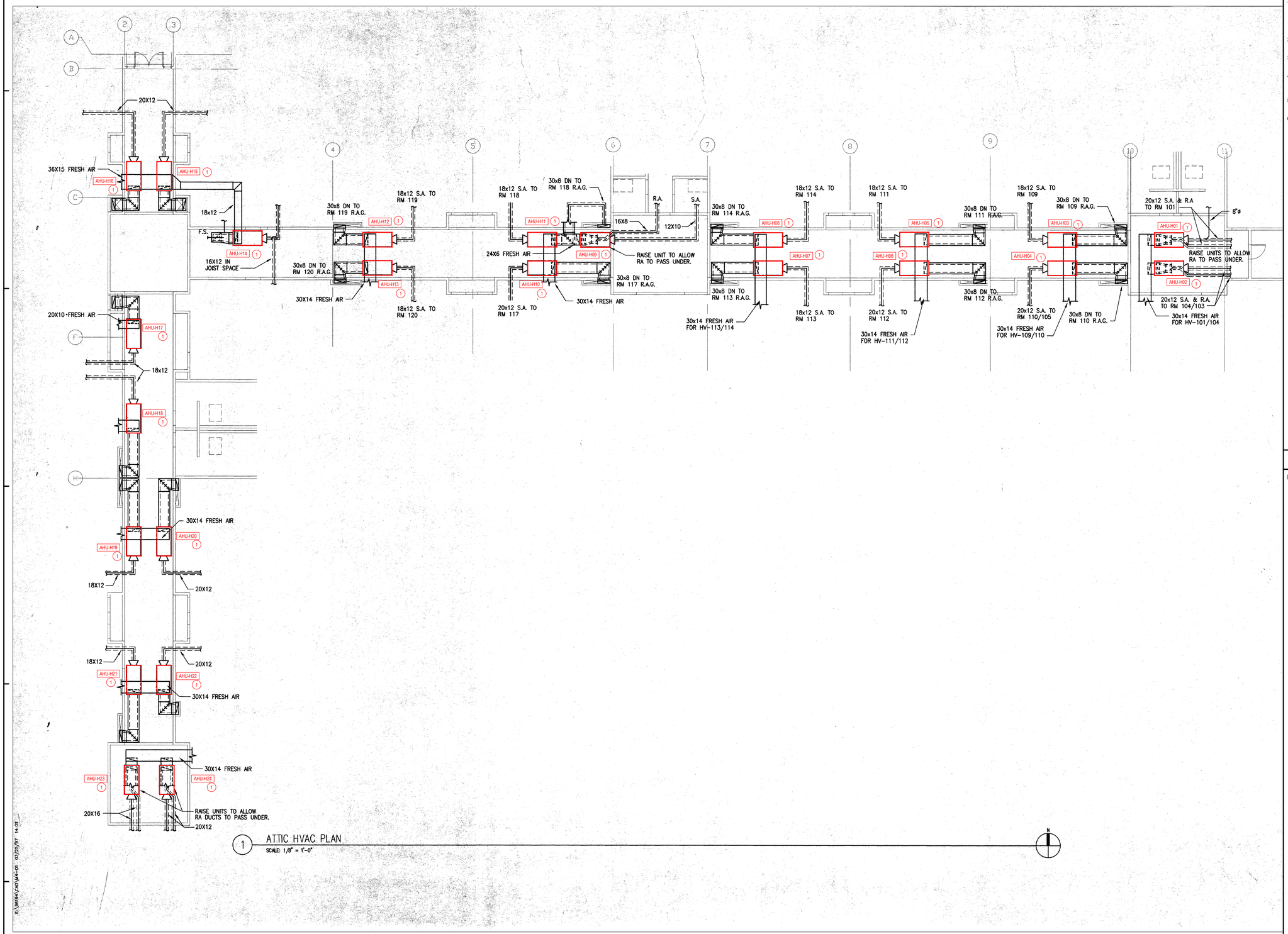

1 ATTIC HVAC PLAN
SCALE: 1/8" = 1'-0"

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GENERAL NOTES

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6. REFER TO SHEET MR-4.1 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

(1) NEW ELECTRIC CABINET HEATER; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL.

BUILDING H ATTIC REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

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STATE OF WASHINGTON
RICHARD A. HOLMAN
46776
REGISTERED PROFESSIONAL ENGINEER

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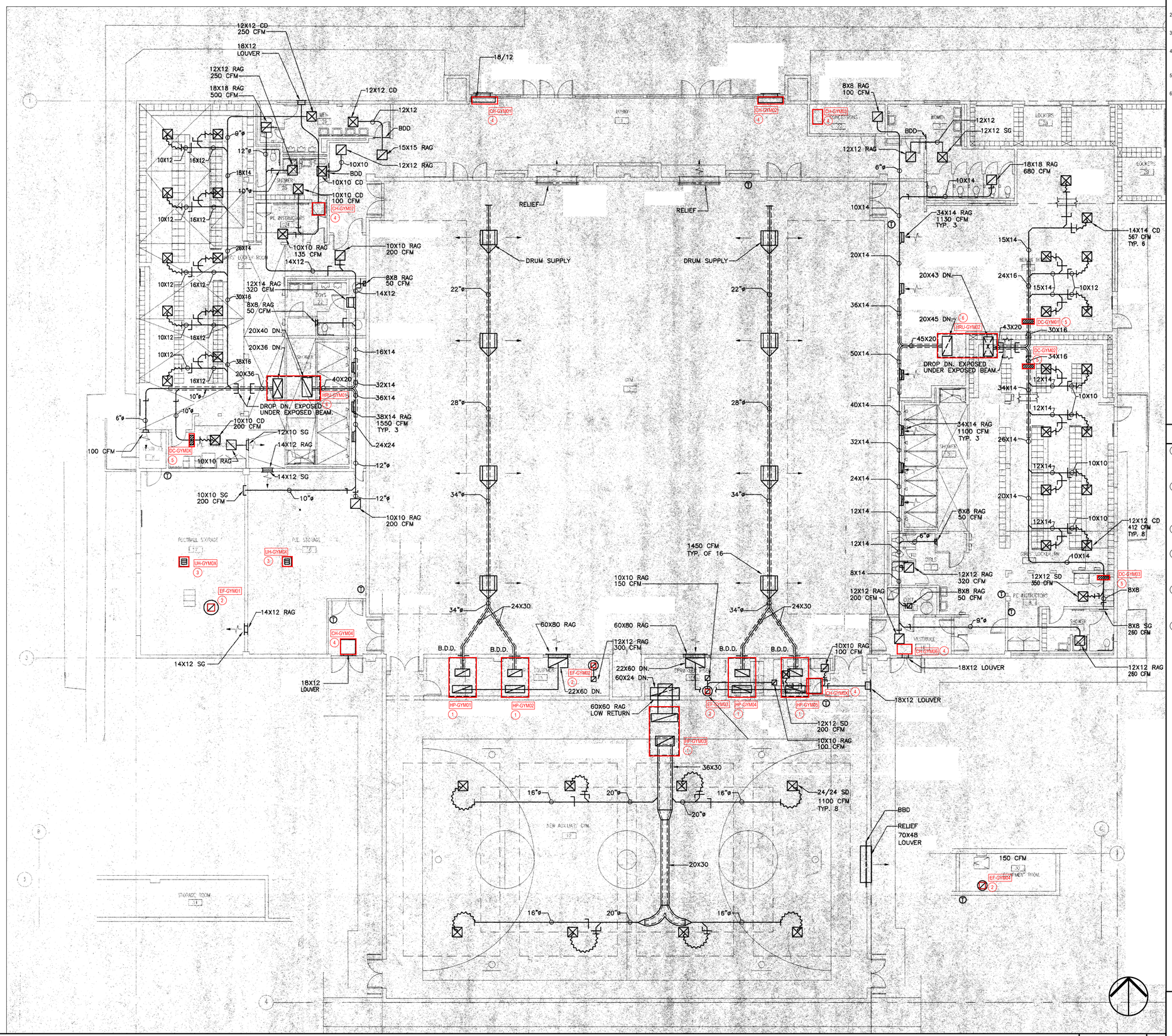
DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING H ATTIC REMODEL PLAN

SHEET NO.
M-2.7

22-482



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5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET M-4.8 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW PACKAGED ROOFTOP UNIT. PROVIDE CORRESPONDING ADAPTER CURB AS NOTED ON RTU SCHEDULE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR PROVIDE LOCAL CONTROL IF EMS UNAVAILABLE. RTU SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.8.
2. NEW ROOF MOUNTED EXHAUST FAN AND CURB. CONNECT TO EXISTING INLET DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MECHANICAL REFERENCE DRAWING, MR-4.8.
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RESERVED FOR BUILDING DEPT STAMP

KEVIN M. NEWMAN
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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	KN
REVIEWED	RH

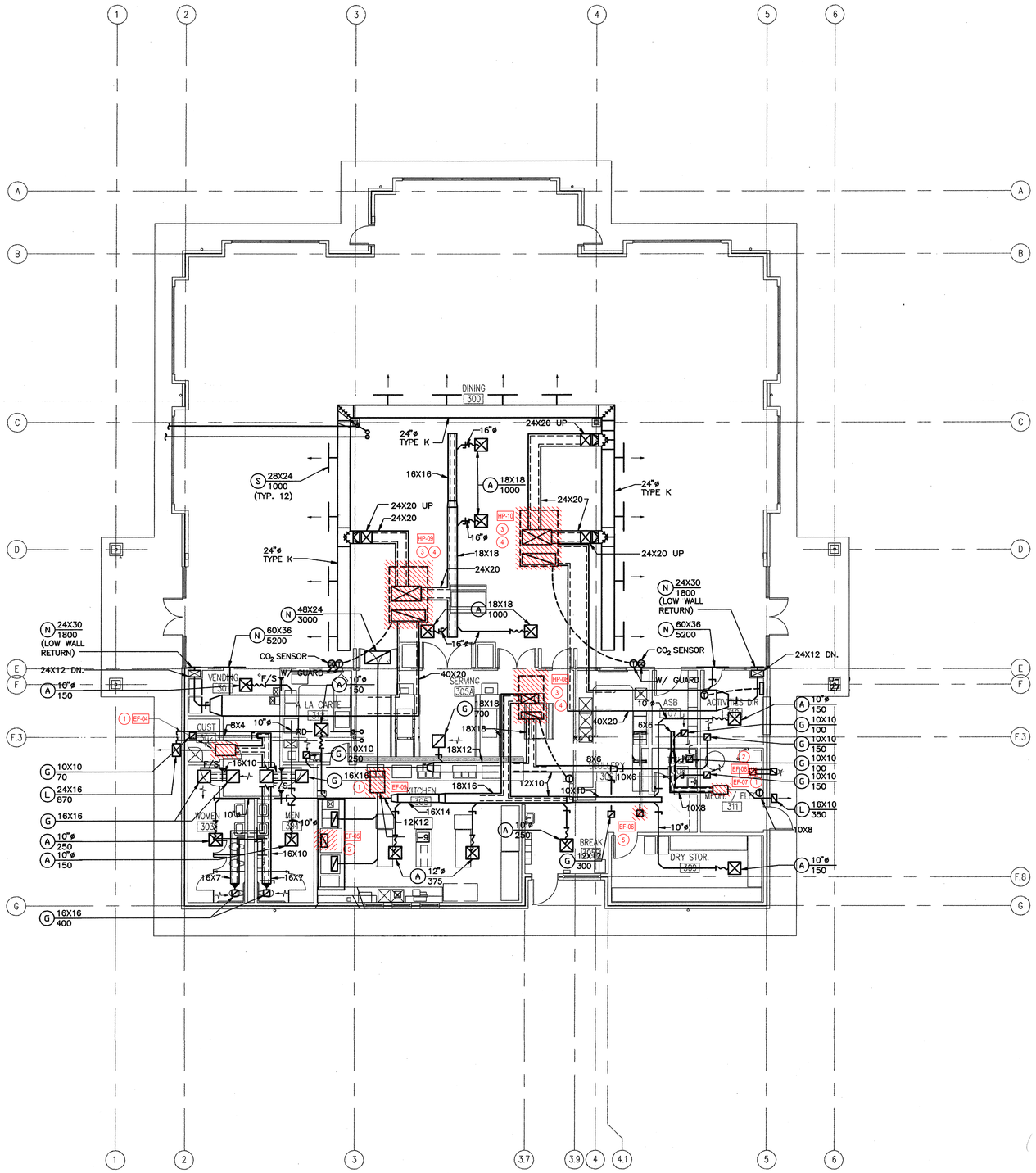
SHEET NAME
MECHANICAL GYMNASIUM REMODEL PLAN

SHEET NO.
M-2.8

22-482

MECHANICAL GYMNASIUM REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNGYM - 2023-11-14 - COLIN GOULET



GENERAL NOTES

1. ALL EQUIPMENT, AND OR PIPING SHOWN IS A REPRESENTATION OF THE ACTUAL SYSTEMS AND IS NOT TO BE CONSIDERED AN AS-BUILT. ALL DIMENSIONS, LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION OR NEW CONSTRUCTION.
2. COORDINATE ALL BUILDING WALL, CEILING FLOOR AND ROOF PENETRATIONS WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE NEW THERMOSTATS IN THE PRIOR (E) LOCATION; ALL CONTROLS TO BE INTEGRATED INTO NEW BMS.
4. REBALANCE ALL (E) SUPPLY AND (E) RETURN DIFFUSERS TO DESIGN AIRFLOWS; REFER TO (E) AS-BUILT DOCUMENTS FOR ALL DESIGN AIRFLOW VALUES.
5. REFER TO AS-BUILT DOCUMENTS FOR (E) DUCTWORK RUNS AND SIZES FOR PROPER CONNECTION TO NEW MECHANICAL UNITS.
6. REFER TO SHEET M-4.9 FOR AS-BUILT DRAWING REFERENCE.

CONSTRUCTION NOTES

1. NEW INLINE EXHAUST FAN; CONNECT TO EXISTING DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. MODIFY EXISTING DUCTWORK AS NECESSARY TO ACCOMMODATE NEW FLEX CONNECTIONS TO FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL CONTROL. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.9.
2. NEW CEILING MOUNTED EXHAUST FAN; CONNECT TO EXISTING DISCHARGE DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. VERIFY OPERATION OF NEW BACKDRAFT DAMPER UPON INSTALLATION OF NEW FAN. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM PROVIDED ON EXHAUST FAN SCHEDULE.
3. NEW PACKAGED ROOFTOP UNIT. PROVIDE CORRESPONDING ADAPTER CURB AS NOTED ON RTU SCHEDULE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR PROVIDE LOCAL CONTROL IF EMS UNAVAILABLE. RTU SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MR-4.9.
4. NEW ROOF MOUNTED EXHAUST FAN AND CURB. CONNECT TO EXISTING INLET DUCTWORK PREVIOUSLY SALVAGED UNDER DEMOLITION PHASE. COORDINATE WITH DIVISION 26 TO RE-CONNECT EXISTING POWER. RE-CONNECT TO EXISTING EMS IF PRESENT OR LOCAL TIMER SWITCH. FAN SHALL BE RE-BALANCED TO DESIGN CFM AS PROVIDED ON MECHANICAL REFERENCE DRAWING, MR-4.9.

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SHEET NAME
MECHANICAL CAFETERIA REMODEL FLOOR PLAN

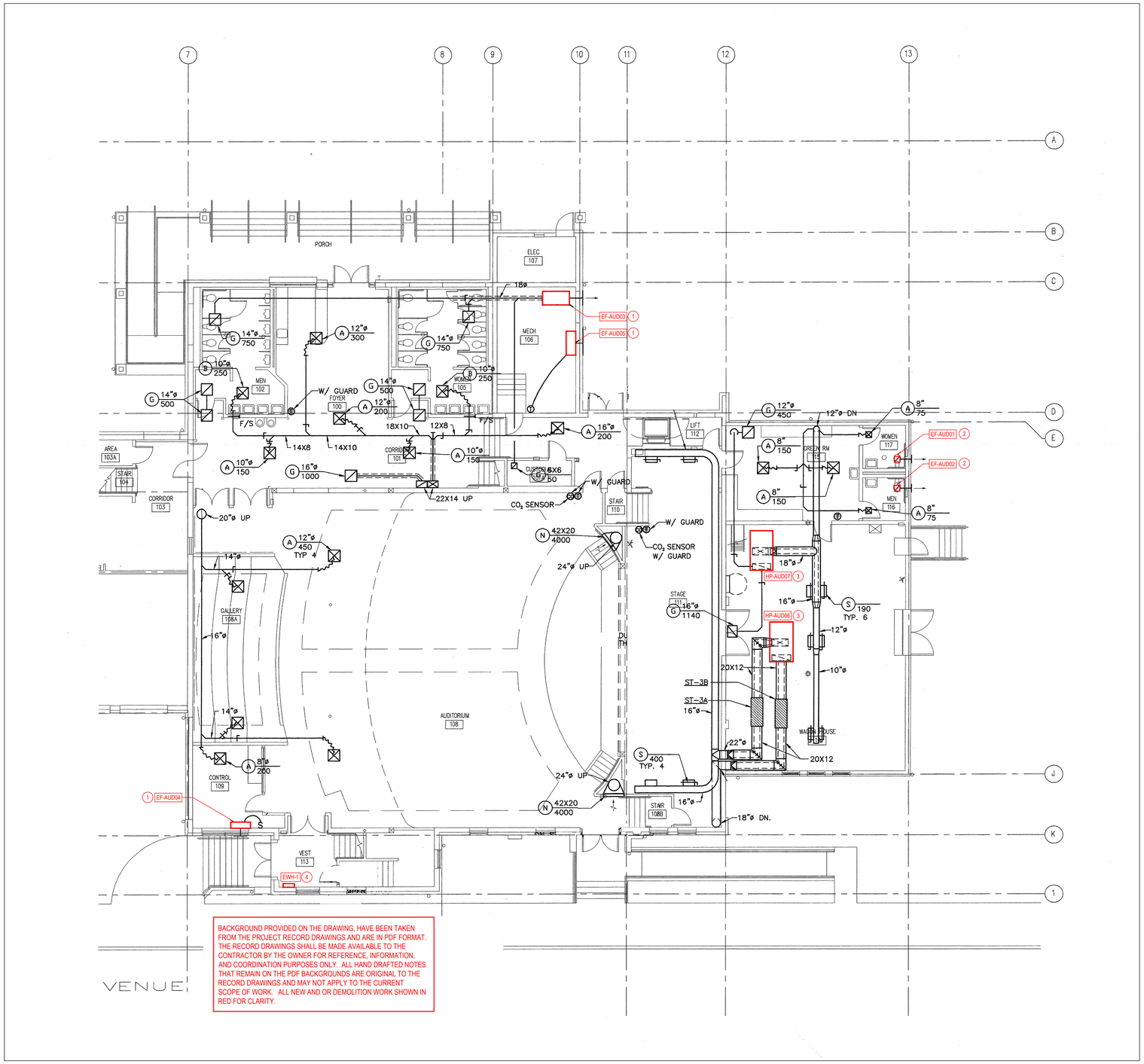
SHEET NO.
M-2.9

RESERVED FOR BUILDING DEPT STAMP

MECHANICAL CAFETERIA REMODEL PLAN | SCALE: 1/8" = 1'-0" | 1

R:\PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLN.CAF - 2023-11-14 - COLIN GOULET

22-482



BACKGROUND PROVIDED ON THE DRAWING, HAVE BEEN TAKEN FROM THE PROJECT RECORD DRAWINGS AND ARE IN PDF FORMAT. THE RECORD DRAWINGS SHALL BE MADE AVAILABLE TO THE CONTRACTOR BY THE OWNER FOR REFERENCE, INFORMATION, AND COORDINATION PURPOSES ONLY. ALL HAND DRAFTED NOTES THAT REMAIN ON THE PDF BACKGROUNDS ARE ORIGINAL TO THE RECORD DRAWINGS AND MAY NOT APPLY TO THE CURRENT SCOPE OF WORK. ALL NEW AND OR DEMOLITION WORK SHOWN IN RED FOR CLARITY.

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CONSTRUCTION NOTES

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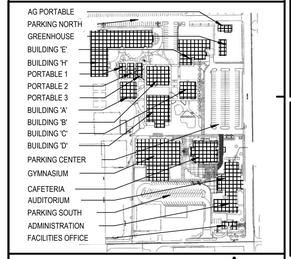

KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

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REVIEWED	RH

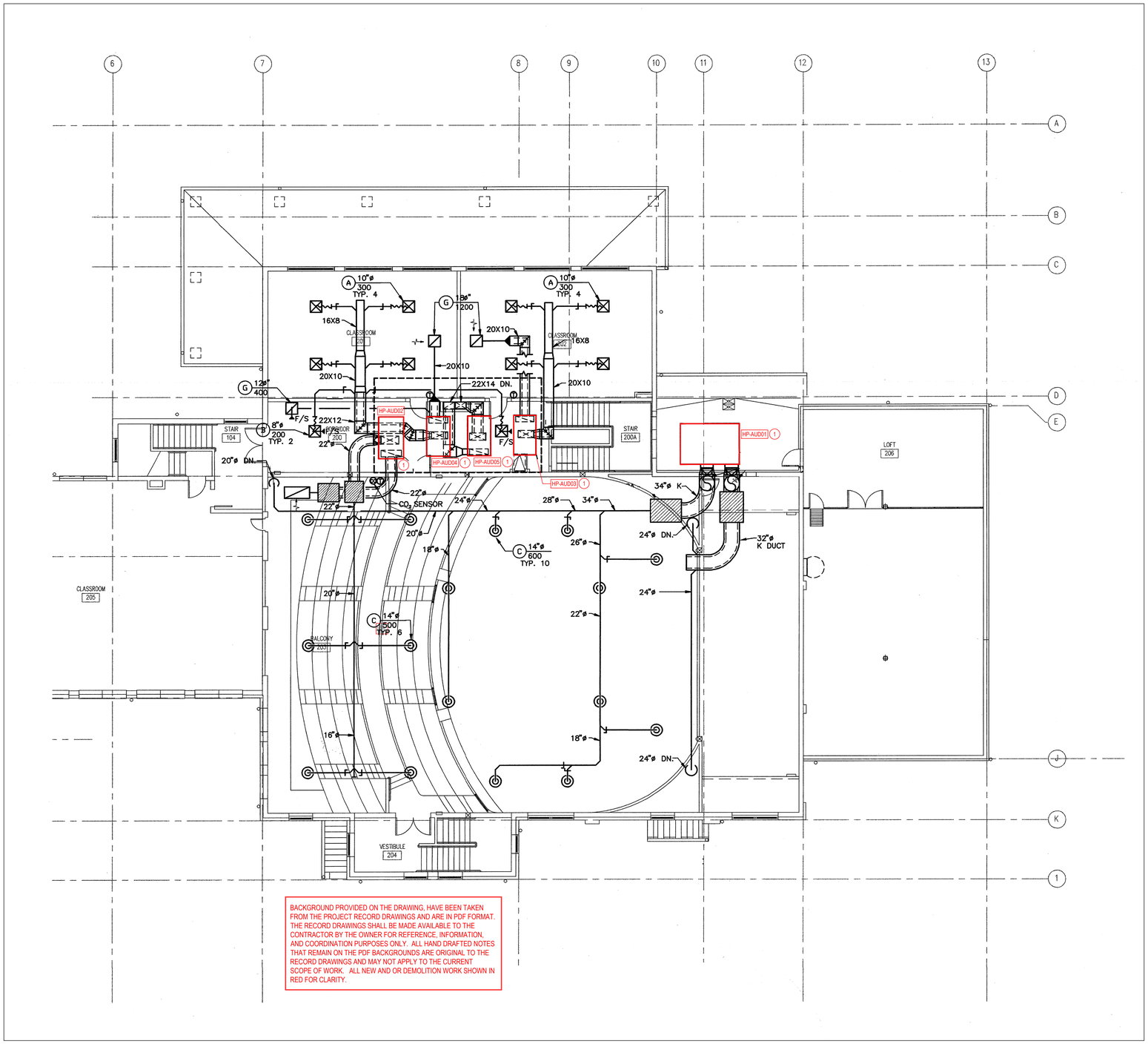
SHEET NAME
MECHANICAL BUILDING AUDITORIUM REMODEL FIRST FLOOR PLAN

SHEET NO.
M-2.10

22-482

BUILDING AUDITORIUM REMODEL FIRST FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLAN.D - 2023-11-14 - COLIN GOULET



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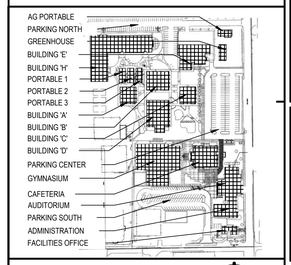

KEY PLAN

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DRAWN	KN
REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING AUDITORIUM REMODEL SECOND FLOOR PLAN

SHEET NO.
M-2.11

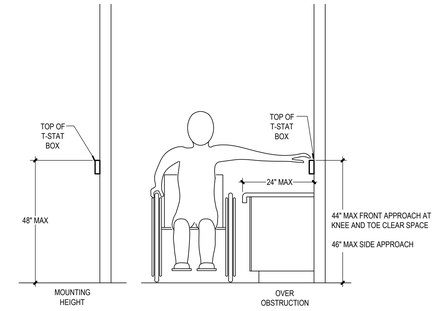
RESERVED FOR BUILDING DEPT STAMP

BUILDING AUDITORIUM REMODEL FIRST FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

22-482

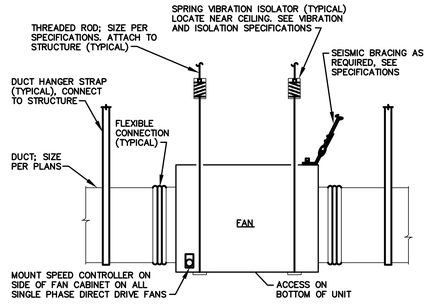
R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLR-PLN.MUD - 2023-11-14 - COLIN GOULET

T'STAT MOUNTING 1

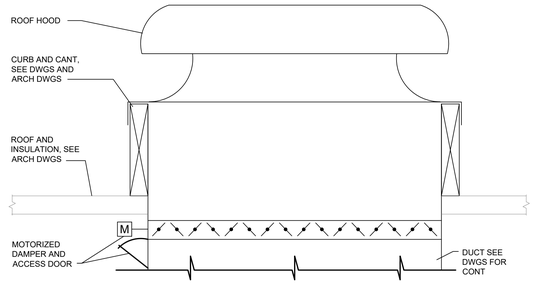


NOTE:
PROVIDE A 30"W x 27"H x 19"D MIN. TOE/KNEE CLEARANCE FOR FRONT APPROACH OVER OBSTRUCTION.

INLINE FAN INSTALLATION 4

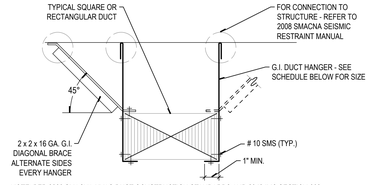


ROOF HOOD 5



NOTES:
1. TOP OF ROOF CURB SHALL BE LEVEL WHERE INSTALLED ON SLOPED ROOFS.
2. DOME TYPE ROOF HOOD SHOWN. LOUVERED AND RECTANGULAR ROOF HOODS SIMILAR.

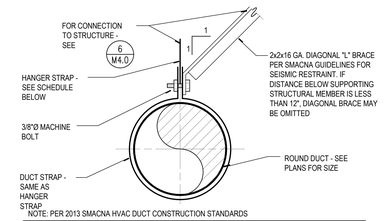
DUCT SUPPORT - RECTANGULAR 2



NOTE: PER 2020 SMACNA HVAC DUCT CONSTRUCTION STANDARDS AND 2018 IMC SECTION 603

HORIZONTAL	HANGER STRAP SCHEDULE		
DUCT SIZE	HANGER SIZE	MAX. SPACING	MATERIAL
UP THRU 18"	1" x 18 GA.	10'-0" O/C	G.I. STEEL
19" TO 30"	1" x 18 GA.	10'-0" O/C	G.I. STEEL
31" TO 48"	1" x 1/8"	10'-0" O/C	G.I. STEEL
VERTICAL			
DUCT SIZE	HANGER SIZE	MAX. SPACING	MATERIAL
UP THRU 24"	1" x 1/8" STRAP	12'-0" O/C	G.I. STEEL
25" TO 36"	1" x 1" x 1/8" ANGLE	12'-0" O/C	G.I. STEEL
37" TO 48"	1-1/8" x 1-1/8" x 1/8" ANGLE	12'-0" O/C	G.I. STEEL

RND - DUCT STRAP DETAIL 3



NOTE: PER 2013 SMACNA HVAC DUCT CONSTRUCTION STANDARDS

HORIZONTAL	HANGER STRAP SCHEDULE		
DUCT SIZE	HANGER SIZE	MAX. SPACING	MATERIAL
UP THRU 10"	1" x 22 GA.	10'-0" O/C	G.I. STEEL
11" TO 20"	1" x 22 GA.	10'-0" O/C	G.I. STEEL
21" TO 40"	1" x 20 GA.	10'-0" O/C	G.I. STEEL
DUCT SIZE	HANGER SIZE	MAX. SPACING	MATERIAL
UP THRU 10"	2" x 18 GA.	12'-0" O/C	G.I. STEEL
11" TO 20"	2" x 16 GA.	12'-0" O/C	G.I. STEEL
21" TO 40"	1/8" STEEL X 1-1/2"	12'-0" O/C	G.I. STEEL

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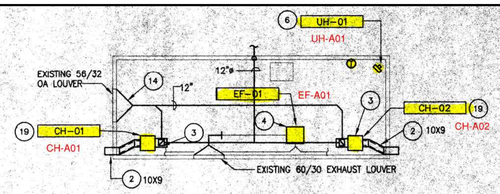
SHEET NAME
MECHANICAL DETAILS

SHEET NO.
M-3.1

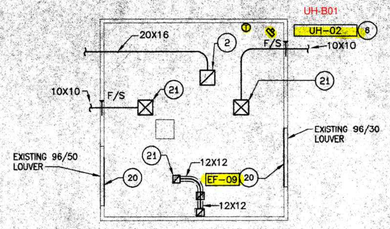
22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M DETAILS - 2023-11-14 - COLIN GOULET



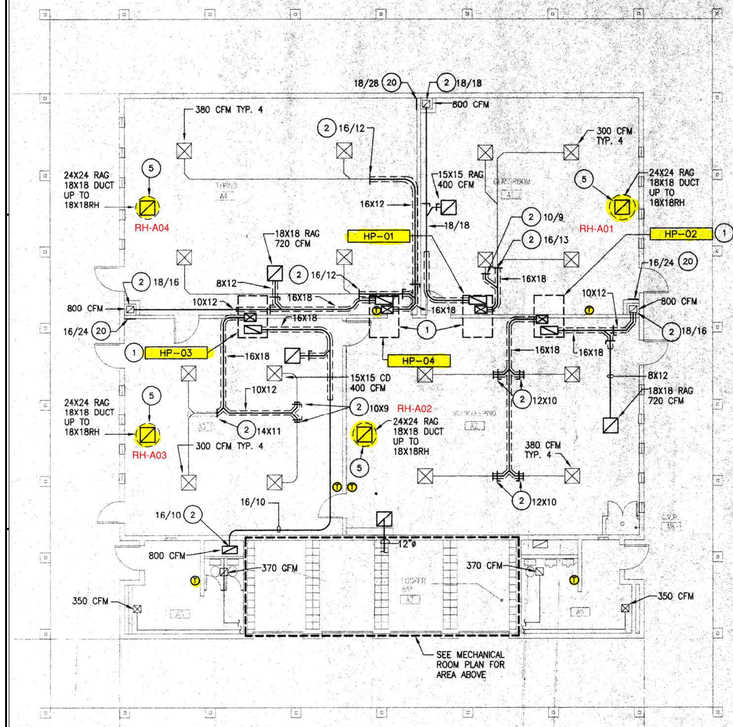
MECHANICAL ROOM PLAN BLDG A HVAC

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



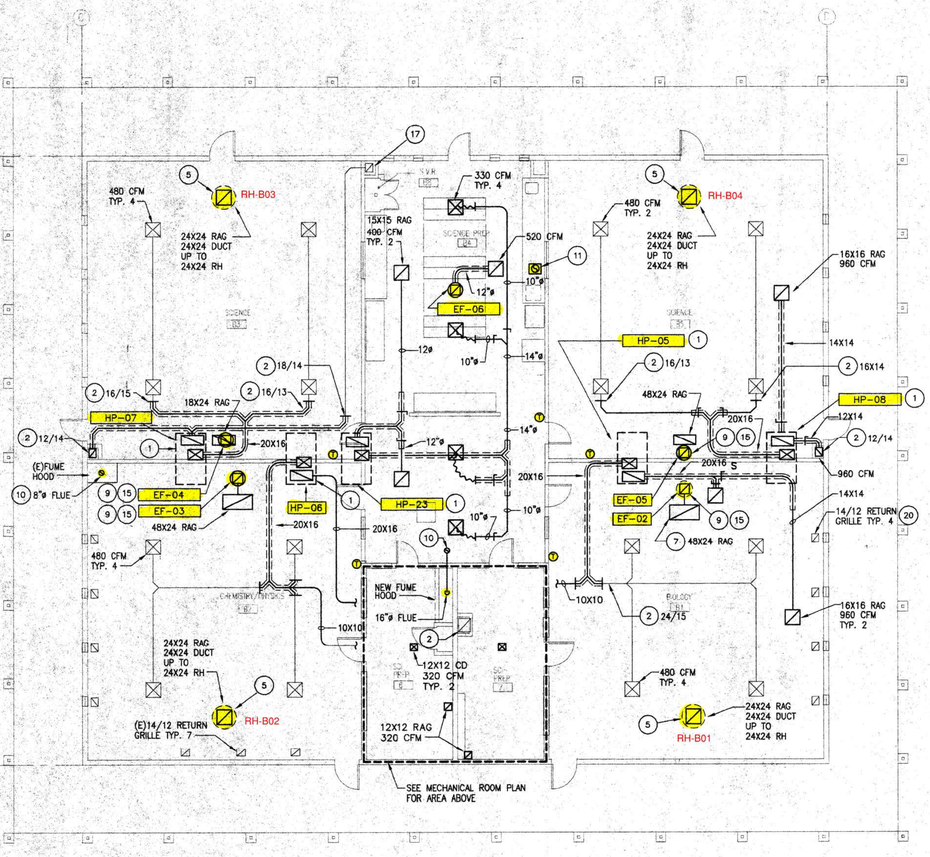
MECHANICAL ROOM PLAN BLDG B HVAC

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



FLOOR PLAN BLDG A HVAC

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



FLOOR PLAN BLDG B HVAC

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

KEYED NOTES

1. INSTALL NEW PUMP UNIT ON FACTORY CURB ON ROOF. CENTER OF GRAVITY OF GRAVITY OF HEAT PUMP SHALL BE PLACED OVER BEARING WALL. COORDINATE W/ DIV. 1 CONTR.
2. CONNECT TO EXISTING DUCT WORK
3. INSTALL ELECTRIC CABINET HEATER IN MECHANICAL ROOM CONSTRUCT MIXING BOX WITH MANUAL DAMPERS.
4. REPLACE EXISTING EXHAUST FAN. CONNECT TO EXIST. DUCTWORK.
5. INSTALL NEW ROOF HOOD. SEE ROOF HOOD DETAIL ON SHT. M5.01.
6. INSTALL NEW WALL MOUNTED ELECTRIC UNIT HEATER IN MECH. ROOM.
7. NOT USED
8. NOT USED
9. INSTALL NEW ROOF TOP EXHAUST FAN. SEE INSTALLATION DETAIL ON M5.01.
10. INSTALL FLUE THROUGH ROOF AND NEW ROOF CAP FOR FUME HOOD. INSTALL PER MANUFACTURERS RECOMMENDATION.
11. ~~INSTALL HOOD AND EXHAUST DUCT THROUGH ROOF OVER COOKTOP.~~
12. NOT USED
13. NOT USED
14. CONNECT TO EXISTING OUTSIDE AIR LOUVER
15. UP TO EMERGENCY EXHAUST FAN ON ROOF.
16. NOT USED
17. REMOVE 18/20 GRILLE ON RM.B4 SIDE PATCH OPENING IN DUCT.
18. NOT USED
19. INSTALL CABINET HEATER IN MECHANICAL ROOM.
20. INSTALL SHEET METAL BLANK ON INSIDE OF EXISTING GRILL. PAINT FLAT BLACK.
21. ~~SAW CUT CONCRETE DECK TO INSTALL.~~

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SHEET NAME
MECHANICAL BUILDING A & B REFERENCE

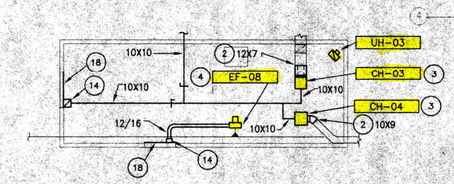
SHEET NO.
MR-4.1

RESERVED FOR BUILDING DEPT STAMP

BUILDING A & B REFERENCE | SCALE: SEE PLANS | 1

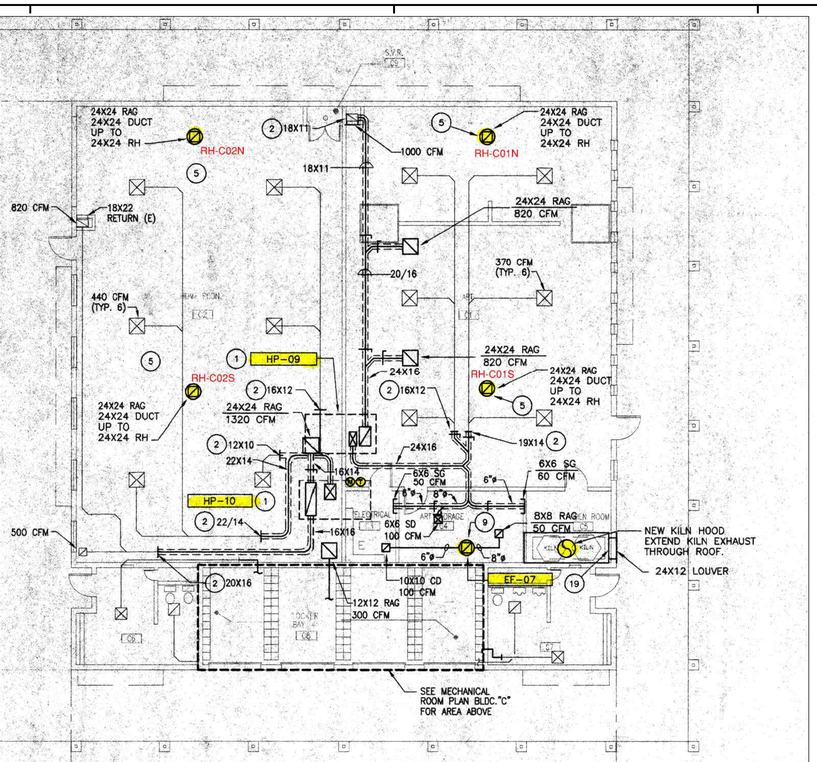
22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNA - 2023-11-14 - COLIN GOULET



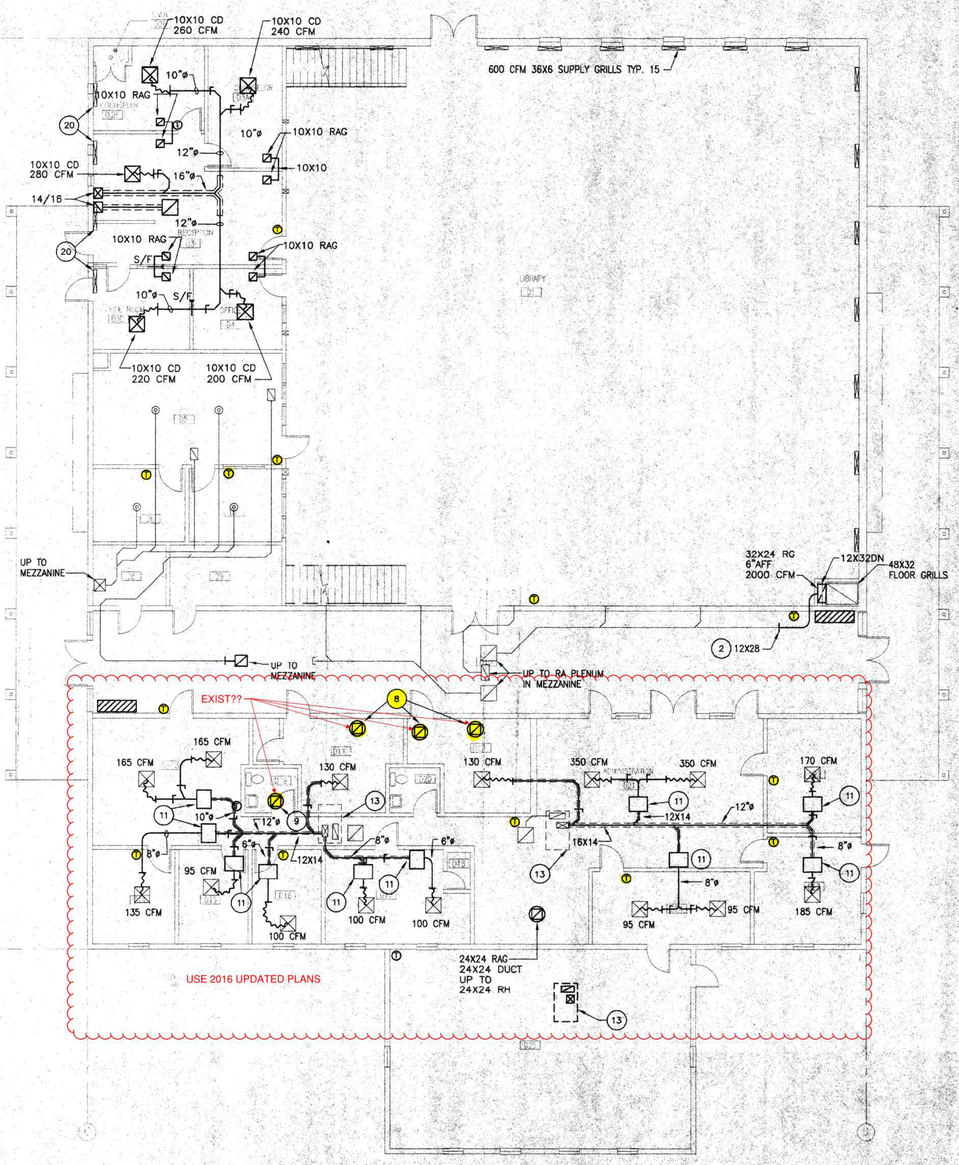
MECHANICAL ROOM PLAN BLDG. C

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



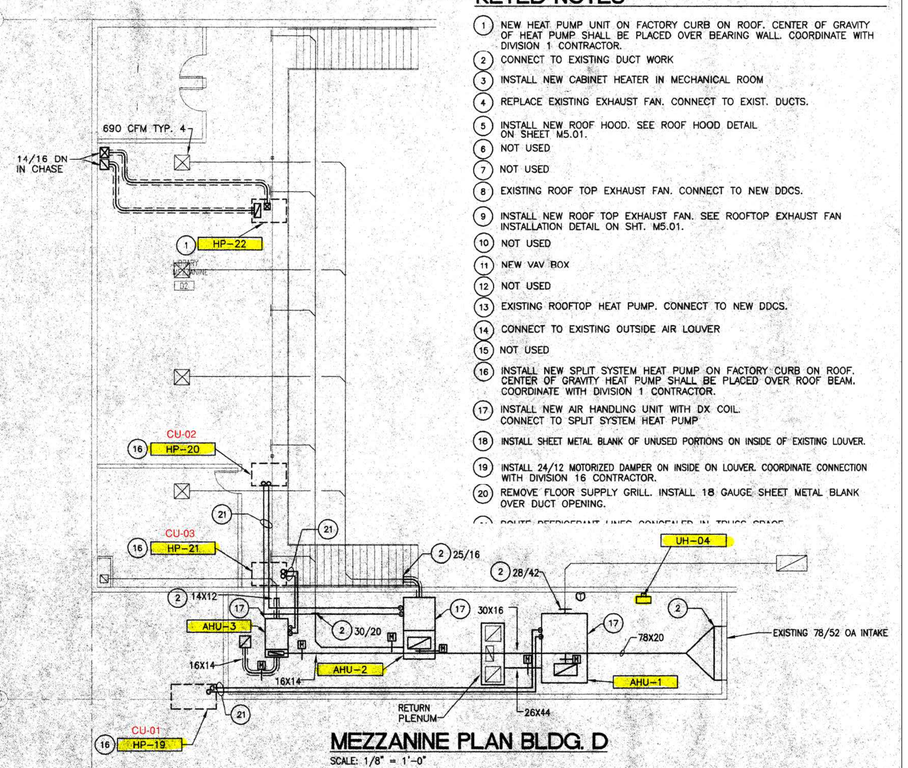
FLOOR PLAN BLDG. C HVAC

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



FLOOR PLAN BLDG. D HVAC

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



MEZZANINE PLAN BLDG. D

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

KEYED NOTES

1. NEW HEAT PUMP UNIT ON FACTORY CURB ON ROOF. CENTER OF GRAVITY OF HEAT PUMP SHALL BE PLACED OVER BEARING WALL. COORDINATE WITH DIVISION 1 CONTRACTOR.
2. CONNECT TO EXISTING DUCT WORK
3. INSTALL NEW CABINET HEATER IN MECHANICAL ROOM
4. REPLACE EXISTING EXHAUST FAN. CONNECT TO EXIST. DUCTS.
5. INSTALL NEW ROOF HOOD. SEE ROOF HOOD DETAIL ON SHEET M5.01.
6. NOT USED
7. NOT USED
8. EXISTING ROOF TOP EXHAUST FAN. CONNECT TO NEW DDCS.
9. INSTALL NEW ROOF TOP EXHAUST FAN. SEE ROOFTOP EXHAUST FAN INSTALLATION DETAIL ON SHT. M5.01.
10. NOT USED
11. NEW VAV BOX
12. NOT USED
13. EXISTING ROOFTOP HEAT PUMP. CONNECT TO NEW DDCS.
14. CONNECT TO EXISTING OUTSIDE AIR LOUVER
15. NOT USED
16. INSTALL NEW SPLIT SYSTEM HEAT PUMP ON FACTORY CURB ON ROOF. CENTER OF GRAVITY HEAT PUMP SHALL BE PLACED OVER ROOF BEAM. COORDINATE WITH DIVISION 1 CONTRACTOR.
17. INSTALL NEW AIR HANDLING UNIT WITH DX COIL. CONNECT TO SPLIT SYSTEM HEAT PUMP
18. INSTALL SHEET METAL BLANK OF UNUSED PORTIONS ON INSIDE OF EXISTING LOUVER.
19. INSTALL 24/12 MOTORIZED DAMPER ON INSIDE ON LOUVER. COORDINATE CONNECTION WITH DIVISION 16 CONTRACTOR.
20. REMOVE FLOOR SUPPLY GRILL. INSTALL 18 GAUGE SHEET METAL BLANK OVER DUCT OPENING.

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HVAC RECAPITALIZATION AT THE HIGH SCHOOL

601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
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JOB NO.	2022-017
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REVIEWED	RH

SHEET NAME
MECHANICAL BUILDING C & D REFERENCE

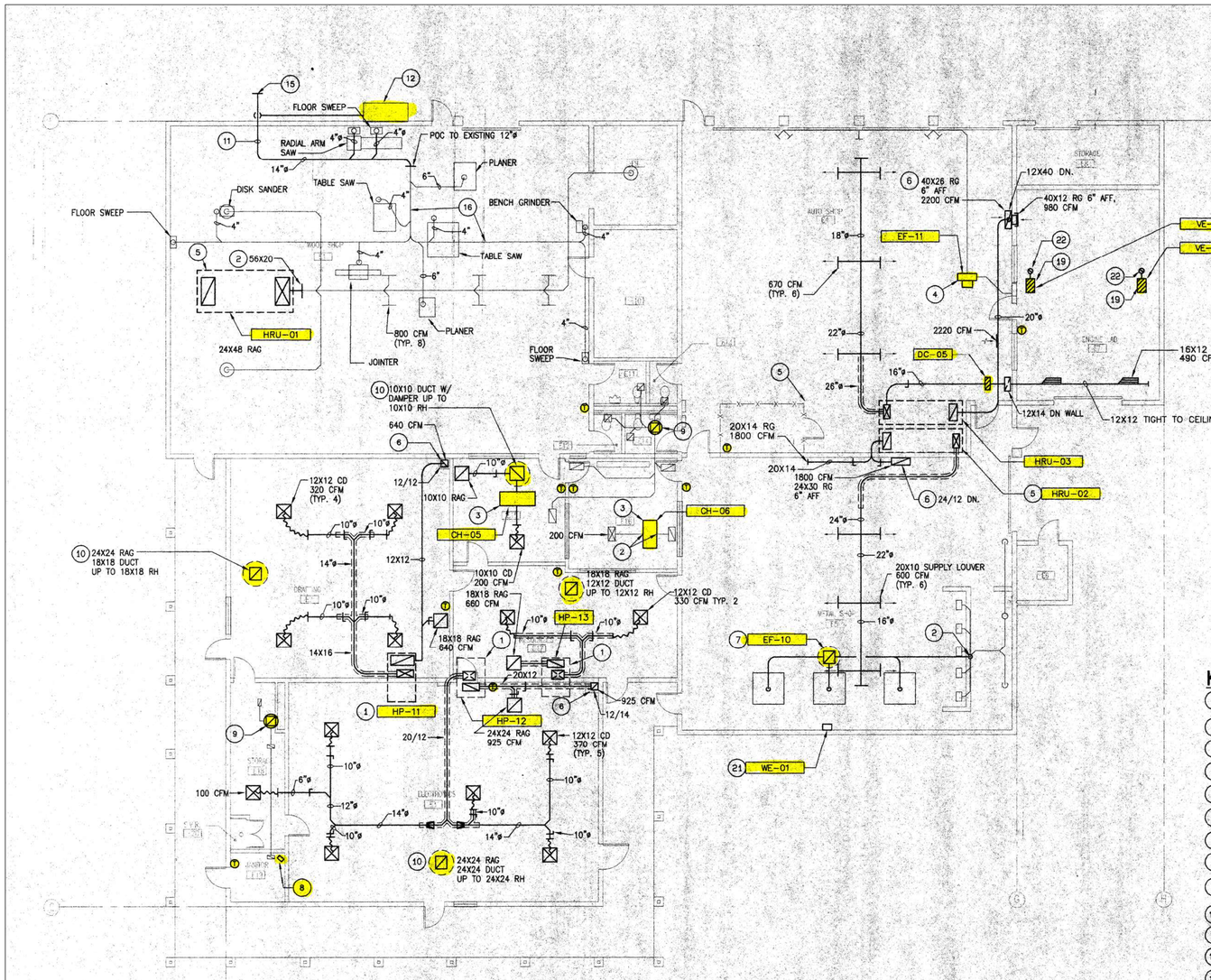
SHEET NO.
MR-4.2

22-482

BUILDING C & D REFERENCE | SCALE: SEE PLANS | 1

RESERVED FOR BUILDING DEPT STAMP

R:_PROJECTS\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 M-FLRPLNC - 2023-11-14 - COLIN GOULET



FLOOR PLAN BLDG E HVAC

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

KEYED NOTES

1. NEW HEAT PUMP UNIT ON FACTORY CURB ON ROOF. CENTER OF GRAVITY OF HEAT PUMP SHALL BE PLACED OVER BEARING WALL. COORDINATE WITH DIV. 1 CONTRACTOR.
2. CONNECT TO EXISTING DUCT WORK
3. INSTALL NEW CABINET HEATER ABOVE DROPPED CEILING (T-BAR).
4. REPLACE EXISTING EXHAUST FAN
5. NEW HEAT RECOVERY UNIT IN ROOF. COORDINATE LOCATION WITH STRUCTURAL PLANS.
6. DUCT DOWN TO LOW RETURN
7. INSTALL NEW ROOFTOP EXHAUST FAN WITH FACTORY CURB. PROVIDE WALL SWITCH FOR CONTROL OF FAN.
8. CONNECT EXISTING ELECTRIC UNIT HEATER TO NEW DDCS.
9. CONNECT EXISTING ROOFTOP EXHAUST FAN TO NEW DDCS. NEW CONTROLS TO INCLUDE CONTRACTOR AND FAN STATUS CURRENT RELAY.
10. INSTALL NEW ROOF HOOD. SEE ROOF HOOD DETAIL ON SHEET M5.01.
11. SAW CUT CMU BLOCK WALL TO INSTALL NEW DUCT.
12. CUT NEW INLET INTO EXISTING SAW DUST COLLECTOR. WELD STEEL CAP OVER EXISTING OUTLET.
13. NOT USED
14. NOT USED
15. INSTALL NEW SAW DUST COLLECTION DUCT EXPLOSION VENT.
16. INSTALL CLEAN OUTS ON EXISTING SAW DUST COLLECTION DUCT. PROVIDE CLEAN OUTS EVERY 10 FT. AND AT EVERY CHANGE OF DIRECTION.
17. NOT USED
18. NOT USED
19. INSTALL NEW WALL MOUNTED DOUBLE EXHAUST EXTRACTOR.
20. INSTALL NEW SAW DUST DUCT DROP AND HOOD FOR RADIAL ARM SAW. SEE RADIAL ARM SAW CONNECTION DETAIL SHEET M5.01.
21. INSTALL WELDING EXHAUST EXTRACTION SYSTEM.
22. INSTALL VEHICLE EXHAUST FLUE UP THRU ROOF.

BUILDING E REFERENCE | SCALE: SEE PLANS | 1

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SHEET NAME
MECHANICAL BUILDING E REFERENCE

SHEET NO.
MR-4.3

22-482

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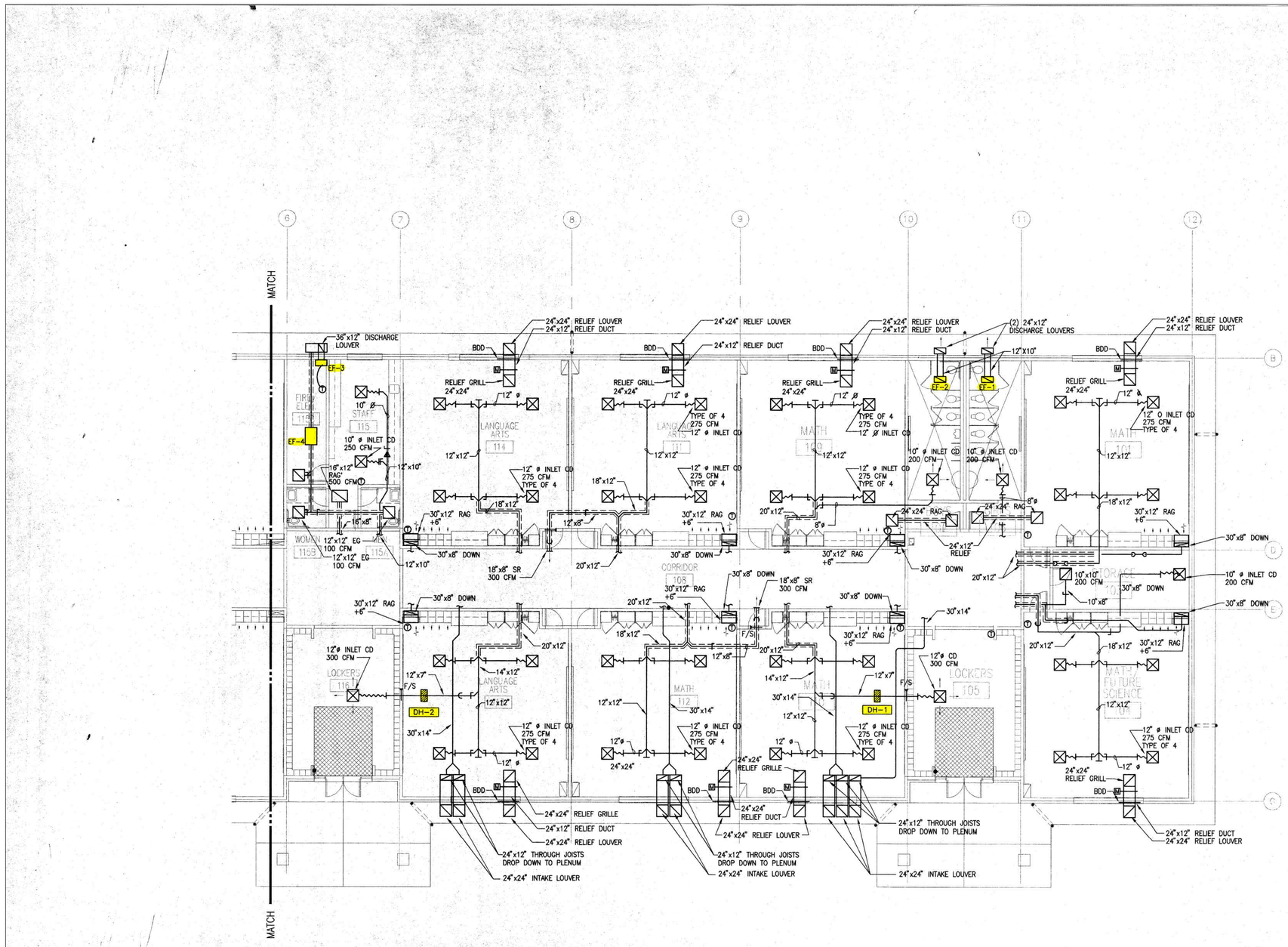

1 PARTIAL HVAC PLAN – SECTION #1 (FOR REFERENCE PURPOSES ONLY)

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

N

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SHEET NAME
MECHANICAL BUILDING H SECTION 1 REFERENCE

SHEET NO.
MR-4.4

BUILDING H SECTION 1 REFERENCE | SCALE: SEE PLANS | 1

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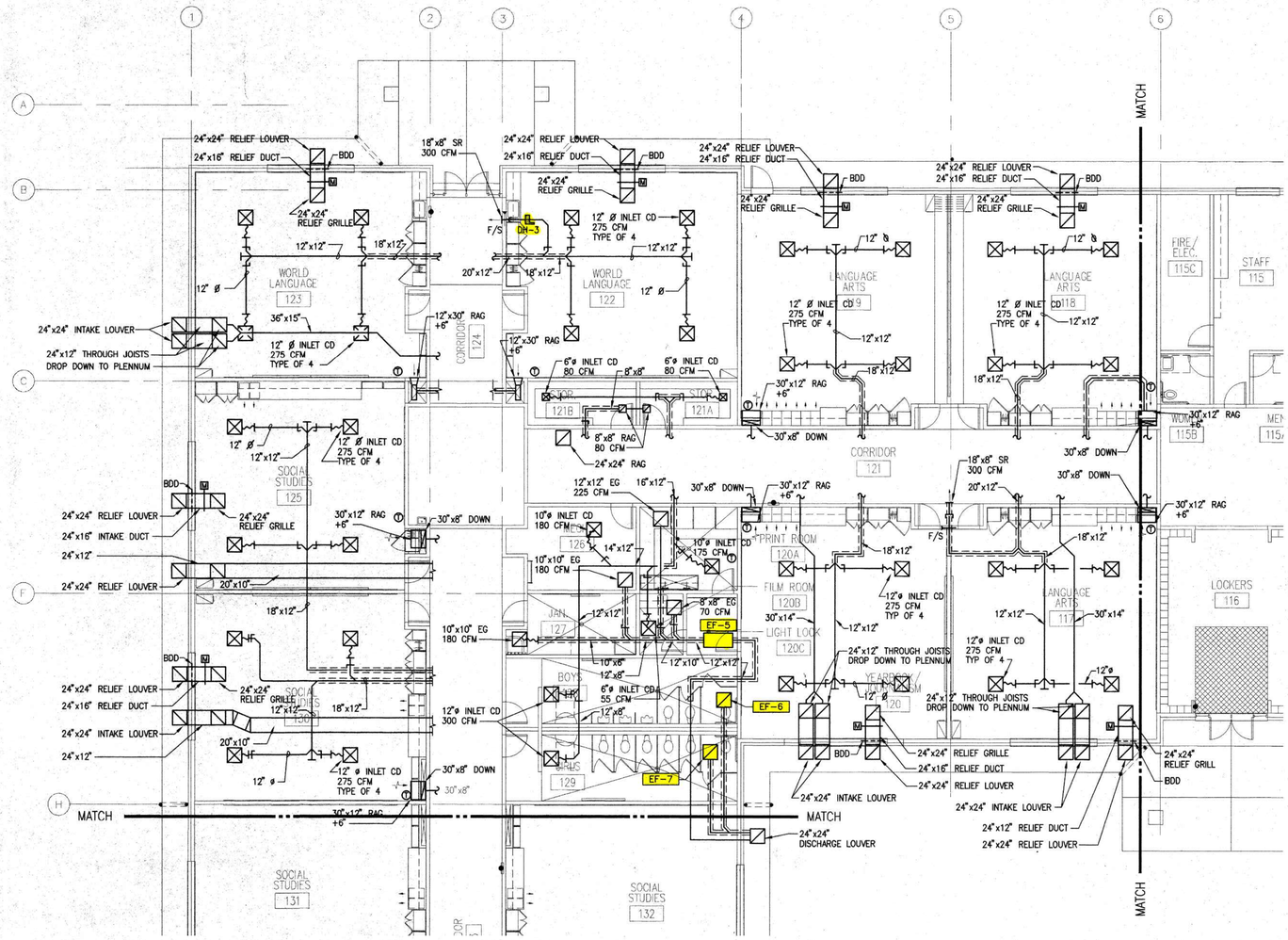

1 PARTIAL HVAC PLAN – SECTION #2 (FOR REFERENCE PURPOSES ONLY)

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

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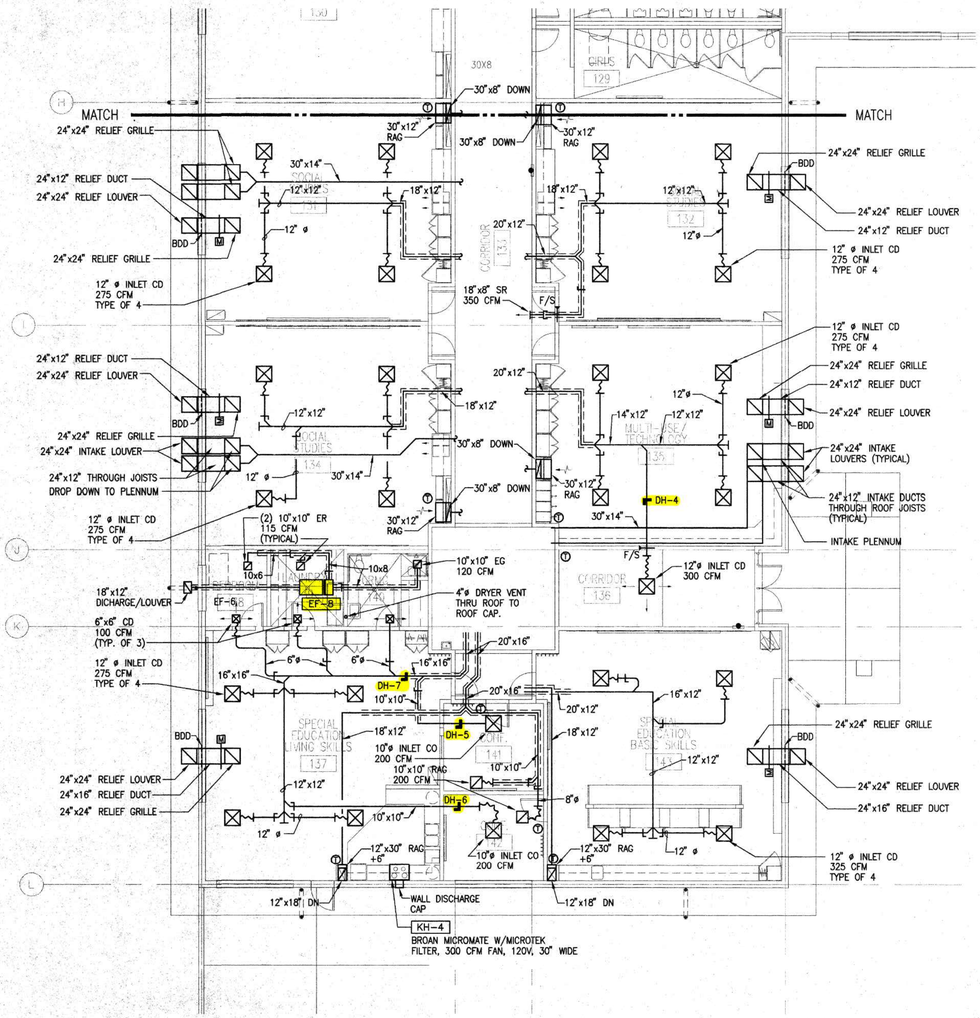
SHEET NAME
MECHANICAL BUILDING H SECTION 2 REFERENCE

SHEET NO.
MR-4.5

22-482

BUILDING H SECTION 2 REFERENCE | SCALE: SEE PLANS | 1

RESERVED FOR BUILDING DEPT STAMP



1 PARTIAL HVAC PLAN – SECTION #3 (FOR REFERENCE PURPOSES ONLY)

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

N

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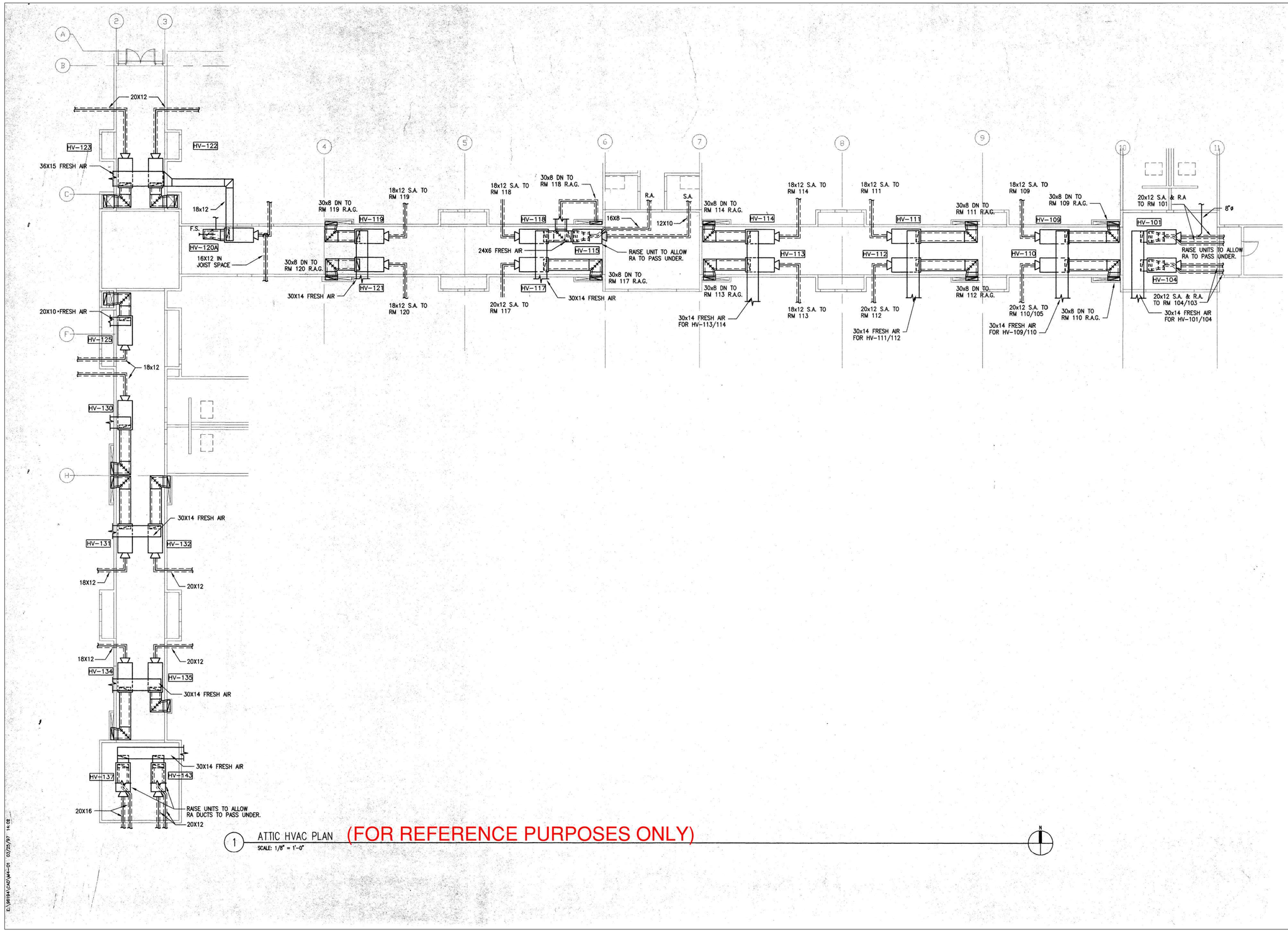
SHEET NAME
MECHANICAL BUILDING H SECTION 3 REFERENCE

SHEET NO.
MR-4.6

22-482

BUILDING H SECTION 3 REFERENCE | SCALE: SEE PLANS | 1

RESERVED FOR BUILDING DEPT STAMP



1 ATTIC HVAC PLAN
SCALE: 1/8" = 1'-0"

(FOR REFERENCE PURPOSES ONLY)

N

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SHEET NAME
MECHANICAL BUILDING H ATTIC REFERENCE

SHEET NO.
MR-4.7

BUILDING H ATTIC REFERENCE | SCALE: SEE PLANS | 1

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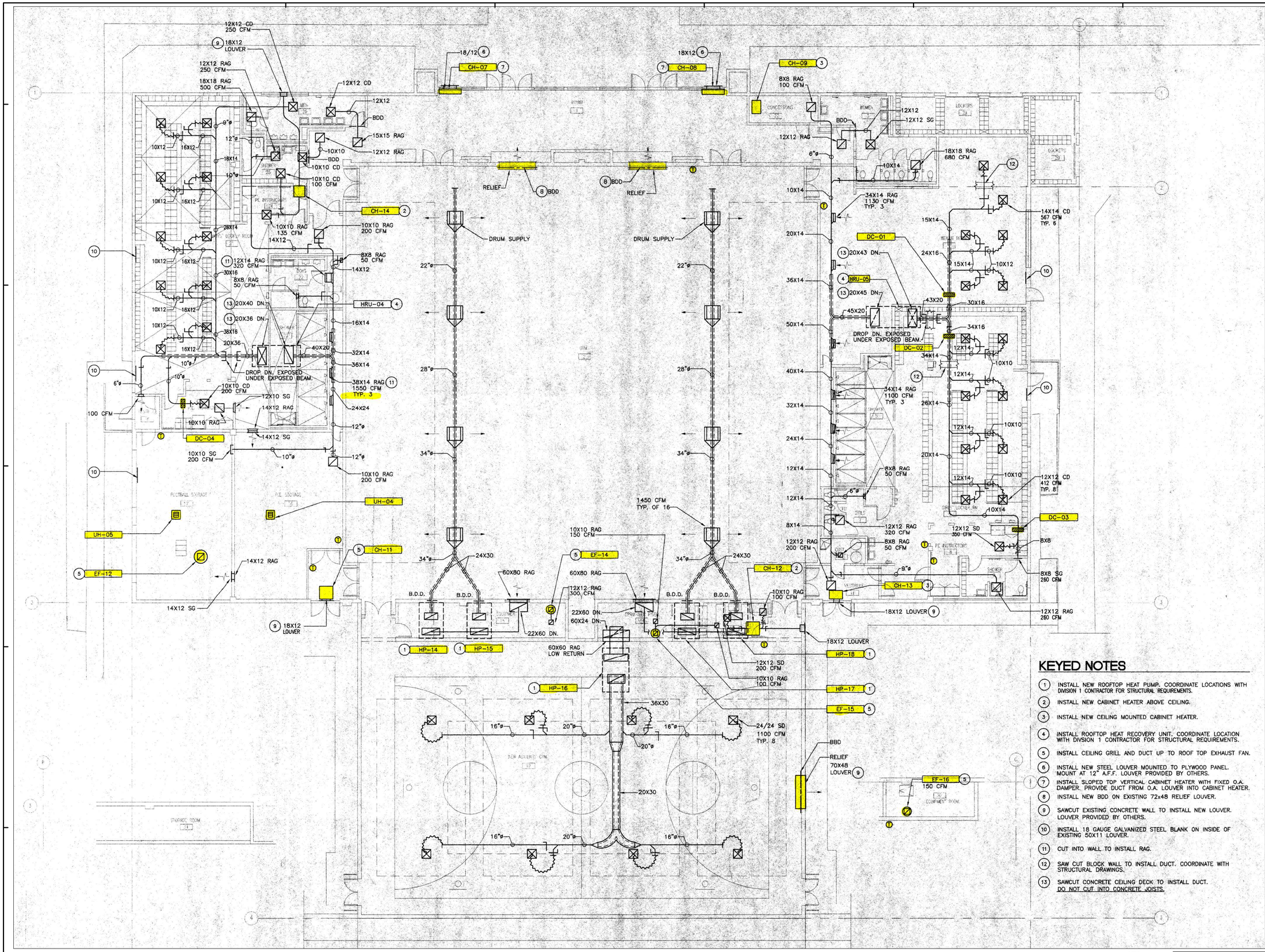
22-482



KEYED NOTES

1. INSTALL NEW ROOFTOP HEAT PUMP. COORDINATE LOCATIONS WITH DIVISION 1 CONTRACTOR FOR STRUCTURAL REQUIREMENTS.
2. INSTALL NEW CABINET HEATER ABOVE CEILING.
3. INSTALL NEW CEILING MOUNTED CABINET HEATER.
4. INSTALL ROOFTOP HEAT RECOVERY UNIT. COORDINATE LOCATION WITH DIVISION 1 CONTRACTOR FOR STRUCTURAL REQUIREMENTS.
5. INSTALL CEILING GRILL AND DUCT UP TO ROOF TOP EXHAUST FAN.
6. INSTALL NEW STEEL LOUVER MOUNTED TO PLYWOOD PANEL. MOUNT AT 12" A.F.F. LOUVER PROVIDED BY OTHERS.
7. INSTALL SLOPED TOP VERTICAL CABINET HEATER WITH FIXED O.A. DAMPER. PROVIDE DUCT FROM O.A. LOUVER INTO CABINET HEATER.
8. INSTALL NEW BDD ON EXISTING 72x48 RELIEF LOUVER.
9. SAWCUT EXISTING CONCRETE WALL TO INSTALL NEW LOUVER. LOUVER PROVIDED BY OTHERS.
10. INSTALL 18 GAUGE GALVANIZED STEEL BLANK ON INSIDE OF EXISTING 50X11 LOUVER.
11. CUT INTO WALL TO INSTALL RAG.
12. SAW CUT BLOCK WALL TO INSTALL DUCT. COORDINATE WITH STRUCTURAL DRAWINGS.
13. SAWCUT CONCRETE CEILING DECK TO INSTALL DUCT. DO NOT CUT INTO CONCRETE JOISTS.

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SHEET NAME
MECHANICAL GYMNASIUM REFERENCE

SHEET NO.
MR-4.8

MECHANICAL GYMNASIUM REFERENCE | SCALE: SEE PLANS | 1

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22-482

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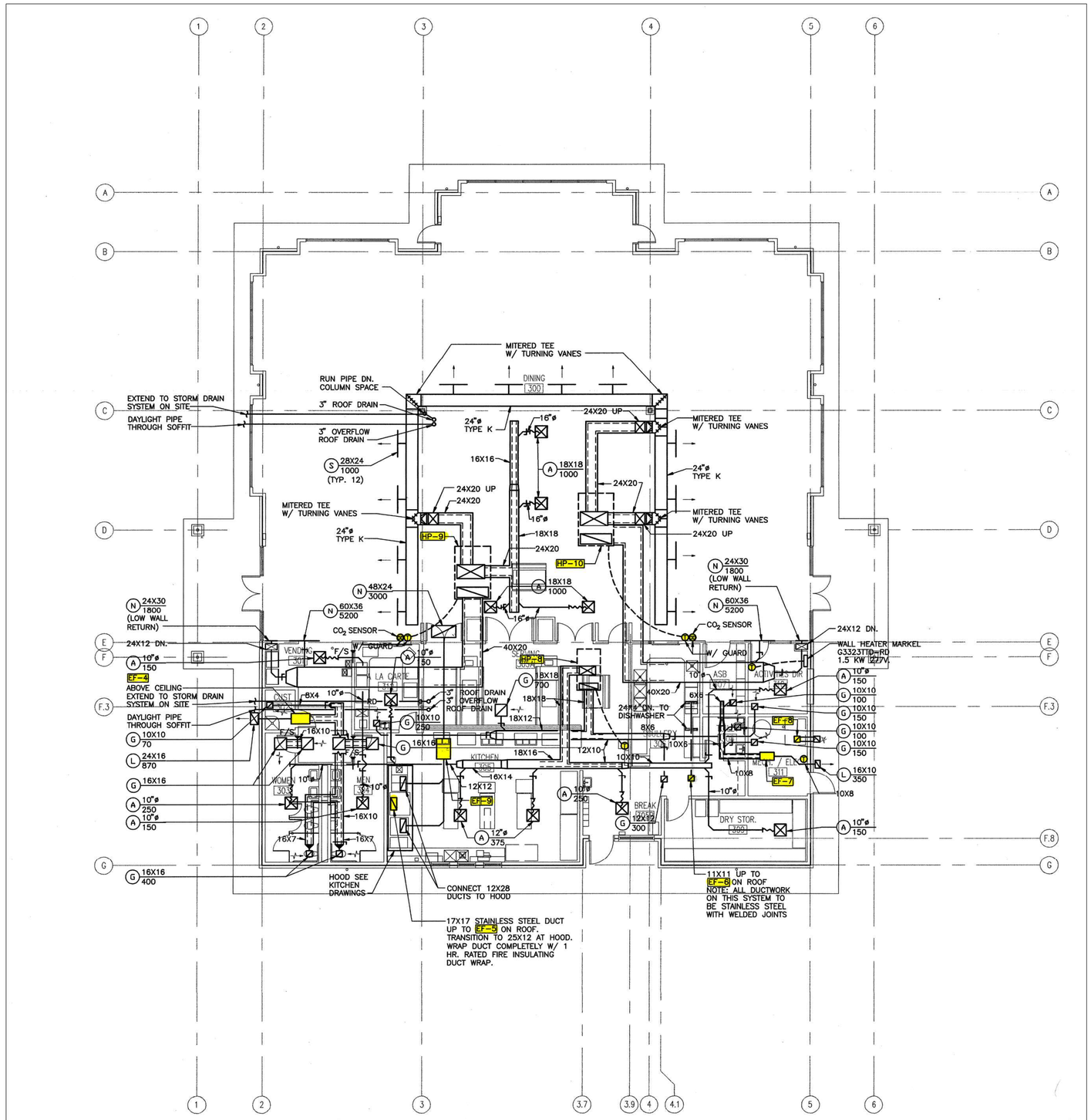

CAFE HVAC PLAN

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

M2.03

A. Discharge louver for EF-8 shall be 12" X 12", Type L

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SHEET NAME
MECHANICAL CAFETERIA REFERENCE

SHEET NO.
MR-4.9

22-482

MECHANICAL CAFETERIA REFERENCE | SCALE: SEE PLANS | 1

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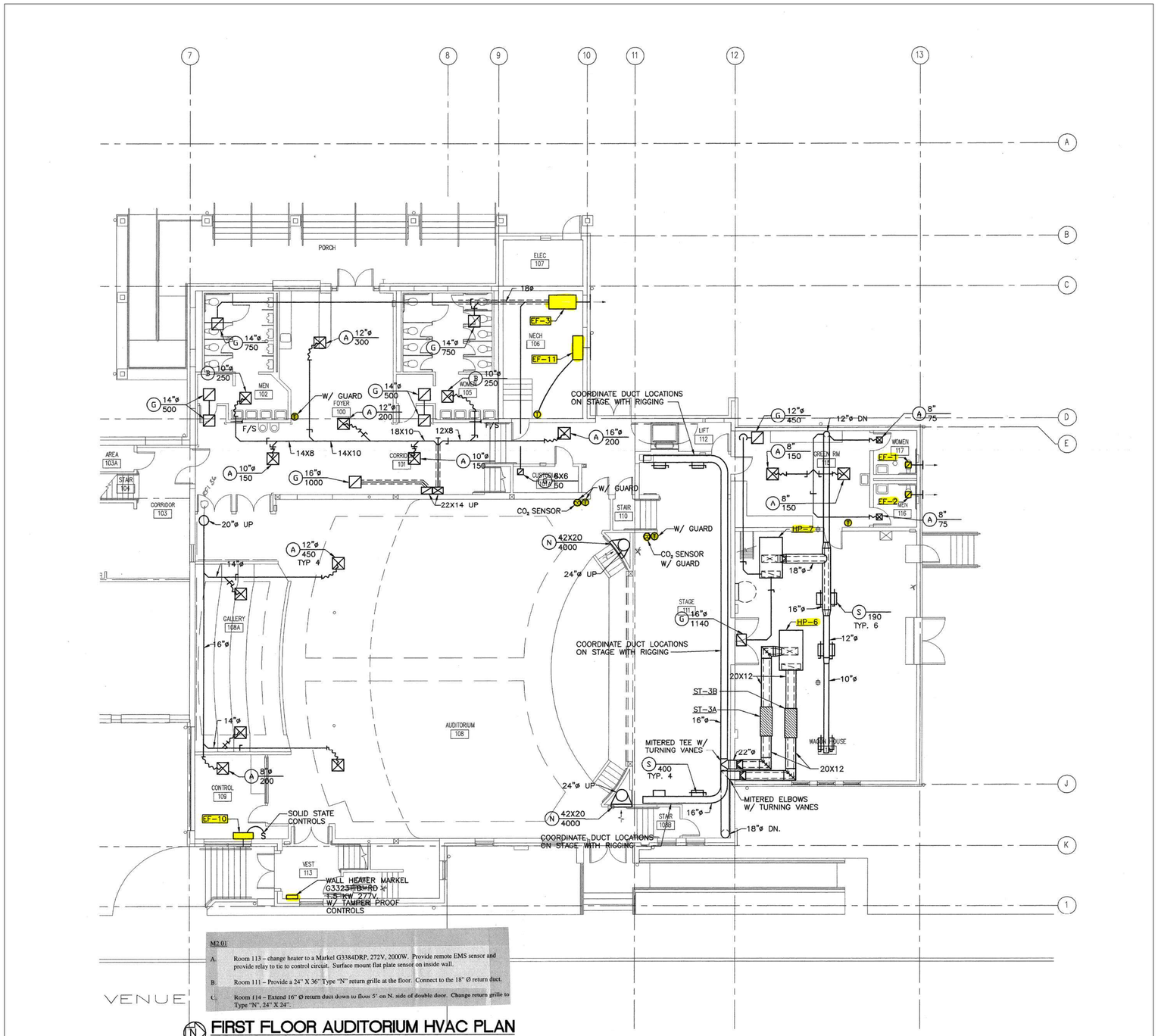

M2.01

A. Room 113 – change heater to a Markel G3384DRP, 272V, 2000W. Provide remote EMS sensor and provide relay to tie to control circuit. Surface mount flat plate sensor on inside wall.

B. Room 111 – Provide a 24" X 36" Type "N" return grille at the floor. Connect to the 18" Ø return duct.

C. Room 114 – Extend 16" Ø return duct down to floor 5' on N. side of double door. Change return grille to Type "N", 24" X 24".

FIRST FLOOR AUDITORIUM HVAC PLAN

SCALE: 1/8" = 1'–0"

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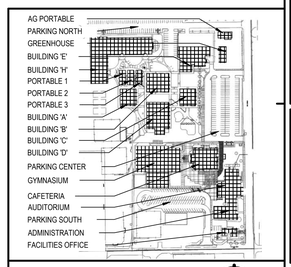

KEY PLAN

JOB NO.	2022-017
DATE	11-14-2023
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SHEET NAME
MECHANICAL BUILDING AUDITORIUM FLOOR 1 REFERENCE

SHEET NO.
MR-4.10

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MECHANICAL BUILDING AUDITORIUM FLOOR 1 REFERENCE | SCALE: PER PLANS | 1

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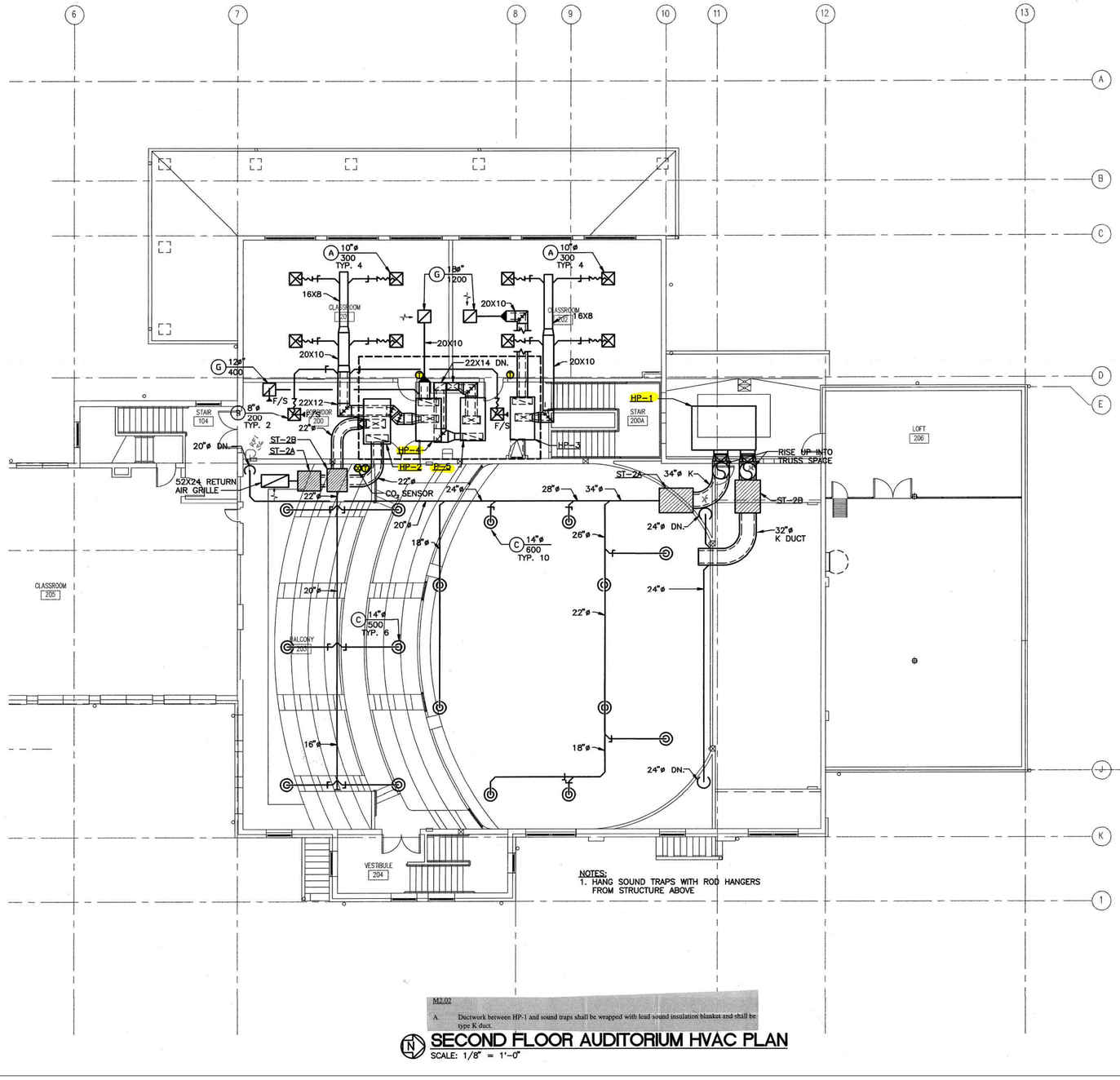


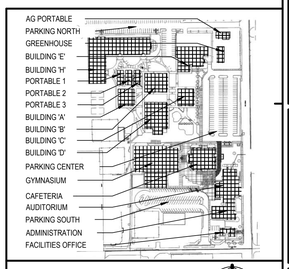
NOTES:
1. HANG SOUND TRAPS WITH ROD HANGERS FROM STRUCTURE ABOVE

M2.02

A. Ductwork between HP-1 and sound traps shall be wrapped with lead sound insulation blanket and shall be type K duct.

N SECOND FLOOR AUDITORIUM HVAC PLAN

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



KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

MECHANICAL BUILDING AUDITORIUM FLOOR 2 REFERENCE | SCALE: PER PLANS | 1

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SHEET NAME
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SHEET NO.
MR-4.11

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GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LATEST CODE OF FEDERAL REGULATIONS (CFR), NATIONAL ELECTRICAL CODE EDITION AND ALL APPLICABLE LOCAL CODES AND REGULATIONS.
2. ALL WORK IS NEW UNLESS NOTED OTHERWISE.
3. ALL PANELS, SWITCHES, ETC. SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS IN COMPLIANCE TO UL REQUIREMENTS TO ACCOMMODATE CONDUCTORS SHOWN.
4. WHERE WIRE SIZES ARE INDICATED ON PLANS, FOR INDIVIDUAL CIRCUITS, THE WIRE SIZE INDICATED SHALL APPLY TO THE COMPLETE CIRCUIT, UNLESS OTHERWISE NOTED.
5. WHERE EXISTING CIRCUITS OR DEVICES ARE DEMOLISHED, MODIFIED, OR REUSED, ENSURE ALL EXISTING ELECTRICAL UTILIZATION DEVICES TO REMAIN ARE ENERGIZED UPON COMPLETION OF WORK.
6. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF MECHANICAL, PLUMBING AND OTHER EQUIPMENT REQUIRING ELECTRICAL CONNECTION PRIOR TO ANY WORK.
7. CONTRACTOR SHALL EXTEND WIRING FROM ALL JUNCTION BOXES, SWITCHES, ETC. AND MAKE FINAL CONNECTION AS REQUIRED TO ALL BUILDING EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS.
8. LOCATION OF LOCAL WALL SWITCHES ARE SUBJECT TO MODIFICATIONS. AT OR NEAR DOORS, INSTALL SWITCHES ON SIDE OPPOSITE TO DOOR HINGE. VERIFY FINAL HINGE LOCATION IN FIELD PRIOR TO ANY WORK.
9. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OR OTHER TRADES RELATING TO WORK TO VERIFY SPACE IN WHICH WORK WILL BE INSTALLED. MAINTAIN HEADROOM AND MINIMUM CODE REQUIRED WORKING CLEARANCES AT ALL TIMES.
10. CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL WALL OUTLET BOXES FOR SWITCHES, BELL/STROBES, FIRE ALARM PULL STATIONS. RECEPTACLES ETC. WITH CABINETS, FURNITURE, EQUIPMENT ETC., TO AVOID CONFLICT.
11. WHERE ELECTRIC MOTORS OR HEATERS ARE INSTALLED IN HUNG CEILINGS, PROVIDE DISCONNECT SWITCH IN HUNG CEILING WITHIN REACH FROM ACCESS POINT.
12. FURNISH APPROVED EXPANSION FITTINGS WHERE RACEWAY CROSSES BUILDING EXPANSION JOINTS.
13. FURNISH PULL STRING IN EACH RACEWAY RUN OVER 10' IN LENGTH, IN WHICH PERMANENT WIRING IS NOT INSTALLED.
14. NOT MORE THAN THREE LIGHTING OR CONVENIENCE OUTLET CIRCUITS ARE PERMITTED IN ONE CONDUIT, PROVIDE SEPARATE CONDUIT FOR EACH HOMERUN INDICATED ON THE DRAWING, UNLESS INDICATED OTHERWISE.
15. PROVIDE PULL BOXES WHEREVER NECESSARY TO FACILITATE PULLING OF CONDUCTORS. COORDINATE LOCATIONS OF BOXES WITH OTHER TRADES TO AVOID CONFLICT. PULL BOXES SHALL BE ACCESSIBLE. THE SIZE OF PULL BOX SHALL COMPLY WITH N.E.C. REQUIREMENTS.
16. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILING SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURES.
17. SEE MECHANICAL AND PLUMBING DRAWINGS AND SPECIFICATION FOR ADDITIONAL CONNECTION REQUIREMENTS TO CONTROL PANELS, CONTROL TRANSFORMERS, POWER FOR CONTROL SYSTEM EP AND PE SWITCHES, TIME CLOCKS, VALVES, STATS, RELAYS, DUCT SMOKE DETECTOR LOCATIONS, ETC. INDICATED ON CONTROL WIRING DIAGRAMS. ELECTRICAL CONTRACTOR SHALL VERIFY FINAL CONTROL WIRING REQUIREMENTS WITH MECHANICAL AND PLUMBING CONTRACTORS PRIOR TO ANY WORK AND PROVIDE ALL NECESSARY DEVICES AND CONNECTIONS AS REQUIRED.
18. ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT INCLUDING THOSE THAT ARE EXPOSED TO OUTSIDE ENVIRONMENT SHALL BE WEATHERPROOF TYPE, NEMA 3R.
19. NO CONDUIT RUNS SHALL BE ALLOWED IN CONCRETE SLABS. ALL CONDUITS WILL BE PLACED ABOVE ACCESSIBLE CEILING SPACES UNLESS SPECIFICALLY INDICATED TO BE UNDERGROUND.
20. LIGHTING, POWER, TELEPHONE AND COMMUNICATIONS OUTLETS SHALL NOT BE PLACED BACK-TO-BACK.
21. WHERE MORE THAN ONE LIGHT SWITCH OCCURS AT SAME LOCATION, SWITCHES SHALL BE MOUNTED IN A MULTIPLE GANG BOX UNDER A SINGLE COVER PLATE. PLATES WITH MORE THAN (3) LIGHT SWITCHES SHALL BE LABELED TO INDICATE THE LIGHT FIXTURES CONTROLLED.
22. DISCONNECT SWITCHES SHALL BE MOUNTED ON INDIVIDUAL SUPPORTS, OR OTHERWISE DIRECTLY ON EQUIPMENT, PROVIDED NO MODIFICATION TO EQUIPMENT IS NECESSARY.
23. ALL ELECTRICAL POWER, LIGHTING, TELEPHONE OR SIGNAL WIRING IN FIRE RATED WALL IS TO BE INSTALLED IN A METALLIC CONDUIT SYSTEM.
24. ALL ELECTRIC MATERIAL SHALL BE LISTED BY "UL" FOR THE TYPE OF APPLICATION AND "UL" LABEL SHALL APPEAR ON ALL ELECTRICAL EQUIPMENT.
25. CONTACT UTILITY COMPANIES FOR SCOPE OF WORK PRIOR TO SUBMITTING BID; INCLUDE UTILITY CHARGES IF ANY.
26. ALL DISTRIBUTION AND CONTROL EQUIPMENT (SUCH AS CB's, SWITCHES, CONTACTORS, ETC.), TERMINATIONS SHALL BE FULLY RATED PER UL AS FOLLOWS:

    a. 100A OR LESS : 60°C OR MORE;
    b. MORE THAN 100A : 75°C OR MORE.
27. ANY ERRORS, OMISSIONS, OR DESIGN DISCREPANCIES ON PLANS OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ELECTRICAL ENGINEER FOR CLARIFICATION OR CORRECTION PRIOR TO CONSTRUCTION AND PREPARATION OF SUBMITTAL PACKAGES.
28. CONDUCTORS SHALL HAVE UNDERWRITER'S LABORATORIES, INC.(UL) LISTED, 600 VOLT INSULATION OF TYPE SPECIFIED BELOW OR ELSEWHERE IN THE SPECIFICATIONS. CONDUCTORS SHALL BE COPPER AND LISTED FOR 90 DEGREE APPLICATIONS.

    1. BRANCH CIRCUITS - LIGHTING AND POWER.

    a. #10 AWG AND SMALLER, SOLID WIRE TYPE THW OR THHN/THWN-2, THHW(THHN FOR DRY LOCATION ONLY).
    b. #8 AWG TO #2 AWG, STRANDED TYPE THW OR THHN/THHW.
    c. #1 AWG AND LARGER, STRANDED TYPE XHHW-2.

    2. FEEDERS : TYPE THW OR THHN/THWN-2, OR XHHW-2.
29. PROVIDE GREEN INSULATED GROUNDING CONDUCTOR IN EACH RACEWAY INCLUDING CONDUITS, PLUG STRIPS, WIREMOLD. SIZE OF GROUNDING SHALL BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 250.
30. WIRING METHOD SHALL BE EMT ABOVE GROUND AND MOUNTED IN CONCEALED SPACES AND SCHEDULE-40 PVC FOR UNDERGROUND INSTALLATION. USE RIGID WHEN ENCASED IN CONCRETE OR SUSCEPTIBLE TO DAMAGE.
31. PROVIDE 110V OUTLET, CFL LIGHT & SWITCH FOR LIGHT @ FAU IN ATTIC, WHERE APPLICABLE.
32. ALL SWITCH LOCATIONS ARE REQUIRED TO HAVE A NEUTRAL CONDUCTOR PROVIDED AT THE SWITCH LOCATION PER NEC 404.2(C).
33. UNLESS OTHERWISE INDICATED, SHARING OF NEUTRAL/GROUNDED CONDUCTORS AMONG SINGLE PHASE BRANCH CIRCUITS OF DIFFERENT PHASES INSTALLED IN THE SAME RACEWAY IS NOT PERMITTED. PROVIDE DEDICATED NEUTRAL/GROUNDED CONDUCTOR FOR EACH INDIVIDUAL BRANCH CIRCUIT.
34. UNLESS OTHERWISE INDICATED, PROVIDE A SEPARATE SWITCHED AND UNSWITCHED PHASE CONDUCTOR TO ALL CONTROLLED RECEPTACLES REGARDLESS OF RECEPTACLE CONFIGURATION.
35. BASIS OF ELECTRICAL DESIGN LIMITS VOLTAGE DROP TO 2% FOR FEEDERS AND 3% FOR BRANCH CIRCUITS. ANY CHANGES MADE IN THE FIELD SHALL LIMIT VOLTAGE DROP TO THESE PERCENTAGES.
36. BRANCH CIRCUIT CONDUITS SHALL BE CONCEALED IN WALL OR CEILING SPACES. EXPOSED CONDUITS ARE NOT ALLOWED WHERE CONCEALED METHODS ARE AVAILABLE.
37. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUITS REQUIRED FOR ALL BRANCH CIRCUITS AND FEEDERS. FOR CIRCUIT SIZES NOT SHOWN, REFER TO PANEL SCHEDULES FOR CONDUCTOR AND CONDUIT SIZES.
38. ALL EMERGENCY CIRCUITS SHALL BE ENTIRELY INDEPENDENT OF ALL OTHER WIRING AND EQUIPMENT AND SHALL NOT ENTER SAME RACEWAY, BOXES OR CABINETS WITH OTHER WIRING EXCEPT WHERE PROVIDED IN NEC 700.9B.
39. REFER TO LIGHTING CONTROL DETAILS FOR WIRING AND CONDUIT REQUIREMENTS. CONTRACTOR SHALL PROVIDE ALL WIRING AND CONDUITS REQUIRED BY MANUFACTURER TO FIXTURES AND CONTROLS.
40. THE CONTRACTOR SHALL COORDINATE THE WORK WITH OTHER TRADES. ANY COSTS TO INSTALL WORK TO ACCOMPLISH SAID COORDINATION, WHICH DIFFERS FROM THE WORK AS SHOWN ON THE CONTRACT DOCUMENTS, SHALL BE INCURRED BY THE CONTRACTOR. ANY DISCREPANCIES, AMBIGUITIES OR CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE DURING BID TIME FOR CLARIFICATION. ANY SUCH CONFLICTS NOT CLARIFIED PRIOR TO BID SHALL BE SUBJECT TO THE INTERRUPTION OF THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST TO THE OWNER.
41. EXACT ROUTING METHOD AND LOCATION OF CONDUIT PENETRATION AND OPENINGS IN WOOD ROOF DECKS, WALL, FLOORS OR STRUCTURAL STEEL MEMBERS SHALL BE DETERMINED BY THE CONTRACTOR IN FIELD. PERFORM CORING, SAWCUTTING, PATCHING AND REFINISHING OF EXISTING WALLS AND SURFACES WHEREVER IT IS NECESSARY TO PENETRATE. OPENINGS SHALL BE SEALED IN AN APPROVED METHOD TO MEET THE FIRE RATING AND WATER PROOFING REQUIREMENTS OF THE PARTICULAR WALL, FLOOR OR CEILING. ALL FIRE SEALS SHALL BE UL APPROVED. CONTRACTOR SHALL SCAN ALL CONCRETE WALLS AND SLABS FOR THE PRESENCE OF REBAR AND/OR UTILITIES PRIOR TO DRILLING OR CUTTING IF CONCRETE WORK IS INVOLVED. CONTRACTOR SHALL PROVIDE CERTIFICATION OF CALIBRATION OF CONCRETE SCANNING EQUIPMENT PRIOR TO PERFORMING WORK.
42. STUB OUT (2)1" CONDUITS FROM ALL FLUSHED MOUNTED PANELBOARDS INTO ACCESSIBLE CEILING SPACE AND CAP FOR FUTURE USE.
43. ALL 125 AND 250-VOLT, 15- AND 20-AMPERE NONLOCKING TYPE RECEPTACLES SHALL BE LISTED TAMPER RESISTANT RECEPTACLES IN AREAS SPECIFIED IN NEC 406.12.
44. ALL 125-VOLT THROUGH 250-VOLT RECEPTACLES SUPPLIED BY SINGLE-PHASE BRANCH CIRCUITS RATED 150 VOLTS OR LESS TO GROUND, 50 AMPERES OR LESS, AND ALL RECEPTACLES SUPPLIED BY THREE-PHASE BRANCH CIRCUITS RATED 150 VOLTS OR LESS TO GROUND, 100 AMPERES OR LESS, INSTALLED IN THE LOCATIONS SPECIFIED BELOW SHALL HAVE GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL AND ANY OTHER AREAS SPECIFIED IN NEC 210.8
    a. BATHROOMS
    b. KITCHENS OR AREAS WITH A SINK AND PERMANENT PROVISIONS FOR EITHER FOOD PREPARATION OR COOKING
    c. ROOFTOPS
    d. OUTDOORS
    e. SINKS — WHERE RECEPTACLES ARE INSTALLED WITHIN 6 FT FROM THE TOP
    f. INDOOR DAMP AND WET LOCATIONS
    g. LOCKER ROOMS WITH ASSOCIATED SHOWERING FACILITIES
    h. GARAGES, ACCESSORY BUILDINGS, SERVICE BAYS, AND SIMILAR AREAS OTHER THAN VEHICLE EXHIBITION HALLS AND SHOWROOMS
    i. CRAWL SPACES — AT OR BELOW GRADE LEVEL
    j. UNFINISHED AREAS OF BASEMENTS
    k. LAUNDRY AREAS
    l. BATHTUBS AND SHOWER STALLS — WHERE RECEPTACLES ARE INSTALLED WITHIN 6 FT OF THE OUTSIDE EDGE OF THE BATHTUB OR SHOWER STALL

ABBREVIATIONS

A	AMPERE
AF	AMPERE FRAME RATING (CIRCUIT BREAKER)
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFU	AMPERE FUSE RATING (FUSE)
AIC	AMPERE INTERRUPTING CAPACITY
AS	AMPERE SWITCH RATING (FUSE)
AT	AMPERE TRIP RATING (CIRCUIT BREAKER)
AWG	AMERICAN WIRE GAUGE
BKBD	BACKBOARD
BLDG	BUILDING
BKR	BREAKER
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CFSD	COMBINATION FIRE SMOKE DAMPER
CO	CONDUIT ONLY
CT	CURRENT TRANSFORMER
CU	COPPER
CL	CENTERLINE
DISC	DISCONNECT
DSBN	DISTRIBUTION SECTION
DN	DOWN
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EGC	EQUIPMENT GROUNDING CONDUCTOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EXIST, (E)	EXISTING
EXO	EXTERNAL OPERABLE DISCONNECT
F	FUSE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FF	FINISHED FLOOR
FG	FINISHED GRADE
FLA	FULL LOAD CURRENT
GEC	GROUNDING ELECTRODE CONDUCTOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
GRC	GALVANIZED RIGID CONDUIT
HOA	HAND-OFF-AUTOMATIC
HP	HORSE POWER
HV	HIGH VOLTAGE
IDF	INTERMEDIATE DISTRIBUTION FRAME
IG	ISOLATED/INSULATED GROUND
ISC	SHORT CIRCUIT CURRENT AVAILABLE IN RMS SYMMETRICAL AMPERES
J-BOX	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
KW	KILOWATT
KV	KILO VOLT
KVA	KILO VOLT-AMPERE
LDC	LOCAL DISTRIBUTION CABINET
LDF	LOCAL DISTRIBUTION FRAME
LCL	LONG CONTINUOUS LOAD
LSIG	LONG, SHORT, INSTANTANEOUS, GROUND
LTG	LIGHTING
LV	LOW VOLTAGE
MFR	MANUFACTURER
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MIN	MINIMUM
MH	MANHOLE / METAL HALIDE
M/M	METER AND MAIN SECTION
MV	MEDIUM VOLTAGE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NEW (N)	NEW, TO BE FURNISHED AND INSTALLED BY CONTRACTOR
NF	NON-FUSED
NIC	NOT IN CONTRACT
N/L	NIGHT LIGHT
NO	NUMBER, NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PB	PULL BOX
PF	POWER FACTOR
PNL	PANEL
POC	POINT OF CONNECTION
PP	POWER POLE
PWR	POWER
PVC	POLYVINYL CHLORIDE
QUAD	QUADRUPLEX
QTY	QUANTITY
RGS	RIGID GALVANIZED STEEL
RMC	RIGID METALLIC CONDUIT
RM	ROOM
RNC	RIGID NONMETALLIC CONDUIT
SHT	SHEET
SN	SOLID NEUTRAL
SPEC	SPECIFICATIONS
SW	SWITCH
SWBD	SWITCHBOARD
TC	TIME CLOCK
TEL	TELEPHONE
TERM	TERMINAL
TP	TEMPORARY POLE
TYP	TYPICAL
UGPS	UNDERGROUND PULL SECTION
UL	UNDERWRITERS LABORATORY
UPS	UNINTERRUPTIBLE POWER SUPPLY
UON	UNLESS OTHERWISE NOTED
V	VOLT, VOLTAGE
VA	VOLT-AMPERE
VFC	VARIABLE FREQUENCY CONTROLLER
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
WH	WATT-HOUR
WP	WEATHERPROOF
WW	WIREWAY
XP	EXPLOSION PROOF
Z	IMPEDANCE
4W	FOUR-WIRE
3W	THREE-WIRE
5S	JUNCTION BOX (4 11/16" SQUARED X2 1/8" DEEP)
Ø	DIAMETER, PHASE
#	NUMBER
°C	DEGREE CELSIUS
(E)	EXISTING DEVICE TO REMAIN
(R)	REMOVE EXISTING DEVICE AND ASSOCIATED CONDUIT AND WIRE
(RL)	REMOVE EXISTING DEVICE AND RELOCATE AS SHOWN ON PLAN
(NL)	NEW LOCATION OF RELOCATED DEVICE

SHEET INDEX

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E-1.1	BUILDING A ELECTRICAL ROOF PLAN
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E-1.7	CAFETERIA POWER & SIGNAL FLOOR PLAN
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E-1.11	AUDITORIUM POWER & SIGNAL FIRST FLOOR PLAN
E-1.12	AUDITORIUM POWER & SIGNAL SECOND FLOOR PLAN
E-1.13	BUILDING H SECTION 1 ELECTRICAL FLOOR PLAN
E-1.14	BUILDING H SECTION 2 ELECTRICAL FLOOR PLAN
E-1.15	BUILDING H SECTION 3 ELECTRICAL FLOOR PLAN
E-1.16	BUILDING H ATTIC ELECTRICAL FLOOR PLAN
E-2.1	ELECTRICAL DETAILS

POWER LEGEND AND SYMBOLS

SYMBOL	DESCRIPTION
200-Y	CONDUIT WIRING DESCRIPTION PER FEEDER SCHEDULE ON OTHER PLAN
PB	CONCRETE ELECTRICAL PULL BOX WITH LID APPROPRIATE FOR INSTALLATION LOCATION. LID SHALL BE LABELED "ELECTRICAL" OR "COMM" ACCORDING TO USE.
	SMOKE FIRE DAMPER
SD	DUCT MOUNTED SMOKE DETECTOR.
T	THERMOSTAT SUPPLIED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL STUB 3/4" C.O. 6" ABOVE CEILING SPACE. PROVIDE BUSHING AND PULL WIRE. IF INSTALLED IN AREA WITH EXPOSED STRUCTURE ABOVE OR HARDLID CEILING, PROVIDE 3/4" C.O. BACK TO ASSOCIATED HVAC UNIT. REFER TO MECHANICAL DETAILS FOR T-STAT MOUNTING HEIGHT REQUIREMENTS. VERIFY LOCATIONS WITH HVAC CONTRACTOR PRIOR TO ROUGH IN.
CO	CARBON MONOXIDE SENSOR SUPPLIED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE 3/4" GALVANIZED RIGID CONDUIT WITH PULL STRING BACK TO HEAD END CARBON MONOXIDE PANEL. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS AND WIRING DETAILS.
P	CEILING MOUNTED PLUG LOAD CONTROLLER.
OCS	CONTACT SENSOR FOR HVAC SHUTDOWN. 4S BOX, MOUNTED ABOVE DOOR OR WINDOW, U.O.N. STUB 3/4" C.O. 6" ABOVE CEILING SPACE. PROVIDE BUSHING AND PULL WIRE. IF INSTALLED IN AREA WITH EXPOSED STRUCTURE ABOVE OR HARD LID CEILING, PROVIDE 3/4" C.O. BACK TO LOCATION OF ASSOCIATED HVAC THERMOSTAT.

APPLICABLE CODES

1. BUILDING CODE: 2018 INTERNATIONAL BUILDING CODE WITH WASHINGTON STATE AMENDMENTS
2. PLUMBING CODE: 2018 UNIFORM PLUMBING CODE WITH WASHINGTON STATE AMENDMENTS
3. MECHANICAL CODE: 2018 INTERNATIONAL MECHANICAL CODE WITH WASHINGTON STATE AMENDMENTS
4. ELECTRICAL CODE: 2020 NATIONAL ELECTRICAL CODE (NFPA 70 - 2020) INC. ANNEX A, B, AND C
5. FIRE/LIFE SAFETY: 2018 INTERNATIONAL FIRE CODE WITH WASHINGTON STATE AMENDMENTS
6. ADA AND ACCESSABILITY GUIDELINES (LATEST EDITION)
7. ASME A17.1 SAFETY CODE FOR ELEVATORS AND ESCALATORS
8. ENERGY: 2018 WASHINGTON STATE ENERGY CODE

GENERAL DEMOLITION NOTES

1. THE CONTRACTOR SHALL VISIT THE PROJECT SITE AND MAKE THEMSELVES COMPLETELY FAMILIAR WITH THE EXISTING INSTALLED CONDITIONS. A FIELD SURVEY VERIFICATION IS MANDATORY IN ORDER TO SUBMIT AN ELECTRICAL BID, FAILURE TO DO SO SHALL NOT RELIEVE THIS CONTRACTOR FROM PERFORMING THE WORK OF THIS CONTRACT.
2. ALL EQUIPMENT OR WORK REQUIRED TO CARRY OUT THE DEMOLITION SCOPE OF WORK IS CONSIDERED TO BE PART OF THE CONTRACTOR SCOPE OF WORK. NO EXTRAS WILL BE CONSIDERED TO PERFORM THE REQUIRED WORK.
3. THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM THE FACILITY DIRECTOR PRIOR TO THE SCHEDULING OF ANY POWER OUTAGE. SUCH PERMISSION MUST BE OBTAINED IN WRITING AND BE GRANTED AT LEAST 7 DAYS PRIOR TO ANY SCHEDULE SHUT DOWN. THE SHUT DOWN SHALL NOT EXCEED A DURATION OF 4 HOURS.
4. THE CONTRACTOR SHALL NOT STORE ON SITE ANY ITEMS THAT WERE DEMOLISHED FOR ANY EXTENDED PERIOD OF TIME, WITHOUT THE WRITTEN PERMISSION OF THE CAMPUS FACILITY DIRECTOR.
5. ALL ELECTRICAL ITEMS DESIGNATED AS EXISTING TO REMAIN SHALL AS PART OF THIS SCOPE OF WORK BE CLEANED AND TESTED, TO INSURE PROPER OPERATION. ANY ITEMS THAT FAIL TO PASS THE TEST SHALL BE BROUGHT TO THE ATTENTION OF THE FIELD INSPECTOR AND THE ENGINEER OF RECORD FOR RESOLUTION.
6. THE CONTRACTOR SHALL REMOVE ALL EXISTING SWITCHBOARDS, DISTRIBUTION BOARDS, PANEL BOARDS, LIGHTING FIXTURES, CONDUITS, WIRES AND OTHER ELECTRICAL APPARATUS DESIGNATED AS EXISTING TO BE REMOVED. DEMOLITION ITEMS, IF NOT REQUIRED TO BE SALVAGED BY OWNER, BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF IN AN APPROPRIATE MANNER.
7. THE CONTRACTOR SHALL REMOVE ALL CONDUITS SERVING DEVICES WHICH ARE DESIGNATED AS EXISTING TO BE REMOVED, BACK TO THE SOURCE.
8. DEMOLITION AND/OR REMOVAL OF ELECTRICAL EQUIPMENT IN AREAS TO BE REMODELED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. WHERE OUTLETS ARE REMOVED IN EXISTING WALL, REMOVE DEVICES, OUTLETS AND WIRING BACK TO PANELBOARD OR BACK TO NEAREST OUTLET WITH OTHER EXISTING LOAD TO REMAIN.
10. WHERE EXISTING CONDUIT AND CONDUCTORS ARE TO BE REMOVED AND CONDUIT IS INSTALLED IN GROUND OR EMBEDDED IN CONCRETE, REMOVE WIRE AND CUT CONDUIT TO BELOW FLOOR, PLUG CONDUIT, PATCH FLOOR AND ABANDON CONDUIT.
11. WHERE ELECTRICAL DEVICES ARE TO BE REMOVED, REMOVE ALL CONDUIT AND CONDUCTORS BACK TO SOURCE, TERMINAL CABINETS AND RACKS, PROVIDE BLANK COVER PLATE FOR ABANDONED JUNCTION BOXES.
12. REMOVE ALL CONTROL PANELS, EQUIPMENT RACKS, PULL-BOXES, TERMINAL CABINETS, ETC. FOR SYSTEMS TO BE DEMOLISHED EXCEPT WHERE ANY OF THE EXISTING DEVICES, SYSTEMS, CONSOLES, ETC. ARE TO BE REUSED FOR UPGRADE.
13. PROVIDE BLANK COVER PLATE FOR ALL EMPTY OUTLET BOXES WHERE DEVICES AND/OR CONDUCTORS HAVE BEEN REMOVED AS PART OF THIS CONTRACT.
14. AFTER REMOVAL OF WIREMOLD AND ASSOCIATED FITTINGS, PATCH, REPAIR AND PAINT AFFECTED SURFACES TO MATCH EXISTING.
15. EXISTING CONDUIT CAN BE REUSED PROVIDING IT IS CODE COMPLIANT, IS CHECKED FOR CONTINUITY OF GROUND, CLEAN AND MANDREL, AND DOES NOT INTERFERE WITH NEW CONSTRUCTION.
16. REMOVALS AND REPAIRS TO EXISTING ELECTRICAL WORK REQUIRED TO AVOID CONFLICTS WITH NEW CONSTRUCTION TO MEET MINIMUM CODE REQUIREMENTS.

NOTE TO CONTRACTOR

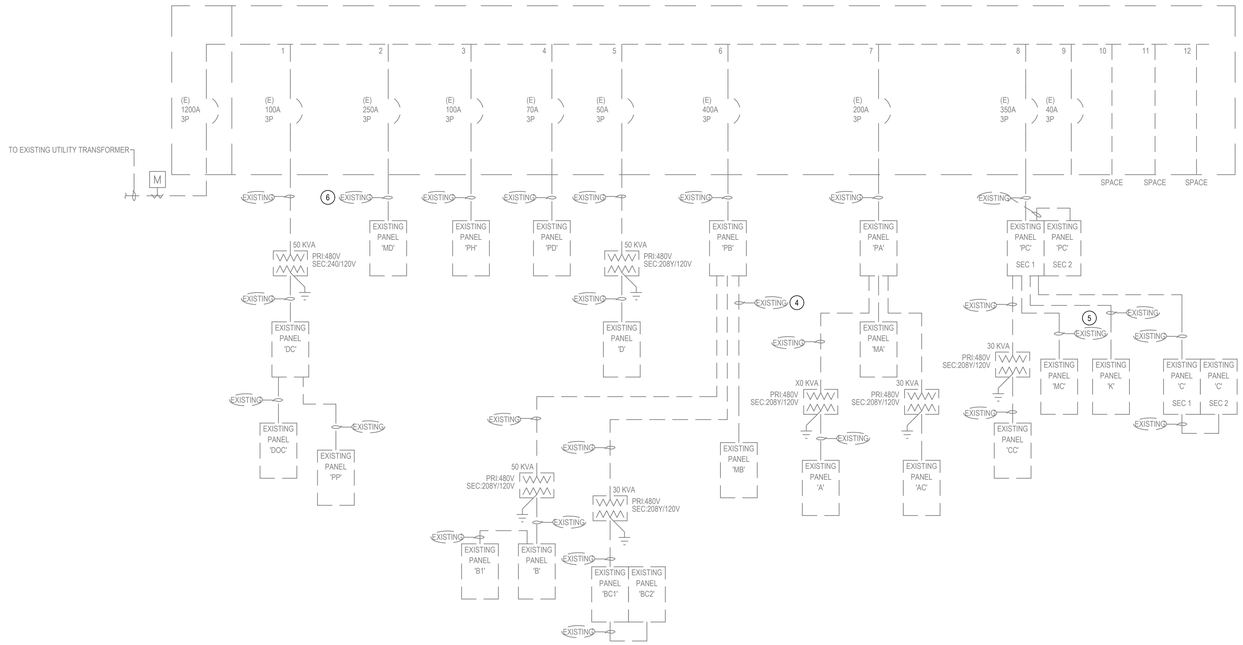
DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR THE SAME.

POWER LEGEND AND SYMBOLS

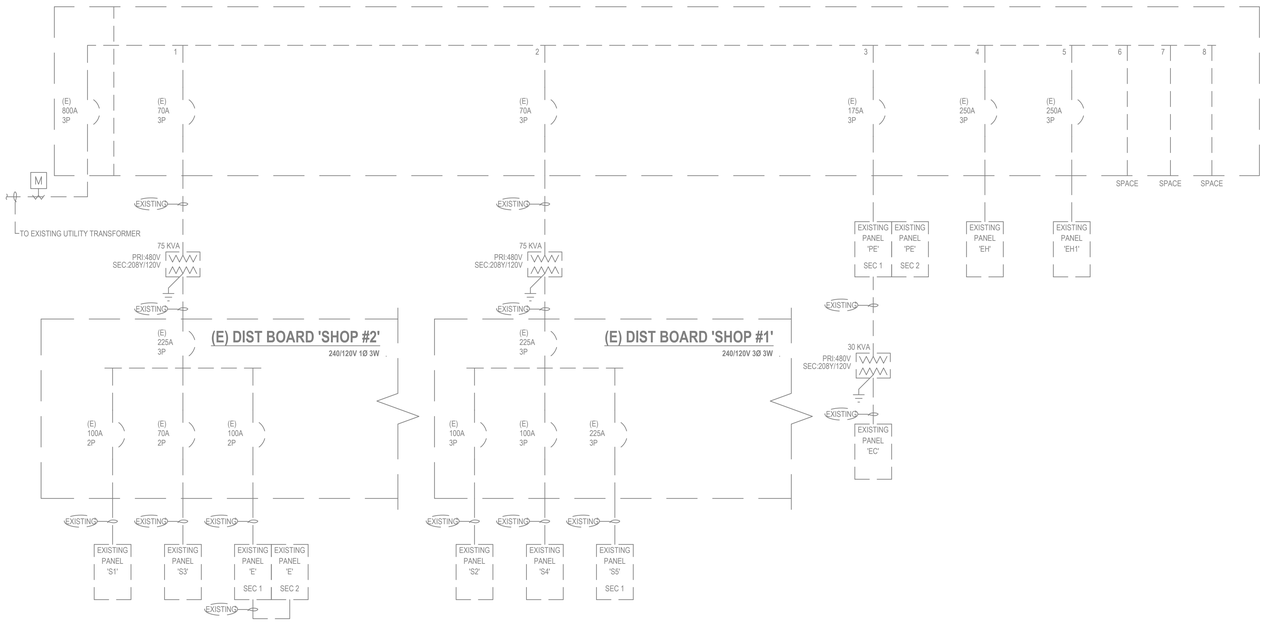
SYMBOL	DESCRIPTION
A-1	SUBSCRIPT "A-1" REFERS TO PANEL DESIGNATION WITH CIRCUIT NUMBER. TYPICAL OF ALL RECEPTACLE OUTLETS.
	DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	DOUBLE DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS, GFCI TYPE) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS) WITH MOUNTING HEIGHT HORIZONTALLY ABOVE COUNTER TOP PER ARCHITECTURAL PLANS OR APPROVAL.
	DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS, GFCI TYPE) WITH MOUNTING HEIGHT HORIZONTALLY ABOVE COUNTER TOP PER ARCHITECTURAL PLANS OR APPROVAL.
	CA TITLE 24 COMPLIANT DUPLEX RECEPTACLE OUTLET, HALF-CONTROLLED, CONVENIENCE, WITH PERMANENT MARKING. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	CA TITLE 24 COMPLIANT DOUBLE DUPLEX RECEPTACLE OUTLET, HALF-CONTROLLED, CONVENIENCE, WITH PERMANENT MARKING. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	SIMPLEX RECEPTACLE OUTLET, CONVENIENCE WITH (2)USB PORTS. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N. LEVITON MODEL #T5832.
WP	WEATHERPROOF DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	DUPLEX RECEPTACLE OUTLET, SINGLE SPLIT-CIRCUIT SWITCHED. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	SURFACE MOUNTED DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS) MOUNTED +15" A.F.F. TO BOTTOM OF DEVICE U.O.N.
	RECESSED CEILING MOUNTED DUPLEX RECEPTACLE OUTLET, CONVENIENCE. (20 AMPS, 125 VOLTS) U.O.N.
	ABOVE CEILING, CONCEALED, JUNCTION BOX, WITH COVER, PER NATIONAL ELECTRICAL CODE (NEC) TABLE 314.16(A)/(B), 4" SQUARE DEEP, WITH PLASTER RING.
	RECESSED WALL MOUNTED JUNCTION BOX, WITH COVER, PER NATIONAL ELECTRICAL CODE (NEC) TABLE 314.16(A)/(B), 4" SQUARE DEEP, WITH PLASTER RING.
SEE NOTE BELOW	DUPLEX RECEPTACLE, FLUSH IN FLOOR, WATERTIGHT JUNCTION BOX (HINGED BRASS COVER: 20 AMP, 120 VOLT, 2-POLE, 3-WIRE) U.O.N.
SEE NOTE BELOW	DOUBLE DUPLEX RECEPTACLE, FLUSH IN FLOOR, WATERTIGHT JUNCTION BOX (20 AMP, 120 VOLT, 2-POLE, 3-WIRE) U.O.N.
SEE NOTE BELOW	JUNCTION BOX, FLUSH IN FLOOR, WATERTIGHT (HINGED BRASS COVER: 20 AMP, 120 VOLT, 2-POLE, 3-WIRE) U.O.N.
	FLOOR BOX NOTE WHERE INDICATED IN AN EXISTING SLAB, PROVIDE SAWCUTTING OF SLAB AS REQUIRED AND EXTEND CONDUIT AND WIRING TO JUNCTION BOX IN NEAREST ACCESSIBLE WALL. DO NOT SAWCUT THROUGH POST TENSION SLABS.
L5-30R	SPECIALTY OUTLET. VERIFY NEMA CONFIGURATION AS NOTED ON PLANS.
OR	BRANCH PANELBOARD, WALL MOUNTED, SEE PLANS AND SCHEDULE. (SURFACE MOUNTED)
	BRANCH PANELBOARD, WALL MOUNTED, SEE PLANS AND SCHEDULE. (RECESSED MOUNTED)
	MAIN SWITCHBOARD, POWER OR LIGHT, FLOOR STANDING ENCLOSURE, (SEE SINGLE LINE DIAGRAM AND LOAD SUMMARY)
100AS	HEAVY DUTY SAFETY SWITCH H.P. AND 600 VOLTS RATED. "S" INDICATES FUSE TYPE. FUSES PER APPROVED EQUIPMENT MANUFACTURERS SHOP DRAWINGS. SUBSCRIPT INDICATES SWITCH AMPERE RATING. # OF POLES TO MATCH SUPPLY CIRCUIT.
#2	MAGNETIC MOTOR STARTER H.P. RATED (NUMBER INDICATES NEMA SIZE)
+96" OR 7'-6" AFF	MOUNTING HEIGHT FROM FINIS

(E) 1200A 480Y/277V 3Ø 4W DISTRIBUTION BOARD 'MDP'



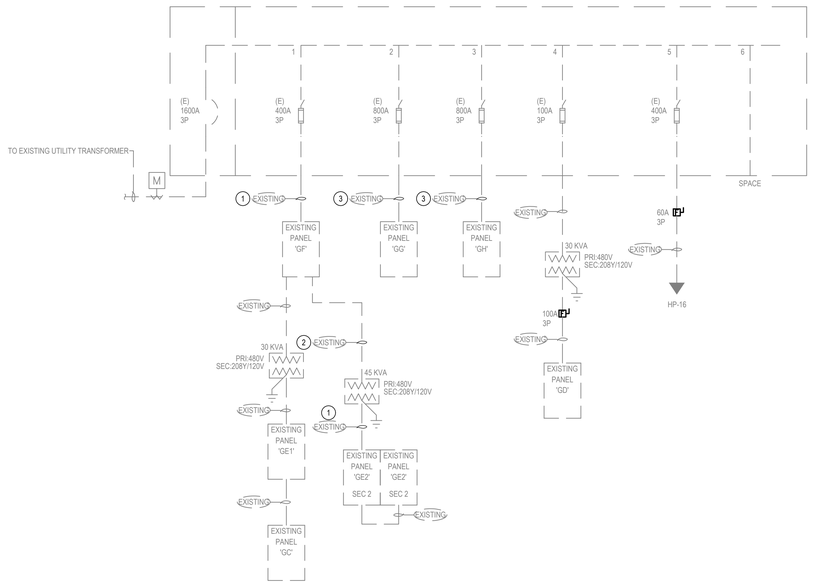
SINGLE LINE DIAGRAM (BLDG A-D) | 1

(E) 800A 480Y/277V 3Ø 4W DISTRIBUTION BOARD 'MDP'



SINGLE LINE DIAGRAM (BLDG E) | 3

(E) 1600A 480Y/277V 3Ø 4W DISTRIBUTION BOARD 'MDP'



SINGLE LINE DIAGRAM (GYM) | 2

CONSTRUCTION NOTES

1. EXISTING CONDUCTORS IS AS FOLLOWS: 2 SETS OF 4#4/0 1#1/0 GND COMBINATION E.G.C. AND SUPPLY SIDE BONDING JUMPER.
2. EXISTING CONDUCTORS IS AS FOLLOWS: 1 SET OF 3#1 1#1/0 GND COMBINATION E.G.C. AND SUPPLY SIDE BONDING JUMPER.
3. EXISTING CONDUCTORS IS AS FOLLOWS: 2 SETS OF 4#350 KCM 1#1/0 GND COMBINATION E.G.C. AND SUPPLY SIDE BONDING JUMPER.
4. EXISTING CONDUCTORS IS AS FOLLOWS: 1 SET OF 4#4/0 1#1/0 GND COMBINATION E.G.C. AND SUPPLY SIDE BONDING JUMPER.
5. EXISTING CONDUCTORS IS AS FOLLOWS: 1 SET OF 4#1 1#1/0 GND COMBINATION E.G.C. AND SUPPLY SIDE BONDING JUMPER.
6. EXISTING CONDUCTORS IS AS FOLLOWS: 1 SET OF 4#250 KCM 1#1/0 GND COMBINATION E.G.C. AND SUPPLY SIDE BONDING JUMPER.

GENERAL NOTES

1. REFER TO 'GENERAL NOTES' ON ELECTRICAL LEGENDS AND NOTES SHEET FOR WIRING METHODS, MATERIALS, AND REQUIREMENTS.
2. ALL CIRCUIT BREAKERS, PANELBOARDS AND TRANSFORMERS SHALL BE OF THE SAME MANUFACTURER.
3. ALL PANELBOARDS SHALL BE FULLY RATED FOR THE AVAILABLE FAULT UNLESS OTHERWISE NOTED.
4. THE FEEDER LENGTHS SHOWN ON THESE DRAWINGS ARE FOR CALCULATION PURPOSES ONLY AND ARE NOT VALID FOR BIDDING.
5. CONTRACTOR SHALL UPDATE ALL MODIFIED PANEL DIRECTORIES OR CREATE A NEW TYPED DIRECTORY, IF ONE DOES NOT EXIST, IDENTIFYING EACH CIRCUIT AND INSTALLED CIRCUIT LOADS, MOUNTED IN GLASS OR PLASTIC INSIDE DOOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UPDATING DIRECTORIES TO INDICATE ALL NEW CIRCUITS AND ACTUAL AREA SERVED WHICH IS NOT NECESSARILY THE DESCRIPTION INDICATED ON THE BID DOCUMENTS. USE A COMPUTER OR TYPEWRITER TO CREATE DIRECTORY; HANDWRITTEN DIRECTORIES ARE NOT ACCEPTABLE.
6. GROUND ALL ELECTRICAL EQUIPMENT, BRANCH CIRCUITS, FEEDERS, PANEL AND DISTRIBUTION BOARDS, ELECTRICAL SERVICES, ETC. PER ADOPTED NEC ARTICLES 250.
7. ALL ELECTRICAL EQUIPMENT (I.E. SWITCHGEAR, TRANSFORMERS, DISTRIBUTION BOARDS, PANELBOARDS, DISCONNECT SWITCHES, ETC.) SHALL BE PROVIDED WITH A PHENOLIC NAMEPLATE WITH ENGRAVED LETTERS PER SPECIFICATIONS. ALL NAMEPLATES SHALL BE FASTENED WITH A MINIMUM OF TWO (2) MACHINE SCREWS. NO SELF ADHESIVE NAMEPLATES ARE ALLOWED.

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE		
#	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME
SINGLE LINE DIAGRAMS

SHEET NO.
E-0.2

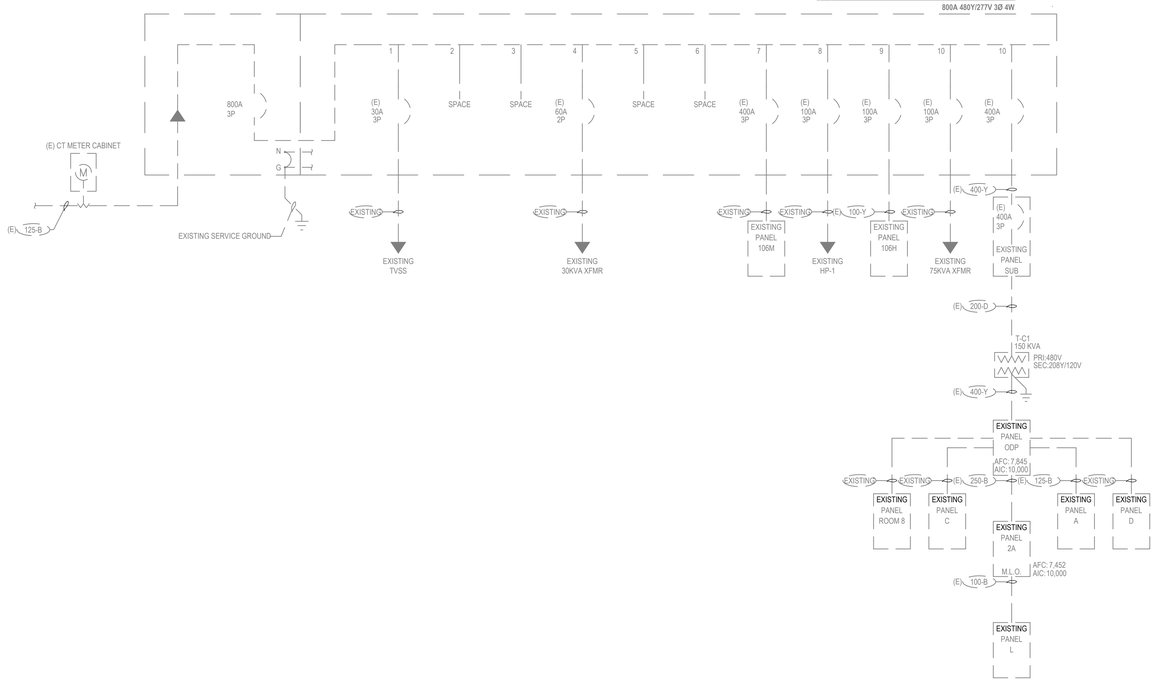
RESERVED FOR BUILDING DEPT STAMP

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E SLD - 2023-11-13 - BETHLEHEM ZEVARIAS

(E) MAIN SWITCHBOARD 'MDP'

800A 480Y/277V 3Ø 4W



CONSTRUCTION NOTES

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SINGLE LINE DIAGRAM (AUDITORIUM) | 1

LOAD SUMMARY - GYM

EXISTING MAIN SWITCHBOARD ' MDP '

		LOAD VA	LOAD AMPS
1	EXISTING LOAD* (KW)	283880	342
2	KW TO KVA (0.93PF)	21291	26
3	+25% EXIST LOAD PER NEC 220.87	76293	92
4	ADDED LOAD ON PANEL 'GH'	305916	368
5	ADDED LOAD ON PANEL 'GG'	442742	533
	TOTAL LOAD INCLUDING NEC DEMAND FACTORS: 480Y/277V 3PH 4W	1130121	1360
	NEW SWITCHBOARD RATED:		1600

*EXISTING LOAD BASED ON PEAK DEMAND FROM 1 YR. UTILITY METERING HISTORY

LOAD SUMMARY - AUDITORIUM

EXISTING MAIN SWITCHBOARD ' MDP '

		LOAD VA	LOAD AMPS
1	EXISTING LOAD*	180089	217
2	KW TO KVA (0.86PF)	28814	35
3	+25% EXIST LOAD PER NEC 220.87	52226	63
5	NEW LOAD ON PANEL '106M'	172563	208
	TOTAL LOAD INCLUDING NEC DEMAND FACTORS: 480Y/277V 3PH 4W	433692	522
	EXISTING SWITCHBOARD RATED:		800

*EXISTING LOAD BASED ON PEAK DEMAND FROM 1 YR. UTILITY METERING HISTORY

LOAD SUMMARY - BUILDING E

EXISTING MAIN SWITCHBOARD ' MDP '

		LOAD VA	LOAD AMPS
1	EXISTING LOAD* (KW)	170560	205
2	KW TO KVA (0.93PF)	12792	15
3	+25% EXIST LOAD PER NEC 220.87	45838	55
4	ADDED LOAD ON PANEL 'EH'	26458	32
5	ADDED LOAD ON PANEL 'EC'	150220	181
	TOTAL LOAD INCLUDING NEC DEMAND FACTORS: 480Y/277V 3PH 4W	405867	488
	NEW SWITCHBOARD RATED:		800

*EXISTING LOAD BASED ON PEAK DEMAND FROM 1 YR. UTILITY METERING HISTORY

LOAD SUMMARY - BUILDINGS A-D

EXISTING MAIN SWITCHBOARD ' MDP '

		LOAD VA	LOAD AMPS
1	EXISTING LOAD* (KW)	283880	342
2	KW TO KVA (0.99PF)	2839	3
3	+25% EXIST LOAD PER NEC 220.87	71680	86
4	ADDED LOAD ON PANEL 'MA'	104233	125
5	NEW PANEL 'MB'	147004	177
6	ADDED LOAD ON PANEL 'MC'	98714	119
7	ADDED LOAD ON PANEL 'MD'	158159	190
	TOTAL LOAD INCLUDING NEC DEMAND FACTORS: 480Y/277V 3PH 4W	866508	1043
	NEW SWITCHBOARD RATED:		1200

*EXISTING LOAD BASED ON PEAK DEMAND FROM 1 YR. UTILITY METERING HISTORY

LOAD SUMMARIES | 3

600V FEEDER SCHEDULE 1Ø 3W

LABEL	TYPE	SETS	PHASE	NEUTRAL	GROUND	CONDUIT
20-B	20A-3W	1	2 # 12	1 # 12	1 # 12	3/4"
30-B	30A-3W	1	2 # 10	1 # 10	1 # 10	3/4"
40-B	40A-3W	1	2 # 8	1 # 10	1 # 10	1"
50-B	50A-3W	1	2 # 6	1 # 6	1 # 10	1"
60-B	60A-3W	1	2 # 6	1 # 6	1 # 10	1"
70-B	70A-3W	1	2 # 4	1 # 4	1 # 8	1-1/4"
80-B	80A-3W	1	2 # 3	1 # 3	1 # 8	1-1/4"
90-B	90A-3W	1	2 # 2	1 # 2	1 # 8	1-1/4"
100-B	100A-3W	1	2 # 1	1 # 1	1 # 8	1-1/2"
125-B	125A-3W	1	2 # 1	1 # 1	1 # 6	1-1/2"
150-B	150A-3W	1	2 # 1/0	1 # 1/0	1 # 6	1-1/2"
175-B	175A-3W	1	2 # 2/0	1 # 2/0	1 # 6	2"
200-B	200A-3W	1	2 # 3/0	1 # 3/0	1 # 6	2"

NOTE:
ALL CONDUCTOR SIZES ARE BASED ON TYPE THHN COPPER CONDUCTOR UNLESS OTHERWISE NOTED. THE AMPACITY OF CONDUCTORS SHALL BE BASED ON THE TERMINALS NOT TO EXCEED 60°C FOR CONDUCTOR SIZE #14 THROUGH #1 AWG OR 75°C FOR CONDUCTOR SIZE OVER #1 AWG AS PER NEC 110.14(C).

600V FEEDER SCHEDULE 1Ø 2W

LABEL	TYPE	SETS	PHASE	NEUTRAL	GROUND	CONDUIT
20-S	20A-2W	1	2 # 12	N/A	1 # 12	3/4"
30-S	30A-2W	1	2 # 10	N/A	1 # 10	3/4"
40-S	40A-2W	1	2 # 8	N/A	1 # 10	1"
50-S	50A-2W	1	2 # 6	N/A	1 # 10	1"
60-S	60A-2W	1	2 # 6	N/A	1 # 10	1"
70-S	70A-2W	1	2 # 4	N/A	1 # 8	1"
80-S	80A-2W	1	2 # 3	N/A	1 # 8	1-1/4"
90-S	90A-2W	1	2 # 2	N/A	1 # 8	1-1/4"
100-S	100A-2W	1	2 # 1	N/A	1 # 8	1-1/4"
125-S	125A-2W	1	2 # 1	N/A	1 # 6	1-1/2"
150-S	150A-2W	1	2 # 1/0	N/A	1 # 6	1-1/2"
175-S	175A-2W	1	2 # 2/0	N/A	1 # 6	2"
200-S	200A-2W	1	2 # 3/0	N/A	1 # 6	2"

NOTE:
ALL CONDUCTOR SIZES ARE BASED ON TYPE THHN COPPER CONDUCTOR UNLESS OTHERWISE NOTED. THE AMPACITY OF CONDUCTORS SHALL BE BASED ON THE TERMINALS NOT TO EXCEED 60°C FOR CONDUCTOR SIZE #14 THROUGH #1 AWG OR 75°C FOR CONDUCTOR SIZE OVER #1 AWG AS PER NEC 110.14(C).

600V FEEDER SCHEDULE 3Ø 4W

LABEL	TYPE	SETS	PHASE	NEUTRAL	GROUND	CONDUIT
20-Y	20A-4W	1	3 # 12	1 # 12	1 # 12	3/4"
30-Y	30A-4W	1	3 # 10	1 # 10	1 # 10	3/4"
40-Y	40A-4W	1	3 # 8	1 # 10	1 # 10	1"
50-Y	50A-4W	1	3 # 6	1 # 6	1 # 10	1"
60-Y	60A-4W	1	3 # 6	1 # 6	1 # 10	1"
70-Y	70A-4W	1	3 # 4	1 # 4	1 # 8	1"
80-Y	80A-4W	1	3 # 3	1 # 3	1 # 8	1-1/4"
90-Y	90A-4W	1	3 # 2	1 # 2	1 # 8	1-1/4"
100-Y	100A-4W	1	3 # 1	1 # 1	1 # 8	1-1/2"
125-Y	125A-4W	1	3 # 1	1 # 1	1 # 6	1-1/2"
150-Y	150A-4W	1	3 # 1/0	1 # 1/0	1 # 6	1-1/2"
175-Y	175A-4W	1	3 # 2/0	1 # 2/0	1 # 6	2"
200-Y	200A-4W	1	3 # 3/0	1 # 3/0	1 # 6	2"
225-Y	225A-4W	1	3 # 4/0	1 # 4/0	1 # 4	2 1/2"
250-Y	250A-4W	1	3 # 250 KCM	1 # 250 KCM	1 # 4	2 1/2"
300-Y	300A-4W	1	3 # 350 KCM	1 # 350 KCM	1 # 4	3"
350-Y	350A-4W	1	3 # 500 KCM	1 # 500 KCM	1 # 2	4"
400-Y	400A-4W	2	3 # 3/0	1 # 3/0	1 # 2	3"
450-Y	450A-4W	2	3 # 4/0	1 # 4/0	1 # 2	3"
500-Y	500A-4W	2	3 # 250 KCM	1 # 250 KCM	1 # 2	3"
600-Y	600A-4W	2	3 # 350 KCM	1 # 350 KCM	1 # 1/0	4"
700-Y	700A-4W	2	3 # 500 KCM	1 # 500 KCM	1 # 1/0	4"
800-Y	800A-4W	3	3 # 300 KCM	1 # 300 KCM	1 # 1/0	3"
1000-Y	1000A-4W	3	3 # 500 KCM	1 # 500 KCM	1 # 2/0	4"
1200-Y	1200A-4W	3	3 # 600 KCM	1 # 600 KCM	1 # 3/0	4"
1600-Y	1600A-4W	4	3 # 600 KCM	1 # 600 KCM	1 # 4/0	4"
2000-Y	2000A-4W	5	3 # 600 KCM	1 # 600 KCM	1#250KCM	4"
2500-Y	2500A-4W	6	3 # 600 KCM	1 # 600 KCM	1#350KCM	4"
3000-Y	3000A-4W	8	3 # 600 KCM	1 # 600 KCM	1#500KCM	4"
4000-Y	4000A-4W	10	3 # 600 KCM	1 # 600 KCM	1#500KCM	4"

NOTE:
ALL CONDUCTOR SIZES ARE BASED ON TYPE THHN COPPER CONDUCTOR UNLESS OTHERWISE NOTED. THE AMPACITY OF CONDUCTORS SHALL BE BASED ON THE TERMINALS NOT TO EXCEED 60°C FOR CONDUCTOR SIZE #14 THROUGH #1 AWG OR 75°C FOR CONDUCTOR SIZE OVER #1 AWG AS PER NEC 110.14(C).

600V FEEDER SCHEDULE 3Ø 3W

LABEL	TYPE	SETS	PHASE	NEUTRAL	GROUND	CONDUIT
20-D	20A-3W	1	3 # 12	NA	1 # 12	3/4"
30-D	30A-3W	1	3 # 10	NA	1 # 10	3/4"
40-D	40A-3W	1	3 # 8	NA	1 # 10	1"
50-D	50A-3W	1	3 # 6	NA	1 # 10	1"
60-D	60A-3W	1	3 # 6	NA	1 # 10	1"
70-D	70A-3W	1	3 # 4	NA	1 # 8	1"
80-D	80A-3W	1	3 # 3	NA	1 # 8	1-1/4"
90-D	90A-3W	1	3 # 2	NA	1 # 8	1-1/4"
100-D	100A-3W	1	3 # 1	NA	1 # 8	1-1/4"
125-D	125A-3W	1	3 # 1	NA	1 # 6	1-1/2"
150-D	150A-3W	1	3 # 1/0	NA	1 # 6	1-1/2"
175-D	175A-3W	1	3 # 2/0	NA	1 # 6	2"
200-D	200A-3W	1	3 # 3/0	NA	1 # 6	2"
225-D	225A-3W	1	3 # 4/0	NA	1 # 4	2 1/2"
250-D	250A-3W	1	3 # 250 KCM	NA	1 # 4	2 1/2"
300-D	300A-3W	1	3 # 350 KCM	NA	1 # 4	3"
350-D	350A-3W	1	3 # 500 KCM	NA	1 # 2	4"
400-D	400A-3W	2	3 # 3/0	NA	1 # 2	3"
450-D	450A-3W	2	3 # 4/0	NA	1 # 2	3"
500-D	500A-3W	2	3 # 250 KCM	NA	1 # 2	3"
600-D	600A-3W	2	3 # 350 KCM	NA	1 # 1/0	4"
700-D	700A-3W	2	3 # 500 KCM	NA	1 # 1/0	4"
800-D	800A-3W	3	3 # 300 KCM	NA	1 # 1/0	3"
1000-D	1000A-3W	3	3 # 500 KCM	NA	1 # 2/0	4"
1200-D	1200A-3W	3	3 # 600 KCM	NA	1 # 3/0	4"
1600-D	1600A-3W	4	3 # 600 KCM	NA	1 # 4/0	4"
2000-D	2000A-3W	5	3 # 600 KCM	NA	1#250KCM	4"
2500-D	2500A-3W	6	3 # 600 KCM	NA	1#350KCM	4"
3000-D	3000A-3W	8	3 # 600 KCM	NA	1#500KCM	4"
4000-D	4000A-3W	10	3 # 600 KCM	NA	1#500KCM	4"

NOTE:
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FEEDER SCHEDULES | 2

RESERVED FOR BUILDING DEPT. STAMP

LEONARD P. MAY — STATE OF WASHINGTON — 54830 — REGISTERED PROFESSIONAL ENGINEER

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REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME
SINGLE LINE DIAGRAM & LOAD SUMMARIES

SHEET NO.
E-0.3

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E SLD - 2023-11-13 - BETHLEHEM ZEVARIAS

PANEL MC (EXISTING)

MOUNTING: SURFACE
FED FROM: PANEL 'PC'
NEMA: 1
A/C RATING:
LOCATION:

VOLTAGE: 480Y/277V 3PH 4W
BUS: 225 A
MAIN: M.L.O.
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
3	UH-03	997			N	3	20	#12	15	0.64	3/4"	1	A - -	2	3/4"	0.69	15	#12	20	3	N	2382			CH-C01	3
	- - - - - -		997		N	-	-	- -				3	- B -	4					- -	-	N		2382		- - - - - -	
	- - - - - -			997	N	-	-	- -				5	- - C	6					- -	-	N			2382	- - - - - -	
1	HP-C01	12327			N	3	45	#6	40	0.31	1"	7	A - -	8	3/4"	0.09	15	#12	20	3	N	2382			CH-C02	3
	- - - - - -		12327		N	-	-	- -				9	- B -	10					- -	-	N		2382		- - - - - -	
	- - - - - -			12327	N	-	-	- -				11	- - C	12					- -	-	N			2382	- - - - - -	
1	HP-C02	12327			N	3	45	#6	30	0.24	1"	13	A - -	14					80	3	N	1240			PNL CC	2
	- - - - - -		12327		N	-	-	- -				15	- B -	16					- -	-	N		1240		- - - - - -	
	- - - - - -			12327	N	-	-	- -				17	- - C	18					- -	-	N			1240	- - - - - -	
	SPARE					1	20					19	A - -	20					20	3	N	500			EXISTING LOAD	2
	SPARE					1	20					21	- B -	22					- -	-	N		500		- - - - - -	
	HE LITES			300	L	1	20					23	- - C	24					- -	-	N			500	- - - - - -	
	ART LITES	300			L	1	20					25	A - -	26					20	1	L	300			YD LITES	
	ART LITES		300		L	1	20					27	- B -	28					20	1	L		300		HE LITES	
	LITES			300	L	1	20					29	- - C	30											SPACE	
	SPACE											31	A - -	32											SPACE	
	SPACE											33	- B -	34											SPACE	
	SPACE											35	- - C	36											SPACE	
	SPACE											37	A - -	38											SPACE	
	SPACE											39	- B -	40											SPACE	
	SPACE											41	- - C	42											SPACE	
	SUBTOTALS	25950	25950	26250																		6804	6804	6504		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	1800	1.25	2250	3
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	96464	1.00	96464	116
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	98264		98714	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 119 A

SUBTOTALS:	PHASE
32755 VA	A
32755 VA	B
32755 VA	C
98264 VA	TOTAL
118	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

PANEL MA (EXISTING)

MOUNTING: SURFACE
FED FROM: PANEL 'PA'
NEMA: 1
A/C RATING:
LOCATION:

VOLTAGE: 480Y/277V 3PH 4W
BUS: 225 A
MAIN: 225 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	WH-01	3000			N	3	20					1	A - -	2					20	3	N	2382			CH-01	3
	- - - - - -		3000		N	-	-	- -				3	- B -	4					- -	-	N		2382		- - - - - -	
	- - - - - -			3000	N	-	-	- -				5	- - C	6					- -	-	N			2382	- - - - - -	
3	UH-01	997			N	3	20					7	A - -	8					20	3	N	2382			CH-02	3
	- - - - - -		997		N	-	-	- -				9	- B -	10					- -	-	N		2382		- - - - - -	
	- - - - - -			997	N	-	-	- -				11	- - C	12					- -	-	N			2382	- - - - - -	
1	HP-A01	5595			N	3	25					13	A - -	14					25	3	N	5734			HP-A02	1
	- - - - - -		5595		N	-	-	- -				15	- B -	16					- -	-	N		5734		- - - - - -	
	- - - - - -			5595	N	-	-	- -				17	- - C	18					- -	-	N			5734	- - - - - -	
1	HP-A03	8919			N	3	40					19	A - -	20					25	3	N	5734			HP-A04	1
	- - - - - -		8919		N	-	-	- -				21	- B -	22					- -	-	N		5734		- - - - - -	
	- - - - - -			8919	N	-	-	- -				23	- - C	24					- -	-	N			5734	- - - - - -	
	SPACE											25	A - -	26					20	1					SPACE	
	SPACE											27	- B -	28					20	1					SPACE	
	SPACE											29	- - C	30					20	1					SPACE	
	SPACE											31	A - -	32					20	1					SPACE	
	SPACE											33	- B -	34					20	1					SPACE	
	SPACE											35	- - C	36					20	1					SPACE	
	SPACE											37	A - -	38					20	1					SPACE	
	SPACE											39	- B -	40					20	1					SPACE	
	SPACE											41	- - C	42					20	1					SPACE	
	SUBTOTALS	18512	18512	18512																		18232	18232	18232		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	104233	1.00	104233	125
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	104233		104233	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 125 A

SUBTOTALS:	PHASE
34744 VA	A
34744 VA	B
34744 VA	C
104233 VA	TOTAL
125	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, NEW LOAD
3. EXISTING BREAKER,NEW LOAD

PANEL MD (EXISTING)

MOUNTING: SURFACE
FED FROM: BLDGS A-D DIST. PANEL
NEMA: 1
A/C RATING:
LOCATION:

VOLTAGE: 480Y/277V 3PH 4W
BUS: 225 A
MAIN: 225 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	UH-04	1100			N	3	20					1	A - -	2					20	3	N	3047			AHU-01 (FAN)	2
	- - - - - -		1100		N	-	-	- -				3	- B -	4					- -	-	N		3047		- - - - - -	
	- - - - - -			1100	N	-	-	- -				5	- - C	6					- -	-	N			3047	- - - - - -	
2	AHU-02 (FAN)	942			N	3	20					7	A - -	8					80	3	N	16667			AHU-01 (DUCT COIL)	2
	- - - - - -		942		N	-	-	- -				9	- B -	10					- -	-	N		16667		- - - - - -	
	- - - - - -			942	N	-	-	- -				11	- - C	12					- -	-	N			16667	- - - - - -	
2	AHU-02 (DUCT COIL)	8333			N	3	40					13	A - -	14	3/4"	0.02	15	#12	20	3	N	526			AHU-03	1
	- - - - - -		8333		N	-	-	- -				15	- B -	16					- -	-	N		526		- - - - - -	
	- - - - - -			8333	N	-	-	- -				17	- - C	18					- -	-	N			526	- - - - - -	
2	HP-19	7091			N	3	40					19	A - -	20					20	1					SPARE	3
	- - - - - -		7091		N	-	-	- -				21	- B -	22					20	1					SPARE	3
	- - - - - -			7091	N	-	-	- -				23	- - C	24					20	1					SPARE	3
1	CU-D02	4986			N	3	20	#12	70	0.91	3/4"	25	A - -	26	3/4"	0.81	70	#12	20	3	N	4432			HP-21	1
	- - - - - -		4986		N	-	-	- -				27	- B -	28					- -	-	N		4432		- - - - - -	
	- - - - - -			4986	N	-	-	- -				29	- - C	30					- -	-	N			4432	- - - - - -	
1	HP-D01	5595			N	3	25	#10	70	0.61	3/4"	31	A - -	32					20	1					SPACE	
	- - - - - -		5595		N	-	-	- -				33	- B -	34					20	1					SPACE	
	- - - - - -			5595	N	-	-	- -				35	- - C	36					20	1					SPACE	
	SPACE					1	20					37	A - -	38					20	1					SPACE	
	SPACE					1	20					39	- B -	40					20	1					SPACE	
	SPACE					1	20					41	- - C	42					20	1					SPACE	
	SUBTOTALS	28047	28047	28047																		24672	24672	24672		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	158159	1.00	158159	190
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	158159		158159	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 190 A

SUBTOTALS:	PHASE
52720 VA	A
52720 VA	B
52720 VA	C
158159 VA	TOTAL
190	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. NEW SPARE

PANEL MB (NEW)

MOUNTING: SURFACE
FED FROM: PANEL 'PB'
NEMA: 1
A/C RATING:
LOCATION:

VOLTAGE: 480Y/277V 3PH 4W
BUS: 225 A
MAIN: M.L.O.
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
3	UH-02	997			N	3	20					1	A - -	2	1"	0.61	60	#8	40	3	N	10027			HP-B01	1
	- - - - - -		997		N	-	-	- -				3	- B -	4					- -	-	N		10027		- - - - - -	
	- - - - - -			997	N	-	-	- -				5	- - C	6					- -	-	N			10027	- - - - - -	
1	HP-B02	10027			N	3	40	#8	40	0.41	1"	7	A - -	8	1"	0.55	54	#8	40	3	N	10027			HP-B03	1
	- - - - - -		10027		N	-	-	- -				9	- B -	10					- -	-	N		10027		- - - - - -	
	- - - - - -			10027	N	-	-	- -				11	- - C	12					- -	-	N			10027	- - - - - -	
1	HP-B04	9003			N	3	35	#8	75	0.69	1"	13	A - -	14	1"	0.28	31	#8	40	3	N	8919			HP-B05	3
	- - - - - -		9003		N	-	-	- -				15	- B -	16					- -	-	N		8919		- - - - - -	
	- - - - - -			9003	N	-	-	- -				17	- - C	18					- -	-	N			8919	- - - - - -	
	SPACE											19	A - -	20											SPACE	
	SPACE											21	- B -	22											SPACE	
	SPACE											23	- - C	24											SPACE	
	SPACE											25	A - -	26											SPACE	
	SPACE											27	- B -	28											SPACE	
	SPACE											29	- - C	30											SPACE	
	SPACE											31	A - -	32											SPACE	
	SPACE											33	- B -	34											SPACE	
	SPACE											35	- - C	36											SPACE	
	SPACE											37	A - -	38											SPACE	
	SPACE											39	- B -	40											SPACE	
	SPACE											41	- - C	42											SPACE	
	SUBTOTALS	20027	20027	20027																		28974	28974	28974		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	147004	1.00	147004	177
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	147004		147004	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 177 A

SUBTOTALS:	PHASE
49001 VA	A
49001 VA	B
49001 VA	C
147004 VA	TOTAL
177	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER AND LOAD, NEW LOAD NAME

PANEL EH (EXISTING)

MOUNTING: SURFACE
FED FROM: BLDG E MAIN DIST. PANEL
NEMA: 1
A/C RATING:
LOCATION: BLDG E

VOLTAGE: 480Y/277V 3PH 4W
BUS: 250 A
MAIN: 250 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
1	HP-E01	8919			N	3	35	#6	54	0.49	1"	1	A - -	2	3/4"	0.06	10	#12	20	3	N	2382			CH-E01	1
	- - - - - -		8919		N	-	-	- -				3	- B -	4					- -	-	N		2382		- - - - - -	
	- - - - - -			8919	N	-	-	- -				5	- - C	6					- -	-	N			2382	- - - - - -	
1	HP-E02	10027			N	3	40	#8	74	0.75	1"	7	A - -	8	3/4"	0.06	10	#12	20	3	N	2382			CH-E02	1
	- - - - - -		10027		N	-	-	- -				9	- B -	10					- -	-	N		2382		- - - - - -	
	- - - - - -			10027	N	-	-	- -				11	- - C	12					- -	-	N			2382	- - - - - -	
2	EF-10	942			N	3	20					13	A - -	14											SPACE	
	- - - - - -		942		N	-	-	- -				15	- B -	16											SPACE	
	- - - - - -			942	N	-	-	- -				17	- - C	18											SPACE	
2	HRU-02 (FAN)	4210			N	3	20					19	A - -	20											SPACE	
	- - - - - -		4210		N	-	-	- -				21	- B -	22											SPACE	
	- - - - - -			4210	N	-	-	- -				23	- - C	24											SPACE	
2	HRU-02 (DUCT COIL)	7667			N	3	40					25	A - -	26											SPACE	
	- - - - - -		7667		N	-	-	- -				27	- B -	28											SPACE	
	- - - - - -			7667	N	-	-	- -				29	- - C	30											SPACE	
2	HRU-03 (FAN)	4210			N	3	20					31	A - -	32											SPACE	
	- - - - - -		4210		N	-	-	- -				33	- B -	34											SPACE	
	- - - - - -			4210	N	-	-	- -				35	- - C	36											SPACE	
2	HRU-02 (DUCT COIL)	9333			N	3	50					37	A - -	38											SPACE	
	- - - - - -		9333		N	-	-	- -				39	- B -	40											SPACE	
	- - - - - -			9333	N	-	-	- -				41	- - C	42											SPACE	
	SUBTOTALS	45309	45309	45309																		4764	4764	4764		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	150220	1.00	150220	181
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	150220		150220	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 181 A

SUBTOTALS:	PHASE
50073 VA	A
50073 VA	B
50073 VA	C
150220 VA	TOTAL
181	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD

LEONARD F. MAY
STATE OF WASHINGTON
54830
REGISTERED PROFESSIONAL ENGINEER

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME
PANEL SCHEDULES

SHEET NO.
E-0.4

PANEL SCHEDULES | 1

RESERVED FOR BUILDING DEPT STAMP

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E SLD - 2023-11-13 - BETHLEHEM ZENKRAS

PANEL GG (EXISTING)

MOUNTING: SURFACE
FED FROM: GYM BLDG MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 480Y/277V 3PH 4W
BUS: 600 A
MAIN: 600 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
3	CH-GYM01	7174			N	3	30	#10	175	1.96	3/4"	1	A - -	2					30	3	N				HRU-04 (FAN)	2
	- - - - - -		7174		N	- -	- -					3	- B -	4					- -	- -	N				- - - - - -	
	- - - - - -			7174	N	- -	- -					5	- - C	6					- -	- -	N				- - - - - -	
3	CH-GYM02	7174			N	3	30	#10	175	1.96	3/4"	7	A - -	8					30	3	N				HRU-04 (DUCT COIL)	2
	- - - - - -		7174		N	- -	- -					9	- B -	10					- -	- -	N				- - - - - -	
	- - - - - -			7174	N	- -	- -					11	- - C	12					- -	- -	N				- - - - - -	
1	CH-GYM05	1385			N	3	15	#12	180	0.65	3/4"	13	A - -	14					80	3	N	20747			HRU-05 (FAN)	2
	- - - - - -		1385		N	- -	- -					15	- B -	16					- -	- -	N		20747		- - - - - -	
	- - - - - -			1385	N	- -	- -					17	- - C	18					- -	- -	N			20747	- - - - - -	
1	CH-GYM07	1385			N	3	15	#12	35	0.13	3/4"	19	A - -	20	1-1/4"	1.35	200	#3	80	3	N	20747			HP-GYM04	1
	- - - - - -		1385		N	- -	- -					21	- B -	22					- -	- -	N		20747		- - - - - -	
	- - - - - -			1385	N	- -	- -					23	- - C	24					- -	- -	N			20747	- - - - - -	
2	DC-01	11000			N	3	50					25	A - -	26	1-1/2"	1.12	220	#1	125	3	N	26038			HP-18	2
	- - - - - -		11000		N	- -	- -					27	- B -	28					- -	- -	N		26038		- - - - - -	
	- - - - - -			11000	N	- -	- -					29	- - C	30					- -	- -	N			26038	- - - - - -	
2	DC-02	15000			N	3	70					31	A - -	32					20	1					SPACE	
	- - - - - -		15000		N	- -	- -					33	- B -	34					20	1					SPACE	
	- - - - - -			15000	N	- -	- -					35	- - C	36					20	1					SPACE	
	SPACE											37	A - -	38					20	1					SPACE	
	SPACE											39	- B -	40					20	1					SPACE	
	SPACE											41	- - C	42					20	1					SPACE	
	SUBTOTALS	43119	43119	43119																		67533	41495	67533		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	305916	1.00	305916	368
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	305916		305916	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 368 A

SUBTOTALS:	PHASE
110651 VA	A
84613 VA	B
110651 VA	C
305916 VA	TOTAL
399	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

PANEL EC (EXISTING)

MOUNTING: SURFACE
FED FROM: BLDG E MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 208Y/120V 3PH 4W
BUS: 100 A
MAIN: 100 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	COMPUTER	720			N	1	20					1	A - -	2					20	1	N	360			JDF	2
2	COMPUTER		720		N	1	20					3	- B -	4					20	1	N		360		RECEPT	2
2	COMPUTER			720	N	1	20					5	- - C	6					20	1	N			200	RELAYS	2
2	COMPUTER	720			N	1	20					7	A - -	8					20	1	N	1080			COMPUTER	2
2	COMPUTER		720		N	1	20					9	- B -	10					20	1	N		900		COMPUTER	2
2	COMPUTER			720	N	1	20					11	- - C	12					20	1	N			1080	COMPUTER	2
2	COMPUTER	540			N	1	20					13	A - -	14					20	1	N	720			COMPUTER	2
2	COMPUTER		720		N	1	20					15	- B -	16					20	1	N		720		COMPUTER	2
2	COMPUTER			720	N	1	20					17	- - C	18					20	1	N			720	COMPUTER	2
2	COMPUTER	720			N	1	20					19	A - -	20					20	1	N	720			COMPUTER	2
2	COMPUTER		720		N	1	20					21	- B -	22					20	1	N		720		COMPUTER	2
2	COMPUTER			720	N	1	20					23	- - C	24					20	1	N			720	COMPUTER	2
1	HP-E03	4389			N	2	50	#6	94	1.87	1"	25	A - -	26					20	1	N	720			COMPUTER	2
	- - - - - -		4389		N	- -	- -					27	- B -	28	3/4"	0.17	30	#12	20	1	N		200		EF-11	1
	SPARE				20	1						29	- - C	30					20	1					SPARE	
	SPARE				20	1						31	A - -	32					20	1					SPARE	
	SPARE				20	1						33	- B -	34					20	1					SPARE	
	SPARE				20	1						35	- - C	36					20	1					SPARE	
	SPARE				20	1						37	A - -	38					30	3					TVSS	2
	SPARE				20	1						39	- B -	40					- -	- -					- - - - - -	
	SPARE				20	1						41	- - C	42					- -	- -					- - - - - -	
	SUBTOTALS	7089	7269	2880																		3600	2900	2720		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	26458	1.00	26458	73
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	26458		26458	

TOTAL AMPS CONNECTED AT 208Y/120V 3PH 4W WITH LCL 73 A

SUBTOTALS:	PHASE
10689 VA	A
10169 VA	B
5600 VA	C
26458 VA	TOTAL
89	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD

PANEL 106M (EXISTING)

MOUNTING: SURFACE
FED FROM: AUDITORIUM BLDG MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION: AUDITORIUM BLDG MECH/ELEC RM
VOLTAGE: 480Y/277V 3PH 4W
BUS: 225 A
MAIN: 225 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
3	HP-AUD06	8033			N	3	30					1	A - -	2					30	3	N	8033			HP-AUD07	3
	- - - - - -		8033		N	- -	- -					3	- B -	4					- -	- -	N		8033		- - - - - -	
	- - - - - -			8033	N	- -	- -					5	- - C	6					- -	- -	N			8033	- - - - - -	
3	EF-AUD03	265			N	3	20					7	A - -	8					70	3	N	17534			HP-AUD02	3
	- - - - - -		265		N	- -	- -					9	- B -	10					- -	- -	N		17534		- - - - - -	
	- - - - - -			265	N	- -	- -					11	- - C	12					- -	- -	N			17534	- - - - - -	
1	HP-AUD04	8033			N	3	30					13	A - -	14					40	3	N	10027			HP-AUD05	1
	- - - - - -		8033		N	- -	- -					15	- B -	16					- -	- -	N		10027		- - - - - -	
	- - - - - -			8033	N	- -	- -					17	- - C	18					- -	- -	N			10027	- - - - - -	
1	HP-AUD03	5595			N	3	25					19	A - -	20					20	3	N	3000			WATER HEATER	2
	- - - - - -		5595		N	- -	- -					21	- B -	22					- -	- -	N		3000		- - - - - -	
	- - - - - -			5595	N	- -	- -					23	- - C	24					- -	- -	N			3000	- - - - - -	
2	LIFT 112	900			N	3	20					25	A - -	26											SPACE	
	- - - - - -		900		N	- -	- -					27	- B -	28											SPACE	
	- - - - - -			900	N	- -	- -					29	- - C	30											SPACE	
	SPARE					1	20					31	A - -	32											SPACE	
	SPARE					1	20					33	- B -	34											SPACE	
	SPARE					1	20					35	- - C	36											SPACE	
	SPARE					1	20					37	A - -	38											SPACE	
	SPARE					1	20					39	- B -	40											SPACE	
	SPARE					1	20					41	- - C	42											SPACE	
	SUBTOTALS	22826	22826	22826																		38595	38595	38595		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	184263	1.00	184263	222
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	184263		184263	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 222 A

SUBTOTALS:	PHASE
61421 VA	A
61421 VA	B
61421 VA	C
184263 VA	TOTAL
222	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

PANEL GH (EXISTING)

MOUNTING: SURFACE
FED FROM: GYM BLDG MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 480Y/277V 3PH 4W
BUS: 800 A
MAIN: 800 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	DC-03	667			N	3	20					1	A - -	2					20	3	N	2500			UH-05	2
	- - - - - -		667		N	- -	- -					3	- B -	4					- -	- -	N		2500		- - - - - -	
	- - - - - -			667	N	- -	- -					5	- - C	6					- -	- -	N			2500	- - - - - -	
2	DC-04	667			N	3	20					7	A - -	8					20	3	N	3300			UH-06	2
	- - - - - -		667		N	- -	- -					9	- B -	10					- -	- -	N		3300		- - - - - -	
	- - - - - -			667	N	- -	- -					11	- - C	12					- -	- -	N			3300	- - - - - -	
1	HP-GYM01	20747			N	3	80	#3	136	0.92	1-1/4"	13	A - -	14					90	3	N	18000			WH-03	2
	- - - - - -		20747		N	- -	- -					15	- B -	16					- -	- -	N		18000		- - - - - -	
	- - - - - -			20747	N	- -	- -					17	- - C	18					- -	- -	N			18000	- - - - - -	
1	HP-GYM02	20747			N	3	80	#3	146	0.99	1-1/4"	19	A - -	20					90	3	N	18000			WH-04	2
	- - - - - -		20747		N	- -	- -					21	- B -	22					- -	- -	N		18000		- - - - - -	
	- - - - - -			20747	N	- -	- -					23	- - C	24					- -	- -	N			18000	- - - - - -	
1	HP-GYM03	26952			N	3	100	#1	170	0.90	1-1/2"	25	A - -	26					90	3	N	18000			WH-05	2
	- - - - - -		26952		N	- -	- -					27	- B -	28					- -	- -	N		18000		- - - - - -	
	- - - - - -			26952	N	- -	- -					29	- - C	30					- -	- -	N			18000	- - - - - -	
	SPACE											31	A - -	32					90	3	N	18000			WH-06	2
	SPACE											33	- B -	34					- -	- -	N		18000		- - - - - -	
	SPACE											35	- - C	36					- -	- -	N			18000	- - - - - -	
	SPACE											37	A - -	38											SPACE	
	SPACE											39	- B -	40											SPACE	
	SPACE											41	- - C	42											SPACE	
	SUBTOTALS	69781	69781	69781																		77800	77800	77800		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	442742	1.00	442742	533
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	442742		442742	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 533 A

SUBTOTALS:	PHASE
147581 VA	A
147581 VA	B
147581 VA	C
442742 VA	TOTAL
533	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD

PANEL CH (EXISTING)

MOUNTING: SURFACE
FED FROM: PANEL 'KH'
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 480Y/277V 3PH 4W
BUS: 400 A
MAIN: 400 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	LIGHTING	1624			L	1	20					1	A - -	2	1"	0.54	53	#8	40	3	N	10027			HP-CAF01	1
2	LIGHTING		2880		L	1	20					3	- B -	4					- -	- -	N		10027		- - - - - -	
2	LIGHTING			3600	L	1	20					5	- - C	6					- -	- -	N			10027	- - - - - -	
2	LIGHTING	3180			L	1	20					7	A - -	8	1-1/2"	0.44	90	#1	100	3	N	24958			HP-CAF02	1
2	EXIT LIGHTS		50		L	1	20					9	- B -	10					- -	- -	N		24958		- - - - - -	
2	BUILDING LIGHTING			600	L	1	20					11	- - C	12					- -	- -	N			24958	- - - - - -	
2	SITE LIGHTING	1560			L	1	20					13	A - -	14	1-1/2"	0.43	78	#1	110	3	N	28143			HP-CAF03	1
2	HEATER		1500		N	1	20					15	- B -	16					- -	- -	N		28143		- - - - - -	
3	EF-CAF06			200	N	3	20	#12	20	0.01	3/4"	17	- - C	18					- -	- -	N			28143	- - - - - -	
	- - - - - -	443			N	- -	- -					19	A - -	20	3/4"	0.02	50	#10	30	3	N	200			EF-CAF02	3
	- - - - - -		443		N	- -	- -					21	- B -	22					- -	- -	N		200		- - - - - -	
	SPARE					1	20					23	- - C	24					- -	- -	N			200	- - - - - -	
	SPACE											25	A - -	26					20	3	N	1800			WATER HEATER	2
	SPACE											27	- B -	28					- -	- -	N		1800		- - - - - -	
	SPACE											29	- - C	30					- -	- -	N			1800	- - - - - -	
	SPACE											31	A - -	32											SPACE	
	SPACE											33	- B -	34											SPACE	
	SPACE											35	- - C	36											SPACE	
	SPACE											37	A - -	38											SPACE	
	SPACE											39	- B -	40											SPACE	
	SPACE											41	- - C	42											SPACE	
	SUBTOTALS	6807	4873	4400																		65128	65128	65128		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	13494	1.25	16868	20
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	197971	1.00	197971	238
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	211465		214838	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 259 A

SUBTOTALS:	PHASE
71935 VA	A
70001 VA	B
69528 VA	C
211465 VA	TOTAL
260	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

LEONARD P. MAY
STATE OF WASHINGTON
54830
REGISTERED PROFESSIONAL ENGINEER

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO. 2022-017
DATE 11-14-2023
DRAWN BZ
REVIEWED LM

SHEET NAME
PANEL SCHEDULES

SHEET NO.
E-0.5

22-482

PANEL SCHEDULES | 1

RESERVED FOR BUILDING DEPT STAMP

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-SLD - 2023-11-13 - BETHLEHEM ZEKARIAS

PANEL GG (EXISTING)

MOUNTING: SURFACE
FED FROM: GYM BLDG MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 480Y/277V 3PH 4W
BUS: 600 A
MAIN: 600 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
3	CH-GYM01	7174			N	3	30	#10	175	1.96	3/4"	1	A - -	2					30	3	N				HRU-04 (FAN)	2
	- - - - - -		7174		N	- -	- -					3	- B -	4					- -	- -	N				- - - - - -	
	- - - - - -			7174	N	- -	- -					5	- - C	6					- -	- -	N				- - - - - -	
3	CH-GYM02	7174			N	3	30	#10	175	1.96	3/4"	7	A - -	8					30	3	N				HRU-04 (DUCT COIL)	2
	- - - - - -		7174		N	- -	- -					9	- B -	10					- -	- -	N				- - - - - -	
	- - - - - -			7174	N	- -	- -					11	- - C	12					- -	- -	N				- - - - - -	
1	CH-GYM05	1385			N	3	15	#12	180	0.65	3/4"	13	A - -	14					80	3	N	20747			HRU-05 (FAN)	2
	- - - - - -		1385		N	- -	- -					15	- B -	16					- -	- -	N		20747		- - - - - -	
	- - - - - -			1385	N	- -	- -					17	- - C	18					- -	- -	N			20747	- - - - - -	
1	CH-GYM07	1385			N	3	15	#12	35	0.13	3/4"	19	A - -	20	1-1/4"	1.35	200	#3	80	3	N	20747			HP-GYM04	1
	- - - - - -		1385		N	- -	- -					21	- B -	22					- -	- -	N		20747		- - - - - -	
	- - - - - -			1385	N	- -	- -					23	- - C	24					- -	- -	N			20747	- - - - - -	
2	DC-01	11000			N	3	50					25	A - -	26	1-1/2"	1.12	220	#1	125	3	N	26038			HP-18	2
	- - - - - -		11000		N	- -	- -					27	- B -	28					- -	- -	N		26038		- - - - - -	
	- - - - - -			11000	N	- -	- -					29	- - C	30					- -	- -	N			26038	- - - - - -	
2	DC-02	15000			N	3	70					31	A - -	32					20	1					SPACE	
	- - - - - -		15000		N	- -	- -					33	- B -	34					20	1					SPACE	
	- - - - - -			15000	N	- -	- -					35	- - C	36					20	1					SPACE	
	SPACE											37	A - -	38					20	1					SPACE	
	SPACE											39	- B -	40					20	1					SPACE	
	SPACE											41	- - C	42					20	1					SPACE	
	SUBTOTALS	43119	43119	43119																		67533	41495	67533		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	305916	1.00	305916	368
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	305916		305916	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 368 A

SUBTOTALS:	PHASE
110651 VA	A
84613 VA	B
110651 VA	C
305916 VA	TOTAL
399	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

PANEL EC (EXISTING)

MOUNTING: SURFACE
FED FROM: BLDG E MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 208Y/120V 3PH 4W
BUS: 100 A
MAIN: 100 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	COMPUTER	720			N	1	20					1	A - -	2					20	1	N	360			JDF	2
2	COMPUTER		720		N	1	20					3	- B -	4					20	1	N		360		RECEPT	2
2	COMPUTER			720	N	1	20					5	- - C	6					20	1	N			200	RELAYS	2
2	COMPUTER	720			N	1	20					7	A - -	8					20	1	N	1080			COMPUTER	2
2	COMPUTER		720		N	1	20					9	- B -	10					20	1	N		900		COMPUTER	2
2	COMPUTER			720	N	1	20					11	- - C	12					20	1	N			1080	COMPUTER	2
2	COMPUTER	540			N	1	20					13	A - -	14					20	1	N	720			COMPUTER	2
2	COMPUTER		720		N	1	20					15	- B -	16					20	1	N		720		COMPUTER	2
2	COMPUTER			720	N	1	20					17	- - C	18					20	1	N			720	COMPUTER	2
2	COMPUTER	720			N	1	20					19	A - -	20					20	1	N	720			COMPUTER	2
2	COMPUTER		720		N	1	20					21	- B -	22					20	1	N		720		COMPUTER	2
2	COMPUTER			720	N	1	20					23	- - C	24					20	1	N			720	COMPUTER	2
1	HP-E03	4389			N	2	50	#6	94	1.87	1"	25	A - -	26					20	1	N	720			COMPUTER	2
	- - - - - -		4389		N	- -	- -					27	- B -	28	3/4"	0.17	30	#12	20	1	N		200		EF-11	1
	SPARE				20	1						29	- - C	30					20	1					SPARE	
	SPARE				20	1						31	A - -	32					20	1					SPARE	
	SPARE				20	1						33	- B -	34					20	1					SPARE	
	SPARE				20	1						35	- - C	36					20	1					SPARE	
	SPARE				20	1						37	A - -	38					30	3					TVSS	2
	SPARE				20	1						39	- B -	40					- -	- -					- - - - - -	
	SPARE				20	1						41	- - C	42					- -	- -					- - - - - -	
	SUBTOTALS	7089	7269	2880																		3600	2900	2720		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	26458	1.00	26458	73
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	26458		26458	

TOTAL AMPS CONNECTED AT 208Y/120V 3PH 4W WITH LCL 73 A

SUBTOTALS:	PHASE
10689 VA	A
10169 VA	B
5600 VA	C
26458 VA	TOTAL
89	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD

PANEL 106M (EXISTING)

MOUNTING: SURFACE
FED FROM: AUDITORIUM BLDG MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION: AUDITORIUM BLDG MECH/ELEC RM
VOLTAGE: 480Y/277V 3PH 4W
BUS: 225 A
MAIN: 225 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
3	HP-AUD06	8033			N	3	30					1	A - -	2					30	3	N	8033			HP-AUD07	3
	- - - - - -		8033		N	- -	- -					3	- B -	4					- -	- -	N		8033		- - - - - -	
	- - - - - -			8033	N	- -	- -					5	- - C	6					- -	- -	N			8033	- - - - - -	
3	EF-AUD03	265			N	3	20					7	A - -	8					70	3	N	17534			HP-AUD02	3
	- - - - - -		265		N	- -	- -					9	- B -	10					- -	- -	N		17534		- - - - - -	
	- - - - - -			265	N	- -	- -					11	- - C	12					- -	- -	N			17534	- - - - - -	
1	HP-AUD04	8033			N	3	30					13	A - -	14					40	3	N	10027			HP-AUD05	1
	- - - - - -		8033		N	- -	- -					15	- B -	16					- -	- -	N		10027		- - - - - -	
	- - - - - -			8033	N	- -	- -					17	- - C	18					- -	- -	N			10027	- - - - - -	
1	HP-AUD03	5595			N	3	25					19	A - -	20					20	3	N	3000			WATER HEATER	2
	- - - - - -		5595		N	- -	- -					21	- B -	22					- -	- -	N		3000		- - - - - -	
	- - - - - -			5595	N	- -	- -					23	- - C	24					- -	- -	N			3000	- - - - - -	
2	LIFT 112	900			N	3	20					25	A - -	26											SPACE	
	- - - - - -		900		N	- -	- -					27	- B -	28											SPACE	
	- - - - - -			900	N	- -	- -					29	- - C	30											SPACE	
	SPARE					1	20					31	A - -	32											SPACE	
	SPARE					1	20					33	- B -	34											SPACE	
	SPARE					1	20					35	- - C	36											SPACE	
	SPARE					1	20					37	A - -	38											SPACE	
	SPARE					1	20					39	- B -	40											SPACE	
	SPARE					1	20					41	- - C	42											SPACE	
	SUBTOTALS	22826	22826	22826																		38595	38595	38595		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	184263	1.00	184263	222
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	184263		184263	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 222 A

SUBTOTALS:	PHASE
61421 VA	A
61421 VA	B
61421 VA	C
184263 VA	TOTAL
222	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

PANEL GH (EXISTING)

MOUNTING: SURFACE
FED FROM: GYM BLDG MAIN DIST. PANEL
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 480Y/277V 3PH 4W
BUS: 800 A
MAIN: 800 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	DC-03	667			N	3	20					1	A - -	2					20	3	N	2500			UH-05	2
	- - - - - -		667		N	- -	- -					3	- B -	4					- -	- -	N		2500		- - - - - -	
	- - - - - -			667	N	- -	- -					5	- - C	6					- -	- -	N			2500	- - - - - -	
2	DC-04	667			N	3	20					7	A - -	8					20	3	N	3300			UH-06	2
	- - - - - -		667		N	- -	- -					9	- B -	10					- -	- -	N		3300		- - - - - -	
	- - - - - -			667	N	- -	- -					11	- - C	12					- -	- -	N			3300	- - - - - -	
1	HP-GYM01	20747			N	3	80	#3	136	0.92	1-1/4"	13	A - -	14					90	3	N	18000			WH-03	2
	- - - - - -		20747		N	- -	- -					15	- B -	16					- -	- -	N		18000		- - - - - -	
	- - - - - -			20747	N	- -	- -					17	- - C	18					- -	- -	N			18000	- - - - - -	
1	HP-GYM02	20747			N	3	80	#3	146	0.99	1-1/4"	19	A - -	20					90	3	N	18000			WH-04	2
	- - - - - -		20747		N	- -	- -					21	- B -	22					- -	- -	N		18000		- - - - - -	
	- - - - - -			20747	N	- -	- -					23	- - C	24					- -	- -	N			18000	- - - - - -	
1	HP-GYM03	26952			N	3	100	#1	170	0.90	1-1/2"	25	A - -	26					90	3	N	18000			WH-05	2
	- - - - - -		26952		N	- -	- -					27	- B -	28					- -	- -	N		18000		- - - - - -	
	- - - - - -			26952	N	- -	- -					29	- - C	30					- -	- -	N			18000	- - - - - -	
	SPACE											31	A - -	32					90	3	N	18000			WH-06	2
	SPACE											33	- B -	34					- -	- -	N		18000		- - - - - -	
	SPACE											35	- - C	36					- -	- -	N			18000	- - - - - -	
	SPACE											37	A - -	38											SPACE	
	SPACE											39	- B -	40											SPACE	
	SPACE											41	- - C	42											SPACE	
	SUBTOTALS	69781	69781	69781																		77800	77800	77800		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	0	1.25	0	0
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	442742	1.00	442742	533
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	442742		442742	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 533 A

SUBTOTALS:	PHASE
147581 VA	A
147581 VA	B
147581 VA	C
442742 VA	TOTAL
533	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD

PANEL CH (EXISTING)

MOUNTING: SURFACE
FED FROM: PANEL 'KH'
NEMA: 1
AIC RATING:
LOCATION:
VOLTAGE: 480Y/277V 3PH 4W
BUS: 400 A
MAIN: 400 A
FEEDER: EXISTING

NOTE	DESCRIPTION	A	B	C	TYPE	POLE	AMP	AWG/PH	LENGTH	V.D. %	CONDUIT		PHASE		CONDUIT	V.D. %	LENGTH	AWG/PH	AMP	POLE	TYPE	A	B	C	DESCRIPTION	NOTE
2	LIGHTING	1624			L	1	20					1	A - -	2	1"	0.54	53	#8	40	3	N	10027			HP-CAF01	1
2	LIGHTING		2880		L	1	20					3	- B -	4					- -	- -	N		10027		- - - - - -	
2	LIGHTING			3600	L	1	20					5	- - C	6					- -	- -	N			10027	- - - - - -	
2	LIGHTING	3180			L	1	20					7	A - -	8	1-1/2"	0.44	90	#1	100	3	N	24958			HP-CAF02	1
2	EXIT LIGHTS		50		L	1	20					9	- B -	10					- -	- -	N		24958		- - - - - -	
2	BUILDING LIGHTING			600	L	1	20					11	- - C	12					- -	- -	N			24958	- - - - - -	
2	SITE LIGHTING	1560			L	1	20					13	A - -	14	1-1/2"	0.43	78	#1	110	3	N	28143			HP-CAF03	1
2	HEATER		1500		N	1	20					15	- B -	16					- -	- -	N		28143		- - - - - -	
3	EF-CAF06			200	N	3	20	#12	20	0.01	3/4"	17	- - C	18					- -	- -	N			28143	- - - - - -	
	- - - - - -	443			N	- -	- -					19	A - -	20	3/4"	0.02	50	#10	30	3	N	200			EF-CAF02	3
	- - - - - -		443		N	- -	- -					21	- B -	22					- -	- -	N		200		- - - - - -	
	SPARE					1	20					23	- - C	24					- -	- -	N			200	- - - - - -	
	SPACE											25	A - -	26					20	3	N	1800			WATER HEATER	2
	SPACE											27	- B -	28					- -	- -	N		1800		- - - - - -	
	SPACE											29	- - C	30					- -	- -	N			1800	- - - - - -	
	SPACE											31	A - -	32											SPACE	
	SPACE											33	- B -	34											SPACE	
	SPACE											35	- - C	36											SPACE	
	SPACE											37	A - -	38											SPACE	
	SPACE											39	- B -	40											SPACE	
	SPACE											41	- - C	42											SPACE	
	SUBTOTALS	6807	4873	4400																		65128	65128	65128		

NEC/CEC LOAD CALC:	CONNECTED	DEMAND	DEMAND	DEMAND
LOAD TYPE	VA	FACTOR	VA	AMPS
(L) LIGHTING	13494	1.25	16868	20
(R) RECEPTACLE	0	NEC 220.44	0	0
(M) MOTOR	0	1.25	0	0
LARGEST MOTOR		0.25	0	0
(C) CONTINUOUS	0	1.25	0	0
(N) NON-CONTINUOUS	197971	1.00	197971	238
(K) KITCHEN (NEC 220.56)	0	0.65	0	0
(S) SPECIAL DEMAND	0	1.00	0	0
TOTALS	211465		214838	

TOTAL AMPS CONNECTED AT 480Y/277V 3PH 4W WITH LCL 259 A

SUBTOTALS:	PHASE
71935 VA	A
70001 VA	B
69528 VA	C
211465 VA	TOTAL
260	AMPS

NOTES:
1. NEW BREAKER, NEW LOAD
2. EXISTING BREAKER, EXISTING LOAD
3. EXISTING BREAKER, NEW LOAD

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME: PANEL SCHEDULES

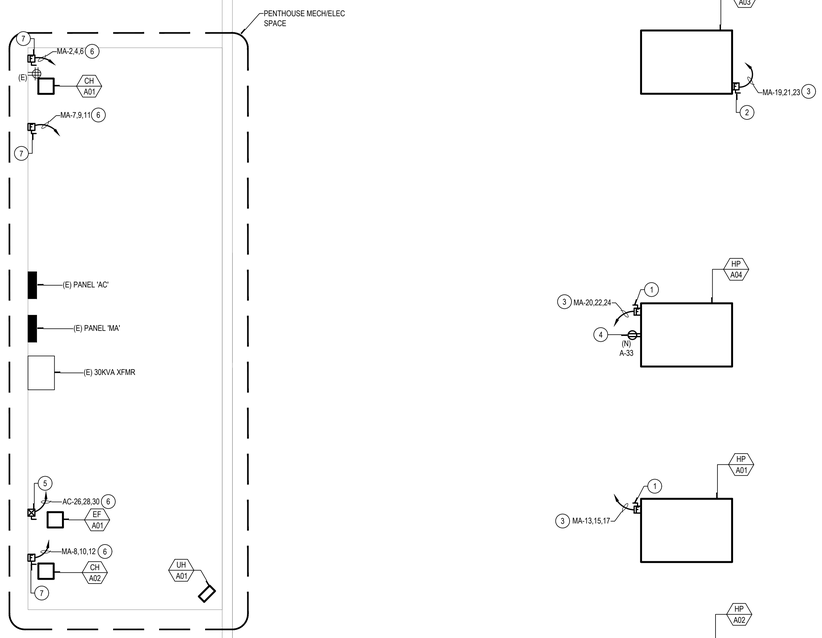
SHEET NO.: E-0.6

22-482

PANEL SCHEDULES | **1**

RESERVED FOR BUILDING DEPT STAMP

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-SLD - 2023-11-13 - BETHLEHEM ZEKARIAS

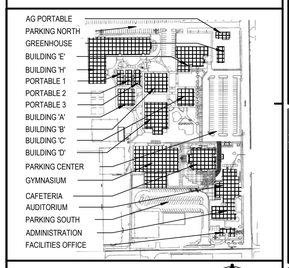


GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES. REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 60A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT FOR NEW UNIT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
3. CONTRACTOR MAY REUSE CONDUIT WHERE IN GOOD WORKING CONDITION FROM SOURCE PANEL TO ROOF PENETRATION, PROVIDE NEW CONDUIT ABOVE ROOF FROM PENETRATION TO NEW DISCONNECT. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
4. NEW UNIT MOUNTED SERVICE OUTLET SHALL REPLACE EXISTING. CONTRACTOR MAY REUSE EXISTING CONDUIT AND CONDUCTORS TO RECIRCUIT TO NEW OUTLET.
5. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
6. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
7. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED FUSED DISCONNECT FOR NEW UNIT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.



KEY PLAN

RESERVED FOR BUILDING DEPT. STAMP

BUILDING A POWER AND SIGNAL ROOF PLAN

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

LEONARD P. MAY — STATE OF WASHINGTON — 54830 — REGISTERED PROFESSIONAL ENGINEER

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME: BUILDING A ELECTRICAL ROOF PLAN

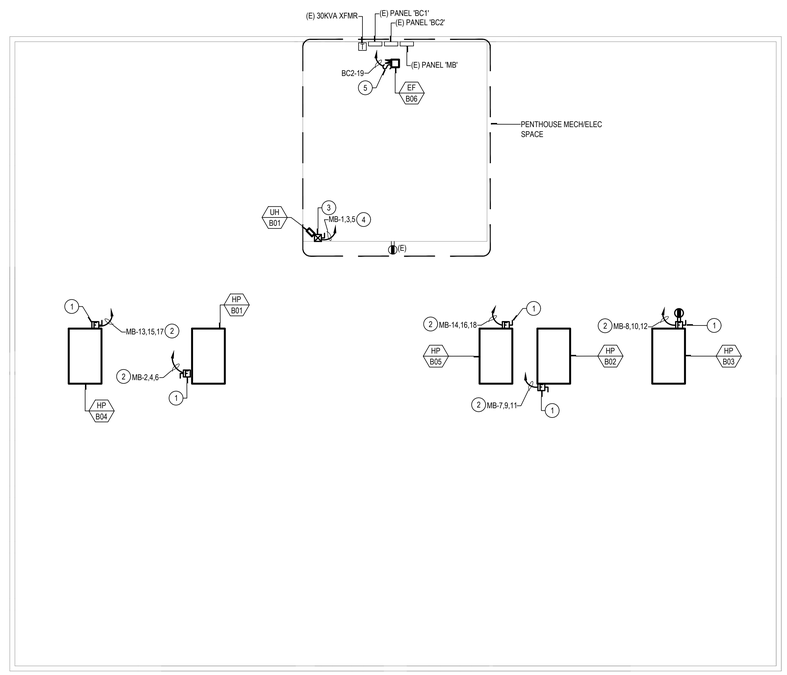
SHEET NO.: E-1.1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E PWRPLNA - 2023-11-13 - BETHLEHEM ZEKARIAS

BUILDING B POWER AND SIGNAL FLOOR PLAN

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



BUILDING B POWER AND SIGNAL ROOF PLAN

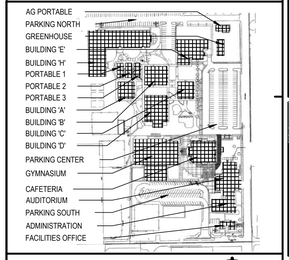
SCALE: 1/8" = 1'-0" | 2

GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL AND PLUMBING PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. PROVIDE 3/4" CONDUIT FOR ELECTRICAL CIRCUITS U.O.N..
9. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUITS REQUIRED FOR ALL BRANCH CIRCUIT AND FEEDERS FOR CIRCUIT SIZES NOT SHOWN, REFER TO PANEL SCHEDULES FOR CONDUCTOR AND CONDUIT SIZES.
10. EXCEPT FOR THE HOMERUN INDICATION, CONDUIT AND WIRING SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE THE NUMBER OF CONDUCTORS REQUIRED FOR HOT LEGS, NEUTRAL AND GROUNDING AT EACH DEVICE FOR PROPER BRANCH CIRCUITING.
11. ALL 125 AND 250-VOLT, 15- AND 20-AMPERE NONLOCKING TYPE RECEPTACLES SHALL BE LISTED TAMPER RESISTANT RECEPTACLES IN AREAS SPECIFIED IN NEC 406.12.
12. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 60A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR MAY REUSE CONDUIT WHERE IN GOOD WORKING CONDITION FROM SOURCE PANEL TO ROOF PENTRATION. PROVIDE NEW CONDUIT ABOVE ROOF FROM PENETRATION TO NEW DISCONNECT. PROVIDE NEW FLEX CONDUIT FROM DISCONNECT TO UNIT. ALL WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
3. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
4. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
5. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE NEMA 1 MOTOR RATED SNAP SWITCH FOR NEW EXHAUST FAN. VERIFY EXACT LOCATION AND WIRING REQUIREMENTS WITH MECHANICAL CONTRACTOR



KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

LEONARD P. MAY — STATE OF WASHINGTON — 54830 — REGISTERED PROFESSIONAL ENGINEER

110 James St., Suite 104
Lynden, WA 98264
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www.design2LAST.com

design2 LAST inc.

SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME
BUILDING B ELECTRICAL FLOOR PLANS

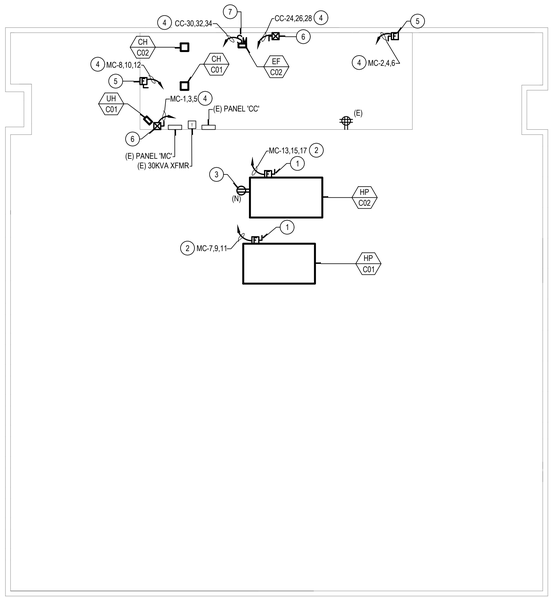
SHEET NO.
E-1.2

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNS 2023-11-13 BETH.EHEM ZEKARIAS

BUILDING C POWER AND SIGNAL FLOOR PLAN

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



BUILDING C POWER AND SIGNAL ROOF PLAN

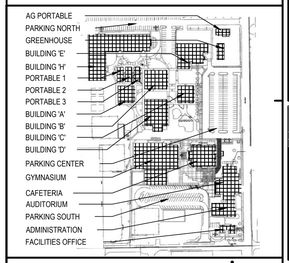
SCALE : 1/8" = 1'-0" | 2

GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL AND PLUMBING PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. PROVIDE 3/4" CONDUIT FOR ELECTRICAL CIRCUITS U.O.N..
9. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUITS REQUIRED FOR ALL BRANCH CIRCUIT AND FEEDERS FOR CIRCUIT SIZES NOT SHOWN, REFER TO PANEL SCHEDULES FOR CONDUCTOR AND CONDUIT SIZES.
10. EXCEPT FOR THE HOMERUN INDICATION, CONDUIT AND WIRING SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE THE NUMBER OF CONDUCTORS REQUIRED FOR HOT LEGS, NEUTRAL AND GROUNDING AT EACH DEVICE FOR PROPER BRANCH CIRCUITING.
11. ALL 125 AND 250-VOLT, 15- AND 20-AMPERE NONLOCKING TYPE RECEPTACLES SHALL BE LISTED TAMPER RESISTANT RECEPTACLES IN AREAS SPECIFIED IN NEC 406.12.
12. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 60A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR MAY REUSE CONDUIT WHERE IN GOOD WORKING CONDITION FROM SOURCE PANEL TO ROOF PENETRATION. PROVIDE NEW CONDUIT ABOVE ROOF FROM PENETRATION TO NEW DISCONNECT. PROVIDE NEW FLEX CONDUIT FROM DISCONNECT TO UNIT. ALL WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
3. NEW UNIT MOUNTED SERVICE OUTLET SHALL REPLACE EXISTING. CONTRACTOR MAY REUSE EXISTING CONDUIT AND CONDUCTORS TO RECIRCUIT TO NEW OUTLET.
4. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
5. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED FUSED DISCONNECT FOR NEW UNIT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
6. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
7. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE NEMA 1 MOTOR RATED SNAP SWITCH FOR NEW EXHAUST FAN. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.



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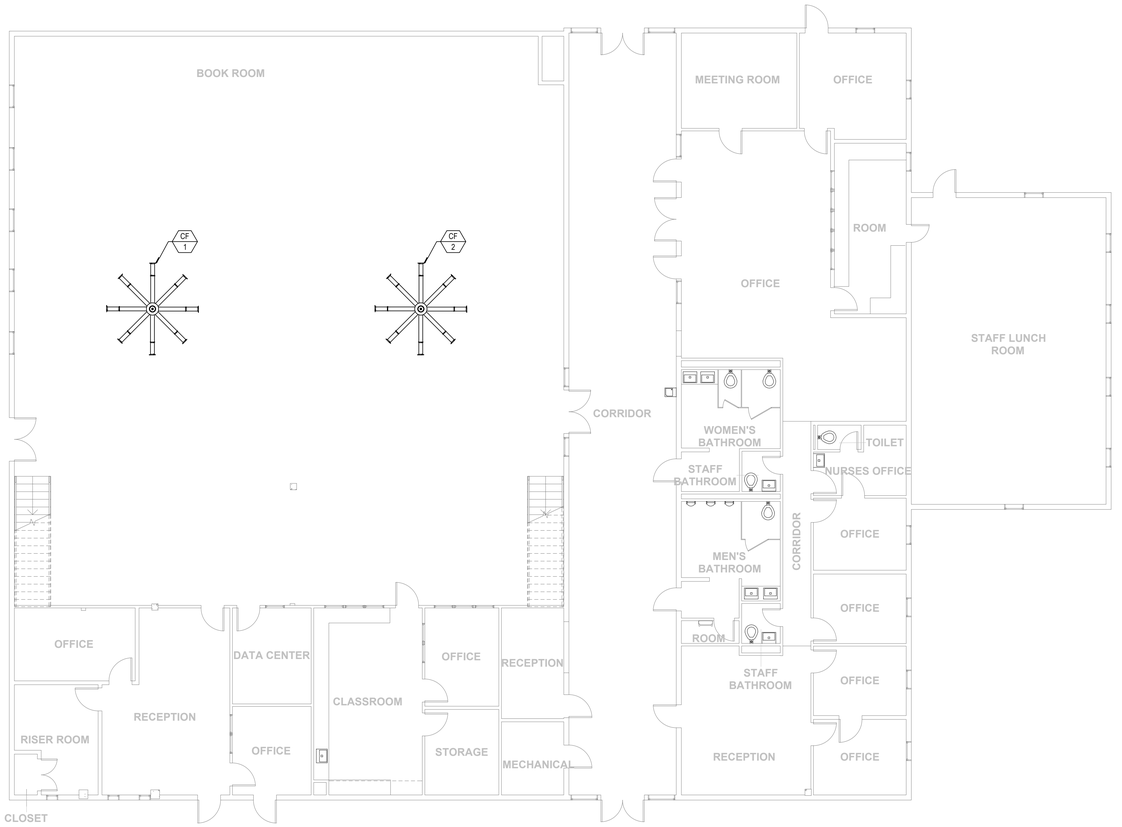
BUILDING C ELECTRICAL FLOOR PLANS

SHEET NO.
E-1.3

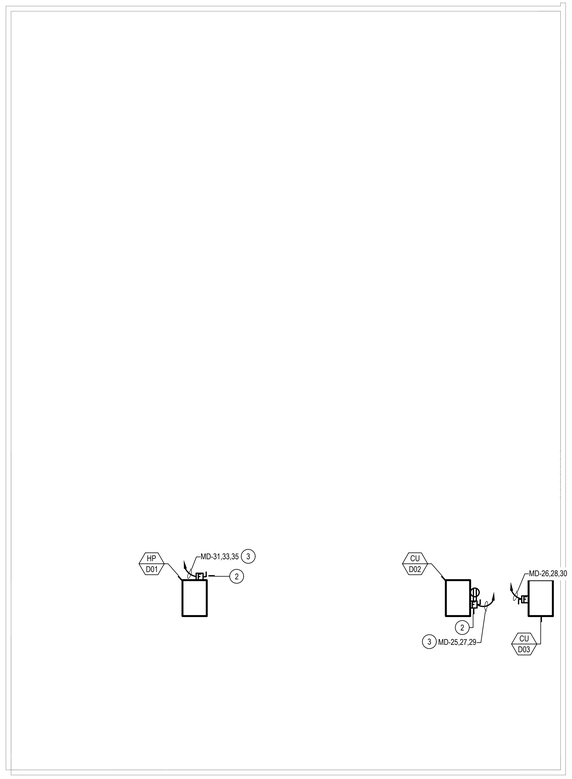
22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWR.RNC - 2023-11-13 - BETHLEHEM ZEKARIAS



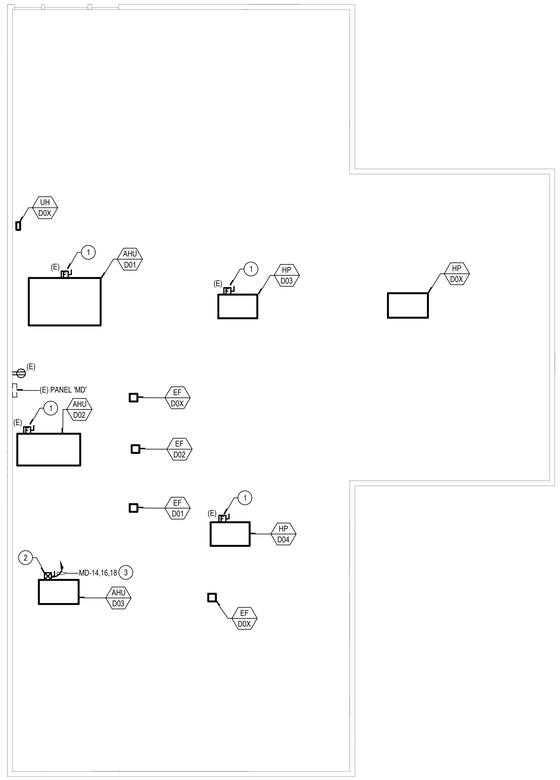
BUILDING D POWER AND SIGNAL FLOOR PLAN

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



BUILDING D POWER AND SIGNAL HIGH ROOF PLAN

SCALE: 1/8" = 1'-0" | 3



BUILDING D POWER AND SIGNAL LOW ROOF PLAN

SCALE: 1/8" = 1'-0" | 2

GENERAL NOTES

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3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. PROVIDE 3/4" CONDUIT FOR ELECTRICAL CIRCUITS U.O.N..
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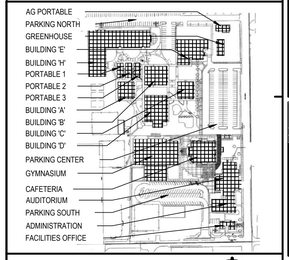
CONSTRUCTION NOTES

1. EXISTING UNIT AND EXISTING DISCONNECT TO REMAIN.
2. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
3. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.



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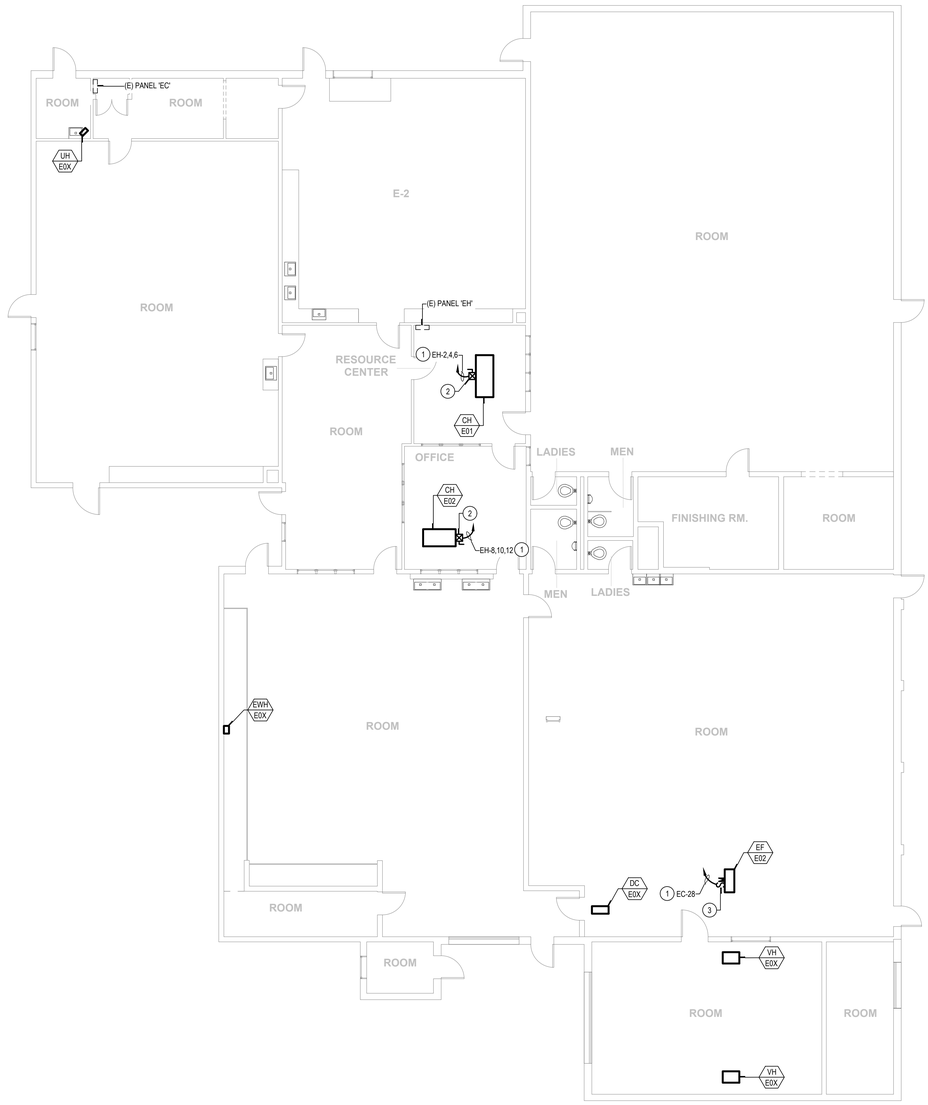
BUILDING D ELECTRICAL FLOOR PLANS

SHEET NO.
E-1.4

SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNG - 2023-11-13 - BETH.LEHEW.ZEKARIAS



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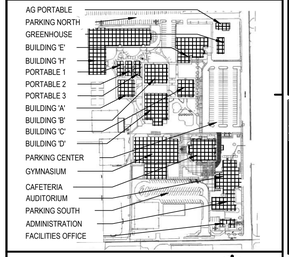

KEY PLAN

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BUILDING E POWER AND SIGNAL ROOF PLAN | SCALE: 1/8" = 1'-0" | 1

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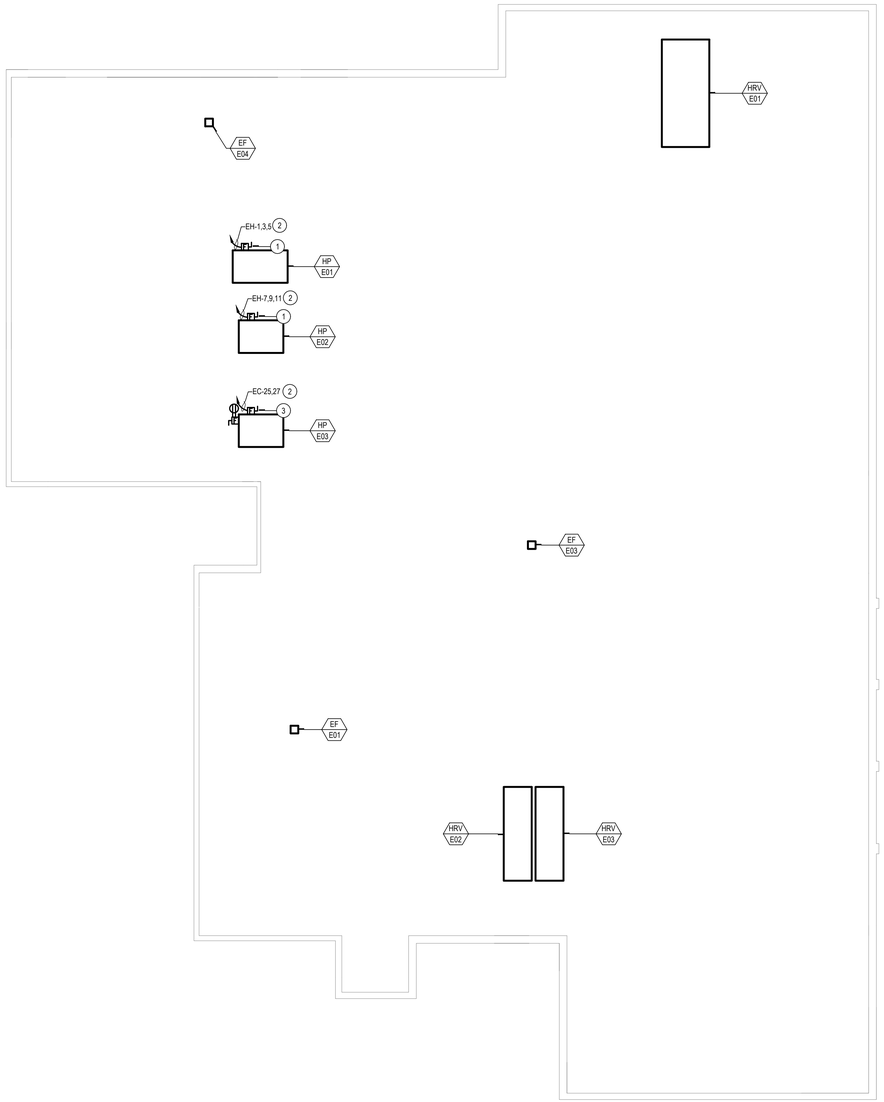
SHEET NAME:
BUILDING E ELECTRICAL ROOF PLAN

SHEET NO.
E-1.5

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWR\RUNE_ 2023-11-13_BETHLEHEM ZEKARIAS



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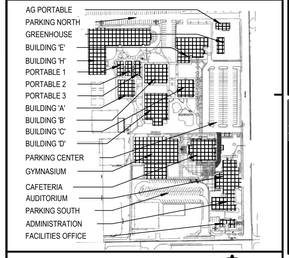

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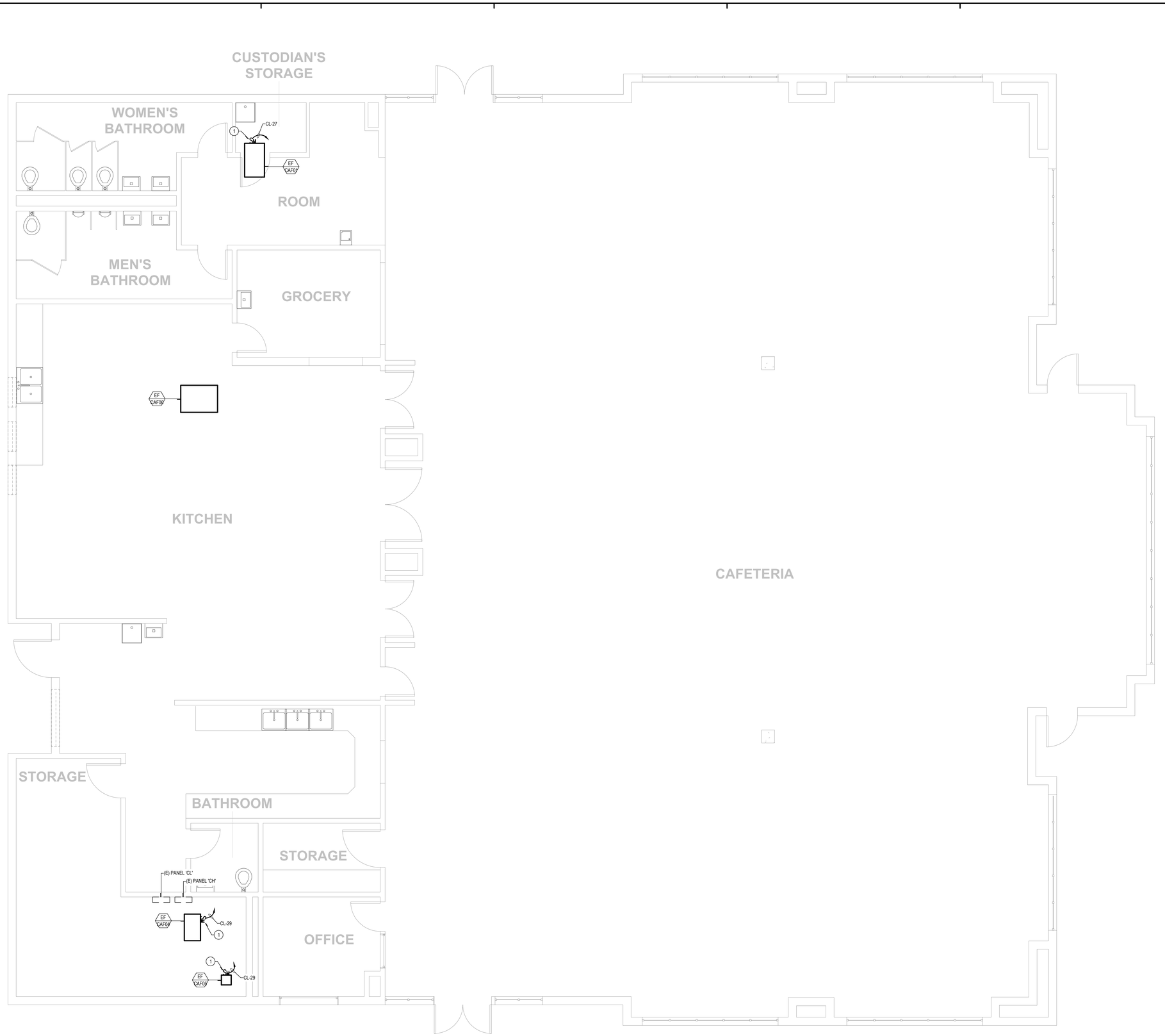
BUILDING E POWER & SIGNAL ROOF PLAN

SHEET NO.
E-1.6

22-482

BUILDING E POWER AND SIGNAL ROOF PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNE - 2023-11-13 - BETHLEHEM ZEKARIAS



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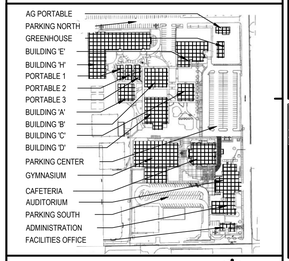

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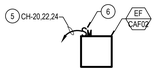
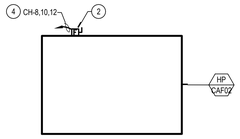
SHEET NO.
E-1.7

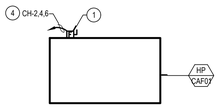
22-482

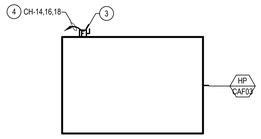
CAFETERIA POWER AND SIGNAL FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

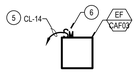
R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNCAF - 2023-11-13 - BETHLEHEM ZEKARIAS











GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 60A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 100A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
3. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 200A 3P H.D. WEATHERPROOF NEMA 3R RATED FUSED DISCONNECT. FUSING PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
4. CONTRACTOR MAY REUSE CONDUIT WHERE IN GOOD WORKING CONDITION FROM SOURCE PANEL TO ROOF PENETRATION. PROVIDE NEW CONDUIT ABOVE ROOF FROM PENETRATION TO NEW DISCONNECT. PROVIDE NEW FLEX CONDUIT FROM DISCONNECT TO UNIT. ALL WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
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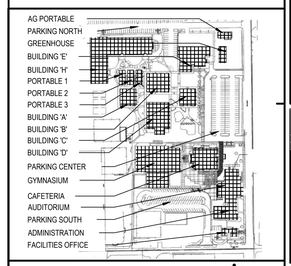
6. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE NEMA 1 MOTOR RATED SNAP SWITCH FOR NEW EXHAUST FAN. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.



KEY PLAN

RESERVED FOR BUILDING DEPT. STAMP

CAFETERIA POWER AND SIGNAL ROOF PLAN

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

LEONARD P. MAY — STATE OF WASHINGTON — 54830 — REGISTERED PROFESSIONAL ENGINEER

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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

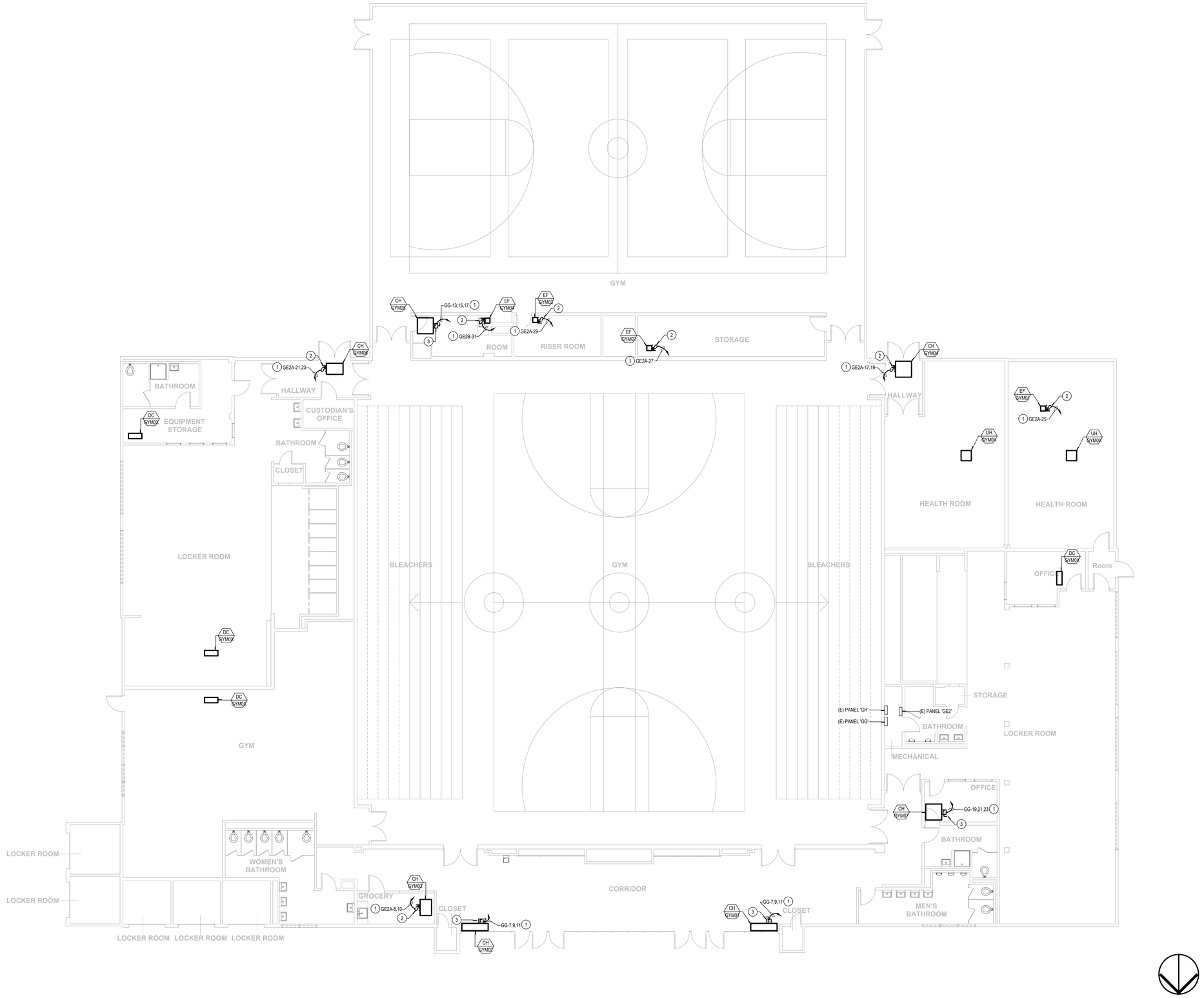
JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

SHEET NAME
CAFETERIA POWER & SIGNAL ROOF PLAN

SHEET NO.
E-1.8

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLN.CAF - 2023-11-13 - BETHLEHEM.ZEKARIAS



GENERAL NOTES

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2. REFER TO MECHANICAL PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
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6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

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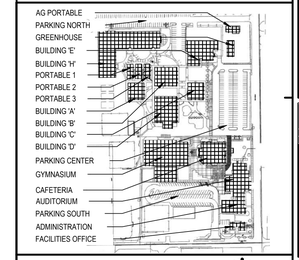
3. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED FUSED DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.



KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

LEONARD P. MAY
STATE OF WASHINGTON
54830
REGISTERED PROFESSIONAL ENGINEER

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601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

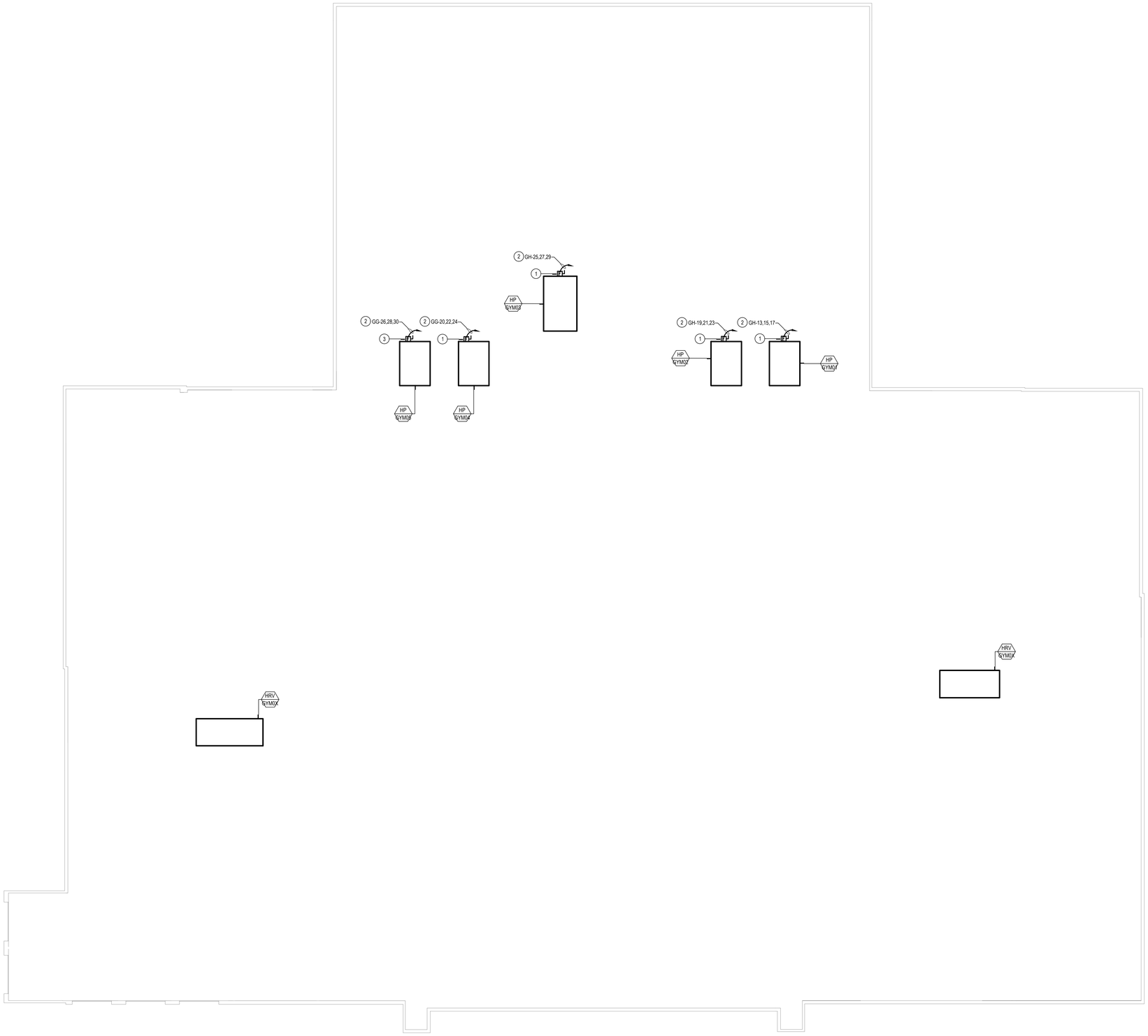
SHEET NAME
GYMNASIUM POWER & SIGNAL FIRST FLOOR PLAN

SHEET NO.
E-1.9

22-482

GYMNASIUM POWER AND SIGNAL FIRST FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNGYM - 2023-11-13 - BETHLEHEM ZEKARIAS



GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
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CONSTRUCTION NOTES

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2. CONTRACTOR MAY REUSE CONDUIT WHERE IN GOOD WORKING CONDITION FROM SOURCE PANEL TO ROOF PENTRATION. PROVIDE NEW CONDUIT ABOVE ROOF FROM PENETRATION TO NEW DISCONNECT. PROVIDE NEW FLEX CONDUIT FROM DISCONNECT TO UNIT. ALL WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
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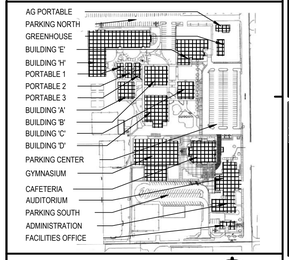

KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

LEONARD P. MAYA
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54830
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SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

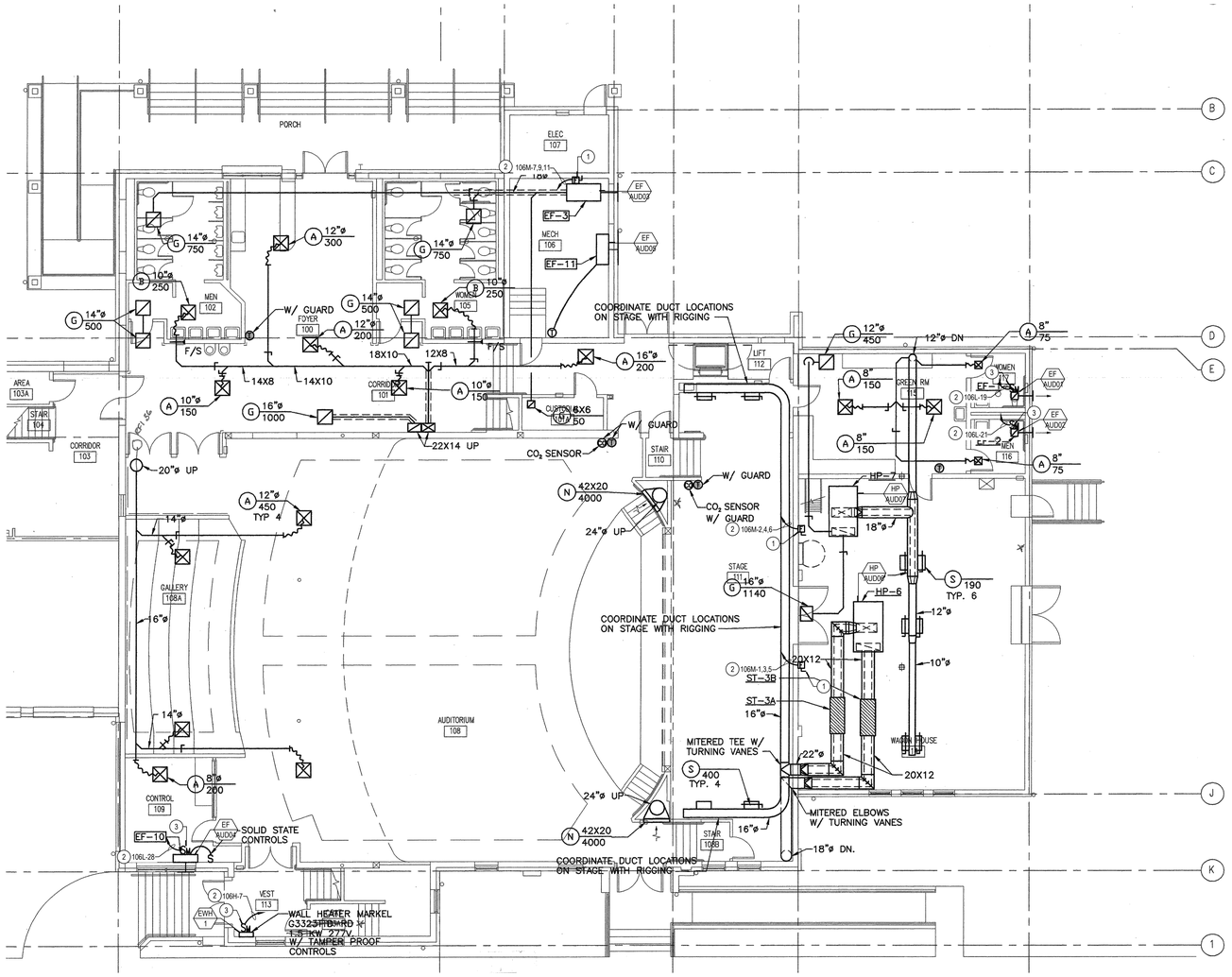
SHEET NAME
GYMNASIUM POWER & SIGNAL LOW ROOF PLAN

SHEET NO.
E-1.10

22-482

GYMNASIUM POWER AND SIGNAL LOW ROOF PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNGYM - 2023-11-13 - BETHLEHEM ZEKARIAS



GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL AND PLUMBING PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
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5. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
6. PROVIDE 3/4" CONDUIT FOR ELECTRICAL CIRCUITS U.O.N..
7. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUITS REQUIRED FOR ALL BRANCH CIRCUIT AND FEEDERS FOR CIRCUIT SIZES NOT SHOWN, REFER TO PANEL SCHEDULES FOR CONDUCTOR AND CONDUIT SIZES.
8. EXCEPT FOR THE HOMERUN INDICATION, CONDUIT AND WIRING SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE THE NUMBER OF CONDUCTORS REQUIRED FOR HOT LEGS, NEUTRAL AND GROUNDING AT EACH DEVICE FOR PROPER BRANCH CIRCUITING.
9. ALL 125 AND 250-VOLT, 15- AND 20-AMPERE NONLOCKING TYPE RECEPTACLES SHALL BE LISTED TAMPER RESISTANT RECEPTACLES IN AREAS SPECIFIED IN NEC 406.12.
10. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED H.D. FUSED DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
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AG PORTABLE
PARKING NORTH
GREENHOUSE
BUILDING 'E'
BUILDING 'H'
PORTABLE 1
PORTABLE 2
PORTABLE 3
BUILDING 'A'
BUILDING 'B'
BUILDING 'C'
BUILDING 'D'
PARKING CENTER
GYMNASIUM
CAFETERIA
AUDITORIUM
PARKING SOUTH
ADMINISTRATION
FACILITIES OFFICE

KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

LEONARD P. MAY — STATE OF WASHINGTON — 54830 — REGISTERED PROFESSIONAL ENGINEER

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SEQUIM SD #323
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601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
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JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

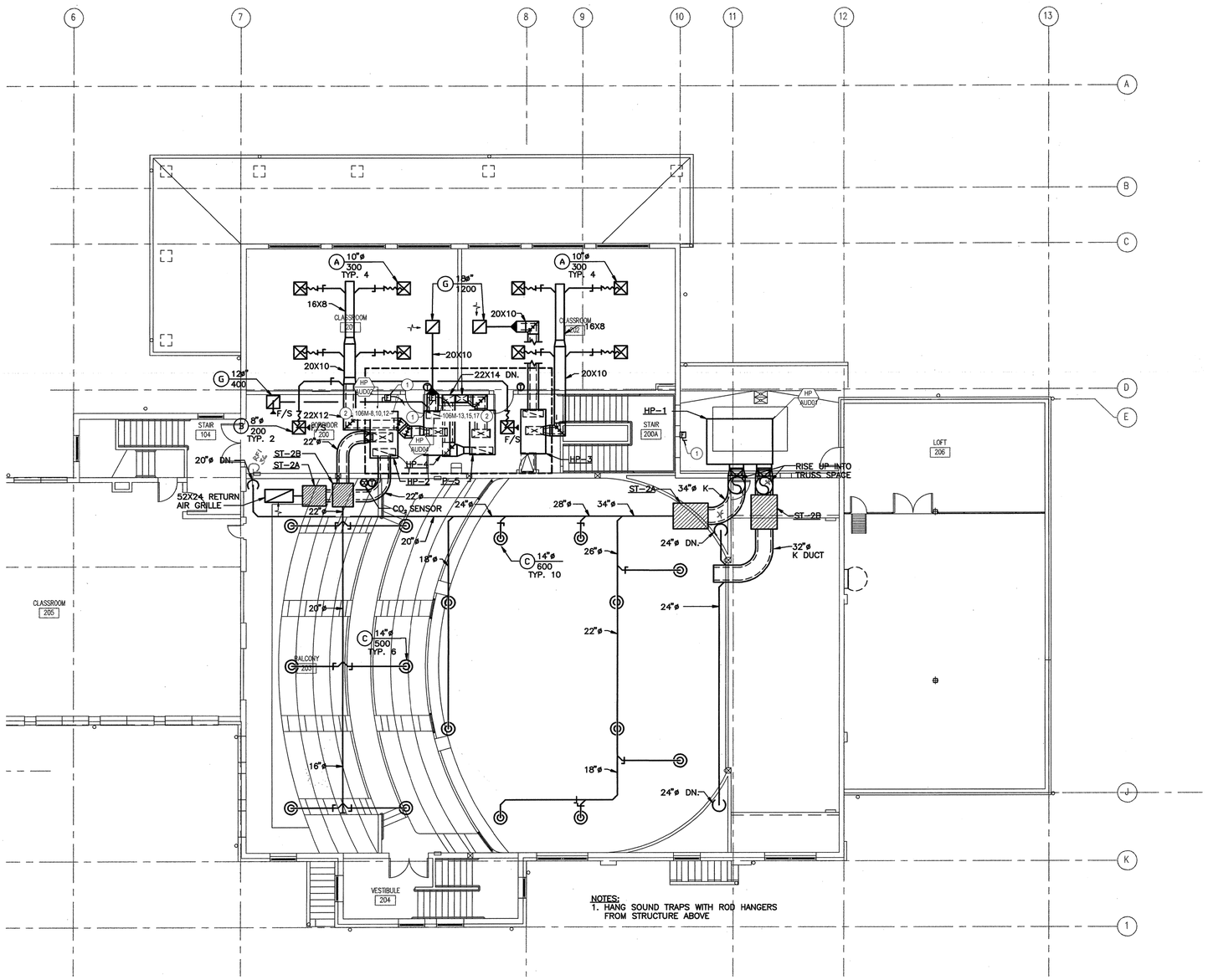
SHEET NAME
AUDITORIUM POWER & SIGNAL FIRST FLOOR PLAN

SHEET NO.
E-1.11

AUDITORIUM POWER & SIGNAL FIRST FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWR.NAUD - 2023-11-13 - BETHLEHEM ZEKARIAS

22-482



NOTES:
1. HANG SOUND TRAPS WITH ROD HANGERS FROM STRUCTURE ABOVE

GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL AND PLUMBING PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
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5. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
6. PROVIDE 3/4" CONDUIT FOR ELECTRICAL CIRCUITS U.O.N..
7. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUITS REQUIRED FOR ALL BRANCH CIRCUIT AND FEEDERS FOR CIRCUIT SIZES NOT SHOWN, REFER TO PANEL SCHEDULES FOR CONDUCTOR AND CONDUIT SIZES.
8. EXCEPT FOR THE HOMERUN INDICATION, CONDUIT AND WIRING SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE THE NUMBER OF CONDUCTORS REQUIRED FOR HOT LEGS, NEUTRAL AND GROUNDING AT EACH DEVICE FOR PROPER BRANCH CIRCUITING.
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CONSTRUCTION NOTES

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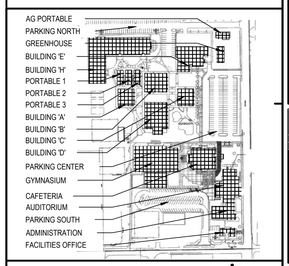

KEY PLAN

RESERVED FOR BUILDING DEPT STAMP

LEONARD P. MAY STATE OF WASHINGTON 54830 REGISTERED PROFESSIONAL ENGINEER

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DRAWN	BZ
REVIEWED	LM

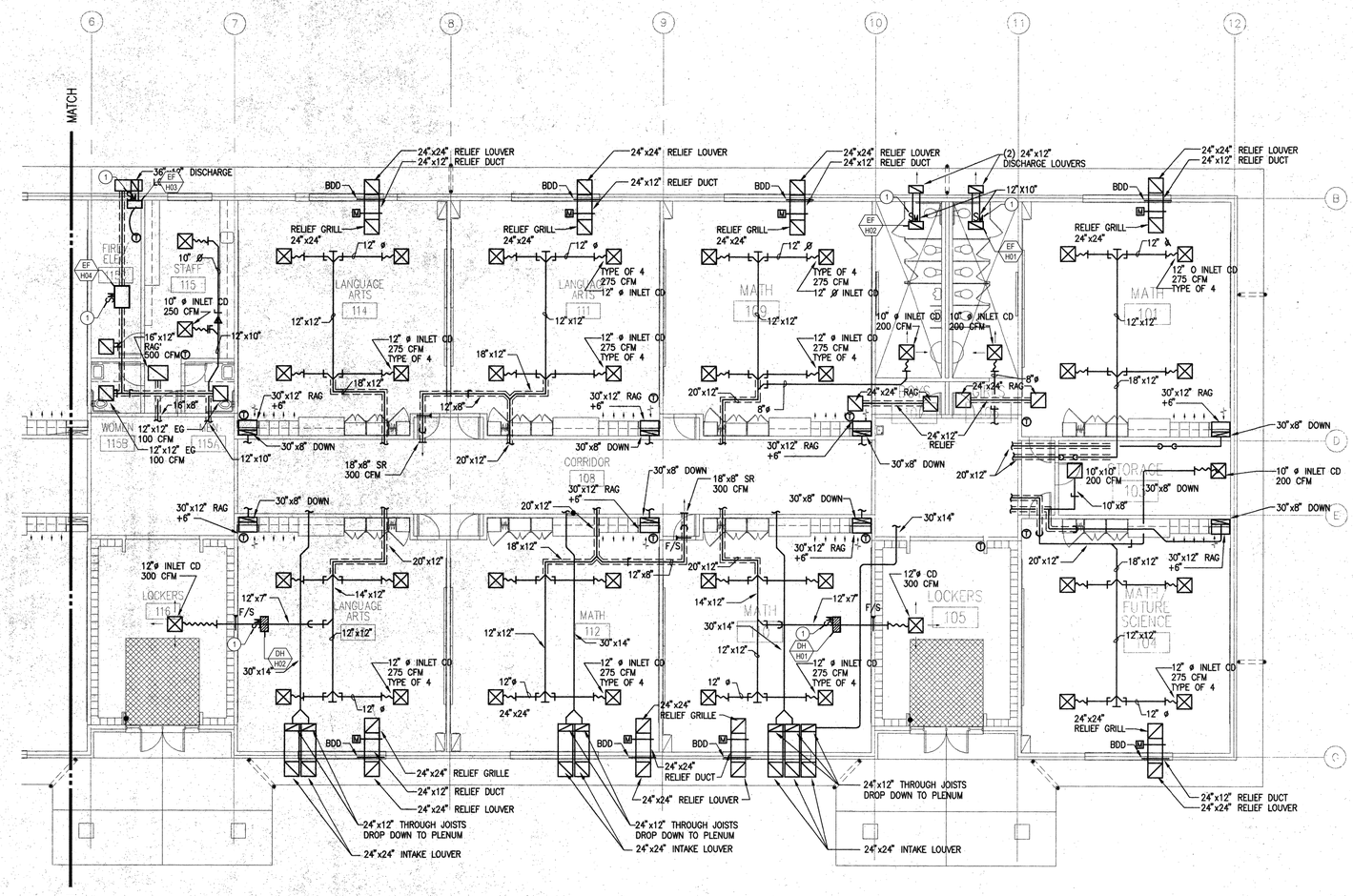
SHEET NAME
AUDITORIUM POWER & SIGNAL SECOND FLOOR PLAN

SHEET NO.
E-1.12

AUDITORIUM POWER & SIGNAL SECOND FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWR.N.NUD, 2023-11-13, BETHLEHEM ZEKARIAS



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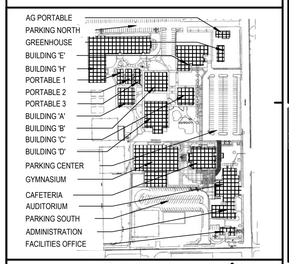

KEY PLAN

RESERVED FOR BUILDING DEPT. STAMP

LEONARD P. MAY
STATE OF WASHINGTON
54830
REGISTERED PROFESSIONAL ENGINEER

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design2 LAST INC.

SEQUIM SD #323
HVAC RECAPITALIZATION AT THE HIGH SCHOOL
601 N SEQUIM AVE, SEQUIM WA 98382

REVISION SCHEDULE

#	DESCRIPTION	DATE
	ISSUED FOR CONSTRUCTION	11-14-23

JOB NO.	2022-017
DATE	11-14-2023
DRAWN	BZ
REVIEWED	LM

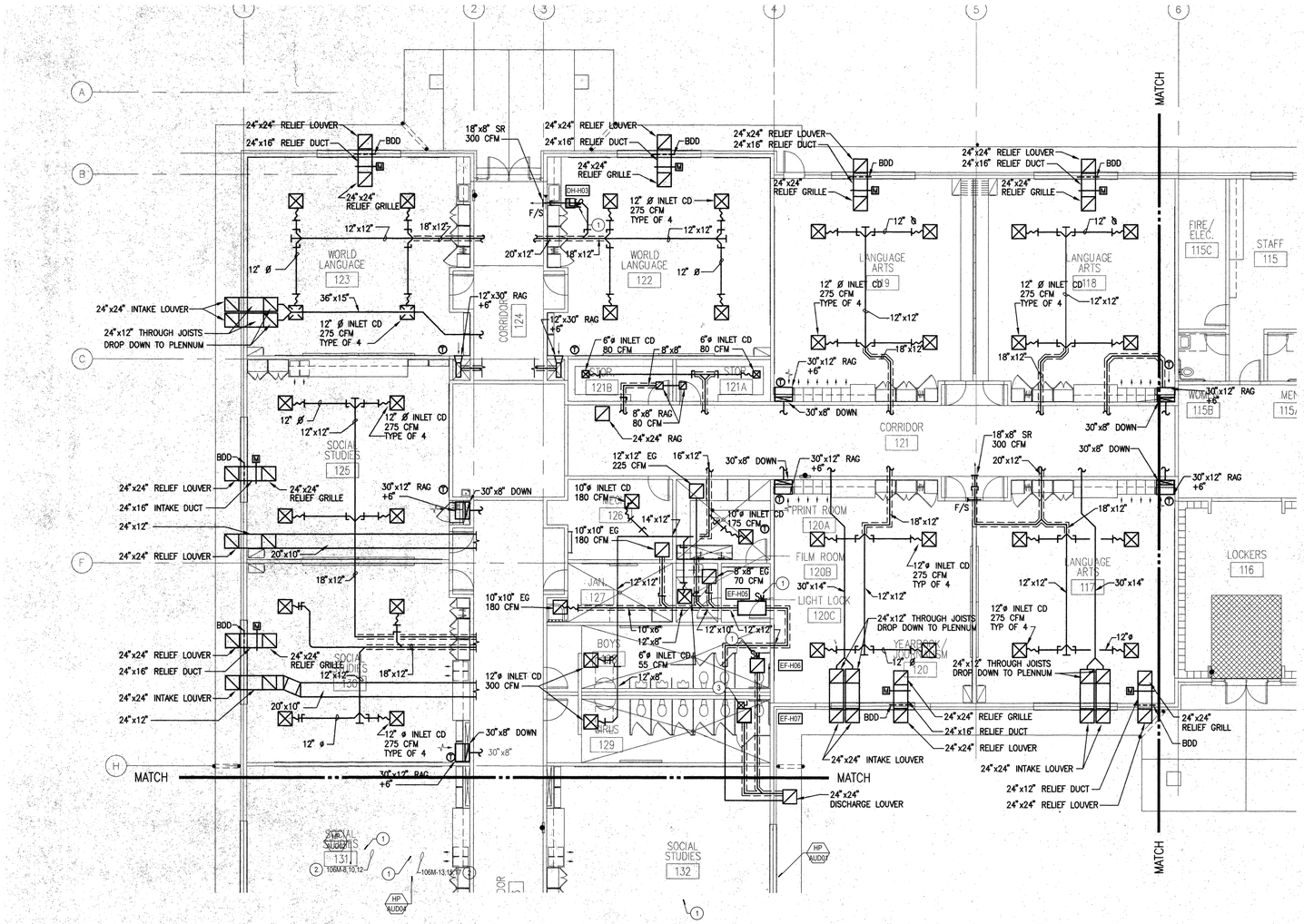
SHEET NAME
BUILDING H SECTION 1 ELECTRICAL FLOOR PLAN

SHEET NO.
E-1.13

BUILDING H SECTION 1 ELECTRICAL FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLN1 - 2023-11-13 - BETHLEHEM ZEVARIAS

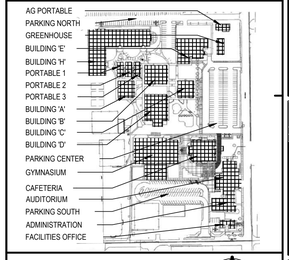


GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE NEMA 1 MOTOR RATED SNAP SWITCH FOR NEW UNIT. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
3. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.



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SHEET NAME
BUILDING H SECTION 2 ELECTRICAL FLOOR PLAN

SHEET NO.
E-1.14

22-482

BUILDING H SECTION 2 ELECTRICAL FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

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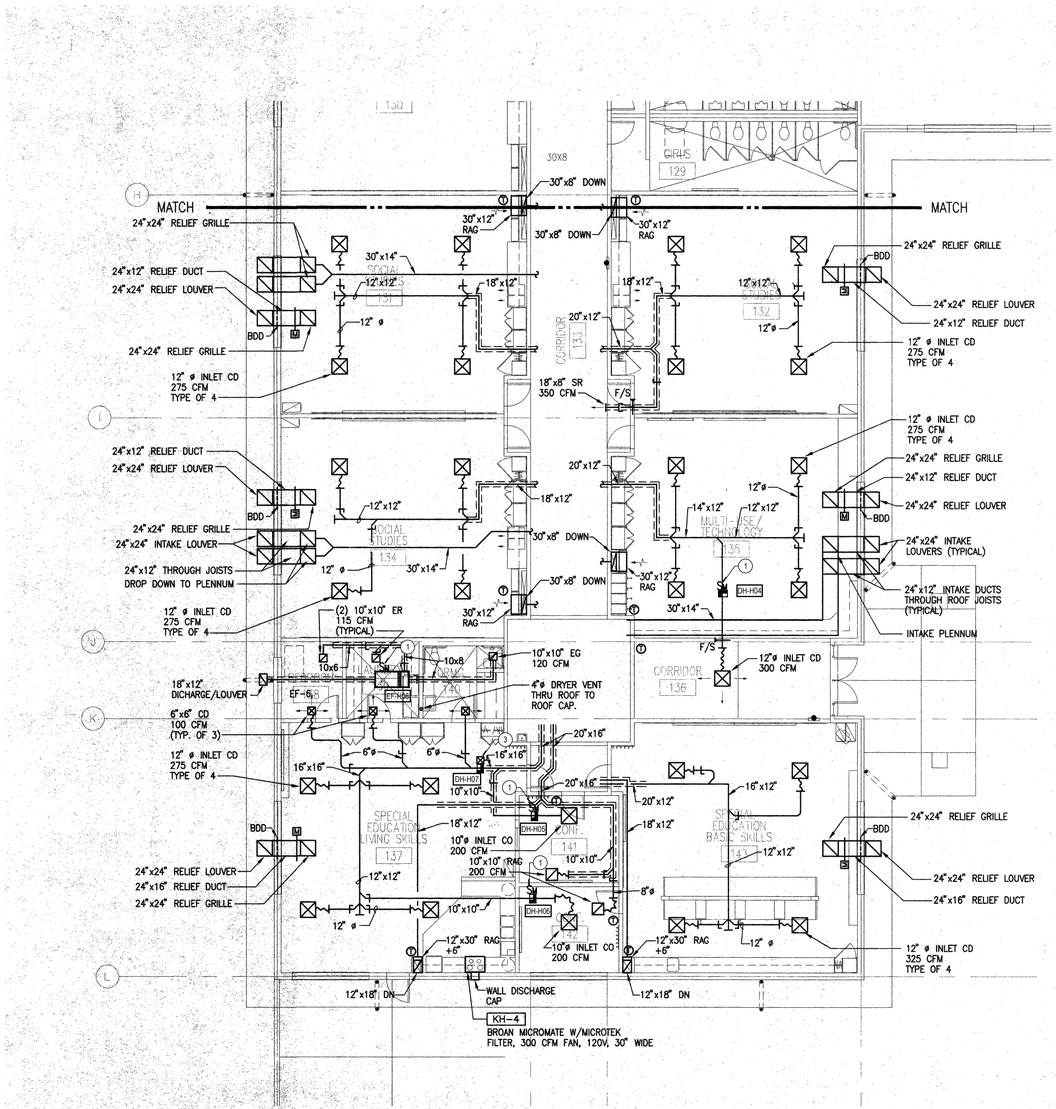
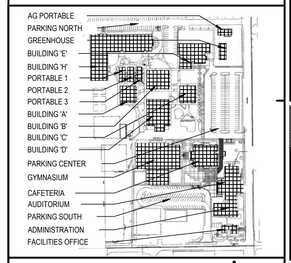


GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
6. ALL EXTERIOR RECEPTACLE OUTLETS SHALL BE GFCI TYPE.
7. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
8. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE NEMA 1 MOTOR RATED SNAP SWITCH FOR NEW UNIT. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.
3. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.



KEY PLAN

NORTH

BUILDING H SECTION 3 ELECTRICAL FLOOR PLAN

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

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SHEET NAME
BUILDING H SECTION 3 ELECTRICAL FLOOR PLAN

SHEET NO.
E-1.15

22-482

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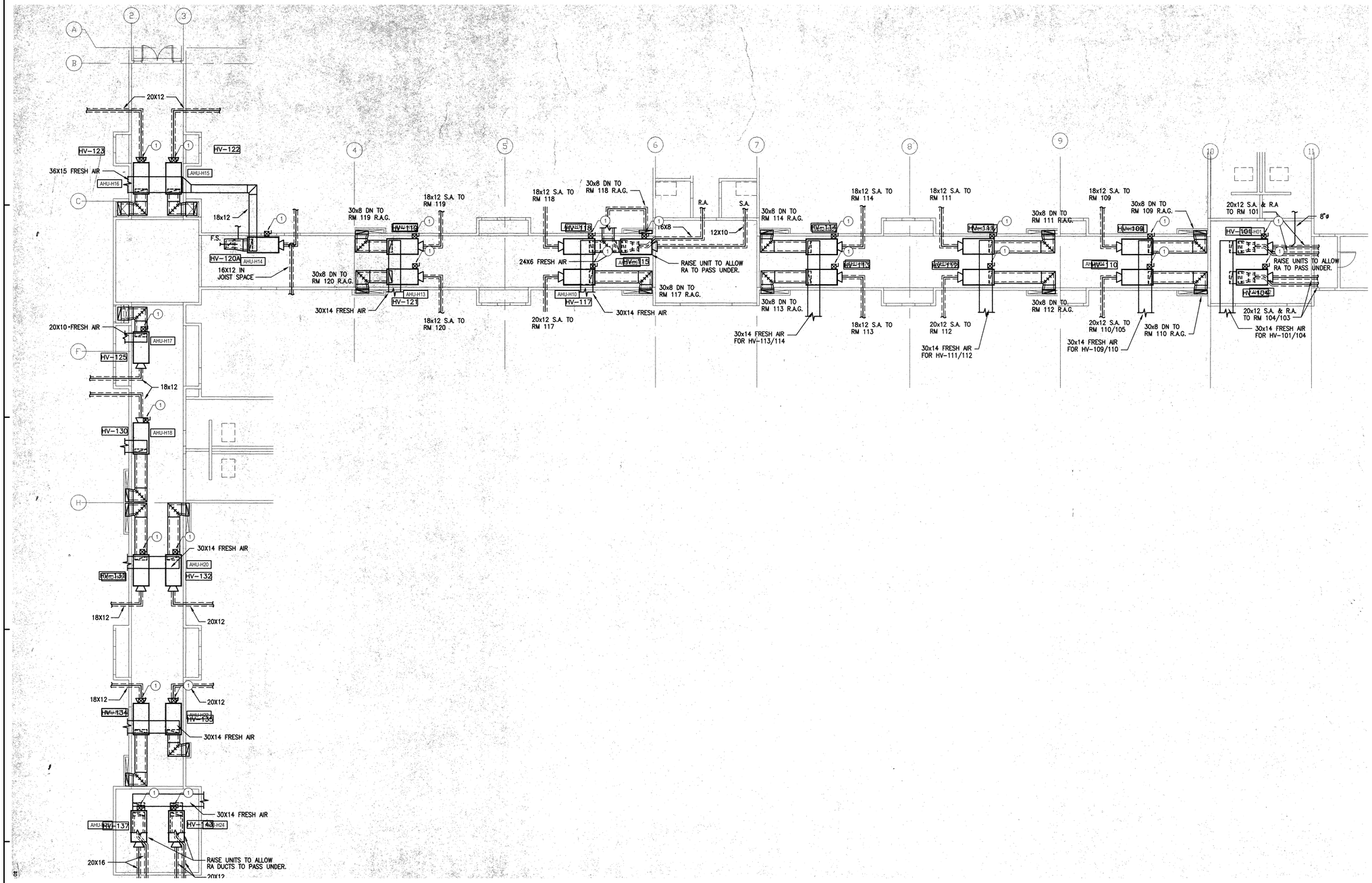
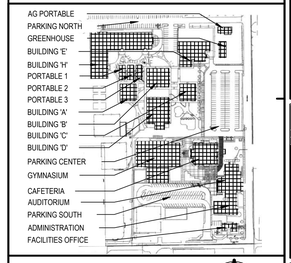


GENERAL NOTES

1. COORDINATE POWER AND DATA DEVICE LOCATIONS, AND DEVICE PLATE COLOR WITH ARCHITECT.
2. REFER TO MECHANICAL AND PLUMBING PLANS FOR THE EXACT LOCATION OF HVAC EQUIPMENT AND ADDITIONAL WIRING REQUIREMENTS.
3. PROVIDE DUCT DETECTOR POWER AND CONNECTIONS AS INDICATED ON MECHANICAL DRAWINGS.
4. PROVED FLEXIBLE SEAL TYPE CONDUIT FOR CONNECTION TO ALL HVAC EQUIPMENT.
5. PROVIDE HEAVY DUTY DISCONNECT SWITCHES WITH DUAL ELEMENT FUSES TO MATCH MOTOR H.P. RATING.
6. PROVIDE 3/4" CONDUIT FOR ELECTRICAL CIRCUITS U.O.N..
7. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUITS REQUIRED FOR ALL BRANCH CIRCUIT AND FEEDERS FOR CIRCUIT SIZES NOT SHOWN, REFER TO PANEL SCHEDULES FOR CONDUCTOR AND CONDUIT SIZES.
8. EXCEPT FOR THE HOMERUN INDICATION, CONDUIT AND WIRING SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE THE NUMBER OF CONDUCTORS REQUIRED FOR HOT LEGS, NEUTRAL AND GROUNDING AT EACH DEVICE FOR PROPER BRANCH CIRCUITING.
9. ALL 125 AND 250-VOLT, 15- AND 20-AMPERE NONLOCKING TYPE RECEPTACLES SHALL BE LISTED TAMPER RESISTANT RECEPTACLES IN AREAS SPECIFIED IN NEC 406.12.
10. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH NAMEPLATES, REFER. TO SPECIFICATIONS. IN ADDITION, EACH DISCONNECT MUST BE MARKED TO IDENTIFY ITS PURPOSE AND INCLUDE IDENTIFICATION OF CIRCUIT SOURCE THAT SUPPLIES DISCONNECTING MEANS. (110.22)

CONSTRUCTION NOTES

1. CONTRACTOR SHALL REMOVE EXISTING DISCONNECT. PROVIDE AND INSTALL 30A 3P H.D. NEMA 1 RATED COMBINATION STARTER/DISCONNECT FOR NEW UNIT. FUSING AND STARTER SIZE PER MECHANICAL EQUIPMENT MANUFACTURERS REQUIREMENTS. VERIFY EXACT LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR.
2. CONTRACTOR MAY REUSE CONDUIT FROM SOURCE PANEL TO NEW DISCONNECT IF IN GOOD WORKING CONDITION. ALL NEW WIRING AND CONTROL REQUIREMENTS SHALL BE VERIFIED WITH MECHANICAL CONTRACTOR.



KEY PLAN

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BUILDING H ATTIC ELECTRICAL FLOOR PLAN | SCALE: 1/8" = 1'-0" | 1

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SHEET NAME
BUILDING H ATTIC ELECTRICAL FLOOR PLAN

SHEET NO.
E-1.16

22-482

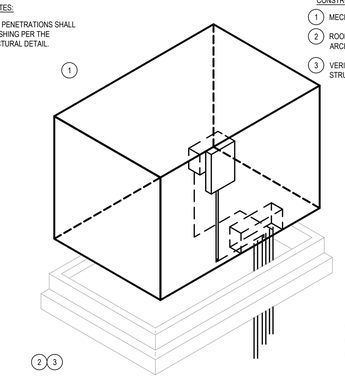
R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-PWRPLNH - 2023-11-13 - BETHLEHEM ZEKARIAS

GENERAL NOTES:

1. ALL ROOF PENETRATIONS SHALL HAVE FLASHING PER THE ARCHITECTURAL DETAIL.

CONSTRUCTION NOTES:

1. MECHANICAL UNIT.
2. ROOF STRUCTURE AND FLASHING PER ARCHITECTURAL PLANS.
3. VERIFY STRUCTURAL ATTACHMENT WITH STRUCTURAL ENGINEER.



PROVIDE AND INSTALL WEATHERPROOF NEMA 3R DISCONNECT SIZED PER PLAN. VERIFY REQUIREMENTS WITH MECHANICAL CONTRACTOR FOR UNIT LOCATION AND EXACT ELECTRICAL REQUIREMENTS PROVIDE EQUIPMENT PER ELECTRICAL SPECIFICATIONS.

HVAC UNIT POWER SUPPLY

CONTROL CIRCUIT

HVAC UNIT POWER CIRCUIT

RECEPTACLE CIRCUIT

-	13	-	9	-	5	**MECHANICAL UNIT DISCONNECT**	1
-	14	-	10	-	6	-	2
-	15	-	11	-	7	-	3
-	16	-	12	-	8		

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SHEET NAME
ELECTRICAL DETAILS

SHEET NO.
E-2.1

22-482

R:_PROJECT\2022\22-482 SEQUIM HIGH SCHOOL HVAC MODERNIZATION_CAD\22-482 E-DETAIL - 2023-11-13 - BETHLEHEM ZEKARIAS