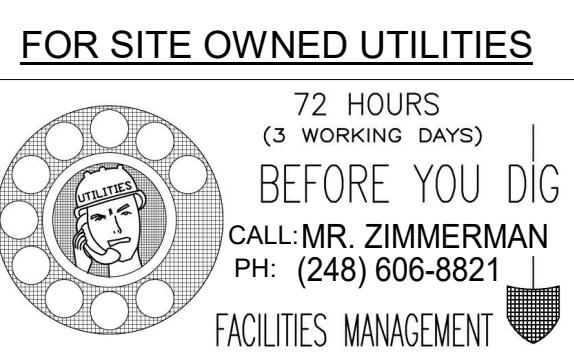
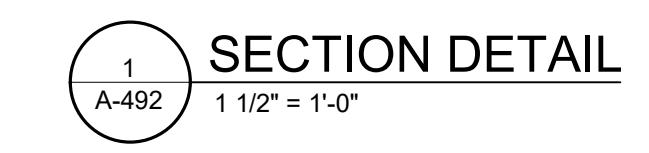
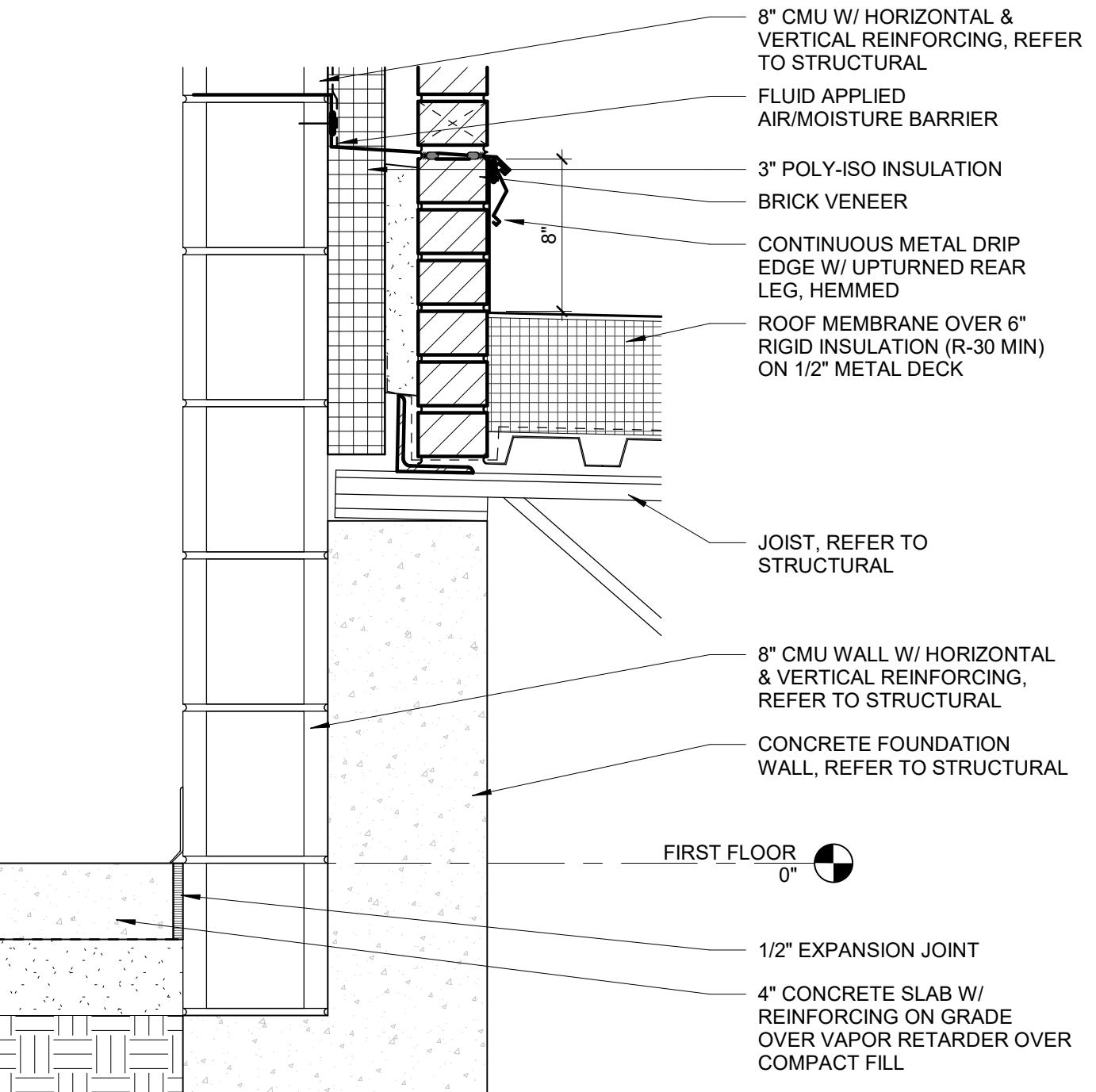
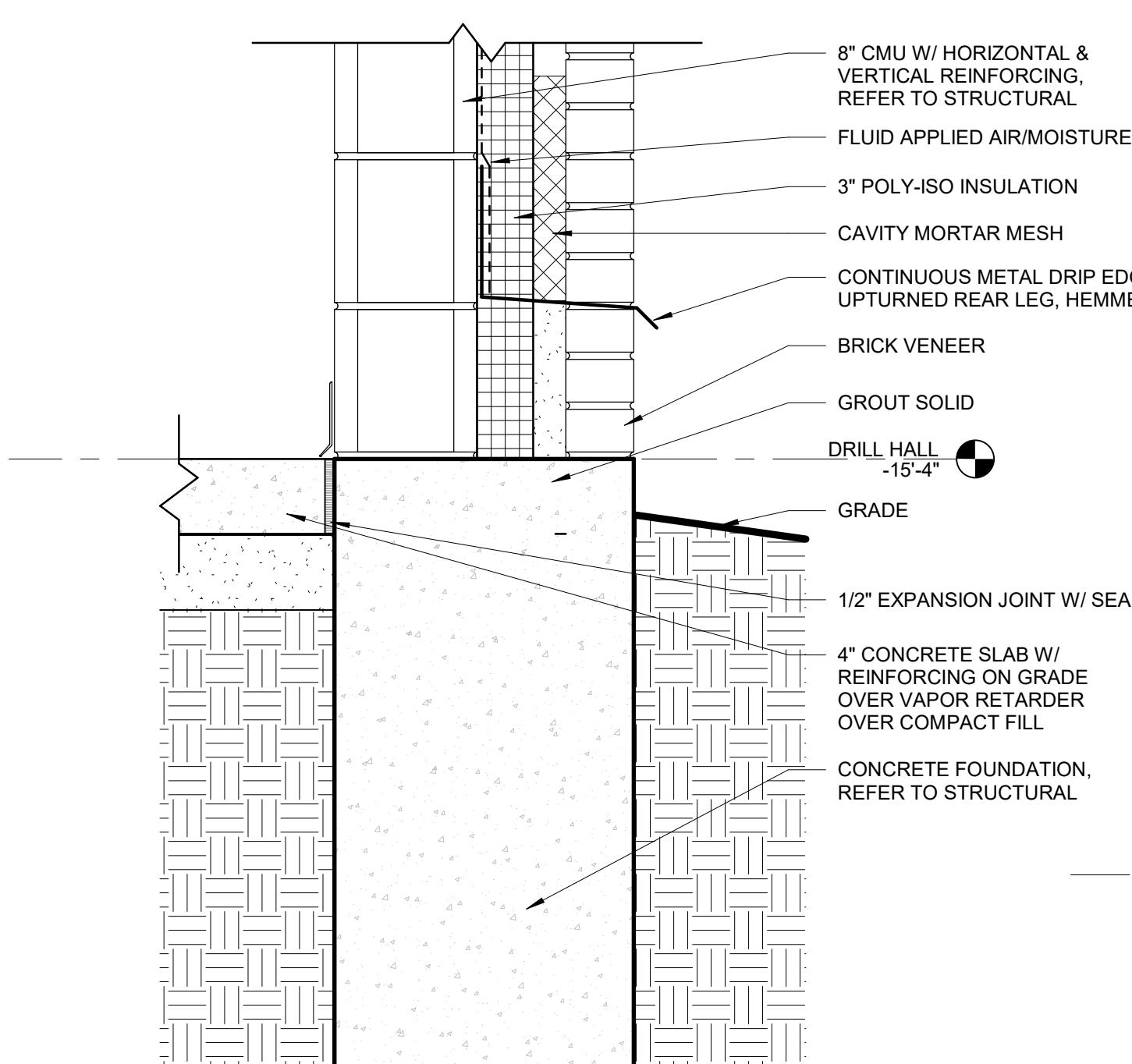
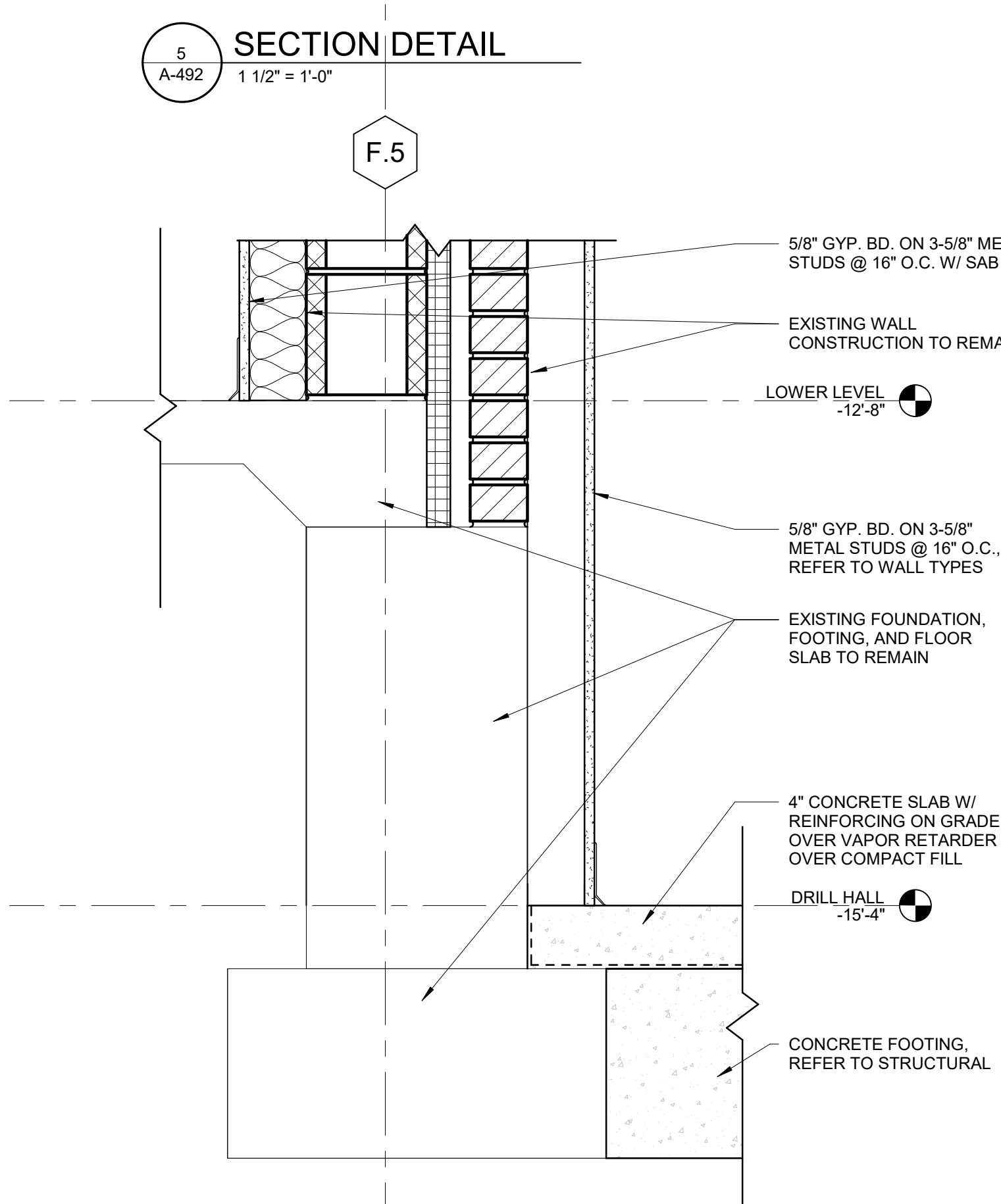
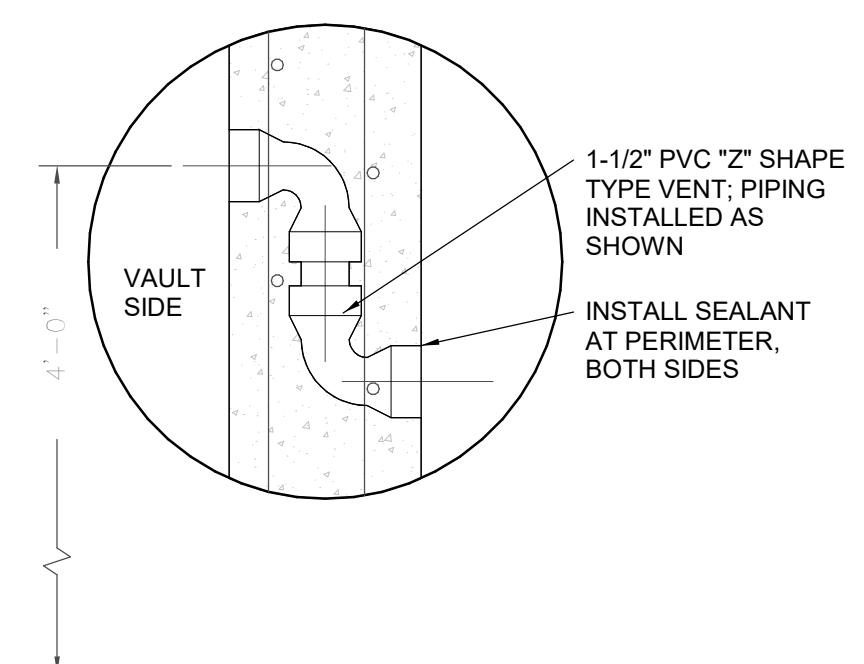
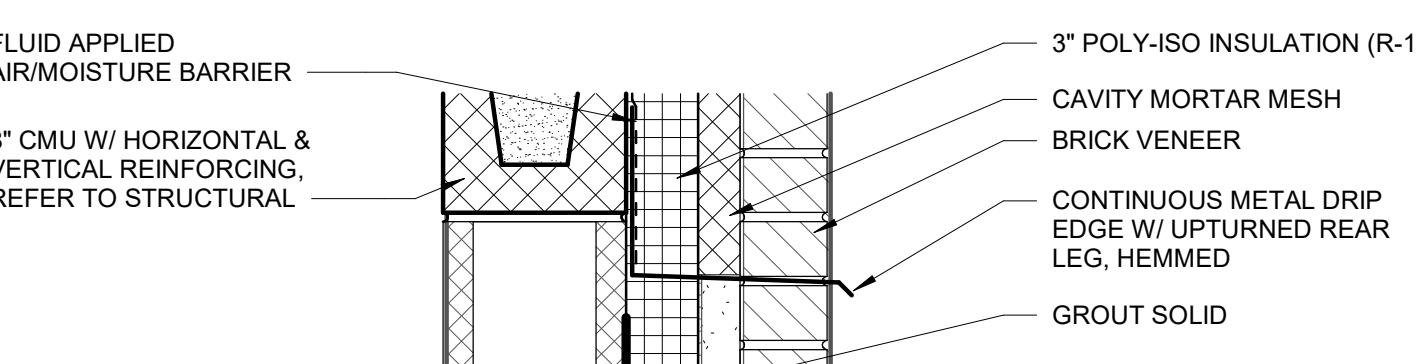
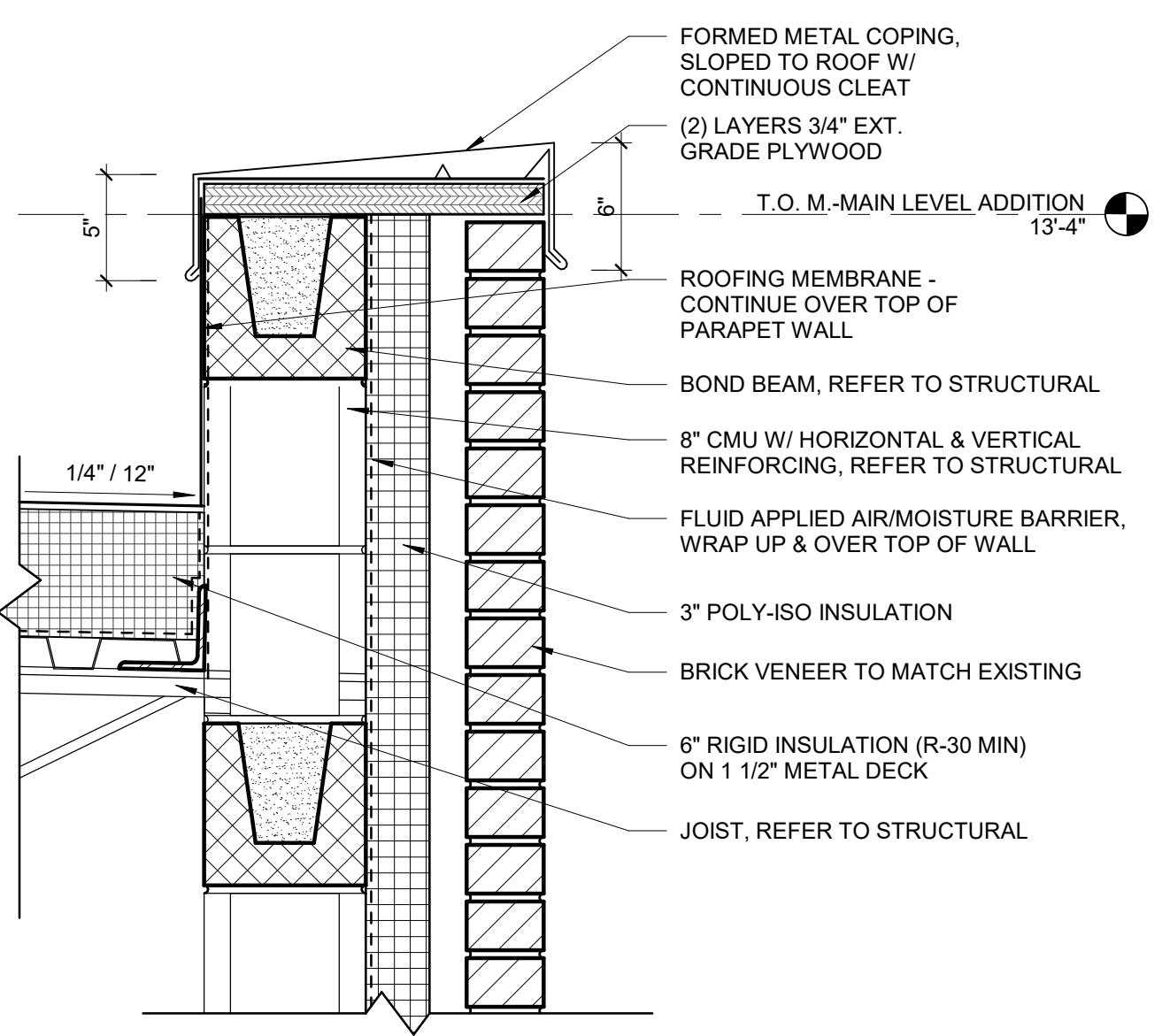
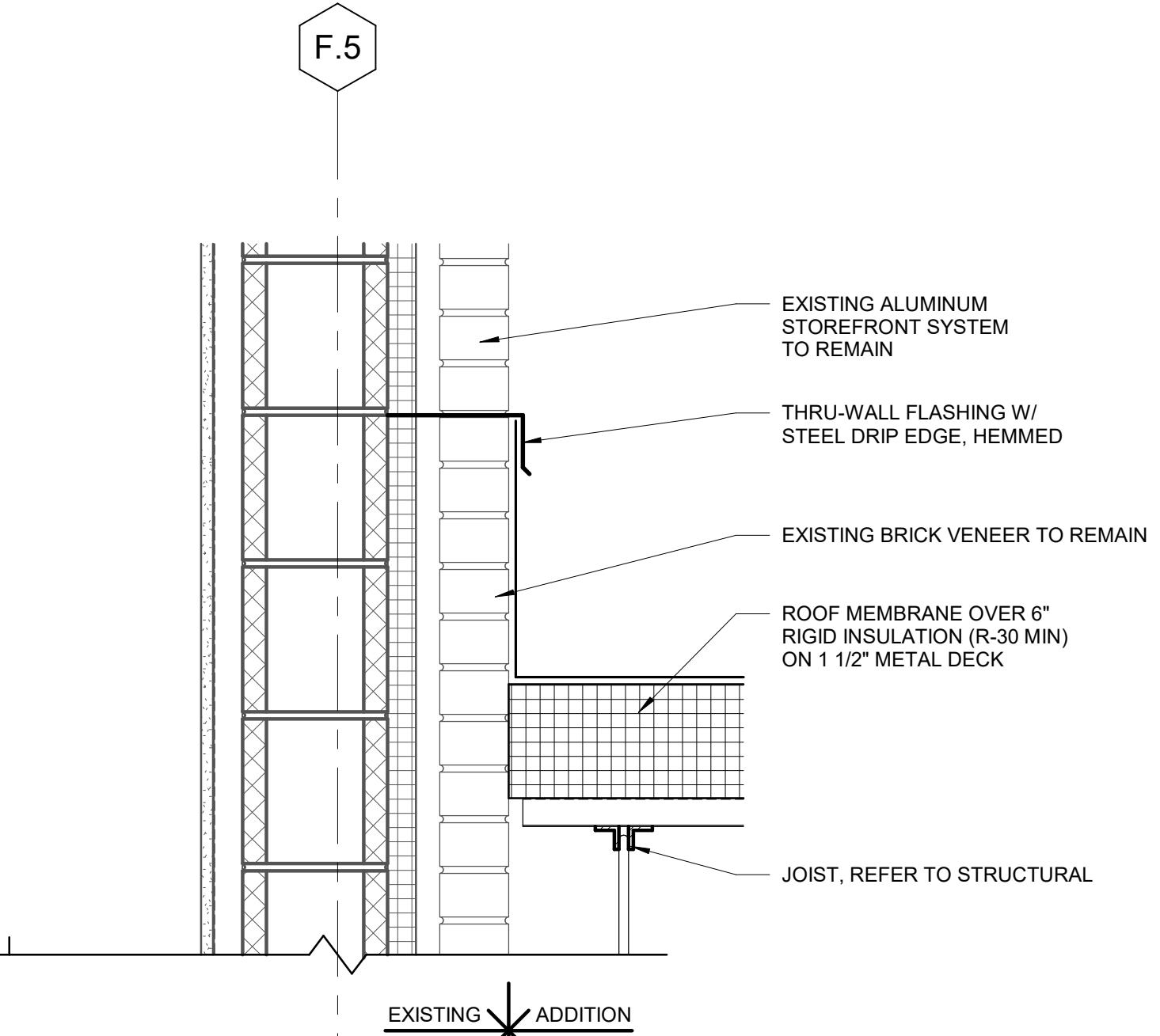
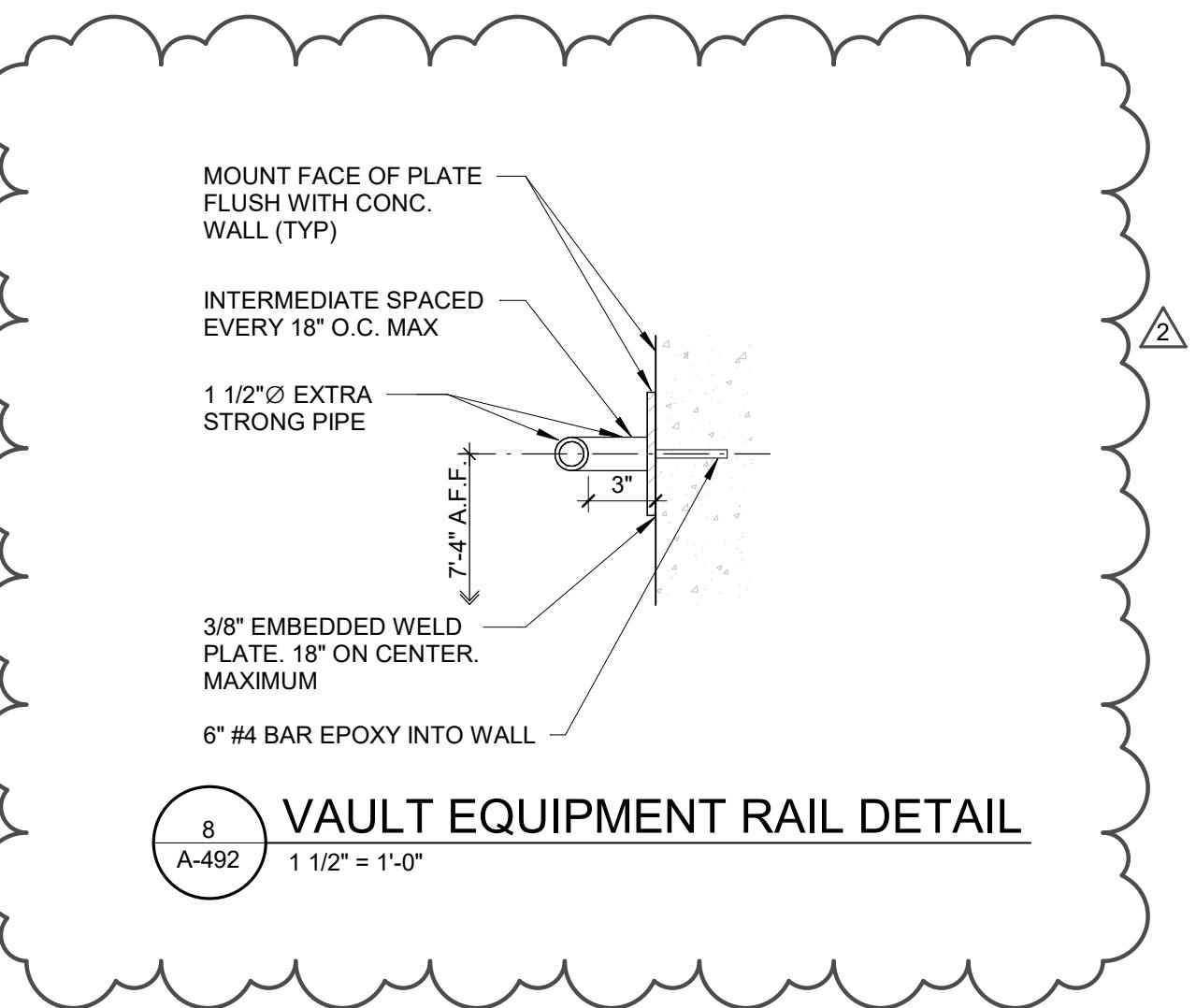


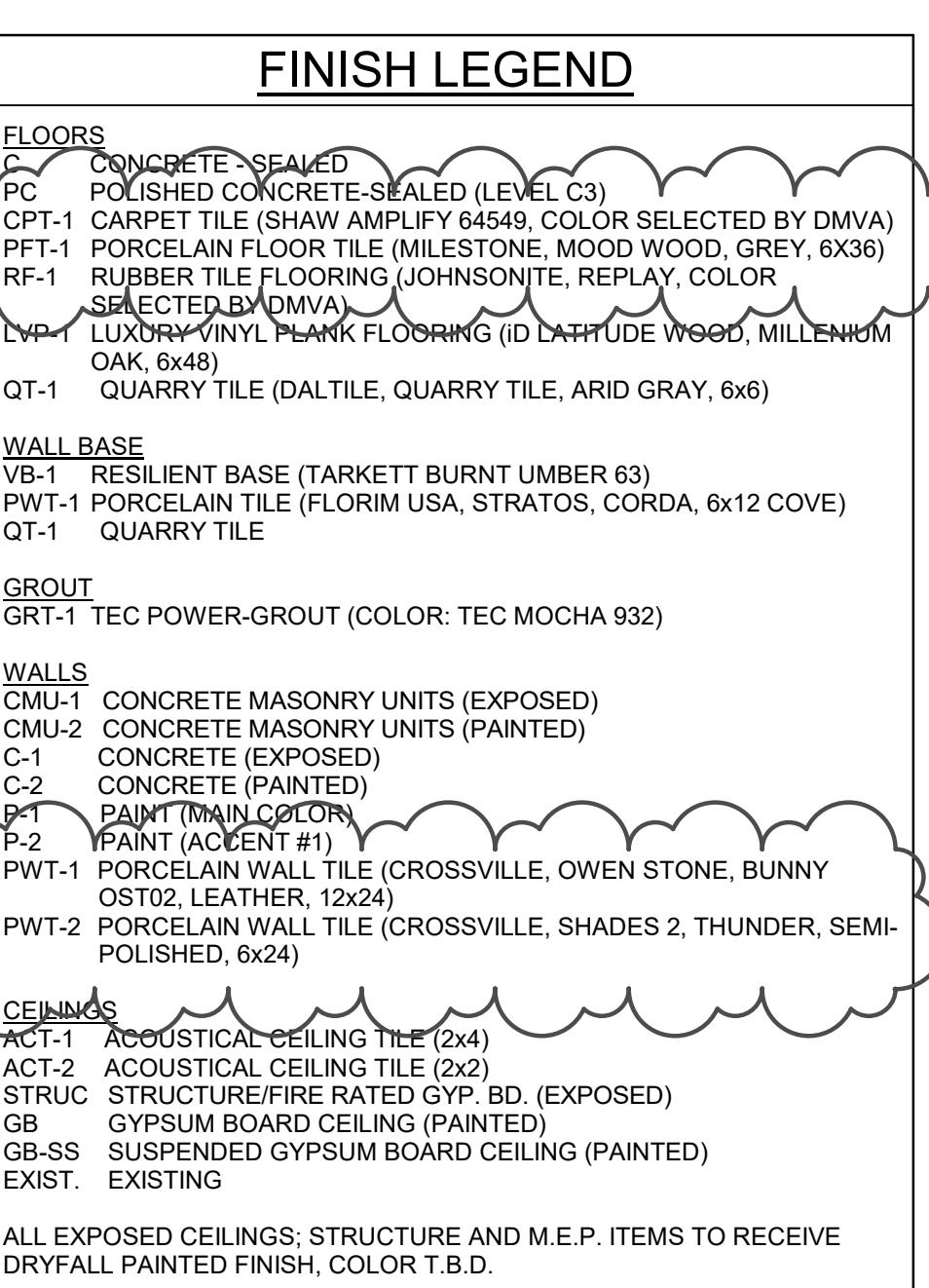


RENOVATE ARMORY, JACKSON (WEST) ARMORY  
DEPARTMENT OF MILITARY AND VETERANS AFFAIRS  
2700 W ARGYLE ST., JACKSON, MI

2025

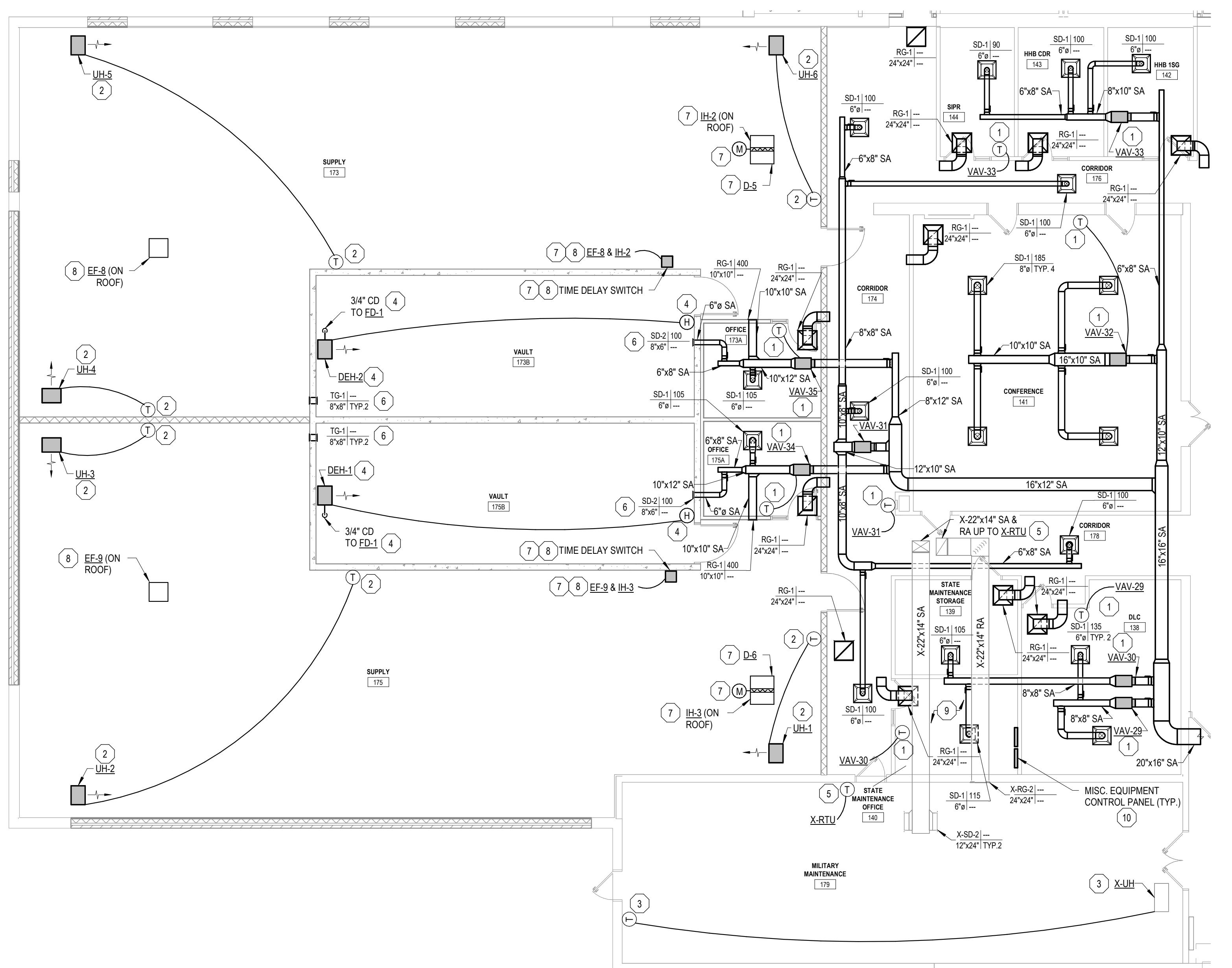


RM. NO.	RM. NM.	FLOOR	BASE	WALL				CEILING	REMARKS
				N	S	E	W		
010	DRILL HALL	PC	-	CMU-2	CMU-2	CMU-2	P	ACT-1	
011	TABLES AND CHAIRS	C	-	CMU-1	C-1	CMU-1	P	STRUC.	2,13
012	STORAGE	C	-	CMU-1	C-1	CMU-1	CMU-1/C-1	STRUC.	2,13
013	KITCHEN	QT	QT	CMU-2	CMU-2/C-2	CMU-2	CMU-2	GB-SS	5
013A	OFFICE	QT	QT	CMU-2	CMU-2/C-2	CMU-2	CMU-2	GB-SS	
013B	TOILET	PFT	PWT	CMU-2	CMU-2	CMU-2	CMU-2	GB-SS	
014	CORRIDOR	PC	VB	CMU-2	P	P	-	STRUC.	
015	PES	C	VB	P	P	P	P	STRUC.	2
016	STORAGE	C	VB	P	P	P	P	ACT-1	2
017	PHYSICAL TRAINING	RF	VB	P	P	P	P	STRUC.	
018	WOMEN'S	PFT	PWT	PWT	PWT	PWT	PWT	GB-SS	4,12
018A	WOMEN'S LOCKER	PFT	PWT	PWT	PWT	PWT	PWT	GB-SS	4,12
019	MEN'S	PFT	PWT	PWT	PWT	PWT	PWT	GB-SS	4,12
019A	MEN'S LOCKER	PFT	PWT	PWT	PWT	PWT	PWT	GB-SS	4,12
020	CORRIDOR	C	VB	P	P	P	P	ACT-1	2
021	MECH	-	-	-	-	-	-	EXIST.	
022	ELEV. MECH	-	-	-	-	-	-	EXIST.	
100	VEST.	-	-	-	-	-	-	EXIST.	
101	LOBBY	LVP	VB	P	-	-	P	ACT-2	
101A	CORRIDOR	LVP	VB	P	P	-	-	ACT-2	
102	COMM	SAT	VB	-	-	-	-	EXIST.	
103	WOMEN'S	PFT	PWT	PWT	PWT	PWT	PWT	GB-SS	4,12
104	MEN'S	PFT	PWT	PWT	PWT	PWT	PWT	GB-SS	4,12
105	CLASSROOM	OPT	VB	P	P	P	P	ACT-2	
106	BREAK ROOM	LVP	VB	CMU-2	P	CMU-2	CMU-2	ACT-1	8,9
107	HHC ADMIN RECRUIT	OPT	VB	P	P	P	-	ACT-1	
108	CHAPLAIN FAMILY SUPPORT	CPT	VB	P	-	P	-	ACT-1	
109	MED	CPT	VB	P	P	P	P	ACT-1	
110	S1	CPT	VB	P	-	-	P	ACT-1	
111	CONF.	CPT	VB	P	P	P	P	ACT-1	
112	HHC 1 SGT	CPT	VB	-	-	-	-	EXIST.	
113	S1 OIC	CPT	VB	-	-	-	-	EXIST.	
114	JAG	CPT	VB	-	-	-	-	EXIST.	
115	S6	CPT	VB	-	-	-	-	EXIST.	
117	SIPR	CPT	VB	-	-	-	-	EXIST.	
117A	SERVER	CPT	VB	P	-	-	P	ACT-1	
119	OFFICE	CPT	VB	-	-	-	-	EXIST.	
120	CORRIDOR	CPT	VB	P	P	-	P	ACT-1	
121	CORRIDOR	CPT	VB	-	-	P	P	ACT-1	
122	CONFERENCE	CPT	VB	P	-	-	P	ACT-1	
123	OPEN WORK SPACE	CPT	VB	-	P	-	-	ACT-1	
124	CSM	CPT	VB	P	-	-	P	ACT-1	
125	OIC	CPT	VB	-	-	-	-	EXIST.	
126	BDE CDR	CPT	VB	-	-	-	-	EXIST.	
127	TNG OFF	CPT	VB	-	-	-	-	EXIST.	
128	MDAY S3/DCOM	CPT	VB	-	-	-	-	EXIST.	
129	OPS SGM	CPT	VB	-	-	-	-	EXIST.	
130	S6	CPT	VB	P	-	P	-	ACT-1	
131	117 HHC BDE	CPT	VB	-	-	-	-	ACT-1	
132	S4 OIC	CPT	VB	-	-	-	-	EXIST.	
133	LACTATION	LVP	VB	P	P	P	P	ACT-1	
134	MED	CPT	VB	P	P	P	P	ACT-1	
135	JAN	C	VB	P	P	P	-	ACT-1	2,6
136	MVA	CPT	VB	P	P	P	P	ACT-1	
137	CORRIDOR	CPT	VB	-	P	-	-	ACT-1	
138	DLC	CPT	VB	P	P	P	P	EXIST.	
139	STATE MAINTENANCE STORAGE	CPT	VB	-	-	-	-	EXIST.	
140	STATE MAINTENANCE OFFICE	CPT	VB	-	-	-	-	EXIST.	
141	CONFERENCE	CPT	VB	-	-	-	-	EXIST.	
142	HHB 1SG	-	-	-	-	-	-	EXIST.	
143	HHB CDR	-	-	-	-	-	-	EXIST.	
144	SIPR	-	-	-	-	-	-	EXIST.	
145	HHB READINESS	-	-	-	-	-	-	EXIST.	
146	MED	-	-	-	-	-	-	EXIST.	
147	MED READINESS	-	-	-	-	-	-	EXIST.	
148	CONFERENCE	CPT	VB	CMU-2	-	CMU-2	-	ACT-1	
149	MDAY	-	-	-	-	-	-	EXIST.	
150	S6-SECTION	-	-	-	-	-	-	EXIST.	
151	S6	-	-	-	-	-	-	EXIST.	
152	S3-SECTION	-	-	-	-	-	-	EXIST.	
153	S1	-	-	-	-	-	-	EXIST.	
154	S4-SECTION	-	-	-	-	-	-	EXIST.	
155	S3	-	-	-	-	-	-	EXIST.	
156	OIC	-	-	-	-	-	-	EXIST.	
157	S4	-	-	-	-	-	-	EXIST.	
158	OPS NCO	-	-	-	-	-	-	EXIST.	
159	BTN CMDR	-	-	-	-	-	-	EXIST.	
160	S1-SECTION	-	-	-	-	-	-	EXIST.	
161	BTN SGM	-	-	-	-	-	-	EXIST.	
162	S2-SECTION	-	-	-	-	-	-	EXIST.	
163	S1NCO	-	-	-	-	-	-	EXIST.	
164	CHAPLAIN	-	-	-	-	-	-	EXIST.	
165	S2	-	-	-	-	-	-	EXIST.	
166	WOMEN	-	-	-	-	-	-	EXIST.	
167	MDAY	-	-	-	-	-	-	EXIST.	
168	CORRIDOR	-	-	-	-	-	-	EXIST.	
169	MEN	-	-	-	-	-	-	EXIST.	
170	OPEN WORK SPACE	-	-	-	-	-	-	EXIST.	
171	STORAGE	-	-	-	-	-	-	EXIST.	
172	CORRIDOR	-	-	-	-	-	-	EXIST.	
173	SUPPLY	C	VB	-	P/C-1	P	-	STRUC.	2
173A	OFFICE	CPT	VB	P	P	P	P	ACT-1	
173B	VAULT	C	VB	C-1	C-1	C-1	C-1	STRUC.	2,13
174	CORRIDOR	PC	VB	-	-	P	-	ACT-1	
175	SUPPLY	C	VB	P/C-1	-	P	-	STRUC.	2
175A	OFFICE	CPT	VB	P	P	P	P	ACT-1	
175B	VAULT	C	VB	C-1	C-1	C-1	C-1	STRUC.	2,13
176	CORRIDOR	LVP	VB	-	-	-	-	ACT-1	
177	CORRIDOR	LVP	VB	-	-	PT	-	ACT-1	
178	CORRIDOR	LVP	VB	-	-	-	-	ACT-1	
179	MILITARY MAINTENANCE	-	-	-	-	-	-	EXIST.	
180	CORRIDOR	-	-	-	-	-	-	EXIST.	
181	MECHANICAL	-	-	-	-	-	-	EXIST.	
181A	ELECTRICAL	-	-	-	-	-	-	EXIST.	
A	STAIRS	-	-	-	-	-	-	EXIST.	
B	EXIST. STAIRS	-	-	-	-	-	-	EXIST.	
C	STAIRS	C	VB	CMU-2	PT	CMU-2	CMU-2	ACT-1	2









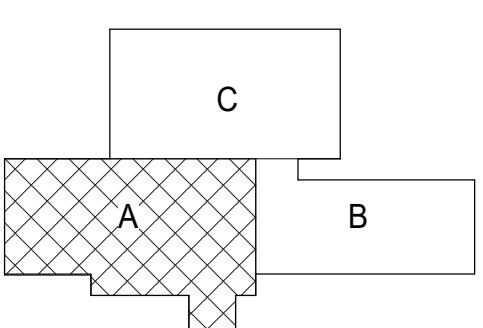
WEST WING - FIRST FLOOR PLAN - MECHANICAL NEW  
SCALE: 1/8" = 1'-0"

## GENERAL MECHANICAL NOTES

1. INSTALL NEW SUPPLY DUCTWORK, RETURN DUCTWORK, EXHAUST DUCTWORK, DIFFUSERS/GRILLES, FITTINGS, HANGERS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN.
2. INSTALL ALL NEW EQUIPMENT PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ENSURE ALL MANUFACTURER REQUIRED CLEARANCES ARE MAINTAINED.
3. INSTALL NEW VAV BOXES CONCEALED IN THE ABOVE CEILING SPACE.
4. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT/COMPONENTS TO CONNECT ALL NEW EQUIPMENT TO NEW DDC CONTROL PANEL AND NEW BAS. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT/COMPONENTS NEEDED TO INTEGRATE NEW EQUIPMENT ON TO THE NEW BAS FRONT END GRAPHICS.
5. ALL NEW CONTROL WIRING IS TO BE CONCEALED WITHIN WALLS, ABOVE CEILING SPACES, OR MECHANICAL SPACES.
6. CONTRACTOR TO PATCH EXISTING WALLS/CEILINGS AS NEEDED TO MATCH EXISTING WHERE DEMOLITION AND/OR NEW WORK IS COMPLETED.
7. IN THE LOCATION WHERE NEW VAV BOXES ARE INSTALLED CONTRACTOR TO PROVIDE LABELS AND INDICATOR ARROWS ON CEILING GRID TO INDICATE THE LOCATION OF THE NEW VAV BOXES.

## MECHANICAL KEY NOTES

1. INSTALL NEW VAV BOX, DUCTWORK, THERMOSTAT, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONNECT NEW VAV BOX AND ALL CONTROLS TO NEW LOWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW VAV BOX ON THE BAS FRONT END GRAPHICS.
2. INSTALL NEW HYDROSTATIC UNIT HEATER, THERMOSTAT, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONNECT NEW HYDROSTATIC UNIT HEATER AND ALL CONTROLS TO NEW LOWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW HYDROSTATIC UNIT HEATER ON THE BAS FRONT END GRAPHICS.
3. INSTALL NEW UNIT HEATER CONTROLS, CONTROL WIRING, THERMOSTAT, SUPPORTS, HANGERS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN FOR EXISTING UNIT HEATER PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONNECT EXISTING UNIT HEATER AND ALL CONTROLS TO NEW LOWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW UNIT HEATER ON THE BAS FRONT END GRAPHICS.
4. INSTALL NEW DEHUMIDIFIER, HUMIDISTAT, CONTROLS, CONTROL WIRING, SUPPORTS, HANGERS, AND ALL ASSOCIATED ACCESSORIES PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONNECT NEW DEHUMIDIFIER AND ALL CONTROLS TO NEW LOWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW DEHUMIDIFIER ON THE BAS FRONT END GRAPHICS.
5. INSTALL NEW ROOF TOP UNIT CONTROLS, CONTROL WIRING, THERMOSTAT, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS ON EXISTING ROOF TOP CURB. CONNECT EXISTING ROOF TOP UNIT AND ALL CONTROLS TO NEW LOWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE ROOFTOP UNIT ON THE BAS FRONT END GRAPHICS.
6. INSTALL SECURITY BARS ON ALL SUPPLY AND TRANSFER GRILLES INTO VAULT.
7. INSTALL NEW INTAKE HOOD, ROOF CURB, CONTROLS, CONTROL WIRING, TIME DELAY SWITCH, DAMPER, DAMPER ACTUATOR, SECURITY GRILLES, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL BIRD SCREEN ON OPENING IN OCCUPIED SPACE. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW DAMPER ON THE BAS FRONT END GRAPHICS. TIME DELAY SWITCH IS TO OVERRIDE INTAKE HOOD SEQUENCE OF OPERATIONS.
8. INSTALL NEW ROOF MOUNTED EXHAUST FAN, DUCTWORK, ROOF CURB, CONTROLS, CONTROL WIRING, TIME DELAY SWITCH, SECURITY GRILLES, AND ALL ASSOCIATED ACCESSORIES IN LOCATION SHOWN PER MANUFACTURER'S INSTRUCTIONS. INSTALL BIRD SCREEN ON OPENING IN OCCUPIED SPACE. CONNECT NEW ROOF MOUNTED EXHAUST FAN AND ALL CONTROLS TO NEW DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW ROOF MOUNTED EXHAUST FAN ON THE BAS FRONT END GRAPHICS. TIME DELAY SWITCH IS TO OVERRIDE ROOF MOUNTED EXHAUST FAN SEQUENCE OF OPERATIONS.
9. CONTRACTOR TO PROVIDE LAPTOP THAT ALLOWS CONNECTION TO THE BAS FRONT END GRAPHICS AND IS TO BE INSTALLED AT THE WORK STATION IN STATE MAINTENANCE OFFICE 140. LAPTOP IS TO BE CAPABLE OF USER TO MONITOR/ADJUST BAS FRONT END GRAPHIC SET POINT FROM THE WORK STATION IN STATE MAINTENANCE OFFICE 140.
10. INSTALL NEW LOWORKS DDC CONTROL PANEL, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO CONNECT THE DDC CONTROL PANEL TO THE BAS. CONTROL PANELS TO HAVE A MAXIMUM OF THREE DDC CONTROLLERS.



## GAS LOAD SUMMARY

B-1 - 3000 CFH - GAS PRESSURE 4" TO 14" W.C.  
 B-2 - 3000 CFH - GAS PRESSURE 4" TO 14" W.C.  
 X-B - 60 CFH - GAS PRESSURE 4" TO 14" W.C.  
 KITCHEN RANGE - 310 CFH - GAS PRESSURE 4" TO 14" W.C.  
 KITCHEN OVEN - 120 CFH - GAS PRESSURE 4" TO 14" W.C.  
 TOTAL = 6490 CFH @ 7" W.C.

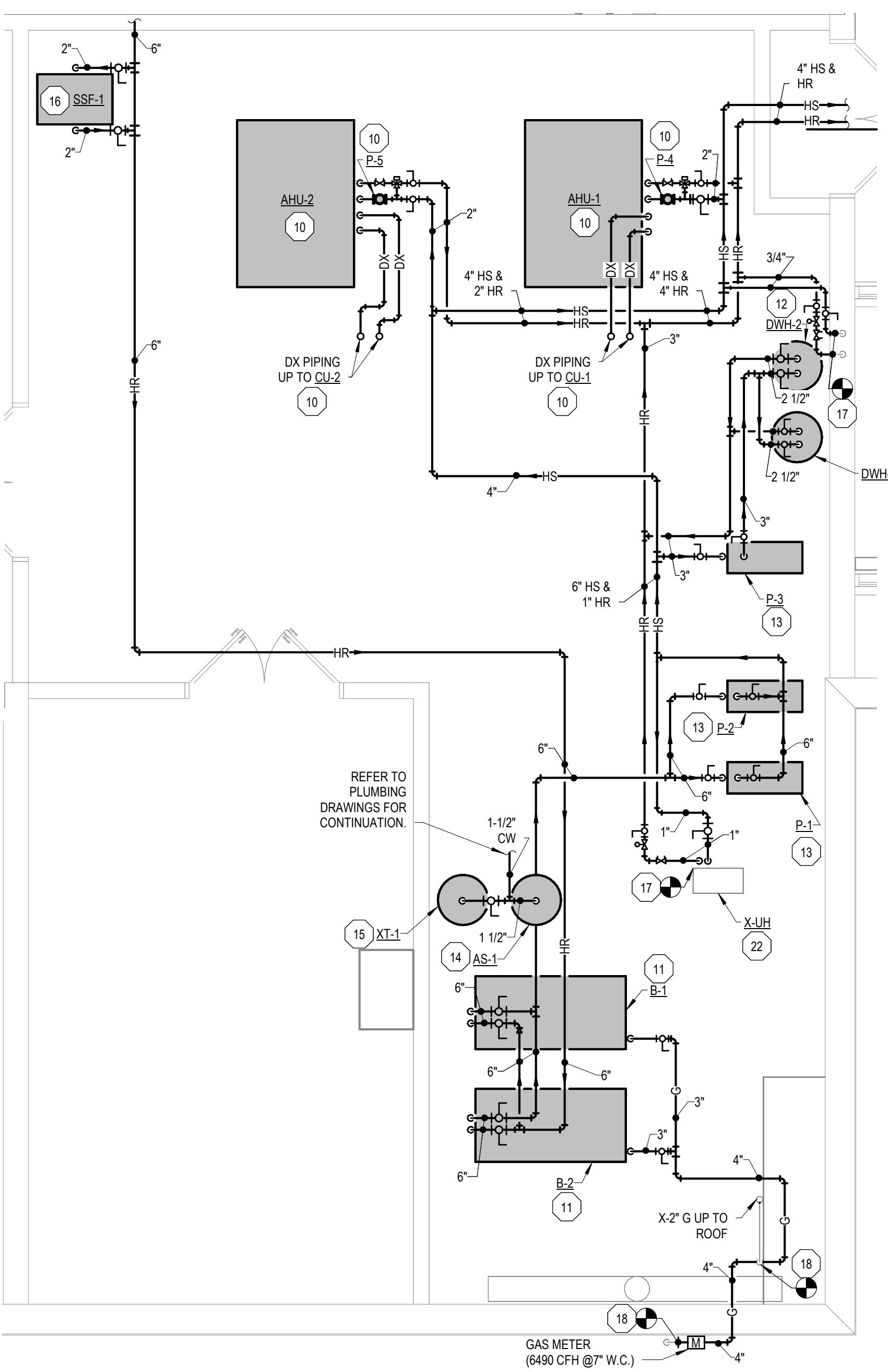


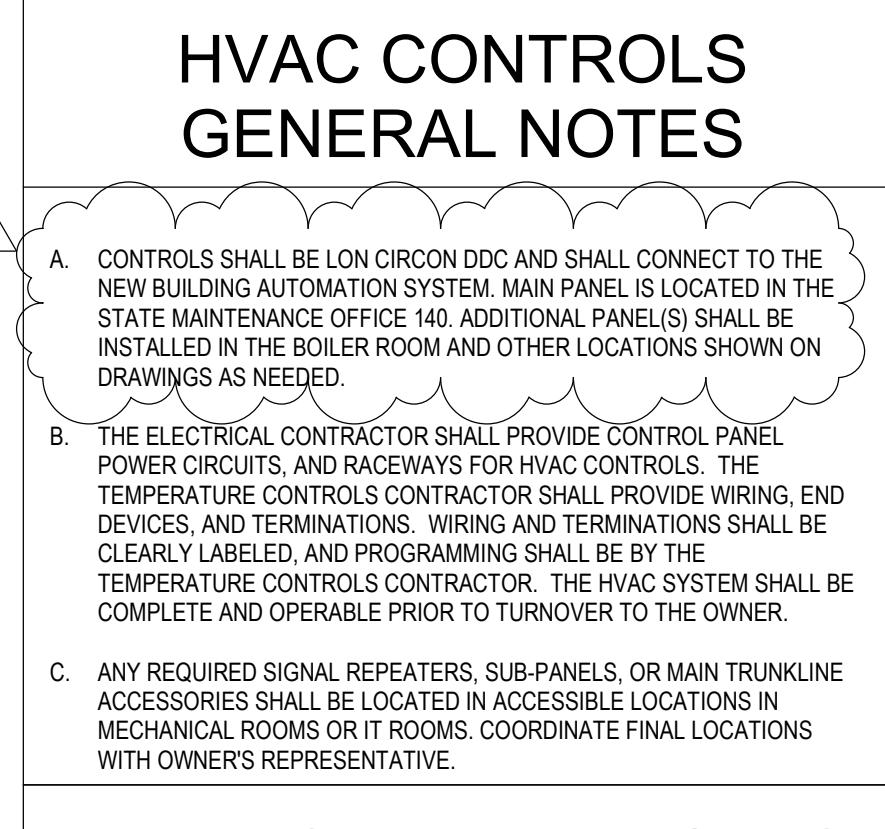
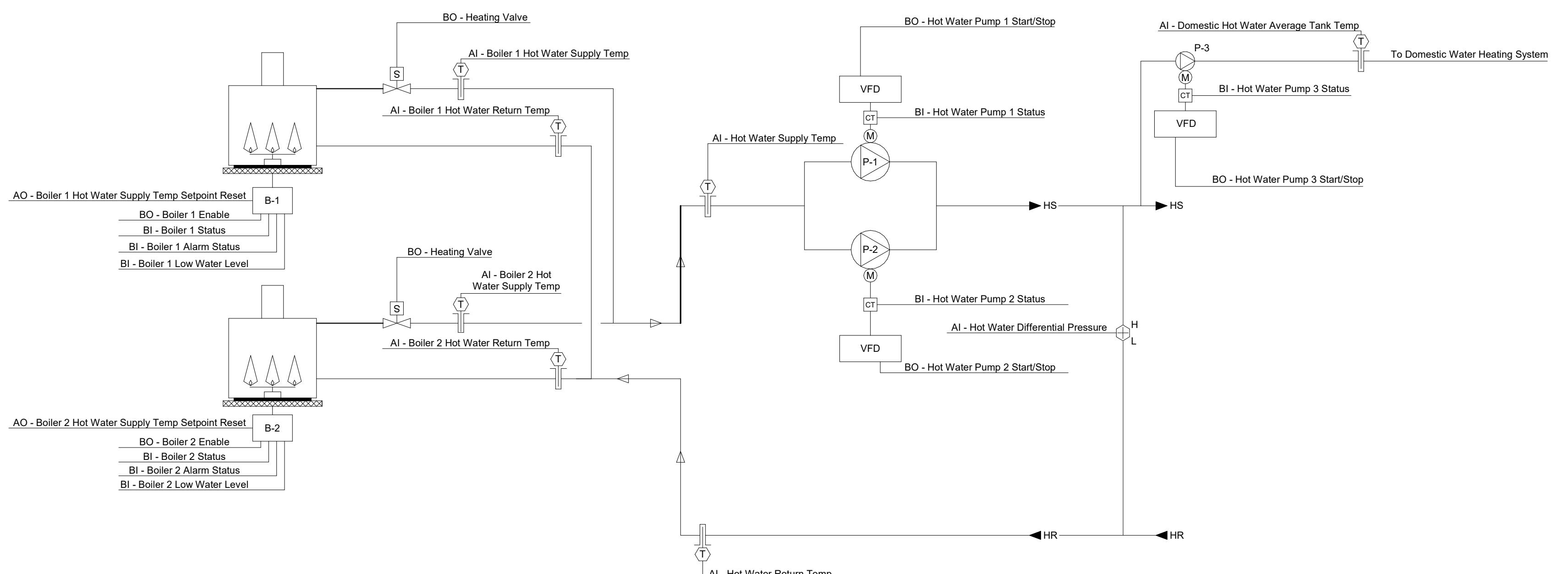
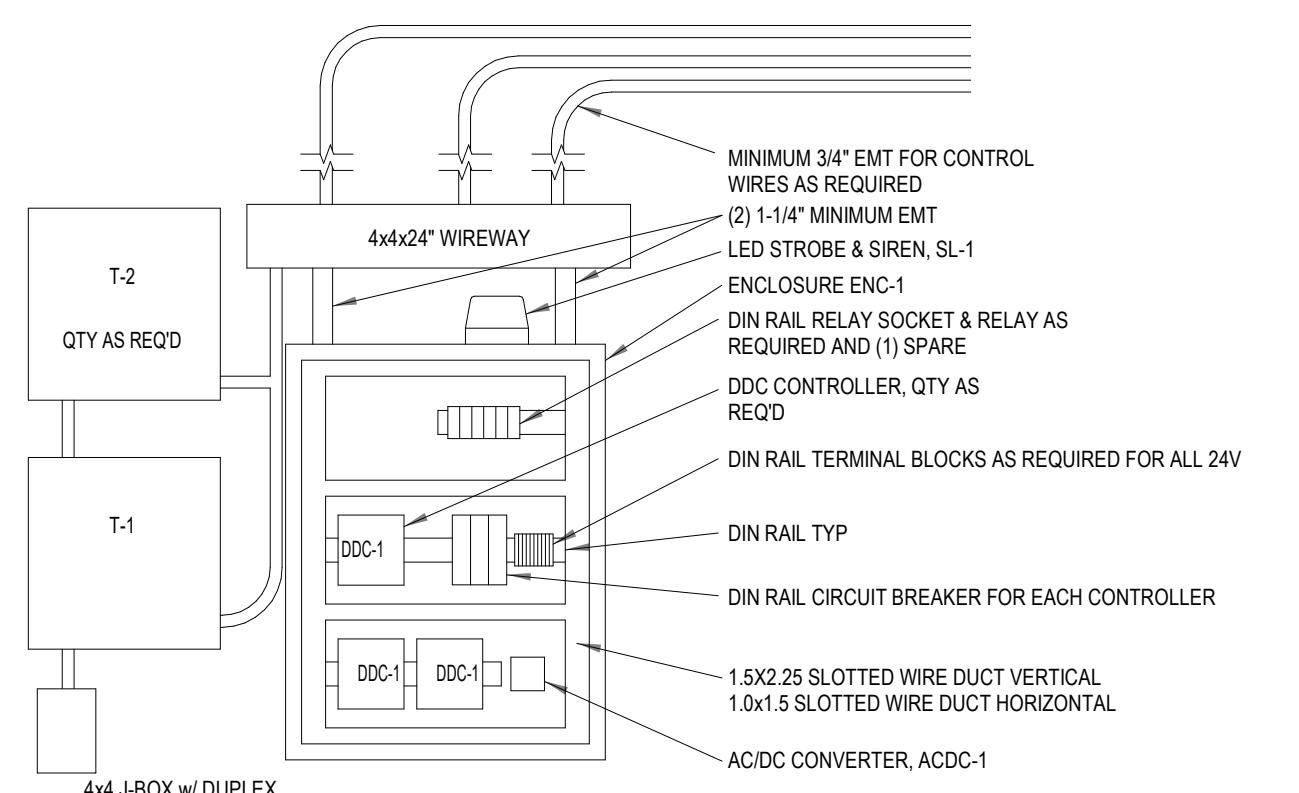
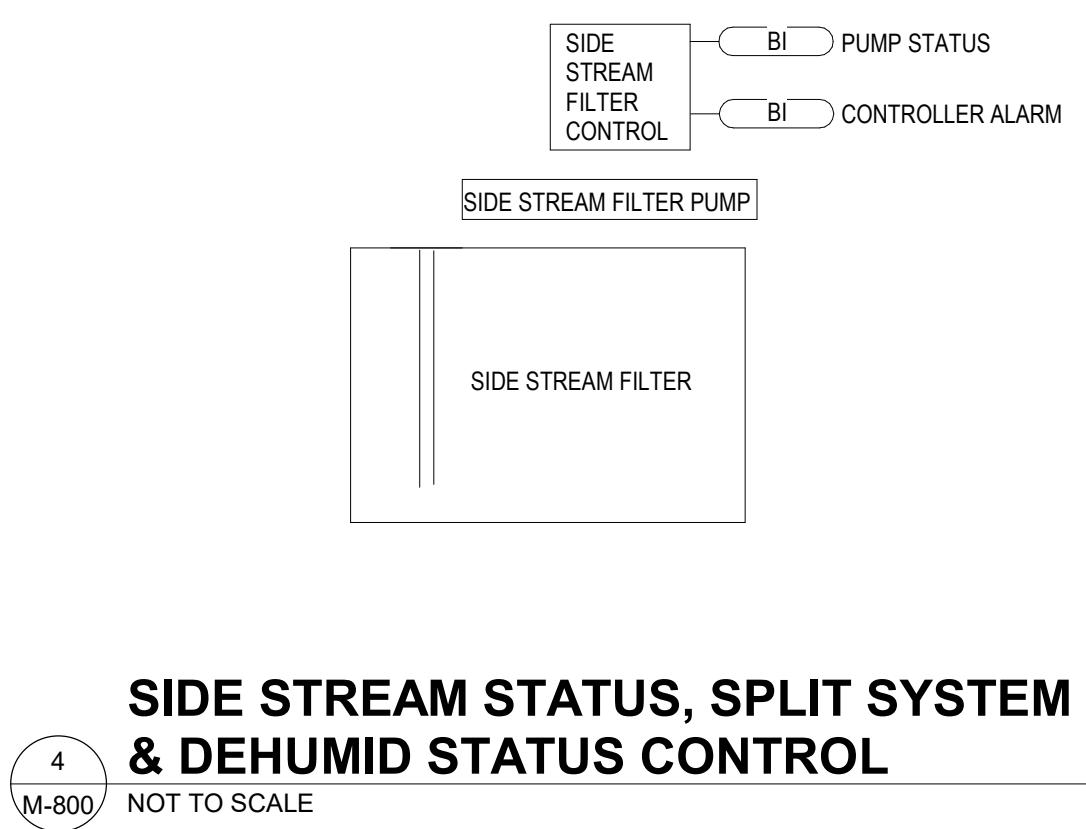
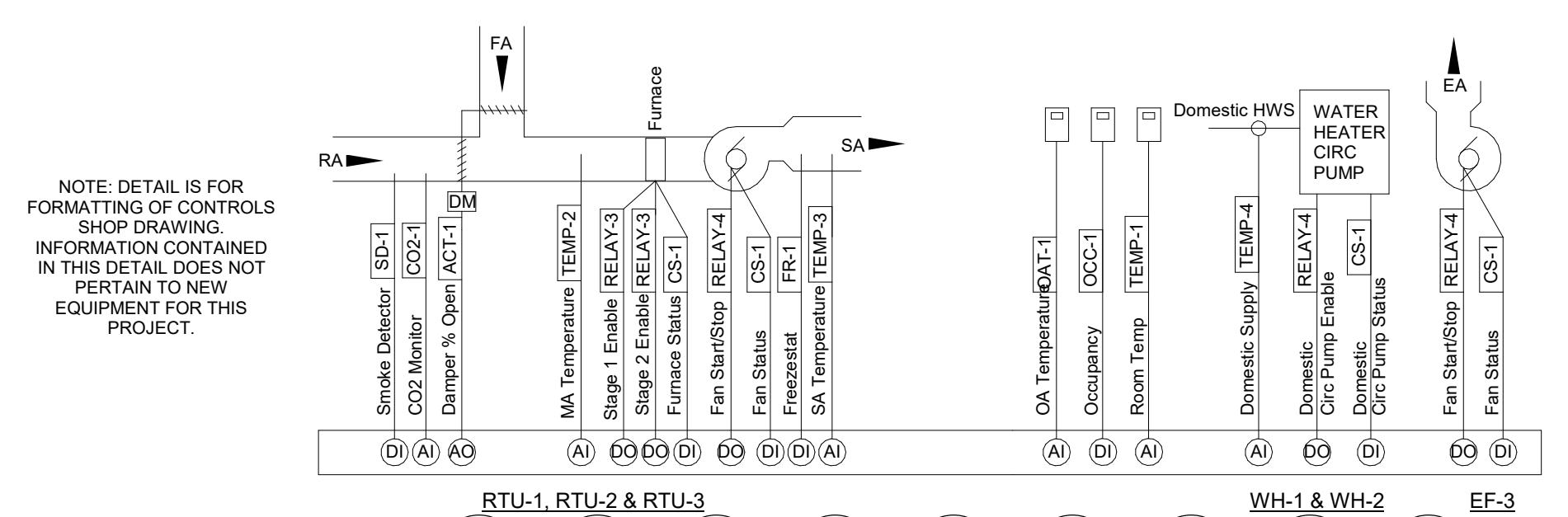
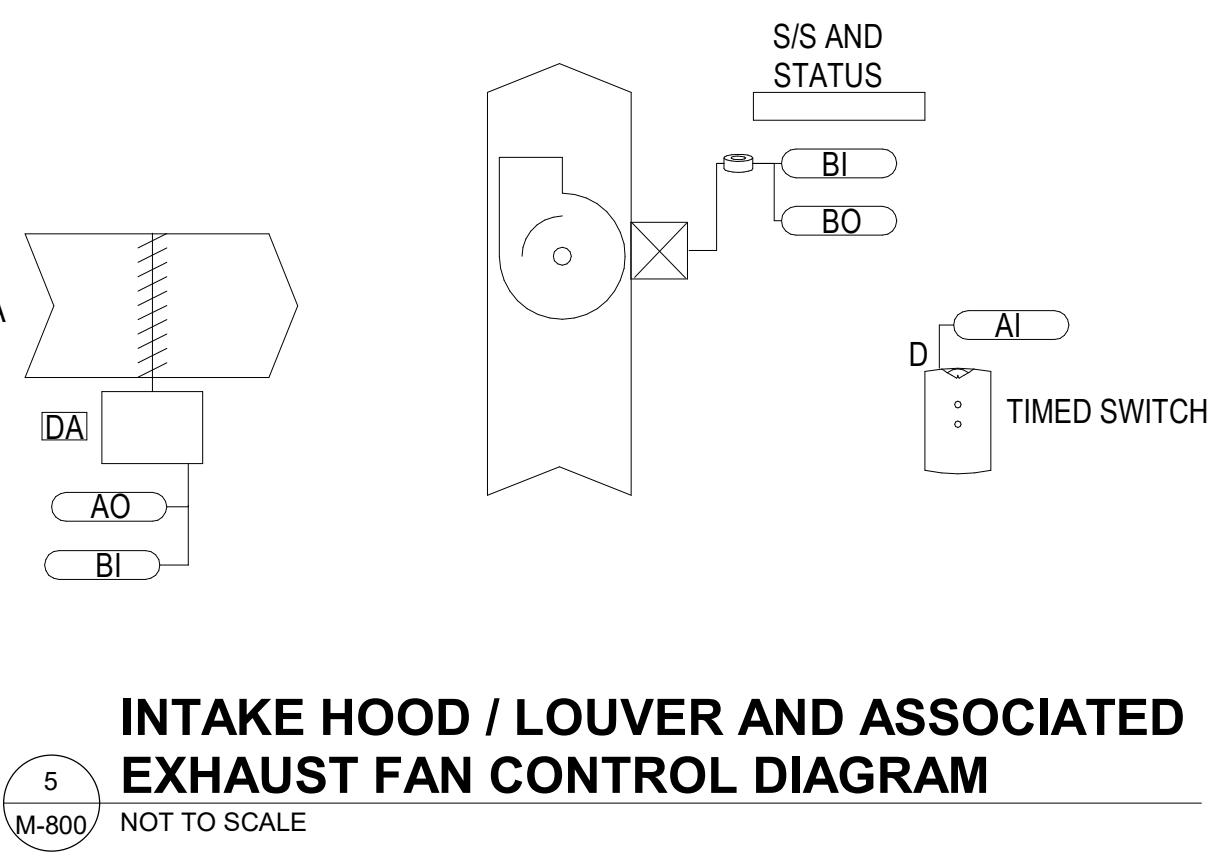
## GENERAL MECHANICAL NOTES

1. INSTALL ALL NEW EQUIPMENT PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ENSURE ALL MANUFACTURER REQUIRED CLEARANCES ARE MAINTAINED.
2. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT/COMPONENTS TO CONNECT ALL NEW EQUIPMENT TO NEW DDC CONTROL PANEL AND NEW BAS. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT/COMPONENTS NEEDED TO INTEGRATE NEW EQUIPMENT ON TO THE NEW BAS FRONT END GRAPHICS.
3. CONTRACTOR TO SIZE CONTROL VALVES AND BALANCE FLOW RATES TO MATCH THE FLOW RATES CALLED OUT IN THE EQUIPMENT SCHEDULES.
4. CONTROL PANELS FOR MAJOR PIECES OF EQUIPMENT ARE SHOWN ON MECHANICAL ROOM FLOOR PLAN. CONTROL PANEL LAYOUT IS SCHEMATIC. CONTRACTOR TO INSTALL NEW DDC CONTROL PANELS AS REQUIRED TO CONNECT ALL NEW EQUIPMENT AND MEET DMVA CONTROL PANEL REQUIREMENTS.

## MECHANICAL KEY NOTES

1. INSTALL NEW AIR HANDLING UNIT, CONCRETE PAD, DUCTWORK, DAMPERS, ACTUATORS, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL NEW AIR HANDLING UNIT ON 4" THICK CONCRETE PAD WITH 4" OVERLAP IN ALL DIRECTIONS. ENSURE ALL REQUIRED CLEARANCES FOR THE NEW AIR HANDLING UNIT ARE MET. CONNECT AIR HANDLING UNIT AND ALL CONTROLS TO NEW DDC CONTROLS CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW CONDENSING UNIT ON THE BAS FRONT END GRAPHICS.
2. INSTALL NEW BOILER, COMBUSTION AIR INLET, VENT, CONTROLS, CONCRETE PAD, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTRACTOR TO INSTALL BOILERS ON CONTINUOUS 4" CONCRETE PAD WITH 6" OVERLAP IN ALL DIRECTIONS. INSTALL NEW BOILER COMBUSTION AIR DUCT, VENT, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN. ROUTE COMBUSTION AIR DUCT AND VENT UP THROUGH NEW ROOF CURE AND NEW ROOF BOOT. PATCH ROOF PENETRATION AT LOCATION SHOWN AND WELD TO STRUCTURAL STEEL END OF VENT AND COMBUSTION AIR INLET TO BE FITTED WITH BIRD SCREEN. CONTRACTOR TO CONNECT NEW BOILERS AND ALL CONTROLS TO NEW LOWWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW BOILER ON THE BAS FRONT END GRAPHICS.
3. INSTALL NEW INDIRECT DOMESTIC WATER HEATER, EXPANSION TANK, CONCRETE PAD, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTRACTOR TO INSTALL DOMESTIC WATER HEATERS ON CONTINUOUS 4" THICK CONCRETE PAD WITH 4" OVERLAP IN ALL DIRECTIONS. CONTRACTOR TO CONNECT NEW INDIRECT DOMESTIC WATER HEATERS AND ALL CONTROLS TO NEW LOWWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW INDIRECT DOMESTIC WATER HEATERS ON THE BAS FRONT END GRAPHICS.
4. INSTALL NEW BASE MOUNTED CIRCULATION PUMP, CONCRETE PAD, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL NEW BASE MOUNTED PUMP ON 4" CONCRETE PAD WITH 4" OVERLAP IN ALL DIRECTIONS. CONTRACTOR TO CONNECT PUMPS AND ALL CONTROLS TO NEW LOWWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW BASE MOUNTED PUMP ON THE BAS FRONT END GRAPHICS.
5. INSTALL NEW AIR SEPARATOR AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6. INSTALL NEW EXPANSION TANK, CONCRETE PAD, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL NEW EXPANSION TANK ON NEW 4" THICK CONCRETE PAD WITH 4" OVERLAP IN ALL DIRECTIONS.
7. INSTALL NEW SIDE STREAM FILTER, SKID PACKAGE, CONCRETE PAD, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTRACTOR TO INSTALL SIDE STREAM FILTER SKID PACKAGE ON 4" THICK CONCRETE PAD WITH 4" OVERLAP IN ALL DIRECTIONS. CONTRACTOR TO CONNECT SIDE STREAM FILTER AND ALL CONTROLS TO NEW LOWWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW SIDE STREAM FILTER ON THE BAS FRONT END GRAPHICS.
8. INSTALL NEW LOWWORKS DDC CONTROL PANEL, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO CONNECT THE DDC CONTROL PANEL TO THE BAS. CONTROL PANELS TO HAVE A MAXIMUM OF THREE DDC CONTROLLERS.
9. INSTALL WATER SOFTENER, BRINE TANK CONCRETE PAD, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL NEW WATER SOFTENER ON NEW 4" THICK CONCRETE PAD WITH 4" OVERLAP IN ALL DIRECTIONS.
10. INSTALL NEW AIR HANDLING UNIT, COIL PUMP, PIPING, VALVES, FITTINGS, DX PIPING, CONDENSATE PIPING, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ROUTE NEW CONDENSATE PIPING AND ALL ASSOCIATED ACCESSORIES TO THE NEAREST FLOOR DRAIN. CONNECT AIR HANDLING UNIT, COIL PUMP, AND ALL CONTROLS TO NEW LOWWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW AIR HANDLING UNIT ON THE BAS FRONT END GRAPHICS.
11. INSTALL NEW BOILER, HEATING SUPPLY PIPING, HEATING RETURN PIPING, GAS PIPING, CONDENSATE PIPING, DRAIN PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
12. INSTALL NEW INDIRECT DOMESTIC WATER HEATER, PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
13. INSTALL NEW BASE MOUNTED CIRCULATION PUMP, SUCTION DIFFUSER, PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
14. INSTALL NEW AIR SEPARATOR, PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
15. INSTALL NEW EXPANSION TANK, PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
16. INSTALL NEW SIDE STREAM FILTER, PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
17. INSTALL NEW HEATING SUPPLY PIPING, HEATING RETURN PIPING, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN. MODIFY EXISTING UNIT HEATER/FINTUBE AS REQUIRED TO MAKE NEW CONNECTION.
18. INSTALL NEW GAS PIPING, GAS METER, VALVES, FITTINGS, AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN. MODIFY EXISTING PIPING AS REQUIRED TO MAKE NEW CONNECTION.
19. INSTALL NEW UNIT HEATER CONTROLS, CONTROLS, CONTROL WIRING, AND ALL ASSOCIATED ACCESSORIES FOR EXISTING UNIT HEATER. CONNECT EXISTING UNIT HEATER AND ALL CONTROLS TO NEW LOWWORKS DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE UNIT HEATER TO THE BAS GRAPHICS.
20. INSTALL NEW EPO SWITCH AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
21. INSTALL NEW WALL MOUNTED CARBON MONOXIDE SENSOR (VERIS-AG01 OR APPROVED EQUIVALENT), STROBE LIGHT WITH SIREN (SECU-LARM-SL1301-SAO), AND ALL ASSOCIATED ACCESSORIES IN THE LOCATION SHOWN. NEW CARBON MONOXIDE SENSOR TO MEET BOILER INSPECTION REQUIREMENTS.
22. BALANCE EXISTING UNIT HEATER TO HAVE A FLOW RATE OF 4.1 GPM.
23. INSTALL NEW INTAKE HOOD, CONTROLS, CONTROL WIRING, THERMOSTAT, DAMPER, DAMPER ACTUATOR, AND ALL ASSOCIATED ACCESSORIES IN THEIR ENTHIRY. CONNECT NEW ROOF MOUNTED EXHAUST FAN AND ALL CONTROLS TO NEW DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW DAMPER ON THE BAS FRONT END GRAPHICS.
24. INSTALL NEW ROOF MOUNTED EXHAUST FAN, DUCTWORK, CURB, CONTROLS, CONTROL WIRING, THERMOSTAT, AND ALL ASSOCIATED ACCESSORIES IN THEIR ENTHIRY. CONNECT NEW ROOF MOUNTED EXHAUST FAN AND ALL CONTROLS TO NEW DDC CONTROL PANEL. PROVIDE ALL REQUIRED CONTROLS EQUIPMENT TO INTEGRATE NEW ROOF MOUNTED EXHAUST FAN ON THE BAS FRONT END GRAPHICS.





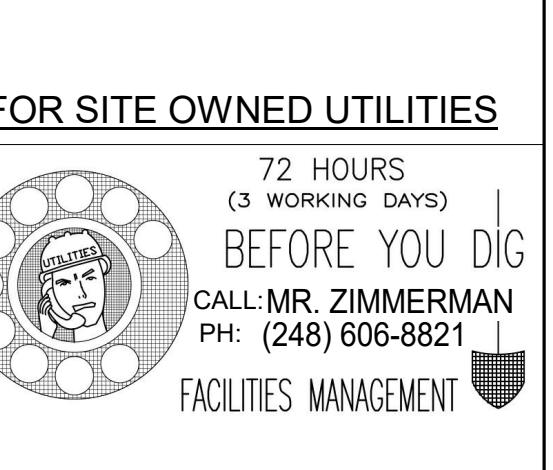
DMVA GENERAL NOTES

- PRIOR TO ANY INSTALLATION OF DDC EQUIPMENT OR DDC WIRING, CONTRACTOR SHALL REQUEST A DDC PRECONSTRUCTION MEETING WITH DMVA ENGINEERING TO DISCUSS CONSTRUCTION SCHEDULING, PRECISE DDC EQUIPMENT LOCATIONS, STARTUPS, LABELING PROCEDURES, AND COMMISSIONING.
- CONTRACTOR MUST FOLLOW A DDC WIRE COLOR SCHEDULE FOR ALL DDC WIRING INSTALLED. THIS SCHEDULE WILL BE AGREED UPON DURING THE PRECONSTRUCTION MEETING.
- CONTRACTOR TO INSTALL A MINIMUM 3/4" CONDUIT FOR ALL DDC WIRING. CONTRACTOR IS ALLOWED TO INSTALL J-HOOKS 4' O.C. FOR DDC CONTROL WIRING ONLY IN AREAS ABOVE A SUSPENDED CEILING. ALL CONDUIT IN WALLS TO BE STUBBED INTO CEILING SPACE.
- CONTRACTOR SHALL PULL ALL DDC WIRING AS SHOWN ON DDC WIRING PLAN AND DDC EQUIPMENT SCHEDULE. ALL WIRES SHALL BE LABELED WITH LABEL MAKER APPROVED BY DMVA ENGINEERING. NO HAND WRITTEN LABELS WILL BE ALLOWED. ALL LABELS LOCATED IN ENCLOSURE ENC-12.3 & 4 MUST BE PLACED 6" DOWN ON WIRE ONCE INSIDE THE ENCLOSURE, DO NOT LOCATE LABEL AT THE END OF WIRE.
- ALL INPUT/OUTPUT CONTROL WIRES TO BE LON RATED, SEE SPECIFICATIONS.
- DDC SEQUENCE AND PROGRAMMING WILL BE COMPLETED BY A DMVA APPROVED CONTROLS SUBCONTRACTOR, SEE SPECIFICATIONS.
- CONTRACTOR TO PURCHASE (1) BUILDING MANAGEMENT WORKSTATION AND TURN OVER TO DMVA ENGINEERING. SEE SPECIFICATIONS FOR FURTHER DETAIL.
- INSTALL TEMPERATURE SENSORS, TEMP-1, 60° AFF.
- INSTALL OCCUPANCY SENSORS, OCC-1, 96° ABOVE FINISHED FLOOR.
- INSTALL ALL QAT-1 ON NORTH FACING EXTERIOR WALL, MAKE WEATHERTIGHT.
- PRINT COPY OF DDC WIRE COLOR SCHEDULE AND SCHEMATIC AND SECURE TO THE BACK OF THE DOOR IN ENC-1,2,3 & 4.
- LABEL ALL MECHANICAL EQUIPMENT TO CORRESPOND TO DDC SCHEMATIC.
- PROVIDE AND INSTALL ALL END DEVICES SHOWN.
- APPROVED CONTROLS CONTRACTORS ARE AS FOLLOWS (IN NO PARTICULAR ORDER):
  - W.J. O'NEILL
  - CONTROLCNET, WEST MICHIGAN BRANCH
  - J.B. ELECTRIC
- SEE SPECIFICATION SECTION 230900 FOR ADDITIONAL INFORMATION. IN THE EVENT OF ANY CONFLICTS BETWEEN THE SEQUENCES/DIAGRAMS AND THE SPECIFICATIONS, THE CONTRACTOR SHALL COMPLY WITH THE SPECIFICATIONS.

Jackson West Armory Renovations

2700 W. Argyle St., Jackson, MI 49202

FOR SITE OWNED UTILITIES



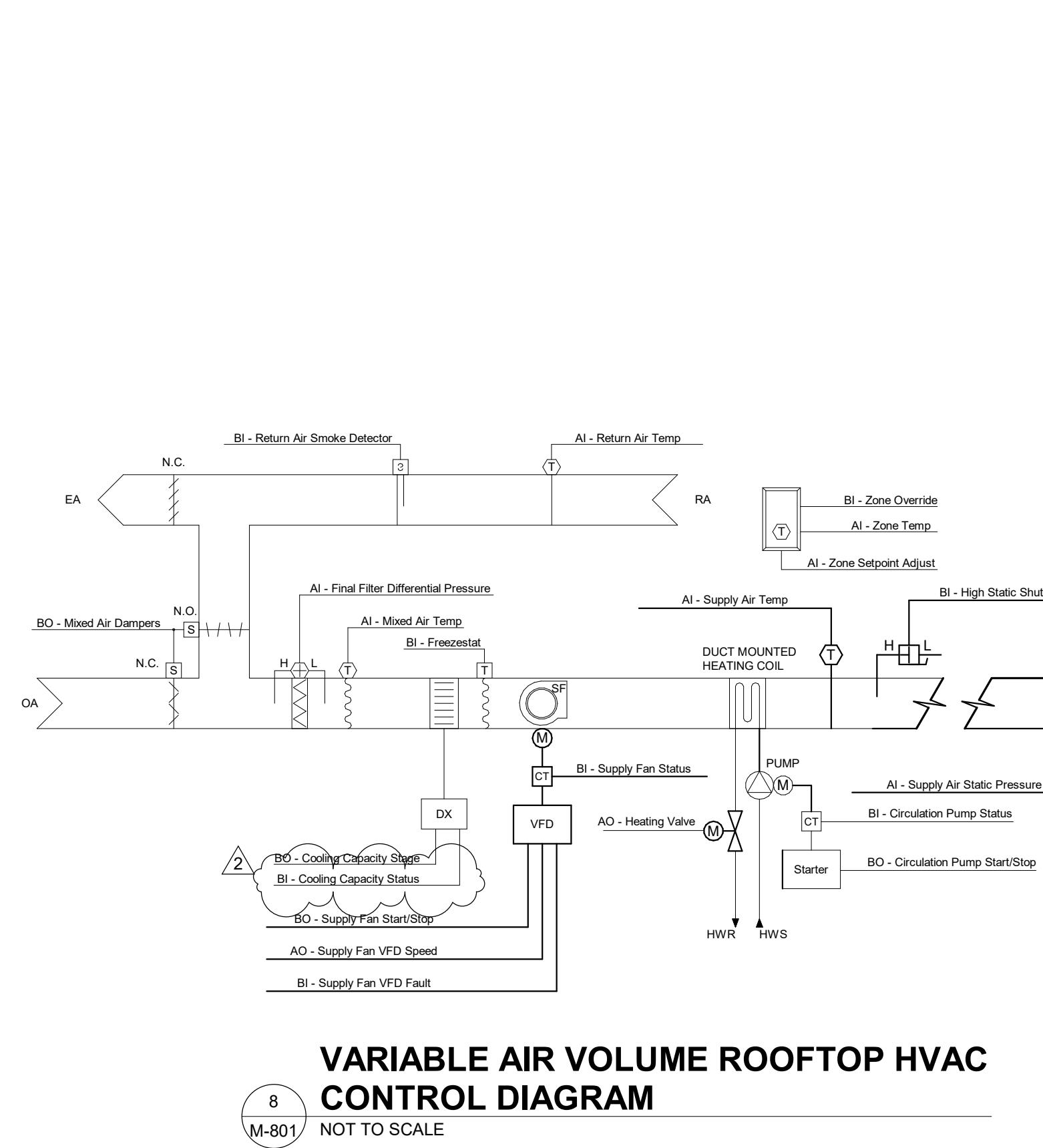
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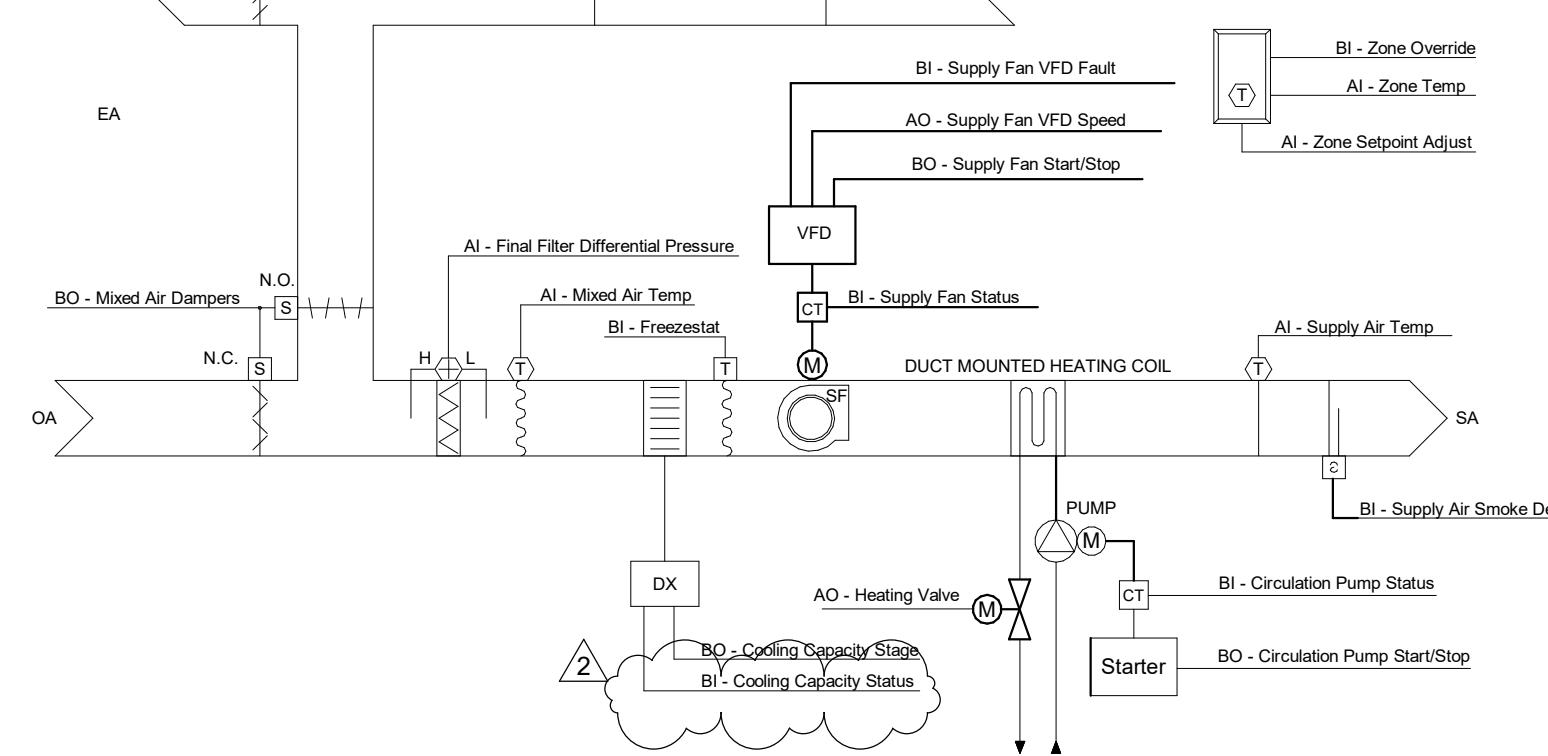
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Author  
CHECKED  
Approver

PRELIMINARY CONSTRUCTION FINAL RECORD

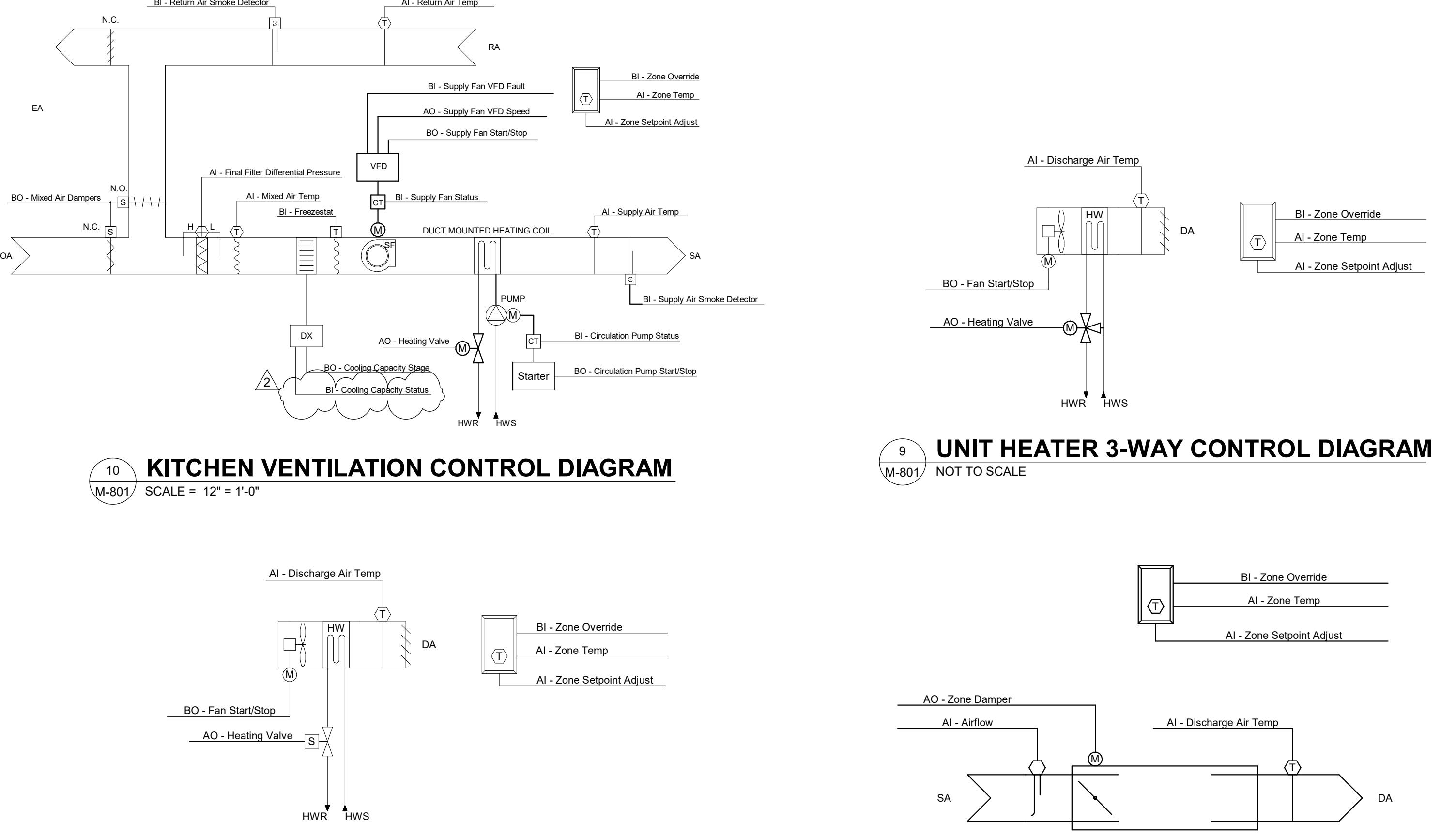
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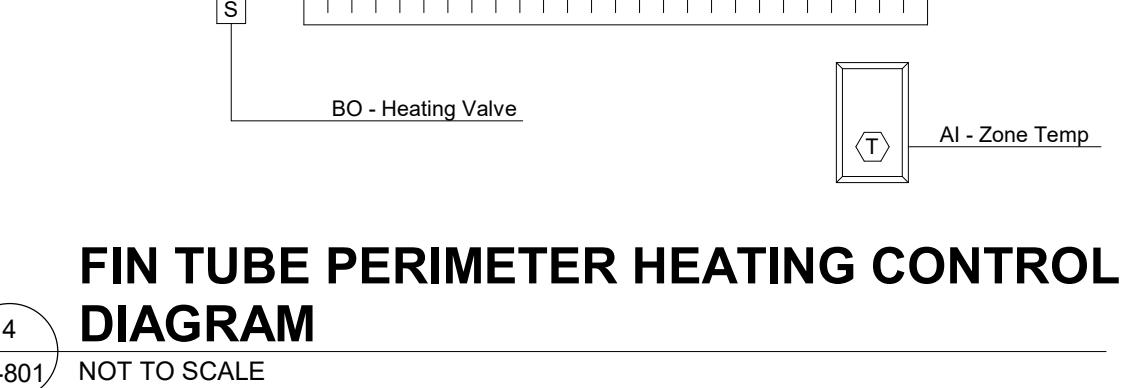
**ENERGY RECOVERY ROOFTOP UNIT COMBO CONTROL DIAGRAM**  
M-801 NOT TO SCALE



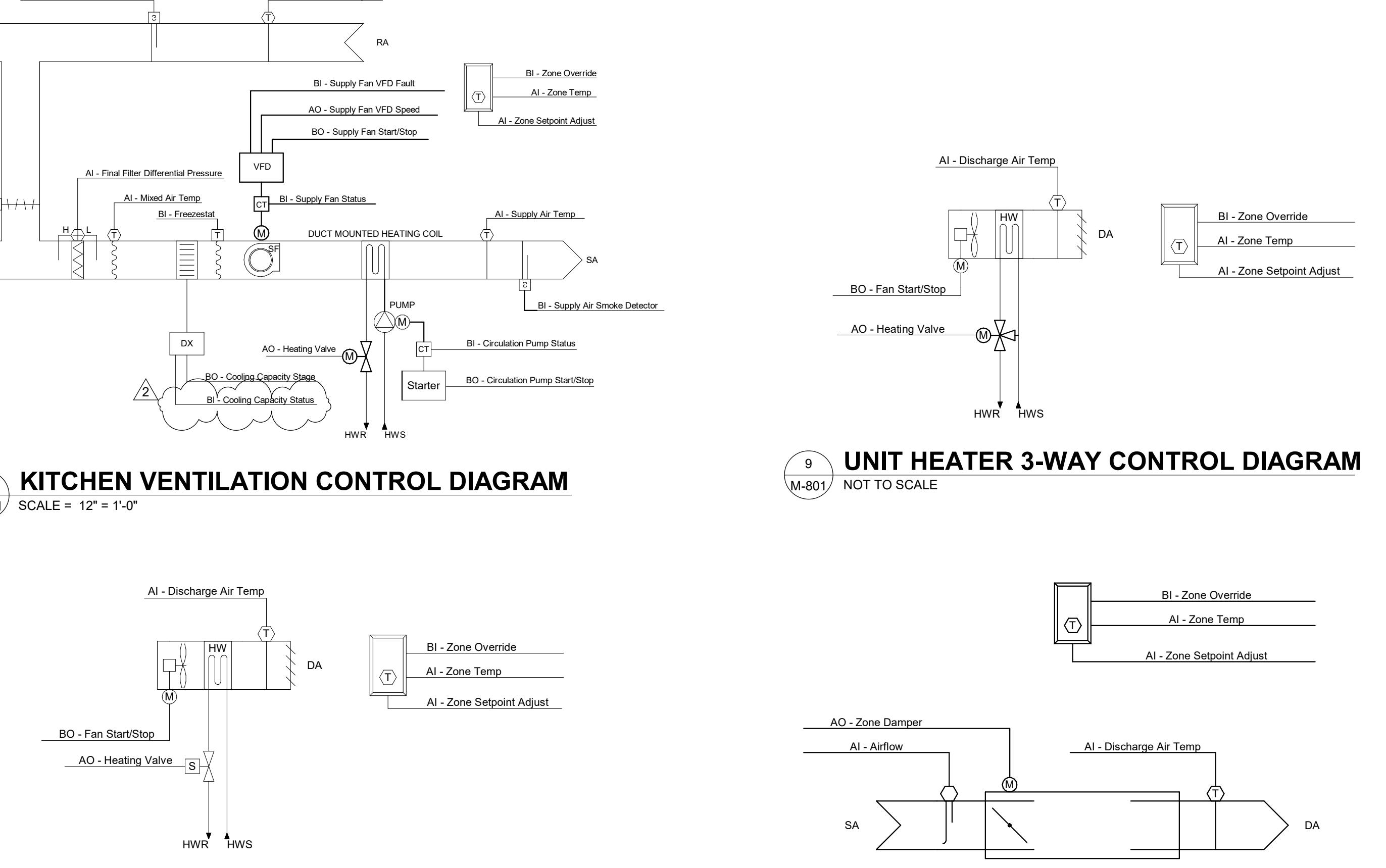
**CONSTANT VOLUME ROOFTOP HVAC CONTROL DIAGRAM**  
M-801 NOT TO SCALE



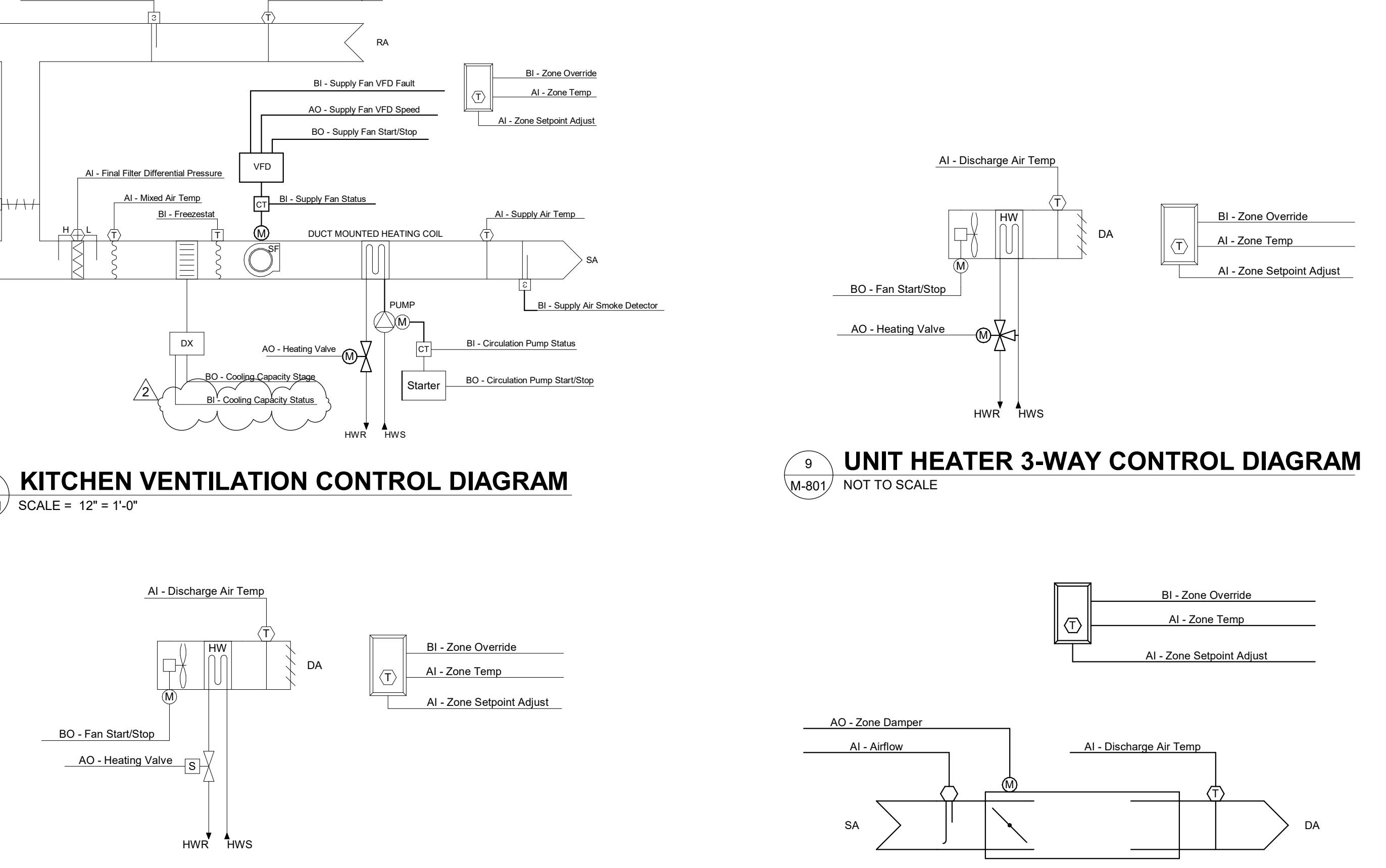
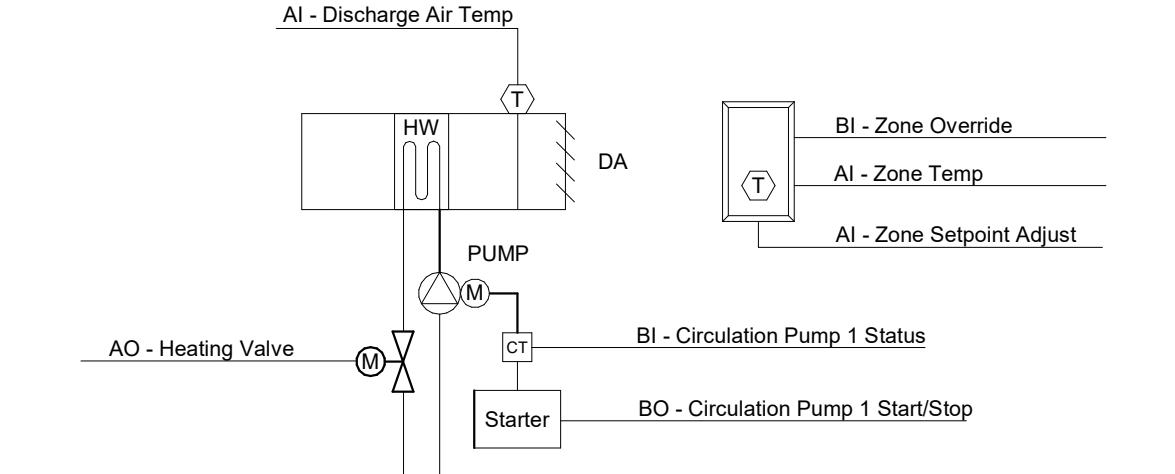
**UNIT HEATER 2-WAY CONTROL DIAGRAM**  
M-801 7 NOT TO SCALE



**VAV AIR HANDLING UNIT CONTROL DIAGRAM**  
M-801 1 NOT TO SCALE

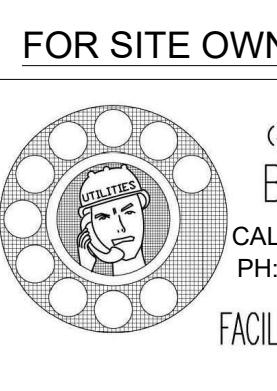


**VAV TERMINAL UNIT CONTROL DIAGRAM**  
M-801 6 NOT TO SCALE



SECTION 230993 SEQUENCE OF OPERATIONS FOR HVAC CONTROLS			
<b>PART 1 - GENERAL</b>			
<b>1.1 RELATED DOCUMENTS</b>			
A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION SPECIFICATION SECTIONS, APPLY TO THIS SECTION.			
<b>1.2 SUMMARY</b>			
A. THIS SECTION INCLUDES CONTROL SEQUENCES FOR HVAC SYSTEMS, SUBSYSTEMS, AND EQUIPMENT.			
B. THIS SECTION DESCRIBES THE MINIMUM PERFORMANCE REQUIREMENTS FOR THE SYSTEMS AND DOES NOT NECESSARILY INCLUDE ALL ELEMENTS OF CONTROL REQUIRED FOR PROPER AND SAFE OPERATION OF THE SYSTEMS. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SAFETIES INTERLOCKS, HIGH LIMITS, LOW LIMITS, TIME DELAYS, AND CONTROL LOGIC FOR A COMPLETE AND OPERABLE SYSTEM.			
C. RELATED SECTIONS INCLUDE THE FOLLOWING:			
1. DIVISION 23 SECTION INSTRUMENTATION AND CONTROLS FOR HVAC* FOR CONTROL EQUIPMENT AND DEVICES AND SUBMITTAL REQUIREMENTS.			
D. ALL EQUIPMENT, VALVES, FANS, ETC. SHALL BE CONTROLLED BY THE TEMPERATURE CONTROL CONTRACTOR UNLESS SPECIFIED TO BE CONTROLLED BY ANOTHER METHOD IN THE SPECIFICATIONS OR THE CONSTRUCTION DOCUMENTS.			
<b>1.3 DEFINITIONS</b>			
A. DDC: DIRECT-DIGITAL CONTROLS.			
B. BAS: BUILDING AUTOMATION SYSTEM.			
<b>1.4 AIR HANDLING UNIT SEQUENCE (AHU-1 AND AHU-2)</b>			
A. GENERAL:			
1. FAN CONTROL: BAS STARTS AND STOPS SUPPLY FANS) AS REQUIRED FOR THE SEQUENCE OF OPERATION AND OCCUPANCY SCHEDULES. CURRENT SENSING RELAYS ON THE FAN MOTOR MONITORS FAN OPERATION AND ALARMS IF FAN FAILS. FANS RUN CONTINUOUSLY DURING OCCUPANCY AND INTermittently DURING UNOCCUPIED CYCLE. SHUT DOWN THE AHU AND ALARM BAS IF UNSAFE OPERATING CONDITIONS OCCUR.			
2. FREEZE PROTECTION: FREEZE STAT WITH AVERAGING ELEMENT LOCATED DOWNSTREAM OF COOLING COIL MONITORS LEAVING AIR TEMPERATURE AND SHUTS DOWN UNIT FAN IF LEAVING AIR TEMPERATURE FALLS BELOW 3 DEG F, AND ALARMS BAS.			
3. FANDAMPER INTERLOCK: OUTDOOR AIR DAMPER CLOSES AND RETURN AIR DAMPER OPENS WHENEVER FAN IS OFF, PROVE ANY SYSTEM DAMPERS OPEN BEFORE FANS CAN START.			
4. SMOKE CONTROL: DUCT SMOKE DETECTOR (SUPPLIED BY DIVISION 28) IS MOUNTED IN THE RETURN AIR AND SUPPLY AIR DUCT FOR EACH ROOFTOP LOCAL DETECTOR. OUTDOOR AIR HANDLING FANS SO THAT WHEN SMOKE IS DETECTED, MONITOR REMOTE SMOKE DAMPERS AND INTERLOCK WITH AHU SO THAT AHU DOES NOT OPERATE IF DAMPERS FAIL TO OPEN.			
5. OUTDOOR AIR/ECONOMIZER CONTROL: INTERLOCK OUTDOOR AND RETURN AIR DAMPERS TO OPERATE IN SEQUENCE. OUTDOOR AIR DAMPER IS CLOSED DURING UNOCCUPIED CYCLE AND OPENS TO SPECIFIED MINIMUM POSITION DURING OCCUPIED HOURS.			
a. DURING OCCUPIED HOURS, BAS TO MONITOR CO2 LEVELS IN THE OCCUPIED SPACE WITH CO2 SENSOR MOUNTED IN THE RETURN AIR DUCT, WHEN THE CO2 LEVELS ARE LESS THAN 800 PPM, THE OUTDOOR AIR DAMPER CAN REDUCE TO 10% OPEN (ADJUSTABLE). IF THE CO2 LEVELS ARE 800 PPM OR GREATER, OUTDOOR AIR DAMPER IS OPEN TO SPECIFIED MINIMUM POSITION.			
MONITOR SUPPLY AIR TEMPERATURE, RETURN AIR TEMPERATURE, AND HUMIDITY. OUTDOOR AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY. MONITOR OUTDOOR OPEN AND RETURN AIR DAMPERS CLOSED IN SEQUENCE WITH COOLING CONTROL VALVES AS REQUIRED TO MAINTAIN 55 DEG F (ADJUSTABLE) SUPPLY TEMPERATURE. WHEN OUTDOOR AIR ENTHALPY IS ABOVE RETURN AIR ENTHALPY, OUTDOOR AIR DAMPER RETURNS TO MINIMUM POSITION SETTING. PROVE RELIEF DAMPER (D-1 FOR AHU-1 AND D-2 FOR AHU-2) OPEN BEFORE OUTSIDE AIR EXCEEDS 50% OPEN.			
6. WARM-UP CONTROL: WHENEVER OUTDOOR TEMPERATURE IS BELOW 55 DEG F (ADJUSTABLE) AND SYSTEM STATUS CHANGES FROM UNOCCUPIED TO OCCUPIED MODE, BAS INITIATES A WARM-UP SEQUENCE. HOLD OUTDOOR AIR DAMPER CLOSED AND RETURN AIR DAMPER OPEN AND ACTIVATE HEATING COIL TO RAISE DISCHARGE AIR TEMPERATURE TO 80 DEG F UNTIL RETURN AIR TEMPERATURE RISES TO WITHIN 3 DEG F (ADJUSTABLE) OF SPACE SETPOINT.			
7. HIGH DISCHARGE AIR PRESSURE LIMIT CONTROL: MONITOR DISCHARGE AIR PRESSURE IN SUPPLY DUCTWORK UPSTREAM OF ANY FIRE DAMPERS. STOP SUPPLY FAN IF DUCT PRESSURE RISES 2 INCHES ABOVE NORMAL OPERATING PRESSURE AND ALARM SYSTEM.			
8. FILTER PRESSURE DROP: MONITOR AIR HANDLING UNIT FILTER PRESSURE DROP GAUGES (REFER TO SECTION 23713 FOR GAUGE SPECIFICATION) AND ALARM SYSTEM WHEN PRESSURE DROP EXCEEDS HIGH OR LOW LIMIT SETTINGS.			
B. VARIABLE AIR VOLUME UNITS:			
1. EQUIPMENT CONTROLLED:			
a. AHU-1/CU-1 & P-4 b. AHU-2/ CU-2 & P-5			
2. UNIT COMPONENTS: SUPPLY FANS (WITH VFDS), COOLING COIL, HEATING COIL, MIXING BOX (OUTSIDE AIR DAMPERS, AND RETURN DAMPERS). SEE DIVISION 26 FOR VFDS SPECIFICATIONS.			
3. OCCUPANCY CONTROL: UNIT FAN IS ON DURING OCCUPIED HOURS AND OFF DURING UNOCCUPIED HOURS.			
4. SUPPLY AIR PRESSURE CONTROL: BAS MONITORS SUPPLY AIR PRESSURE (2/3 DOWNSTREAM) AND MODULATES SUPPLY FAN SPEED THROUGH VFD TO MAINTAIN DUCT STATIC PRESSURE AT 1.5 INCH WC (ADJUSTABLE). BAS TO ALSO MONITOR BOX POSITIONS AND REDUCE STATIC PRESSURE SETPOINT TO ALLOW FOR AT LEAST ONE BOX TO BE 95% OPEN (STATIC PRESSURE RESET).			
5. COOLING COIL CONTROL: BAS TO MODULATE THE CONDENSING UNIT COMPRESSORS AS REQUIRED TO MAINTAIN 55 DEG F (ADJUSTABLE) DISCHARGE TEMPERATURE.			
6. HEATING COIL CONTROL: BAS TO ACTIVATE HEATING COIL PUMP WHENEVER OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE) OR ON A CALL FOR HEATING. THE CONTROL VALVE MODULATES HYDROSTATIC FLOW ACROSS TO THE COOLING COIL. WHEN THE UNIT IS OFF, MODULATE THE HEATING COV TO MAINTAIN 55 DEG F INSIDE THE SUPPLY DUCT. MONITOR COIL PUMP THROUGH CURRENT SENSING RELAYS. IF PUMP FAILS CLOSE OUTDOOR AIR DAMPER AND ALARM BAS.			
7. ZONE UNOCCUPIED OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN UNOCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.			
8. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +/- 3 DEG F.			
E. BAS TO DISPLAY AND/OR CONTROL THE FOLLOWING:			
1. SYSTEM GRAPHIC.			
2. SUPPLY FAN STATUS.			
3. SUPPLY FAN FAILURE ALARM STATUS.			
4. SUPPLY FAN VFD SPEED.			
5. SUPPLY FAN VFD FAILURE ALARM.			
6. SUPPLY AIR PRESSURE.			
7. SUPPLY AIR PRESSURE SETPOINT (RTU-1, RTU-2, AND RTU-3).			
8. OCCUPANCY STATUS.			
9. FREEZE STAT ALARM STATUS.			
10. OA DAMPER FLOW (CFM).			
11. OA DAMPER POSITION.			
12. OA DAMPER MINIMUM SETPOINT.			
13. OA TEMPERATURE.			
14. OA RH.			
15. RETURN AIR DAMPER POSITION.			
16. RETURN AIR CO2 PPM.			
17. RELIEF AIR DAMPER POSITION.			
18. ECONOMIZER STATUS.			
19. DISCHARGE AIR SETPOINT (RTU-1, RTU-2, AND RTU-3).			
20. DISCHARGE AIR TEMPERATURE.			
21. HIGH LIMIT SUPPLY AIR PRESSURE ALARM STATUS.			
22. FILTER HIGH LIMIT STATUS.			
23. FILTER LOW LIMIT STATUS.			
24. BUILDING PRESSURE.			
25. BUILDING PRESSURE HIGH LIMIT ALARM.			
26. HEATING COIL CV POSITION.			
27. HEATING COIL PUMP STATUS.			
28. HEATING COIL PUMP ALARM.			
29. POWERED EXHAUST STATUS.			
30. SPACE TEMPERATURE (RTU-4, AND RTU-5).			
31. SPACE TEMPERATURE SETPOINT (RTU-4, AND RTU-5).			
32. HEATING COIL LEAVING AIR TEMPERATURE.			
33. COOLING STATUS.			
34. COOLING STAGE.			
35. COOLING ALARM.			
1.6 ENERGY RECOVERY UNIT SEQUENCE			
A. EQUIPMENT CONTROLLED:			
1. ERV1, ERV4-1, AND P-13			
2. ERV2, ERV-HC2, AND P-9			
B. PACKAGED ENERGY RECOVERY UNIT TO BE PROVIDED WITH A FACTORY PROVIDED DDC CONTROLS READY PACKAGE/TERMINAL STRIP THAT ALLOWS THE BAS TO MODULATE FANS, MODULATE COMPRESSORS DURING COOLING MODE, AND MODULATE REMOTE MOUNTED HYDROSTATIC HEATING COIL CONTROL VALVE DURING HEATING MODE. THE BAS MUST ALSO BE ABLE TO CONTROL THE HEATING COIL CONTROL VALVE AND OPERATE THE HEATING COIL PUMP. THE BAS MUST ALSO BE CAPABLE OF CONTROLLING THE ENERGY RECOVERY UNIT SYSTEM. BAS TO MONITOR ALL ERV CONTROL POINTS AND BE CAPABLE OF ADJUSTING TEMPERATURE SETPOINTS AND SCHEDULES.			
C. BAS MONITORS SPACE TEMPERATURE. CONTROLS CONTRACTOR PROVIDED THERMOSTAT THAT IS CONNECTED TO THE BAS.			
1. 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.			
2. ZONE UNOCCUPIED OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN UNOCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.			
3. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +/- 3 DEG F.			
C. BAS MONITORS SPACE TEMPERATURE. CONTROLS CONTRACTOR PROVIDED THERMOSTAT THAT IS CONNECTED TO THE BAS.			
1. 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.			
2. ZONE UNOCCUPIED OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN UNOCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.			
3. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +/- 3 DEG F.			
D. GENERAL:			
1. FAN CONTROL: BAS CONTROLS THE START AND STOP OF THE SUPPLY FAN AND EXHAUST FAN AS REQUIRED FOR THE SEQUENCE OF OPERATION AND OCCUPANCY SCHEDULES. CURRENT SENSING RELAYS ON THE FAN MOTOR MONITORS FAN OPERATION AND ALARMS IF A FAN FAILS. FANS RUN CONTINUOUSLY DURING OCCUPANCY AND INTermittently DURING UNOCCUPIED CYCLE. SHUT DOWN THE ENERGY RECOVERY UNIT AND ALARM BAS IF UNSAFE OPERATING CONDITIONS OCCUR.			
2. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +/- 3 DEG F.			
3. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE T			

1.8 VAV BOX SEQUENCE	1. EQUIPMENT CONTROLLED: VAV BOXES (VAV-1 - VAV-53) AND PERIMETER FIN TUBE. B. COOLING ONLY VAV: BAS MONITORS SPACE TEMPERATURE AND MODULATES BOX DAMPER FROM MINIMUM TO MAXIMUM SETTING AS REQUIRED TO MAINTAIN SPACE SETPOINT. RESET DAMPER POSITION AS REQUIRED TO MAINTAIN REQUIRED AIRFLOW UNDER VARYING SUPPLY PRESSURE. SPACE TEMPERATURE SETPOINT SHALL BE CAPABLE OF BEING CONTROLLED BY BAS. 1. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +3 DEG F. 2. MORNING WARM-UP: OPEN BOX TO MAXIMUM DURING MORNING WARM-UP UNTIL SPACE TEMPERATURE REACHES SETPOINT. CLOSE DAMPER IF SPACE TEMPERATURE REACHES 5 DEG F ABOVE SETPOINT AND COOLING IS UNAVAILABLE. 3. OVERCOOLING CONTROL: DURING OCCUPIED STATUS, RESET BOX MINIMUM TO ZERO IF SPACE TEMPERATURE FALLS MORE THAN 2 DEG F BELOW SETPOINT. 4. REMOTE HEAT ACTIVATION: BAS ACTIVATES 2 WAY, 2 POSITION CV ON REMOTE HEAT (I.E. RADIANT FINE TUBE) WHEN SPACE TEMPERATURE FALLS BELOW HEATING SETPOINT. BAS MODULATES DAMPER AS REQUIRED TO MAINTAIN HEATING SETPOINT. REMOTE HEAT (FTA) CV CLOSES WHEN SPACE TEMPERATURE RISES 2 DEG F ABOVE SETPOINT (ADJUSTABLE). C. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. SYSTEM GRAPHIC. 2. BOX OCCUPANCY STATUS. 3. SPACE TEMPERATURE. 4. SPACE HEATING SETPOINT (OCCUPIED AND UNOCCUPIED). 5. SPACE COOLING SETPOINT (OCCUPIED AND UNOCCUPIED). 6. BOX DAMPER POSITION. 7. BOX AIRFLOW CFM. 8. BOX MINIMUM POSITION SETTING. 9. BOX MAXIMUM POSITION SETTING. 10. REMOTE HEAT CONTROL VALVE POSITION (WHERE APPLICABLE)	1. RESET SCHEDULE: RESET THE SUPPLY WATER TEMPERATURE FROM 140 DEG F TO 120 DEG F (ADJUSTABLE) AS OUTDOOR TEMPERATURE GOES FROM -10 DEG F TO 55 DEG F (ADJUSTABLE). 2. ALARM SYSTEM IF SUPPLY WATER TEMPERATURE FALLS 20 DEG F BELOW SETPOINT FOR MORE THAN 5 MINUTES.	A. EQUIPMENT CONTROLLED: 1. EXHAUST FAN IS TO RUN CONTINUOUSLY DURING OCCUPIED HOURS. SCHEDULES ARE TO BE SET AND CONTROLLED BY BAS. C. MONITOR FAN STATUS WITH CURRENT SENSING RELAY AND ALARM BAS IF UNIT FAILS. D. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. EACH FAN STATUS. 2. EACH FAN FAILURE ALARM. 3. OCCUPIED/UN-OCCUPIED SCHEDULE.
1.9 FIN TUBE CONTROL	A. RADIANT FIN TUBE CONTROL: FT-1 - FT-8 1. BAS MONITORS SPACE TEMPERATURE AND MODULATES 2-WAY CV AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. SPACE TEMPERATURE SETPOINT SHALL BE CAPABLE OF BEING CONTROLLED BY BAS. 2. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +3 DEG F. B. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. SPACE TEMPERATURE (OCCUPIED AND UNOCCUPIED). 2. SPACE TEMPERATURE SETPOINT. 3. CV STATUS OR POSITION.	1. BAS OPERATES IN LEAD/LAG ARRANGEMENT WITH ONE PUMP OPERATING IN LEAD MODE AND THE OTHER PUMP IN STANDBY (LAG) MODE. THE BAS ACTIVATES THE LEAD PUMP WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 55 DEG F (ADJUSTABLE). EACH PUMP IS EQUIPPED WITH A VARIABLE FREQUENCY DRIVE (VFD) WHICH TIE THE VFD'S ON THE LEAD/LAG PUMPS AS REQUIRED TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE SETPOINT (ADJUSTABLE). PROVIDE DIFFERENTIAL PRESSURE SENSORS INSTALLED IN THE MECHANICAL ROOM. THE BAS MONITORS CURRENT SENSING RELAYS ON THE PUMP TO VERIFY ITS OPERATING STATUS AND ALARMS IF THE PUMP FAILS. STANDBY PUMP IS ACTIVATED IF THE LEAD PUMP FAILS. PUMP OPERATION ROTATES LEAD/LAG STATUS TO EVEN PUMP WEAR. G. ALL BOILERS AND PUMPS ARE TO BE TIED TO THE NEW BAS AND BE INTEGRATED ON TO THE NEW FRONT-END GRAPHICS. H. OPERATOR STATION: CONTROL AND/OR DISPLAY THE FOLLOWING: 1. SYSTEM GRAPHIC. 2. OUTDOOR TEMPERATURE. 3. EACH BOILER STATUS. 4. EACH BOILER CONTROL VALVE POSITION. 5. EACH BOILER ALARM STATUS. 6. DISCHARGE WATER TEMPERATURE FOR EACH BOILER. 7. ENTERING WATER TEMPERATURE FOR EACH BOILER. 8. HOT WATER LOOP SUPPLY WATER TEMPERATURE. 9. HOT WATER LOOP RETURN WATER TEMPERATURE. 10. HOT WATER LOOP RETURN WATER TEMPERATURE. 11. EMERGENCY SHUT DOWN STATUS. 12. EACH PUMP STATUS. 13. EACH PUMP ALARM. 14. EACH PUMP VFD SPEED. 15. DIFFERENTIAL PRESSURE OF SYSTEM. 16. DIFFERENTIAL PRESSURE SETPOINT OF SYSTEM.	A. EQUIPMENT CONTROLLED: 1. EXHAUST FAN IS TO RUN CONTINUOUSLY DURING OCCUPIED HOURS. SCHEDULES ARE TO BE SET AND CONTROLLED BY BAS. C. MONITOR FAN STATUS WITH CURRENT SENSING RELAY AND ALARM BAS IF UNIT FAILS. D. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. EACH FAN STATUS. 2. EACH FAN FAILURE ALARM. 3. OCCUPIED/UN-OCCUPIED SCHEDULE.
1.10 EXISTING FIN TUBE CONTROL	A. RADIANT FIN TUBE CONTROL: X-FT 1. BAS MONITORS SPACE TEMPERATURE AND MODULATES 2-WAY CV AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. SPACE TEMPERATURE SETPOINT SHALL BE CAPABLE OF BEING CONTROLLED BY BAS. 2. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +/- 3 DEG F. B. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. SPACE TEMPERATURE (OCCUPIED AND UNOCCUPIED). 2. SPACE TEMPERATURE SETPOINT. 3. CV STATUS OR POSITION.	1.2 HYDRONIC UNIT HEATER SEQUENCE A. EQUIPMENT CONTROLLED: UH-1, UH-2, UH-3, UH-4, UH-5, UH-6, UH-7, UH-8, AND X-UH (MILITARY MAINTENANCE 179). B. UNIT HEATERS ARE TO BE TIED TO MANUFACTURER PROVIDED SPACE THERMOSTAT. BAS TO MONITOR SPACE TEMPERATURE. ON A CALL FOR HEAT, BAS WILL TURN ON THE UNIT HEATER. BAS CONTROLS VALVE AND TURN FAN ON AS REQUIRED TO MAINTAIN SPACE HEATING SETPOINT. WHEN SETPOINT IS MET BAS SHALL CLOSE TWO POSITION VALVE AND TURN FAN OFF. LOCK OUT FANS WHEN HEATING SYSTEM IS OFF. SPACE TEMPERATURE SETPOINT SHALL BE CAPABLE OF BEING CONTROLLED BY THE BAS. C. ZONE SETPOINT ADJUSTMENT: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE THERMOSTAT. LIMIT ADJUSTMENT FROM BAS TEMPERATURE SETPOINT TO +/- 3 DEG F. D. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. SPACE TEMPERATURE. 2. SPACE TEMPERATURE SETPOINT (OCCUPIED AND UNOCCUPIED). 3. FAN STATUS. 4. HEATING SYSTEM STATUS. 5. CONTROL VALVE POSITION.	A. EQUIPMENT CONTROLLED: 1. EXHAUST FAN ALARM. 2. INTAKE DAMPER POSITION. 3. INTAKE DAMPER ALARMS. 4. UNIT HEATER CONTROL VALVE POSITION.
1.11 PRIMARY HEATING SYSTEM	A. EQUIPMENT CONTROLLED: 1. BOILERS: B-1 AND B-2. 2. PUMPS: P-1 AND P-2. B. THE BOILERS ARE TO BE EQUIPPED WITH INTERNAL CONTROLS THAT ALLOWS THE BOILER INTERNAL CONTROL PANELS TO CONTROL SEQUENCING OF ALL BOILERS AND ASSOCIATED BOILER CONTROL VALVES AS REQUIRED TO MAINTAIN LOOP SUPPLY WATER TEMPERATURE (140-DEGREE F, ADJUSTABLE) AT THE OPTIMUM EFFICIENCIES BASED ON OUTDOOR AIR TEMPERATURE RESET SCHEDULE (ADJUSTABLE). THE BOILERS SHALL ALTERNATE ALL BOILERS BEFORE A BOILER FAILS. START STANDBY BOILER AND ALARM BAS. IF ALL THE BOILERS ARE OFF, BUT THE HEATING SYSTEM IS ACTIVATED THE CONTROL VALVE FOR THE NEXT BOILER TO FIRE ON A CALL FOR HEAT SHALL REMAIN OPEN TO AVOID DEADHEADING THE PUMP. C. EACH BOILER IS TO HAVE THEIR OWN OUTDOOR AIR SENSOR INSTALLED TO ALLOW BOILERS TO RUN STANDALONE IN A CONTROL PANEL FAILURE EVENT. D. BAS TO SEND SIGNAL TO BOILER(S) CONTROL PANEL TO ACTIVATE THE HEATING SYSTEM WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 55 DEG F (ADJUSTABLE). E. HOT WATER SUPPLY LOOP TEMPERATURE SHALL BE CAPABLE OF BEING CHANGED FROM THE BAS AND INCLUDE AN OUTDOOR AIR RESET SCHEDULE (ADJUSTABLE).	1.3 ELECTRIC CABINET UNIT HEATER A. EQUIPMENT CONTROLLED: ECUH-1, ECUH-2, AND ECUH-3 B. CABINET UNIT HEATER SHALL START/STOP THE ELECTRIC RESISTANCE COIL AND UNIT SUPPLY FAN TO MAINTAIN SPACE HEATING SETPOINT. CABINET UNIT HEATER SHALL BE CONTROLLED BY INTERNAL STANDALONE TAMPERPROOF THERMOSTAT.	1.4 EXISTING HYDRONIC CABINET UNIT HEATER A. EQUIPMENT CONTROLLED: X-CUH B. CABINET UNIT HEATER SHALL START/STOP UNIT SUPPLY FAN TO MAINTAIN SPACE HEATING SETPOINT. CABINET UNIT HEATER SHALL BE CONTROLLED BY STANDALONE INTERNAL TAMPERPROOF THERMOSTAT.
1.12 SIDE STREAM FILTER SKID PACKAGE	A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).	1.5 SIDE STREAM FILTER SKID PACKAGE A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).	1.6 MECHANICAL ROOM UNIT HEATER, EXHAUST FAN, AND INTAKE DAMPER SEQUENCE A. EQUIPMENT CONTROLLED: EF-1, EF-2, AND EF-3
1.13 DOMESTIC WATER HEATER CONTROL	A. EQUIPMENT CONTROLLED: DWH-1, DWH-2, & P-3 B. DOMESTIC WATER HEATER(S) AND PUMP CONTROL: CONTRACTOR TO CONNECT NEW DOMESTIC WATER HEATERS AND PUMP TO BOILER INTERNAL "DOMESTIC WATER HEATER PRIORITY" CONTROLS. PUMP IS TO RUN ON A CALL FOR DOMESTIC HOT WATER. MONITOR PUMP THROUGH CURRENT SENSING RELAYS. IF PUMP FAILS ALARM BAS. THE BOILER INTERNAL "DOMESTIC WATER HEATER PRIORITY" CONTROLS MODULATE THE 2-WAY CV AS REQUIRED TO MAINTAIN DOMESTIC HOT WATER HEATER STORAGE TANK WATER TEMPERATURE SETPOINT (140 DEG F, ADJUSTABLE).	1.7 DEHUMIDIFIER SEQUENCE A. EQUIPMENT CONTROLLED: DEH-1 AND DEH-2 B. DEHUMIDIFIER TO BE CONTROLLED BY STANDALONE UNIT CONTROLS AND REMOTE MOUNTED PROGRAMMABLE HUMIDISTAT. BAS TO MONITOR ALL DEHUMIDIFIER CONTROLLER POINTS AND CAPABLE OF ADJUSTING HUMIDITY SETPOINTS AND SCHEDULES.	1.8 DOMESTIC WATER HEATER CONTROL A. EQUIPMENT CONTROLLED: DWH-1, DWH-2, & P-3 B. DOMESTIC WATER HEATER(S) AND PUMP CONTROL: CONTRACTOR TO CONNECT NEW DOMESTIC WATER HEATERS AND PUMP TO BOILER INTERNAL "DOMESTIC WATER HEATER PRIORITY" CONTROLS. PUMP IS TO RUN ON A CALL FOR DOMESTIC HOT WATER. MONITOR PUMP THROUGH CURRENT SENSING RELAYS. IF PUMP FAILS ALARM BAS. THE BOILER INTERNAL "DOMESTIC WATER HEATER PRIORITY" CONTROLS MODULATE THE 2-WAY CV AS REQUIRED TO MAINTAIN DOMESTIC HOT WATER HEATER STORAGE TANK WATER TEMPERATURE SETPOINT.
1.14 EXISTING DOMESTIC WATER HEATER CONTROL	A. EQUIPMENT CONTROLLED: DWH-1, DWH-2, & P-3 B. DOMESTIC WATER HEATER(S) AND PUMP CONTROL: CONTRACTOR TO CONNECT NEW DOMESTIC WATER HEATERS AND PUMP TO BOILER INTERNAL "DOMESTIC WATER HEATER PRIORITY" CONTROLS. PUMP IS TO RUN ON A CALL FOR DOMESTIC HOT WATER. MONITOR PUMP THROUGH CURRENT SENSING RELAYS. IF PUMP FAILS ALARM BAS. THE BOILER INTERNAL "DOMESTIC WATER HEATER PRIORITY" CONTROLS MODULATE THE 2-WAY CV AS REQUIRED TO MAINTAIN DOMESTIC HOT WATER HEATER STORAGE TANK WATER TEMPERATURE SETPOINT (140 DEG F, ADJUSTABLE).	1.9 TOILET EXHAUST FANS A. EQUIPMENT CONTROLLED: EF-1, EF-2, AND EF-3	1.10 SIDE STREAM FILTER PRESSURE DROP A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).
1.15 SIDE STREAM FILTER PRESSURE DROP	1.11 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW) A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).	1.12 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW) A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).	1.13 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW) A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).
1.16 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW)	1.17 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW) A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).	1.18 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW) A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).	1.19 SIDE STREAM FILTER PRESSURE DROP ALARMS (HIGH AND LOW) A. EQUIPMENT CONTROLLED: SSF-1 B. THE BAS ACTIVATES PUMP ON THE SIDE STREAM FILTER SKID PACKAGE WHENEVER THE MAIN BUILDING CIRCULATION PUMPS ARE ACTIVATED OR WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 45 DEG F (ADJUSTABLE).
1.20 MISCELLANEOUS EXHAUST FANS	A. EQUIPMENT CONTROLLED: EF-4 & EF-5 B. EXHAUST FAN IS TO RUN CONTINUOUSLY DURING OCCUPIED HOURS. SCHEDULES ARE TO BE SET AND CONTROLLED BY BAS. C. MONITOR FAN STATUS WITH CURRENT SENSING RELAY AND ALARM BAS IF UNIT FAILS. D. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. EACH FAN STATUS. 2. EACH FAN FAILURE ALARM. 3. OCCUPIED/UN-OCCUPIED SCHEDULE	1.21 ODOR PURGE FANS A. EQUIPMENT CONTROLLED: EF-7/D-4, EF-8/D-5, & EF-9/D-6. B. EXHAUST FAN IS TO BE LOCALLY CONTROLLED BY MANUFACTURER PROVIDED TIME DELAY SWITCH. EXHAUST FAN CAN ALSO BE MANUALLY ENABLED/DISABLED FROM THE BAS FRONT-END GRAPHICS. THE INTAKE DAMPER SHALL PROVE OPEN PRIOR TO STARTING THE EXHAUST FAN. C. MONITOR FAN STATUS WITH CURRENT SENSING RELAY AND ALARM BAS IF UNIT FAILS. D. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. EXHAUST FAN STATUS. 2. EXHAUST FAN ALARM. 3. EXHAUST FAN ENABLE/DISABLE. 4. INTAKE DAMPER POSITION. 5. INTAKE DAMPER ALARMS.	1.22 DIGITAL MIXING VALVE A. EQUIPMENT CONTROLLED: MV-1 B. MIXING VALVE IS TO BE CONTROLLED BY INTERNAL CONTROLLER AND HAVE LONWORKS INTERFACE CARD INSTALLED. BAS SYSTEM SHALL BE ABLE TO MONITOR AND ADJUST DOMESTIC HOT WATER SUPPLY TEMPERATURE. C. MONITOR FAN STATUS WITH CURRENT SENSING RELAY AND ALARM BAS IF UNIT FAILS. D. DISPLAY AND/OR CONTROL THE FOLLOWING: 1. SYSTEM GRAPHIC. 2. DOMESTIC HOT WATER TEMPERATURE. 3. DOMESTIC HOT WATER TEMPERATURE SETPOINT. 4. MIXING VALVE POSITION. 5. ALARMS
1.23 NEW SPLIT SYSTEM HEAT PUMP	A. EQUIPMENT CONTROLLED: HP-1/AIC-1 B. HEAT PUMP SPLIT SYSTEM TO BE CONTROLLED BY MANUFACTURER PROVIDED THERMOSTAT/CONTROLLER AS NEEDED TO MAINTAIN SPACE TEMPERATURE SETPOINT. HEAT PUMP SPLIT SYSTEM TO PROVIDE HEATING/COOLING AS NEEDED TO MAINTAIN SPACE TEMPERATURE SETPOINT. C. BAS TO CONNECT TO HEAT PUMP SPLIT SYSTEM TO MONITOR AND ADJUST OCCUPIED/UNOCCUPIED SPACE TEMPERATURE SETPOINTS. D. MONITOR AND/OR CONTROL THE FOLLOWING: 1. SYSTEM GRAPHIC. 2. SPACE TEMPERATURE SETPOINT. 3. SPACE TEMPERATURE. 4. SPLIT SYSTEM ALARMS	PART 2 - PRODUCTS (NOT APPLICABLE) PART 3 - EXECUTION (NOT APPLICABLE)	END OF SECTION 230993



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GAS MONITORING EQUIPMENT SCHEDULE						
MARK	DESCRIPTION	BASIS OF DESIGN	MOUNTING LOCATION	NOTES		
CO-1	CO SENSOR & BASE	VERIS - AG01 CO SENSOR	HYDRONIC SYSTEM	WALL MOUNT, SEE NOTES 1 & 2		
SL-1	LED STROBE LIGHT W/ SIREN	SECO-LARM - SL-1301-SAQ (RED)	HYDRONIC SYSTEM	MOUNT ON TOP OF GAS MONITORING ENCLOSURE		
<b>NOTES:</b> 1. INCLUDE (2) ADDITIONAL CO SENSORS 2. INSTALL 2 CONDUCTOR / 18 GA. SHIELD, 2 CONDUCTOR TO EACH BASE SENSOR UNIT FROM GAS CONTROLLER						

AIR SEPARATOR SCHEDULE						
TAG	MODEL	LOCATION	TYPE	MAX GPM	CONNECTION SIZE (FLANGED OR GROOVED)	COMMENTS
AS-1	R-6	MECHANICAL ROOM	HYDRONIC	700	6"	1.2
<b>NOTES:</b> 1. BASED ON BELL & GASSETT 2. CONTAINS STRAINER						

DEHUMIDIFIER SCHEDULE							
TAG	SERVES	MODEL	CFM	ESP	WATER REMOVAL	ELECTRICAL	COMMENTS
					(PINTS/DAY)	AMPS	
DEH-1	119TH HHC BTN STORAGE	QUEST 100	280	0.1	100.0	5	120 1 1,2,3,4,5,6,7,8,9
DEH-2	117TH HHC BTN STORAGE	QUEST 100	280	0.1	100.0	5	120 1 1,2,3,4,5,6,7,8,9
<b>NOTES:</b> 1. BASED ON QUEST 4. MANU. PROVIDED, REMOTE MOUNTED DIGITAL HUMIDISTAT 7. DISCONNECT BY EC 2. CONDENSATE PUMP KIT 5. LONWORKS CONTROLS INTERFACE CONNECTION 8. MERV-13 FILTER 3. CEILING AND WALL MOUNTING KIT 6. R454B REFRIGERANT 9. VIBRATION ISOLATORS							

SPLIT SYSTEM HEAT PUMP SCHEDULE													
TAG	CONNECTED EVAPORATOR	CONDENSING UNIT / HEAT PUMP LOCATION	OUTDOOR MODEL	INDOOR MODEL	SERVES	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	COOLING EFFICIENCY (IEER/EER)	HEATING COP	VOLTAGE	PHASE	MCA	COMMENTS
HP-1	AC-1	WALL MOUNTED	PUZ-AH24NL	PKA-AK24NL	PHYSICAL TRAINING	24.0	28.0	12.0	3.4	208	1	22	1,2,3,4,5,6,7,8,9,10,11,12,13,14
<b>NOTES:</b> 1. BASED ON MITSUBISHI ELECTRIC 7. COOLING DESIGN BASED ON 80°F DB AND 67°F WB, OUTDOOR 95°F DB 13. HEATING CAPACITY DOWN TO -4°F 2. R-454B REFRIGERANT 8. HEATING DESIGN BASED ON 70°F DB AND 60°F WB, OUTDOOR 47°F DB 14. LONWORKS INTERFACE CARD 3. MANUFACTURER PROVIDED OUTDOOR WALL MOUNTING KIT 9. EC SHALL PROVIDE DISCONNECT SWITCH FOR OUTDOOR UNIT 4. MANU. PROVIDED CONDENSATE PUMP 10. MANU. PROVIDED REMOTE MOUNTED THERMOSTAT 5. LOW AMBIENT COOLING KIT (100% COOLING AT 0 DEG F) 11. MANU. PROVIDED WND BAFFLES 6. OUTDOOR UNIT POWERS INDOOR UNIT 12. MANU. PROVIDED DEFROST HEATER													

INDIRECT DOMESTIC WATER HEATER SCHEDULE												
TAG	MODEL	LOCATION	GALLON CAPACITY	GPH @ 100°F RISE	DOMESTIC INLET / OUTLET (")	HYDRONIC COIL						COMMENTS
						CAPACITY (MBH)	COIL INLET / OUTLET (")	EWT °F	LWT °F	GPM	WPD FT. HD.	
DWH-1	GVG0257JR	MECHANICAL ROOM	257	500	2" / 2"	425.0	3" / 3"	165	145	43	1.5'	1,2,3,4,5,6,7,8,9
DWH-2	GVG0257JR	MECHANICAL ROOM	257	500	2" / 2"	425.0	3" / 3"	165	145	43	1.5'	1,2,3,4,5
<b>NOTES:</b> 1. BASED ON LOCHINVAR 2. 91" TALL x 34" DIA 3. VERTICAL ORIENTATION 4. GROUND MOUNTED 5. PRESSURE/TEMPERATURE RELIEF VALVE												

CONDENSING UNIT SCHEDULE											
TAG	SERVES	MODEL	NOMINAL TONS	CAPACITY MBH	EER	ELECTRICAL				COMMENTS	
						VOLTAGE	PHASE	MCA	DISC. BY		
CU-1	AHU-1	CFA-025	25	290.0	14.8	480	3	50	EC	1,2,3,4,5,6,7,8,9	
CU-2	AHU-2	CFA-025	25	290.0	14.8	480	3	50	EC	1,2,3,4,5,6,7,8,9	
<b>NOTES:</b> 1. BASED ON AAON 9. INCLUDE THE FOLLOWING ACCESSORIES: EVAPORATOR FREEZESTAT, TXV VALVE, FAN CYCLING KIT, COMPRESSOR SHORT CYCLE CONTROL, AND REFRIGERANT FILTER/DRYER 2. VARIABLE SCROLL COMPRESSORS 3. VIBRATION ISOLATORS 4. R-454B REFRIGERANT 5. TWO COMPRESSORS, DUAL CIRCUIT SERVING ITERLACED COIL 6. CRANKCASE HEATER 7. DIGITAL MODULATING LEAD SCROLL COMPRESSOR 8. SECONDARY TWO STAGE COMPRESSOR											

EXHAUST FAN SCHEDULE														
TAG	MODEL	SERVICE/ LOCATION	CFM	TYPE	DRIVE	ESP (IN WCF)	FAN RPM	SONES	ELECTRICAL					COMMENTS
									FAN HP	VOLTAGE	PHASE	DISC. BY	STARTER BY	
EF-1	G-095-VG	SOUTH BATHROOM	700	ROOF	DIRECT	0.7	1637	9.8	1/6	120	1	EC	EC	1,2,3,4,5
EF-2	G-090-D	NORTH BATHROOM	420	ROOF	DIRECT	0.5	1550	7.4	1/15	120	1	EC	EC	1,2,3,4,5
EF-3	G-070-VG	KITCHEN BATHROOM	170	ROOF	DIRECT	0.5	1352	3.1	1/15	120	1	EC	EC	1,2,4,5,7
EF-4	CSP-A390-VG	ELEVATOR ROOM	150	INLINE	DIRECT	0.5	989	1.2	1/15	120	1	EC	EC	1,2,4,5,7
EF-5	G-060-VG	JANITOR CLOSET	100	ROOF	DIRECT	0.3	1596	3.						

EXPANSION TANK SCHEDULE						
TAG	MODEL	LOCATION	TYPE	TANK VOLUME (GAL.)	ACCEPTABLE VOLUME (GAL.)	COMMENTS
XT-1	B-300	MECHANICAL ROOM	HYDROIC	80	80	1,2,3

NOTES:  
1. BASED ON BELL & GASSETT  
2. BLADDER TYPE PRESSURE VESSEL  
3. GROUND MOUNTED  
4. SECURITY BARS IN CURB

INTAKE HOOD SCHEDULE											
TAG	FUNCTION	SERVICE	MODEL	THROAT SIZE	HEIGHT	INLET FREE AREA (SQ. FT.)	CFM	PRESSURE DROP (IN WC)	SCREEN	COMMENTS	
IH-1	INTAKE	EF-6	FGI	24x24	19"	4.00	1800	0.03	BIRD	1,2,3	
IH-2	INTAKE	EF-8	FGI	30x36	19"	7.50	3300	0.03	BIRD	1,3,4,5	
IH-3	INTAKE	EF-9	FGI	30x36	19"	7.50	3300	0.03	BIRD	1,3,4,5	

NOTES:  
1. BASED ON GREENHECK  
2. CURB ADAPTER  
3. CONTROL DAMPER WITH DDC ACTUATOR  
4. SECURITY BARS IN CURB  
5. MANU. PROVIDED ROOF CURB  
6. INLET/OUTLET VALVE KIT  
7. 140 PSI MAXIMUM PRESSURE  
8. STAINLESS STEEL STANDPIPE  
9. HIGH TEMPERATURE RATED CARTRIDGE FILTERS  
10. CONTRACTOR TO PROVIDE 5 REPACKABLE CARTRIDGE FILTERS  
11. SIDE STREAM ASSEMBLY TO BE FULLY ASSEMBLED AND PRE PIPED ON SKID  
12. INLET/OUTLET PRESSURE GAUGES (0-100 PSI SLYCERIN-FILLED)  
13. INLET/OUTLET VALVE KIT  
14. IN MARKERS INTERFACE CARD

SIDE STREAM FILTER SCHEDULE											
TAG	MODEL	LOCATION	PARTICLE SIZE	MAX GPM	INLET/OUTLET	ELECTRICAL			COMMENTS		
						VOLTS	PHASE	AMPS			
SSF-1	TBX-0030	SOUTH MECH. ROOM	44 MICRON	30	1-1/2"1"	480	3	2.1	1,2,3,4,5,6,7,8,9,10,11,12,13,14		

NOTES:  
1. BASED ON LAKOS  
2. UL LISTED/NEMA 4X MOTOR STARTER AND CONTROLS WITH HOA SWITCH  
3. SOLIDS RECOVERY VESSEL (SRV)  
4. SRV 44 MICRON REPLACEABLE BAG FILTER DIRTY FILTER INDICATOR  
5. 19.5" TALL x 13" DIA  
6. INLET/OUTLET VALVE KIT  
7. 140 PSI MAXIMUM PRESSURE  
8. STAINLESS STEEL STANDPIPE  
9. HIGH TEMPERATURE RATED CARTRIDGE FILTERS  
10. CONTRACTOR TO PROVIDE 5 REPACKABLE CARTRIDGE FILTERS  
11. SIDE STREAM ASSEMBLY TO BE FULLY ASSEMBLED AND PRE PIPED ON SKID  
12. INLET/OUTLET PRESSURE GAUGES (0-100 PSI SLYCERIN-FILLED)  
13. INLET/OUTLET VALVE KIT  
14. IN MARKERS INTERFACE CARD

LOUVER SCHEDULE											
TAG	FUNCTION	SERVES	MAKE/ MODEL	NECK SIZE		DEPTH	INLET FREE AREA (SQ FT)	CFM	PRESSURE DROP (IN WC)	SCREEN	COMMENTS
				WIDTH	HEIGHT						
L-1	EXHAUST	EF-4	L6375D	12"	12"	6"	0.25	150	0.08	BIRD	1,2
L-2	EXHAUST	EF-7	L6375D	36"	24"	6"	2.72	1,815	0.08	BIRD	1,2
L-3	SUPPLY	D-4	L6375D	48"	24"	6"	3.69	1,815	0.08	BIRD	1,2

NOTES:  
1. BASED ON RUSKIN  
2. ARCHITECT TO SELECT COLOR

DAMPER SCHEDULE												
TAG	FUNCTION	LOUVER SERVICE	# OF SECTIONS	SECTION SIZE		DEPTH	CFM	ELECTRICAL		NOTES		
				WIDTH	HT OR L			WATTS	VOLTAGE			
D-1	RELIEF AIR	AHU-1	1	40	24	6"	8,825	--	24	NR	NR	1,2,3,4
D-2	RELIEF AIR	AHU-2	1	40	24	6"	8,755	--	24	NR	NR	1,2,3,4
D-3	INTAKE AIR	IH-1	1	24	24	6"	1,800	--	24	NR	NR	1,2
D-4	INTAKE AIR	L-3	1	48	24	6"	1,815	--	24	NR	NR	1,2
D-5	INTAKE AIR	IH-2	1	36	30	6"	3,300	--	24	NR	NR	1,2
D-6	INTAKE AIR	IH-3	1	36	30	6"	3,300	--	24	NR	NR	1,2

NOTES:  
1. BASED ON RUSKIN  
2. LOW LEAKAGE AND LOW PRESSURE  
3. DAMPER TO BE INSTALLED ON EXISTING HOOD  
4. CONTRACTOR TO FIELD VERIFY REQUIRED DAMPER  
SIZE NEEDED FOR EXISTING HOOD

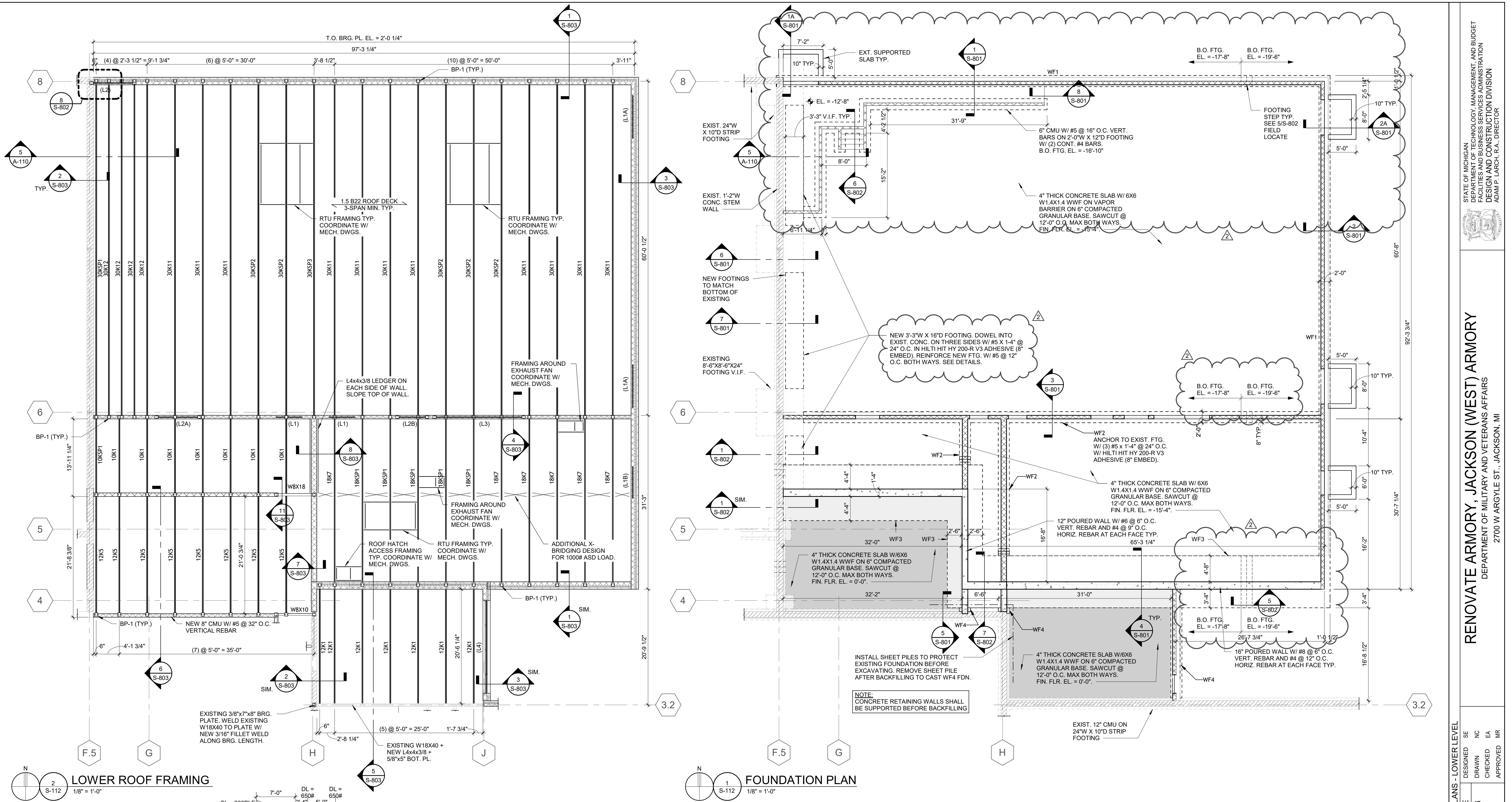
ELECTRICAL NOTES:  
EC - ELECTRICAL CONTRACTOR  
MC - MECHANICAL CONTRACTOR  
NR - NOT REQUIRED

DUCT MOUNTED HEATING COIL									
TAG	HTG. MBH	EAT (DB)	LAT (DB)	CFM	EWT	LWT	CONTROL VALVE	GPM	COMMENTS
RTU-HC-1	59.3	62	95	1640	140	110	4.0		1,2,4,5,8
RTU-HC-2	59.3	59	95	1495	140	110	4.0		1,2,4,5,8
RTU-HC-3	51.9	63	95	1435	140	110	3.5		1,2,4,5,8
RTU-HC-4	315.1	26	102	3810	140	110	21.0		1,2,4,6,9
RTU-HC-5	315.1	28	104	3840	140	110	21.0		1,2,4,6,9
ERV-HC-1	96.3	31	104	1215	140	110	6.5		1,2,4,7,8
ERV-HC-2	192.7	29	98	2600	140	110	13.0		1,2,4,7,10
MAU-HC-1	234.7	-10	95	2070	140	108.3	15.0		1,2,4,6,11

NOTES:  
1. BASED ON AON  
2. 2-WAY MODULATING CONTROL VALVE  
3. 3-WAY MODULATING CONTROL VALVE  
4. REFER TO PIPE SIZE INDICATED ON DRAWINGS

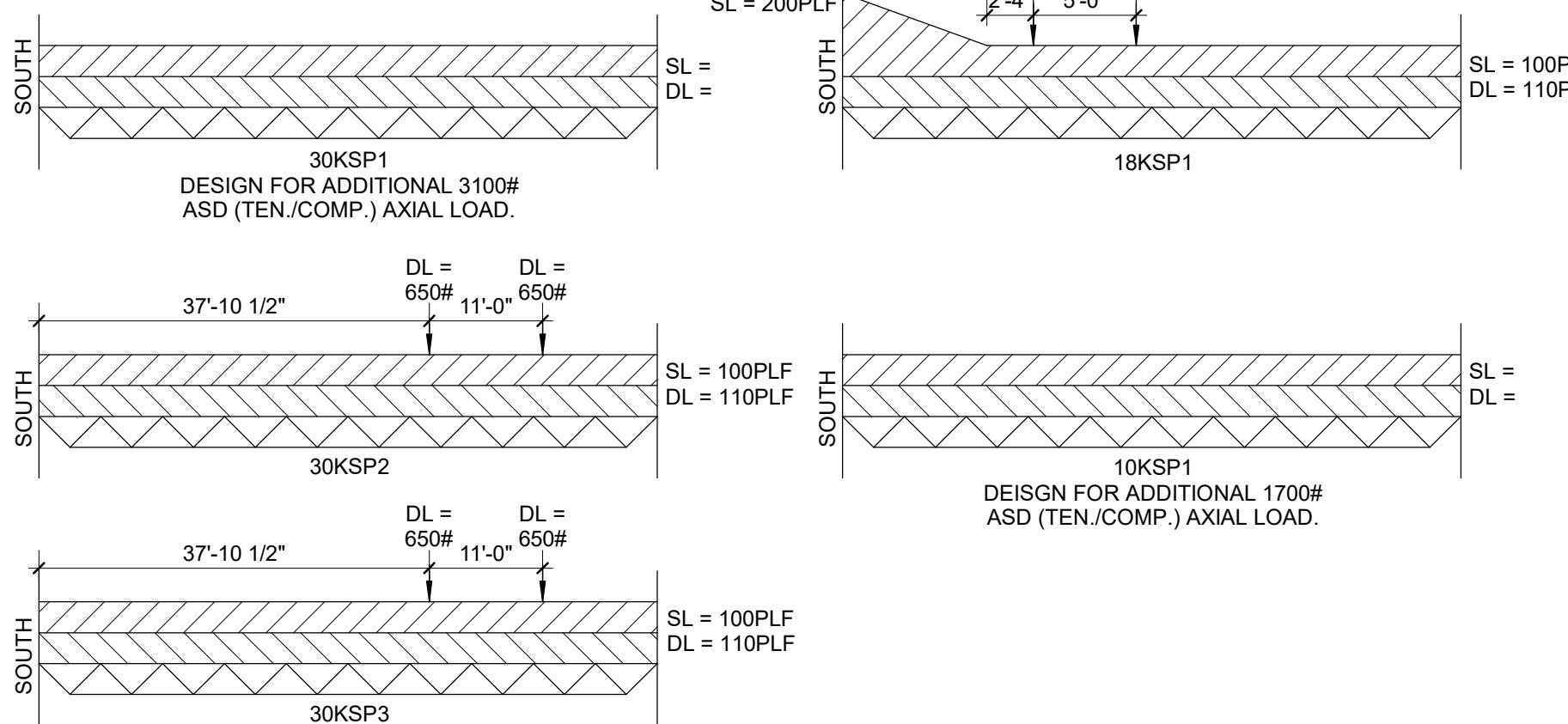
5. 2-ROW COPPER COIL WITH ALUMINUM FINS  
6. 4-ROW COPPER COIL WITH ALUMINUM FINS  
7. 3-ROW COPPER COIL WITH ALUMINUM FINS  
8. 24" WIDE x 17.5" TALL WITH 168 FINS PER FOOT  
9. 36" WIDE x 28.5" TALL WITH 168 FINS PER FOOT  
10. 32" WIDE x 22.5" TALL WITH 168 FINS PER FOOT  
11. 24" WIDE x 23.75" TALL WITH 168 FINS PER FOOT

FINNED TUBE RADIATION SCHEDULE									
TAG	TYPE	LENGTH, FT.							





# LOWER ROOF FRAMING



## **SPECIAL JOISTS**

## BEARING PLATE SCHEDULE

MARK	SIZE	ANCHORAGE
BP-1	7" x 7" x 3/8"	(2) 1/2" Ø x 5" STUDS
BP-2	7" x 7" x 5/8"	(2) 1/2" Ø x 5" STUDS

# LINTEL SCHEDULE

MARK	LINTEL	OPENING SIZE	REMA
L1	8" W x 16" H w/ (2) #5 BARS	3'-4"	
L1A	8" W x 16" H w/ (2) #5 BARS	6'-4"	
L1B	8" W x 16" H w/ (2) #5 BARS	4'-2"	
L2	W8X13 w/ 3/8"x15" PL. TOP & BOT.	6'-5"	BP
L2A	W8X13 w/ 3/8"x7" PL. TOP & BOT.	4'-5"	BP
L2B	W8X13 w/ 3/8"x7" PL. TOP & BOT.	4'-0"	BP
L3	W10X30 w/ 3/8"x7" PL. TOP & BOT.	15'-4"	BP
L4	W8X21 w/ 3/8"x15" PL. TOP & BOT.	16'-8"	BP

**NOTE:** THE WEST END OF L2 TO BEAR ON EXISTING CMU - GROUT SOLID BEARING UNIT.

## GENERAL FRAMING NOTES

1. JOIST MANUFACTURER SHALL DESIGN JOISTS FOR ADDITIONAL LOADS AT LOCATIONS SHOWN AND BRIDGING. CONTRACTOR OPTION TO ALTERNATE JOISTS AT COMMON BRG. POINT.
2. JOIST DESIGNATION; SP - SPECIAL JOIST.
3. METAL ROOF DECK: 3 SPAN MIN., 36/4 FASTENER PATTERN W/ MIN. 3 SIDE LAP FASTENERS UNO.
4. ROOF DECK SUPPORT FASTENERS: 5/8" PUDDLE WELDS OR #12 TEK SCREWS UNO.
5. ROOF DECK SIDE LAP FASTENERS: #10 TEK SCREWS AND WELDS RESPECTIVELY.
6. 10 PSF NET UPLIFT @ ROOF JOISTS.
7. GC SHALL CONFIRM CURB SIZES FOR ROOF ACCESS AND HVAC EQUIPMENT PRIOR TO STEEL SHOP DRAWING APPROVAL.
8. ALL ROOF SUMP OPENINGS TO BE 2'-0" X 2'-0" CLEAR W/ L4 X 4 X 1/4 FRAMING. CONTRACTOR OPTION TO USE SUMP PANS.
9. ALL RTI FRAMING TO BE L5X2 1/2X5/16 L-L-V TYPE.

## FOOTING SCHEDULE

MARK	SIZE	REBAR
WF-1	2'-0" W X 1'-0"D STRIP FTG.	#5 @ 12" O.C. TRANS. BAR (3) #4 CONT. LONG. BAR
WF-2	2'-0" X 1'-0" STRIP FTG.	#5 @ 12" O.C. TRANS. BAR (3) #4 CONT. LONG. BAR
WF-3	SEE PLAN	#6 @ 10" O.C. T/B TRANS #5 @ 10" O.C. T/B LONG.
WF-4	2'-0" X 3'-6" CONC. TRENCH FTG.	(3) #5 CONT. BARS TOP & BOT.

**MISSDIG811**

## FOR SITE OWNED UTILITIES

72 HOURS  
(7.5 METERS, 50 FEET)

PH: (248) 606-8821  
FACILITIES MANAGEMENT

# FACILITIES MANAGEMENT

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