

PROJECT SCOPE

THE WORK UNDER THIS CONTRACT IS TO PROVIDE THE LABOR, MATERIAL, AND EQUIPMENT FOR THE COMPLETE INSTALLATION OF THE HVAC & ELECTRICAL SYSTEMS DESCRIBED. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION, BALANCING, TESTING, STARTUP, AND OPERATIONAL CHECKOUT FOR A FULLY FUNCTIONAL SYSTEM.

THE DRAWINGS AND WORK SCOPE ARE NOT INTENDED TO BE COMPREHENSIVE OF ALL WORK TO BE DONE UNDER THIS CONTRACT. SPECIFICATIONS, DRAWINGS, AND WORK SCOPE MUST BE USED IN THEIR ENTIRETY TO DEVELOP FULL UNDERSTANDING OF THE WORK TO BE DONE UNDER THIS CONTRACT.

WORK COVERED BY CONTRACT DOCUMENTS

THESE DRAWINGS AND THE SPECIFICATIONS CENTRAL MIDDLE SCHOOL HVAC RENOVATION SUMMARIZE THE WORK. THE REQUIREMENTS OF BOTH MUST BE MET UNDER THIS CONTRACT. THE WORK IS LISTED BY SPECIFICATION DIVISION AND IS SUMMARIZED BELOW. REFER TO BOTH PLANS AND SPECIFICATIONS FOR A COMPLETE DESCRIPTION OF THE WORK.

DIVISION 0 - PROCUREMENT REQUIREMENTS

001116 - INVITATION TO BID  
002113 - INSTRUCTIONS TO BIDDERS  
004100 - BID FORM  
007300 - SUPPLEMENTARY CONDITIONS  
007343 - WAGE RATE REQUIREMENTS

DIVISION 1 – GENERAL REQUIREMENTS

011000 - SUMMARY OF WORK  
012500 - SUBSTITUTIONS  
012976 - APPLICATION FOR PAYMENT  
013119 - PROJECT MEETINGS  
013216 - CONSTRUCTION SCHEDULING  
013300 - SUBMITTALS  
013513 - SPECIAL PROJECT PROCEDURES  
016000 - MATERIAL AND EQUIPMENT  
017329 - CUTTING AND PATCHING  
017400 - CLEANING AND WASTE MANAGEMENT  
017700 - CONTRACT CLOSEOUT

DIVISION 2 – EXISTING CONDITIONS

024119 - SELECTIVE DEMOLITION

DIVISION 23 – HEATING, VENTILATION, AND AIR CONDITIONING

230100 - BASIC MECHANICAL MATERIALS & METHODS  
230500 - HEATING, VENTILATION, AND AIR CONDITIONING  
230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC  
230900 – HVAC CONTROLS  
231123 – FUEL PIPING

DIVISION 26 - ELECTRICAL

26 00 00 - BASIC ELECTRICAL REQUIREMENTS

OREGON STATE ENERGY CODE CONFORMANCE NOTES

- GENERAL**
- BUILDING OPERATIONS AND MAINTENANCE DOCUMENTS SHALL BE PROVIDED TO THE OWNER. DOCUMENTS WILL COVER MANUFACTURERS' INFORMATION, SPECIFICATIONS, PROGRAMMING PROCEDURES AND MEANS OF ILLUSTRATING TO OWNER HOW BUILDING EQUIPMENT AND SYSTEMS ARE INTENDED TO BE INSTALLED, MAINTAINED, AND OPERATED.
  - TOTAL VOLTAGE DROP ACROSS THE COMBINATION OF FEEDERS AND BRANCH CIRCUITS SHALL BE <= 5%

ENVELOPE

- BUILDING ENVELOPE INSULATION SHALL BE LABELED WITH R-VALUE OR INSULATION CERTIFICATE PROVIDING R-VALUE AND OTHER RELEVANT DATA. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- EXTERIOR INSULATION SHALL PROTECTED AGAINST DAMAGE, SUNLIGHT, MOISTURE, WIND, LANDSCAPING AND EQUIPMENT MAINTENANCE ACTIVITIES.
- FENESTRATION PRODUCTS SHALL BE RATED IN ACCORDANCE WITH NFRC.
- THE BUILDING ENVELOPE SHALL CONTAIN A CONTINUOUS AIR BARRIER THAT IS SEALED IN AN APPROVED MANNER AND EITHER CONSTRUCTED OR TESTED IN AN APPROVED MANNER. AIR BARRIER PENETRATIONS ARE SEALED IN AN APPROVED MANNER.
- ALL SOURCES OF AIR LEAKAGE IN THE BUILDING THERMAL ENVELOPE SHALL BE SEALED, CAULKED, GASKETED, WEATHER STRIPPED OR WRAPPED WITH MOISTURE VAPOR-PERMEABLE WRAPPING MATERIAL TO MINIMIZE AIR LEAKAGE.

ELECTRICAL

- RECESSED LUMINAIRES IN THERMAL ENVELOPE SHALL LIMIT INFILTRATION AND BE IC RATED AND LABELED. SEAL BETWEEN INTERIOR FINISH AND LUMINAIRE HOUSING.
- ELECTRICAL AND LIGHTING CONTRACTOR/S SHALL PROVIDE PLANS, SPECIFICATIONS, AND/OR CALCULATIONS WITH WHICH COMPLIANCE CAN BE DETERMINED FOR THE INTERIOR LIGHTING AND ELECTRICAL SYSTEMS AND EQUIPMENT AND DOCUMENT WHERE EXCEPTIONS TO THE STANDARD ARE CLAIMED. INFORMATION PROVIDED SHOULD INCLUDE INTERIOR LIGHTING POWER CALCULATIONS, WATTAGE OF BULBS AND BALLASTS, TRANSFORMERS AND CONTROL DEVICES.
- FURNISHED O&M INSTRUCTIONS FOR SYSTEMS AND EQUIPMENT TO THE BUILDING OWNER OR DESIGNATED REPRESENTATIVE.
- FURNISHED AS-BUILT DRAWINGS FOR ELECTRIC POWER SYSTEMS WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.
- TEST LIGHTING SYSTEMS TO ENSURE PROPER CALIBRATION, ADJUSTMENT, PROGRAMMING, AND OPERATION.
- PROVIDE OCCUPANCY SENSORS FOR RESTROOMS AND LOUNGES.
- IN DAYLIT SPACES, PROVIDE LIGHT-REDUCTION CONTROLS THAT HAVE A MANUAL CONTROL THAT ALLOWS THE OCCUPANT TO REDUCE THE CONNECTED LIGHTING LOAD IN A REASONABLY UNIFORM ILLUMINATION PATTERN >= 50 PERCENT.
- PROVIDE INDEPENDENT CONTROL OF LIGHTING ASSOCIATED WITH DISPLAY, ACCENT, TASK, CABINET, SALES, AND DEMONSTRATION LIGHTING.
- EXIT SIGNS DO NOT EXCEED 5 WATTS PER FACE.

MECHANICAL

- HVAC PIPING SHALL BE INSULATED IN ACCORDANCE WITH SCHEDULE C403.11.3. INSULATION EXPOSED TO WEATHER SHALL BE PROTECTED FROM DAMAGE AND IS PROVIDED WITH SHIELDING FROM SOLAR RADIATION.
- HEATING AND COOLING SYSTEMS THERMOSTATS SHALL INCLUDE OPTIMUM START CONTROLS. THERMOSTATIC CONTROLS HAVE A 5°F DEADBAND. EACH ZONE SHALL BE EQUIPPED WITH SETBACK CONTROLS USING AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM. AUTOMATIC CONTROLS SHALL BE CAPABLE OF: SETBACK TO 55°F (HEAT) AND 85°F (COOL); 7-DAY CLOCK, 2-HOUR OCCUPANT OVERRIDE, 10-HOUR BACKUP.
- FURNISHED O&M MANUALS FOR HVAC SYSTEMS WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.
- HVAC EQUIPMENT SHALL BE TESTED TO ENSURE PROPER OPERATION.
- FURNISH HVAC AS-BUILT DRAWINGS AND SUBMIT WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.
- ALL AIR OUTLETS AND ZONE TERMINAL DEVICES SHALL HAVE MEANS FOR AIR BALANCING. PROVIDE AN AIR SYSTEM BALANCING REPORT FOR HVAC SYSTEMS.
- HVAC DUCTS AND PLENUMS SHALL BE INSULATED IN ACCORDANCE WITH C403.11.1 AND CONSTRUCTED IN ACCORDANCE WITH C403.11.2.
- HVAC CONTROL SYSTEMS SHALL BE TESTED TO ENSURE PROPER OPERATION, CALIBRATION AND ADJUSTMENT OF CONTROLS.

HVAC BASIS OF DESIGN				
OUTDOOR DESIGN TEMPERATURES PER ASHRAE	91.2°F DB SUMMER 64.2°F WB SUMMER 9.0°F DB WINTER	STATE: OREGON	COUNTY: UMATILLA	CLIMATE ZONE: 5B
		DESIGN ALTITUDE 1043 FT ABOVE SEA LEVEL		
INDOOR AREA DESIGN CONDITIONS		SUMMER		WINTER
GENERAL SPACE DESIGNATION		Db (°F)	% HUMIDITY	Db (°F) % HUMIDITY
GENERAL BUILDING		75	50	70 50
THESE DOCUMENTS WERE DEVELOPED USING THE 2019 OREGON MECHANICAL CODE, 2019 OREGON ZERO ENERGY READY COMMERCIAL CODE.				

GENERAL CONSTRUCTION NOTES

GENERAL

- ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND REGULATIONS AS ENFORCED BY THE STATE OF OREGON AND THE LOCAL CODE AUTHORITY.
- PROVIDE SHOP DRAWINGS OF LAYOUT OF MECHANICAL ROOM HVAC EQUIPMENT, DUCTWORK, AND PIPING. ALSO, OTHER SPACES WHERE SERVICE ACCESS IS REQUIRED FOR MECHANICAL OR PLUMBING EQUIPMENT FOR ENGINEER APPROVAL PRIOR TO INSTALLATION.
- VISITATION OF THE JOB SITE IS REQUIRED BEFORE BIDDING, EXISTING CONDITIONS MAY AFFECT THE EXTENT OF THE WORK. ADDITIONAL COSTS WILL NOT BE AUTHORIZED DUE TO LACK OF UNDERSTANDING OF THE SCOPE OF WORK AND EXISTING CONDITIONS.
- EXISTING FACILITIES ARE DRAWN AS ACCURATELY AS CAN BE DETERMINED FROM EXISTING DRAWINGS AND ON-SITE INSPECTIONS. VERIFY AT PROJECT.
- INSTALL ALL WORK PARALLEL AND PLUMB TO BUILDING LINES.
- ALL DUCTWORK, PIPING, AND EQUIPMENT SHALL BE INSTALLED IN A MANNER AND IN LOCATIONS TO AVOID OBSTRUCTION, PRESERVE HEAD ROOM, AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.
- NO ATTEMPT HAS BEEN MADE TO SHOW ALL PIPE SUPPORTS, LOCATIONS, AND EXPANSION JOINTS. REFER TO SPECIFICATIONS FOR THIS.
- TO INSURE THE STRUCTURAL INTEGRITY OF THE BUILDING, ALL CUTTING REQUIRED FOR THE INSTALLATION OF DUCTS, PIPING, AND CONDUIT IS TO BE CLEARED THROUGH THE ENGINEER BEFORE WORK IS DONE.
- CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO ROOF MEMBRANE RESULTING FROM THIS WORK.
- ENSURE WATERTIGHT DUCTWORK CONNECTIONS.
- COORDINATE EQUIPMENT LABELING AND MARKING OF SERVICE POINT ACCESS WITH OWNER/MAINTENANCE STAFF.
- ALL HOLE CUTTING, FRAMING, PATCHING, PAINTING AND ROOFING BY GENERAL CONTRACTOR (G.C.)

MECHANICAL HVAC

- HVAC CONTRACTOR TO PROVIDE MECHANICAL PERMITS.
- HVAC CONTRACTOR SHALL TEST AND BALANCE TO THE AIR QUANTITIES PER PLAN.
- THE HVAC CONTRACTOR SHALL PROVIDE A ONE(1) YEAR PARTS & LABOR WARRANTY. ALL COMPRESSORS SHALL HAVE A ONE(1) YEAR WARRANTY AS PROVIDED BY THE MANUFACTURER.
- HEATING & COOLING EQUIPMENT SELECTED SHALL BE NO LARGER THAN THE SMALLEST AVAILABLE SIZE EXCEEDING LOAD CALCULATIONS.
- IN FAN SYSTEMS OVER 2,000 CFM SERVING MORE THAN ONE ROOM, PROVIDE AUTOMATIC FAN SHUTDOWN FOR SMOKE CONTROL PER INTERNATIONAL MECHANICAL CODE (IMC) / OREGON MECHANICAL SPECIALTY CODE.
- 2-INCH AND SMALLER PIPE TO BE THREADED, OR SLIP JOINT AND SOLDER.
- ELECTRICAL TO PROVIDE CONVENIENCE OUTLET WITHIN 25-FEET OF ALL HVAC EQUIPMENT FOR MAINTENANCE SERVICE.

DUCTWORK

- DUCT SIZES LISTED ARE NET INSIDE DIMENSIONS. ALLOW FOR SHEET METAL AND INSULATION THICKNESS.
- UNLESS OTHERWISE INDICATED, ALL RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED SHEET METAL. ALL ROUND DUCTWORK SHALL BE OF SPIRAL OF SNAP-LOCK CONSTRUCTION AND FABRICATED FROM GALVANIZED SHEET METAL.
- PROVIDE ESSENTIALLY AIR TIGHT SHEET METAL DUCTWORK. DUCTWORK SHALL CONFORM TO ASHRAE, LATEST EDITION, AND CONSTRUCTION PER SMACNA MANUAL OF HVAC DUCT CONSTRUCTION STANDARDS AND IN ACCORDANCE TO INTERNATIONAL MECHANICAL CODE, LATEST EDITION.
- SHEET METAL TO COMPLY WITH ASTM A-525, WITH 1-1/4 OZ COATING AND BEAR STAMP OF MANUFACTURER.
- DUCT LINERS (WHERE REQUIRED): DUCT LINERS SHALL BE 1-INCH THICK, 1-1/2 LB DENSITY GLASS FIBER MATERIAL. LINER SHALL BE BLACK NEOPRENE COATED, MATTE FACE ON EXPOSED SIDE AND RATED UP TO 4000 FPM VELOCITY. OWENS CORNING AEROFLEX MANVILLE LINACOLUSTIC, OR APPROVED EQUAL.
- MATERIALS IN DUCTS AND PLENUMS SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPMENT RATING OF NOT MORE THAN 50, PER LOCAL CODE.
- INSULATE ALL DUCTWORK PER THE APPLICABLE ENERGY CODE.
- ALL LOW VELOCITY FLEXIBLE DUCTWORK TO BE CLASS 1-AIR DUCT.

DUCT ACCESSORIES

- TURNING VANES: TURNING VANES SHALL BE AIRFOIL, DOUBLE THICKNESS TYPE.
- VOLUME DAMPERS: VOLUME DAMPERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA DETAILS FOR BUTTERFLY-TYPE DAMPERS. DURO-DYNE 3/8-INCH QUADLINE.
- DUCT CONNECTORS: DUCT CONNECTORS SHALL BE IMC, SMACNA, OR APPROVED MANUFACTURED JOINING SYSTEM.
- FLEXIBLE CONNECTORS: FLEXIBLE DUCT CONNECTORS SHALL BE IMPREGNATED DUROPRENE GLASS FABRIC, LOW SMOKE DEVELOPMENT. PROVIDE WITH THE NECESSARY ANGLE, STRAPS, BOLTS, OR CLIPS TO SECURE THE MATERIAL TO THE EQUIPMENT AND DUCTS.

BALANCING DAMPERS

- PROVIDE BALANCING DAMPER(S) FOR EACH SUPPLY AND RETURN OUTLET.
- BALANCING DAMPER TO BE QUADRANT DAMPER INSTALLED IN DUCTWORK WITH LOCKING LEVEL FOR ALL SUPPLY OUTLETS. OPPOSED BLADE DAMPER (OBD) LOCATED BEHIND EACH RETURN GRILLE MAY BE USED FOR RETURN OR EXHAUST OUTLETS. OBD TO BE FULLY ADJUSTABLE FROM BACK OF GRILLE WITHOUT REMOVING GRILLE FACE.
- THE USE OF OBDs MAY NOT BE USED FOR SUPPLY OUTLETS.

GRILLES, DIFFUSERS, AND REGISTERS

- DIFFUSERS SHALL BE SUPPLIED PER THE AIR DISTRIBUTION DEVICE SCHEDULE.
- MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED-ON ENAMEL, STANDARD WHITE UNLESS OTHERWISE NOTED.

PIPING

- NO ATTEMPT HAS BEEN MADE TO SHOW ALL PIPE SUPPORTS, LOCATIONS AND EXPANSION JOINTS. REFER TO SPECIFICATIONS FOR THIS.
- PROVIDE ANGLE STOPS OR SHUT-OFF VALVES AND UNIONS AT ALL EQUIPMENT/FIXTURE CONNECTIONS.
- SEAL ALL PIPING AT THEIR PERIMETERS TO WALLS, FLOORS WITH AN APPROVED SEALANT.
- GAS PIPING IN THE MECHANICAL ROOM SHALL COMPLY WITH LOCAL CODES AND A S.M.E. CSD-1 (LATEST EDITION) AND CONFORM TO THE SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL COMPONENTS PER THE BUILDING CODE. SEISMIC BRACING IS REQUIRED ON ALL RUL-PIPE AND ALL OTHER PIPING THAT IS 1-25 NOMINAL INCHES AND LARGER IN MECHANICAL ROOM OR 2.5-INCHES AND LARGER OUTSIDE MECHANICAL ROOM. SEISMIC BRACING MUST HAVE A MINIMUM OF TWO TRAVERSE BRACES AND ONE LONGITUDAL BRACE. A RUN IS REFINED AS A LENGTH OF PIPE WITHOUT ANY CHANGES IN DIRECTION. BRANCH LINES MAY NOT BE USED TO BRACE MAIN LINES.

ELECTRICAL

- ALL POWER WIRING INCLUDING FINAL CONNECTIONS AND FUSED DISCONNECT SWITCHES BY ELECTRICAL CONTRACTOR (E.C.). 110V MECHANICAL SERVICE OUTLETS BY E.C.
- VERIFY MECHANICAL EQUIPMENT NAMEPLATE AMPERAGES BEFORE MAKING FINAL CONNECTIONS.

DUCTWORK SYMBOLS			
SINGLE LINE	DOUBLE LINE	SINGLE LINE	DOUBLE LINE
	DUCT UP		RETURN/EXHAUST DUCT UP
	SUPPLY DUCT UP		RETURN/EXHAUST DUCT DOWN
	SUPPLY DUCT DOWN		HORIZONTAL OFFSET SUPPLY/RETURN /EXHAUST
	STANDARD RADIUS ELBOW (R = W) SUPPLY/RETURN /EXHAUST		RISE/DROP
	RISE/DROP		RISE OR DROP SUPPLY/RETURN/ EXHAUST
	TURNING VANES		45°F TAP TAKE-OFF
	SPLIT TAKE-OFF W/ BRANCH DAMPERS SUPPLY		90°F TAP TAKE-OFF
	BULLHEAD SPLIT SUPPLY		RING DUCT
	BULLHEAD SPLIT SUPPLY		BULLHEAD CONVERGE RETURN/EXHAUST
	SIDEWALL DUCT MTD. REG./GRILLE		SUPPLY SIDEWALL LINEAR DIFFUSER (W/SHEET METAL PLENUM W/1" LINING & BRANCH CONN FOR EVERY 4' OF LENGTH)
	CEILING DUCT MTD. DIFF/GRILLE		SUPPLY CEILING LINEAR DIFFUSER (W/SHEET METAL PLENUM W/1" LINING & BRANCH CONN FOR EVERY 4' OF LENGTH)
	CEILING DUCT MTD. DIFF/GRILLE		HARD ELBOW
	ACOUSTICALLY LINED DUCT		OPEN END DUCT W/ 1/4"x1/4" VMS
	DUCTWORK OR EQUIPMENT TO BE REMOVED		FLEXIBLE DUCT
ADDITIONAL SYMBOLS			
	AVS	AIR VOLUME TRAVERSE STATION	
	ACD	AUTOMATIC CONTROL DAMPER W/ACCESS DOOR	
	SGD	SLIDE GATE DAMPER	
	VD	MANUAL VOLUME DAMPER	
	FD	SELF-CLOSING FIRE DAMPER W/ACCESS DOOR	
	SD	AUTOMATIC SMOKE DAMPER W/ACCESS DOOR	
	SFD	COMBINATION SMOKE/FIRE DAMPER W/ACCESS DOOR	
	BD	BACKDRAFT DAMPER	
	(M)	MOTORIZED DAMPER	
		STANDARD 4-WAY BLOW SUPPLY DIFFUSER	
		BLANKED FOR 3-WAY BLOW SUPPLY DIFFUSER	
	OR	BLANKED FOR 2-WAY BLOW SUPPLY DIFFUSER	
		BLANKED FOR 1-WAY BLOW SUPPLY DIFFUSER	
		ROOF EXHAUST FAN SHOWN ON ROOF	
		ROOF EXHAUST FAN SHOWN ON FLOOR PLAN	
		UNDERCUT DOOR	
		LOUVERED DOOR	
		RETURN OR EXHAUST AIR FLOW DIRECTION	
		SUPPLY AIR FLOW	
		CONNECT NEW TO EXISTING	
		POINT OF DEMOLITION	
		SECTION DESIGNATION SHEET NUMBER	
	(T)	TEMPERATURE SENSOR OR THERMOSTAT	
	(S)	SMOKE DETECTOR	
	(TS)	TIMER SWITCH	
	(OS)	OCCUPANCY SENSOR	

OWNER

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MILTON-FREEWATER, OR 97862  
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MECHANICAL ENGINEER

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ELECTRICAL ENGINEER

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8524 W. GAGE BLVD STE A1 108  
KENNEWICK, WA 99336  
PHONE: 509 543 7597

STRUCTURAL ENGINEER

KNUTZEN ENGINEERING  
ERIC ANDERSON, PE, SE  
5401 RIDGELINE DRIVE SUITE 160  
KENNEWICK, WA 99338  
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ABBREVIATIONS

AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
AMPS	AMPERAGE
APD	AIR PRESSURE DROP, INCH
BTUH	BRITISH THERMAL UNITS PER HOUR
CFM	CUBIC FEET PER MINUTE
EA	EXHAUST AIR
EF	EXHAUST FAN
EDB	ENTERING DRY BULB
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EWT	ENTERING WATER
FV	FACE VELOCITY
GPM	GALLONS PER MINUTE
HP	HORSE POWER
KW	KILOWATTS
L	LOUVER
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAU	MAKEUP AIR UNIT
MIN	MINIMUM
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MDO	MOTORIZED DAMPER
OA	OUTSIDE AIR
OS	OCCUPANCY SENSOR
PRV	PRESSURE RELIEF VALVE
RA	RETURN AIR
RET	RETURN
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SUP	SUPPLY
TON	~12,000 BTUH (3.5kW) COOLING CAPACITY
TS	TEMPERATURE SENSOR
VD	VOLUME DAMPER
VTR	VENT THROUGH ROOF
WPD	WATER PRESSURE DROP, INCH

(E) EXISTING  
(N) NEW

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REGISTERED PROFESSIONAL ENGINEER  
83123PE  
Digital Signature  
OREGON  
JUNE 2, 2019  
MICHAEL A. LOVEJOY

RENEWAL DATE DEC. 31, 2022

HELIX ENERGY PARTNERS, LLC

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REV	DATE	BY

CENTRAL MIDDLE SCHOOL HVAC UPGRADE

120 S MAIN ST, MILTON-FREEWATER, OR 97862

MECHANICAL LEGEND, SYMBOLS, ABBREVIATIONS

PROJECT TITLE: PROJECT ADDRESS: PROJECT ADDRESS: SHEET TITLE:

PROJECT NO. HEP-21-17  
DESIGNED BY MAL  
DRAWN BY YD  
ISSUE DATE 8 JUL 2022  
CHECKED BY MAL  
PHASE CD SET  
SHEET NO.

M0.01

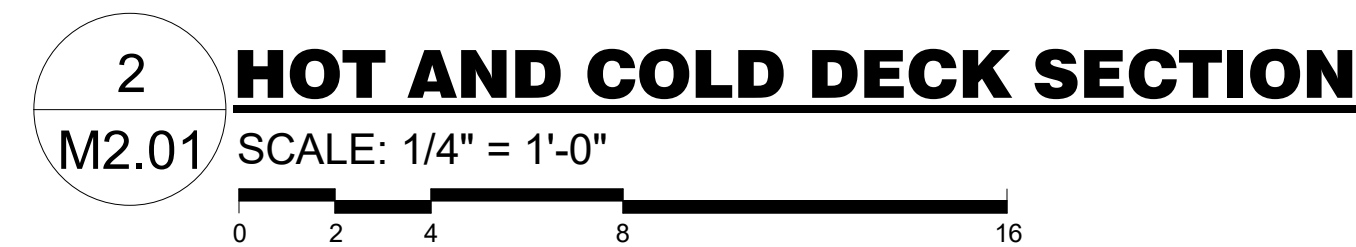
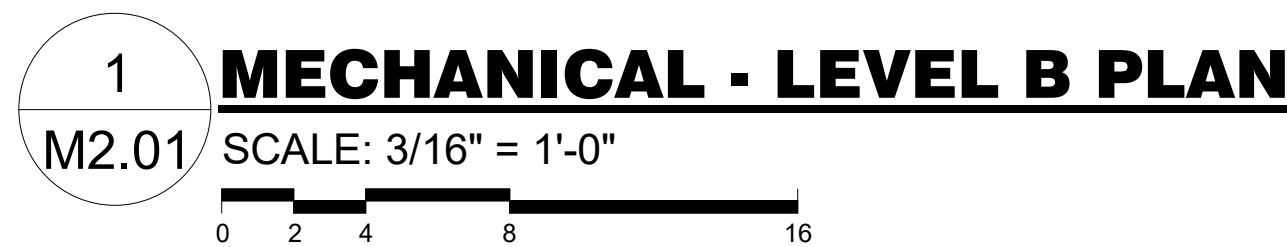




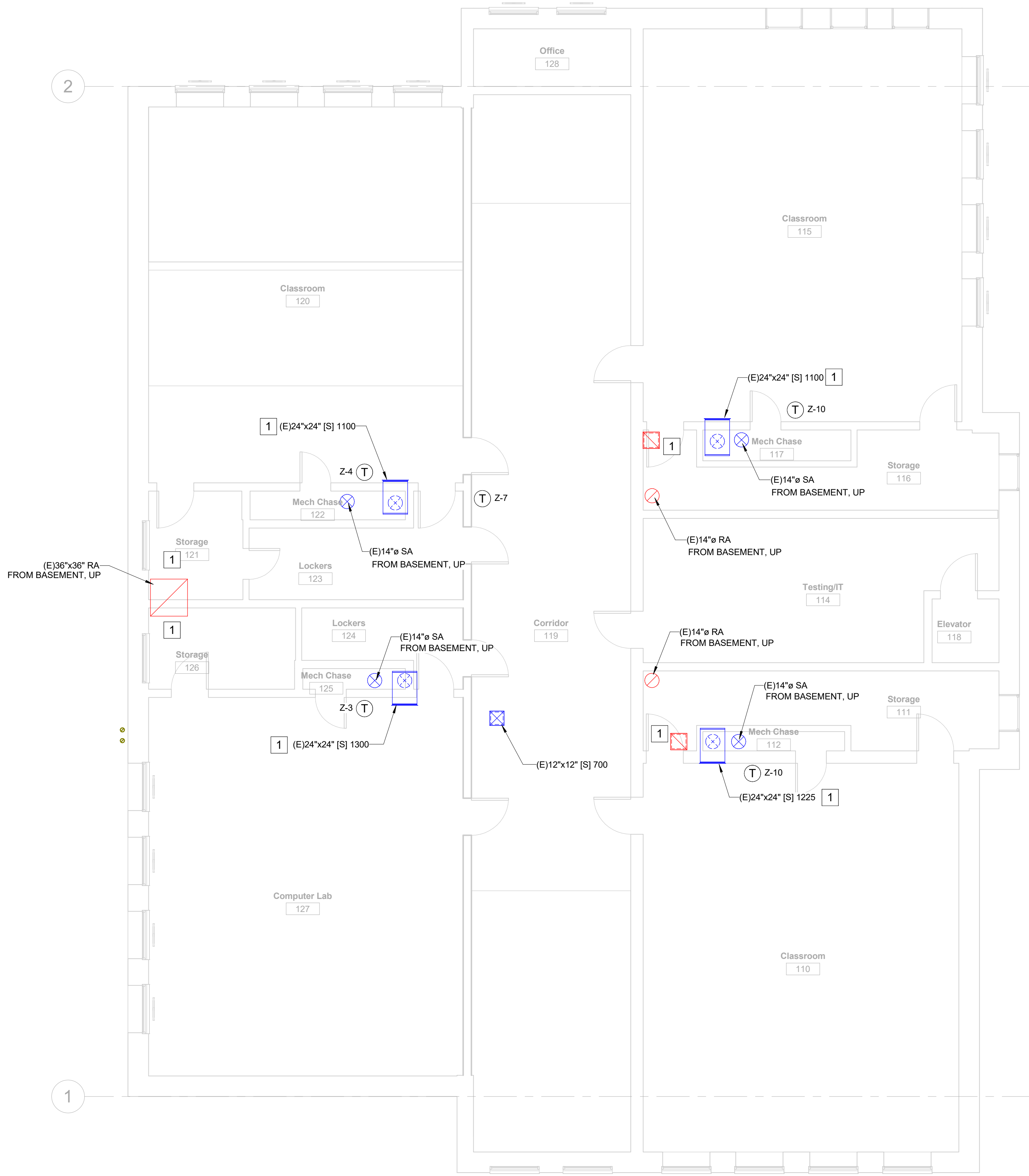




# M1.01







1  
M2.02  
MECHANICAL - LEVEL 1 PLAN  
SCALE: 3/16" = 1'-0"

## GENERAL NOTES

- FOR THE PURPOSES OF CLEARNESS AND LEGIBILITY, DRAWINGS ARE DIAGRAMMATIC AND FOR DESIGN INTENT ONLY. CONTRACTOR MUST VERIFY ALL DIMENSIONS BY FIELD MEASUREMENT BEFORE BEGINNING ANY FABRICATION OR CONSTRUCTION.
- ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL CODES IN ACCORDANCE WITH THE CURRENT INTERNATIONAL MECHANICAL CODE.
- ALL NEW MATERIAL, METHODS, AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE BUILDING STANDARDS AS APPROVED BY THE OWNER.
- CONTRACTOR SHALL INSTALL ALL EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- COORDINATION BETWEEN TRADES IS NECESSARY. MECHANICAL, ELECTRICAL, AND CONTROLS.
- BALANCE AIR SYSTEMS WITHIN 10% OF CAPACITIES LISTED.
- ALL ROTATING EQUIPMENT SHALL BE SUSPENDED WITH VIBRATION HANGERS.
- MAINTAIN WORK SPACE IN ORDERLY CONDITION.
- REMOVE ALL DEMOLITION DEBRIS FROM SITE.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS, BEST PRACTICES AND WARRANTY.
- CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING STRUCTURAL AND PRESTRESSED REINFORCEMENT PRIOR TO DRILLING ANY CONCRETE STRUCTURE.
- EQUIPMENT BEING REPLACED SHALL MATCH COLOR, STYLE, AND MANUFACTURER OF EXISTING OR ADJACENT EQUIPMENT EXCEPT AS CALLED OUT.
- COORDINATE EQUIPMENT LABELING AND MARKING OF SERVICE POINT ACCESS WITH OWNER/MAINTENANCE STAFF.
- ALL DUCT SIZES INDICATE NET INSIDE DIMENSIONS UNLESS OTHERWISE NOTED.
- PROVIDE FIRE CAULKING FOR PIPE AND/OR DUCT PENETRATIONS THROUGH FIRE RATED BARRIERS.
- SEISMIC BRACING IS REQUIRED ON ALL DUCTING THAT IS 8" OR LARGER AND MUST COMPLY WITH SMACNA OR EQUIVALENT GUIDELINES. SUCH RUNS OF DUCTING MUST HAVE A MINIMUM OF TWO TRANSVERSE BRACES AND ONE LONGITUDINAL BRACE. BRANCH LINES MAY NOT BE USED AS A SUBSTITUTE FOR SEISMIC BRACING.
- PROVIDE FLEXIBLE DUCT, PIPING, AND CONDUIT CONNECTIONS AT EQUIPMENT.

## KEYED NOTES

- 1 REPAIR OR REPLACE EXISTING RETURN AIR AND SUPPLY AIR GRILLES AS NEEDED.



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REV	DATE	BY

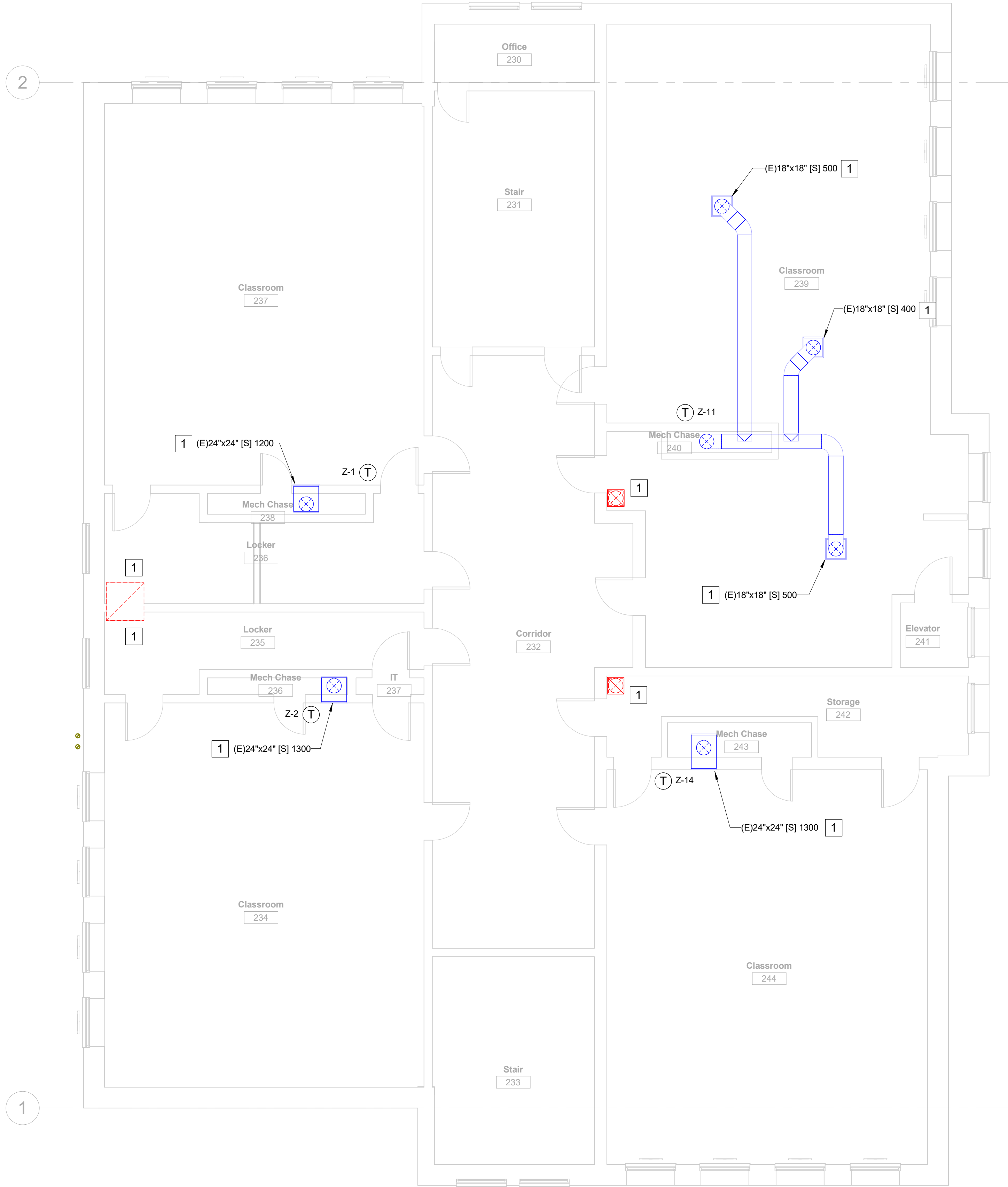
CENTRAL MIDDLE SCHOOL HVAC UPGRADE

120 S MAIN ST, MILTON-FREEWATER, OR 97862

MECHANICAL - LEVEL 1 PLAN

PROJECT TITLE	HEP-21-17
PROJECT ADDRESS	
SHEET TITLE	
PROJECT NO.	HEP-21-17
DESIGNED BY	MAL
DRAWN BY	YD
ISSUE DATE	8 JUL 2022
CHECKED BY	MAL
PHASE	CD SET
SHEET NO.	

M2.02



**MECHANICAL - LEVEL 2 PLAN**  
SCALE: 3/16" = 1'-0"  
0 2 4 8 16

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- CONTRACTOR SHALL INSTALL ALL EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- COORDINATION BETWEEN TRADES IS NECESSARY. MECHANICAL, ELECTRICAL, AND CONTROLS.
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- MAINTAIN WORK SPACE IN ORDERLY CONDITION.
- REMOVE ALL DEMOLITION DEBRIS FROM SITE.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS, BEST PRACTICES AND WARRANTY.
- CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING STRUCTURAL AND PRESTRESSED REINFORCEMENT PRIOR TO DRILLING ANY CONCRETE STRUCTURE.
- EQUIPMENT BEING REPLACED SHALL MATCH COLOR, STYLE, AND MANUFACTURER OF EXISTING OR ADJACENT EQUIPMENT EXCEPT AS CALLED OUT.
- COORDINATE EQUIPMENT LABELING AND MARKING OF SERVICE POINT ACCESS WITH OWNER/MAINTENANCE STAFF.
- ALL DUCT SIZES INDICATE NET INSIDE DIMENSIONS UNLESS OTHERWISE NOTED.
- PROVIDE FIRE CAULKING FOR PIPE AND/OR DUCT PENETRATIONS THROUGH FIRE RATED BARRIERS.
- SEISMIC BRACING IS REQUIRED ON ALL DUCTING THAT IS 8" OR LARGER AND MUST COMPLY WITH SMACNA OR EQUIVALENT GUIDELINES. SUCH RUNS OF DUCTING MUST HAVE A MINIMUM OF TWO TRANSVERSE BRACES AND ONE LONGITUDINAL BRACE. BRANCH LINES MAY NOT BE USED AS A SUBSTITUTE FOR SEISMIC BRACING.
- PROVIDE FLEXIBLE DUCT, PIPING, AND CONDUIT CONNECTIONS AT EQUIPMENT.

## KEYED NOTES

- 1** REPAIR OR REPLACE EXISTING RETURN AIR AND SUPPLY AIR GRILLES AS NEEDED.



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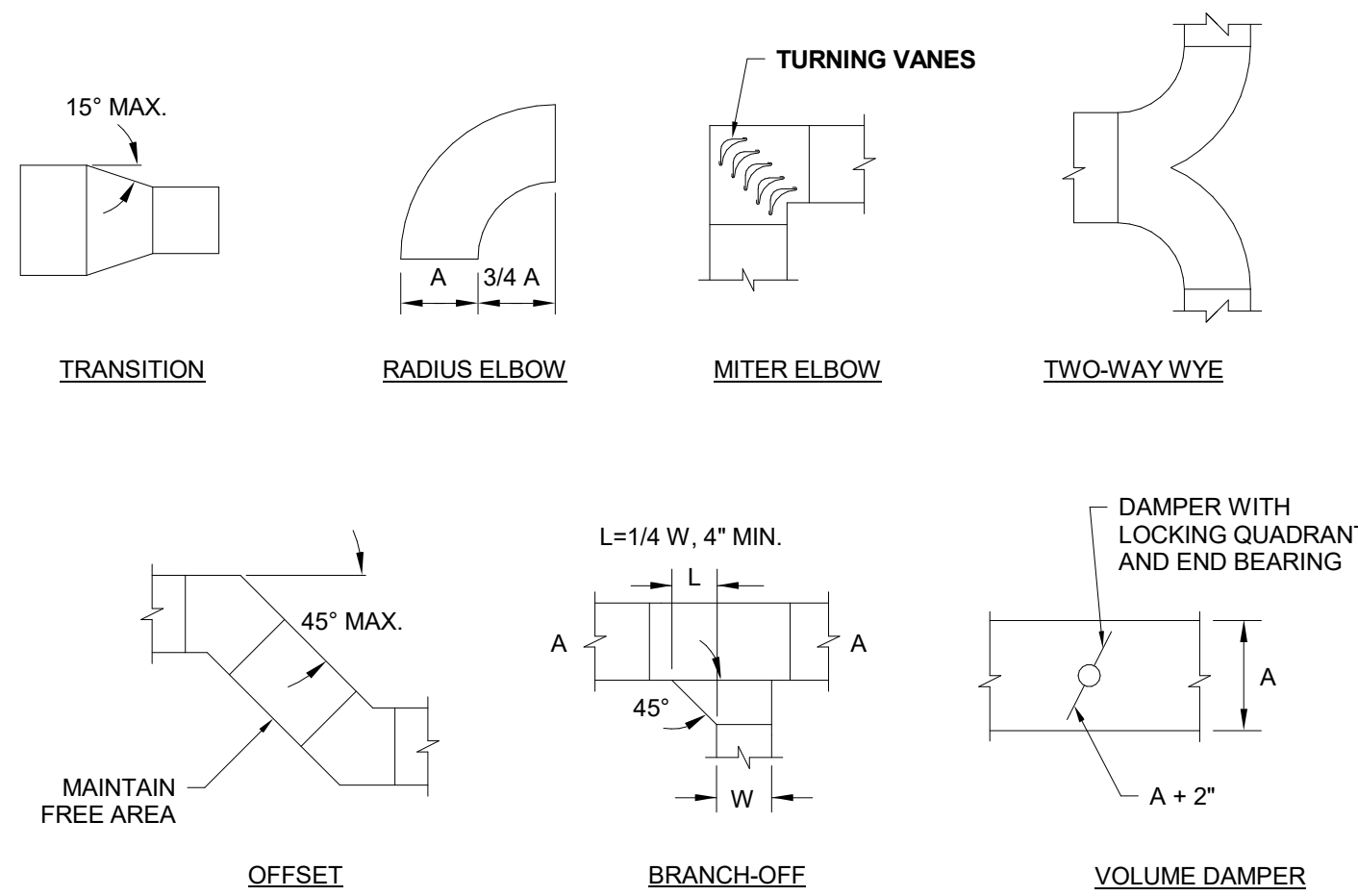
CENTRAL MIDDLE SCHOOL HVAC UPGRADE

120 S MAIN ST, MILTON-FREEWATER, OR 97862

MECHANICAL - LEVEL 2 PLAN

PROJECT TITLE	HEP-21-17
PROJECT ADDRESS	
SHEET TITLE	
PROJECT NO.	HEP-21-17
DESIGNED BY	MAL
DRAWN BY	YD
ISSUE DATE	8 JUL 2022
CHECKED BY	MAL
PHASE	CD SET
SHEET NO.	

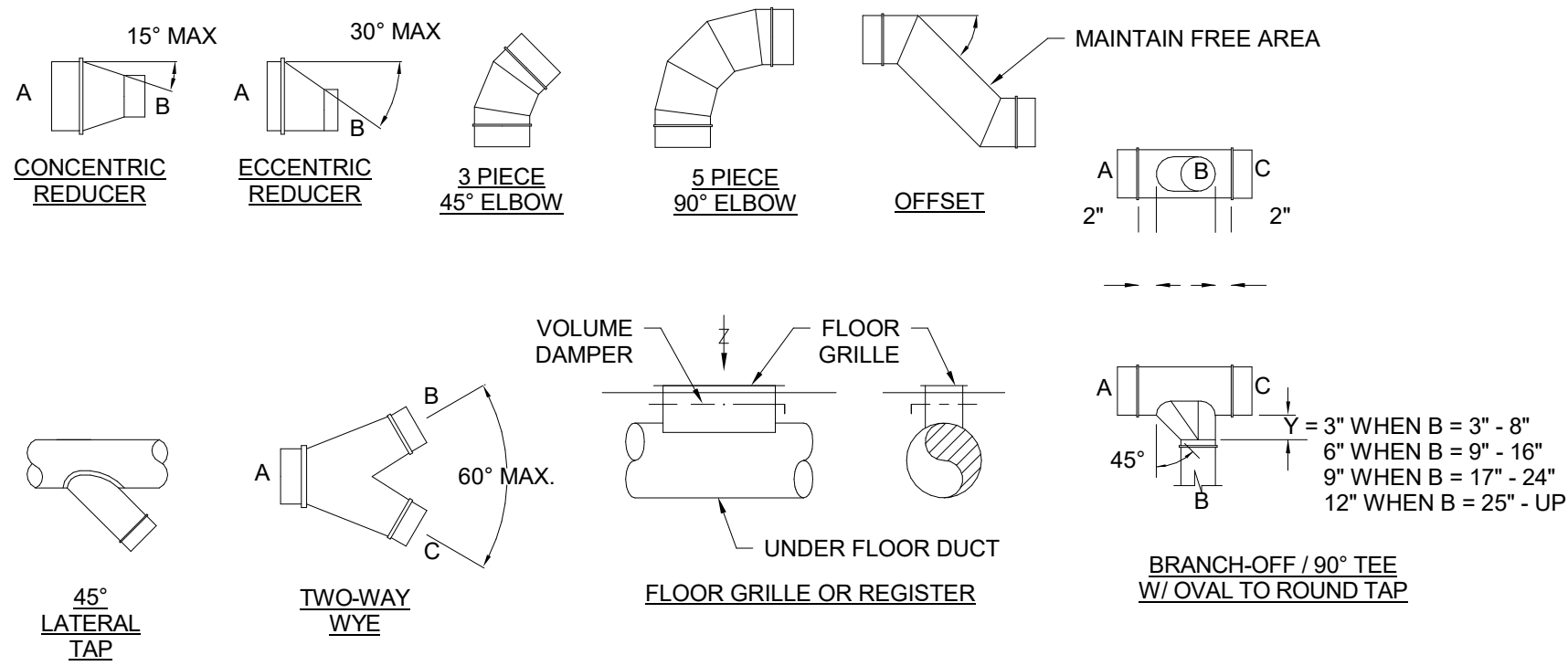
**M2.03**



GENERAL CONSTRUCTION DETAIL. APPLIES TO ALL RELEVANT CONSTRUCTION EVEN WHERE NOT CALLED OUT DIRECTLY.

### 1 RECTANGULAR DUCT CONSTRUCTION DETAILS

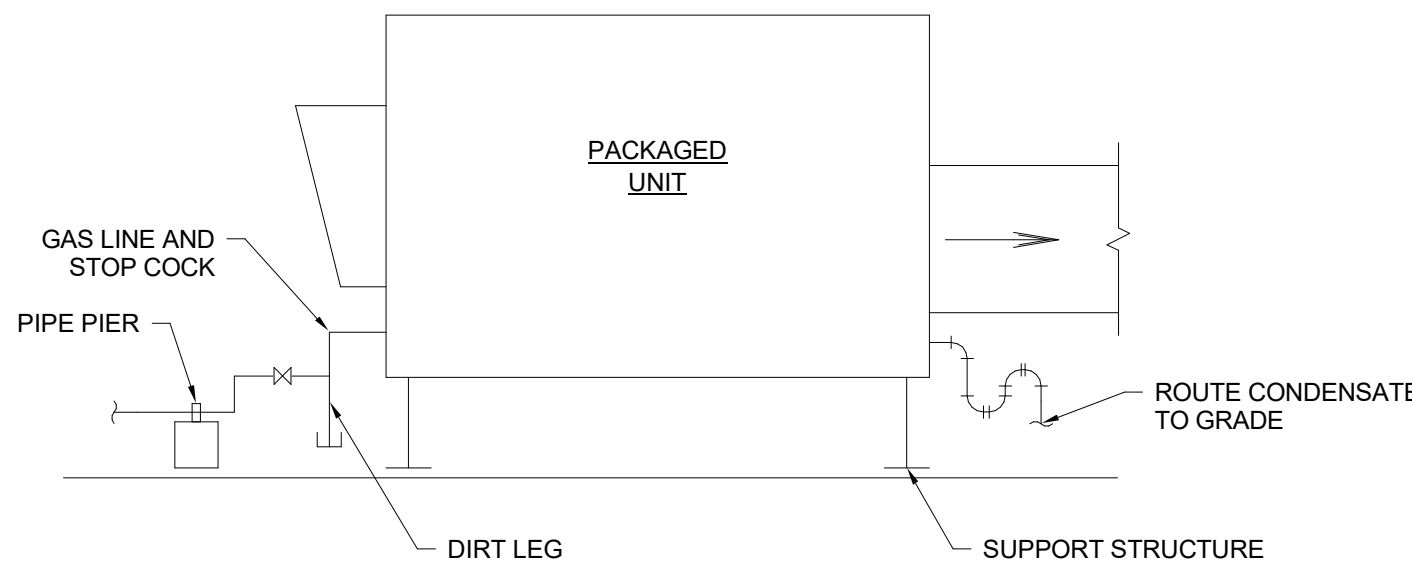
M5.01 SCALE: 1/8" = 1'-0"



GENERAL CONSTRUCTION DETAIL. APPLIES TO ALL RELEVANT CONSTRUCTION EVEN WHERE NOT CALLED OUT DIRECTLY.

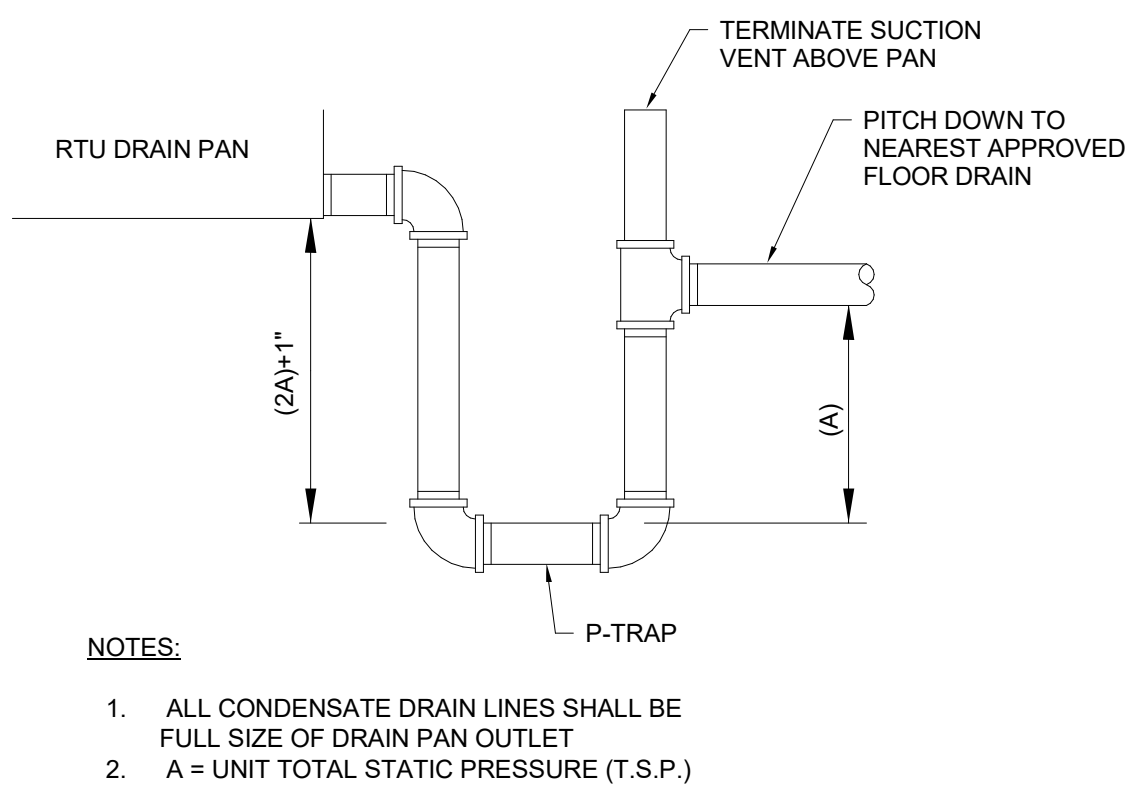
### 2 ROUND DUCT CONSTRUCTION DETAILS

M5.01 SCALE: 1/8" = 1'-0"



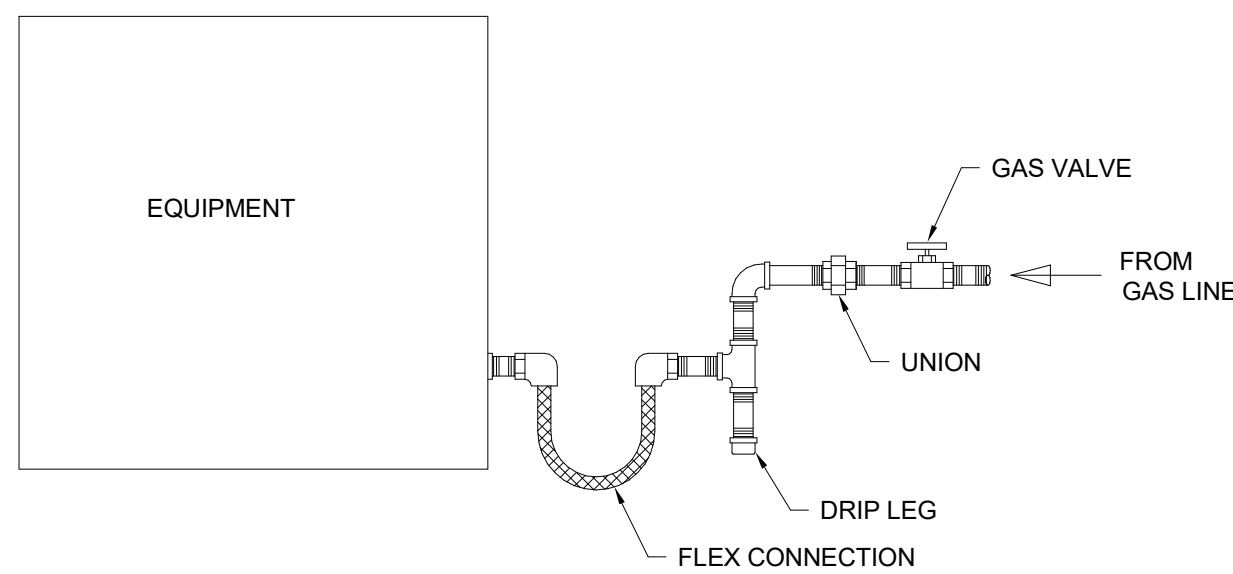
### 3 RTU GROUND MOUNT DETAIL

M5.01 SCALE: 1/8" = 1'-0"



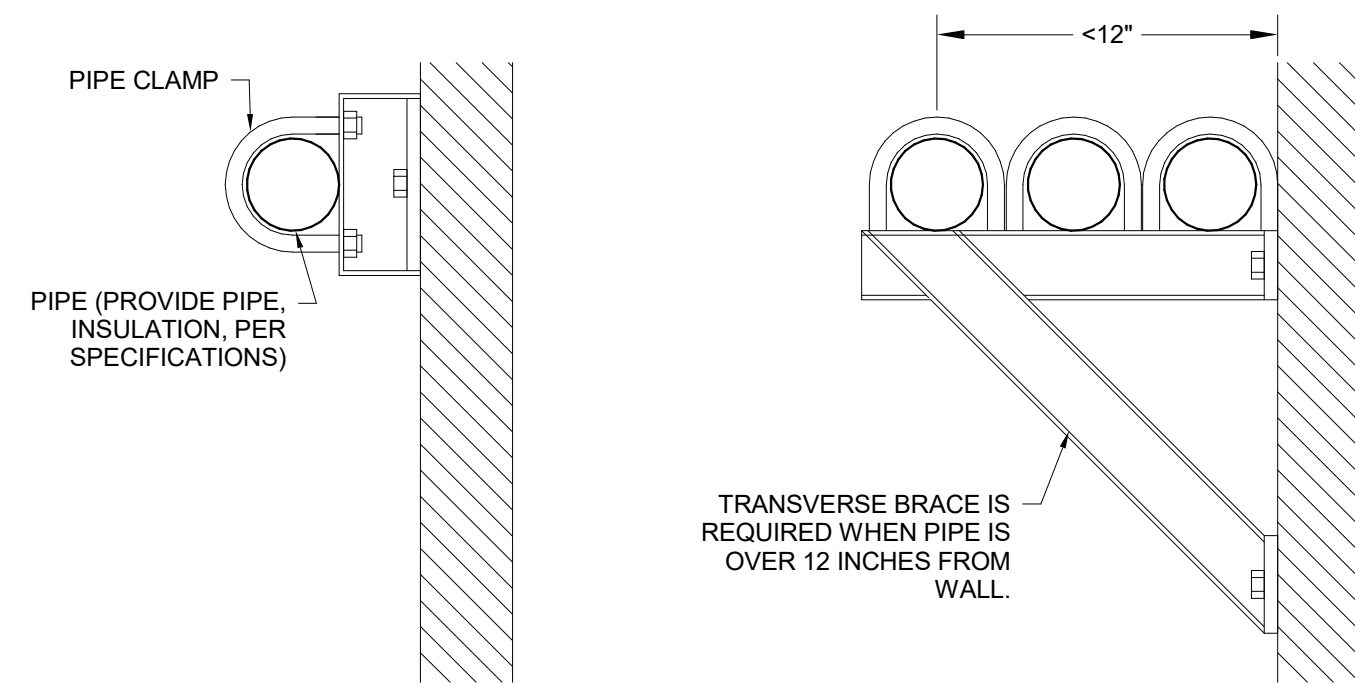
### 4 CONDENSATE DRAIN DETAIL

M5.01 SCALE: 1/8" = 1'-0"



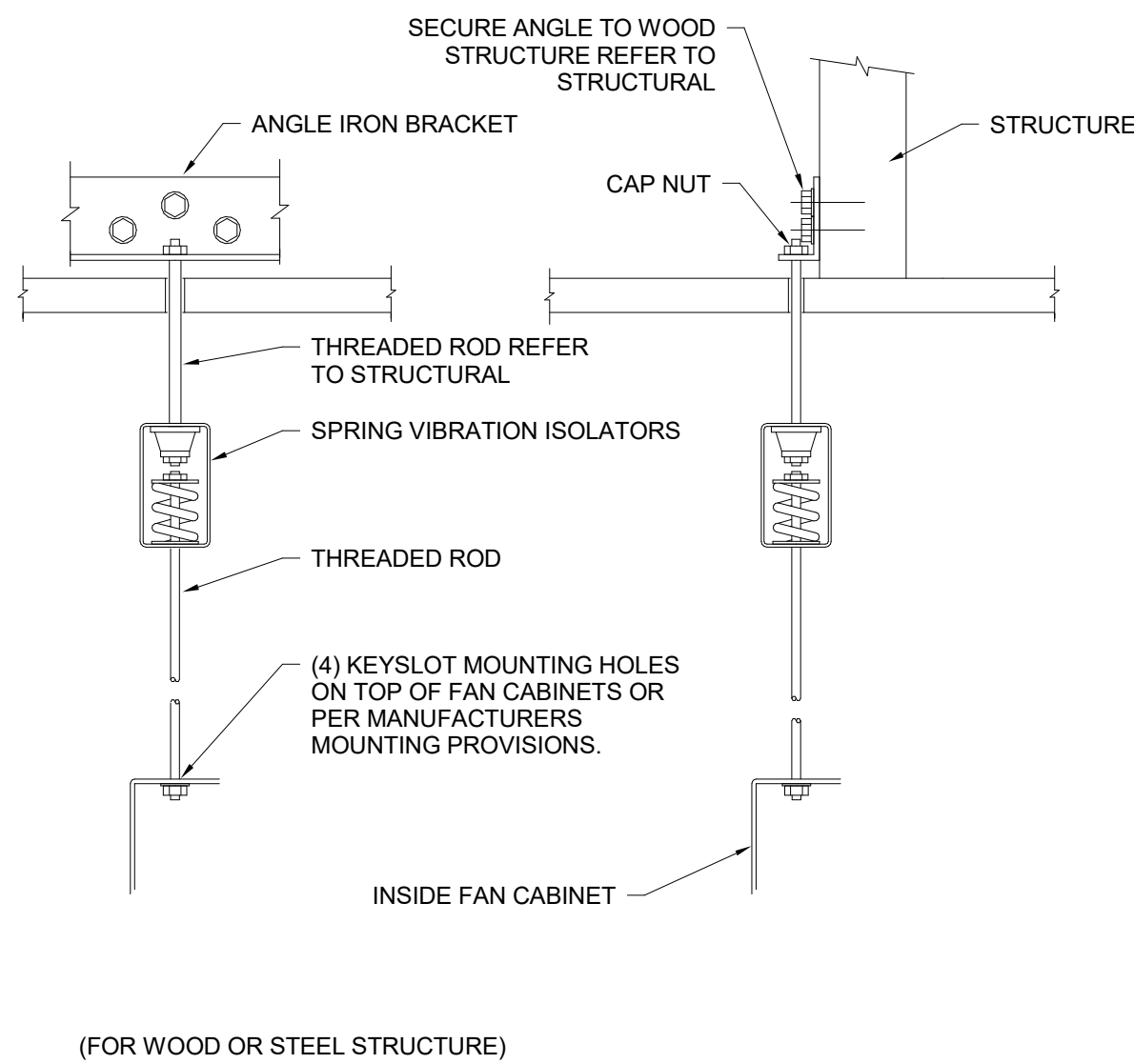
### 5 TYPICAL GAS CONNECTION DETAIL

M5.01 SCALE: 1/8" = 1'-0"



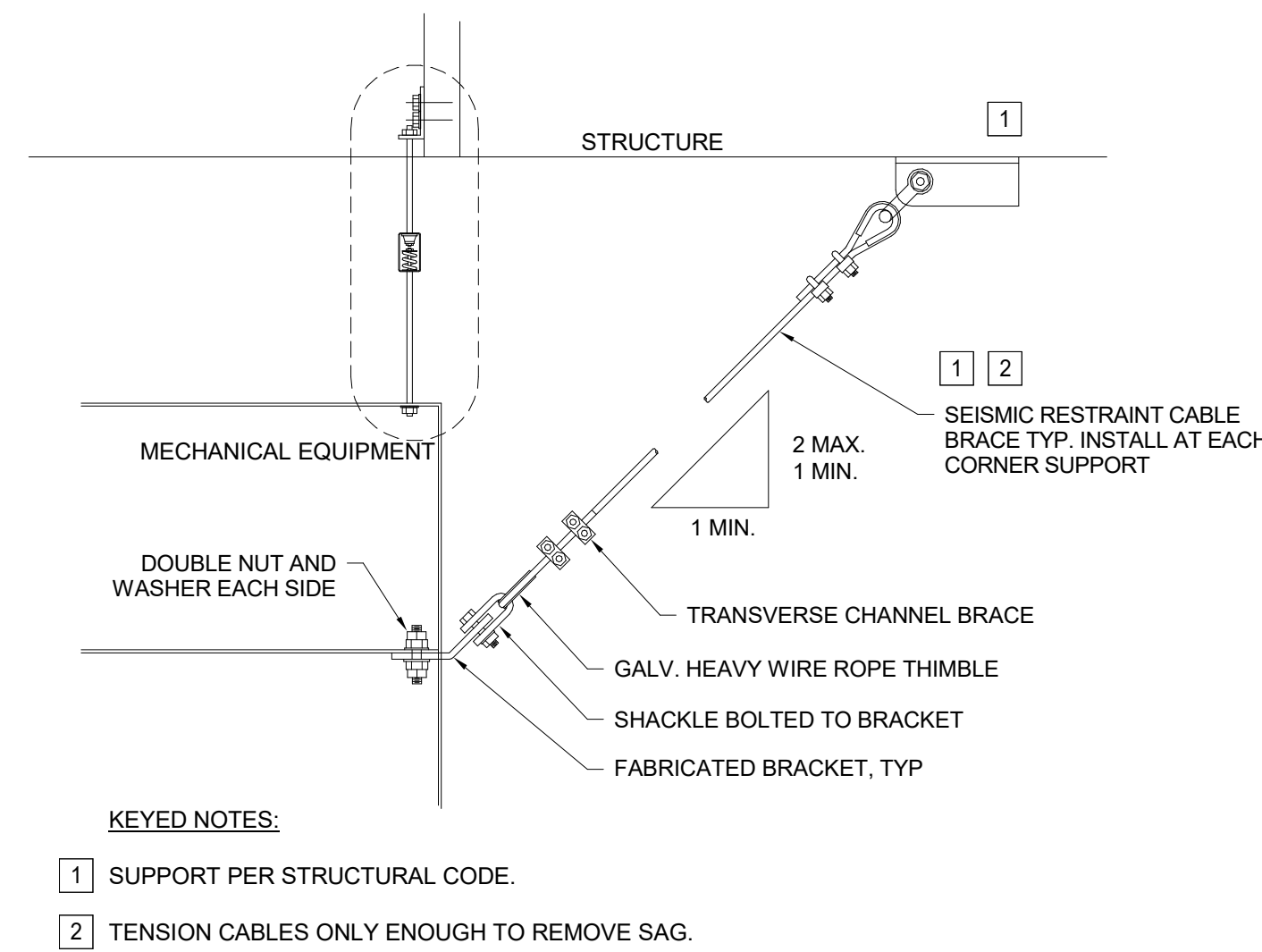
### 6 WALL MOUNT PIPE SUPPORT DETAIL

M5.01 SCALE: 1/8" = 1'-0"



### 7 EQUIPMENT SUSPENSION DETAIL

M5.01 SCALE: 1/8" = 1'-0"



### 8 MECH EQUIPMENT SEISMIC RESTRAINT DETAIL

M5.01 SCALE: 1/8" = 1'-0"



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120 S MAIN ST, MILTON-FREEWATER, OR 97862

PROJECT TITLE

PROJECT ADDRESS

SHEET TITLE: MECHANICAL DETAILS

PROJECT NO.	HEP-21-17
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DRAWN BY	YD
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PHASE	CD SET
SHEET NO.	

M5.01



GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS FOR LOCATION OF FAN UNITS AND MECHANICAL EQUIPMENT. COORDINATE EQUIPMENT WIRING AND SENSOR INSTALLATION WITH EQUIPMENT SUPPLIER AND MECHANICAL CONTRACTOR.
2. BAS POINTS LIST WITH INTERFACE LEGEND INDICATES BASIC COMPONENT REQUIRED FOR INTERFACE BUT DOES NOT DETAIL ALL NECESSARY WIRING, POWER SUPPLIES, AND AUXILIARY DEVICES REQUIRED FOR FULL IMPLEMENTATION. INSTALLATION SHALL INCLUDE ALL REQUIRED COMPONENTS TO FULLY IMPLEMENT THE POINT FUNCTION.
3. FURNISH AND INSTALL ANY INCIDENTAL WORK NOT SHOWN OR SPECIFIED BUT NECESSARY TO PROVIDE A COMPLETE AND WORKING SYSTEM.
4. FOR ANY CONFLICT IN THE DRAWINGS AND/OR THE SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY. ANY SUCH CONFLICT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION PRIOR TO INSTALLATION OF AFFECTED COMPONENTS.
5. SCHEMATIC DIAGRAMS SHOWING SENSOR POSITIONS ARE DIAGRAMMATIC. CONFIRM LOCATION AND INSTALLATION PROCEDURE WITH ENGINEER.
6. ALL CONTROL WIRING IN BUILDING SPACES, SHALL BE INSTALLED IN CONDUIT. CONTROL WIRING ABOVE ACCESSIBLE CEILING MAY BE INSTALLED WITHOUT CONDUIT. INSTALL PLENUM RATED WIRE NEATLY BUNDLED, SUPPORT AT 5 FOOT INTERVAL. ALL WIRE AND CONDUIT INSTALLATION PER NEC CODE.
7. ALL CONTROL POINTS AND SEQUENCES OF OPERATION ARE DIAGRAMATIC AND MAY DIFFER BASED ON FINAL EQUIPMENT SELECTIONS OR SUBSTITUTIONS. ANY PROPOSED OR INCIDENTAL CHANGES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. CONTRACTOR IS RESPONSIBLE FOR A FULLY OPERATION SYSTEM.

SCOPE OF WORK:

THE WORK UNDER THIS CONTRACT IS TO PROVIDE THE LABOR, MATERIAL, AND EQUIPMENT FOR THE COMPLETE INSTALLATION OF THE SYSTEMS DESCRIBED. FULLY CONNECT ALL POINTS AS OUTLINED IN THE POINTS LIST IN THE DRAWINGS, AND MEET THE SYSTEM REQUIREMENTS SPECIFIED. LANDING CONTROL WIRE TO CONTROL PANEL TERMINALS WILL BE COMPLETED BY CLIMA-TECH. PROVIDE CONDUIT AND WIRING IN QUANTITIES AND LOCATIONS AS REQUIRED TO MEET THE FUNCTIONS AND PERFORMANCE SPECIFIED AND INDICATED ON THE DRAWINGS.

PROVIDE ALL LABOR, WIRE, CONDUIT, AND FAN VFDS NECESSARY TO COMPLETE A FULLY FUNCTIONAL SYSTEM. SENSORS, RELAYS, DAMPER ACTUATORS, INDICATOR LIGHTS, WARNING LIGHTS, CONTROL PANELS, AND ENCLOSURES WILL BE SUPPLIED BY JOHNSON CONTROL INC. PANELS ARE LOCATED IN MECHANICAL AND FAN ROOMS, COORDINATE WITH CLIMA-TECH.

LOW VOLTAGE CONTROL WIRING AND LINE VOLTAGE WIRING AND CONDUIT TO CONTROL PANELS, DAMPER ACTUATORS, VFDS, AND MOTORS; AS SHOWN ON THE DRAWINGS, ARE WORK OF THE CONTRACT. COORDINATE WITH OWNER TO DETERMINE ACCEPTABLE ELECTRICAL PANELS AND CIRCUITS AT WHICH TO OBTAIN POWER.

ALL ECONOMIZER DAMPERS AND OUTSIDE AIR DAMPERS SHALL USE SPRING RETURN ACTUATORS, PROVIDED BY CLIMA-TECH, CONFIGURED TO FAIL CLOSED. ACTUATORS SHALL BE SIZED FOR DAMPER AREA AND ACTUAL REQUIRED DAMPER TORQUE.

IN LOCATIONS SHOWN ON THE DRAWINGS, INSTALL FREEZE STATS, PROVIDED BY CLIMA-TECH; REQUIRED COMPONENTS; AND CONNECT TO SHUT DOWN FAN ON FREEZE INDICATION.

MOTOR STARTERS AND LINE VOLTAGE MOTOR CONTACTORS ARE DEPICTED GENERICALLY BUT NOT DIFFERENTIATED ON THE DRAWINGS. CONTRACTOR TO VERIFY AND REUSE EXISTING MOTOR STARTERS OR REPLACE AT CONTRACTORS OPTION AND EXPENSE. REPLACEMENT OF VERIFIED FAULTY EXISTING COMPONENTS TO BE MADE ON A TIME AND MATERIAL BASIS.

WORK TO COMPLY WITH CURRENT NATIONAL, STATE, AND LOCAL CODES. OBTAIN PERMITS NECESSARY FOR WORK. ALL WORK MUST SATISFY CODE AUTHORITY WITH JURISDICTION.

COMMUNICATION TRUNK: COORDINATE PANEL LOCATION AND WIRE REQUIREMENTS WITH CLIMA-TECH.

REMOVE NONFUNCTIONAL CONTROL PANELS AND CONTROL WIRE IN MECHANICAL ROOMS. CONTROL PANELS CONTAINING LIGHTING OR OTHER EXISTING FUNCTIONAL CONTROLS WILL BE RETAINED. REMOVE NONFUNCTIONAL CONTROLS, SENSORS, ACTUATORS, WIRE (UNLESS WIRE IS TO BE REUSED), CONDUIT (UNLESS CONDUIT IS TO BE REUSED), AND TUBING IN MECHANICAL ROOMS. REMOVE NONFUNCTIONAL CONTROL WIRE, CONDUIT, AND TUBING ABOVE DROP CEILINGS. REMOVE NONFUNCTIONAL ROOM THERMOSTATS AND SENSORS. ABANDON IN PLACE CONTROL WIRE, CONDUIT, AND TUBING ABOVE HARD CEILINGS AND IN WALLS. PROVIDE COMPLETE IDENTIFICATION OF ALL COMPONENTS AND CONDUCTORS. COLOR CODE AND NUMBER CONDUCTORS AND TERMINALS ACCORDING TO CONSISTENT SCHEME THROUGHOUT PROJECT. PROVIDE ENGRAVED IDENTIFICATION OR EQUIVALENT PERMANENCE ON PANEL FRONTS. USE EQUIPMENT IDENTIFICATION SAME AS INDICATED ON SUBMITTED POINTS LIST.

CONTRACTOR SHALL ASSIST CLIMA-TECH DURING THE CONTROLS POINT TO POINT CHECKOUT TO RESOLVE ISSUES WITH WIRING, COMPONENTS, SENSORS, ACTUATORS, OR EQUIPMENT INSTALLED UNDER THIS CONTRACT.

GENERAL NOTES

1. PROVIDE AUTOMATIC CONTROL FOR SYSTEM OPERATION AS DESCRIBED HEREIN, ALTHOUGH WORD "AUTOMATIC" OR "AUTOMATICALLY", IS NOT USED.

2. PROVIDE CONTROL DEVICES, CONTROL SOFTWARE AND CONTROL WIRING AS REQUIRED FOR AUTOMATIC OPERATION OF EACH SEQUENCE SPECIFIED.

3. ANY REFERENCE TO MAKING A POINT ADJUSTABLE REQUIRES THAT THE POINT CAN BE MANIPULATED DIRECTLY FROM THE GRAPHIC DISPLAY WITHOUT ACCESSING OR MODIFYING THE CONTROL CODE.

4. WORK OF THIS SECTION REQUIRES THAT A FULLY FUNCTIONAL SEQUENCE OF OPERATION BE IMPLEMENTED IN THE BMS. THE SEQUENCES OUTLINED HERE ARE PROVIDED AS A MINIMUM GUIDE TO ASSIST PROGRAMMING. SYSTEM OR OPERATIONAL CONSTRAINTS MAY REQUIRE ADDITIONAL LOGIC AND SEQUENCING FOR PROPER OPERATION. THE CONTROL CONTRACTOR SHALL IMPLEMENT CHANGES TO THE SEQUENCE, REQUIRED FOR PROPER OPERATION, AS WORK OF THIS SECTION FOR A FULLY FUNCTIONAL SYSTEM. A STEPPED SUBMITTAL, REVIEW, AND APPROVAL APPROACH SHALL BE EMPLOYED TO MODIFY, ADD, AND DELETE SEQUENCES. ALL ADDITIONS AND MODIFICATIONS OF SEQUENCE PROGRAMMING SHALL BE INCLUDED AS WORK OF THIS SECTION AT NO ADDITIONAL COST TO THE OWNER.

5. UNIT PROOF POINTS:

A. PROVIDE UNIT PROOF POINTS FOR DEVICES (MOTORS, ETC.) WITH ANALOG CURRENT (AMPS) SENSORS AS INDICATED. UNIT PROOF POINTS SHALL BE VIRTUAL DIGITAL POINTS (SOFTWARE VARIABLES THAT FUNCTION AS REAL POINTS). PROOF POINTS SHALL INDICATE ON WHEN ANALOG CURRENT SENSOR IS ABOVE A SET (ADJUSTABLE) LEVEL AND OFF WHEN BELOW A SET (ADJUSTABLE) LEVEL. THE MODIFICATION OF THE TRIP LEVEL SHALL BE READILY AVAILABLE AND EASY TO ADJUST BY THE OPERATOR.

B. WHERE THE CURRENT INDICATION IS PROVIDED BY A VFD, SET THE LEVEL SUCH THAT, AT 50 PERCENT SPEED, LOSS OF FAN BELT, PUMP COUPLING, OR FREEWHEELING OF MOTOR WILL INDICATE AN OFF CONDITION. USE VFD PROOF POINT TO PREVENT FALSE LOW AMP ALARMS BELOW 50% SPEED.

C. FOR NON-VFD APPLICATIONS, ADJUST THE ON / OFF LEVEL TO REFLECT UNIT OPERATION. SET THE LEVEL SUCH THAT LOSS OF FAN BELT, PUMP COUPLING, OR FREEWHEELING OF MOTOR WILL INDICATE OFF CONDITION.

6. UNIT PROOF ALARMS: ANY DISCREPANCY BETWEEN THE COMMANDED STATE OF A DEVICE AND ITS UNIT PROOF POINT WILL INITIATE A PROOF FAILURE ALARM. TO ELIMINATE NUISANCE ALARMS DUE TO COMMUNICATIONS DELAYS, A CONTINUOUS DISCREPANCY IS REQUIRED FOR 5 MINUTES (ADJUSTABLE) BEFORE INITIATING THE ALARM. A UNIT PROOF ALARM WILL IDENTIFY THE DEVICE THAT DOES NOT AGREE WITH ITS PROOF POINT AS WELL AS BOTH THE COMMANDED STATE OF THE DEVICE AND THE INDICATION FROM THE PROOF POINT.

7. ALL ANALOG INPUT POINTS SHALL BE PROVIDED WITH HIGH AND LOW VALUE LIMITS THAT WILL NOTIFY THE OPERATOR INTERFACE OF SENSOR READINGS BEYOND NORMAL LIMITS.

A. THE LIMITS SHALL BE IN EFFECT ONLY WHEN THE ASSOCIATED UNIT IS OPERATING. DURING START-UP OF A SYSTEM, AN ADJUSTABLE TIME DELAY, INITIALLY SET AT 30 MINUTES, SHALL PREVENT THE REPORTING OF OUT OF LIMIT SENSORS UNTIL THE SYSTEM OPERATION IS STABILIZED.

B. TEMPERATURE SENSOR LIMITS SHALL BE INITIALLY SET TO THE FOLLOWING TABLE UNLESS SPECIFIED OTHERWISE OR SYSTEM CHARACTERISTICS OF THE SENSOR LOCATION REQUIRE DIFFERENT VALUES:

Sensor Type	Low Value	High Value
Duct Sensor	40	140
Room Temperature Sensor	67	82
Heating Water Sensors	60	220
Chilled Water Sensors	40	65

8. ORDER OF PRECEDENCE:
- A. THE SEQUENCES OF OPERATION FOR THE MECHANICAL EQUIPMENT ARE OUTPUT OBJECT ORIENTED. THEY ARE GROUPED, FIRST ACCORDING TO TYPE OF UNIT, THEN LISTED BY THE PHYSICAL OUTPUT POINTS CONTROLLING THAT UNIT. LISTED AFTER EACH OUTPUT ARE THE SEQUENCES THAT OPERATE THAT OUTPUT IN THE ORDER OF PRIORITY. ITEMS LISTED FIRST TAKE PRECEDENCE OVER SUBSEQUENT ITEMS. FOR EXAMPLE, WHEN REFERENCING THE SUPPLY FAN START/STOP OF A UNIT, THE FIRE ALARM IS LISTED AHEAD OF THE SCHEDULE MODE SINCE IT TAKES PRECEDENCE. IF A FIRE ALARM INPUT IS ACTIVATED REQUIRING A SUPPLY FAN TO STOP, THE OUTPUT IS STOPPED AND ALL FURTHER ITEMS OF CONTROL BELOW AND OF A LOWER PRIORITY ARE SKIPPED.
- B. OFTEN MODES ARE THE BASIS FOR ACTIVATION OF AN OUTPUT. MODES DEFINE A SPECIAL OPERATIONAL CONDITION THAT THE OVERALL SYSTEM HAS ACTIVE (SUCH AS FIRE ALARM MODE). MODES ARE GLOBAL IN NATURE AND THEIR SEQUENCE OF ACTIVATION IS DEFINED SEPARATELY.
9. WHERE INDICATED ON THE FLOOR PLAN DRAWINGS, MULTIPLE SPACE SENSORS SHALL BE AVERAGED TO DETERMINE THE SPACE TEMPERATURE.
- UNIT SHALL STOP WHEN ITS SPACE TEMPERATURE IS LESS THAN THE UNOCCUPIED COOLING SETPOINT MINUS 5°F (USER ADJUSTABLE).
10. CONTROL ACTION BASED ON VALVES OR DAMPERS AT 0% OR 100% MAY NEED TO BE ADJUSTED IF MINIMUM ACTUATOR TRAVEL LIMITS OR OTHER SYSTEM LIMITATIONS PREVENT THE DEVICE FROM RELIABLY ATTAINING 0% OR 100%. 0% AND 100% POSITIONS REPRESENT THEORETICAL VALUES FOR THE CONTROL SEQUENCE. DEVIATION FROM THESE VALUES SHALL BE DOCUMENTED AND EXPLAINED ON THE GRAPHICS DISPLAY SO THAT AN OPERATOR CAN TROUBLESHOOT THE SYSTEM WITHOUT REFERENCE TO ADDITIONAL DOCUMENTS.
11. PUMP AND FANS WITH VFDS SHALL RAMP SLOWLY USING A 120 SECOND FULL SCALE RAMP UNLESS INDICATED OTHERWISE OR REQUIRED FOR PROPER SEQUENCE OPERATION. PUMPS SHALL RAMP DOWN ON SHUT OFF TO PREVENT WATER HAMMER. FANS SHALL SHUT OFF WITHOUT RAMP DOWN ON FAN STOP.
12. STAGE VALVING AND PUMPING TO PREVENT DEADHEADING AT THE PUMPS. ALWAYS OPEN A NEW CIRCUIT BEFORE CLOSING ALL EXISTING CIRCUITS. ALWAYS OPEN A CIRCUIT BEFORE STARTING A PUMP.
13. STAGE EQUIPMENT WITH VALVING, DAMPERS, FANS, AND PUMPS SO THAT IT STARTS AFTER AIR OR WATER LOOPS HAVE ATTAINED MINIMUM FLOW VALUES AND STOP EQUIPMENT BEFORE SHUTTING DOWN FLOW.
14. SHUTDOWN OF AN INDIVIDUAL PIECE OF EQUIPMENT DUE TO ANY ALARM, FAILURE, OR EQUIPMENT PROTECTION MODE SHALL CREATE AND RECORD AN ALARM THAT IDENTIFIES THE AFFECTED UNIT AND REASON FOR STOPPAGE. INDIVIDUAL EQUIPMENT ALARMS SHALL NOT BE DISPLAYED OR RECORDED FOR STOPPAGE DUE TO SYSTEM WIDE ALARMS UNLESS THE EQUIPMENT INITIATED THE ALARM.
- CALL FOR HEAT:
1. A CALL FOR HEAT IS CREATED IF AT LEAST 20 MINUTES (USER ADJUSTABLE) HAS PASSED SINCE THE PREVIOUS CALL FOR HEAT WAS CANCELED AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE HEAT LOCK OUT TEMPERATURE (HLT), 65°F (USER ADJUSTABLE).
2. A CALL FOR HEAT IS CANCELED IF AT LEAST 15 MINUTES (USER ADJUSTABLE) HAS PASSED SINCE THE CALL FOR HEAT WAS INITIATED AND OUTSIDE AIR TEMPERATURE IS GREATER THAN HLT +5°F (USER ADJUSTABLE).
- UNOCCUPIED LOW LIMIT OPERATION:
1. DURING UNOCCUPIED PERIODS, UNOCCUPIED LOW LIMIT OPERATION SHALL BE TRIGGERED BY A SPACE TEMPERATURE THAT INDICATES LESS THAN THE UNOCCUPIED HEATING SETPOINT, 55°F (USER ADJUSTABLE ZONE BY ZONE)
2. DURING UNOCCUPIED LOW LIMIT OPERATION, ALL UNITS WITH INDICATED SPACE TEMPERATURES LESS THAN THEIR UNOCCUPIED HEATING SETPOINT WILL START AND RUN.
3. DURING UNOCCUPIED LOW LIMIT OPERATION, EACH RUNNING UNIT SHALL STOP WHEN ITS SPACE TEMPERATURE IS GREATER THAN THE UNOCCUPIED HEATING SETPOINT PLUS 5°F (USER ADJUSTABLE).
- UNOCCUPIED HIGH LIMIT OPERATION:
1. DURING UNOCCUPIED PERIODS, UNOCCUPIED HIGH LIMIT OPERATION SHALL BE TRIGGERED BY A SPACE TEMPERATURE THAT INDICATES GREATER THAN THE UNOCCUPIED COOLING SETPOINT 85°F (USER ADJUSTABLE AT ZONE BY ZONE)
2. DURING UNOCCUPIED HIGH LIMIT OPERATION, ALL UNITS WITH INDICATED SPACE TEMPERATURES GREATER THAN THEIR UNOCCUPIED HEATING SETPOINT WILL START AND RUN.
3. DURING UNOCCUPIED HIGH LIMIT OPERATION, EACH RUNNING UNIT SHALL STOP WHEN ITS SPACE TEMPERATURE IS LESS THAN THE UNOCCUPIED COOLING SETPOINT MINUS 5°F (USER ADJUSTABLE).
- OPTIMAL START/STOP
1. THE BUILDING AUTOMATION SYSTEM SHALL CALCULATE OPTIMAL START AND STOP TIMES BASED ON HISTORICAL SYSTEM PERFORMANCE AND FORECASTED TEMPERATURES OR TEMPERATURE EXTREMES OF THE PREVIOUS DAY.

DDC INPUT / OUTPUT MODE	
AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
NET	NETWORK
VI	VARIABLE INPUT

I/O	DEVICE	POINT NAME
ICES	FC 1	MA T

BUILDING
ICES ISLAND CITY ELEMENTARY SCHOOL

SYSTEM	
FOLLOWED BY NUMERIC SUFFIX (X) IF APPLICABLE	
ACU	ROOFTOP UNIT WITH AC
ASU	AIR SUPPLY UNIT
B	BOILER
CH	CHILLER
CHW	CHILLED WATER
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CW	CONDENSER WATER
EA	EXTRACTION ARM
EF	EXHAUST FAN
FC	FAN COIL
H	DOWN FLOW HOOD
MAU	MAKEUP AIR UNIT
PS	PRESSURE SENSOR
RTU	ROOFTOP UNIT
UH	UNIT HEATER

POINT DEVICE	
ADPS	AIR DIFFERENTIAL PRESSURE SENSOR
ADTS	AVERAGING DUCT TEMP SENSOR
AFS	AIR FLOW SENSOR
ATS	AIR TEMPERATURE SENSOR
CSW	CURRENT SWITCH
CT	CURRENT TRANSDUCER
DC	DIRECT CONNECTION
DCS	DUCT CO2 SENSOR
DSD	DUCT SMOKE DETECTOR
DTS	DUCT TEMPERATURE SENSOR
EDA	ELECTRIC DAMPER ACTUATOR
ES	END SWITCH
EVA	ELECTRIC VALVE ACTUATOR
FT	FREEZE THERMOSTAT
OATS	OUTSIDE AIR TEMPERATURE SENSOR
OCC	SPACE OCCUPANCY SENSOR
OVR	OCCUPANCY OVERRIDE
RCS	ROOM CO2 SENSOR
RLY	RELAY
RTS	ROOM TEMPERATURE SENSOR
WDPS	WATER DP SENSOR
WFM	WATER FLOW METER
WTS	WATER TEMPERATURE SENSOR

FUNCTION	
ALM	ALARM
AMPS	AMPS
CDT	CONDUCTIVITY SENSOR
CO2	CARBON DIOXIDE
CT	CURRENT TRANSDUCER
D	DAMPER
DMD	DEMAND
DP	DIFFERENTIAL PRESSURE
ENA	ENABLE
FAULT	FAULT
FLO	FLOW
FZ	FREEZE STATUS
H	HOURS
LO	LOCK OUT
LW	LOW WATER M MODE
OCC	SPACE OCCUPANCY SENSOR
PRF	PROOF
PRES	PRESSURE RPM SPEED
RPM	FAN SPEED
RST	RESET
SD	STAGE OF HEAT OR COOL
SD	SMOKE DETECTOR
SS	START/ STOP
SS	SPACE TEMPERATURE
STOP	STOP
STPT	SETPOINT
T	TEMPERATURE
V	VALVE

SUBSYSTEM	
BP	BYPASS
CC	COOLING COIL
CD	COLD DECK
CO2	CARBON DIOXIDE
COOL	COOLING
CMP	COMPRESSOR
CP	CIRCULATION PUMP
CW	CHILLED WATER
D	DUCT
DC	DUST COLLECTOR
EA	EXHAUST AIR
EC	ECONOMIZER
EDH	ELECTRIC DUCT HEAT
EF	EXHAUST FAN
EFT	EFFECTIVE
EOL	END OF LINE
EW	ENERGY WHEEL
EWBP	ENERGY WHEEL BYPASS
F	FAN
FLO	FLOW
FLT	FILTER
FAN	THERMOSTAT FAN CONTROL
G	GAS
H	HOOD
HEAT	HEATING
HC	HEATING COIL
HD	HOT DECK
HW	HEATING WATER
I	ISOLATION
IA	INTAKE AIR
MA	MIXED AIR
OA	OUTSIDE AIR
PH	PRE HEAT
PX	PUMP X
RA	RETURN AIR
RF	RETURN FAN
RFG	REFRIGERANT
RH	ROOF HEAD
RL	RELIEF AIR
RM	ROOM
RW	RETURN WATER
SA	SUPPLY AIR
SF	SUPPLY FAN
SSP	SOLIDS SEPARATOR
SUMP	SUMP
SW	SUPPLY WATER
T	THERMOSTAT
Z	ZONE

LEGEND

	IT DROP
	CONTROL PANEL (BY OTHERS)
	BACnet IP CONNECTION
	BACnet MS/TP
	RELAY
	MANUAL VALVE
	AUTOMATIC VALVE
	TEMPERATURE SENSOR
	PUMP
	MOTOR STARTER
	VARIABLE FREQUENCY DRIVE
	DIFFERENTIAL PRESSURE SWITCH/SENSOR
	DAMPER ACTUATOR
	HAND - OFF - AUTO
	DAMPER
	DUCT AVERAGING TEMPERATURE SENSOR
	AIR FILTER
	AIR FLOW METER
	DUCT CO2 SENSOR
	DUCT SMOKE SENSOR



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REV	DATE	BY

CENTRAL MIDDLE SCHOOL HVAC UPGRADE

120 S MAIN ST, MILTON-FREEWATER, OR 97862

MECHANICAL CONTROLS COVER SHEET

PROJECT TITLE	PROJECT ADDRESS	SHEET TITLE
PROJECT NO.	HEP-21-17	DESIGNED BY
DESIGNED BY	MAL	DRAWN BY
DRAWN BY	YD	ISSUE DATE
ISSUE DATE	8 JUL 2022	CHECKED BY
CHECKED BY	MAL	PHASE
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M6.01



MULTI-ZONE VARIABLE VOLUME AIRHANDLERS (AHUS)

1. THE AIRHANDLER PACKAGED CONTROLS SHALL RECEIVE AN ENABLE/DISABLE SIGNAL BASED ON SCHEDULING THROUGH THE BAS, SUBJECT TO THE OPTIMUM START/STOP CALCULATION, TIMED OVERRIDE BUTTON, AND UNOCCUPIED HIGH AND LOW LIMIT OPERATION.

2. THE BAS SHALL DIRECTLY MONITOR DISCHARGE AIR, ZONE TEMPERATURE, AND TIMED OCCUPANCY OVERRIDE AND PROVIDE HEATING AND COOLING SETPOINTS (USER ADJUSTABLE) AND UNOCCUPIED SIGNAL TO THE AIR HANDLER PACKAGED CONTROLS.

3. THE BAS SHALL MONITOR ALL PACKAGED CONTROL POINTS MAPPED THROUGH A GATEWAY OR DIRECT NETWORK CONNECTION AS NECESSARY.

4. THE AIRHANDLER PACKAGED CONTROLS SHALL MANAGE ALL NECESSARY CONTROLS TO OPERATE THE UNIT INCLUDING, BUT NOT LIMITED TO:

A. START/STOP THE FAN DUE TO ANY OF THE FOLLOWING:

- 1) FIRE SMOKE ALARM.
- 2) HIGH SUPPLY FAN DIFFERENTIAL STATIC PRESSURE (2" W.C., USER ADJUSTABLE)
- 3) FAN MOTOR OR VFD FAILURE ALARM. FANS WILL AUTOMATICALLY RESTART FROM A FIRE SMOKE ALARM AFTER THE ALARM IS MANUALLY CLEARED.
- 3) FANS WILL AUTOMATICALLY RESTART FROM A HIGH FAN DIFFERENTIAL PRESSURE SHUTDOWN AFTER A 5-MINUTE DELAY (USER ADJUSTABLE). FANS WILL REMAIN OFF AFTER 3 HIGH STATIC SHUTDOWNS IN A PERIOD OF 60 MINUTES.
- 3) BAS SCHEDULING.

4) THE POWERED EXHAUST FAN SHALL START AND STOP WITH THE SUPPLY FAN.

B. PRESSURE CONTROL

- 1) THE SUPPLY FAN SPEED SHALL MODULATE TO MAINTAIN THE REQUESTED STATIC PRESSURE SETPOINT (SYS-SP).
- 2) THE RETURN FAN SPEED SHALL MODULATE WITH THE SUPPLY FAN. A SPEED OFFSET SHALL BE DETERMINED BY THE AIR BALANCER TO MAINTAIN SLIGHT POSITIVE BUILDING PRESSURE. THE OFFSET SHALL BE NO MORE THAN 10%.

C. ECONOMIZER DAMPER CONTROL

- 1) THE ECONOMIZER SHALL CLOSE TO 0% WHEN THE SUPPLY FAN IS OFF.
- 2) THE ECONOMIZER SHALL CLOSE TO 0% DURING ALL UNOCCUPIED OPERATION WHEN HEATING IS ENABLED (THIS INCLUDES OPTIMAL START AND UNOCCUPIED LOW LIMIT)
- 3) DURING OCCUPIED OPERATION THE ECONOMIZER POSITION SHALL BE EQUAL TO OR GREATER THAN THE MINIMUM ECONOMIZER POSITION BASED ON RETURN AIR CO2 (ECO2).
- 4) THE ECONOMIZER SHALL MODULATE TO MAINTAIN THE OUTSIDE AIR TEMPERATURE EXCEEDS THE RETURN AIR TEMPERATURE, THE ECONOMIZER WILL MODULATE CLOSED TO THE ECO2 POSITION.
- 5) THE ECONOMIZER SHALL MODULATE AS THE FIRST STAGE OF COOLING AS SPECIFIED IN THE COOLING CONTROL SEQUENCE.
- 6) MINIMUM ECONOMIZER POSITION BASED ON RETURN AIR CO2 (ECO2):

- 1) THE BALANCER SHALL ESTABLISH THE ECONOMIZER POSITION THAT PROVIDES DESIGN MINIMUM OUTSIDE AIR FLOW AT FULL LOAD.



BAS	POINT NAME				POINT			
DESCRIPTION	bldg	system	sub-sys	function	Device	Type	Connection	INSTRUCTIONS

Sensors								
Return Air Temperature	CMS	MZ	RA	T	ADTS	AI	Direct	Install and connect to indicate return air temperature.
Hot Deck Temperature	CMS	MZ	HD	T	ADTS	AI	Direct	Install and connect to indicate hot deck temperature.
Cold Deck Temperature	CMS	MZ	CD	T	ADTS	AI	Direct	Install and connect to indicate cold deck temperature.
Hot Deck Pressure	CMS	MZ	HD	DP	ADPS	AI	Direct	Install and connect to indicate hot deck pressure.
Cold Deck Pressure	CMS	MZ	CD	DP	ADPS	AI	Direct	Install and connect to indicate cold deck pressure.
Zone Supply Air Temperature	CMS	MZ	Z-x	SAT	DTS	AI	Direct	Install and connect to indicate zone supply air temperature.
Zone CO2 Sensor	CMS	MZ	Z-x	CO2	ZCS	AI	Direct	Install and connect to indicate zone air CO2 content.
Space Sensor Override Button	CMS	MZ	Z-x	SS	OVR	DI	Direct	Install and connect to provide after hours override to occupants
Space Temperature Sensor	CMS	MZ	Z-x	ST	RTS	AI	Direct	Install and connect to indicate room temperature.

	POINT NAME	POINT			
DESCRIPTION	school system sub-sys function	Device	Type	Connection	INSTRUCTIONS
				NET	Multiple points. Connect to monitor and control. Provide gateway as necessary and map all available points.

Exhaust Fan Variable Frequency Drive							
ExhaustFan start/stop	CMS AHU-x	EF	SS	None	DO	NET	Connect to Start/Stop fan
Exhaust Fan speed	CMS AHU-x	EF	RPM	None	AO	NET	Connect to control VFD speed.
Exhaust Fan amps	CMS AHU-x	EF	AMPS	None	AI	NET	Connect to indicate VFD amps.
Exhaust Fan fault	CMS AHU-x	EF	FAULT	None	DI	NET	Connect to indicate fault condition of drive.
Fan proof	CMS AHU-x		PRF	CSW	DI	Direct	Connect to indicate fan operation.

Control Valves / Dampers								
Economizer Mixed Air Dampers	CMS	AHU-x	MA	D	EDA	AO	NET	Install and connect to control damper. Provide power to devices.

Sensors								
Mixed Air Temperature	CMS	AHU-x	MA	T	ADTS	AI	NET	Install and connect to indicate air temperature.
Return Air Temperature	CMS	AHU-x	RA	T	ADTS	AI	NET	Install and connect to indicate air temperature.
Return Smoke Detector	CMS	AHU-x	RA	SD	DSD	DI	NET	Install and connect to indicate return air presence of smoke.
Return Air CO2 Sensor	CMS	AHU-x	RA	CO2	DCS	AI	NET	Install and connect to indicate CO2 concentration




















































# MECHANICAL CONTROLS, SYSTEM CONTROLS DIAGRAM MULTIZONE SYSTEM




FEEDER SCHEDULE		
FEEDER	CONDUIT & WIRE SIZE	
30B	1/2" 4#10	
40A	3/4" 3#8	
40B	3/4" 4#8	
60B	1" 4#6	
70B	1-1/4" 4#4	
100A	1-1/4" 3#3	
100B	1-1/4" 4#3	
150B	2" 4#1/0	
150D	2" 4#1/0, 1#8 GRD	
150E	2" 3#1/0, 1#3	
175B	2" 4#2/0	
200B	2" 4#3/0	
400D	3-1/2" 4#500MCM, 1#3 GRD	
500A	(2) 2-1/2" 3#250MCM	
600A	(2) 2-1/2" 3#350MCM	
600B	(2) 3" 4#350MCM	
600D	(2) 3-1/2" 4#350MCM, 1#1 GRD	
1200E	(4) 3" 3#350, 1#1/0	
1600B	(3) 4" 8#400MCM THHN	

MECHANICAL EQUIPMENT LIST				
Nº	DESCRIPTION	VOLTAGE	PHASE	MCA
1	AHU-01	460	3	84
2	AHU-02	460	3	84

ABBREVIATIONS			
AFF	ABOVE FINISHED FLOOR	KVA	KILOVOLT AMP
A	AMPERE (AMP)	KVAR	KILOVAOLT AMPS REACTIVE
AL	ALUMINUM	LA	LIGHTING ARRESTOR
ARCH	ARCHITECTURAL/ ARCHITECT	LV	LOW VOLTAGE
ATS	AUTOMATIC TRANSFER SWITCH	MA	MASTER ANTENNA TELEVISION
BOF	BOTTOM OF FIXTURE	MCA	MINIMUM CIRCUIT AMPS
CB	CIRCUIT BREAKER	MCB	MAIN CIRCUIT BREAKER
C	CONDUIT	MCC	MOTOR CONTROL CENTER
CCTV	CLOSED CIRCUIT TELEVISION	MDP	MAIN DISTRIBUTION PANEL
CKT	CIRCUIT	MECH	MECHANICAL
CLG	CEILING	MH	METAL HALIDE
CT	CURRENT TRANSFORMER	MLO	MAIN LUGS ONLY
CU	COPPER	MV	MERCURY VAPOR
DN	DOWN	MTS	MANUAL TRANSFER SWITCH
(E)	EXISTING TO REMAIN	(N)	NEW
		(NL)	NEW LOCATION OF EXISTING DEVICE
ECH	ELECTRIC HEATER	NIC	NOT IN CONTRACT
EF	EXHAUST FAN	PA	PUBLIC ADDRESS
EMERG	EMERGENCY	PE	PHOTOELECTRIC CELL
EMT	ELECTRIC METALLIC TUBING	PF	POWER FACTOR
EP	EXPLOSION PROOF	PNL	PANEL
EPO	EMERGENCY POWER OFF	PCV	POLYVINYL CHLORIDE CONDUIT
EWC	ELECTRIC WATER COOLER	PWR	POWER
FA	FIRE ALARM	R	REMOVE (DEMOLISH)
FC	FAN COIL	(RL)	RELOCATE EXISTING DEVICE
FAP	FIRE ALARM PANEL	SDP	SUB-DISTRIBUTION PANEL
FANN	FIRE ALARM ANNUNCIATOR	SF	SUPPLY FAN
FLA	FULL LOAD AMPS	STR	STARTER
FLUOR	FLUORESCENT	SV	SOLENOID VALVE
FCIC	FURNISHED BY CONTACTOR	SW	SWITCH
	INSTALLED BY CONTRACTOR	TD	TIME DELAY
FOIC	FURNISHED BY OWNER	TP	TAMPERPROOF
	INSTALLED BY CONTRACTOR	TTB	TELEPHONE TERMINAL BOARD
FOIO	FURNISHED BY OWNER	TTC	TELEPHONE TERMINAL CABINET
	INSTALLED BY OWNER	TV	TELEVISION
GFP	GROUND FAULT PROTECTION	TYP	TYPICAL
GFI	GROUND FAULT INTERRUPTER	UG	UNDERGROUND
GRC	GALVANIZED RIGID CONDUIT	UNO	UNLESS OTHERWISE NOTED
GRD	GROUND	UPS	UNINTERRUPTIBLE POWER SUPPLY
HP	HORSEPOWER	V	VOLTAGE
HPS	HIGH PRESSURE SODIUM	VA	VOLT AMPERES
HV	HIGH VOLTAGE	VP	VAPOR PROOF
HZ	HERTZ	W	WATTS
IG	ISOLATED GROUND	WP	WEATHERPROOF
INC	INCANDESCENT	XFMR	TRANSFORMER
JB	JUNCTION BOX	XFSW	TRANSFER SWITCH
KW	KILOWATT		
KWH	KILOWATT HOUR		
KV	KILOVOLT		


POWER LEGEND	
	WALL RECEPTACLE, SINGLE ±18" AFF
	120 VOLT, 15/20A, DUPLEX WALL RECEPTACLE ±18" AFF
	120 VOLT, DUPLEX RECEPTACLE, EMERGENCY
	120 VOLT, DUPLEX RECEPTACLE, MOUNTED AT NON-STANDARD HEIGHT, # INDICATES INCHES ABOVE FINISHED FLOOR
	120 VOLT, DUPLEX RECEPTACLE, GROUND FAULT CIRCUIT INTERRUPT, MOUNTED NEAR WATER FEATURE, SMARTLOCK GFCI
	WALL RECEPTACLE, FOURPLEX OR DOUBLE DUPLEX ±18" AFF
	CEILING RECEPTACLE: DUPLEX
	WALL RECEPTACLE: DUPLEX, MOUNTED 6" ABOVE COUNTER
	IN-FLOOR DUPLEX OUTLET: F= FLUSH MOUNTED, S=SURFACE MOUNTED
	RECEPTACLE, 240V 1□ #10 30A NEMA 6-30R
	EQUIPMENT MAIN LUGS
	SPECIAL PURPOSE RECEPTACLE: AS NOTED, EMERGENCY
	DISCONNECT SWITCH: FUSED, NON-FUSED
	MOTOR, MOTOR CONNECTION
	120V 20A TWIST-LOCK RECEPTACLE
	TWIST-LOCK RECEPTACLE PENDENT
	EPO KILL SWITCH
	BRANCH CIRCUIT WITH HOT, NEUTRAL, GROUND - CONCEALED IN CEILING OR WALL
	WIRING CONCEALED IN FLOOR OR UNDERGROUND
	HOME RUN TO PANEL
	INSULATED GREEN GROUND WIRE
	CONDUIT: UP, DOWN
	WALL PLATE WITH QUICKPORT DATA JACK, WALL MOUNTED +18" U.O.N. 2 X 4 BOX WITH 3/4" C STUB TO ACCESSIBLE CEILING. # INDICATES NUMBER OF CAT6 CABLES
	FLUSH MOUNTED CEILING SPEAKER, ONE WAY, SELF AMPLIFIED
	TELEPHONE COMMUNICATION OUTLET
	TELEPHONE COMMUNICATION OUTLET
	BOX FOR CEILING MOUNTED WIRELESS AP
	MECHANICAL EQUIPMENT RECEPTACLE
	LOW VOLTAGE WIRING
	TRANSFORMER
	SWITCH. SINGLE POLE +48" CENTER
	SWITCH. THREE WAY +48" CENTER
	SWITCH. KEYED +48" CENTER
	DIMMER SWITCH WATTSTOPPER LS-4 OR EQUAL.
	OCCUPANCY SENSOR CEILING MOUNT
	PHOTOCELL SENSOR
	POWER PACK FOR OCCUPANCY SENSOR
	JUNCTION BOX
	PHOTO ELECTRIC SMOKE DETECTOR
	FLOW SWITCH
	BRANCH PANEL SURFACE MOUNTED
	BRANCH PANEL FLUSH MOUNTED
	SURFACE POWER STRIP, LENGTH AS SHOWN
	TV CONNECTION WITH CABLE
	MOTOR STARTER: MANUAL, MAGNETIC, COMBINATION
	CONTACTOR, RELAY, SOLENOID
	PUSHBUTTON STATION: SINGLE, DOUBLE
	FIRE ALARM CALL STATION
	FIRE ALARM BELL
	TELEPOWER POLE: POWER, COMBINATION
	CABLE TRAY: CENTER SUPPORT, OUTER SUPPORTS



REGISTERED PROFESSIONAL ENGINEER  
83123PE  
OREGON  
JUNE 2, 2019  
MICHAEL A. LOVEDO

RENEWAL DATE DEC. 31, 2022

HELIX ENERGY PARTNERS, LLC



HELIX-ENGINEERS.NET

115 MAIN ST  
BOX 418  
HELIX, OR 97835  
PHONE: +1 (541) 379-0271

REV	DATE	BY

PROJECT TITLE

PROJECT ADDRESS

SHEET TITLE

CENTRAL MIDDLE SCHOOL HVAC UPGRADE

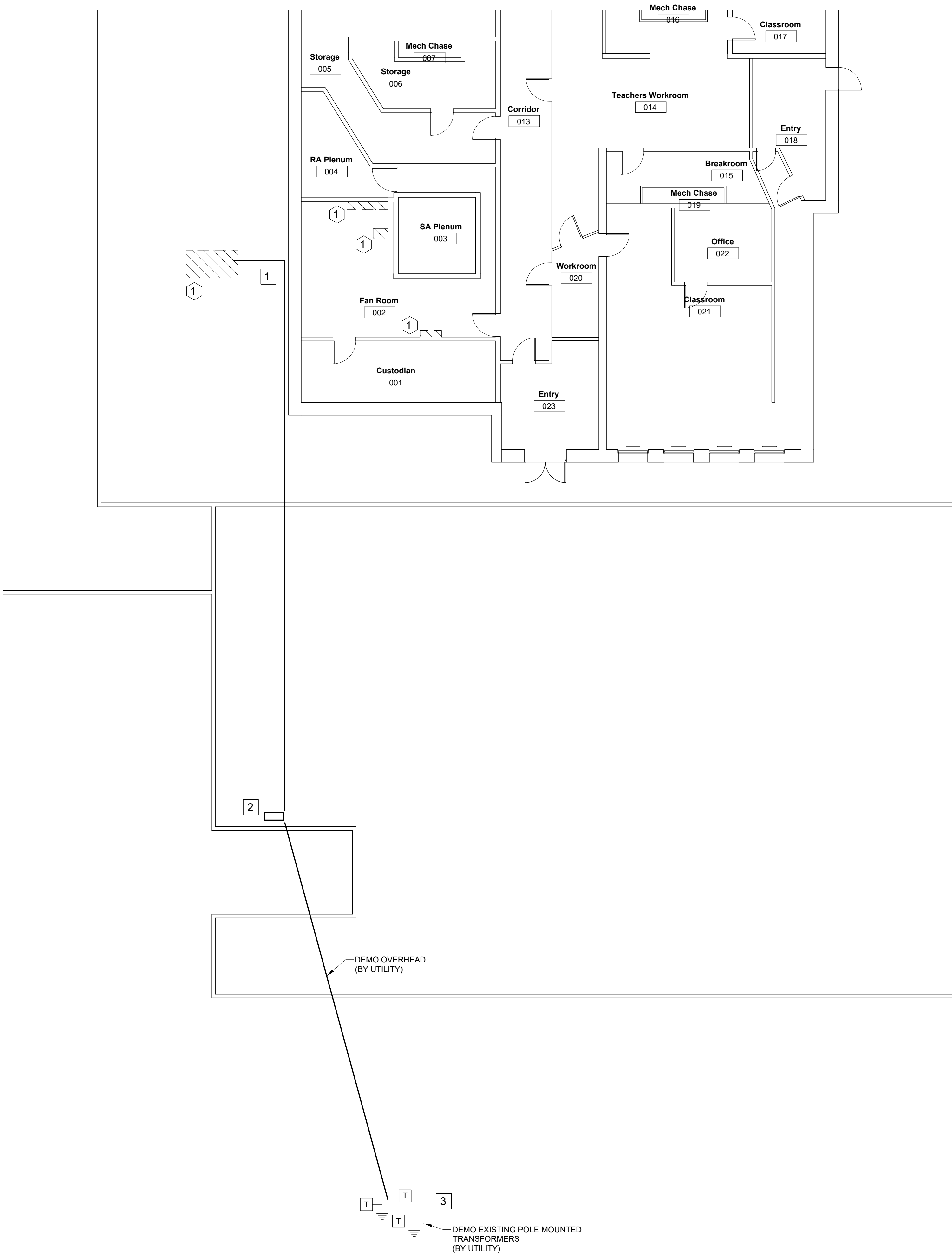
120 S MAIN ST, MILTON-FREEWATER, OR 97862

ELECTRICAL LEGEND, SYMBOLS, SCHEDULES

PROJECT NO.	HEP-21-17
DESIGNED BY	MAL
DRAWN BY	YD
ISSUE DATE	8 JUL 2022
CHECKED BY	MAL
PHASE	CD SET
SHEET NO.	

E0.01





GENERAL NOTES

- 1. ALL WORK TO MEET NATIONAL ELECTRIC CODE. MAINTAIN ACCESSIBILITY OF EQUIPMENT AND JUNCTION BOXES AS PER NEC AND TO OWNERS SATISFACTION.
- 2. THE WORD "PROVIDE" WHEN USED ON THESE ELECTRICAL PLANS IS INTENDED TO MEAN THAT THE ELECTRICAL CONTRACTOR IS TO FURNISH AND INSTALL THE RELATED WORK DESCRIBED. COORDINATE WITH OTHER TRADES AS NECESSARY DURING ALL PHASES OF WORK.
- 3. MOUNT ALL DUPLEX RECEPTACLES AND COMMUNICATION OUTLETS UP +18" UNLESS OTHERWISE NOTED.
- 4. MATCH ALL DEVICE PLATES.
- 5. PROVIDE SEPARATE NEUTRAL WITH EACH RECEPTACLE CIRCUIT. CARRY GROUND WIRE WITH ALL CIRCUITS.
- 6. UNLESS OTHERWISE NOTED, INTERIOR CONDUIT SHALL BE MIN. 1/2" EMT. CONDUCTORS SHALL BE #12 THWN, 800V CU.
- 7. REUSE EXISTING CIRCUITS AS MUCH AS PRACTICAL. HOME RUNS ARE NOT DETAILED. UNLESS NOTED OTHERWISE, FOLLOW THE BEST ROUTE. COORDINATE LOCATIONS WITH OWNER AND OTHER TRADES.
- 8. PROVIDE TYPEWRITTEN UPDATED PANEL SCHEDULES TO REFLECT CONNECTED LOAD.
- 9. COORDINATE CONDUIT, JUNCTION BOXES, SUPPORTING EQUIPMENT, ETC. AFFECTING NORMAL OPERATING AND MAINTENANCE ACTIVITES RELATED TO MECHANICAL EQUIPMENT, PIPING, VALVES, ACCESSORIES, ETC.
- 10. ALL HOLES REMAINING DUE TO DEMOLITION TO BE PATCHED AND FINISHED TO MATCH ADJACENT CEILING, WALL FLOOR AND ROOF SURFACES AS REQUIRED.
- 11. COORDINATE WITH OTHER TRADES AS NECESSARY DURING ALL PHASES OF WORK.
- 12. SEE DRAWING M0.01 FOR ADDITIONAL NOTES.

DEMOLITION NOTES

- 1. EXISTING AIR HANDLER, BOOSTER FAN, AND ORIGINAL MAIN FAN WILL BE REMOVED. DISCONNECT POWER, REMOVE BREAKERS FROM PANEL, AND MARK AS EMPTY.

 DENOTES DEMOLITION AREAS

KEYED NOTES

- 1. DEMO EXISTING CIRCUIT, CONDUIT, AND CONDUCTORS.
- 2. DEMO EXISTING MAIN SERVICE PANEL LOCATED INSIDE OLD BOILER ROOM.
- 3. DEMO UTILITY TRANSFORMER AND OVERHEAD LINES.



RENEWAL DATE JUN. 30, 2023

HELIX ENERGY PARTNERS, LLC



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BOX 418  
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REV	DATE	BY

CENTRAL MIDDLE SCHOOL HVAC UPGRADE

120 S MAIN ST, MILTON-FREEWATER, OR 97862

ELECTRICAL - SITE DEMOLITION PLAN

PROJECT TITLE:

PROJECT ADDRESS:

SHEET TITLE:

PROJECT NO.	HEP-21-17
DESIGNED BY	JEG
DRAWN BY	JEG
ISSUE DATE	14 FEB 2022
CHECKED BY	JEG
PHASE	CD SET
SHEET NO.	

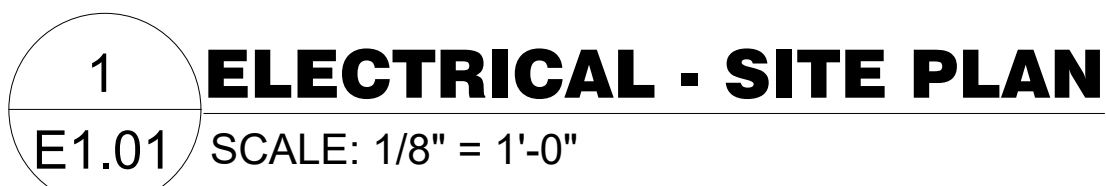
G6ENGINEERING  
LLC

Kennewick, WA 99336  
509-543-7597

E1.01

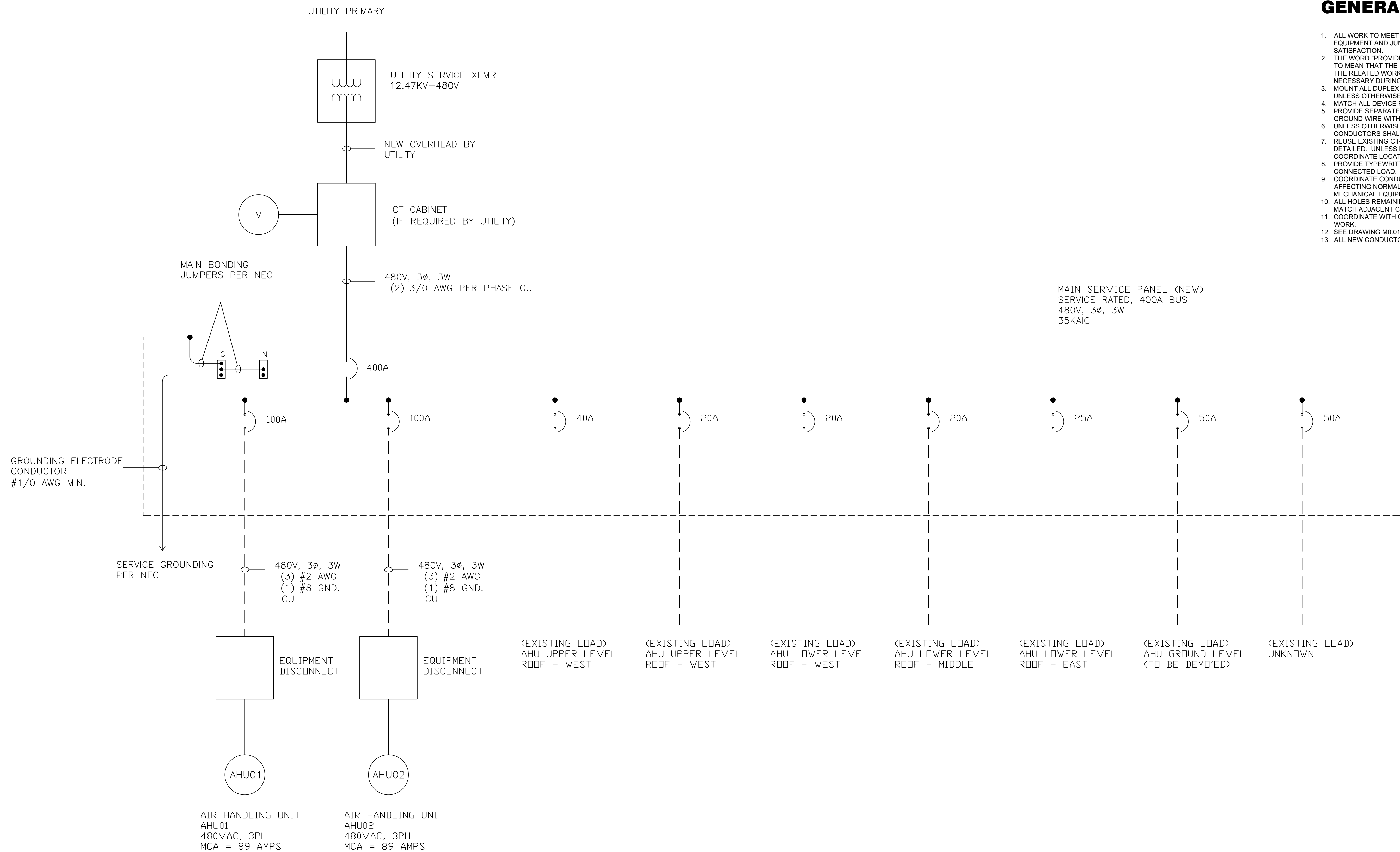
1 ELECTRICAL - SITE PLAN  
E1.01 SCALE: 1/8" = 1'-0"





## E1.02





## GENERAL NOTES

1. ALL WORK TO MEET NATIONAL ELECTRIC CODE. MAINTAIN ACCESSIBILITY OF EQUIPMENT AND JUNCTION BOXES AS PER NEC AND TO OWNERS SATISFACTION.
2. THE WORD "PROVIDE" WHEN USED ON THESE ELECTRICAL PLANS IS INTENDED TO MEAN THAT THE ELECTRICAL CONTRACTOR IS TO FURNISH AND INSTALL THE RELATED WORK DESCRIBED. COORDINATE WITH OTHER TRADES AS NECESSARY DURING ALL PHASES OF WORK.
3. MOUNT "NO. 10" DIELECTRIC REPLACES AND COMMUNICATION OUTLETS UP +18" UNLESS OTHERWISE NOTED.
4. MATCH ALL DEVICE PANELS.
5. PROVIDE SEPARATE NEUTRAL WITH EACH RECEPTACLE CIRCUIT. CARRY GROUND WIRE WITH ALL CIRCUITS.
6. UNLESS OTHERWISE NOTED, INTERIOR CONDUIT SHALL BE MIN. 1/2" EMT. CONDUCTORS SHALL BE #12 THW, 600V/CU.
7. REUSE EXISTING CIRCUITS AS MUCH AS PRACTICAL. HOME RUNS ARE NOT REQUIRED, UNLESS NOTED OTHERWISE. FOLLOW THE BEST ROUTE.
8. COORDINATE LOCATION WITH OWNER AND OTHER TRADES.
9. PROVIDE TYPEWRITTEN UPDATED PANEL SCHEDULES TO REFLECT CONNECTED LOAD.
10. COORDINATE CONDUIT, JUNCTION BOXES, SUPPORTING EQUIPMENT, ETC. AFFECTING ALL OPERATING AND MAINTENANCE ACTIVITIES RELATED TO MECHANICAL EQUIPMENT, PIPING, VALVES, ACCESSORIES, ETC.
11. ALL HOLES REMAINING DUE TO DEMOLITION TO BE PATCHED AND FINISHED TO MATCH ADJACENT CEILING, WALL FLOOR AND ROOF SURFACES AS REQUIRED.
12. COORDINATE WITH OTHER TRADES AS NECESSARY DURING ALL PHASES OF WORK.
13. SEE DRAWING M0.01 FOR ADDITIONAL NOTES.
14. ALL NEW CONDUCTORS TO BE COPPER (CU).



HELIUM ENERGY PARTNERS, LLC



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[illegible]

CENTRAL MIDDLE SCHOOL HVAC UPGRADE  
120 S MAIN ST, MILTON-FREEWATER, OR 97862

## ELECTRICAL - SINGLE LINE DIAGRAM

PROJECT TITLE:	PROJECT ADDRESS:	SHEET TITLE:
PROJECT NO.	HEP-21-17	
DESIGNED BY	JEG	
DRAWN BY	JEG	
ISSUE DATE	14 FEB 2022	
CHECKED BY	JEG	
PHASE	CD SET	
SHEET NO.		

## E1.03



Kennewick, WA 99336  
509-543-7597