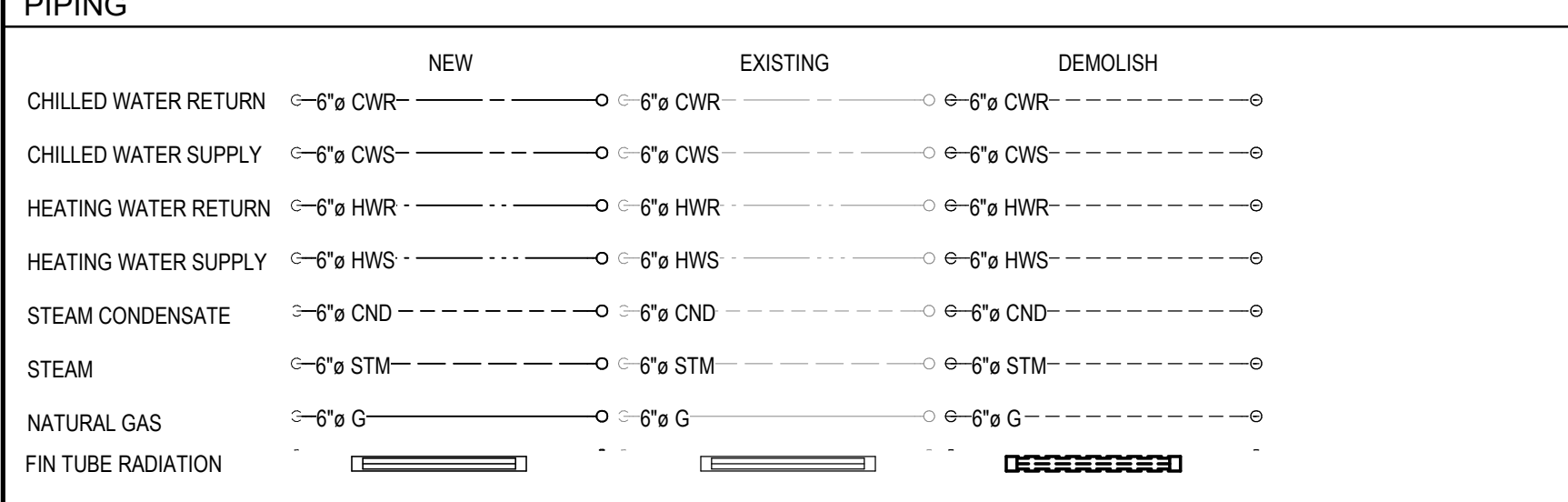
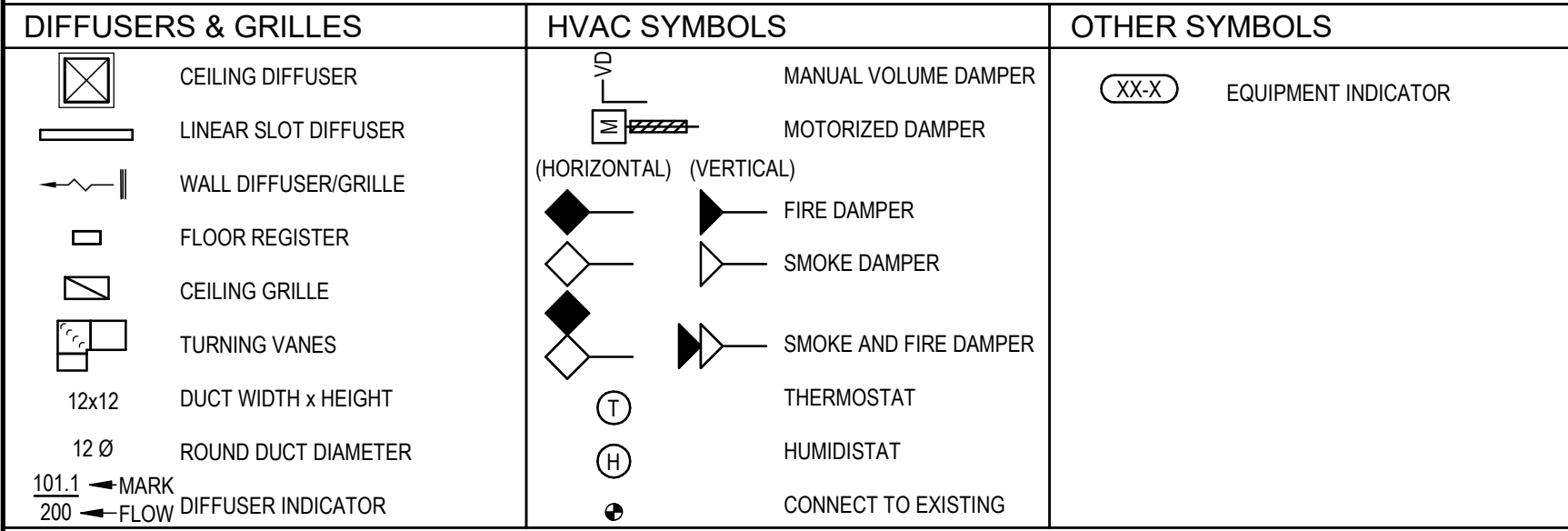
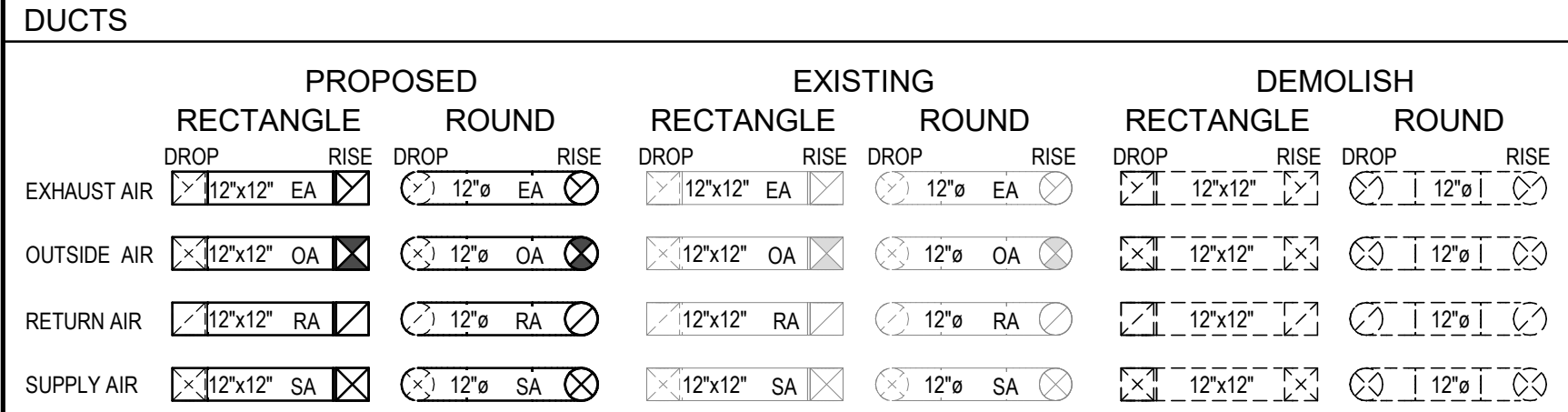


HVAC SYMBOLS LEGEND



INSULATION SCHEDULE

ITEM	THICKNESS	TYPE	REMARKS
HOT WATER SUPPLY	1 1/2" - 2" SEE NOTE 1	FIBERGLASS	SELF SEALING WIPVC FITTING COVERS
HOT WATER RETURN	1 1/2" - 2" SEE NOTE 1	FIBERGLASS	SELF SEALING WIPVC FITTING COVERS
OUTSIDE AIR DUCT	2"	FIBERGLASS	TYPE ASJ

1. FOR PIPING NO LARGER THAN 1 1/4", INSULATION THICKNESS SHALL BE 1 1/2", FOR PIPING 1 1/2" AND LARGER, INSULATION THICKNESS SHALL BE 2".

GENERAL NOTES - MECHANICAL

- FIELD VERIFY LOCATIONS OF EXISTING PIPING THAT MAY CONFLICT WITH NEW CONSTRUCTION AND RELOCATE AS NEEDED.
- COORDINATE LOCATIONS OF THE THERMOSTATS WITH OTHER TRADES.
- PROVIDE BALANCE DAMPERS FOR EACH DIFFUSER/GRILLE AND BRANCH DUCT.
- COORDINATE ROOF MOUNTED EQUIPMENT SIZES WITH ARCHITECTURAL TRADES PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL FIELD VERIFY THE SIZES, LOCATION, ELEVATIONS, AND DETAILS OF ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ALL EQUIPMENT AND MATERIALS IN A "NEW" CONDITION DURING CONSTRUCTION.
- ALL EXTERNALLY ISOLATED HVAC EQUIPMENT SHALL HAVE FLEXIBLE DUCT CONNECTORS.
- ALL CONDENSATE DRAIN PIPING TO TERMINATE TO DRAIN VIA AIR GAP.
- DRAWINGS INDICATE REQUIRED SIZES AND POINTS OF TERMINATION OF PIPES AND DUCTS AND SUGGESTED ROUTES. IT IS THE NOT INTENTION THE OF DRAWINGS TO INDICATE ALL NECESSARY OFFSETS. INSTALL WORK IN MANNER TO CONFORM TO STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. DO NOT SCALE FROM DRAWINGS.

MECH. ABBR.	MECH. ABBR.	MECH. ABBR.
A AIR	FT FOOT / FEET	O OUTSIDE AIR
AAV AUTOMATIC AIR VENT	FTR FIN TUBE RADIATION	OA OUTSIDE AIR
AD ACCESS DOOR/PANEL	"F FAHRENHEIT DEGREE	
AFF ABOVE FINISH FLOOR	G GALLONS PER HOUR	P PUMP
AHU AIR HANDLING UNIT	G NATURAL / LP GAS	PH PHASE
APD AIR PRESSURE DROP	GA GAUGE	PRV PRESSURE REDUCING VALVE
AS AIR SEPARATOR	GPH GALLONS PER HOUR	PSI POUNDS PER SQUARE INCH
	GPM GALLONS PER MINUTE	PSIG POUNDS PER SQUARE INCH GAUGE
B BOILER	H HOT WATER COIL	R SUPPLY REGISTER
BDD BACK DRAFT DAMPER	HC HORSEPOWER	RA RETURN AIR
BFP BACK FLOW PREVENTER	HP HIGH PRESSURE STEAM	RAD RADIANT HEATER
	HRU HEAT RECOVERY UNIT	RD ROUND DIFFUSER
C CUBIC FEET PER MINUTE	HVAC HEATING VENTILATING & AIR CONDITIONING	RF RETURN FAN
CFM CUBIC FEET PER MINUTE		RG GRAVITY RELIEF HOOD
CG CEILING GRID		RPM REVOLUTIONS PER MINUTE
CHR CHILLED WATER RETURN	HWR HEATING WATER RETURN	
CHS CHILLED WATER SUPPLY	HWS HEATING WATER SUPPLY	
CONV CONVECTOR	HX HEAT EXCHANGER	
CR CONDENSATE RETURN		S SUPPLY AIR
CU CONDENSING UNIT	I INCH / INCHES	SC STEAM COIL
CUH CABINET UNIT HEATER		SD SMOKE DAMPER
		SF SUPPLY FAN
D DRY BULB	K KITCHEN HOOD	SP STATIC PRESSURE
DB DIAMETER		STD STANDARD
DN DOWN	L LOUVER	STM STEAM
	LAT LEAVING AIR TEMPERATURE	SWG SIDE WALL GRILLE
E EXHAUST AIR	LDB LEAVING DRY BULB	SWR SIDE WALL REGISTER
EAT ENTERING AIR TEMPERATURE	LF LINEAL FEET	T TYPICAL
EDB ENTERING DRY BULB	LPS LOW PRESSURE STEAM	
EF EXHAUST FAN	LWB LEAVING WET BULB	
ESP EXTERNAL STATIC PRESSURE	LWT LEAVING WATER TEMPERATURE	U UNIT HEATER
ET EXPANSION TANK		
EWB ENTERING WET BULB	M MAXIMUM	V VENT
EWT ENTERING WATER TEMPERATURE	MBH THOUSAND BTU PER HOUR	VAV VARIABLE AIR VOLUME
EXST EXISTING	MCA MINIMUM CIRCUIT AMPS	VD VANED DIFFUSER
	MIN MINIMUM	
F FAN COIL UNIT	MISC MISCELLANEOUS	
FPM FEET PER MINUTE	MTD MOUNTED	W WATER HEATER
FPS FEET PER SECOND	MUA MAKE-UP AIR UNIT	WPD WATER PRESSURE DROP

GAS LOAD SCHEDULE

MARK	DESCRIPTION	BTU / HOUR	CU FT / HOUR	REMARKS
B-1	GAS FIRED BOILER	800,000	728	
B-2	GAS FIRED BOILER	800,000	728	
---	EXISTING RANGE W/ BURNERS & OVEN	152,000	138	
---	EXISTING RANGE W/ GRIDDLE TOP & OVEN	152,000	138	
---	EXISTING DOUBLE DECK CONVECTION OVEN	110,000	100	
---	EXISTING KITCHEN WATER HEATER	199,000	181	
---	EXISTING ROOFTOP MAKEUP AIR	250,000	227	
TOTALS		3,087,000	2,240	

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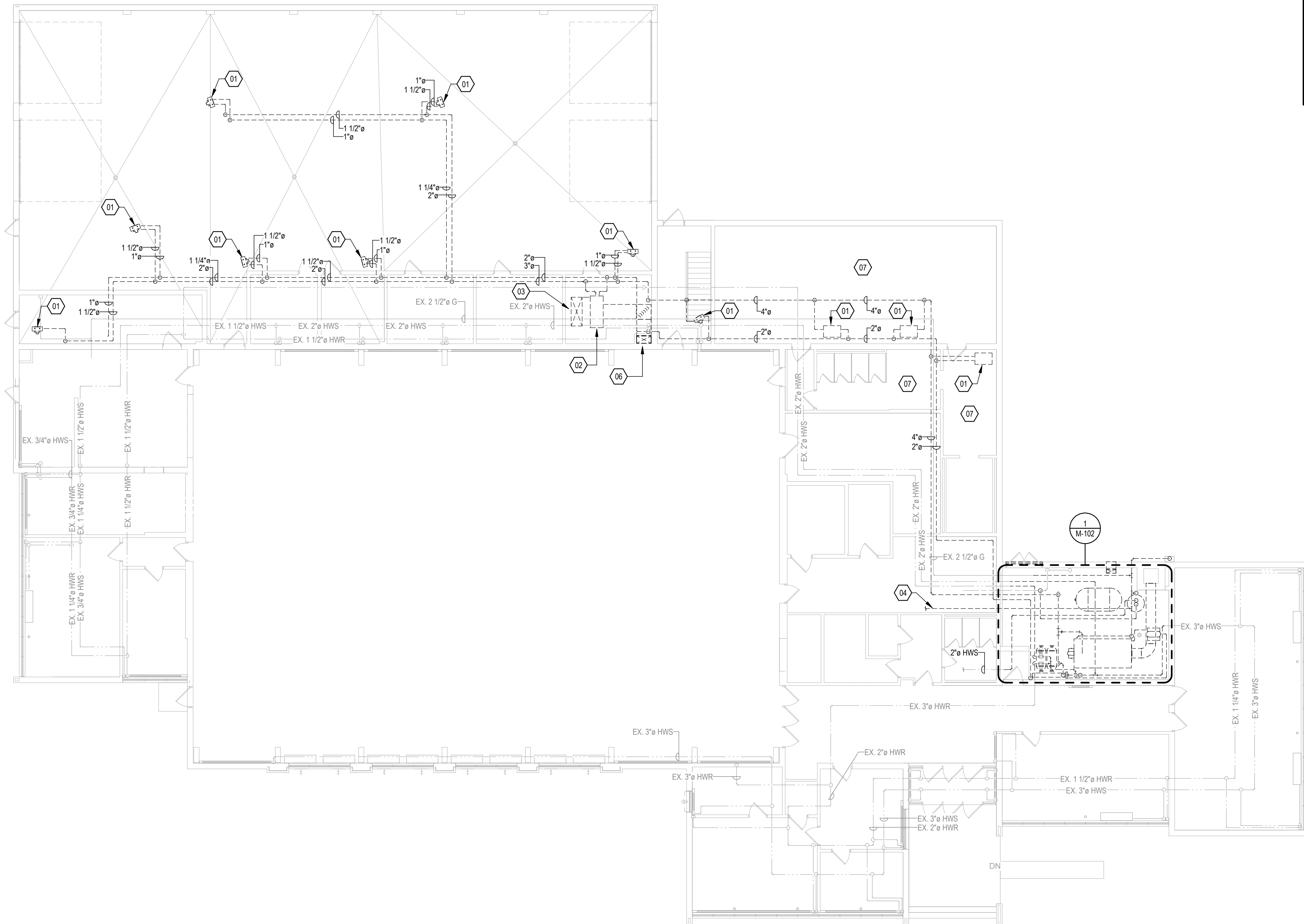
MECHANICAL NOTES AND SYMBOLS
Marquette Army Replace Boiler
 DEPARTMENT OF MILITARY & VETERANS AFFAIRS

SHEET	IDENTIFICATION No.	DATE	DESIGNED	DESIGNER
			DRAWN	CHECKER
M-001	ISSUED FOR	DATE	PRELIMINARY	APPROVED
			CONSTRUCTION	APPROVED
	DTW FILE NUMBER:	2022/06/15	xxxxxx/xx	xxxxxx/xx
	ACCOUNTING TEMP:			



1 BASEMENT HVAC DEMOLITION PLAN

3/32" = 1'-0"



2 1ST FLOOR HVAC DEMOLITION PLAN

3/32" = 1'-0"

MECHANICAL DEMOLITION NOTES

1. ALL BIDDING CONTRACTORS ARE REQUIRED TO FIELD VERIFY EXISTING CONDITIONS AND DESIGN INTENT PRIOR TO SUBMITTING A BID. QUESTIONS OR COMMENTS SHALL BE SUBMITTED IN WRITING DURING THE BIDDING PHASE. NO ADDITIONAL COSTS TO THE PROJECT WILL BE ACCEPTED AFTER PROJECT AWARD FOR CHANGES DUE TO LACK OF KNOWLEDGE OF EXISTING CONDITIONS OR LACK OF COORDINATION.
2. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATION THE PATCHING, CAPPING, OR REPAIRING OF WALLS AND ROOF WHERE OPENINGS OCCUR AS A RESULT OF REMOVAL OF MECHANICAL AND ELECTRICAL COMPONENTS AS PART OF THIS CONTRACT, UNLESS THE OPENING IS BEING RE-USED OR ENLARGED IN THE RENOVATION WORK.
3. ROOF OPENINGS SHALL BE SEALED WEATHER-TIGHT AND WITH ROOFING MATERIALS COMPATIBLE WITH EXISTING ROOF MEMBRANE.
4. ANY DEVICE/EQUIPMENT NO LONGER NEEDED SHALL BE PROPERLY DISPOSED OF.
5. ALL MECHANICAL PIPING INSULATION FOR DEMOLITION CONTAINS ASBESTOS. ALL ASBESTOS REMOVAL SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

XX SHEET KEYNOTES - MECH. DEMOLITION

- 01 CONTRACTOR SHALL DEMOLISH STEAM UNIT HEATER AND ASSOCIATED PIPING AND CONTROLS.
- 02 CONTRACTOR SHALL DEMOLISH ABANDONED IN PLACE AIR HANDLER. DEMOLISH ALL ASSOCIATED DUCTWORK, PIPING, AND CONTROL WIRING.
- 03 CONTRACTOR SHALL DEMOLISH 60x23 DUCT UP TO ROOF. PATCH AND REPAIR ROOF PENETRATION. SEAL AIR AND WATER TIGHT.
- 04 CONTRACTOR SHALL TRACE EXISTING 1-1/2" GAS PIPING AND DEMOLISH ALL ABANDONED IN PLACE GAS PIPING. CONTRACTOR SHALL VERIFY EXACT LOCATIONS IN FIELD.
- 05 DEMOLISH EXISTING 30x15 DUCT. REFER TO RENOVATION PLANS FOR RE-USE OF EXISTING FLOOR PENETRATION.
- 06 CONTRACTOR SHALL DEMOLISH 30x15 DUCT DOWN TO BASEMENT
- 07 DEMOLISH EXISTING CEILING FOR DEMOLITION AND RENOVATION WORK THIS AREA.



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DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
STATE FACILITIES ADMINISTRATION
DESIGN AND CONSTRUCTION DIVISION
ADAM P. LACH, RA, DIRECTOR



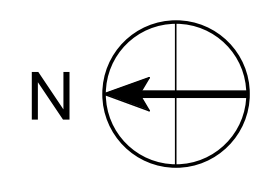
MECHANICAL DEMOLITION PLANS

Marquette Army Replace Boiler

DEPARTMENT OF MILITARY & VETERANS AFFAIRS

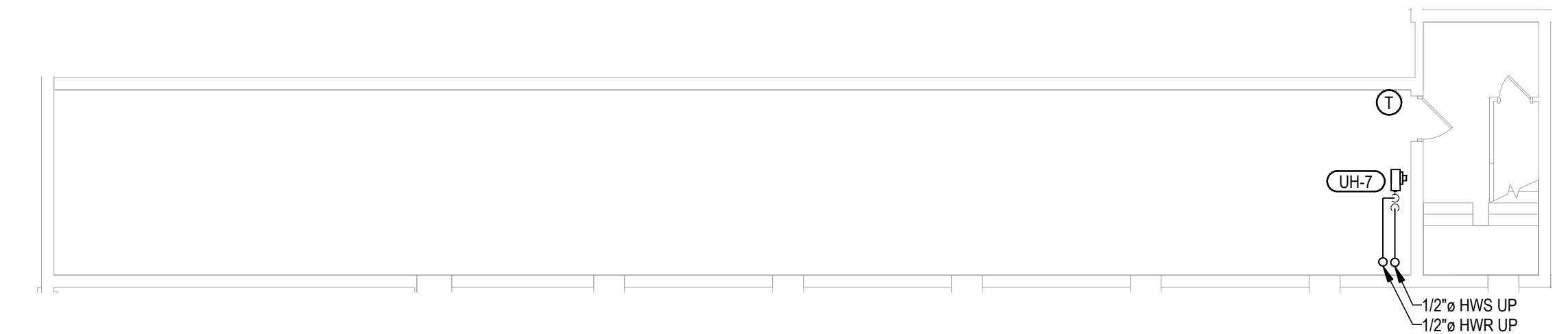
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	ISSUED FOR	CHECKED	APPROVED
	DATE	APPROVED	APPROVED
	2022/06/15		
	PRELIMINARY		
	CONSTRUCTION		
	FINAL RECORD		
		xxxxxx/xx	xxxxxx/xx



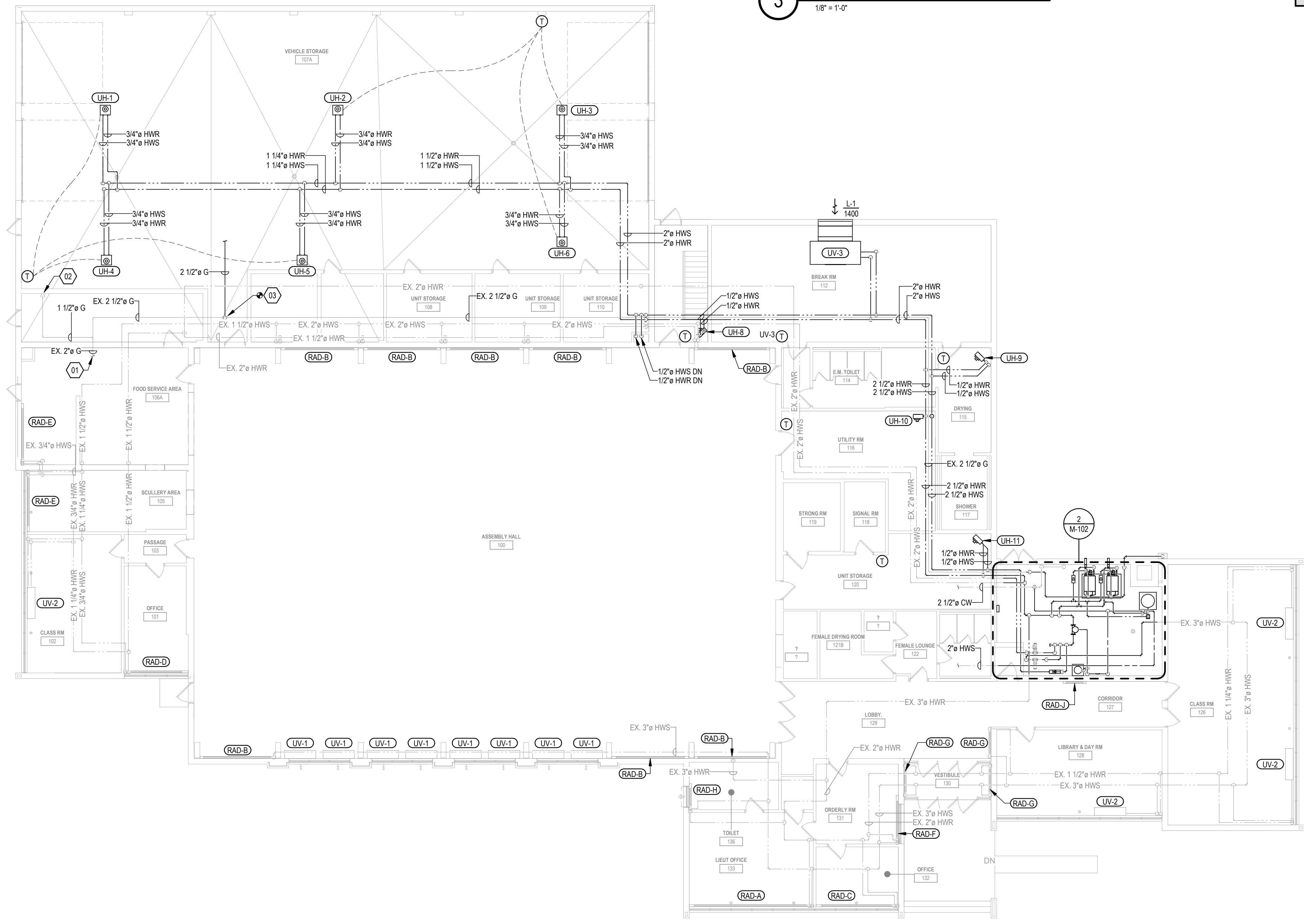
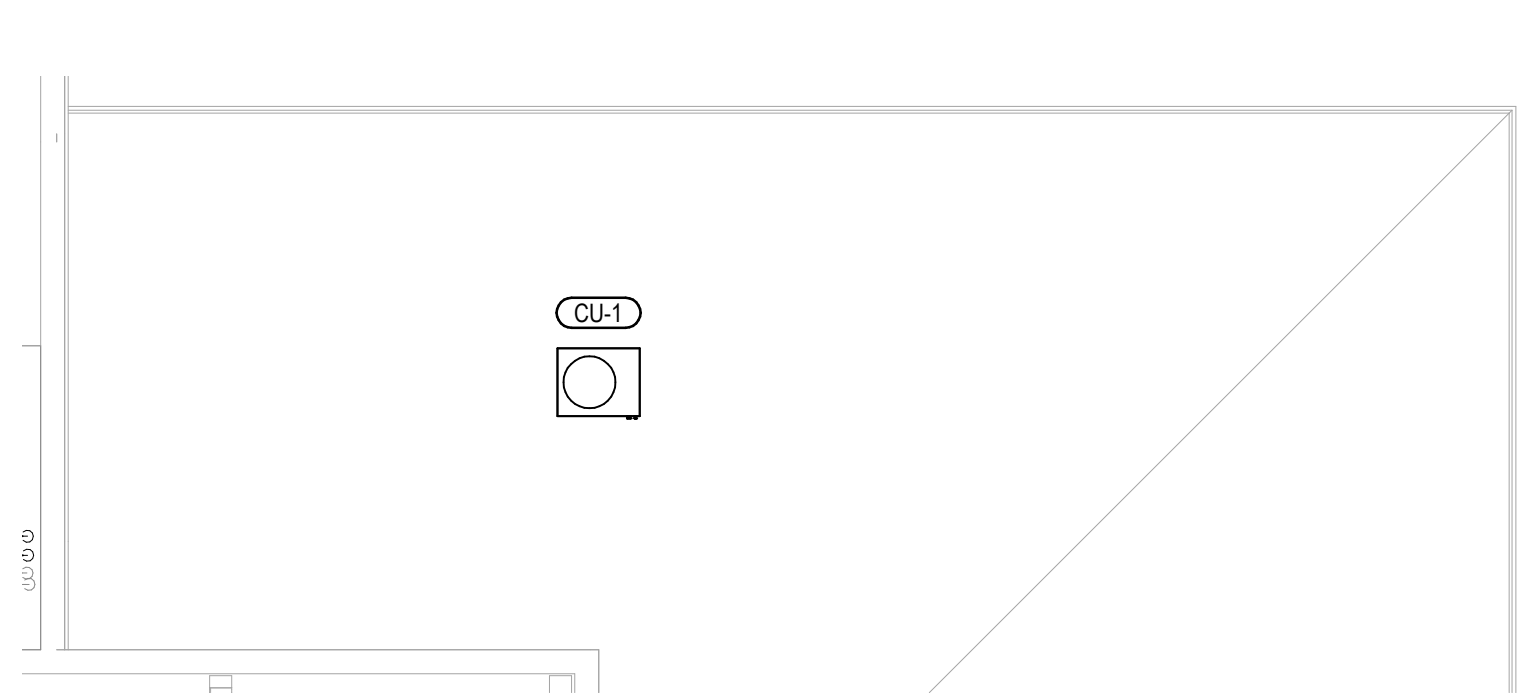
2 BASEMENT HVAC PLAN

3/32" = 1'-0"



3 112 ASSEMBLY ROOF PLAN

1/8" = 1'-0"



1 1ST FLOOR HVAC PLAN

3/32" = 1'-0"

MECHANICAL RENOVATION NOTES

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2. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING MERV 8 CONSTRUCTION FILTERS AT THE AIR INLETS FOR AIR HANDLING EQUIPMENT OPERATED DURING CONSTRUCTION, AS WELL AS, ONE STANDARD FILTER CHANGE JUST PRIOR TO SUBSTANTIAL COMPLETION AND FINAL TEST AND BALANCE.
3. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE TRIMMING AND RESEALING THE WALLS, FLOORS, AND ROOFS WHERE OPENINGS OCCUR AS A RESULT OF NEW MECHANICAL AND ELECTRICAL COMPONENTS AS PART OF THIS CONTRACT, INCLUDING TRIMMING OPENINGS BEING RE-USED OR ENLARGED IN THE RENOVATION WORK.

SHEET KEYNOTES - MECH. PLAN

- 01 EXISTING 2" GAS TO EXISTING KITCHEN EQUIPMENT AND ROOFTOP MAKEUP AIR UNIT. REFER TO GAS LOAD SCHEDULE ON SHEET M-001.
- 02 EXISTING 1-1/2" GAS TO EXISTING KITCHEN WATER HEATER. REFER TO GAS LOAD SCHEDULE ON SHEET M-001.
- 03 ALTERNATE #1. CONNECT TO EXISTING 2-1/2" GAS LINE AND PROVIDE TEMPORARY GAS UNIT HEATERS IN VEHICLE STORAGE. CONFIRM QUANTITY, SIZE, AND LOCATION WITH OWNER.



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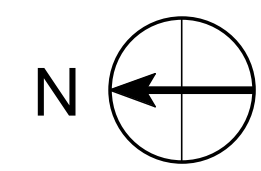
MECHANICAL RENOVATION PLANS

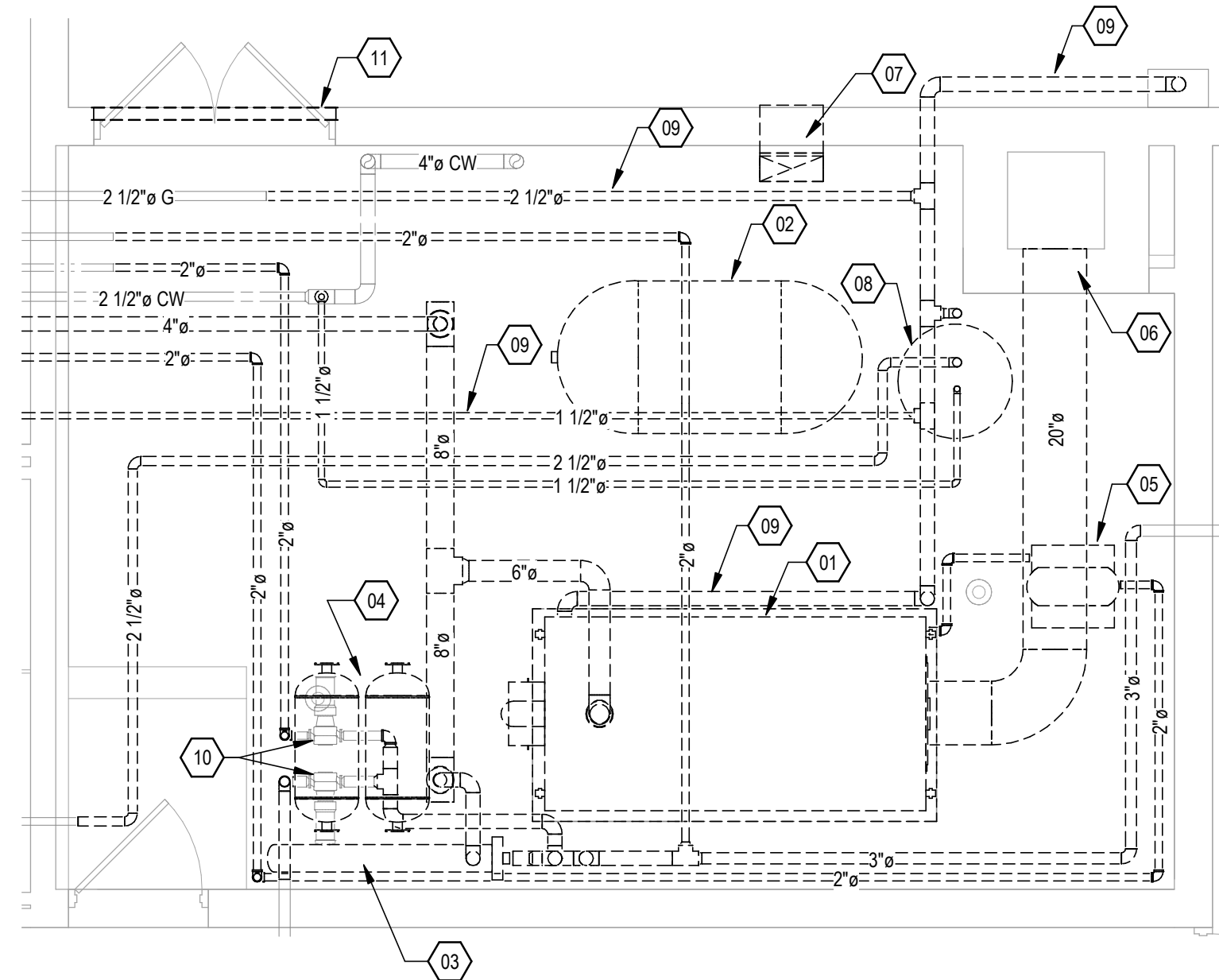
Marquette Army Replace Boiler

DEPARTMENT OF MILITARY & VETERANS AFFAIRS

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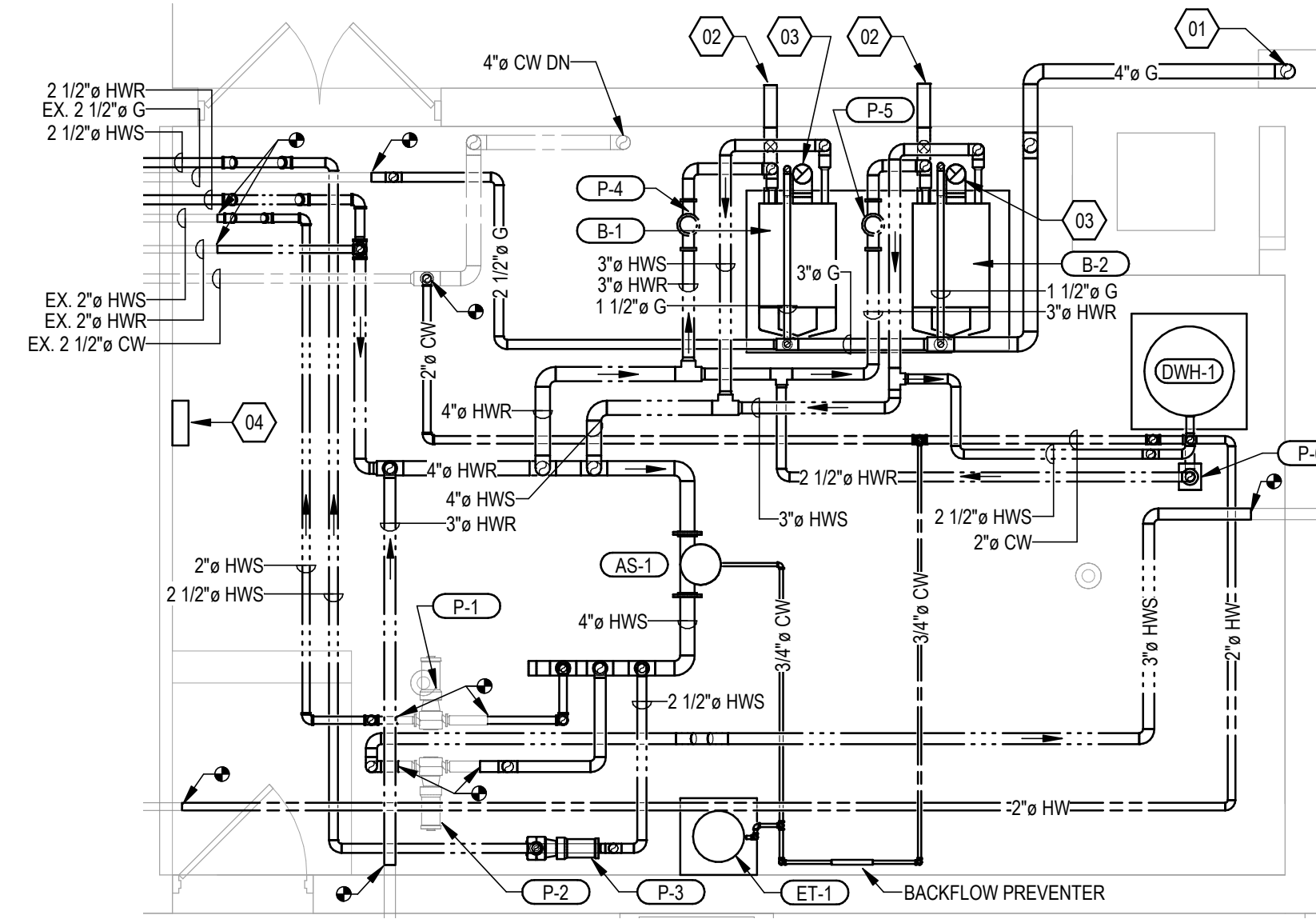
1 ENLARGED BOILER ROOM HVAC DEMOLITION PLAN
1/4" = 1'-0"

MECHANICAL DEMOLITION NOTES

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- ROOF OPENINGS SHALL BE SEALED WEATHER-TIGHT AND WITH ROOFING MATERIALS COMPATIBLE WITH EXISTING ROOF MEMBRANE.
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- ALL MECHANICAL PIPING INSULATION FOR DEMOLITION CONTAINS ASBESTOS. ALL ASBESTOS REMOVAL SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

MECH. DEMOLITION SHEET KEYNOTES

- CONTRACTOR SHALL DEMOLISH BOILER AND ASSOCIATED HOUSEKEEPING PAD. CONTRACTOR SHALL DEMOLISH ALL ASSOCIATED STEAM PIPING, CONDENSATE PIPING, COMBUSTION INTAKE, AND FLUE EXHAUST.
- CONTRACTOR SHALL DEMOLISH ABANDONED STORAGE TANK AND ALL ASSOCIATED PIPING.
- CONTRACTOR SHALL DEMOLISH HEAT EXCHANGER AND ALL ASSOCIATED STEAM AND CONDENSATE PIPING. DEMOLISH HOT WATER SUPPLY AND RETURN PIPING TO POINT SHOWN.
- CONTRACTOR SHALL DEMOLISH EXPANSION TANKS AND ALL ASSOCIATED PIPING.
- CONTRACTOR SHALL DEMOLISH CONDENSATE PUMP AND ALL ASSOCIATED PIPING.
- CONTRACTOR SHALL SEAL WALL PENETRATION AIR AND WATER TIGHT WITH INSULATED METAL PANEL TO MATCH EXISTING FACADE.
- DEMOLISH EXISTING 20x8 INTAKE DUCT. SEAL WALL PENETRATION AIR AND WATER TIGHT WITH INSULATED METAL PANEL TO MATCH EXISTING FACADE.
- CONTRACTOR SHALL DEMOLISH EXISTING WATER HEATER. DEMOLISH ALL DOMESTIC COLD WATER PIPING AND GAS PIPING BACK TO MAIN AND CAP. DEMOLISH DOMESTIC HOT WATER PIPING BACK TO POINT SHOWN.
- CONTRACTOR SHALL DEMOLISH GAS PIPING BACK TO GAS MAIN. EXISTING SMART METER SHALL REMAIN.
- EXISTING PUMP SHALL REMAIN.
- APPROXIMATELY 76x44 LOUVER SHALL BE DEMOLISHED. DEMOLISH ALL CONTROL WIRING.



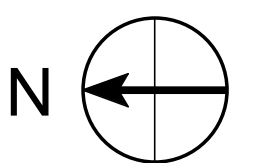
2 ENLARGED BOILER ROOM HVAC RENOVATION PLAN
1/4" = 1'-0"

MECHANICAL RENOVATION NOTES

- ALL BIDDING CONTRACTORS ARE REQUIRED TO FIELD VERIFY EXISTING CONDITIONS AND DESIGN INTENT AND PERFORM A CONSTRUCTABILITY ANALYSIS PRIOR TO SUBMITTING A BID. QUESTIONS OR COMMENTS SHALL BE SUBMITTED IN WRITING DURING THE BIDDING PHASE. NO ADDITIONAL COSTS TO THE PROJECT WILL BE ACCEPTED AFTER PROJECT AWARD FOR CHANGES DUE TO LACK OF KNOWLEDGE OF EXISTING CONDITIONS OR LACK OF COORDINATION.
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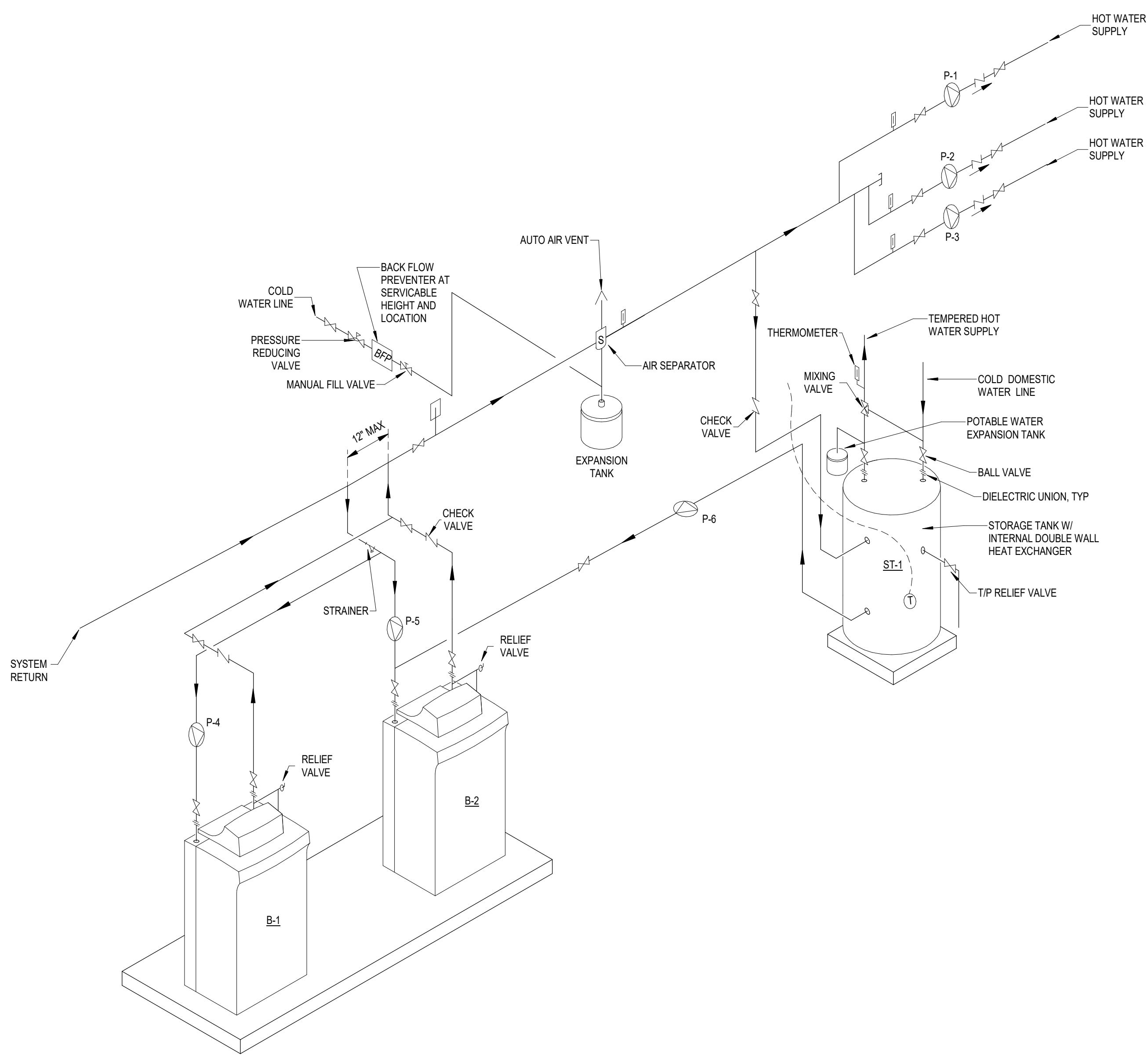
MECH. RENOVATION SHEET KEYNOTES

- CONNECT NEW 4" GAS AT GAS METER. CONTRACTOR TO COORDINATE METER AND MAIN REGULATOR UPGRADE WITH GAS UTILITY.
- 4" INTAKE THROUGH EXTERIOR METAL PANEL. REFER TO MANUFACTURER FOR INSTALLATION INSTRUCTIONS.
- 6" VENT THROUGH ROOF. REFER TO MANUFACTURER FOR INSTALLATION INSTRUCTIONS. MAINTAIN ROOF WARRANTY.
- NEW CONTROL'S CABINET.

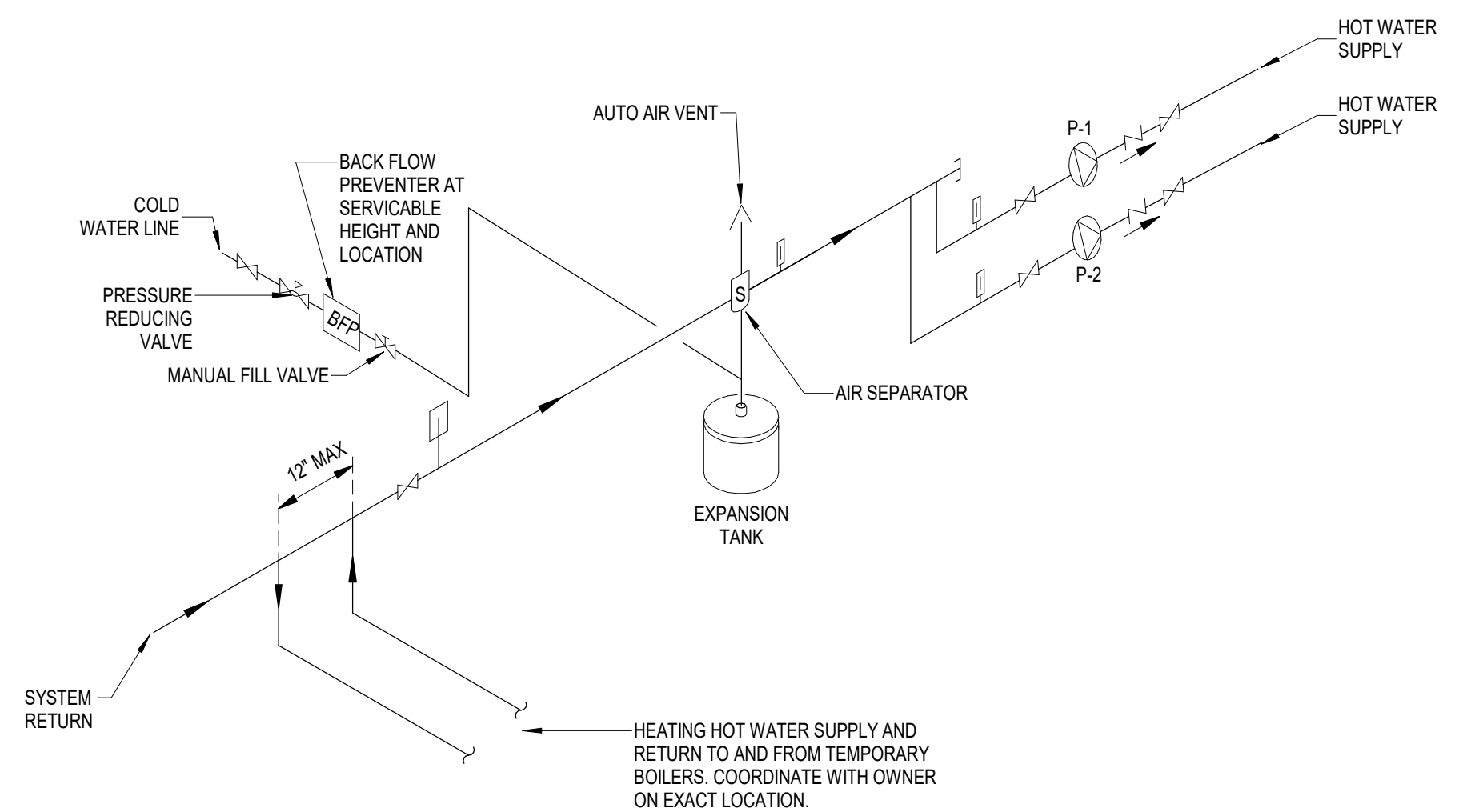


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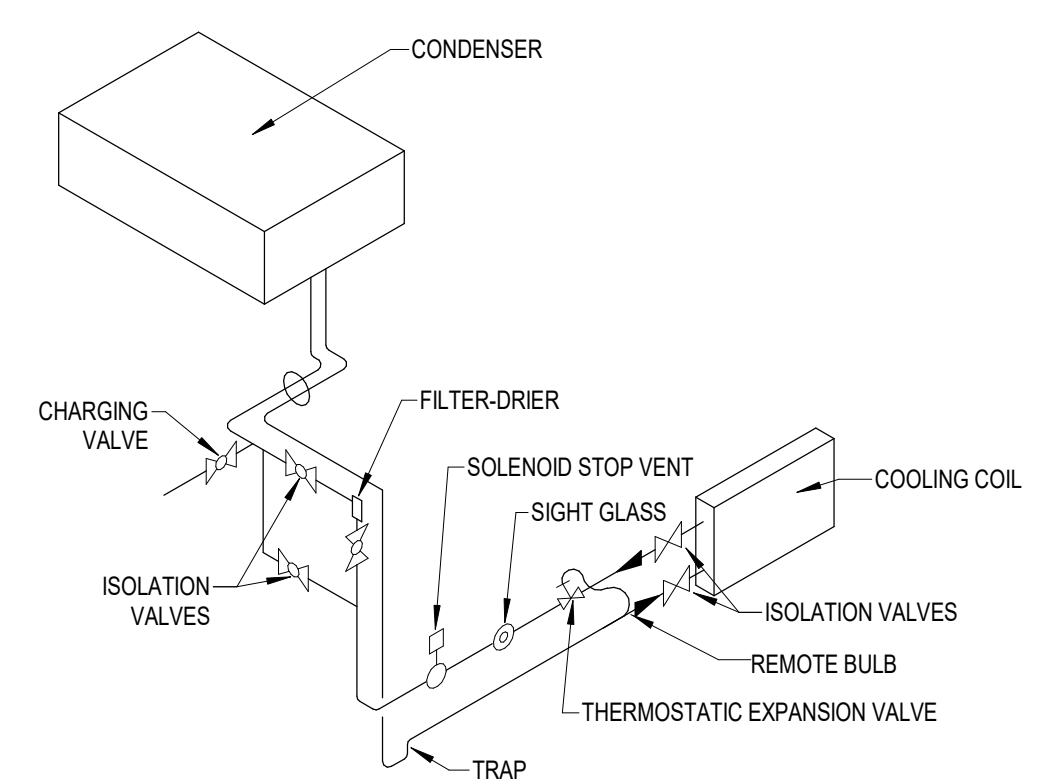
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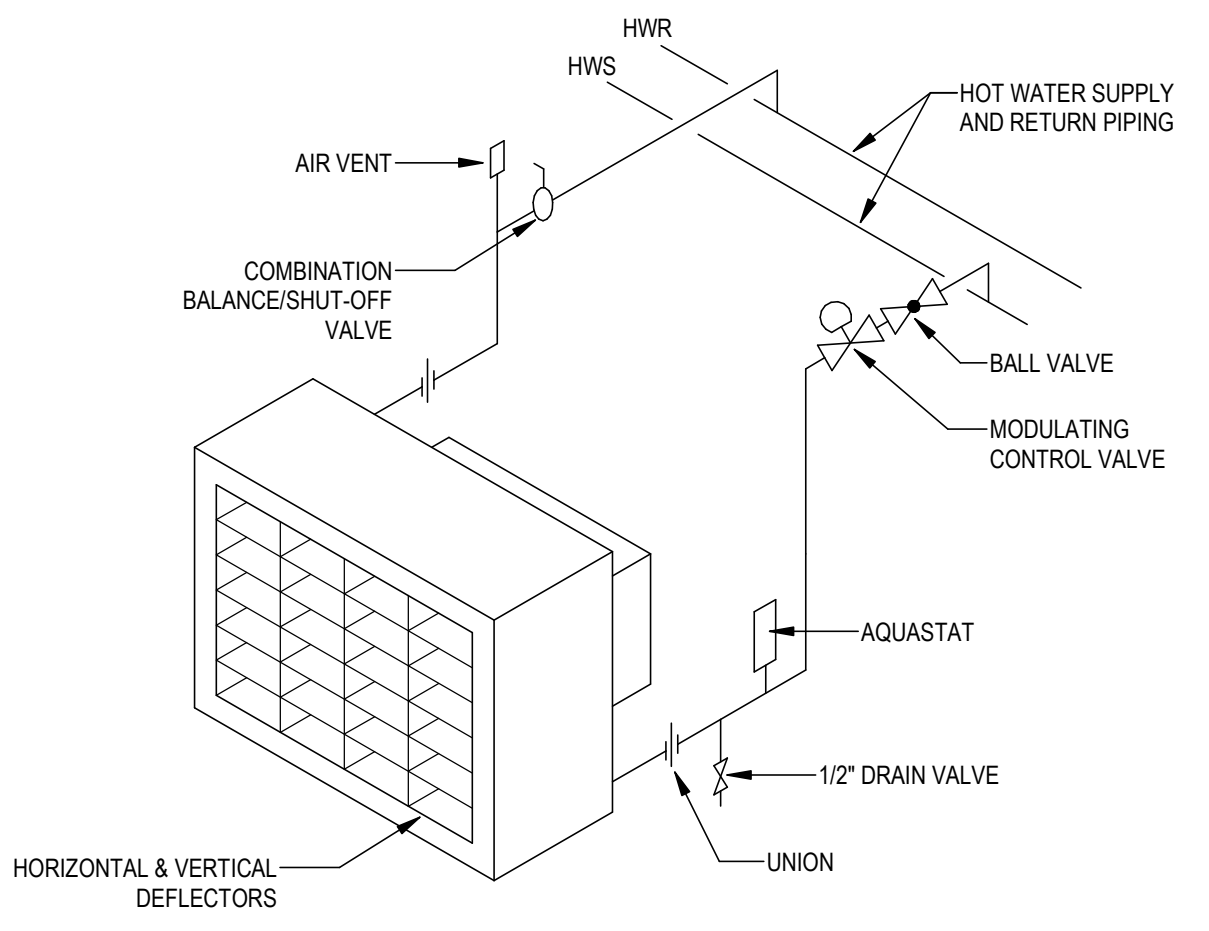
1 BOILER PIPING DETAIL
N.T.S.



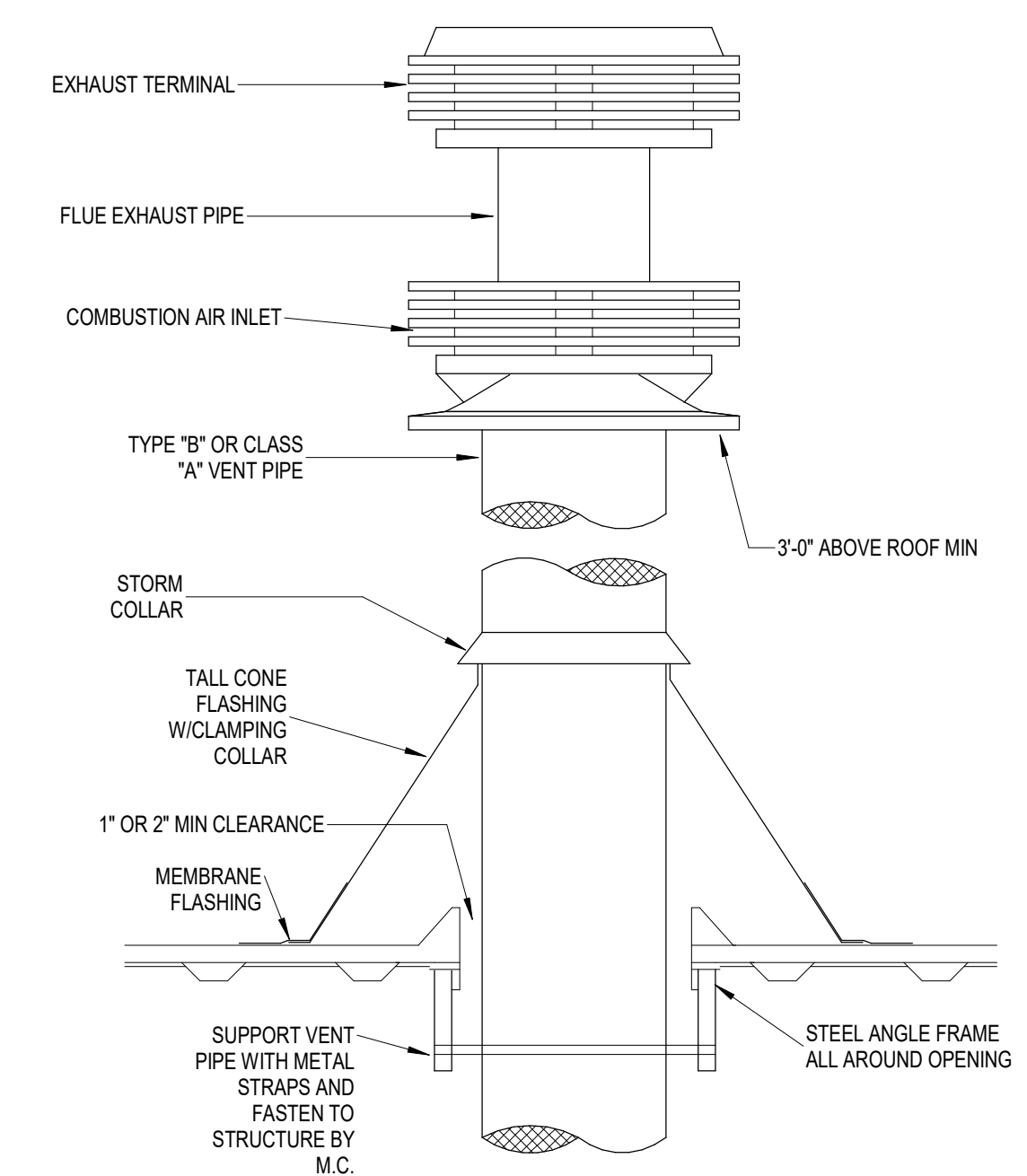
2 BOILER PIPING DETAIL - ALTERNATE #1
12" = 1'-0"



3 REFRIGERANT PIPING DETAIL
12" = 1'-0"



4 HOT WATER UNIT HEATER DETAIL
N.T.S.



5 COMBUSTION AIR-VENT DETAIL (FLAT ROOF)
12" = 1'-0"

LOUVER SCHEDULE

MARK	SERVICE	CFM	SIZE (IN.)	MAX PRESS. DROP (IN-WG)	MINIMUM FREE AREA	MANUFACTURER	MODEL	NOTES
L-1	UV-1	1,400	72x16	0.05	2.9	GREENHECK	ESD-635	SEE ALL

NOTES: 1. PROVIDE WITH ALUMINUM BIRDSCREEN.

EXISTING UNIT VENTILATOR SCHEDULE

MARK	QUANTITY	CFM	MINIMUM O.A.	HEATING CAPACITY (MBH)	AVERAGE WATER TEMP (°F)
UV-1	8	750	25%	51.3	170
UV-2	4	750	25%	51.3	170

NOTE: INFORMATION TAKEN FROM RECORD DRAWINGS DATED 04/08/1955.

EXISTING RADIATOR SCHEDULE

MARK	QUANTITY	MBH	SIZE	LENGTH	ELEMENT HEIGHT
RAD-A	1	36.12	1-1/4"	21'-0"	2 ROWS
RAD-B	5	19.08	1-1/4"	12'-0"	2 ROWS
RAD-C	1	18.92	1-1/4"	11'-0"	2 ROWS
RAD-D	1	15.48	1-1/4"	9'-0"	2 ROWS
RAD-E	1	15.12	1-1/4"	8'-0"	2 ROWS
RAD-F	1	12.04	1-1/4"	7'-0"	2 ROWS
RAD-G	3	9.7	1-1/4"	4'-0"	3 ROWS
RAD-H	1	6.88	1-1/4"	4'-0"	2 ROWS
RAD-J	1	4.85	1-1/4"	2'-0"	3 ROWS

NOTE: INFORMATION TAKEN FROM RECORD DRAWINGS DATED 04/08/1955.

GAS FIRED BOILER SCHEDULE

MARK	LOCATION	TYPE	CAPACITY		MAX OPP. PRESSURE	GPM	EWT (°F)	LWT (°F)	HEAD LOSS (FT)	ELECTRICAL		CONNECTIONS		MANUFACTURER	MODEL	NOTES
			GAS INPUT	HOT WATER OUTPUT						V/PHHZ	FLA / MCA	FLUE	COMB. AIR			
B-1	124 BOILER RM.	WATER TUBE CONDENSING	800 MBH	776 MBH	160 PSIG	76	160	180	17	120/1/60	4.3 / 5.4	6"ø	4"ø	LOCHINVAR	KBX0800	SEE ALL
B-2	124 BOILER RM.	WATER TUBE CONDENSING	800 MBH	776 MBH	160 PSIG	76	160	180	17	120/1/60	4.3 / 5.4	6"ø	4"ø	LOCHINVAR	KBX0800	SEE ALL

NOTES: 1. ON-BOARD CONTROLLER.
2. PROVIDE ALL NECESSARY BOILER TRIM FOR A COMPLETE AND FUNCTIONAL SYSTEM. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. PROVIDE WITH BOILER CIRCULATOR (P-4).
4. PROVIDE WITH BOILER CIRCULATOR (P-5).

PUMP SCHEDULE

MARK	PUMP CONDITION	SERVICE	LOCATION	TYPE	FLUID	GPM	HEAD (FT)	MIN NPSHR (FT)	MIN EFF (%)	CONNECTIONS		MOTOR DATA			STARTER	MANUFACTURER	MODEL	NOTES
										SUCTION	DISCHARGE	HP	RPM	V/PHHZ				
P-1	EXISTING	HWS/R	BOILER RM	IN-LINE	WATER	38	---	---	---	---	---	---	---	---	---	---	---	---
P-2	EXISTING	HWS/R	BOILER RM	IN-LINE	WATER	55	---	---	---	---	---	---	---	---	---	---	---	---
P-3	NEW	HWS/R	BOILER RM	IN-LINE	WATER	45	35	3	57	1-1/2"	1-1/2"	1	1723	208/3/60	VFD	BELL & GOSSETT	E-80 1.5x1.5x7C	1
P-4	NEW	B-1	BOILER RM	IN-LINE	WATER	76	25	---	52	2-1/2"	2-1/2"	1	2883	208/1/60	ECM	BELL & GOSSETT	ECOCIRC XL 40-200	
P-5	NEW	B-2	BOILER RM	IN-LINE	WATER	76	25	---	52	2-1/2"	2-1/2"	1	2883	208/1/60	ECM	BELL & GOSSETT	ECOCIRC XL 40-200	
P-6	NEW	DWH-1	BOILER RM	IN-LINE	WATER	14	10	---	48	1.25"	1.25"	1/6	2455	120/1/60	ECM	BELL & GOSSETT	ECOCIRC XL 36-45	

NOTES: 1. PROVIDE WITH OPTIONAL INTEGRATED VFD CONTROLLER

UNIT VENTILATOR SCHEDULE

MARK	LOCATION	SA CFM	OA CFM	DX COOLING			HOT WATER HEATING			ELECTRICAL		MANUFACTURER	MODEL	NOTES		
				GROSS MBH	EAT (DB/WB)	LAT (DB/WB)	GPM	MBH	WPD (FT-WG)	EWT / LWT (°F)	EAT / LAT				V/PHHZ	HP
UV-3	112 BREAK ROOM	1,400	320	48	75.7 / 64.7	53 / 52.9	5.3	53	15.6	180 / 160	60.5 / 95.0	208/1/60	1	TRANE	HUVC15020	SEE ALL

NOTES: 1. PROVIDE PUMP FOR CONDENSATE DISPOSAL.
2. UNIT SHALL BE CEILING MOUNTED, EXPOSED, WITH REAR CONNECTION FOR OUTSIDE AIR.

HYDRONIC UNIT HEATER SCHEDULE

MARK	SERVICE	CFM	CAPACITY	HOT WATER			ELECTRICAL		MANUFACTURER	MODEL	NOTES
				GPM	WPD (FT-WG)	EWT / LWT (°F)	V/PHHZ	HP			
UH-1	107 VEHICLE STORAGE	1,155	42.6	4.4	0.5	180 / 160	120/1/60	1/30	MODINE	V59	1
UH-2	107 VEHICLE STORAGE	1,155	42.6	4.4	0.5	180 / 160	120/1/60	1/30	MODINE	V59	1
UH-3	107 VEHICLE STORAGE	1,155	42.6	4.4	0.5	180 / 160	120/1/60	1/30	MODINE	V59	1
UH-4	107 VEHICLE STORAGE	1,155	42.6	4.4	0.5	180 / 160	120/1/60	1/30	MODINE	V59	1
UH-5	107 VEHICLE STORAGE	1,155	42.6	4.4	0.5	180 / 160	120/1/60	1/30	MODINE	V59	1
UH-6	107 VEHICLE STORAGE	1,155	42.6	4.4	0.5	180 / 160	120/1/60	1/30	MODINE	V59	1
UH-7	BASEMENT	370	16.2	1.7	0.8	180 / 160	120/1/60	1/25	MODINE	HC24	
UH-8	111 STAIR	340	12.6	1.3	0.5	180 / 160	120/1/60	1/60	MODINE	HSB18	
UH-9	115 DRYING	340	12.6	1.3	0.5	180 / 160	120/1/60	1/60	MODINE	HSB18	
UH-10	116 UTILITY	340	12.6	1.3	0.5	180 / 160	120/1/60	1/60	MODINE	HSB18	
UH-11	120 STORAGE	340	12.6	1.3	0.5	180 / 160	120/1/60	1/60	MODINE	HSB18	

NOTES: 1. MOUNT UNIT HEATER AT EQUAL ELEVATION OF STRUCTURAL TRUSSES.

CONDENSING UNIT SCHEDULE

MARK	SERVICE	LOCATION	MBH	COMPRESSOR		ELECTRICAL			MANUFACTURER	MODEL	NOTES
				QTY	NO. STAGES	V/PHHZ	MCA	MOCP			
CU-1	UV-3	ROOF	48	1	2	208/3/60	18	30	TRANE	4TTR7048A	

AIR SEPARATOR SCHEDULE

MARK	SERVICE	LOCATION	FLUID	MAX GPM	MAX PRESSURE DROP (FT-WG)	CONNECTION SIZE	MANUFACTURER	MODEL	NOTES
AS-1	HEATING HOT WATER	124 BOILER RM.	WATER	300	3	4"ø	BELL & GOSSETT	R-4F	1-3

NOTES: 1. CONTRACTOR SHALL PROVIDE INSULATION AND JACKETING ON AIR SEPARATOR TO MATCH THE HYDRONIC PIPING.
2. PROVIDE DRAIN VAVLE, MOUNTING BRACKETS, AND HIGH CAPACITY AIR VENT.
3. AIR SEPARATOR MUST REMOVE 100% OF VISIBLE AIR AND 99.6% OF DISSOLVED AIR.

EXPANSION TANK SCHEDULE

MARK	SERVICE	LOCATION	FLUID	CAPACITY	ACCEPTANCE	MANUFACTURER	MODEL	NOTES
ET-1	HEATING HOT WATER	124 BOILER RM.	WATER	14 GALLONS	11.3 GALLONS	BELL & GOSSETT	HFT-30V	1-2

NOTES: 1. EXPANSION TANK SHALL BE PROVIDED WITH PURGE VALVE
2. TANK SHALL BE PRE-CHARGED AT MINIMUM 12 PSI.

DOMESTIC WATER HEATER SCHEDULE

MARK	LOCATION	TYPE	STORAGE CAPACITY	FLOW IN	FIRST HR. RATING	CONTINUOUS DRAW RATING	FRICTION LOSS (FT HD)	MANUFACTURER	MODEL
DWH-1	BOILER RM.	INDIRECT	113 GALLONS	14 GPM	280 GPH	174 GPH	6	LOCHINVAR	SIT119DW




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DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
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MECHANICAL SCHEDULES
Marquette Army Replace Boiler
DEPARTMENT OF MILITARY & VETERANS AFFAIRS

95% REVIEW 2022/06/15

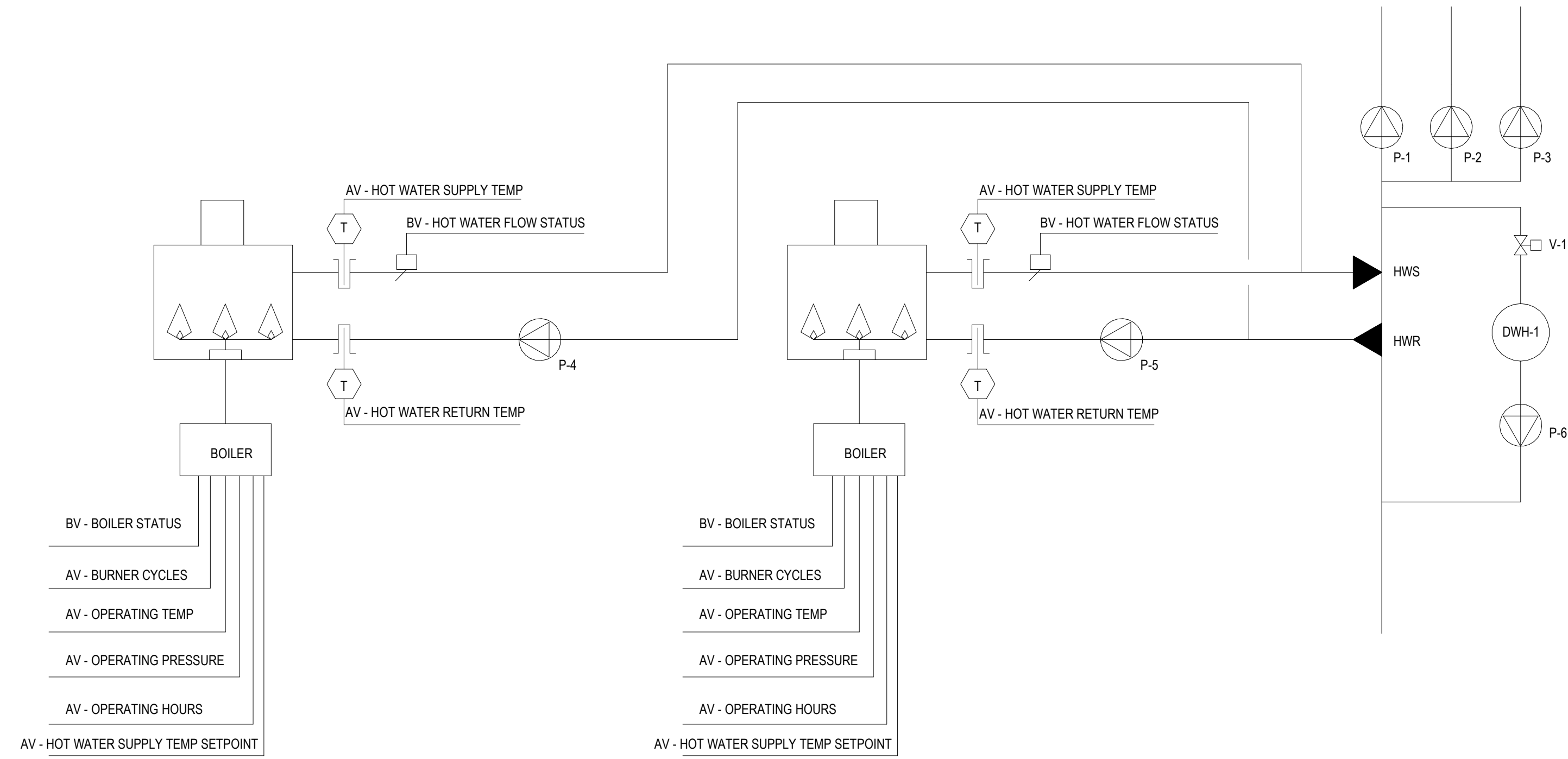
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APPROVED: Mh601

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ISSUED FOR: PRELIMINARY CONSTRUCTION FINAL RECORD

IDENTIFICATION No. DTMB FILE NUMBER: 151122046 (BB) ACCOUNTING TEMP: 260221038

SHEET M-601



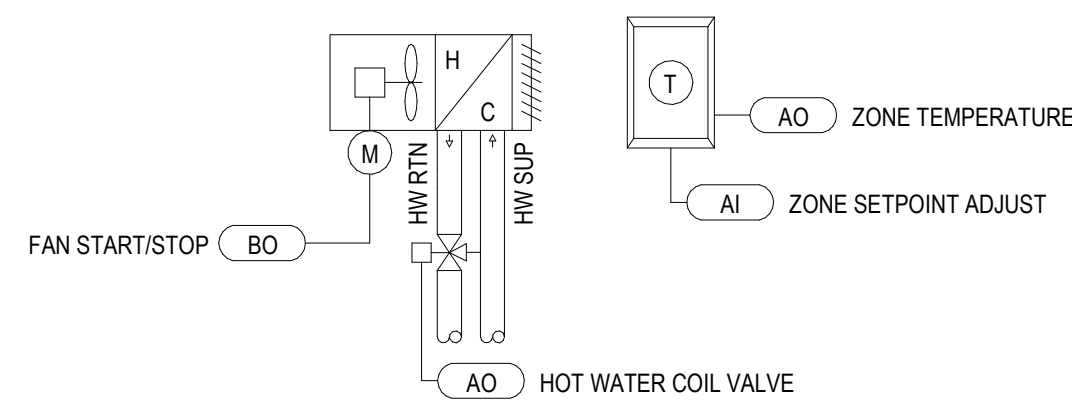
WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 40°F (ADJUSTABLE) THE LEAD HOT WATER PUMP P-1 (ADJ.) SHALL RUN. IF THE LEAD HOT WATER PUMP P-1 FAILS THE LAG HOT WATER PUMP P-2 (ADJ.) SHALL RUN. THE LEAD AND LAG PUMPS SHALL ALTERNATE EVERY WEEK.

WHEN THE MAIN SYSTEM RETURN TEMPERATURE DROPS BELOW SETPOINT (ADJUSTABLE) THE BOILERS SHALL BE ENABLED IN A LEAD-LAG CYCLE. DURING A CALL FOR HEATING TO THE SECONDARY LOOP THE BOILERS SHALL BE STAGED FOR THE LEAD BOILER AND ITS ASSOCIATED PUMP SHALL BE ENABLED AND FIRE TO A RATE OF 80% (ADJUSTABLE). ONCE THE FIRING RATE IS ACHIEVED THE LAG BOILER SHALL BE ENABLED ALONG WITH THE ASSOCIATED PUMP. THE BOILER SEQUENCER SHALL MODULATE THE FIRING RATES OF THE BOILER(S) TO OPTIMIZE EFFICIENCY. THE OUTSIDE TEMPERATURE SHALL DICTATE A SUPPLY TEMPERATURE RESET SCHEDULE.

ON A DROP BELOW SET POINT (ADJUSTABLE) IN THE DOMESTIC WATER HEATER (DWH-1), THE DOMESTIC HOT WATER VALVE (V-1) SHALL OPEN, AND PUMP P-6 SHALL BE ENERGIZED, AND BOILER B-1 AND ITS ASSOCIATED CIRCULATOR PUMP SHALL BE ENABLED TO MAINTAIN BOILER WATER RETURN TEMPERATURE (ADJUSTABLE).

ALARMS SHALL BE GENERATED ON THE FAILURE OF PUMPS P-1, P-2, OR P-3, HOT WATER HEATING RETURN TEMPERATURE BELOW SETPOINT FOR A PERIOD OF 1 HOUR (ADJUSTABLE), AND ANY BOILER GENERAL ALARMS.

1 BOILER CONTROL DIAGRAM
N.T.S.



UNIT HEATER SEQUENCE OF OPERATION:

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
OCCUPIED MODE: THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 70°F (ADJ.)
UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 60°F (ADJ.)

ALARMS SHALL BE PROVIDED AS FOLLOWS:
LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.)

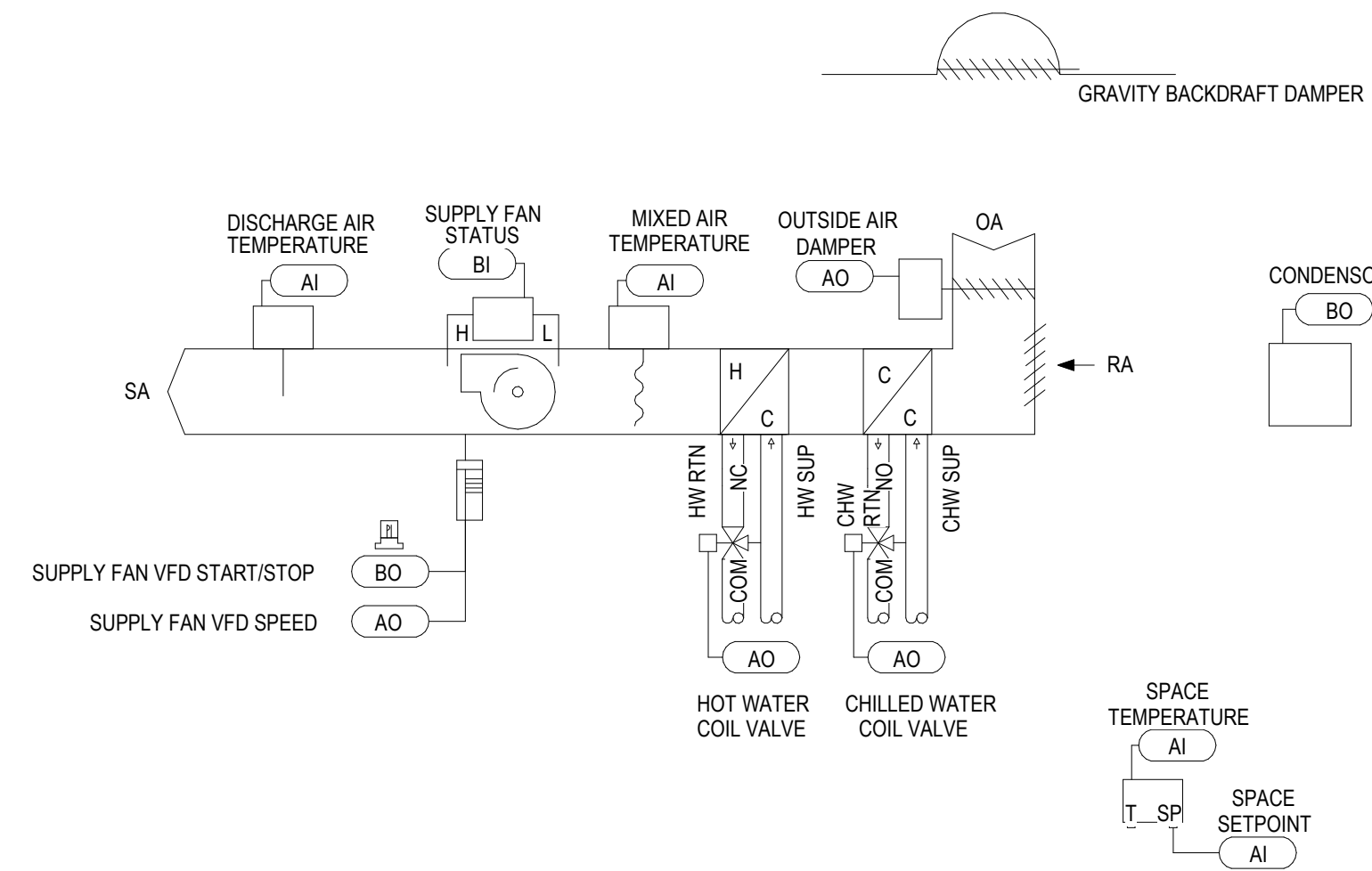
ZONE SETPOINT ADJUST:
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINTS AT THE ZONE SENSOR.

FAN:
THE FAN SHALL RUN ANYTIME THE ZONE TEMPERATURE DROPS BELOW THE HEATING SETPOINT, UNLESS SHUTDOWN ON SAFETIES.

HOT WATER COIL VALVE:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN ITS HEATING SETPOINT.

THE HEATING SHALL BE ENABLED WHENEVER:
OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.) AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT AND THE FAN IS ON.

2 UNIT HEATER CONTROL DIAGRAM
N.T.S.



UNIT VENTILATOR WITH COOLING SEQUENCE OF OPERATION:

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
OCCUPIED MODE: THE UNIT SHALL MAINTAIN A 75°F (ADJ.) COOLING SETPOINT AND A 70°F (ADJ.) HEATING SETPOINT.
UNOCCUPIED MODE: THE UNIT SHALL MAINTAIN A 70°F (ADJ.) COOLING SETPOINT AND A 70°F (ADJ.) HEATING SETPOINT.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.)
LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.)

ZONE SETPOINT ADJUST:
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR.

ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:
A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

FREEZE PROTECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

FAN:
THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN UNLESS SHUTDOWN ON SAFETIES.

HEATING COIL VALVE:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN ITS HEATING SETPOINT.
THE HEATING SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.) AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT AND THE FAN IS ON.
THE HEATING COIL VALVE SHALL OPEN WHENEVER THE FREEZESTAT (IF PRESENT) IS ON.

ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE MIXED AIR DAMPERS IN SEQUENCE TO MAINTAIN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN DURING HEATING AND VENTILATION WHENEVER OCCUPIED. THE ECONOMIZER SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS AT LEAST 3°F (ADJ.) LESS THAN THE ZONE TEMPERATURE AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 75°F (ADJ.)
THE ECONOMIZER SHALL CLOSE WHENEVER THE FREEZESTAT IS ON.
THE OUTSIDE AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.
THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE. SHOULD DISCHARGE TEMPERATURE DROP BELOW A USER DEFINABLE TEMPERATURE (ADJ.), THE CONTROLLER SHALL ENABLE THE HEATING, CLOSE THE OUTSIDE DAMPER AND OPEN THE RETURN DAMPER.

MINIMUM OUTSIDE AIR VENTILATION - FIXED PERCENTAGE:
THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION (ADJ.) DURING BUILDING OCCUPIED HOURS AND BE CLOSED DURING UNOCCUPIED HOURS.
DISCHARGE AIR TEMPERATURE: THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.)
LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40°F (ADJ.)

FAN STATUS: THE CONTROLLER SHALL MONITOR THE FAN STATUS.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.)

3 UNIT VENTILATOR CONTROL DIAGRAM
N.T.S.

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