DUCT CONFIGURATIONS

SINGLE LINE	DOUBLE LINE	IDENTIFICATION
		LONG SWEEP 90° ELBOW - RECTANGULAR, ROUND OR OVAL
		SHORT SWEEP 90° ELBOW - RECTANGULAR, ROUND OR OVAL
		45° LATERAL - ROUND TO ROUND OR OVAL TO OVAL
		90° TAKEOFF WITH 45° ELONGATED TEE - ROUND TO ROUND
		90° CONICAL TEE - ROUND TO ROUND OR OVAL TO OVAL
		Y BRANCH - ROUND OR OVAL DUCT
		90° ELBOW - RECTANGULAR DUCT (NO DUCT TURNING VANES)
		90° ELBOW -RECTANGULAR DUCT WITH TURNING VANES
		90° TAKEOFF WITH 45° TAPER - RECTANGULAR TO RECTANGULAR (FOR BRANCH TAKEOFF LONGER THAN 50'-0", USE 15°)
		90° RADIUS SPLIT - RECTANGULAR DUCT, PROVIDE SPLITTER DAMPER, X/Y PROPORTIONAL SPLIT
		90° RECTANGULAR SPLIT - RECTANGULAR DUCT, PROVIDE SPLITTER DAMPER, X/Y PROPORTIONAL SPLIT
		SPIN-IN WITH BALANCE DAMPER - RECTANGULAR TO ROUND OR RECTANGULAR TO OVAL

GAS SYMBOLS

SYMBOL	IDENTIFICATION
	PIPE ABOVE GRADE
	PIPE BELOW GRADE
	PIPE UP
	PIPE DROP
	PIPE DROP AT TEE
	PIPE CAP
	PIPE CONTINUED
	PIPE TRANSITION
	TEE
	SHUT-OFF VALVE
	GAS PRESSURE REGULATOR
	BALL VALVE
	UNION

HVAC SYMBOLS

SYMBOL	IDENTIFICATION
	DUCT; SINGLE-LINE
	DUCT; DOUBLE-LINE
	45 DEGREE DUCT ELBOW; SINGLE-LINE
	DUCT TRANSITION; SINGLE-LINE
	DUCT TRANSITION; DOUBLE-LINE
	DUCT TRANSITION RECTANGULAR TO ROUND; DOUBLE-LINE
	SUPPLY AIR DUCT IN CROSS-SECTION ROUTED UP OR HORIZONTAL MOUNTED SUPPLY AIR DIFFUSER
	RETURN AIR DUCT IN CROSS-SECTION ROUTED UP OR HORIZONTAL MOUNTED RETURN AIR GRILLE
	EXHAUST AIR DUCT IN CROSS-SECTION ROUTED UP OR HORIZONTAL MOUNTED EXHAUST AIR GRILLE
	SUPPLY AIR DUCT IN CROSS-SECTION ROUTED DOWN
	RETURN AIR DUCT IN CROSS-SECTION ROUTED DOWN
	EXHAUST AIR DUCT IN CROSS-SECTION ROUTED DOWN
	ROUND DUCT UP - SUPPLY, RETURN OR EXHAUST
	ROUND DUCT DOWN - SUPPLY, RETURN OR EXHAUST
	VERTICAL MOUNTED SUPPLY AIR DEVICE
	VERTICAL MOUNTED RETURN OR EXHAUST AIR DEVICE
	AIR FROM DEVICE
	AIR TO DEVICE
	BALANCE DAMPER
M	MOTORIZED DAMPER
FD	FIRE DAMPER - HORIZONTAL
FD	FIRE DAMPER - VERTICAL
FSD	FIRE AND SMOKE DAMPER - HORIZONTAL
FSD	FIRE AND SMOKE DAMPER - VERTICAL
T	THERMOSTAT
T	TEMPERATURE SENSOR
CO_2	CARBON DIOXIDE SENSOR
	POINT OF CONNECTION
12x12 CD - X (300)	REGISTER NECK SIZE AND MARK (DESIGN CFM)
	CENTERLINE
	SHEET KEYNOTE TAG
	CONTRACTOR EQUIPMENT TAG

ABBREVIATIONS

ABBRV.	IDENTIFICATION	ABBRV.	IDENTIFICATION
ø	DIAMETER	ID	INSIDE DIAMETER
&	AND	IN	INCH
@	AT	KW	KILOWATTS
°F	DEGREES FAHRENHEIT	LAT	LEAVING AIR TEMPERATURE
AC	AIR CONDITIONER	LBS	POUNDS
AC/H	AIR CHANGES PER HOUR	LRA	LOCKED ROTOR AMPS
AFF	ABOVE FINISH FLOOR	LVG	LEAVING
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	LWT	LEAVING WATER TEMPERATURE
AMP	AMPERE	LWB	LEAVING WET BULB
ARCH	ARCHITECT/ARCHITECTURAL	MAX	MAXIMUM
BDD	BACKDRAFT DAMPER	MBH	1000 BTU PER HOUR
BHP	BRAKE HORSEPOWER	MCA	MINIMUM CIRCUIT AMPACITY
BLDG	BUILDING	MCC	MOTOR CONTROL CENTER
BTUH	BRITISH THERMAL UNITS PER HOUR	MECH	MECHANICAL
CA	COMBUSTION AIR	MFR	MANUFACTURER
CFM	CUBIC FEET PER MINUTE	MIN	MINIMUM
CIRC	CIRCULATING	MOCP	MAXIMUM OVERCURRENT PROTECTION
CLG	CEILING	(N)	NEW
CONN	CONNECTION	NC	NORMALLY CLOSED
CONT	CONTINUED, CONTINUATION	NIC	NOT IN CONTRACT
COOL	COOLING	NTS	NOT TO SCALE
COORD	COORDINATE	OA	OUTSIDE AIR
COP	COEFFICIENT OF PERFORMANCE	OBD	OPPOSED BLADE DAMPER
CONST	CONSTRUCTION	OC	ON CENTER
CV	COEFFICIENT OF FLOW	OD	OUTSIDE DIAMETER
dBA	A-WEIGHTED DECIBELS	PD	PRESSURE DROP
DB	DRY BULB	PH	PHASE
DN	DOWN	P/N	PART NUMBER
DSD	DUCT SMOKE DETECTOR	POC	POINT OF CONNECTION
DWGS	DRAWINGS	PSI	POUNDS PER SQUARE INCH
(E)	EXISTING TO REMAIN	P/T	PRESSURE/TEMPERATURE
EA	EXHAUST AIR	QTY	QUANTITY
EAT	ENTERING AIR TEMPERATURE	(R)	RELOCATE EXISTING
EER	ENERGY EFFICIENCY RATIO	RA	RETURN AIR
EF	EXHAUST FAN	REQD	REQUIRED
EFF	EFFICIENCY	RLA	RATED/RUNNING LOAD AMPS
ELEC	ELECTRICAL	RPM	REVOLUTIONS PER MINUTE
EQUIP	EQUIPMENT	SA	SUPPLY AIR
ESP	EXTERNAL STATIC PRESSURE	SC	SENSIBLE COOLING
EWB	ENTERING WET BULB	SEER	SEASONAL ENERGY EFFICIENCY RATIO
EWT	ENTERING WATER TEMPERATURE	SF	SUPPLY FAN OR SQUARE FEET
FD	FIRE DAMPER	SOV	SHUT-OFF VALVE
FSD	FIRE AND SMOKE DAMPER	SOO	SEQUENCE OF OPERATION
FLA	FULL LOAD AMPS	SP	STATIC PRESSURE
FLEX	FLEXIBLE	SPEC	SPECIFICATION
FPM	FEET PER MINUTE	TC	TOTAL (COOLING) CAPACITY
FT	FEET	TEMP	TEMPERATURE
FT HD	FEET HEAD	TSP	TOTAL STATIC PRESSURE
FTR	FLUE THRU ROOF	TSTAT	THERMOSTAT
G	GAS	TYP	TYPICAL
GA	GAUGE	UCD	UNDERCUT DOOR
GPM	GALLONS PER MINUTE	UL	UNDERWRITER'S LABORATORIES
GPR	GAS PRESSURE REGULATOR	UON	UNLESS OTHERWISE NOTED
HP	HORSEPOWER	V	VOLT
HR	HOUR	W/	WITH
HSPF	HEATING SEASONAL PERFORMANCE FACTOR	W	WATTS
		WB	WET BULB
HTG	HEATING	WC	WATER COLUMN
HZ	HERTZ	WT	WEIGHT
		(X)	EXISTING TO BE REMOVED

LEGEND NOTES

A. ALL SYMBOLS MAY NOT BE USED IN THIS PROJECT.
B. SYMBOLS DO NOT ALWAYS REPRESENT REAL LIFE DIMENSIONS.
C. SEE BOOK SPECIFICATIONS FOR ADDITIONAL INFORMATION.
D. SEE PLANS FOR DUCT AND PIPE SIZES.

GENERAL MECHANICAL NOTES

1. **SCOPE OF WORK**: THIS PROJECT IS NEW CONSTRUCTION. THE PLANS AND SPECIFICATIONS INDICATE THE GENERAL EXTENT OF THE WORK BASED ON OWNER PROVIDED INFORMATION AND LIMITED FIELD VERIFICATION. CONTRACTOR SHALL VISIT SITE, AND REPORT ANY DISCREPANCIES NOTED TO THE ENGINEER PRIOR TO SUBMITTING A BID. CONTRACTOR SHALL BE RESPONSIBLE FOR THE MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEMS NECESSARY TO ACCOMPLISH THE WORK WHETHER OR NOT SPECIFIED AND/OR INDICATED.
2. MECHANICAL CONTRACTOR SHALL NOTIFY GENERAL CONTRACTOR TO REPAIR WALL, FLOOR AND CEILING SURFACES AS REQUIRED DUE TO DEMOLITION OR INSTALLATION WORK.
3. ALL CONTROL WIRING SHALL BE IN CONDUIT. CONDUIT AND WIRING SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL CONTRACTOR. PROVIDE AND INSTALL RIGID CONDUIT IN AREAS EXPOSED TO THE ELEMENTS.
4. ALL TRANSITIONS IN DUCTWORK SHALL BE MADE AT 15 DEGREES TO EACH FACE MAXIMUM, UNLESS OTHERWISE NOTED OR SPECIFICALLY APPROVED.
5. MECHANICAL CONTRACTOR TO REVIEW TRUSS SUBMITTAL PRIOR TO DUCT FABRICATION AND VERIFY TRUSS OPENING SIZES AND DUCT SIZES DO NOT CONFLICT.

LIST OF GOVERNING CODES

THIS WORK SHALL CONFORM TO ALL CURRENT AND ADOPTED LOCAL CODES

- OREGON STRUCTURAL SPECIALTY CODE (OSSC)
- OREGON MECHANICAL SPECIALTY CODE (OMSC)
- OREGON PLUMBING SPECIALTY CODE (OPSC)
- OREGON ENERGY CODE (OEG)
- OREGON FIRE CODE (OFC)

COMMISSIONING MECHANICAL

MECHANICAL SYSTEM COMMISSIONING STATEMENT OF WORK: MECHANICAL SYSTEM COMMISSIONING SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2025 OREGON ENERGY CODE (OEESC). A THIRD PARTY COMMISSIONING AGENT (CXA) WILL BE CONTRACTED BY THE OWNER TO VERIFY SYSTEM PERFORMANCE IN ACCORDANCE WITH OEESC REQUIREMENTS. THE CXA WILL PROVIDE THE COMMISSIONING PLAN AND TEST RESULTS. FUNCTIONAL TESTING WILL BE REQUIRED FOR NEW HVAC SYSTEMS.

MECHANICAL SHEET KEY

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
OREGON | CALIFORNIA

BID AND PERMIT SET

KCC CHILDCARE LEARNING CENTER

PROJECT #: 20230862
KLAMATH COMMUNITY COLLEGE
7390 S. 6TH ST.
KLAMATH FALLS, OR
97603

SHEET TITLE:
LEGEND

REVISIONS:

#	DESCRP.	DATE

ISSUE DATE: 08/01/2025

M001

FAN COIL UNITS

MARK	SERVING			FAN MOTORS																						ELECTRICAL				FILTER	WT (LBS)	MAKE & MODEL	NOTES
		CFM	ESP	QTY	BHP	HP	RPM	TYPE	TC (MBH)	SC (MBH)	EAT DB (F)	LAT DB (F)	EWT (F)	LWT (F)	FLOW (GPM)	WPD (FT. WC)	ROWS	VALVE	TH (MBH)	EAT DB (F)	LAT DB (F)	EWT (F)	LWT (F)	FLOW (GPM)	WPD (FT. WC)	ROWS	VALVE	V/PH	MCA	MOCP	SCCR				
FC-101	Classroom 135	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-102	Classroom 137	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-103	Classroom 140	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-104	Classroom 142	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-105	Classroom 132	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-106	Classroom 130	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-107	Classroom 127	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-108	Classroom 125	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-109	Office Area	1400	0.5	2	0.3	1/3	1235	ECM	12	12	75	65.3	46	60	2.10	2.36	3	2-WAY	17	65	76.9	130	100	1.10	0.27	1	2-WAY	208/1	6.75	15	15	2" MERV-8	193	JCI FNP14	ALL
FC-201	Classroom 157	700	0.4	1	0.3	1/3	1204	ECM	12.8	12	75	56.3	46	60	2.00	0.86	6	2-WAY	20.6	65	95.2	130	100	1.3	0.35	2	2-WAY	208/1	3.75	15	15	2" MERV-8	166	JCI FNP10	ALL
FC-202	Break 172/Office 201	700	0.4	1	0.3	1/3	1204	ECM	13.2	12.2	75	56	46	59	2.30	1.03	6	2-WAY	14	65	85	130	100	0.90	0.06	2	2-WAY	208/1	3.75	15	15	2" MERV-8	166	JCI FNP10	ALL
FC-203	Large Conf 208	1100	0.4	2	0.3	1/3	1064	ECM	19.8	18.7	75	56.2	46	60.9	3	0.39	6	2-WAY	16.9	65	80	130	100	1.10	0.29	2	2-WAY	208/1	6.75	15	15	2" MERV-8	242	JCI FNP16	ALL
FC-204	Entry / Commons	2400	0.5	2	0.	3/4	1075	ECM	36.3	36.2	75	58.8	46	61.0	5.10	1.95	6	2-WAY	57.2	65	91.5	130	100	3.90	1.43	2	2-WAY	208/1	16.43	20	20	2" MERV-8	527	JCI AHD30	ALL
FC-206	Classroom 159	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-207	KCC CR 205	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-208	KCC CR 204	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-209	Classroom 164	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL
FC-210	Classroom 161	1000	0.4	2	0.23	1/3	1008	ECM	19.3	17.7	75	55.7	46	60	3.1	0.41	6	2-WAY	29.6	65	95.1	130	100	1.9	0.17	2	2-WAY	208/1	6.75	15	15	2" MERV-8	254	JCI FNP16	ALL

NOTES:

1. PROVIDE BELIMO ACTUATORS ON ALL CONTROL VALVES. ACTUATORS PROVIDED BY CONTROLS CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR. REFER TO DRAWINGS FOR COIL HANDING.
2. STAINLESS STEEL DRAIN PAN WITH FACTORY MOUNTED OVERFLOW SWITCH. PROVIDE CONDENSATE PUMP.
3. SEE VENTILATION REQUIREMENTS SCHEDULE FOR OA AIRFLOW REQUIREMENTS. BALANCE OA AIRFLOWS AS NOTED.
4. SEE M701 FOR CONNECTION AND MOUNTING DETAILS.

DEDICATED OUTDOOR AIR SYSTEM

MARK	LOCATION	SERVING	SUPPLY FAN						EXHAUST FAN						WINTER (HEATING)					SUMMER (COOLING)						HEATING WATER COIL							
			AIRFLOW CFM	ESP IN WG	MOTOR BHP	MOTOR HP	MOTOR RPM	MOTOR CONTROL	AIRFLOW CFM	ESP IN WG	MOTOR BHP	MOTOR HP	MOTOR RPM	MOTOR CONTROL	OSA EAT	OSA LAT	EA EAT	EA LAT	EFF. %	OSA EAT	OSA LAT	EA EAT	EA LAT	EFF. %	CONTROL	HEAT MBH	EAT	LAT	EWT	LWT	FLOW GPM	ROWS	WTR PD FT
DOAS-1	RR 136 MEZZ	SECTOR A - WEST	2300	2.40	1.27	2	1777	ECM	2300	1.37	0.7	4	1216	ECM	10	53	70	28.3	68.7	91	79.3	75	86.6	70.4	-	88.4	53	92.7	130	110	9	2	0.7
DOAS-2	RR 160 MEZZ	SECTOR B - NORTH	1290	2.28	0.85	1	2015	ECM	1290	1.24	0.37	1.34	1769	ECM	10	53	70	27	71.2	91	79.2	75	86.7	72	-	43.6	53.3	88.3	130	110	3	2	1.2
DOAS-3	RR 133 MEZZ	SECTOR A - EAST	2215	2.40	1.21	2	1748	ECM	2215	1.34	0.66	4	1195	ECM	10	53	70	28.1	69.1	91	79.2	75	86.6	70.7	-	82.5	54	80	130	110	5.5	2	2.1
DOAS-4	RR 162 MEZZ	SECTOR B - SOUTH	1830	3.73	1.65	2	2511	ECM	1830	1.5	0.69	1	2222	ECM	10	53	70	29.1	67.1	91	79.2	75	86.5	69.4	-	48	54	80	130	110	4	2	2

NOTES:

1. SUPPLY FANS AND EXHAUST FANS SHALL BE PROVIDED WITH EC MOTORS.
2. 100% OSA UNIT WITH STATIC PLATE ENERGY RECOVERY.
3. UNIT MOUNTED ON MEZZANINE. REFERENCE STRUCTURAL DOCUMENTS FOR ANCHORAGE REQUIREMENTS.
4. PROVIDE DUCT SMOKE DETECTORS IN SUPPLY AIR AND EXHAUST AIR DUCTWORK. INTERLOCK DETECTORS WITH ELECTRICAL SERVICE TO DE-ENERGIZE UNIT UPON DETECTION OF SMOKE.
5. PROVIDE WITH MOTORIZED DAMPERS ON OA AND EA. ACTUATORS BY CONTROLS CONTRACTOR.

CHILLED WATER COIL								FILTERS			ELECTRICAL			WT LBS	MAKE & MODEL
TOTAL COOL MBH	EAT	LAT	EWT	LWT	FLOW GPM	ROWS	WTR PD FT	OSA PF	OSA FF	EA FF	V/PH	MCA	MOCP		
86.5	79.3	56.6	46	50.9	25	6	4.2	MERV-8	MERV-13	MERV-8	208/3	16	20	1875	AAON V3
47.7	79.2	55.1	46	53.8	8.5	6	5.2	MERV-8	MERV-13	MERV-8	208/3	6	15	1556	AAON V3
82.5	79.2	55.0	46	55.6	12	6	6.2	MERV-8	MERV-13	MERV-8	208/3	16	20	1875	AAON V3
62.0	79.2	58.9	46	53.0	12	6	7.9	MERV-8	MERV-13	MERV-8	208/3	9	15	1556	AAON V3

AIR COOLED CHILLER

MARK	EVAPORATOR - OPERATING CONDITION						CONDENSER FANS			COMPRESSORS		ELECTRICAL				EER	IPLV	GLYCOL (%)	REFRIGERANT	REFRIGERANT CHARGE (LBS)	WT (LBS)	MAKE & MODEL	NOTES
	TONS	EWT (F)	LWT (F)	MIN. FLOW (GPM)	DESIGN FLOW (GPM)	WPD (FT. WC)	OADB (F)	QTY	FLA (EACH)	TYPE	QTY	V/PH	MCA	MOCP	SCCR								
CH-1	50	61	46	48	83.86	8	91	2	7.6	SCROLL	4	208/3	235	250	250	11.8	18	30	R454B	66	3503	YORK YLAA0048J17XCB	ALL

NOTES:

1. SOUND PRESSURE: XX DBA OVERALL. SOUND POWER: XX DBA OVERALL.
2. PROVIDE COMPRESSOR SOUND BLANKETS.
3. SINGLE POINT POWER CONNECTION AND DISCONNECT. PHASE AND UNDER/OVER VOLTAGE PROTECTION.
4. INSTALL ON XXX (CONCRETE PAD) . SEE X/M701 FOR DETAILS.
5. SEE 1/M501 FOR PIPING DIAGRAM. HEAT TRACE EXTERIOR PIPES.

HOT WATER CONDENSING BOILER

MARK	LOCATION	INPUT [MBH]	HIGH FIRE OUTPUT [MBH]	AFUE [%]	MIN GAS PRESS [IN. WC]	MAX GAS PRESS [IN. WC]	TURNDOWN	MAX GPM	MIN GPM	MAX PD [PSIG]	EWT [°F]	LWT [°F]	MAX PRESS [PSIG]	FLUE DIAM [IN]	AIR INLET [IN]	GAS INLET [IN]	ELEC [V/H/P]	FLA	MANUFACTURER	MODEL	OPER WEIGHT [LBS]	NOTES
B-1	BOILER RM	600	585	97.5	5	14	10:1	105	10	160	110	130	160	4	4	1	120/1	6	LOCHINVAR	FTX600	560	
B-2	BOILER RM	600	585	97.5	5	14	10:1	105	10	160	110	130	160	4	4	1	120/1	6	LOCHINVAR	FTX600	560	

NOTES:

1. PROVIDE ONE ANSI CERTIFIED GAS REGULATOR WITH EACH BOILER. CONTRACTOR TO VENT REGULATOR OUTDOORS.
2. PROVIDE MANUFACTURER'S CONDENSATE NEUTRALIZER. ONE PER BOILER.
3. PROVIDE MANUFACTURER'S CONCENTRIC VENT KIT. ONE PER BOILER.
4. PROVIDE 6" CONCRETE SERVICE PAD.
5. PROVIDE WITH BACNET MSTP OPTION FOR INTEGRATION INTO BAS. PROVIDE WITH FLOW SWITCH.
6. PROVIDE HIGH ALTITUDE OPTION IF REQUIRED

EXHAUST FANS

MARK	SERVING	CFM	ESP	SONES	MOTOR V/PH	MOTOR AMPS	MOTOR WATTS/HP	FAN RPM	WT LBS	MAKE & MODEL	NOTES
KEF-1	KITCHEN GREASE HOOD	2150	1.0	11.5	208/3	4.4	1.5	1073	162	CAPTIVEAIRE DU180HFA	

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING A COMPLETE CONTROLS SYSTEM IN ORDER TO ACCOMPLISH THE DESCRIPTION OF CONTROLS DESCRIBED IN SCHEDULE AND IN MAU SEQUENCE OF OPERATION.
2. INTERLOCK HOOD FAN OPERATION W/ MAU-1 FOR BALANCED VENTILATION.
3. REFER TO SHEETS MXXX FOR DETAILS AND MFR INSTALLATION REQUIREMENTS.

EXPANSION TANK - VERTICAL BLADDER

MARK	CON. SIZE	VOLUME GAL	WT LBS	MAKE AND MODEL	REMARKS
ET-1				TACO-Caxxx	ALL

NOTES:

1. ASME RATED PRESSURE VESSEL

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
OREGON, CALIFORNIA

BID AND PERMIT SET

KCC CHILDCARE LEARNING CENTER

PROJECT #: 20230862
KLAMATH COMMUNITY COLLEGE
7390 S. 6TH ST.
KLAMATH FALLS, OR
97603

SHEET TITLE:
SCHEDULES

REVISIONS:
DESCRP. DATE

ISSUE DATE: 08/01/2025

M002

HYDRONIC PUMPS

MARK	SERVICE	LOCATION	TYPE	FLOW GPM	HEAD FT	DUTY EFF %	NPSH FT	OPER. RPM	MOTOR						WT LBS	MAKE & MODEL	NOTES
									BHP	HP	RPM	V/PH	CONTROL	TYPE			
CHP-1	CHILLED WATER	BOILER ROOM	VERT. IN-LINE	106	55	58.2	5.8	1893	2.6	3	2000	208/3	VFD	TEFC	185	BG E-80X 2X7B	1,2
CHP-2	CHILLED WATER	BOILER ROOM	VERT. IN-LINE	106	55	58.2	5.8	1893	2.6	3	2000	208/3	VFD	TEFC	185	BG E-80X 2X7B	1,2
BP-1	PRIMARY HW	BOILER ROOM	CIRC. IN-LINE	50	12	56.4	-	2576	-	0.5	-	208/1	ECM	-	35	BG ECOCIRC XL 20-140	2
BP-2	PRIMARY HW	BOILER ROOM	CIRC. IN-LINE	50	12	56.4	-	2576	-	0.5	-	208/1	ECM	-	35	BG ECOCIRC XL 20-140	2
HWP-1	SECONDARY HW	BOILER ROOM	VERT. IN-LINE	116	40	32.8	4.7	1681	1.8	3	2000	208/3	VFD	TEFC	215	BG E-80X 2.5X7B	1,2
HWP-2	SECONDARY HW	BOILER ROOM	VERT. IN-LINE	116	40	62.8	4.7	1681	1.8	3	2000	208/3	VFD	TEFC	215	BG E-80X 2.5X7B	1,2
SP-1	SNOWMELT	BOILER ROOM	VERT. IN-LINE	116	40	62.9	4.8	1682	1.9	3	2000	208/4	VFD	TEFC	216	BG E-80X 2.5X7B	1,2
SP-2	SNOWMELT	BOILER ROOM	VERT. IN-LINE	116	40	62.10	4.9	1683	1.10	3	2000	208/5	VFD	TEFC	217	BG E-80X 2.5X7B	1,2

GENERAL NOTES:

A. EFFICIENCY LISTED IS WIRE TO WATER EFFICIENCY.

B. CHILLED WATER SYSTEM IS 30% PROPYLENE GLYCOL. HOT WATER SYSTEM IS WATER ONLY.

NOTES:

1. PROVIDE WITH INVERTER DUTY MOTOR AND INTEGRATED VFD.
2. SEE M701 FOR CONNECTION DETAILS.

SPLIT SYSTEM HEAT PUMPS

MARK	SERVING	COOL MBH		HEAT MBH	TONS	CFM	ELECTRICAL DATA			REFRIGERANT DATA			SEER2	HSPF2	WT LBS	MAKE & MODEL	NOTES
		TC	SC				V/PH	MCA	MOCP	TYPE	LINE LEN. (FT)	CHARGE (LBS)					
HP-01	MDF	30	22	30	2		208/1	19	30	R-32		4.081	22	9.7	135.4	LG-KUSAP241A	6
FC-01					2	389	-	-		-		-	-	-	36.6	LG-KNSAP241A	1,2,3,4,5
HP-02	MDF	14	12	12	1	-	208/1	12	15	R-32		1.81	22.5	10.5	68.8	LG - KSUAB121A	6
FC-02					1	194	-	-		-		-	-	-	19.73	LG - KNUAB121A	1,2,3,4,5

NOTES:

1. PROVIDE PROGRAMMABLE THERMOSTAT & CONDENSATE PUMP. ROUTE CONDENSATE TO NEAREST APPROVED RECEPTACLE.
2. CONTROLS CONTRACTOR SHALL FURNISH AND INSTALL REMOTE TEMPERATURE SENSOR AND CONNECT TO DDC SYSTEM FOR MONITORING. GENERATE ALARM ON TEMPERATURE RISE ABOVE SETPOINT.
3. SIZE AND INSTALL REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS.
4. PROVIDE WITH MANUFACTURERS FACTORY MOUNTED REFRIGERANT LEAK DETECTOR.
5. INDOOR UNIT POWERED BY OUTDOOR UNIT.
6. MOUNT OUTDOOR UNIT ON QSMS1200 MINI SPLIT STAND AND ANCHOR TO HOUSEKEEPING PAD.

MAKE UP AIR UNITS

MARK	SERVING	COOL MBH		HEAT MBH		TONS	CFM	ESP	FAN RPM	MOTOR		UNIT		WT LBS	(S)EER	HEAT EFF.	MAKE & MODEL	NOTES
		TC	SC	IN	OUT					HP	V/PH	MCA	MOCP					
MAU-1	KITCHEN	91	90	174	141	7.5	2150	0.5	2175	1.5	208/3	33.9	35	726	18.6	92%	CAPTIVEAIRE CAS-HVAC1-I.200-18-7.5T	

NOTES:

1.

HYDRAULIC / AIR SEPARATOR

MARK	GPM MAX	SERVING	CONN SIZE	WEIGHT	MAKE AND MODEL	REMARKS
HS-1	124	HEATING WATER	3	112	CALEFFI SEP4 549582A	1,2,3
AS-1	138	CHILLED WATER	3	125	BELL AND GOSSETT CRS-3F MAG	1,2,3

NOTES:

1. PROVIDE FACTORY INSULATION
2. PROVIDE AUTO AIR VENT
3. PROVIDE SHUTOFF AND DRAIN VALVE

AIR DISTRIBUTION

MARK	TYPE	MAKE & MODEL	REMARKS
LS-1	SUPPLY	PRICE SDS100	PRICE LINEAR SLOT, 2 SLOTS, SUPPLY GRILLE, SURFACE MOUNTED, 1" SLOT, 4' LENGTH, FIELD PLENUM
LR-1	RETURN	PRICE SRS100	PRICE LINEAR SLOT, 2 SLOTS, RETURN GRILLE, SURFACE MOUNTED, 1" SLOT, 5' LENGTH, FIELD PLENUM
RG-1	RETURN	TITUS 50F	24X24 EGGCRATE FACE RETURN, MATCH FRAME TO CEILING TYPE, NECK SIZE AS INDICATED
RG-2	RETURN	TITUS 350RL	LOUVERED FACE RETURN, SIZE AS INDICATED
SD-1	SUPPLY	TITUS OMNI	24X24 PLAQUE DIFFUSER, MATCH FRAME TO CEILING TYPE, NECK SIZE AS INDICATED
SD-2	SUPPLY	TITUS 300RL	DOUBLE DEFLECTION LOUVERED FACE SUPPLY, SIZE AS INDICATED
EG-1	EXHAUST	TITUS 50F	24X24 EGGCRATE FACE RETURN, MATCH FRAME TO CEILING TYPE, NECK SIZE AS INDICATED
LV-1	LOUVER	RUSKIN ELF6375DX	LOUVERED SUPPLY, SIZE AS INDICATED
LV-2	LOUVER	RUSKIN ELF6375DX	LOUVERED EXHAUST, SIZE AS INDICATED

NOTES:

1. MAY PROVIDE EQUIVALENT EQUIPMENT FROM NAILOR, PRICE, TUTTLE & BAILEY, GREENHECK.

ELECTRIC HEATERS

MARK	SERVING	CFM	KW	AMPS	V/PH	WT LBS	MAKE & MODEL	NOTES
EH-1	BOILER 149	100	1.5	12.5	120/1	22	BERKO FRA1512F	
EH-2	FIRE RISER 167	100	1.5	12.5	120/1	22	BERKO FRA1512F	
EH-3	VESTIBULE 100	100	1.5	12.5	120/1	22	BERKO FRA1512F	

NOTES:

1.

VENTILATION REQUIREMENTS

TAG	ROOM	PEOPLE	@	CFM/PERSON	+	AREA	@	CFM/SQ.FT.	/	Ez	=	CFM OSA REQUIRED	CFM OSA PROVIDED
DOAS-1	CLASSROOM 135	24	@	10.0	+	957.0	@	0.12	/	0.8	=	442.6	450
	CLASSROOM 137	24	@	10.0	+	951.0	@	0.12	/	0.8	=	439.8	440
	CLASSROOM 140	24	@	10.0	+	948.0	@	0.12	/	0.8	=	438.5	440
	CLASSROOM 140	24	@	10.0	+	950.0	@	0.12	/	0.8	=	439.4	440
	COMMONS	50	@	5.0	+	2,800.0	@	0.06	/	0.8	=	522.5	530
											DOAS-1 TOTAL:	2282.8	2300
DOAS-2	CLASSROOM 159	24	@	10.0	+	971.0	@	0.12	/	0.8	=	449.1	450
	CLASSROOM 157	21	@	10.0	+	854.0	@	0.12	/	0.8	=	395.0	400
	BREAK ROOM 172	10	@	5.0	+	382.0	@	0.06	/	0.8	=	88.3	90
	SHARED OFFICE 201	4	@	5.0	+	227.0	@	0.06	/	0.8	=	42.0	45
	LARGE CONFERENCE 209	20	@	5.0	+	394.0	@	0.06	/	0.8	=	152.7	155
	OFFICE 208	1	@	5.0	+	100.0	@	0.06	/	0.8	=	10.6	15
	OFFICE 207	1	@	5.0	+	104.0	@	0.06	/	0.8	=	11.1	15
	HALLWAY 200	0	@	0.0	+	620.0	@	0.06	/	0.8	=	46.5	50
	HALLWAY 105/106	0	@	0.0	+	908.0	@	0.06	/	0.8	=	68.1	70
											DOAS-2 TOTAL:	1263.4	1290
DOAS-3	CLASSROOM 132	24	@	10.0	+	974.0	@	0.12	/	0.8	=	450.5	455
	CLASSROOM 130	24	@	10.0	+	972.0	@	0.12	/	0.8	=	449.6	450
	CLASSROOM 127	24	@	10.0	+	971.0	@	0.12	/	0.8	=	449.1	450
	CLASSROOM 135	24	@	10.0	+	975.0	@	0.12	/	0.8	=	450.9	455
	SHARED OFFICE 118	4	@	5.0	+	211.0	@	0.06	/	0.8	=	40.8	45
	SHARED OFFICE 115	3	@	5.0	+	213.0	@	0.06	/	0.8	=	34.7	35
	OFFICE 114	1	@	5.0	+	105.0	@	0.06	/	0.8	=	11.2	15
	OFFICE 113	1	@	5.0	+	104.0	@	0.06	/	0.8	=	11.1	15
	RECEPTIONS 112	3	@	5.0	+	102.0	@	0.06	/	0.8	=	26.8	30
	SHARED OFFICE 111	3	@	5.0	+	145.0	@	0.06	/	0.8	=	29.6	30
	DIRECTORS OFFICE 110	1	@	5.0	+	152.0	@	0.06	/	0.8	=	16.2	20
	SMALL CONF. 117	6	@	5.0	+	115.0	@	0.06	/	0.8	=	44.6	45
	OFFICE 119	1	@	5.0	+	120.0	@	0.06	/	0.8	=	12.8	15
	HALLWAY 103	0	@	0.0	+	1,464.0	@	0.06	/	0.8	=	109.8	110
	WORK AREA 120	2	@	5.0	+	419.0	@	0.06	/	0.8	=	44.5	45
											DOAS-3 TOTAL:	2182.0	2215
DOAS-4	CLASSROOM 161	25	@	10.0	+	982.0	@	0.12	/	0.8	=	454.2	455
	CLASSROOM 164	24	@	10.0	+	976.0	@	0.12	/	0.8	=	451.4	455
	LACTATION/QUIET 168	1	@	5.0	+	73.0	@	0.06	/	0.8	=	11.7	15
	KCC CR 205	24	@	10.0	+	965.0	@	0.12	/	0.8	=	446.3	450
	KCC CR 206	24	@	10.0	+	952.0	@	0.12	/	0.8	=	440.3	455
											DOAS-4 TOTAL:	1803.9	1830

HEAT EXCHANGER

MARK	LOCATION	CFM	HOT SIDE				COLD SIDE				WEIGHT (LBS)	MAKE & MODEL	NOTES
			FLOW (GPM)	INLET TEMP (ºF)	OUTLET TEMP (ºF)	PRESSURE DROP (PSI)	FLOW (GPM)	INLET TEMP (ºF)	OUTLET TEMP (ºF)	PRESSURE DROP (PSI)			
HX-1	BOILER		16	135	100	1.188	17	85	115	2.282	182	TACO PF 09-35-1-NH	1, 2

NOTES:

1. FLOOR MOUNTED, SNOW MELT HEAT EXCHANGER WITH 40% PROPYLENE GLYCOL

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
OREGON, CALIFORNIA

BID AND PERMIT SET

KCC CHILDCARE LEARNING CENTER

PROJECT #: 20230862
KLAMATH COMMUNITY COLLEGE
7390 S. 6TH ST.
KLAMATH FALLS, OR
97603

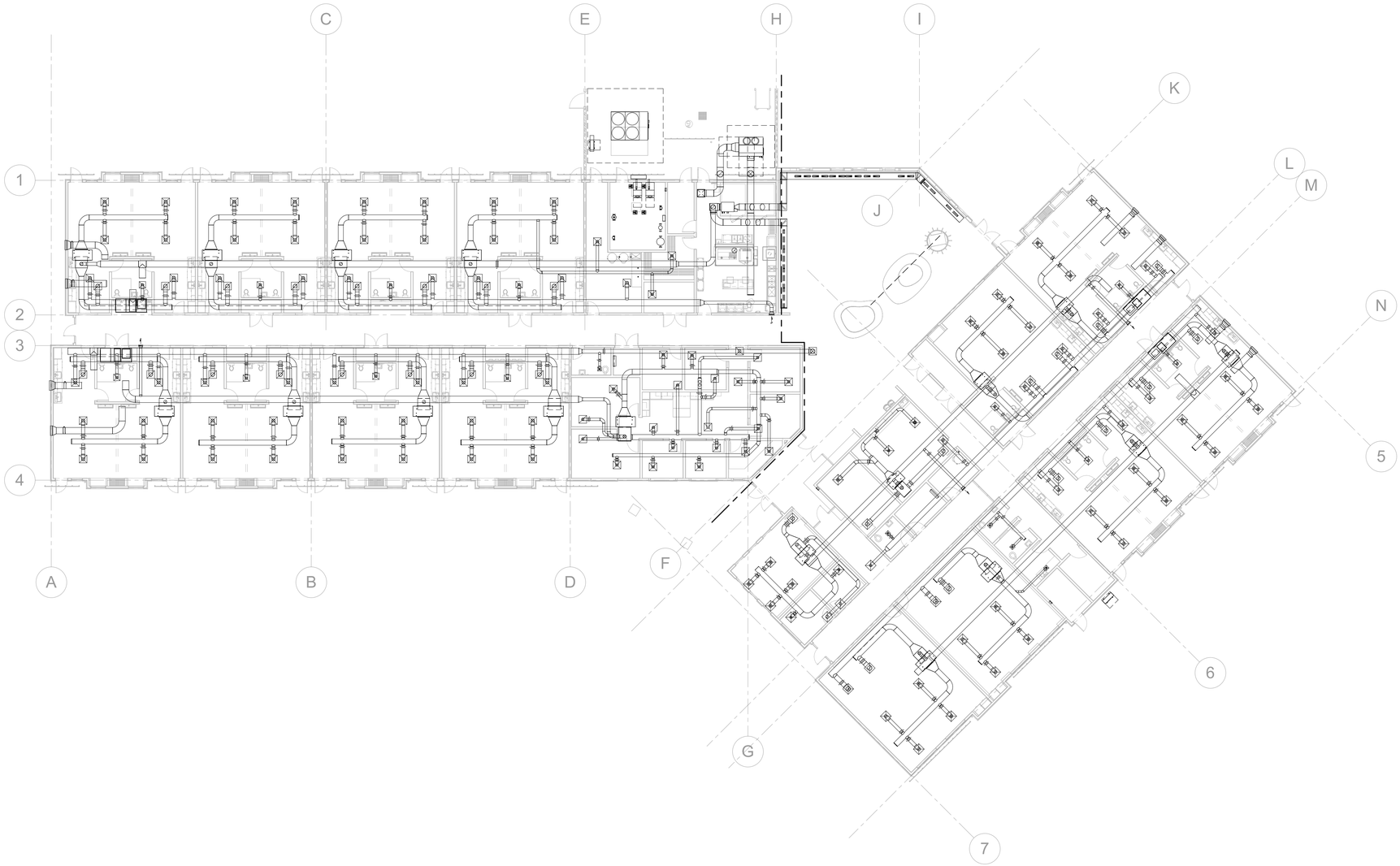
SHEET TITLE:
SCHEDULES

REVISIONS:

#	DESCRP.	DATE

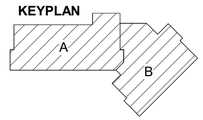
ISSUE DATE: 08/01/2025

M003



1 M201 LEVEL 1 - HVAC PLAN
1/16" = 1'-0"

KEYPLAN



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SCALE OF 11 x 17 SHEETS IS HALF OF SCALE INDICATED

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
OREGON | CALIFORNIA

BID AND PERMIT SET

KCC CHILDCARE LEARNING CENTER

PROJECT #: 20230862
KLAMATH COMMUNITY COLLEGE
7390 S. 6TH ST.
KLAMATH FALLS, OR
97603

SHEET TITLE:
FIRST FLOOR - HVAC

REVISIONS:

#	DESCRP.	DATE

ISSUE DATE: 08/01/2025

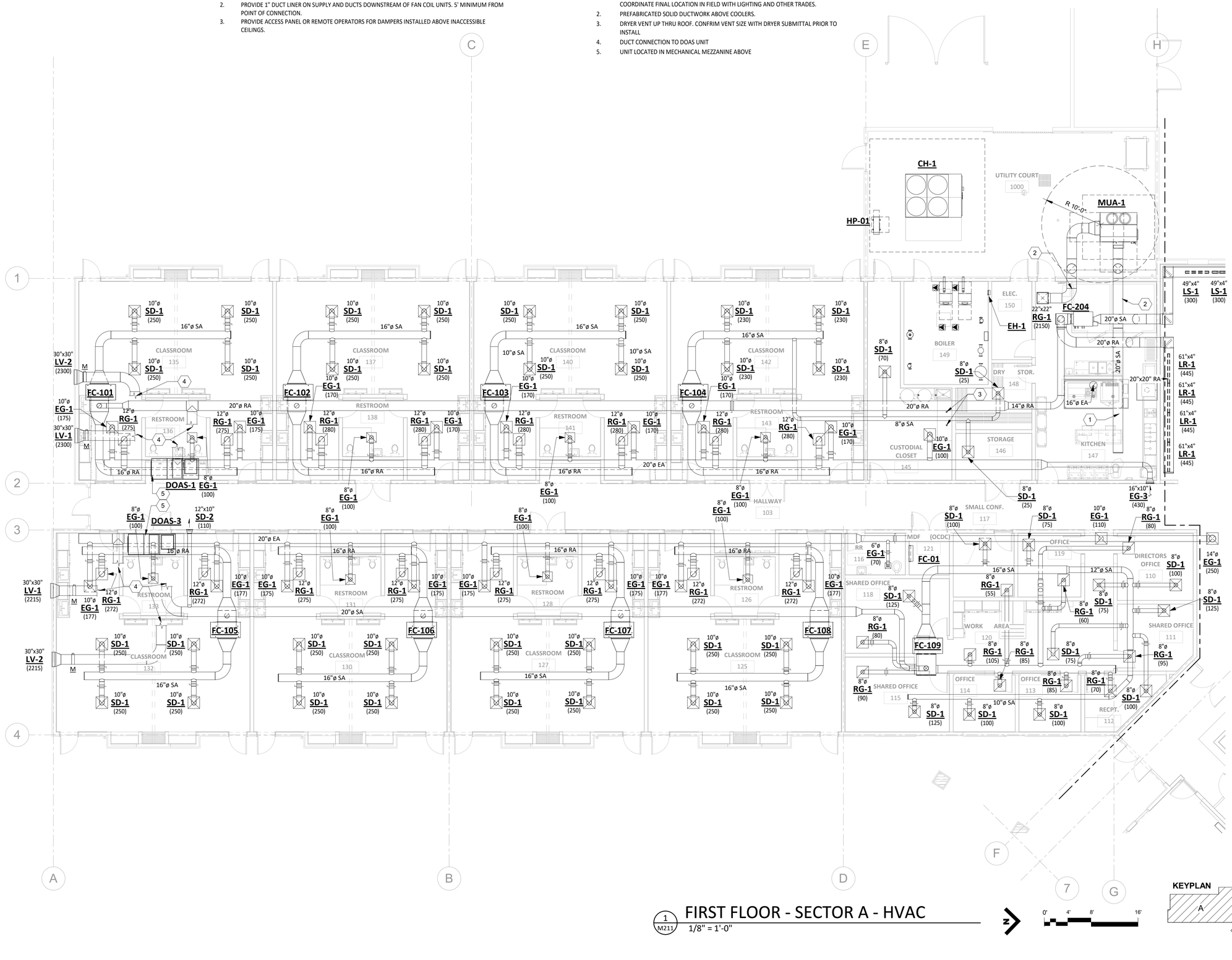
M201

MECHANICAL SHEET NOTES

1. PROVIDE FLEXIBLE DUCT CONNECTION AT ALL FAN COIL UNIT DUCT CONNECTIONS.
2. PROVIDE 1" DUCT LINER ON SUPPLY AND DUCTS DOWNSTREAM OF FAN COIL UNITS. 5' MINIMUM FROM POINT OF CONNECTION.
3. PROVIDE ACCESS PANEL OR REMOTE OPERATORS FOR DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS.

KEY NOTES

1. PREFABRICATED PERFORATED DUCTWORK THROUGH KITCHEN, BELOW CEILING. COORDINATE FINAL LOCATION IN FIELD WITH LIGHTING AND OTHER TRADES.
2. PREFABRICATED SOLID DUCTWORK ABOVE COOLERS.
3. DRYER VENT UP THRU ROOF. CONFRIM VENT SIZE WITH DRYER SUBMITTAL PRIOR TO INSTALL
4. DUCT CONNECTION TO DOAS UNIT
5. UNIT LOCATED IN MECHANICAL MEZZANINE ABOVE



1 M211 FIRST FLOOR - SECTOR A - HVAC

1/8" = 1'-0"

0' 4' 8' 16'

KEYPLAN

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
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OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
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KCC CHILDCARE LEARNING CENTER

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KLAMATH FALLS, OR
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SHEET TITLE:
FIRST FLOOR - SECTOR A - HVAC

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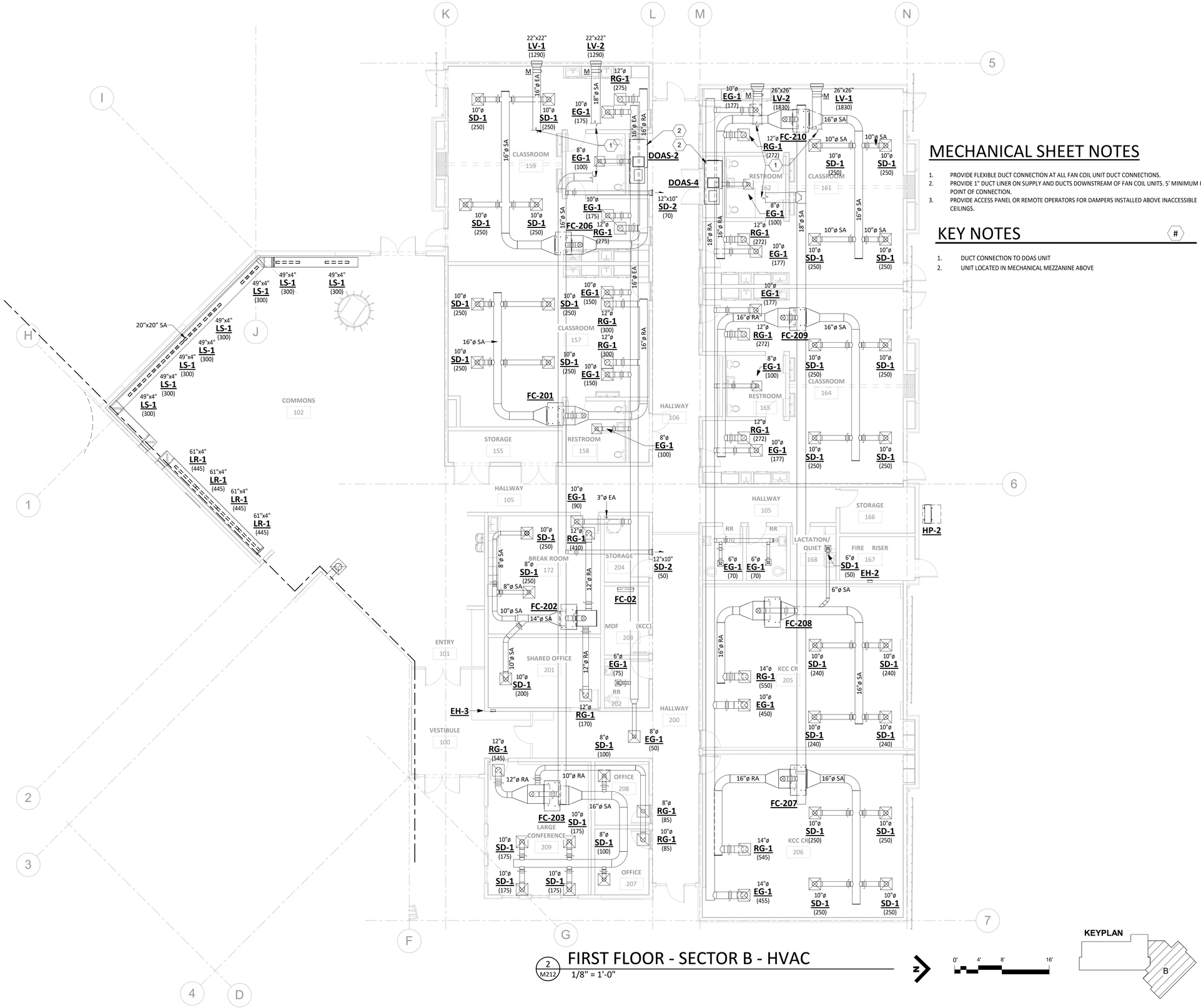

2 M212 FIRST FLOOR - SECTOR B - HVAC

1/8" = 1'-0"

0' 4' 8' 16'

KEYPLAN

MECHANICAL SHEET NOTES

1. PROVIDE FLEXIBLE DUCT CONNECTION AT ALL FAN COIL UNIT DUCT CONNECTIONS.
2. PROVIDE 1" DUCT LINER ON SUPPLY AND DUCTS DOWNSTREAM OF FAN COIL UNITS. 5' MINIMUM FROM POINT OF CONNECTION.
3. PROVIDE ACCESS PANEL OR REMOTE OPERATORS FOR DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS.

KEY NOTES (#)

1. DUCT CONNECTION TO DOAS UNIT
2. UNIT LOCATED IN MECHANICAL MEZZANINE ABOVE

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER 101011PE OREGON SEP. 13, 2022 THOMAS KELLY EXPIRES 06/30/2027

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PROJECT #: 20230862

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M212

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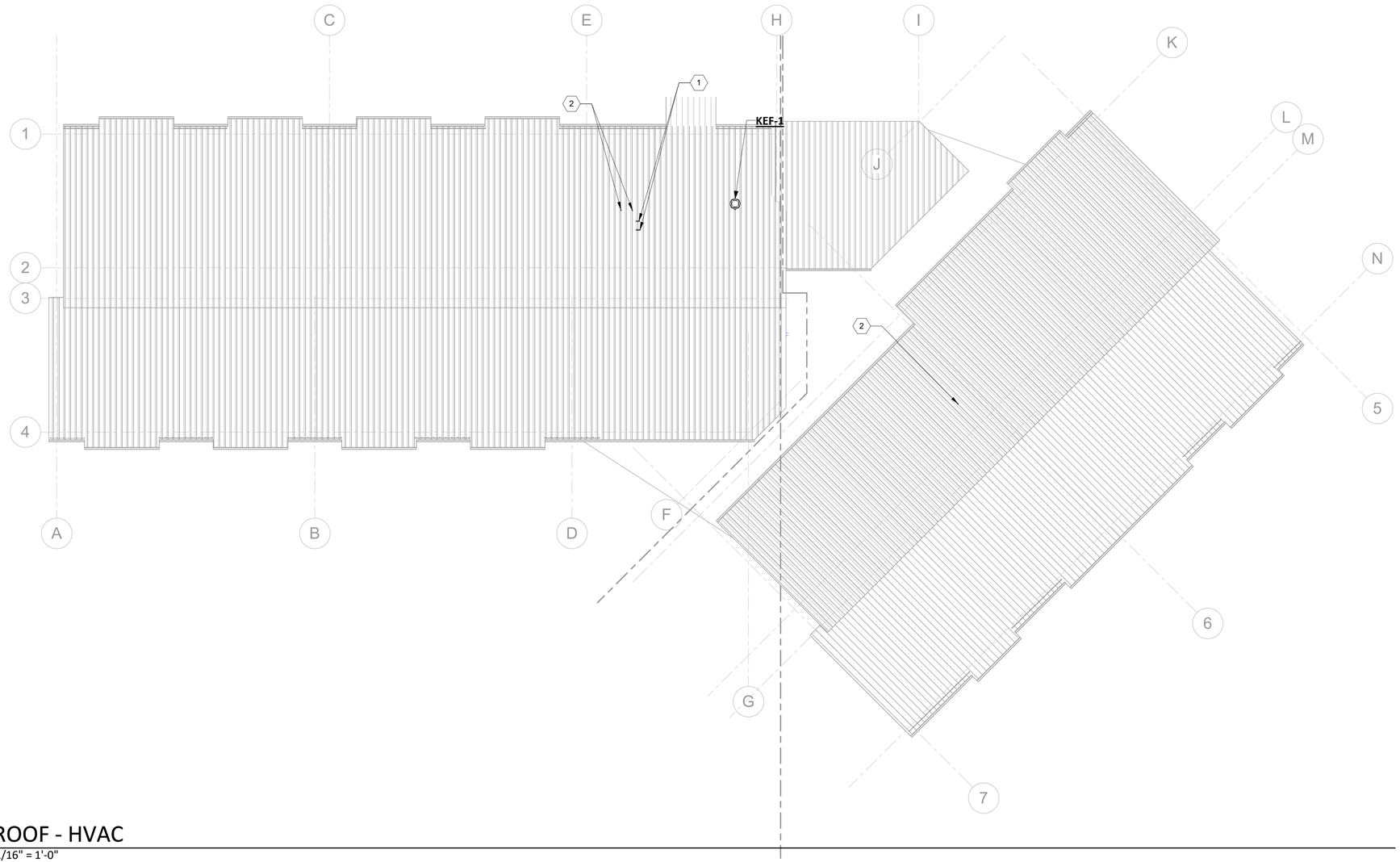
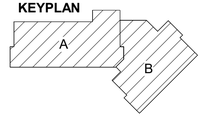
KEY NOTES

1. DRYER EXHAUST PROVIDE GOOSENECK TERMINATION AT ROOF
2. WATER HEATER COMBUSTION AIR AND FLUE EXHAUST CONCENTRIC VENT UP THRU ROOF.



1 M231 ROOF - HVAC
1/16" = 1'-0"

KEYPLAN



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SHEET TITLE:
ROOF - HVAC

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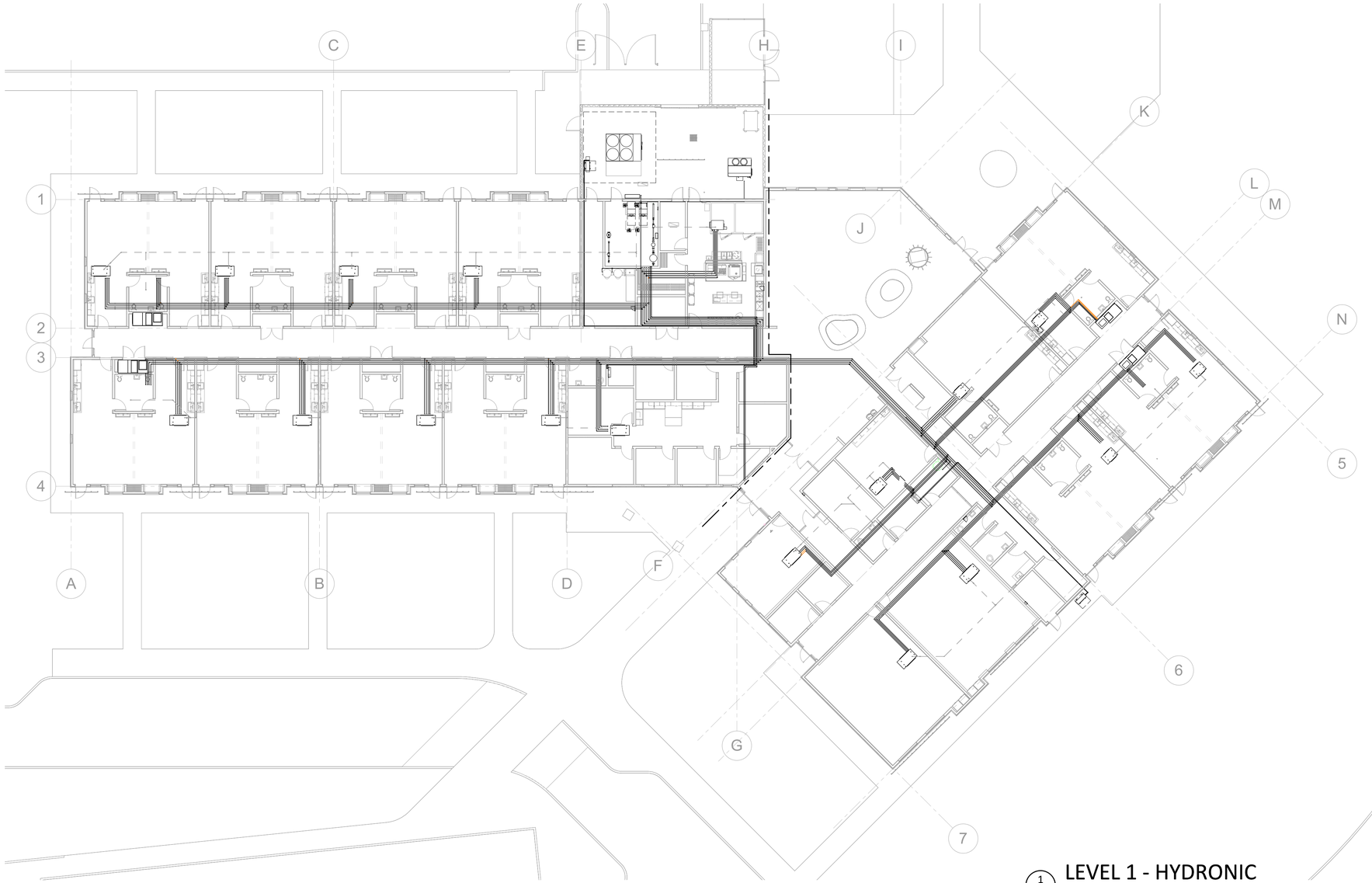
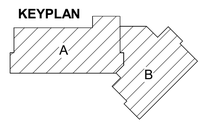
M231



1 M301 LEVEL 1 - HYDRONIC
1/16" = 1'-0"

KEYPLAN



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PIVOT ARCHITECTURE

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SHEET TITLE:
FIRST FLOOR - HYDRONIC

REVISIONS:

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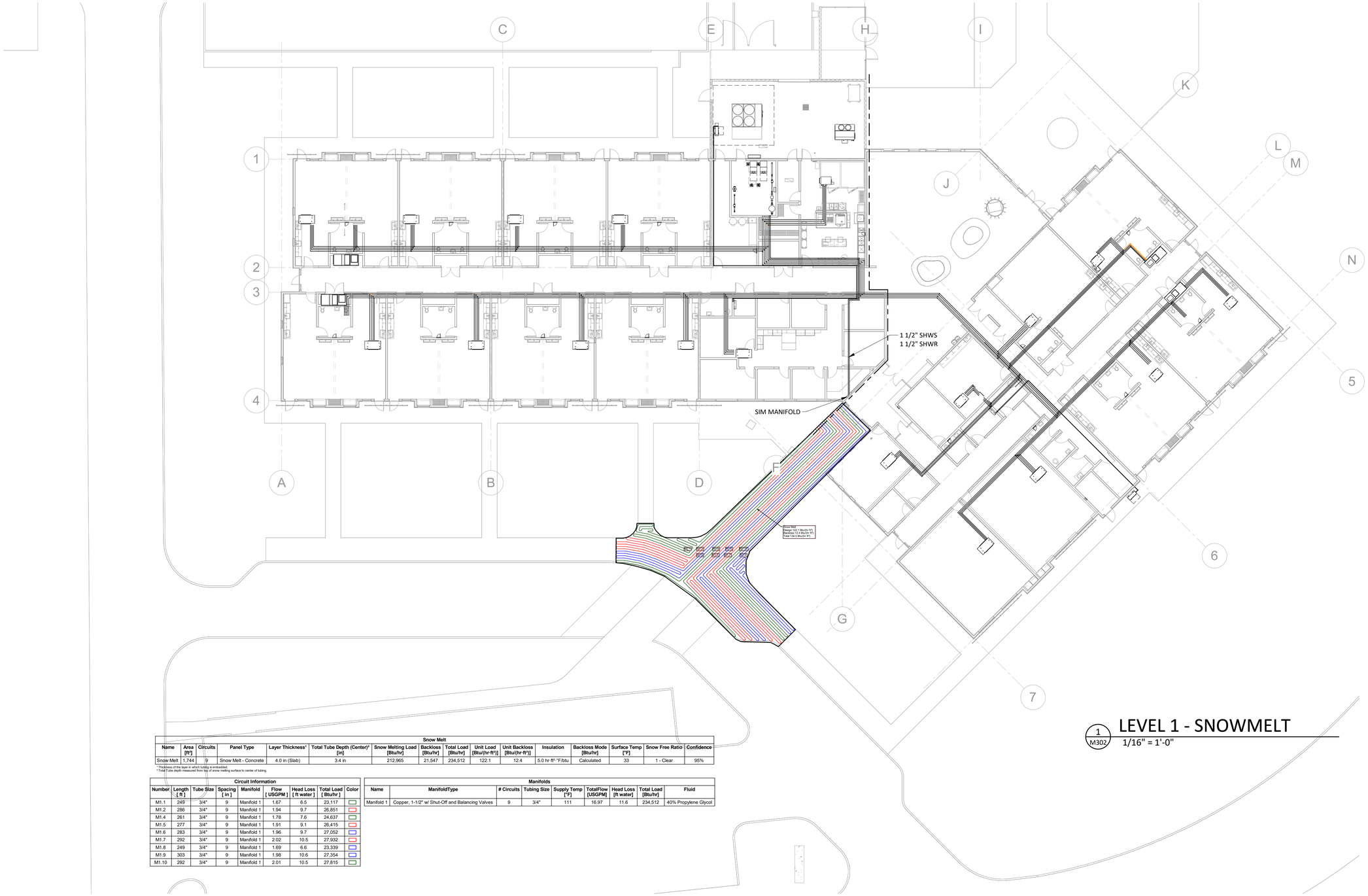
M301



LEVEL 1 - SNOWMELT

1 / M302 — 1/16" = 1'-0"

Snow Melt

Name	Area [ft²]	Circuits	Panel Type	Layer Thickness*	Total Tube Depth (Center)* [in]	Snow Melting Load [Btu/hr]	Backloss [Btu/hr]	Total Load [Btu/hr]	Unit Load [Btu/(hr-ft²)]	Unit Backloss [Btu/(hr-ft²)]	Insulation	Backloss Mode [Btu/hr]	Surface Temp [°F]	Snow Free Ratio	Confidence
Snow Melt	1,744	9	Snow Melt - Concrete	4.0 in (Slab)	3.4 in	212,965	21,547	234,512	122.1	12.4	5.0 hr·ft²·°F/btu	Calculated	33	1 - Clear	95%

* Thickness of the layer in which tubing is embedded.
* Total Tube depth measured from top of snow melting surface to center of tubing.

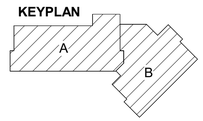
Circuit Information

Number	Length [ft]	Tube Size	Spacing [in]	Manifold	Flow [USGPM]	Head Loss [ft water]	Total Load [Btu/hr]	Color
M1.1	249	3/4"	9	Manifold 1	1.67	6.5	23,117	
M1.2	286	3/4"	9	Manifold 1	1.94	9.7	26,851	
M1.4	261	3/4"	9	Manifold 1	1.78	7.6	24,637	
M1.5	277	3/4"	9	Manifold 1	1.91	9.1	26,415	
M1.6	283	3/4"	9	Manifold 1	1.96	9.7	27,052	
M1.7	292	3/4"	9	Manifold 1	2.02	10.5	27,932	
M1.8	249	3/4"	9	Manifold 1	1.69	6.6	23,339	
M1.9	303	3/4"	9	Manifold 1	1.98	10.6	27,354	
M1.10	292	3/4"	9	Manifold 1	2.01	10.5	27,815	

Manifolds

Name	ManifoldType	# Circuits	Tubing Size	Supply Temp [°F]	TotalFlow [USGPM]	Head Loss [ft water]	Total Load [Btu/hr]	Fluid
Manifold 1	Copper, 1-1/2" w/ Shut-Off and Balancing Valves	9	3/4"	111	16.97	11.6	234,512	40% Propylene Glycol

KEYPLAN



PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
OREGON | CALIFORNIA

BID AND PERMIT SET

KCC CHILDCARE LEARNING CENTER

PROJECT #: 20230862
KLAMATH COMMUNITY COLLEGE
7390 S. 6TH ST.
KLAMATH FALLS, OR
97603

SHEET TITLE:
FIRST FLOOR - SNOWMELT

REVISIONS:

#	DESCRP.	DATE

ISSUE DATE: 08/01/2025

M302

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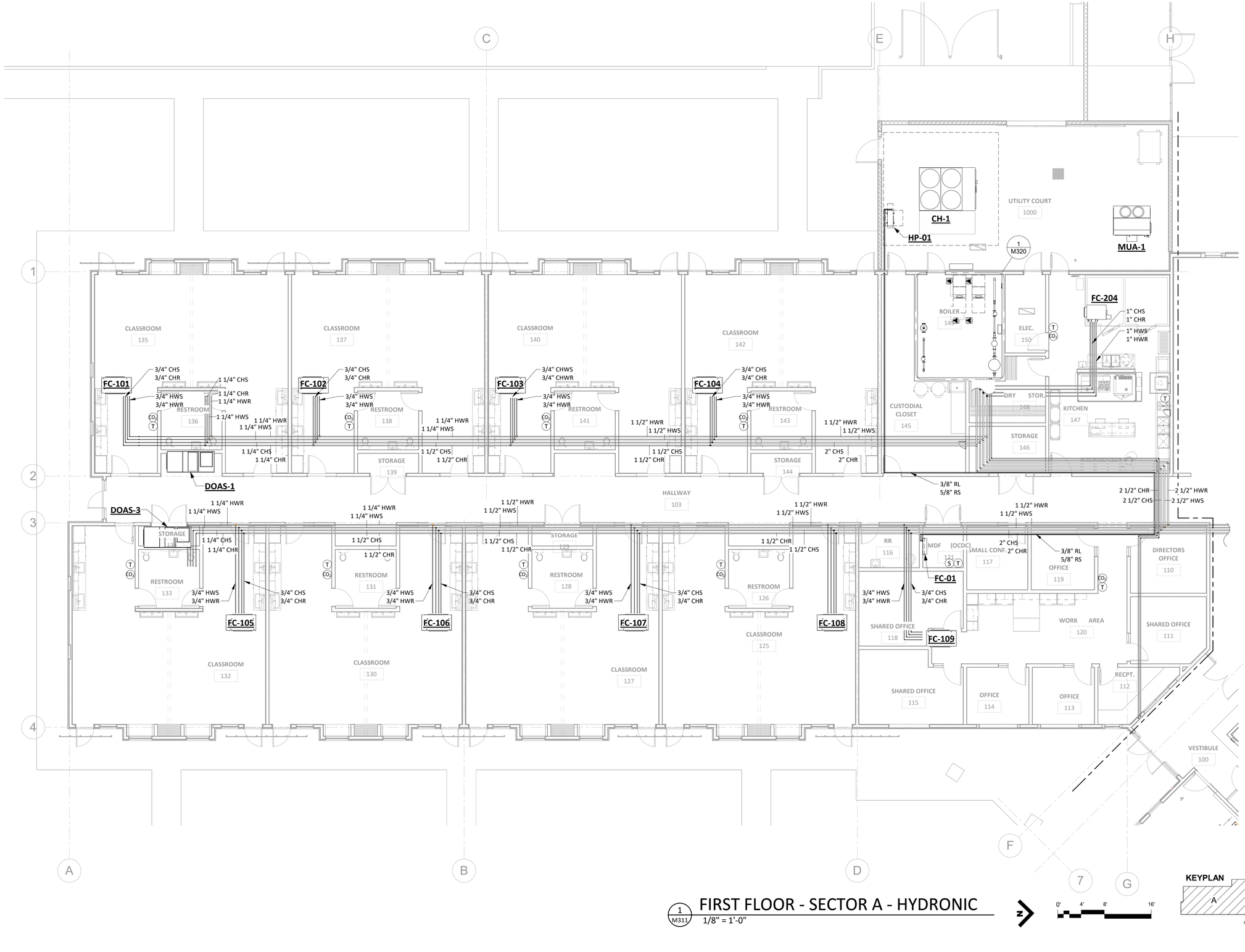

1 M311 FIRST FLOOR - SECTOR A - HYDRONIC

1/8" = 1'-0"

0' 4' 8' 16'

KEYPLAN

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
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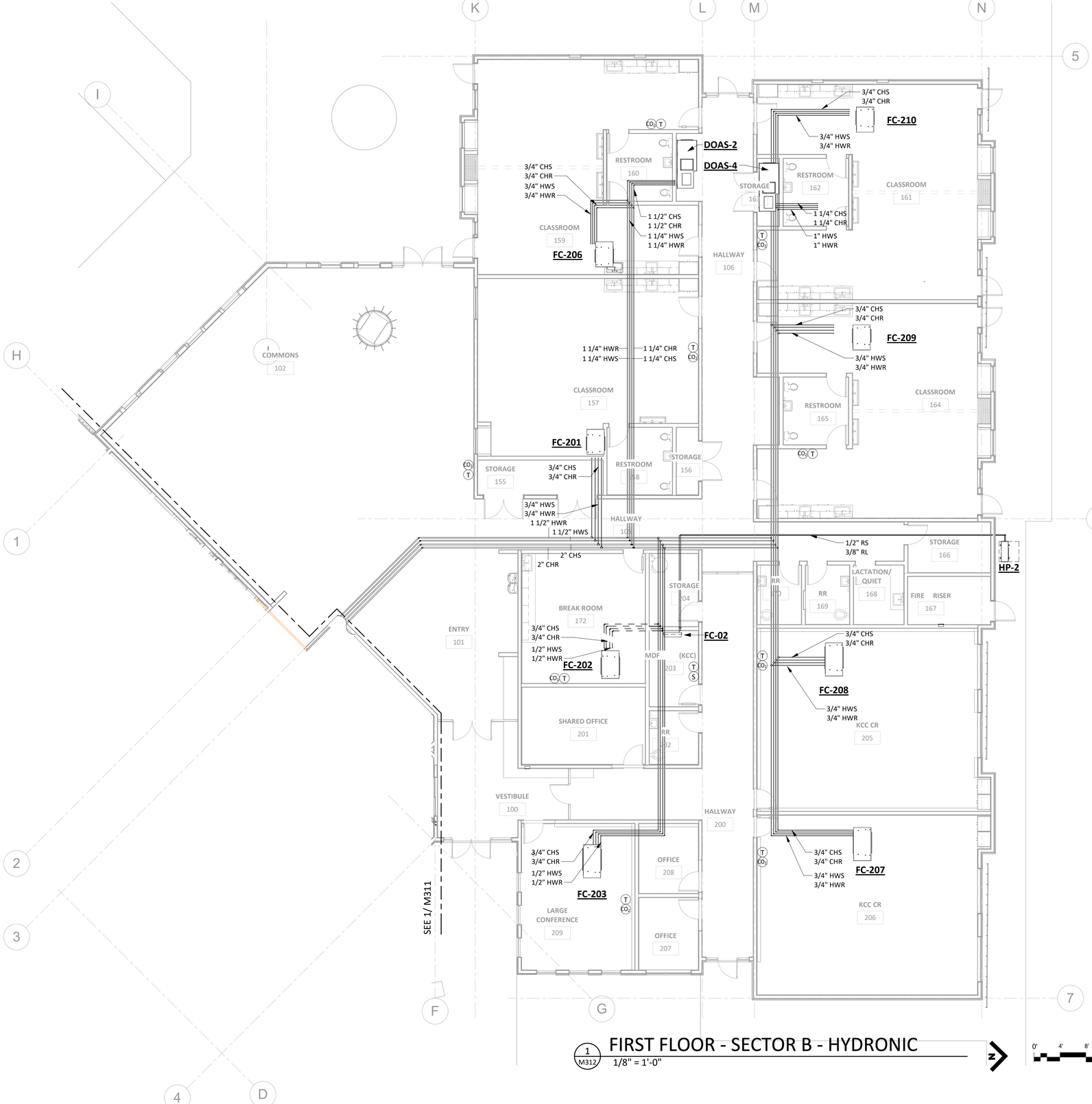
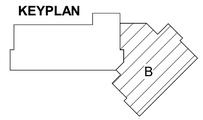


1 M312 FIRST FLOOR - SECTOR B - HYDRONIC

1/8" = 1'-0"

0' 4' 8' 16'

KEYPLAN



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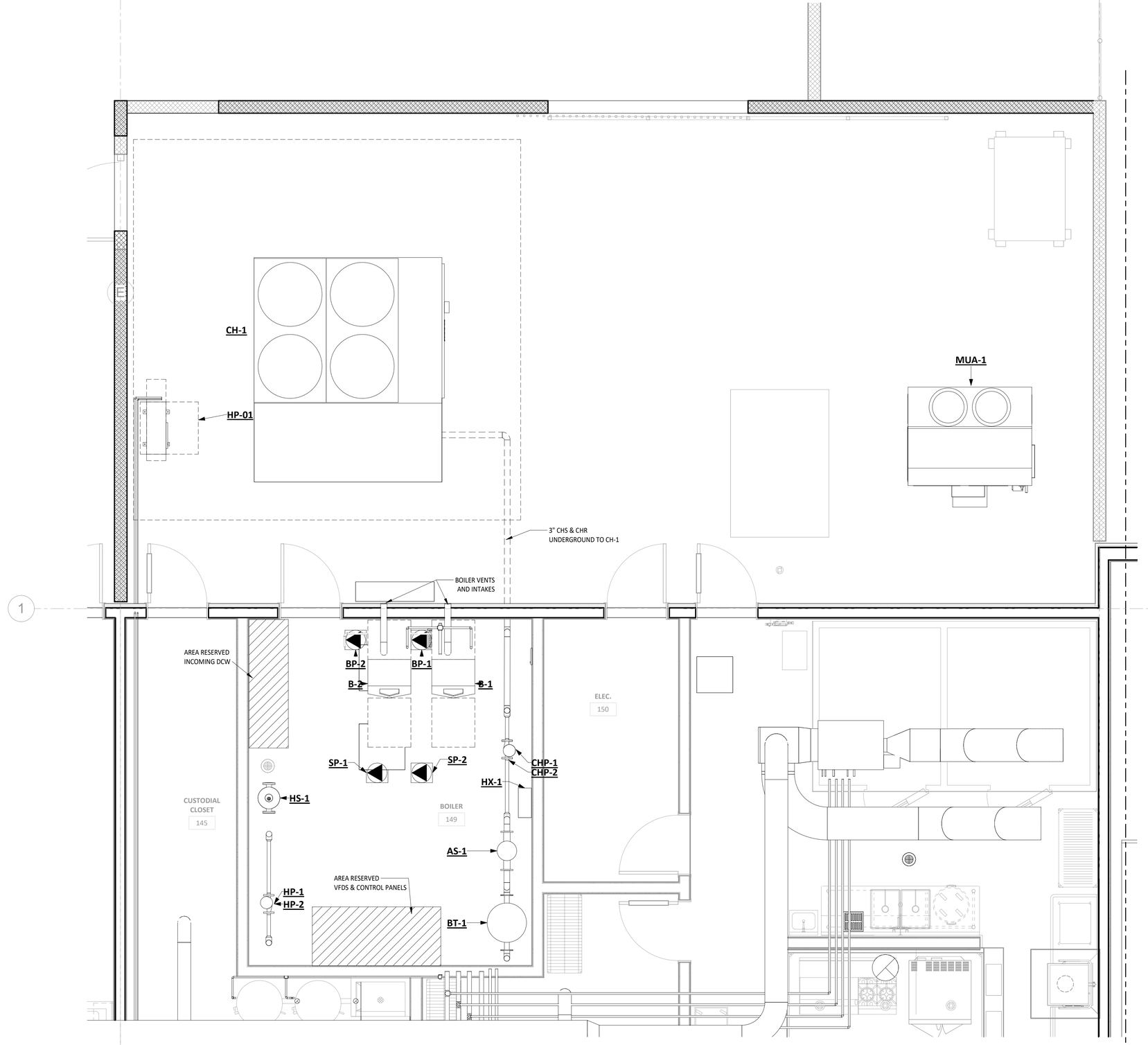

1 M320 BOILER ROOM - ENLARGED

3/8" = 1'-0"

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ENLARGED PLANS

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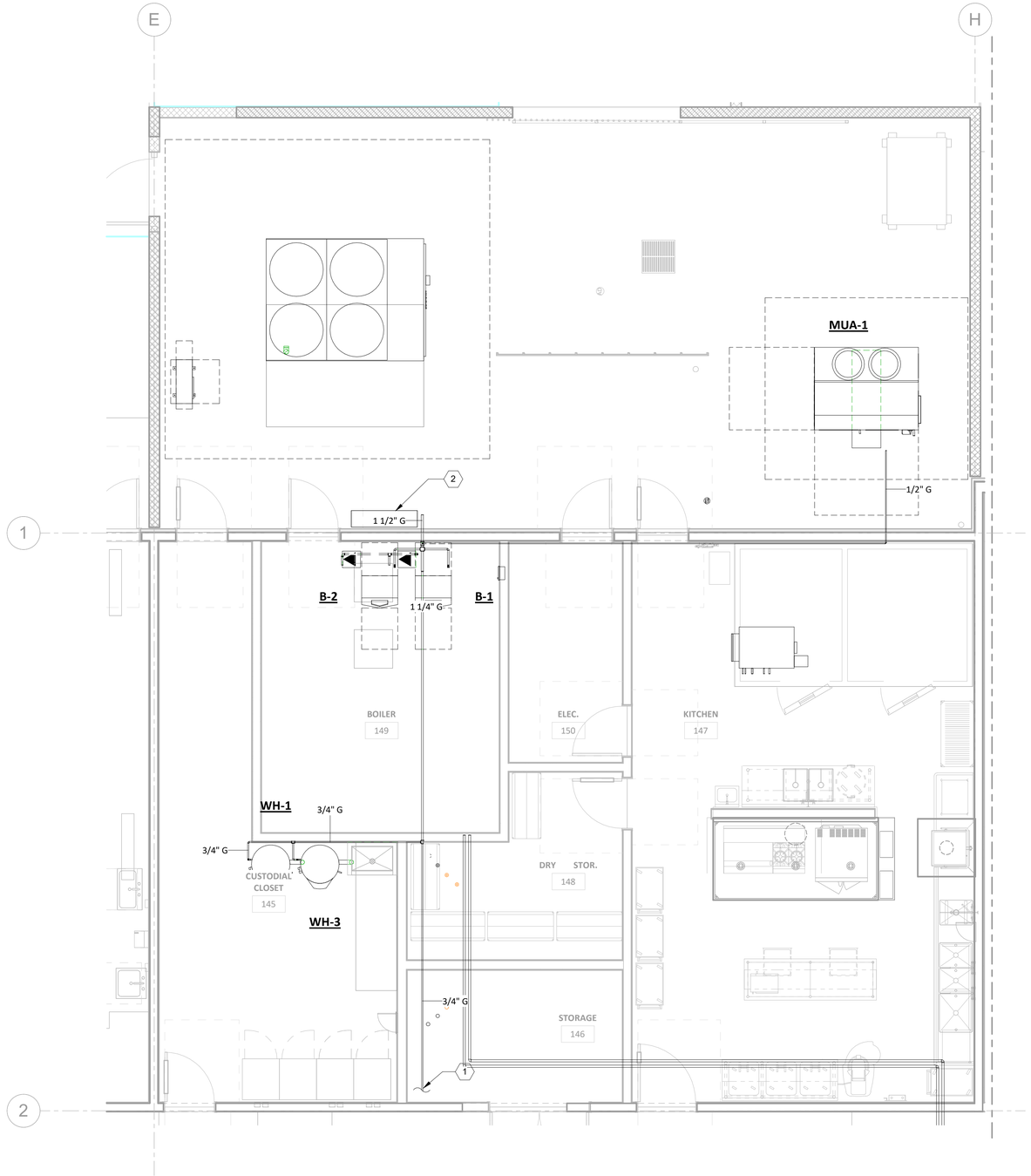


GAS CONNECTION SCHEDULE

MARK	FIXTURE NAME	MBH	BRANCH SIZE (IN)	QTY	TOTAL MBH
B	BOILER	500	3/4	2	1000
WH	WATER HEATER	125	1/2	2	250
MAU	Make Up Air Unit	180	1/2	1	180
-	Kitchen Gas Range	237	1/2	1	237
WH	WATER HEATER	180	1/2	1	180
-		0	1/2	0	0
-		0	1/2	0	0
-		0	1/2	0	0
-		0	1/2	0	0
-		0	1/2	0	0
-		0	1/2	0	0
-		0	1/2	0	0
-		0	1/2	0	0
			TOTAL		1847

MAIN LINE SIZING

INPUTS		UNITS
INPUT RATE	1847	CU FT/HR
UPSTREAM PRESSURE	2	PSIA
DOWNSTREAM PRESSURE	1	PSIA
DEVELOPED LENGTH	150	FT
	MAIN LINE SIZE	1 1/4

Notes:

1. SIZED IN ACCORDANCE WITH 2019 OMSC, C402.4 USING EQUATION 4-2 SCHEDULE 40 METALLIC PIPING.
2. LENGTH IN ISOMETRIC DIAGRAM ARE APPROXIMATE AND MAY CHANGE DEPENDANT ON FIELD ROUTING.
3. PROVIDE REGULATOR AT EACH PIECE OF EQUIPMENT, PROVIDE VENT LIMITER OR ROUTE VENT TO EXTERIOR.

KEY NOTES

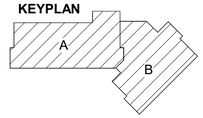
#

1. GAS PIPE TO WH-2 SEE 3/M401 FOLLOW ROUTING OF HVAC HYDRONIC PIPING, SEE X/MXX.
2. COORDINATE WITH CIVIL FOR METER SET LOCATION. COORDINATE WITH GAS UTILITY COMPANY FOR INSTALLATION OF HIGH PRESSURE GAS LINE TO METER. SET BUILDING SIDE PRESSURE AT 2 PSIG.

1 M401 ENLARGED GAS
1/4" = 1'-0"

3 M401 ENLARGED GAS SECTOR B
1/4" = 1'-0"

KEYPLAN



PIVOT ARCHITECTURE

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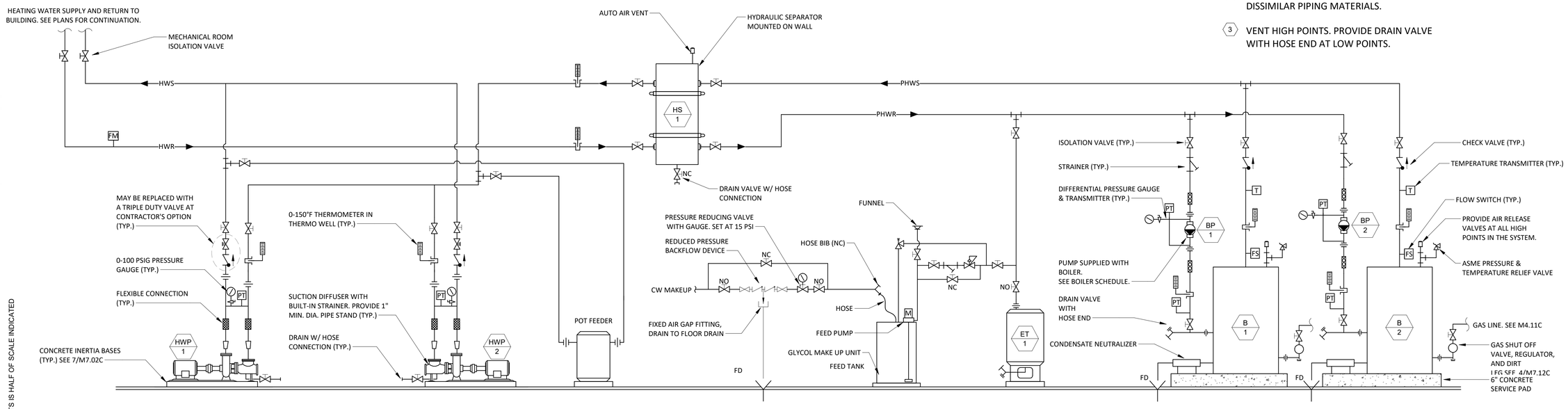
1. PROVIDE BUTTERFLY VALVES FOR PIPING 2 1/2" AND LARGER, AND BALL VALVES FOR PIPING 2" INCH AND SMALLER.
2. PROVIDE DIELECTRIC UNION BETWEEN DISSIMILAR PIPING MATERIALS.
3. VENT HIGH POINTS. PROVIDE DRAIN VALVE WITH HOSE END AT LOW POINTS.



1 / M501 HOT WATER PIPING DIAGRAM

NTS

PIVOT ARCHITECTURE

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SHEET TITLE:
HOT WATER PIPING DIAGRAMS

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M501

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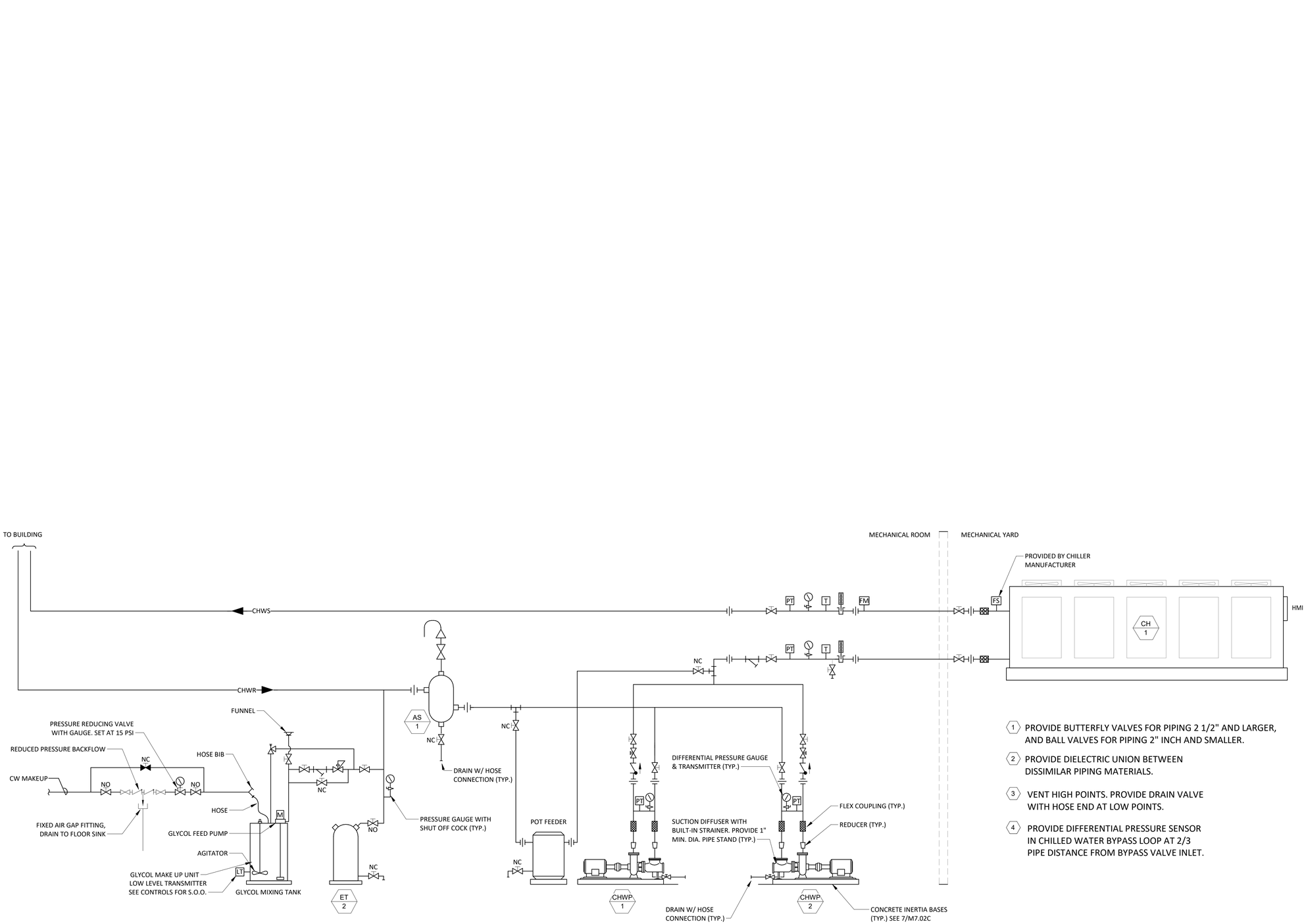

1. PROVIDE BUTTERFLY VALVES FOR PIPING 2 1/2" AND LARGER, AND BALL VALVES FOR PIPING 2" INCH AND SMALLER.
2. PROVIDE DIELECTRIC UNION BETWEEN DISSIMILAR PIPING MATERIALS.
3. VENT HIGH POINTS. PROVIDE DRAIN VALVE WITH HOSE END AT LOW POINTS.
4. PROVIDE DIFFERENTIAL PRESSURE SENSOR IN CHILLED WATER BYPASS LOOP AT 2/3 PIPE DISTANCE FROM BYPASS VALVE INLET.

1 M502 CHILLED WATER PIPING DIAGRAM

12" = 1'-0"

PIVOT ARCHITECTURE

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CHILLED WATER PIPING DIAGRAMS

REVISIONS:

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M502

DOAS UNITS

DOAS UNITS - SEQUENCE OF OPERATION & BAS INTERFACE

1. DOAS UNITS WILL BE PROVIDED WITH FIELD CONTROLS BY CONTROLS CONTRACTOR TO CONTROL ALL DOAS UNIT COMPONENTS INCLUDING SUPPLY FANS, EXHAUST FANS, ENERGY RECOVERY WHEEL, AND COIL CONTROL VALVES. PROVIDE A COMPLETE SYSTEM TO CONTROL ALL UNIT FUNCTIONS INCLUDING TEMPERATURE CONTROL, SCHEDULING, MONITORING, UNIT SAFETY PROTECTION, AND DIAGNOSTICS. THE SYSTEM SHALL CONSIST OF ALL REQUIRED TEMPERATURE SENSORS, PRESSURE SENSORS, AND CONTROLLERS.
2. THE BUILDING AUTOMATION SYSTEM (BAS) WILL SEND OCCUPIED, UNOCCUPIED, OPTIMAL START, NIGHT HEAT / COOL AND TIMED OVERRIDE COMMANDS. THE BAS WILL SEND DISCHARGE AIR TEMPERATURE SETPOINT AND DUCT STATIC PRESSURE SETPOINT. IF COMMUNICATIONS IS LOST WITH THE BAS, THE CONTROLLER WILL OPERATE IN THE OCCUPIED HEATING MODE USING ITS DEFAULT SETPOINTS.
3. OCCUPIED:
   DURING OCCUPIED PERIODS THE SUPPLY FANS AND EXHAUST FANS WILL RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPERS AND EXHAUST AIR DAMPERS WILL OPEN TO MAXIMUM POSITIONS. FANS MODULATE SPEED TO MAINTAIN DUCT STATIC PRESSURE AT 0.5" (ADJUSTABLE) BASED ON FEEDBACK FROM DUCT STATIC PRESSURE SENSOR. FINAL DUCT STATIC PRESSURE SETPOINT TO BE DETERMINED DURING TAB. THE ENERGY RECOVERY WHEEL IS ENABLED AND SPEED IS MODULATED VIA VFD AND OUTPUT SIGNAL FROM BAS.
   A. COOLING:
      a. WHEN THE UNIT IS IN COOLING MODE, CHILLED WATER CONTROL VALVE MODULATES TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT BASED ON RESET SCHEDULE.
      b. RESET SCHEDULE: MINIMUM LEAVING AIR TEMPERATURE OF 55F AT 75F OUTDOOR AIR TEMPERATURE.
   B. HEATING:
      a. WHEN THE UNIT IS IN HEATING MODE, HEATING WATER CONTROL VALVE MODULATES TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT BASED ON RESET SCHEDULE.
      b. RESET SCHEDULE: MAXIMUM LEAVING AIR TEMPERATURE OF 75F AT 50F OUTDOOR AIR TEMPERATURE.
   C. DUCT STATIC PRESSURE:
      a. A DUCT STATIC PRESSURE TRANSDUCER SHALL BE PROVIDED WITH THE SENSOR LOCATED AT APPROXIMATELY TWO-THIRDS OF THE DISTANCE OF THE TOTAL SUPPLY DUCT LENGTH. FAN SPEEDS WILL BE MODULATED TO MAINTAIN STATIC PRESSURE SETPOINT.
   D. BUILDING STATIC PRESSURE
      a. A DIFFERENTIAL PRESSURE TRANSDUCER SHALL ACTIVELY MONITOR THE DIFFERENCE IN PRESSURE BETWEEN THE BUILDING (INDOORS) AND OUTDOORS.
   E. DEMAND CONTROL VENTILATION
      a. EACH ZONE IS EQUIPPED WITH A CO_2 SENSOR. WHEN ALL ZONES SERVED BY A DOAS UNIT MEASURE CO_2 CONCENTRATIONS BELOW 800 PPM (ADJUSTABLE), THE DOAS SHALL OPERATE AT THE DCV MINIMUM OUTDOOR AIRFLOW. IF ANY ZONE EXCEEDS THE CO_2 THRESHOLD OF 800 PPM (ADJUSTABLE) FOR MORE THAN 5 CONTINUOUS MINUTES, THE DOAS SHALL MODULATE OUTDOOR AIRFLOW USING A PID CONTROL LOOP TO GRADUALLY INCREASE FROM THE DCV MINIMUM TO THE DCV MAXIMUM AIRFLOW. ONCE ALL ZONE CO_2 LEVELS FALL BELOW THE SETPOINT, THE DOAS SHALL MODULATE AIRFLOW BACK DOWN TO THE DCV MINIMUM.
4. UNOCCUPIED (NIGHT SETBACK):
   DOAS UNIT IS OFF.
5. SAFETY SHUTDOWN:
   WHEN OCCUPIED, SUPPLY FANS SHALL SHUT DOWN WHENEVER THE RELATED DUCT SMOKE DETECTOR ALARMS, AND WHEN ANY OTHER SMOKE DETECTOR IN THE AREA SERVED BY THE DOAS UNIT ALARMS.
6. FILTER STATUS:
   A DIFFERENTIAL PRESSURE SWITCH WILL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSES DURING NORMAL OPERATION A DIRTY FILTER ALARM WILL BE ANNUNCIATED.
7. ALARMS:
   AT A MINIMUM, PROVIDE UNIT FAILURE, SUPPLY FAN FAILURE, EXHAUST FAN FAILURE, HIGH / LOW SUPPLY AIR TEMPERATURE, HIGH / LOW SUPPLY AIR STATIC PRESSURE, CONDENSATE OVERFLOW, HIGH / LOW STATIC PRESSURE, DIRTY FILTER.
8. UNIT STATUS:
   AT A MINIUM, PROVIDE STATUS OF UNIT MODE, ENERGY RECOVERY WHEEL, FANS, AND DAMPERS

DOMESTIC HOT WATER

DOMESTIC HOT WATER - SEQUENCE OF OPERATION & BAS INTERFACE

A. LEAD/LAG OPERATION: PROVIDE AUTOMATIC LEAD/LAG CONTROL FOR TWO (2) PUMPS. ONLY ONE (1) PUMP SHALL OPERATE AT A TIME.
B. MONTHLY ALTERNATION: ALTERNATE LEAD PUMP SELECTION MONTHLY TO BALANCE RUN TIMES.
C. FAILURE ALARM & SWITCHOVER: UPON FAILURE OF THE OPERATING PUMP, AUTOMATICALLY SWITCH TO THE STANDBY PUMP AND GENERATE A PUMP FAILURE ALARM AT THE BMS.
D. OCCUPANCY-BASED ENABLE/DISABLE: ENABLE PUMPS BASED ON THE BUILDING OCCUPANCY SCHEDULE; DISABLE WHEN UNOCCUPIED.
E. TEMPERATURE CONTROL: PROVIDE A RETURN WATER TEMPERATURE SENSOR. TURN PUMPS OFF WHEN RETURN TEMPERATURE IS ABOVE THE SETPOINT; ENABLE THEM WHEN RETURN TEMPERATURE DROPS BELOW SETPOINT.
F. RESPONSIBILITIES:
   a. BMS CONTRACTOR: FURNISH TEMPERATURE SENSORS, CONTROL RELAYS, AND NECESSARY INTERFACE POINTS. PROVIDE PROGRAMMING FOR LEAD/LAG CONTROL, ALARM, AND SCHEDULING.
   b. PLUMBER: INSTALL PUMPS, TEMPERATURE SENSOR WELLS, AND PIPING AS INDICATED.
   c. ELECTRICIAN: PROVIDE POWER WIRING, AND IF SPECIFIED, CONDUIT FOR CONTROL WIRING.

SNOW MELT

SNOW MELT - SEQUENCE OF OPERATION & BAS INTERFACE
GENERAL: CONTRACTOR SHALL PROVIDE A COMPLETE SYSTEM OF CONTROLS TO ENABLE A FULLY FUNCTIONAL SNOW MELT SYSTEM TO BE CONNECTED TO THE BUILDING AUTOMATION SYSTEM (BAS).

A. SNOW MELT PUMPS SHALL BE CONTROLLED BY THE BAS.
B. HEAT EXCHANGER (HX) CONTROL VALVE SHALL BE CONTROLLED BY THE BAS. CONTROL VALVE SHALL BE 100% CLOSED WHENEVER THE ICE/SNOW CONDITION IS CLEARED AND THE OAT IS ABOVE 32 DEG F (ADJ.).
C. UPON A CALL FOR HEAT FROM THE ZONE SLAB SENSOR FROM ICE OR SNOW, CIRCULATION PUMP SHALL BE ENERGIZED AND THE HEATING WATER VALVES SHALL BE MODULATED TO MAINTAIN 120 DEG F (ADJ.) SUPPLY TEMPERATURE TO THE SNOW MELT SYSTEM. THE SUPPLY TEMPERATURE SHALL BE MAINTAINED AND THE PUMP SHALL OPERATE UNTIL 30 MINUTES (ADJ.) PAST THE ICE/SNOW CONDITION BEING CLEARED.

KITCHEN MECHANICAL EQUIPMENT

KITCHEN MECHANICAL EQUIPMENT - SEQUENCE OF OPERATION & BAS INTERFACE
GENERAL: MECHANICAL SYSTEM CONSISTS OF TYPE 1 GREASE EXHAUST FAN (KEF), MAKEUP AIR UNIT (MAU), GREASE HOOD, HOOD CONTROL PANEL, DUCT TEMPERATURE SENSOR, AND ROOM TEMPERATURE SENSOR. HOOD CONTROL PANEL AND MAKEUP AIR UNIT CONTROLLER BY CAPTIVEAIRE. SEE FOOD SERVICE DRAWINGS FOR DETAILS, CONTROL SEQUENCE, AND ADDITIONAL REQUIREMENTS. CAPTIVEAIRE CONTROLLERS SHALL BE INTEGRATED TO BAS VIA BACNET.

A. KITCHEN HOOD EXHAUST FAN (KEF) SHALL OPERATE ACCORDING TO AUTOMATIC, MANUAL, SCHEDULED, OR FIRE COMMANDS FROM HOOD CONTROL PANEL.
B. MAKEUP AIR UNIT (MAU) SHALL BE INTERLOCKED TO THE KITCHEN HOOD EXHAUST FAN (KEF-01) AND SHALL PROVIDE MAKEUP AIR TO THE HOOD WHEN IN OPERATION. MAKEUP AIR UNIT SHALL ALSO PROVIDE SPACE CONDITIONING.
C. BAS SHALL MONITOR THE STATUS OF KEF AND MAU, AND GENERATE AN ALARM UPON A FAILURE TO RUN CONDITION.

HEATING WATER SYSTEM

HEATING WATER SYSTEM CONTROL SEQUENCE (B-1, B-2, BP-1, BP-2, HWP-1, HWP-2)

A. BOILERS INCORPORATE INTEGRAL TEMPERATURE AND SAFETY CONTROLS. DDC SYSTEM INTERFACES TO BOILER THROUGH BACNET NETWORK. BOILERS AND PUMPS ARE CONTROLLED BY THE BUILDING AUTOMATION SYSTEM (BAS).
B. BOILERS (B-1, B-2)
   a. BOILERS SHALL BE ENABLED WHENEVER:
      1. A PERCENTAGE OF ZONES CALL FOR HEATING (10%, ADJ.)
      2. AND THE OUTSIDE AIR TEMPERATURE IS BELOW 75F (ADJ.)
   b. THE BOILER SHALL BE ENABLED A USER ADJUSTABLE TIME AFTER BOILER PUMP STATUS IS PROVEN ON. DELAY ON START SHALL BE ADJUSTABLE.
   c. BOILER SHALL NOT BE ENABLED UNTIL FLOW THROUGH BOILER IS PROVEN BY THE FLOW SWITCH AND SAFETY INTERLOCKS ARE PROVEN (LOW WATER, BLOCKED FLUE, HIGH LIMIT, AIRFLOW, GAS PRESSURE).
   d. BOILERS OPERATE AND MODULATE BURNERS TO MAINTAIN HOT WATER SUPPLY TEMPERATURE. BOILER SHALL AUTOMATICALLY FIRE AS MANY STAGES OF HEATING AS NECESSARY TO MEET HEATING DEMAND.
   e. BOILERS OPERATE IN CASCADING CONFIGURATION TO PROVIDE EVEN OPERATING HOURS.
   f. IF A BOILER FAILS, SHUTDOWN ASSOCIATED BOILER PUMP AND DISABLE CASCADING MODE.
C. BOILER PUMPS (BP-1, BP-2)
   a. BOILER PUMPS SHALL RUN ANYTIME THE BOILERS ARE CALLED TO RUN.
   b. THE BOILER PUMPS SHALL START PRIOR TO THE BOILERS BEING ENABLED AND SHALL STOP ONLY AFTER THE BOILERS ARE DISABLED. DELAY ON START AND DELAY ON STOP SHALL BE ADJUSTABLE.
   c. IF A BOILER PUMP FAILS, SHUTDOWN ASSOCIATED BOILER AND DISABLE CASCADING MODE.
   d. MODULATE THE BOILER PUMP SPEED AS HEATING DEMAND VARIES.
D. HEATING WATER PUMPS (HWP-1, HWP-2)
   a. ON A CALL FOR HEAT, LEAD HEATING WATER PUMP IS AUTOMATICALLY STARTED.
   b. VFD SHALL MODULATE PUMP SPEED BASED ON FEEDBACK FROM DIFFERENTIAL PRESSURE TRANSMITTER TO MAINTAIN CONSTANT DIFFERENTIAL PRESSURE.
   c. IF FLOW FROM LEAD HEATING WATER PUMP IS NOT SUFFICIENT, LAG SECONDARY PUMP IS STARTED, AND BOTH PUMPS MODULATE IN UNISON TO MAINTAIN DIFFERENTIAL SETPOINT.
   d. BAS SHALL AUTOMATICALLY ROTATE LEAD HEATING WATER PUMP ON A WEEKLY BASIS (ADJ.)
   e. RESET SYSTEM DIFFERENTIAL PRESSURE IN RESPONSE TO SYSTEM FLOWRATE.
E. HEATING WATER SUPPLY TEMPERATURE
   a. THE HEATING WATER SUPPLY TEMPERATURE SETPOINT SHALL BE RESET USING A TRIM AND RESPOND ALGORITHM IN RESPONSE TO THE BUILDING'S HEATING DEMANDS TO REDUCE HEATING ENERGY USE.
   b. THE HEATING WATER SUPPLY TEMPERATURE SETPOINT SHALL BE RESET BASED ON OUTDOOR AIR TEMPERATURE.
F. MINIMUM FLOW
   a. THE BOILER PUMPS SHALL NOT TURNDOWN LESS THAN MINIMUM BOILER FLOW (15 GPM, ADJ.) SEE BOILER SCHEDULE.
G. SAFETY AND ALARMS
   a. IF THE BOILER EXPERIENCES A FAULT CONDITION, SHUT DOWN THE BOILER AND PUMPS, AND GENERATE AN ALARM NOTIFICATION.
   b. THE BOILER SHALL INCLUDE A FACTORY MOUNTED FLOW SWITCH TO MONITOR PROOF OF FLOW FOR EQUIPMENT START AND LOSS OF FLOW / LOW FLOW FOR EQUIPMENT SHUTOFF.
H. SYSTEM SHUTDOWN
   a. IF THERE IS NO BUILDING HEATING DEMAND FOR MORE THAN AN ADJUSTABLE PROGRAMMED TIME LIMIT (15 MIN, ADJ.), SHUTDOWN THE BOILER AND PUMPS.
I. ALARMS:
   a. BOILER FAILURE
   b. BOILER PUMP FAILURE
   c. HEATING WATER PUMP FAILURE
   d. HIGH / LOW SUPPLY WATER TEMPERATURE
   e. HIGH / LOW DIFFERENTIAL PRESSURE
   f. LOW FLOW (FLOW SWITCH)
J. GRAPHIC DISPLAY:
   a. OUTDOOR AIR TEMPERATURE
   b. DIFFERENTIAL SYSTEM PRESSURE
   c. DIFFERENTIAL SYSTEM PRESSURE SETPOINT
   d. HEATING WATER RETURN TEMPERATURE
   e. HEATING WATER SUPPLY TEMPERATURE
   f. HEATING WATER SUPPLY TEMPERATURE SETPOINT
   g. BOILER STATUS
   h. BOILER PUMP STATUS
   i. BOILER PUMP SPEED
   j. HEATING WATER PUMP STATUS
   k. HEATING WATER PUMP SPEED
   l. OPERATING HOURS
   m. TREND LOGS
   n. ALARM HISTORY

ENERGY METERING

ENERGY METERING - SEQUENCE OF OPERATION & BAS INTERFACE

A. ENERGY METERING SHALL COMPLY WITH REQUIREMENTS OF ASHRAE 90.1 SECTION 8.4.3.
B. ELECTRICAL CONTRACTOR SHALL PROVIDE REMOTE METERING CAPABILITY.
C. MONITOR THE ELECTRICAL ENERGY USE FOR EACH OF THE FOLLOWING SEPARATELY:
   a. TOTAL ELECTRICAL ENERGY
   b. HVAC SYSTEMS
   c. INTERIOR LIGHTING
   d. EXTERIOR LIGHTING
   e. RECEPTACLE CIRCUITS
D. THE ELECTRICAL ENERGY USE FOR ALL LOADS SPECIFIED ABOVE SHALL BE RECORDED A MINIMUM OF EVERY 15 MINUTES AND REPORTED HOURLY, DAILY, MONTHLY, AND ANNUALLY.
E. ENERGY USE DATA AS SPECIFIED ABOVE SHALL BE TRANSMITTED TO THE BAS AND GRAPHICALLY DISPLAYED.
F. DATA SHALL BE MAINTAINED FOR A MINIMUM OF 36 MONTHS.

OUTDOOR AIR SENSOR

OUTSIDE AIR TEMPERATURE AND HUMIDITY - SEQUENCE OF OPERATION & BAS INTERFACE

A. PROVIDE OUTSIDE AIR TEMPERATURE SENSOR AND OUTSIDE AIR HUMIDITY SENSOR. MOUNT ON NORTH WALL OF BUILDING.
B. BAS SHALL MONITOR OUTSIDE AIR TEMPERATURE AND HUMIDITY.
C. OUTSIDE AIR CONDITIONS SHALL BE VISIBLE ON THE GRAPHICAL USER INTERFACE, AND TRENDED FOR DIAGNOSTIC PURPOSES.

ELECTRIC HEATERS

ELECTRIC HEATERS - SEQUENCE OF OPERATION & BAS INTERFACE

A. ELECTRIC HEATERS OPERATE VIA A FACTORY BUILT-IN THERMOSTAT. HEATER SHALL MODULATE TO MEET SPACE TEMPERATURE SETPOINT.
   a. INITIAL SETPOINT: 60 DEG F (ADJUSTABLE).
B. EACH SPACE THAT HAS A HEATER WILL BE EQUIPPED WITH ADDITIONAL BAS CONNECTED SPACE TEMPERATURE SENSOR WHICH WILL GENERATE LOW SPACE TEMPERATURE ALERTS.
C. ALARMS: AT A MINIMUM, PROVIDE LOW SPACE TEMPERATURE.

CHILLED WATER SYSTEM

CHILLED WATER SYSTEM CONTROL SEQUENCE (CH-1, CHP-1, CHP-2):

1. AIR-COOLED CHILLER INCORPORATES INTEGRAL TEMPERATURE AND SAFETY CONTROLS. DDC SYSTEM INTERFACES TO CHILLER THROUGH BACNET NETWORK.
2. CHILLER (CH-1)
   a. THE CHILLER SHALL BE ENABLED WHENEVER:
      1. A PERCENTAGE OF ZONES CALL FOR COOLING (20%, ADJ.)
      2. AND THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 54F (ADJ.)
   b. THE CHILLER SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES TO PREVENT SHORT CYCLING, UNLESS SHUTDOWN ON SAFETIES OR OUTSIDE AIR CONDITIONS.
   c. THE CHILLER SHALL BE ENABLED A USER ADJUSTABLE TIME AFTER PUMP STATUS IS PROVEN ON. DELAY ON START SHALL BE ADJUSTABLE.
   d. CHILLER OPERATES AND MODULATES COMPRESSORS TO MAINTAIN CHILLED WATER SUPPLY TEMPERATURE.
3. CHILLED WATER PUMPS (CHP-1, CHP-2)
   a. CHILLED WATER PUMP SHALL RUN ANYTIME THE CHILLER IS CALLED TO RUN. CHILLED WATER PUMP SHALL ALSO RUN FOR FREEZE PROTECTION WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN A USER DEFINABLE SETPOINT.
   b. THE CHILLED WATER PUMP SHALL START PRIOR TO THE CHILLER BEING ENABLED AND SHALL STOP ONLY AFTER THE CHILLER IS DISABLED. DELAY ON START AND DELAY ON STOP SHALL BE ADJUSTABLE.
   c. CHILLED WATER PUMPS OPERATE IN A LEAD / LAG CONFIGURATION. WHEN CHILLED WATER SYSTEM IS ON, ONE PUMP IS REQUIRED TO OPERATE. START PUMP WITH LOWEST RUNTIME (UNLESS IT HAS FAILED) OR HAS BEEN DESIGNATED OUT OF SERVICE, AND ROTATE PUMPS ON A WEEKLY BASIS.
   d. IF OPERATING PUMP FAILS, IMMEDIATELY START BACKUP PUMP.
   e. MODULATE THE CHILLED WATER PUMP SPEED TO MAINTAIN A DIFFERENTIAL PRESSURE SETPOINT (ADJ.) IN THE CHILLED WATER LOOP. FINAL SETPOINT DETERMINED DURING TAB.
4. CHILLED WATER SUPPLY TEMPERATURE
   a. THE CHILLED WATER SUPPLY TEMPERATURE SETPOINT SHALL RESET USING A TRIM AND RESPOND ALGORITHM IN RESPONSE TO THE BUILDING'S COOLING DEMANDS TO REDUCE COOLING ENERGY USE.
5. MINIMUM FLOW
   a. THE BAS SHALL MONITOR DIFFERENTIAL PRESSURE BETWEEN ENTERING AND LEAVING CHILLED WATER AT THE CHILLER EVAPORATOR AND SHALL MAINTAIN A MINIMUM PRESSURE DROP ACROSS THE CHILLER EVAPORATOR CORRESPONDING TO MINIMUM FLOW WHEN THE CHILLED WATER PUMP IS ENABLED AND THE CHILLER IS ENABLED.
   b. THE MINIMUM PRESSURE DROP SHALL CORRESPOND TO CHILLER MANUFACTURER'S SPECIFIED MINIMUM CHILLED WATER FLOW AND SHALL BE MAINTAINED BY THE CHILLED WATER SYSTEM LOW FLOW BYPASS CONTROL VALVE INSTALLED IN THE FIELD PIPING.
      1. DURING LOW FLOW OPERATIONS WITH CHILLER ENABLED, THE BYPASS CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN MINIMUM CHILLED WATER FLOW REQUIREMENTS AT CHILLER EVAPORATOR.
6. SAFETY AND ALARMS
   a. IF THE CHILLER EXPERIENCES A FAULT CONDITION, SHUT DOWN THE CHILLER AND GENERATE AN ALARM NOTIFICATION.
   b. IF THE CHILLED WATER PUMP FAILS TO MAINTAIN FLOW, INITIATE A BACKUP PUMP AND GENERATE AN ALARM NOTIFICATION.
   c. THE CHILLER SHALL INCLUDE A FACTORY MOUNTED FLOW SWITCH TO MONITOR PROOF OF FLOW FOR EQUIPMENT START AND LOSS OF FLOW / LOW FLOW FOR EQUIPMENT SHUTOFF.
7. SYSTEM SHUTDOWN
   a. IF THERE IS NO BUILDING COOLING DEMAND FOR MORE THAN AN ADJUSTABLE PROGRAMMED TIME LIMIT (15 MIN, ADJ.), SHUTDOWN THE CHILLER AND CHILLED WATER PUMP.
8. ALARMS:
   a. CHILLER FAILURE
   b. PUMP FAILURE
   c. HIGH / LOW SUPPLY WATER TEMPERATURE
   d. HIGH / LOW SYSTEM PRESSURE
   e. LOW FLOW (FLOW SWITCH)
9. GRAPHIC DISPLAY:
   a. OUTDOOR AIR TEMPERATURE
   b. DIFFERENTIAL PRESSURE ACROSS CHILLER EVAPORATOR.
   c. CHILLED WATER RETURN TEMPERATURE
   d. CHILLED WATER SUPPLY TEMPERATURE
   e. CHILLED WATER SUPPLY TEMPERATURE SETPOINT
   f. CHILLER KW
   g. OPERATING HOURS
   h. CHILLED WATER FLOW STATUS
   i. CHILLED WATER PUMP STATUS
   j. CHILLED WATER PUMP SPEED
   k. CHILLER STATUS
   l. TREND LOGS
   m. ALARM HISTORY

FAN COIL UNITS

FAN COIL UNITS - SEQUENCE OF OPERATION & BAS INTERFACE
GENERAL: CONSTANT VOLUME FOUR-PIPE FAN COIL UNIT WITH VENTILATION AIR PROVIDED BY DOAS UNIT.

1. FAN COIL UNITS WILL BE PROVIDED WITH FIELD CONTROLS BY CONTROLS CONTRACTOR TO CONTROL ALL FAN COIL UNIT COMPONENTS INCLUDING FANS AND COIL CONTROL VALVES. PROVIDE A COMPLETE SYSTEM TO CONTROL ALL UNIT FUNCTIONS INCLUDING TEMPERATURE CONTROL, SCHEDULING, MONITORING, UNIT SAFETY PROTECTION, AND DIAGNOSTICS. THE SYSTEM SHALL CONSIST OF ALL REQUIRED SENSORS AND CONTROLLERS.
2. EACH FAN COIL UNIT IS PROVIDED WITH AN ELECTRONIC ZONE THERMOSTAT.
3. THE BUILDING AUTOMATION SYSTEM (BAS) WILL SEND OCCUPIED, UNOCCUPIED, OPTIMAL START, NIGHT HEAT / COOL AND TIMED OVERRIDE COMMANDS. THE BAS WILL SEND DISCHARGE AIR TEMPERATURE SETPOINT.
4. OCCUPIED:
   DURING OCCUPIED PERIODS THE SUPPLY FAN WILL RUN CONTINUOUSLY.
   A. COOLING: 75 DEG F ZONE SETPOINT (ADJ.)
      a. WHEN THE UNIT IS IN COOLING MODE, CHILLED WATER CONTROL VALVE MODULATES TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT TO MAINTAIN ZONE SETPOINT.
   B. HEATING: 70 DEG F ZONE SETPOINT (ADJ.)
      a. WHEN THE UNIT IS IN HEATING MODE, HEATING WATER CONTROL VALVE MODULATES TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT TO MAINTAIN ZONE SETPOINT.
5. UNOCCUPIED (NIGHT SETBACK):
   FAN COIL UNIT CYCLES ON AND OFF, AND HEATING AND COOLING CONTROL VALVES ARE MODULATED, TO MAINTAIN UNOCCUPIED SETPOINTS (60 DEG F HEATING, 85 DEG F COOLING).
6. ALARMS:
   AT A MINIMUM, PROVIDE FAN FAILURE, CONDENSATE OVERFLOW.
7. UNIT STATUS:
   AT A MINIMUM, PROVIDE STATUS OF UNIT MODE, DISCHARGE AIR TEMPERATURE, CONTROL VALVE POSITION.

SPLIT SYSTEMS - AIR SOURCE

SPLIT SYSTEMS - SEQUENCE OF OPERATION & BAS INTERFACE

1. DUCTLESS WALL MOUNT FAN COILS OPERATE VIA A FACTORY WALL MOUNT THERMOSTAT PROVIDED BY THE MANUFACTURER TO MAINTAIN SPACE TEMPERATURE IN THE ASSOCIATED AREA. EQUIPMENT OPERATION IS BY LOCAL FACTORY CONTROLLER, CONNECTION TO BAS FOR MONITORING ONLY.
2. FAN COIL CYCLES FAN AND COOLING ON AND OFF UPON CALL FOR COOLING. OUTDOOR UNIT MODULATES COMPRESSOR TO MEET COOLING DEMAND. UNIT IS DISABLED WHEN SPACE TEMPERATURE IS SATISFIED.
3. WALL MOUNT THERMOSTAT SHALL BE MONITORED BY THE BAS.
   A. INITIAL SETPOINT: 78 DEG F (ADJUSTABLE).
4. EACH SPACE THAT HAS A FAN COIL WILL BE EQUIPPED WITH ADDITIONAL BAS CONNECTED SPACE TEMPERATURE SENSOR WHICH WILL GENERATE HIGH OR LOW SPACE TEMPERATURE ALERTS.
5. ALARMS: AT A MINIMUM, PROVIDE HIGH SPACE TEMPERATURE, LOW SPACE TEMPERATURE, FAN COIL FAILURE, OUTDOOR UNIT FAILURE.
6. STATUS: AT A MINIMUM, PROVIDE STATUS OF UNIT MODE AND SPACE TEMPERATURE.

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PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
101011PE
OREGON
SEP. 13, 2022
THOMAS KELLY
EXPIRES 06/30/2027

COLEBREIT ENGINEERING
OREGON | CALIFORNIA

BID AND PERMIT SET

KCC CHILDCARE LEARNING CENTER

PROJECT #: 20230862
KLAMATH COMMUNITY COLLEGE
7390 S. 6TH ST.
KLAMATH FALLS, OR
97603

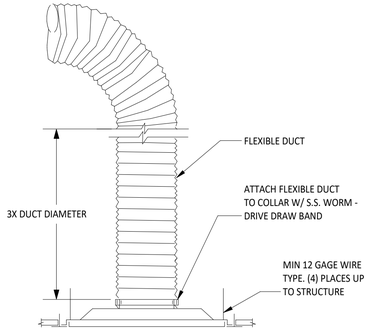
SHEET TITLE:
CONTROLS

REVISIONS:

#	DESCRP.	DATE

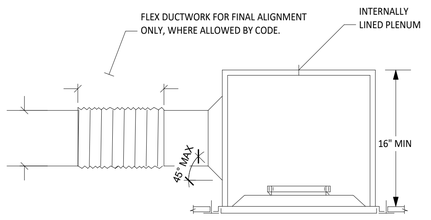
ISSUE DATE: 08/01/2025

M601



TOP CONNECTION @ DIFFUSER

NO SCALE

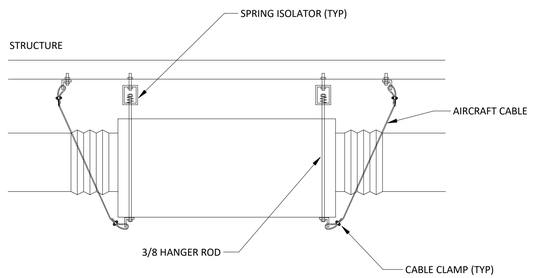


PLENUM CONNECTION AT DIFFUSER

NO SCALE

8 M701 DIFFUSER CONNECTION DETAILS

NTS



7 M701 FAN COIL MOUNTING

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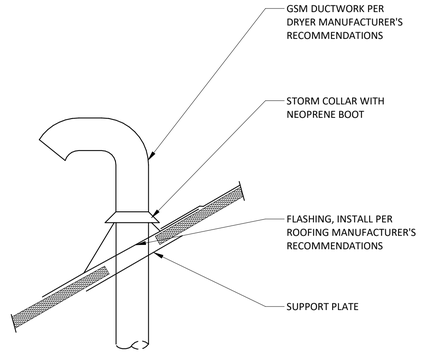
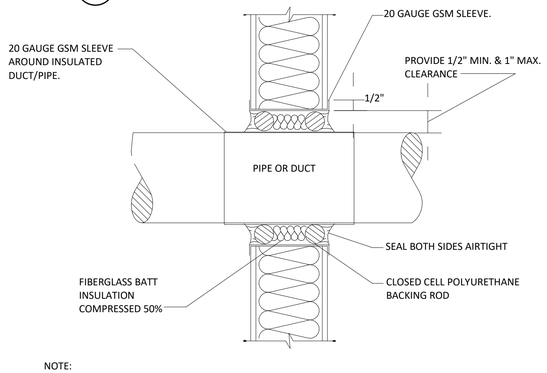


6 M701 DRYER EXHAUST CAP

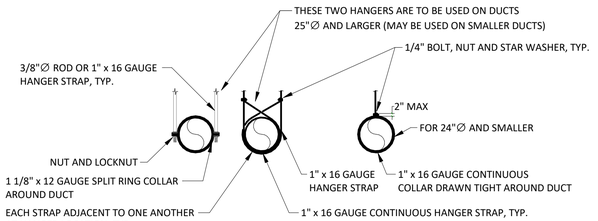
NTS



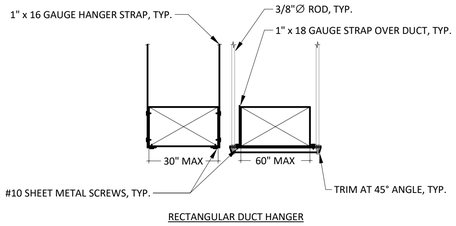
NOTE:
DUCT/PIPE MUST "FLOAT" IN OPENING AND NOT HAVE CONTACT WITH PARTITION

5 M701 DUCT THROUGH NON RATED

NTS



ROUND DUCT HANGER



RECTANGULAR DUCT HANGER

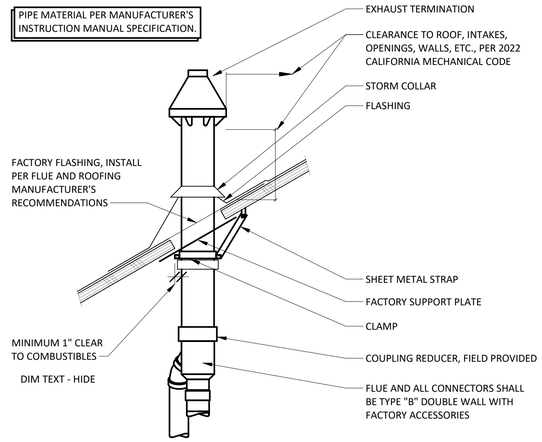
NOTES:

1. REFER TO SPECIFICATIONS FOR HANGER SPACING.
2. PROVIDE SEISMIC BRACING FOR ALL DUCTS WITH A CROSS SECTIONAL AREA OF 6 SF OR LARGER. SEE SPECIFICATIONS FOR REQUIREMENTS.

4 M701 DUCT SUPPORT DETAIL

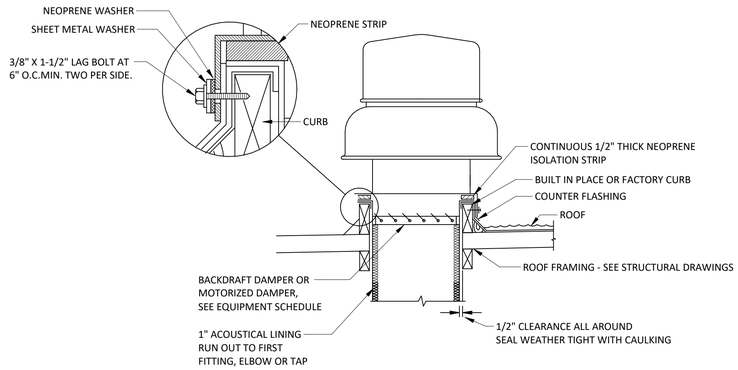
NTS

PIPE MATERIAL PER MANUFACTURER'S INSTRUCTION MANUAL SPECIFICATION.



3 M701 CONCENTRIC FLUE

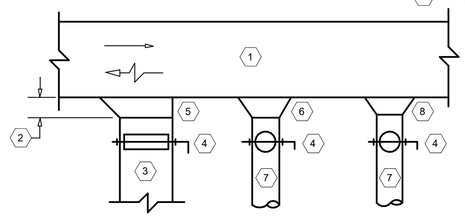
NTS



2 M701 EXHAUST FAN MOUNTING

NTS

1. MAIN SUPPLY, RETURN OR EXHAUST DUCT (LOW OR MEDIUM PRESSURE)
2. DISTANCE = (1/4) X DUCT WIDTH; 4" MINIMUM
3. RECTANGULAR BRANCH TAKE-OFF DUCT
4. VOLUME DAMPER
5. 45 DEGREE ENTRY FITTING
6. CONICAL DUCT TAKE-OFF FITTING
7. ROUND BRANCH TAKE-OFF DUCT
8. BELLMOUTH DUCT TAKE-OFF FITTING



NOTES:

1. SPIN-IN DUCT TAKE-OFF FITTINGS MAY NOT BE USED.
2. SEAL ALL TAKE-OFF AND OTHER DUCT FITTINGS AIR TIGHT AS PER SPECIFICATION.
3. FABRICATE BRANCH DUCT TAKE-OFF FITTINGS PER LATEST EDITION OF SMACNA DUCT CONSTRUCTION MANUAL, AS INDICATED ON PLANS, OR AS DESCRIBED IN THE SPECIFICATION.

1 M701 BRANCH TAKE-OFF DUCT

NTS

PIVOT ARCHITECTURE

REGISTERED PROFESSIONAL ENGINEER
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97603

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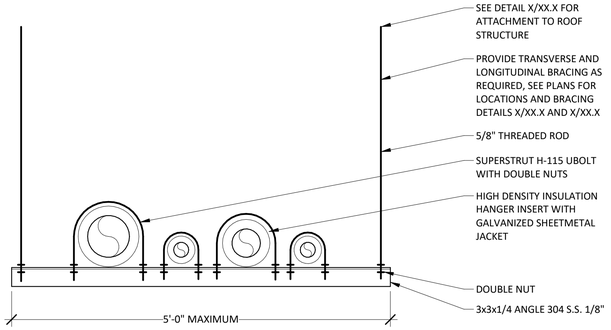
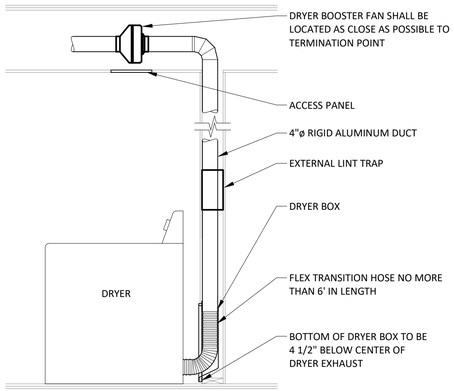
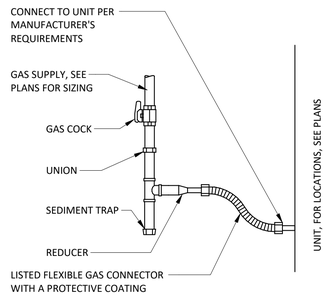


8 / M702 TRAPEZE PIPE SUPPORT
NTS

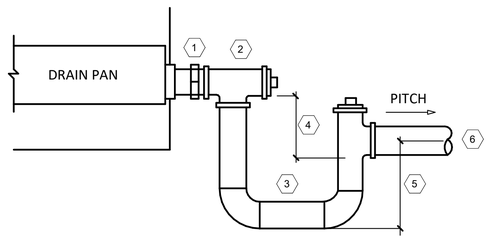


5 / M702 DRYER BOOSTER FAN
NTS



7 / M702 GAS CONNECTION AT UNIT
NTS

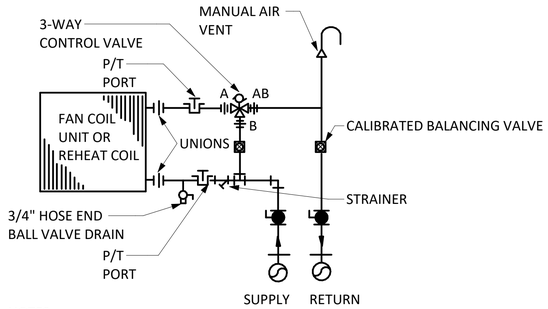
1. UNION
2. TEE WITH CLEANOUT PLUG. (TYPICAL)
3. TRAP
4. FAN STATIC PRESSURE (FSP) + 1"
5. (FSP/2) + 1"
6. PITCH PIPE TO NEAREST FLOOR DRAIN.



NOTES:

1. ALLOW SUFFICIENT SPACE BELOW DRAIN PAN FOR TRAP.
2. PITCH DRAIN FOR PROPER RUNOFF.
3. MANUALLY PRIME FILL TRAP BEFORE STARTUP TO FORM INITIAL DRAIN SEAL.
4. SUPPORT LENGTHY DRAIN LINES TO PREVENT SAG AND CONDENSATE OVERFLOW.
5. WHERE REQUIRED CONTRACTOR RESPONSIBLE FOR CUTTING FLOOR TO ACCOMODATE PROPER DIMENSIONS.

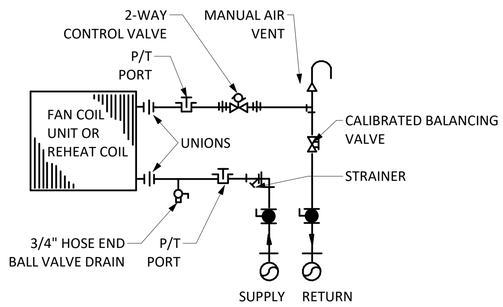
6 / M702 DRAW-THROUGH CONDENSATE TRAP
NTS



NOTES:

1. USE THIS DETAIL WHERE 3-WAY CONTROL VALVES ARE REQUIRED.

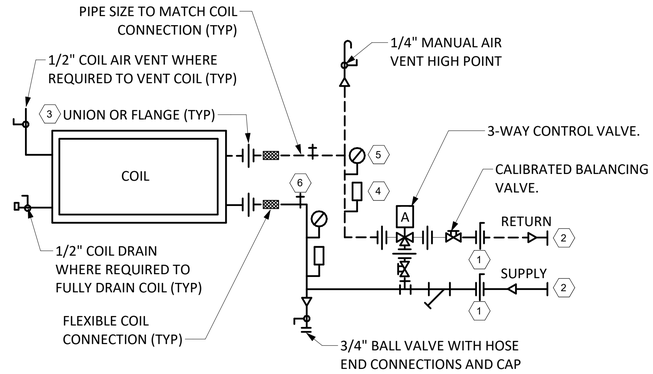
4 / M702 FC HEATING OR COOLING COIL W/ 3-WAY MIXING VALVE
NTS



NOTES:

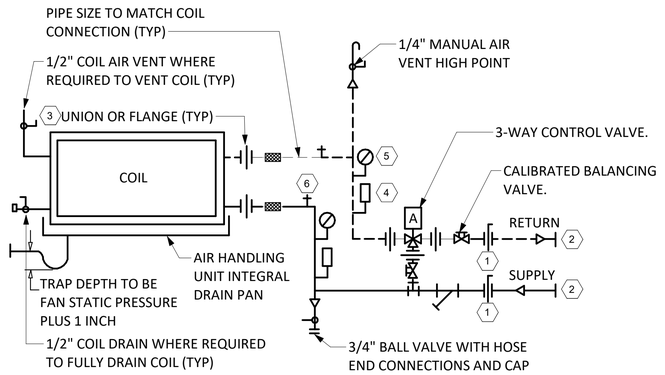
1. USE THIS DETAIL WHERE 2-WAY CONTROL VALVES ARE REQUIRED.
2. PROVIDE CONDENSATE DRAIN PAN FOR COOLING COILS.
3. PROVIDE DIELECTRIC UNION BETWEEN DISSIMILAR PIPING MATERIALS.
4. DRAIN LOW POINTS, VENT HIGH POINTS.

3 / M702 FC HEATING OR COOLING COIL W/ 2-WAY CONTROL VALVE
NTS



1. PROVIDE BUTTERFLY VALVES FOR PIPING 2 1/2" AND LARGER, AND BALL VALVES FOR PIPING 2" INCH AND SMALLER.
2. PIPE SIZE AS SHOWN ON DRAWINGS.
3. PROVIDE DIELECTRIC UNION BETWEEN DISSIMILAR PIPING MATERIALS.
4. THERMOMETER
5. PRESSURE GAUGE.
6. P/T PORT

2 / M702 DOAS HEATING COIL W/ 3-WAY CONTROL VALVE
NTS



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2. PIPE SIZE AS SHOWN ON DRAWINGS.
3. PROVIDE DIELECTRIC UNION BETWEEN DISSIMILAR PIPING MATERIALS.
4. THERMOMETER
5. PRESSURE GAUGE.
6. P/T PORT

1 / M702 DOAS COOLING COIL W/ 3-WAY CONTROL VALVE
NTS

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REGISTERED PROFESSIONAL ENGINEER 101011PE OREGON SEP. 13, 2022 THOMAS KELLY
EXPIRES 06/30/2027
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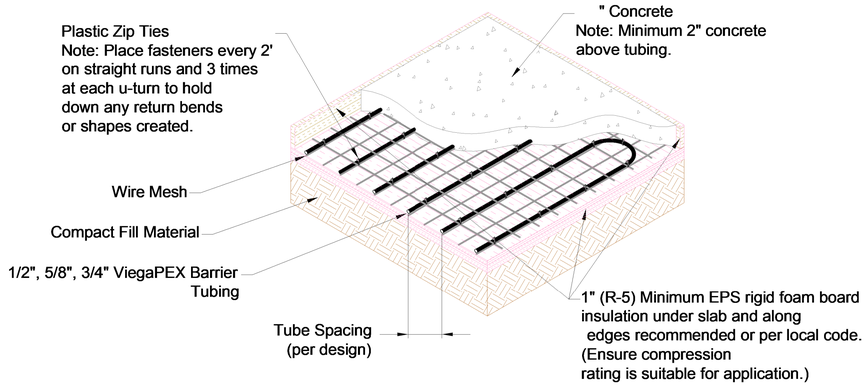
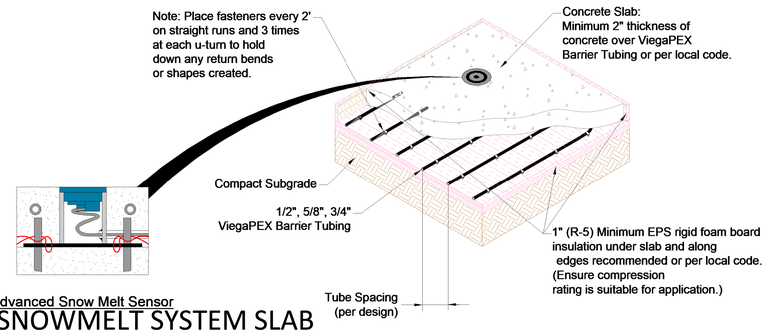
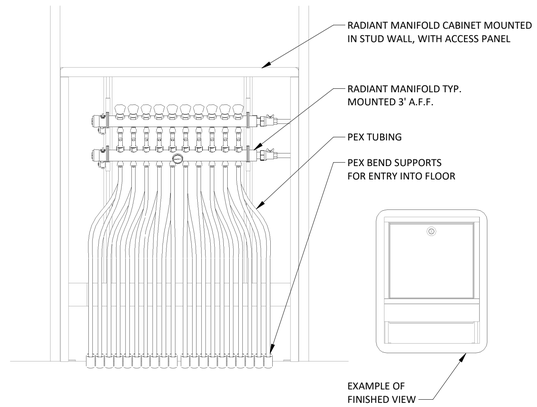


SNOW MELTING INSTALLATION - CONCRETE
Plastic Zip Ties

3 M703 SNOWMELT SYSTEM SLAB INSTALLATION
NTS



2 M703 SNOWMELT SYSTEM SLAB
NTS



1 M703 RADIANT MANIFOLD
NTS

PIVOT ARCHITECTURE

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