

HYDRONIC HEATING EQUIPMENT SCHEDULE								
TAG	ITEM	QTY	MANUFACTURER	PART NO.	DESCRIPTION	HEATING CAP.	%EFF	VOLTAGE
B-1	LP GAS BOILER	1	BOSCH	FS 151	FLOOR STANDING PROPANE GAS FIRED CONDENSING BOILER WITH INTERNAL CIRCULATOR	137,500 BTUH	96	115-120/1/60
NOTES: PROVIDE CONDENSATE NEUTRALIZER. UTILIZE PROVIDED INTERNAL LOW LOSS HEADER PER INSTALLATION INSTRUCTIONS.								

HYDRONIC TANK SCHEDULE					
TAG	ITEM	QTY	MANUFACTURER	PART NO.	DESCRIPTION
HWT-1	DOMESTIC HOT WATER TANK	1	BOSCH	SU80	77.4 GALLON, 264 GALLON FIRST HOUR DELIVERY HOT WATER TANK

WOOD HEATING BOILER SCHEDULE							
TAG	ITEM	QUAN.	MANUFACTURER	PART NO.	DESCRIPTION	HEATING CAP.	VOLTAGE
WB-1	WOOD BOILER	1	SWITZER	1750	WOOD-FIRED GASIFICATION BOILER	200,000 BTUH	220/1/60 (15A)

NOTES: PROVIDE COMBUSTION AIR INTAKE WITH DRAFT DAMPER PER MANUFACTURER. PROVIDE CHIMNEY INDUCER, HEAT RECLAIMER, DOMESTIC HOT WATER COIL, EXPANSION TANK AND COMPLETE CONTROL PACKAGE FOR AUTOMATIC OPERATION WITH HIGH LIMIT, OVERRIDE FOR HEAT DUMP AND RELAY FOR BACK-UP BOILER B-1 AND HEATING PUMP P-3 OPERATION. PROVIDE MANUFACTURER INSTALLATION OF WB-1 AND ALL COMPONENTS, VENTING AND WIRING, START-UP AND COMMISSIONING.

HYDRONIC TANK SCHEDULE					
TAG	ITEM	QUAN.	MANUFACTURER	PART NO.	DESCRIPTION
EX-1	*HEATING SYSTEM EXPANSION TANK	1	AMTROL	#60	TANK VOLUME: 7.6 GALLONS. 5 GAL. REQUIRED FOR PIPING OUTSIDE SWITZER SYSTEM. 12 PSI.
M-1,3	RADIANT FLOOR TUBING MANIFOLD - EXISTING	2	UPONOR	EXISTING	FULLY ASSEMBLED EP WITH MOUNTING HARDWARE, TEMP GAUGES, BALANCE VALVES. ZONING BY ZONE VALVE ON SUPPLY FEED.
	ZONE VALVE ON SUPPLY PIPING PER PLANS.	2	TACO	3/4" ZONE SENTRY	
M-2	RADIANT FLOOR TUBING MANIFOLD - 6 CIRCUITS	1	UPONOR	A2670601	FULLY ASSEMBLED EP WITH MOUNTING HARDWARE, TEMP GAUGES, BALANCE VALVES AND CIRCUIT ACTUATORS FOR ZONING.
	THERMO-ELECTRIC CIRCUIT ACTUATORS	6	UPONOR	A3030522	
M-4	RADIANT FLOOR TUBING MANIFOLD - 5 CIRCUITS	1	UPONOR	A2670501	FULLY ASSEMBLED EP WITH MOUNTING HARDWARE, TEMP GAUGES, BALANCE VALVES AND CIRCUIT ACTUATORS FOR ZONING.
	THERMO-ELECTRIC CIRCUIT ACTUATORS	5	UPONOR	A3030522	
M-5	RADIANT FLOOR TUBING MANIFOLD - 8 CIRCUITS	1	UPONOR	A2670801	FULLY ASSEMBLED EP WITH MOUNTING HARDWARE, TEMP GAUGES, BALANCE VALVES AND CIRCUIT ACTUATORS FOR ZONING.
	THERMO-ELECTRIC CIRCUIT ACTUATORS	8	UPONOR	A3030522	
MV-1	MIXING VALVE	1	TACO	i100U3R-1	1" 3-WAY VALVE. Cv 4.5. 0.3 AMPS. 24V MOTOR. OUTDOOR RESET. 120 DEG F DESIGN.
MV-2	MIXING VALVE	1	TACO	i075U3R-1	3/4" 3-WAY VALVE. Cv 4.5. 0.3 AMPS. 24V MOTOR. OUTDOOR RESET. 100 DEG F DESIGN.
HS-1	HYDRO-SEPARATOR 1-1/4" SWEAT	1	CALEFFI	549597A	CALEFFI AIR, DIRT, HYDRAULIC, AND MAGNETIC SEPARATOR WITH INSULATION SHELL.
P-1,2,3	HYDRONIC CIRCULATORS BOILER HEAT	3	GRUNDFOS	15-58 FC	115V/1/60. SET TO SPEED 3. WITH INTERNAL FLOW CHECK. 10 GPM / 6 FT.HD.
P-4	HYDRONIC CIRCULATORS FLOOR HEAT	1	GRUNDFOS	ALPHA 2 26-99F	115V/1/60. SET TO AUTOADAPT. 8 GPM / 20 FT.HD.
P-5	HYDRONIC CIRCULATORS FLOOR HEAT	1	GRUNDFOS	ALPHA 2 15-55F/LC	115V/1/60. SET TO AUTOADAPT. WITH LINE CORD PLUG. 4 GPM / 12 FT.HD.
NOTES: *SWITZER SYSTEM MANUFACTURER AND INSTALLER SHALL VERIFY WHETHER OR NOT EX-1 IS REQUIRED.					

SUPPORTS FOR PIPING AND EQUIPMENT

A. SUPPORT FOR PIPING AND EQUIPMENT SHALL BE SUPPORTED FROM STRUCTURAL MEMBERS.

FINAL INSPECTION

A. NOTICE TO THE OWNER THAT THE WORK IS READY FOR FINAL INSPECTION. THE CONTRACTOR SHALL:
1. FURNISH NECESSARY MECHANICS TO OPERATE SYSTEM, MAKE NECESSARY ADJUSTMENTS AND ASSIST WITH FINAL INSPECTION.

OPERATION AND MAINTENANCE MANUALS

A. FURNISH COMPLETE OPERATION AND MAINTENANCE MANUALS TO THE OWNER, ON ALL EQUIPMENT AND SYSTEMS.

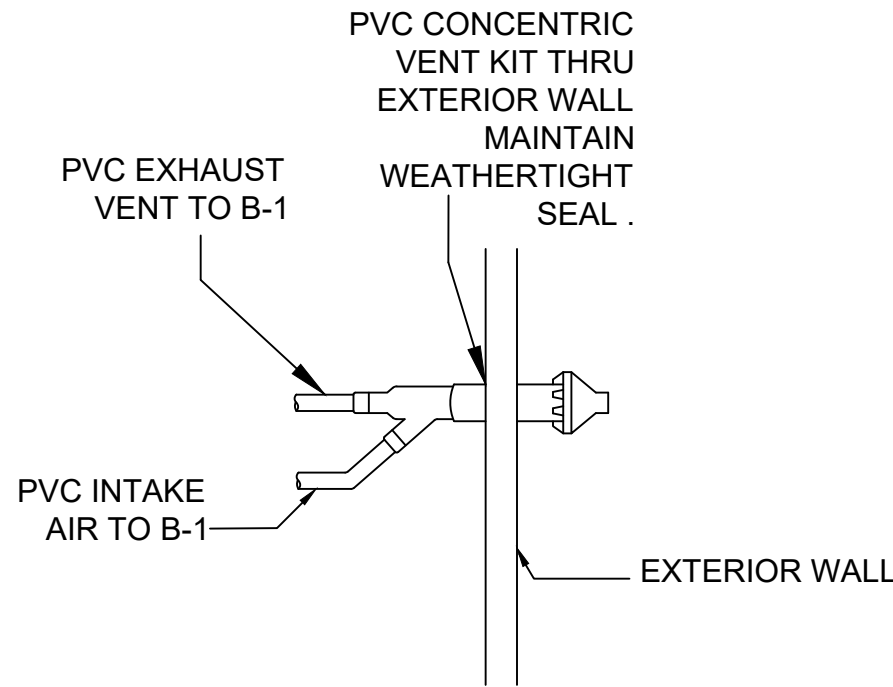
HVAC PIPING

GENERAL DESCRIPTION

A. ALL PIPING 2" AND UNDER TYPE "L" COPPER WITH SOLDERED 90° JOINTS. 2-1/2" AND LARGER PIPING TO BE IRON PIPE WITH WELDED, GROOVED, OR FLANGED JOINTS. (UP TO 3" TYPE "L" COPPER WITH SILVER-BRAZED OR PRESS JOINTS ACCEPTABLE.)
B. ALL NEW PIPING TO BE HYDROSTATICALLY LEAK TESTED TO 100 PSIG AND FLUSHED PRIOR TO PUTTING NEW HEATING SYSTEM INTO OPERATION.
C. PURGE AIR FROM ALL CONNECTED SYSTEM PIPING PRIOR TO PUTTING NEW HEATING SYSTEM INTO OPERATION.

WATER TREATMENT:

VERIFY FILL WATER pH AND TREAT ACCORDINGLY PER FERNOX F1 INHIBITOR AND pH TEST INSTRUCTIONS TO MAINTAIN A pH BETWEEN 7.2-7.4.



BOILER VENTING DETAIL

(DIAGRAMMATIC - NOT MEANT TO SHOW ALL DETAILS)

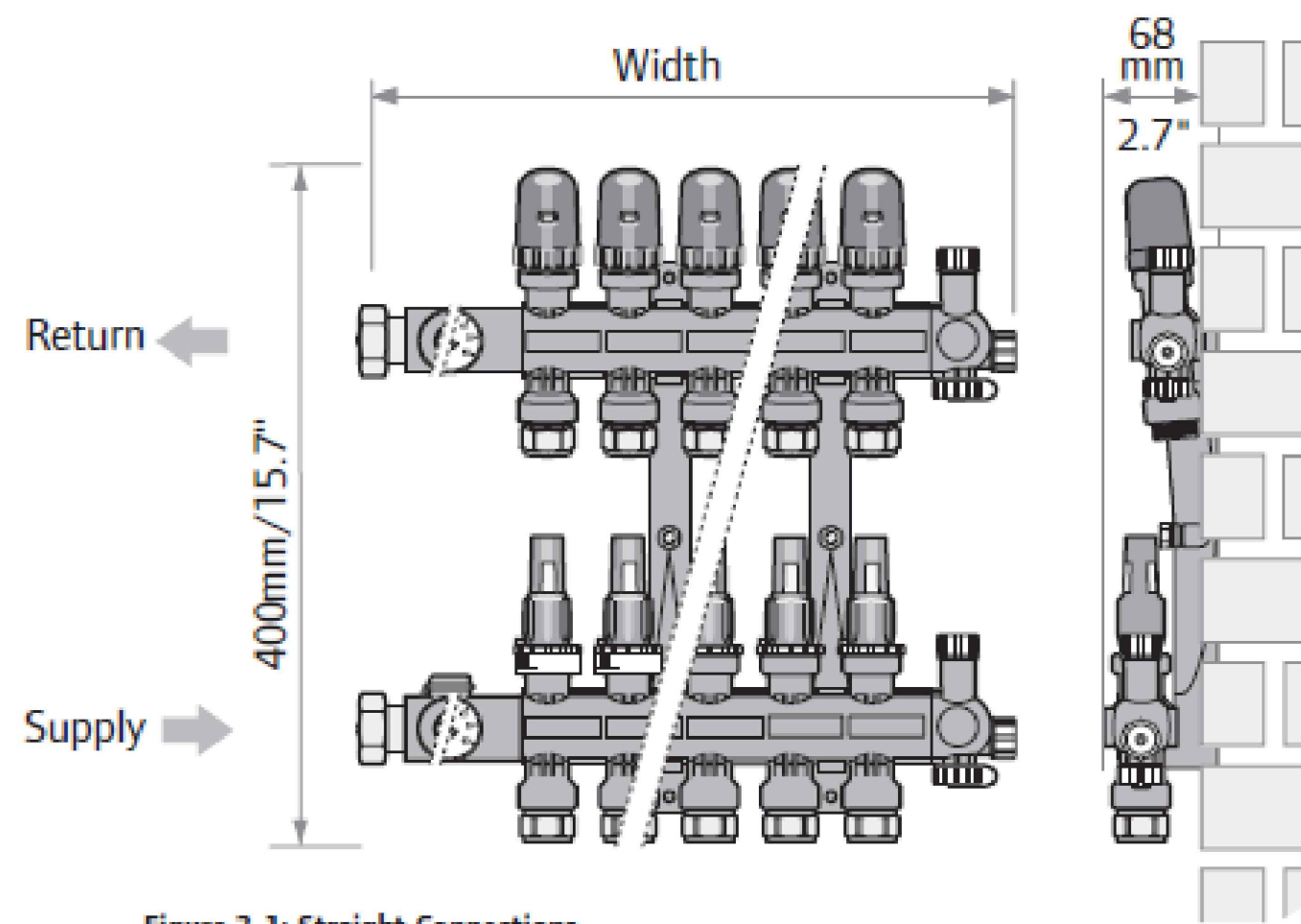
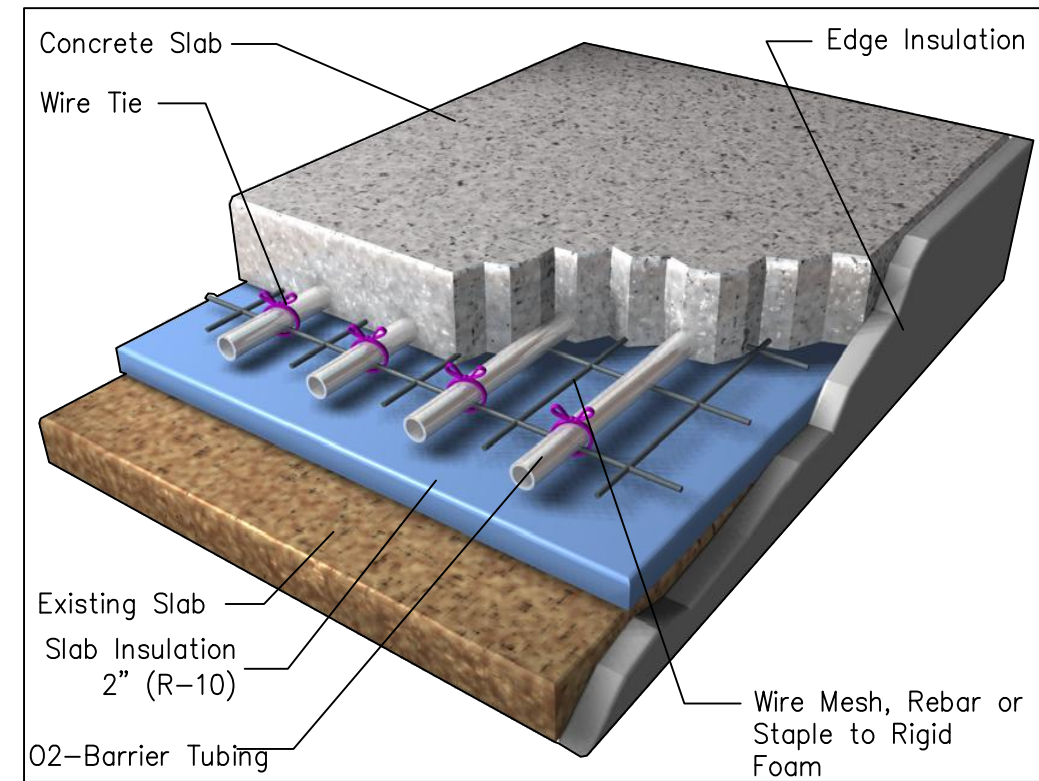


Figure 3-1: Straight Connections

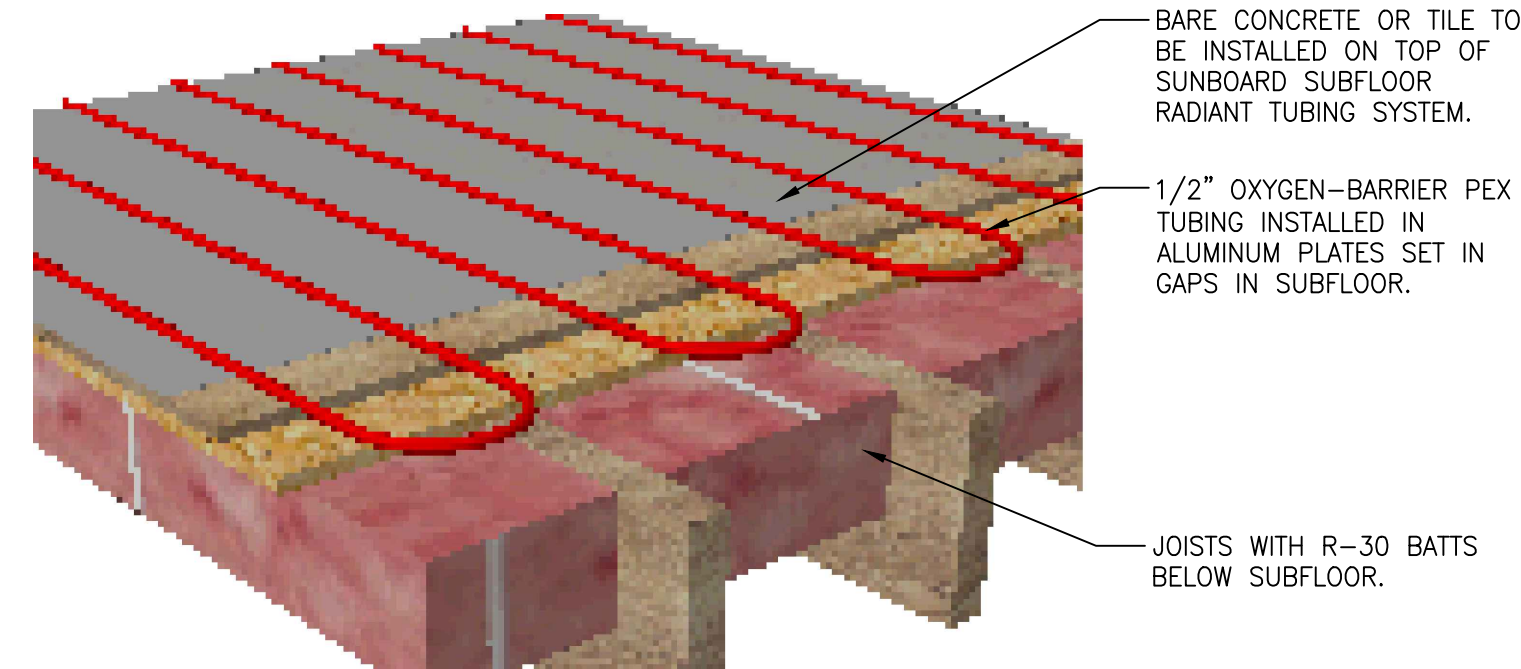
MANIFOLD DETAIL-UPRIGHT INSTALL ONLY

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SLAB RADIANT FLOORS

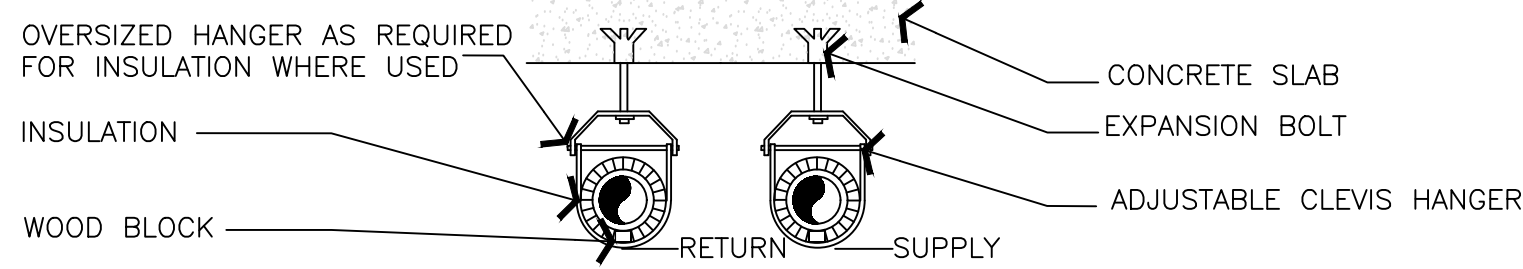
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FLOOR HEATING SYSTEMS' INSULATION:
ALL AREAS WHERE SUSPENDED FLOOR HEATING IS INSTALLED SHALL HAVE R-30 INSULATION MIN. INSTALLED UNDERNEATH.

SUNBOARD SILVER RADIANT FLOORS

(DIAGRAMMATIC - NOT MEANT TO SHOW ALL DETAILS)



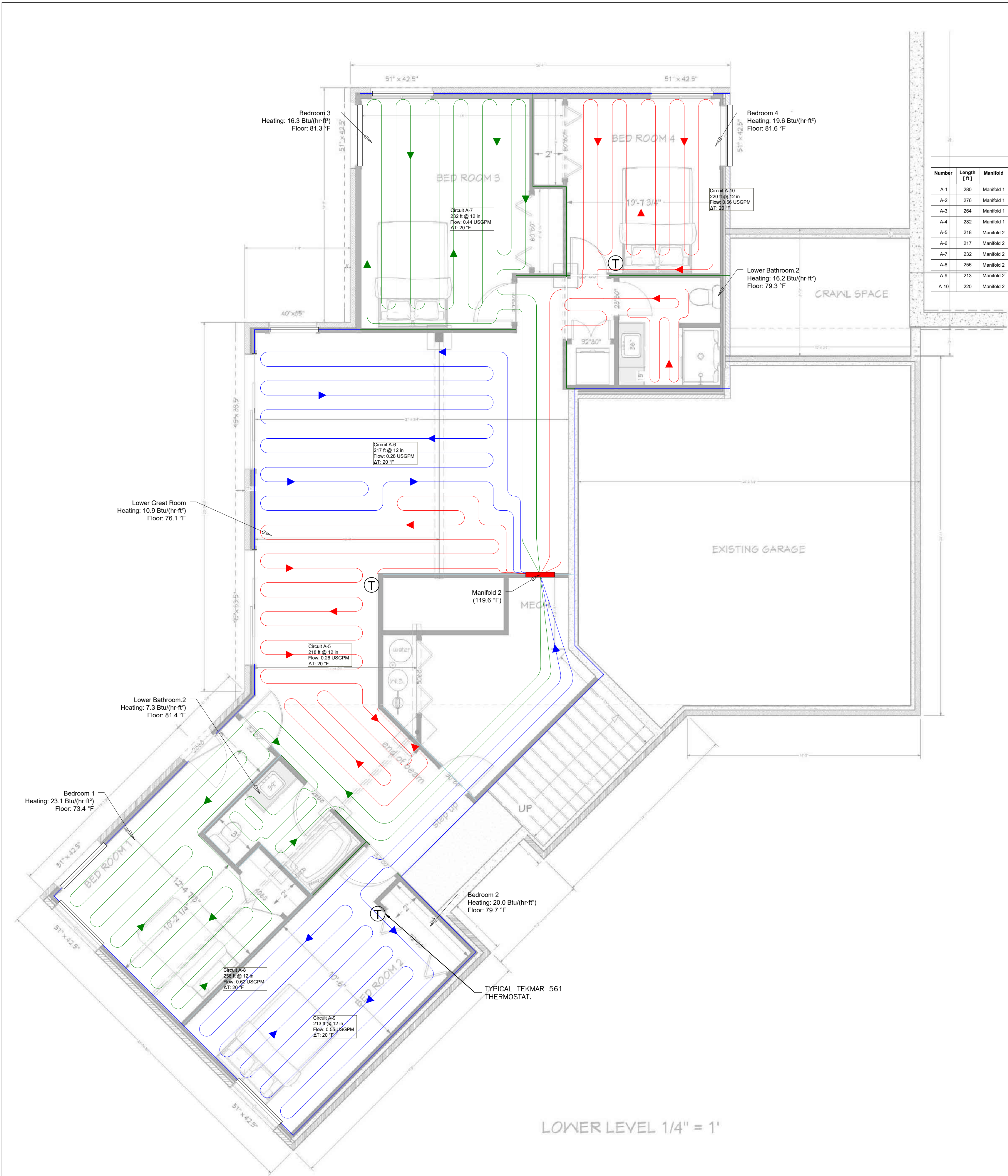
PIPE HANGER RODS AND SUPPORT SPACING				
PIPE DIA. (INCHES)	ROD DIA. (INCHES)	MAX. SUPPORT SPACING (FEET)		
		BLACK IRON	COPPER**	P.V.C. PLASTIC
3/4" & LESS	3/8	6	6	3
1 & 1-1/4	3/8	8	6	3

* HANGER ALSO REQUIRED AT CHANGE OF DIRECTION

PIPE INSULATION	
PIPE INSULATION: PIPING 1.5" OR LESS 1" THICK INSULATION MIN. PIPING 2" OR LARGER 1.5" THICK INSULATION MIN.	

PIPE HANGAR AND INSULATION DETAILS

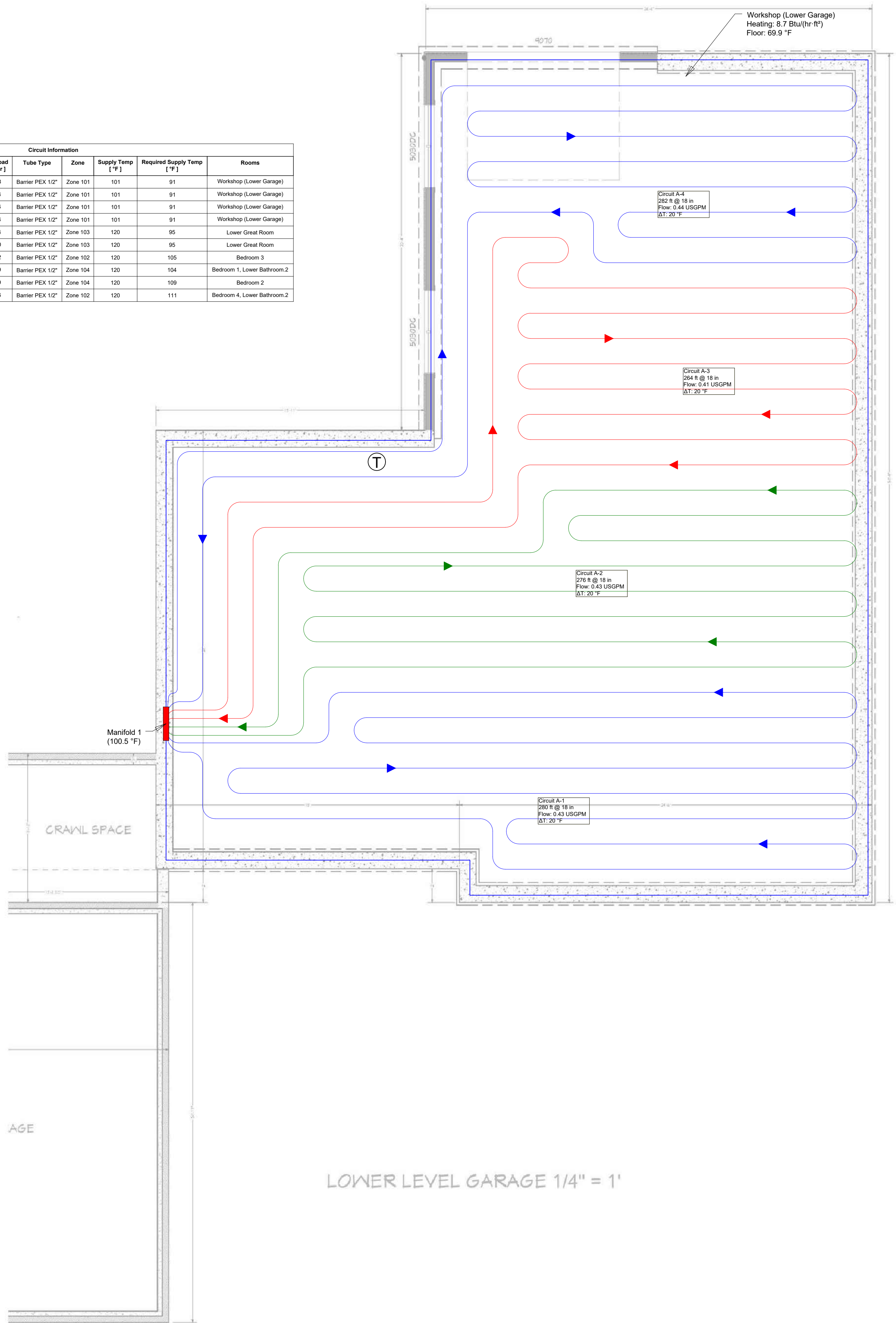
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HOUSE LOWER LEVEL RADIANT HYDRONIC PLAN

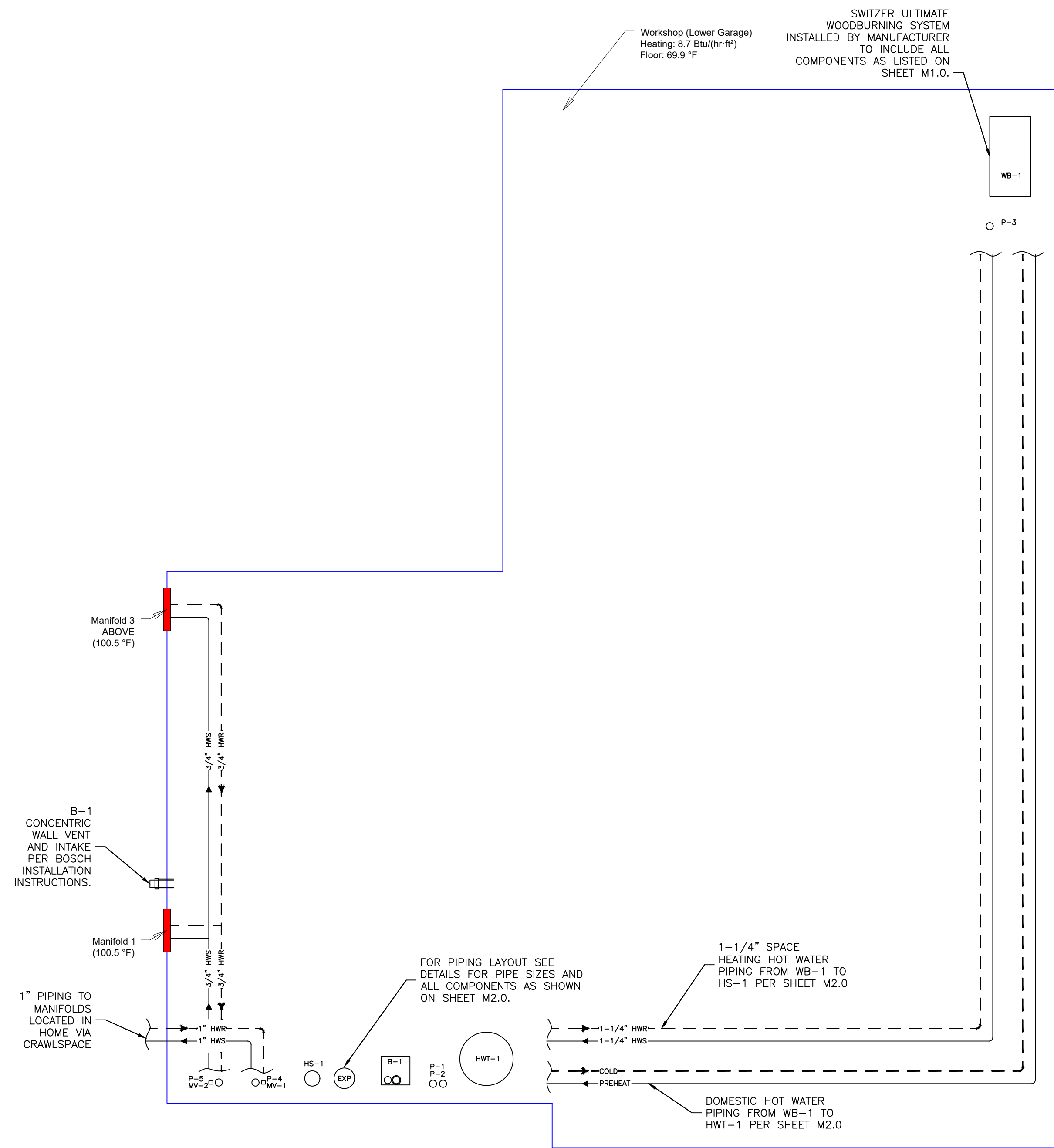
SCALE: 1/4" = 1'-0"

Circuit Information										
Number	Length [ft]	Manifold	Flow [USGPM]	Head Loss [ft water]	Total Load [Btu/hr]	Tube Type	Zone	Supply Temp [°F]	Required Supply Temp [°F]	Rooms
A-1	280	Manifold 1	0.43	2.6	4,318	Barrier PEX 1/2"	Zone 101	101	91	Workshop (Lower Garage)
A-2	276	Manifold 1	0.43	2.6	4,284	Barrier PEX 1/2"	Zone 101	101	91	Workshop (Lower Garage)
A-3	264	Manifold 1	0.41	2.3	4,114	Barrier PEX 1/2"	Zone 101	101	91	Workshop (Lower Garage)
A-4	282	Manifold 1	0.44	2.7	4,364	Barrier PEX 1/2"	Zone 101	101	91	Workshop (Lower Garage)
A-5	218	Manifold 2	0.26	0.8	2,604	Barrier PEX 1/2"	Zone 103	120	95	Lower Great Room
A-6	217	Manifold 2	0.26	0.9	2,780	Barrier PEX 1/2"	Zone 103	120	95	Lower Great Room
A-7	232	Manifold 2	0.44	2.1	4,052	Barrier PEX 1/2"	Zone 102	120	105	Bedroom 3
A-8	256	Manifold 2	0.62	4.3	5,909	Barrier PEX 1/2"	Zone 104	120	104	Bedroom 1, Lower Bathroom 2
A-9	213	Manifold 2	0.55	2.8	5,239	Barrier PEX 1/2"	Zone 104	120	109	Bedroom 2
A-10	220	Manifold 2	0.56	3.1	5,156	Barrier PEX 1/2"	Zone 102	120	111	Bedroom 4, Lower Bathroom 2



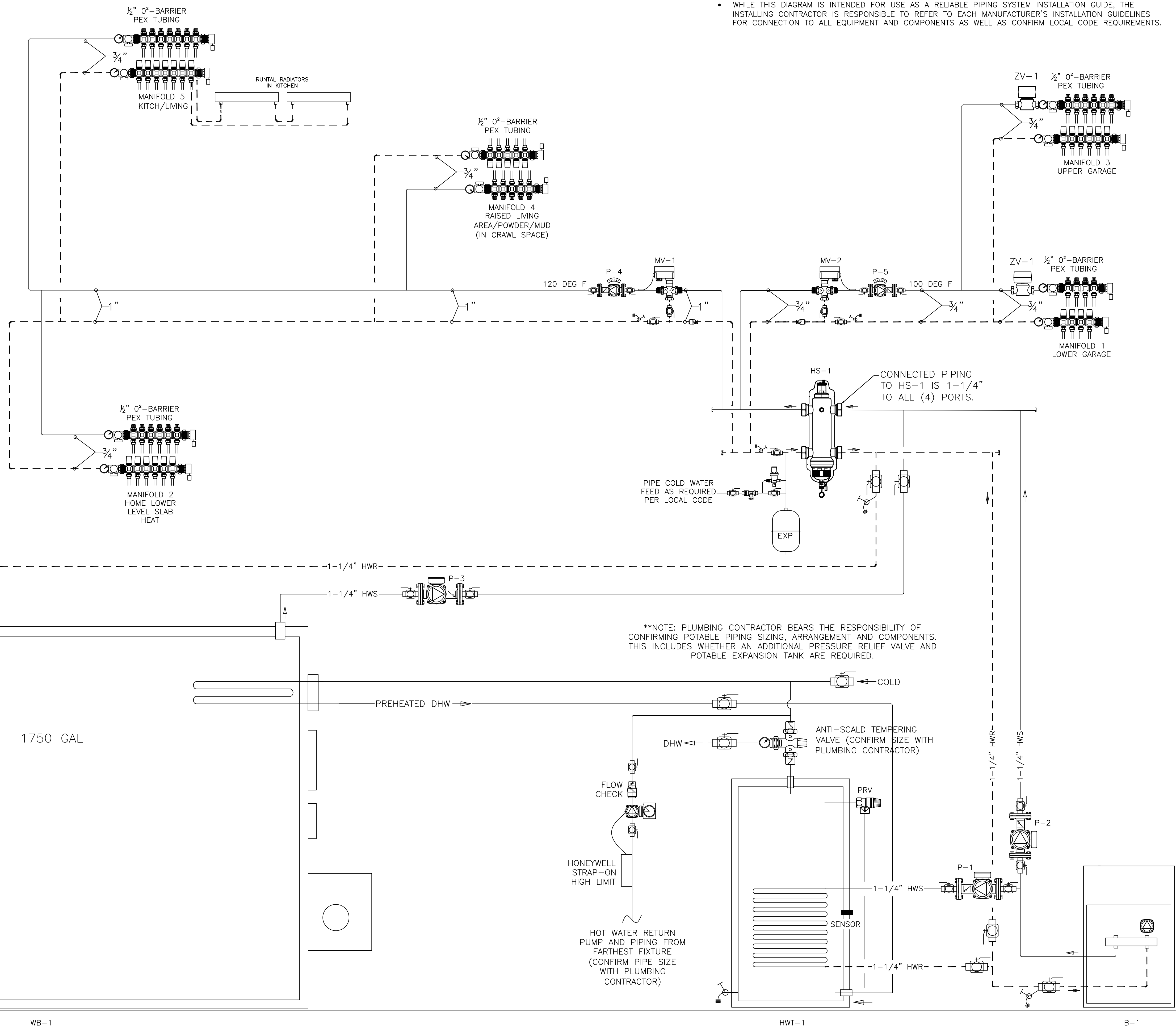
LOWER LEVEL NEW GARAGE RADIANT FLOOR HYDRONIC PLAN

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

SCALE: 1/4" = 1'-0"



- WHILE THIS DIAGRAM IS INTENDED FOR USE AS A RELIABLE PIPING SYSTEM INSTALLATION GUIDE, THE INSTALLING CONTRACTOR IS RESPONSIBLE TO REFER TO EACH MANUFACTURER'S INSTALLATION GUIDELINES FOR CONNECTION TO ALL EQUIPMENT AND COMPONENTS AS WELL AS CONFIRM LOCAL CODE REQUIREMENTS.

****NOTE: PLUMBING CONTRACTOR BEARS THE RESPONSIBILITY OF
CONFIRMING POTABLE PIPING SIZING, ARRANGEMENT AND COMPONENTS.
THIS INCLUDES WHETHER AN ADDITIONAL PRESSURE RELIEF VALVE AND
POTABLE EXPANSION TANK ARE REQUIRED.**

REVISIONS:				
1	02-09-2021	P-4	M-5	UPSIZED POST SUNBOARD LAYOUT SUBMITAL

ACT TITLE:
HYDRONIC FLOW DIAGRAM

SHEET

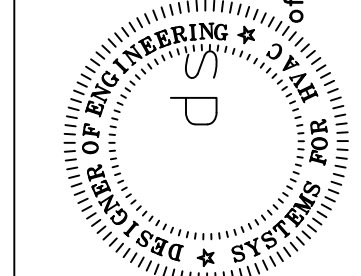
DATE: 01-07

SCALE

PROJECT	DANIEL A. SHRIVER 8746 MIDDLE RD. SOUTH BELOIT, IL 61080
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PROJECT

M2.0

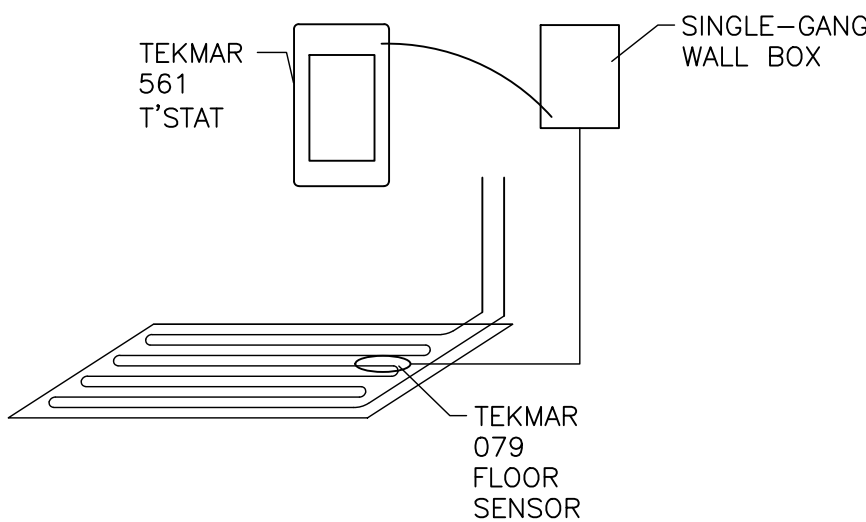


ds design consultants

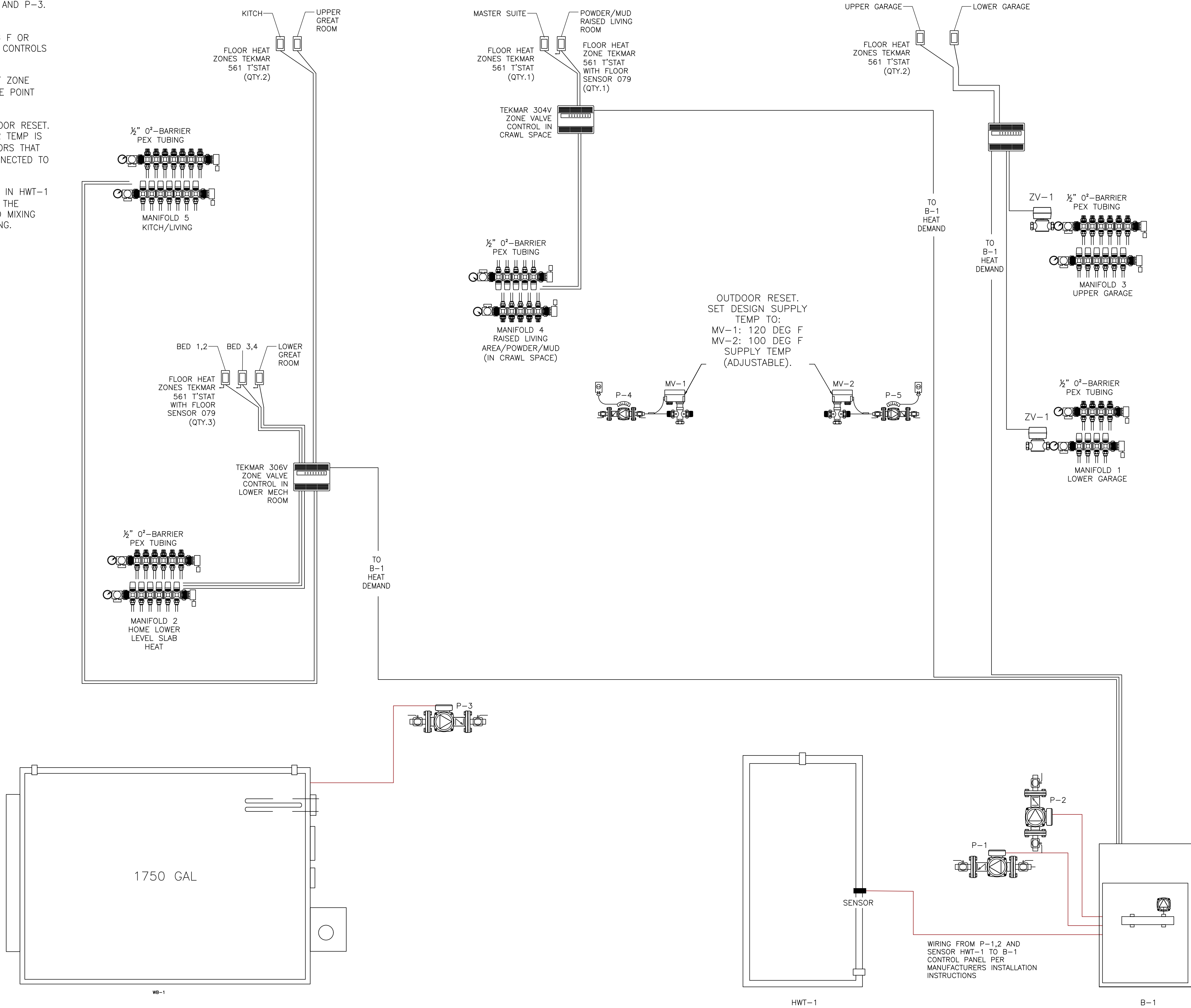
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SEQUENCE OF OPERATION:

1. WB-1 SWITZER WOOD HEATING BOILER SYSTEM:
- THE BOILER MANUFACTURER SHALL SUPPLY ALL CONTROLS NECESSARY TO OPERATE UNIT PROVIDED AND P-3.
- HEATING HOT WATER SHALL BE AVAILABLE WHEN STORAGE IS GREATER THAN 120 DEG F SETPOINT (ADJUSTABLE).
- WHENEVER THE TANK TEMPERATURE SENSOR IN THE 1750 GALLON STORAGE TANK SENSES 120 DEG F OR HIGHER, B-1 SPACE HEATING DEMAND SHALL BE DISABLED BY MEANS OF SWITZER BOILER ON-BOARD CONTROLS END SWITCH.
2. FLOOR HEATING ZONE THERMOSTATS SHALL OPERATE CIRCUIT ACTUATORS ON MANIFOLDS BY MEANS OF ZONE CONTROLLER(S). ZONE CONTROLLERS SHALL SIGNAL B-1 TO OPERATE ON ANY HEAT DEMAND. SEE POINT (1.) ABOVE FOR B-1 HEATING DEMAND DISABLE SEQUENCE.
3. THREE-WAY MIXING VALVES MV-1,2 SHALL CONTROL VARIANT SUPPLY WATER TEMPERATURES VIA OUTDOOR RESET. DESIGN CONDITIONS SETPOINT SHALL DELIVER LISTED SUPPLY WATER TEMPERATURES WHEN OUTDOOR TEMP IS 0 DEG F (ADJUSTABLE). P-4,5 ARE VARIABLE SPEED CIRCULATORS WITH INTERNAL PRESSURE SENSORS THAT ALLOW THE CIRCULATORS TO "GO TO SLEEP" WHEN ALL ZONES ARE CLOSED. P-4,5 SHALL BE CONNECTED TO CONTINUOUS POWER BY MEANS OF A LINE CORD WITH PLUG TO A WALL OUTLET.
4. HWT-1 IS A DOMESTIC HOT WATER TANK WITH INTERNAL COIL AND TANK SENSOR. THE TANK SENSOR IN HWT-1 SHALL SIGNAL B-1 TO OPERATE IF TANK TEMPERATURE DROPS BELOW 120 DEG F. (ADJUSTABLE). THE INCOMING DOMESTIC HOT WATER SHALL BE PRE-HEATED BY WB-1 WHEN AVAILABLE. AN ANTI-SCALD MIXING VALVE ON THE OUTLET DOMESTIC HOT WATER LINE SHALL PROVIDE USER PROTECTION FROM SCALDING.



HOME LOWER LEVEL FLOOR SENSOR DETAIL



REVISIONS: 1 02-09-2021 P-4, M-5 UPSIZED POST SUNBOARD LAYOUT SUBMITTAL

SHEET TITLE:		CONTROLS INFORMATION	
DATE:	01-07-2021	DRAWN BY:	DMS
SCALE:	NONE		

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