

**Heating System Notes** (Unless Otherwise Specified)

- Perimeter Fin Tube systems are designed for up to 230°F water. Refer to design for operating Temperature. Do NOT exceed this temperature or system damage can occur.
- Maintain a water treatment program appropriate for all the materials in the heating system. In addition, the pH of the system water is to be maintained between 6.8 and 8.5.
- All Steel Piping to be Schedule 40.
- Vent high spots in piping mains to prevent air locks.
- Piping runs to be supported as required.
- Installation to follow all state and local codes where applicable.
- Heat Source shall be by General Contractor. General Contractor shall provide and install hot water supply and return line, with flanged connections and ball valves into each greenhouse corridor as indicated on H Drawings, with constant flow at hot water supply temperatures consistent with established ratios of 1:1 from baseline of 160°F HWS at OAT of below -10°F. Refer to below System Design Note.
- All Line Voltage and Low Voltage Wiring, Conduit and Disconnect shall be Supplied and Installed By Electrical Contractor.
- Installing subcontractor will be required to measure, cut, and modify in the field for proper fit per details.
- Attachment to structure shall be supplied by installing subcontractor as required.
- Installing subcontractor will be required to measure and cut all sections of the threaded rod, Unistrut, and related hanging materials based on Field Conditions.
- The installing subcontractor will be required to measure and cut some sections of Expanded Metal Covers based on Field Conditions.
- All Delta Fin material shall be supplied in 12'-0" lengths. Installing Contractor will be required to measure, cut, de-fin, and groove some sections of the Delta Fin SF-125 Fin Pipe and Fin Pipe Covers based on Field Conditions. Fin Covers supplied are a 8'-0" lengths.
- All hanging hardware shall be Galvanized or aluminum
- This is a corrosive environment and proper materials must be used.
- Insulation to be provided for bare aluminum pipe riser with-in zones below the 7 ft. (Off Finished Floor) level in each zone.
- All piping shall be designed with expansion joints where required.
- Installer will be required to assemble zone valve stations and piping connections using appropriate Teflon tape and sealant to insure leak free assembly.
- Installing Contractor shall verify all dimensions at the site making field measurements and shop drawings necessary for fabrication of erection of HVAC and piping systems. Make allowance for beams, pipes, and other obstructions in building construction. Check drawings showing work of other trades and consult with the owner's representative in the event of potential interference. Shop drawings shall be minimum 1/4"=1'-0" scale, indicating fittings, sizes, welds, and configurations and submitted in the latest version of autocad to the engineer for review.
- Fill, Leak Test and Pressure Test system after installation is complete but prior to installation of insulation, to be completed by installing subcontractor.
- Installing Subcontractor shall be responsible for start up and testing of systems.
- Inslab heating shall be PEX6250X tubing with manifold box.
- In-Slab hot water heating systems are designed for 130-140°F water. Do NOT exceed this temperature or system damage can occur.
- The Installer will be required to measure and cut some sections of PEX Delta Tube based on Project design.
- PEX 6250X rolls lengths are 500 or 1000 Feet.
- All exposed piping (including bends) to be insulated.
- All pipes to be labeled with Type and flow direction.
- All Valves to be tagged, provide tagged list mounted under glass in each greenhouse, Fog Room, and Boiler Room. Indicate Size type, water type and location.

Sheet	Description
H1	Greenhouse Heating System Notes & Schedules
H2	Greenhouse Heating System Layout
H2A	Greenhouse Heating System PEX Manifold Box
H3	Greenhouse Heating System PEX Layout
H3A	Greenhouse Heating System PEX Details
H4	Greenhouse Heating Upper & Lower Fin Tube Layout
H4A	Greenhouse Snow Melt Fin Tube Layout
H4B	Fin Tube Details
H4C	Fin Tube Cover & Insulation Details
H5	Tropical Ghse. A Piping Elevation
H5A	Tropical Ghse. B Piping Elevation
H5B	Orchid Intermediate Ghse. A Piping Elevation
H5C	Orchid Intermediate Ghse. B Piping Elevation
H5D	Orchid Cool Ghse. Piping Elevation
H5E	Production Ghse. A Piping Elevation
H5F	Production Ghse. B Piping Elevation
H5G	Corridor Piping Elevation
H6	Mixing Valve Details
H6A	Zone Control Valve Details
H7	Bench Top Heating Layout
H7A	Bench Top Heating Details
H7B	Bench Top Zone Control Valve Details

GREENHOUSE HEATING SYSTEM DESIGN REQUIREMENTS - PEX TUBE	
Inside Temperature:	58 °F (Average based on 65°, 62°, 52°, 62°, 42°, 65° temps )
Outside Temperature:	-15 °F
Temperature Difference:	73 °F (Average based on 80°, 77°, 67°, 77°, 57°, 80° temps )
Hot Water Supply	130 °F
Hot Water Return	110 °F
Temperature Differential:	20 °F
Relief Valve Pressure:	30psi
Operating Pressure:	12psi
<b>DESIGN FLOW RATE FOR EACH AREA AS FOLLOWS:</b>	
PEX Floor Heat Minimum Flow Req	51 GPM

GREENHOUSE HEATING SYSTEM DESIGN REQUIREMENTS - Delta Fin Pipe	
Inside Temperature:	58 °F (Average based on 65°, 62°, 52°, 62°, 42°, 65° temps )
Outside Temperature:	-15 °F
Temperature Difference:	73 °F (Average based on 80°, 77°, 67°, 77°, 57°, 80° temps )
Hot Water Supply	160 °F
Hot Water Return	140 °F
Temperature Differential:	20 °F
Relief Valve Pressure:	30psi
Operating Pressure:	12psi
<b>DESIGN FLOW RATE FOR EACH AREA AS FOLLOWS:</b>	
Delta Fin Heat Minimum Flow Req	177 GPM

**GREENHOUSE HEATING SYSTEM DESIGN NOTE**  
System to Accommodate 1:1 water temp. reset ratio to 60 °F outdoor / 90 °F HWS

System Specs				
Temp	Volume	BTU Potential	GPM	pH
160°F *	668.7 Gallons	2,158,348 BTU per hour	225 GPM	6.8 - 8.5
* 160°F Water Temp for Peak Load when outside temp is -10°F and below.				

Zone Valves - Delta Fin SF-125										Actuator			Flow Control				Detail
Item	Qty	Location	Type	Brand	Valve Model	Size	CV	Brand	Model	VAC	Brand	Model	GPM	Size	Detail Sheet		
ZF-1	2	Tropical - Lower Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0110	11	1 1/4"	H6A		
ZF-2	2	Tropical - Upper Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0120	12	1 1/4"	H6A		
ZF-3	2	Orchids - Upper Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0100	10	1 1/4"	H6A		
ZF-4	1	Orchids Cool - Upper Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0130	13	1 1/4"	H6A		
ZF-5	1	Production - Lower Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0150	15	1 1/4"	H6A		
ZF-6	1	Production - Upper Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0160	16	1 1/4"	H6A		
ZF-7	1	Production - Lower Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0150	15	1 1/4"	H6A		
ZF-8	1	Production - Upper Fin	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0160	16	1 1/4"	H6A		
ZF-9	1	Corridor	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0140	14	1 1/4"	H6A		
ZF-10	1	Snow Melt Loop - North	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0060	6	1 1/4"	H6A		
ZF-11	1	Snow Melt Loop - Corridor	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0060	6	1 1/4"	H6A		
ZF-12	1	Snow Melt Loop - South	3-Way	Belimo	B330+ARB24-3-S	1 1/2"	19.0	Belimo	ARB24-3-S	24	Flow Design	YRH125-0060	6	1 1/4"	H6A		

Mixing Group - PEX Manifold										Control Valve			Actuator			Pump					Flow Control				Detail
Item	Qty	Location	Type	Brand	Model	Size	CV	Brand	Model	VAC	Brand	Model	Flange	GPM	Ft Hd	HP	VAC	Ø	Amps	Hz	Brand	Model	GPM	Size	Detail Sheet
ZP-1	1	Tropical	3-Way Mixing	Belimo	B239	1 1/2"	68.0	Belimo	ARB24-3-S	24	Grundfos	UP 26-64F	1 1/2" GF	12.0	11.6	1/12	120	1	0.74/0.43	60	Flow Design	YRH125-0120	12	1 1/4"	H6
ZP-2	1	Orchid Intermediate	3-Way Mixing	Belimo	B239	1 1/2"	68.0	Belimo	ARB24-3-S	24	Grundfos	UP 15-58F	1 1/2" GF	9.0	12.6	1/25	120	1	0.75	60	Flow Design	YRH125-0090	9	1 1/4"	H6
ZP-3	1	Orchid Cool	3-Way Mixing	Belimo	B239	1 1/2"	68.0	Belimo	ARB24-3-S	24	Grundfos	UP 15-58F	1 1/2" GF	3.0	13.6	1/25	120	1	0.75	60	Flow Design	YRH125-0003	3	1 1/4"	H6
ZP-4	1	Production	3-Way Mixing	Belimo	B239	1 1/2"	68.0	Belimo	ARB24-3-S	24	Grundfos	UP 26-64F	1 1/2" GF	12.0	14.6	1/12	120	1	0.74/0.43	60	Flow Design	YRH125-0120	12	1 1/4"	H6
ZP-5	1	Production	3-Way Mixing	Belimo	B239	1 1/2"	68.0	Belimo	ARB24-3-S	24	Grundfos	UP 26-64F	1 1/2" GF	12.0	15.6	1/12	120	1	0.74/0.43	60	Flow Design	YRH125-0120	12	1 1/4"	H6

Zone Valves - Bench Top Heat										Actuator			Flow Control				Detail
Item	Qty	Location	Type	Brand	Valve Model	Size	CV	Brand	Model	VAC	Brand	Model	GPM	Size	Detail Sheet		
ZB-1	1	Orchid Int.	3-Way	Honeywell	VCZMR6100	1"	8.6	Honeywell	VC2714ZZ11	24	Flow Design	YR0100F	1	1"	H7C		
ZB-2	2	Production	3-Way	Honeywell	VCZMR6100	1"	8.6	Honeywell	VC2714ZZ11	24	Flow Design	YR0100F	1	1"	H7C		

Bench Top Heating System Design Requirments - Delta SD Tube	
HOT WATER SUPPLY TEMP:	135°
HOT WATER RETURN TEMP:	115°
TEMPERATURE DIFFERENTIAL:	20°
RELIEF VALVE:	30 PSI
OPERATING PRESSURE	12-15 PSI STATIC
PRODUCTION ZONE BTU POTENTIAL	10,000 BTUH
ORCHID ZONE BTU POTENTIAL	10,000 BTUH

- Radiation - Delta SD Tube**
- Refer to Drawings H7 for Delta Tube Layout H7A & H7B for the details.
  - Bench-Top and In-Slab hot water heating systems are designed for 130-140°F water. Do NOT exceed this temperature or system damage can occur.
  - The Installer will be required to measure and cut some sections of SD Delta Tube based on Project design.
  - Standard roll lengths for Delta Tube are 500 or 1000 Feet.

**MSR** 710 South 2nd Street, 8th Floor  
Minneapolis, Minnesota 55401-3282  
Architecture 612.375.0336 tel  
Interiors and 612.342.2216 fax  
Urban Design www.msrdesign.com

Civil Engineer  
**Vierbicher Associates, Inc.**  
999 Fournier Drive, Suite 201  
Madison, WI 53717  
608.826.0532 tel

Landscape Architect  
**Ken Saiki Design, Inc.**  
303 South Paterson Street, Suite 1  
Madison, WI 53703  
608.251.3600 tel

Structural Engineer, Technology and AV  
**IMEG Corp.**  
1800 Deming Way, Suite 200  
Middleton, WI 53562  
608.223.9800 tel

MEP Engineer  
**MEP Associates, LLC**  
860 Blue Garden Road, Suite 175  
Eagan, MN 55121  
651.379.9120 tel

Fire Protection Engineer and Code Consultant  
**Summit Fire Consulting**  
575 Minnehaha Ave West  
St. Paul, MN 55103  
651.251.1880 tel

Greenhouse Design  
**Rough Brothers, Inc.**  
5513 Vine Street  
Cincinnati, OH 45217  
513.242.0310 tel

**Olbrich Botanical Gardens**  
**Expansion Phase 1**  
BPW Project # 8162  
3330 Atwood Avenue  
Madison, WI 53704

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Signature: *Daniel Jack Poling*  
Print Names: Jack Poling  
Date: JUNE 4, 2018 License No.: A-8984

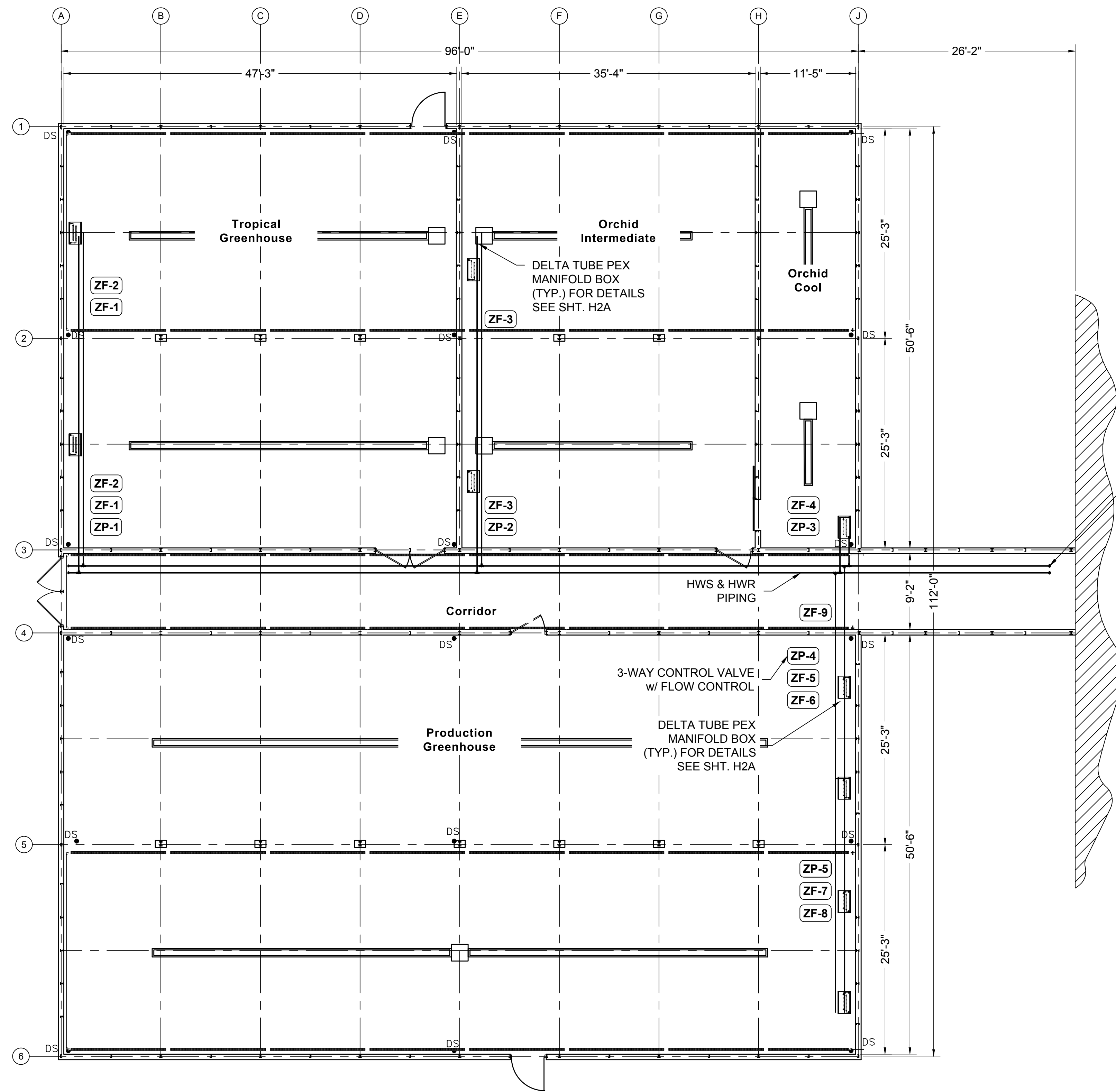
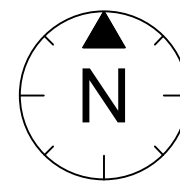
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**GREENHOUSE HEATING SYSTEM NOTES & SCHEDULES**

EXHIBIT I  
**H1**





SUPPLY AND RETURN LINES FOR FIN TUBE HEATING SYSTEM SHALL BE BROUGHT INTO THE GREEN HOUSE CORRIDOR BY MECHANICAL CONTRACTOR WITH A FLANGED CONNECTION AND A BALL VALVE

System Piping Layout  
Scale: 1/8" = 1'-0"

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Minneapolis, Minnesota 55401-2282  
Architecture 612.375.0336 tel  
Interiors and 612.342.2216 fax  
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Civil Engineer  
**Verbicher Associates, Inc.**  
999 Fourier Drive, Suite 201  
Madison, WI 53717  
608.826.0532 tel

Landscape Architect  
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303 South Paterson Street, Suite 1  
Madison, WI 53703  
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Middleton, WI 53562  
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MEP Engineer  
**MEP Associates, LLC**  
660 Blue Geranium Road, Suite 175  
Eagan, MN 55121  
651.379.9120 tel

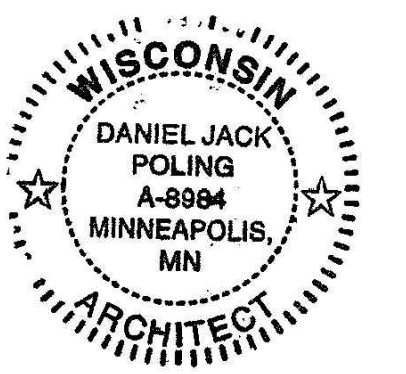
Fire Protection Engineer and Code Consultant  
**Summit Fire Consulting**  
575 Minnehaha Ave West  
St. Paul, MN 55103  
651.251.1880 tel

Greenhouse Design  
**Rough Brothers, Inc.**  
5513 Vine Street  
Cincinnati, OH 45217  
513.242.0310 tel

# Olbrich Botanical Gardens Expansion Phase 1

BPW Project # 8162  
3330 Atwood Avenue  
Madison, WI 53704

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ARCHITECT SEAL



Signature: *Daniel Jack Poling*  
Print Name: Jack Poling  
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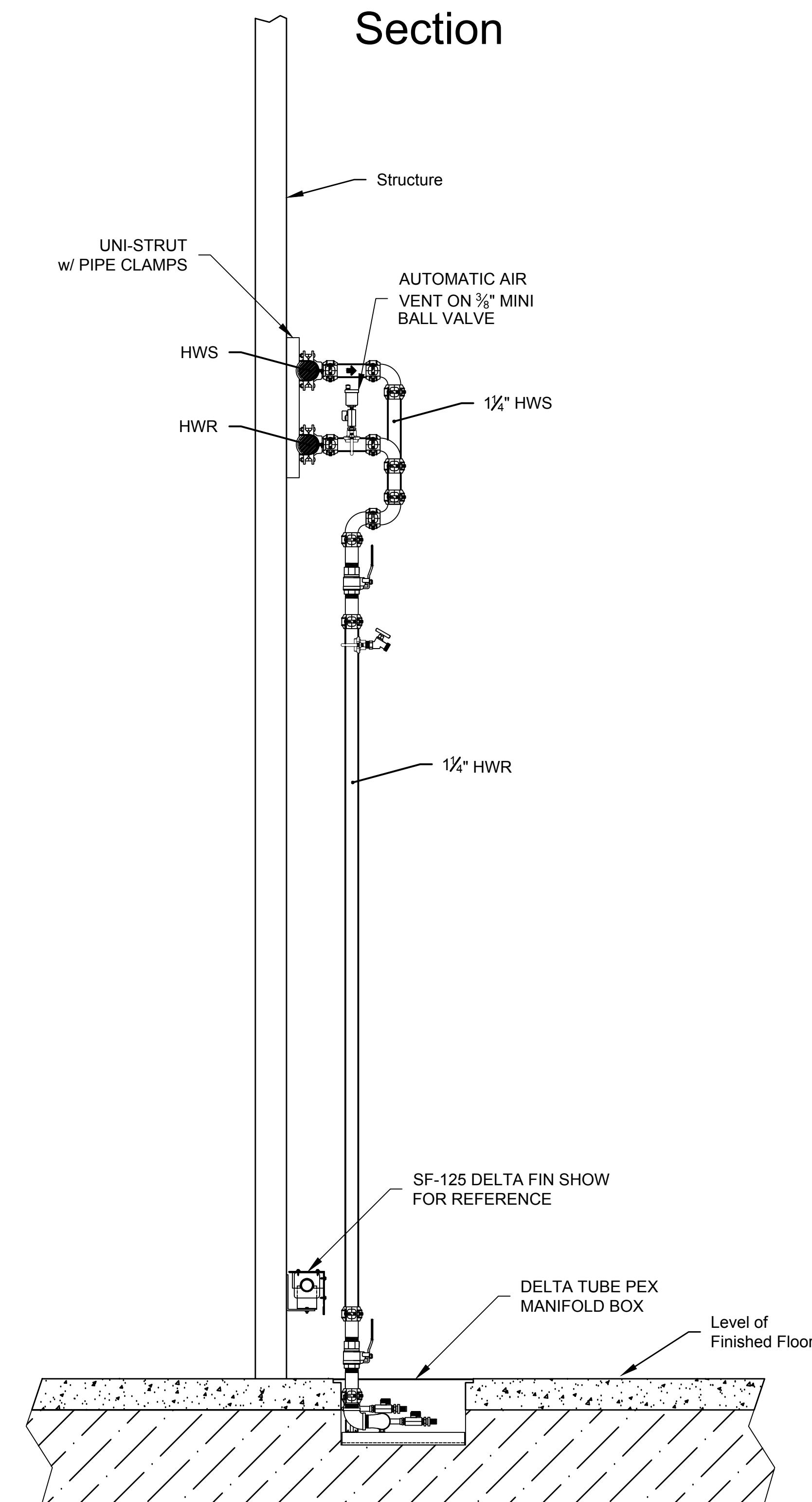
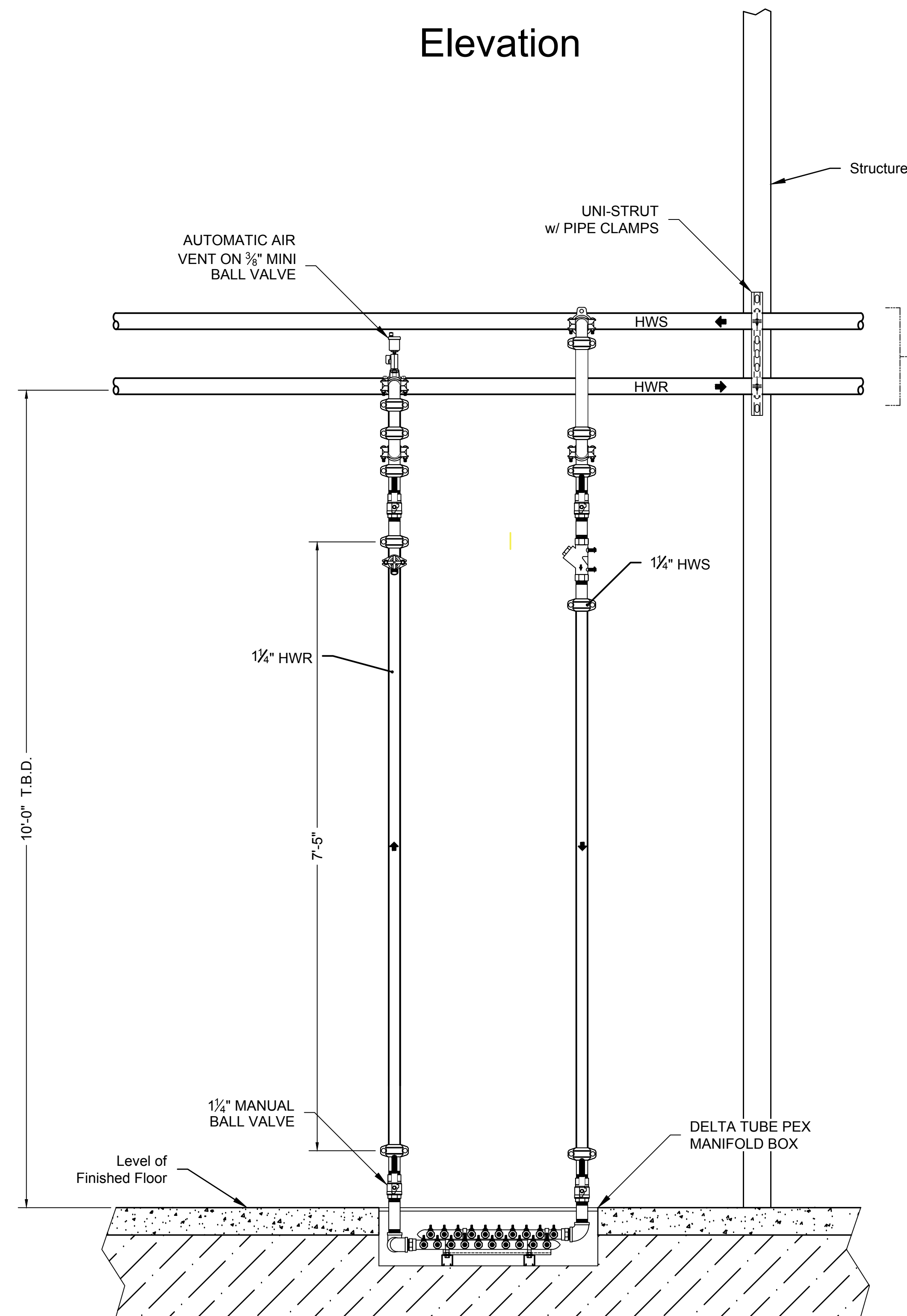
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	05-04-2018	90% CD SUBMISSION
	06-01-2018	BID ISSUE
	06-04-2018	PERMIT ISSUE

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PROJECT PHASE:  
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DRAWN BY:  
JP  
CHECKED BY:

## GREENHOUSE HEATING SYSTEM LAYOUT

### EXHIBIT I H2

Heating System Notes (Unless Otherwise Specified)	
1.	All exposed piping (including bends) to be insulated.
2.	All pipes to be labeled with Typ and flow direction.
3.	All Valves to be tagged, provide tagged list mounted under glass in each greenhouse, Fog Room, and Boiler Room. Indicate Size type, water type and location.



System Piping to PEX Manifold Box  
Scale: 1" = 1'-0"

MSR 710 South 2nd Street, 8th Floor  
Minneapolis, Minnesota 55401-2282  
Architecture 612.375.0336 tel  
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Civil Engineer  
Vierbicher Associates, Inc.

999 Fourier Drive, Suite 201  
Madison, WI 53717  
608.826.0532 tel

Landscape Architect  
Ken Saiki Design, Inc.

303 South Paterson Street, Suite 1  
Madison, WI 53703  
608.251.3600 tel

Structural Engineer, Technology and AV  
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1800 Deming Way, Suite 200  
Middleton, WI 53562  
608.223.9600 tel

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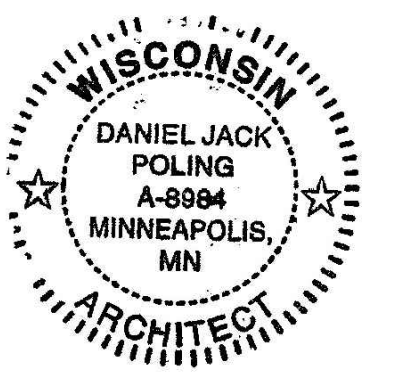
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St. Paul, MN 55103  
651.251.1880 tel

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5513 Vine Street  
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Signature: *[Handwritten Signature]*  
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Date: JUNE 4, 2018 License No.: A-9984

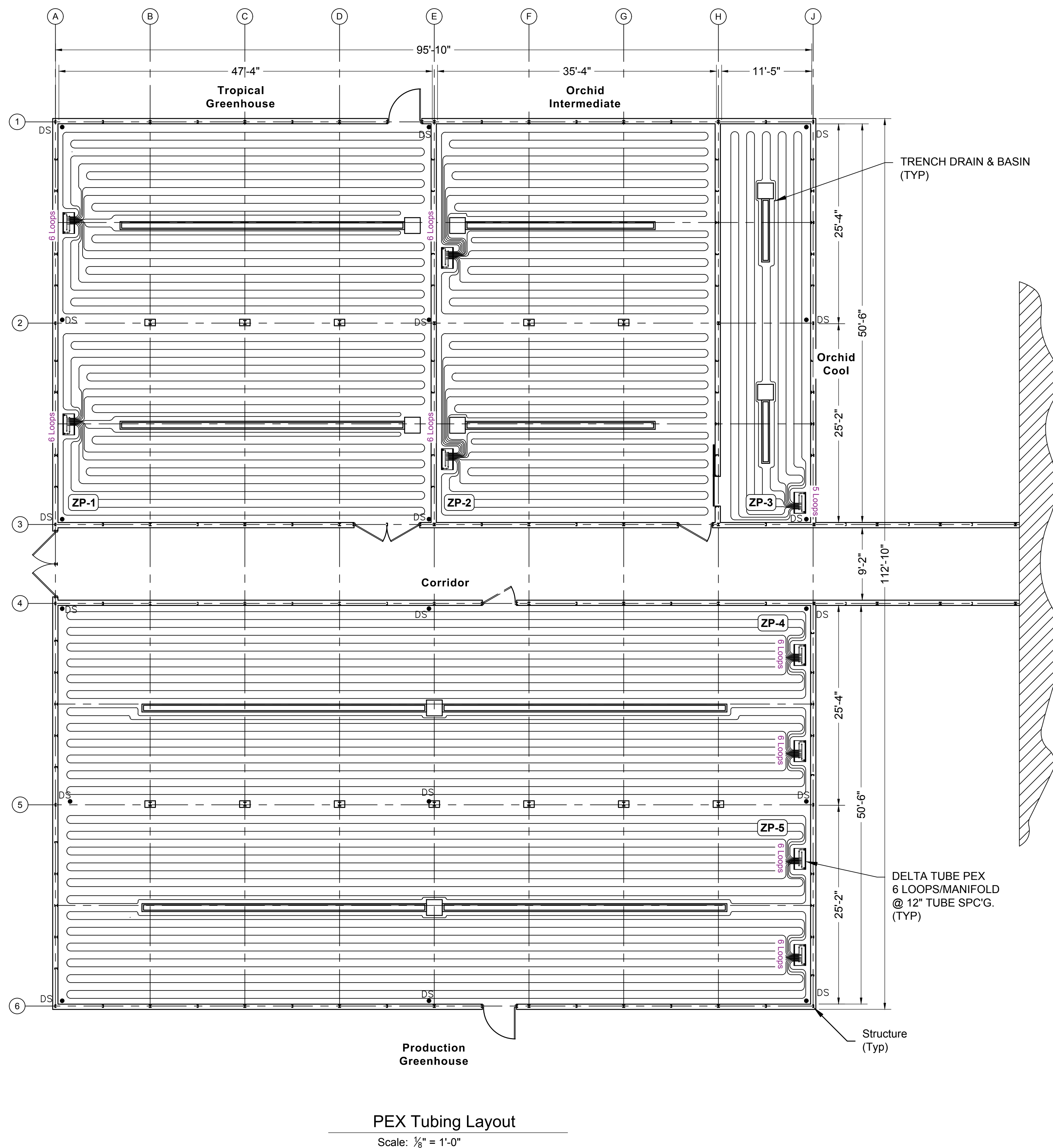
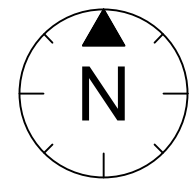
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JP CHECKED BY:

GREENHOUSE  
HEATING SYSTEM PEX  
MANIFOLD BOX

EXHIBIT I  
H2A





Note: Piping shown outside the greenhouse for clarity only.

**MSR** 710 South 2nd Street, 8th Floor  
Minneapolis, Minnesota 55401-2282  
Architecture 612.375.0336 tel  
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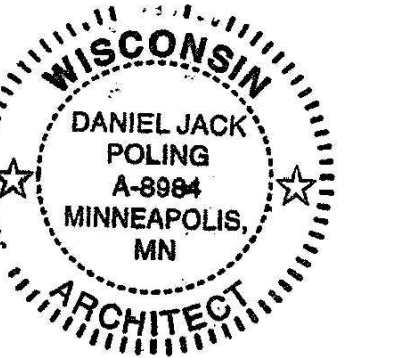
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Cincinnati, OH 45217  
513.242.0310 tel

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GREENHOUSE HEATING SYSTEM PEX LAYOUT

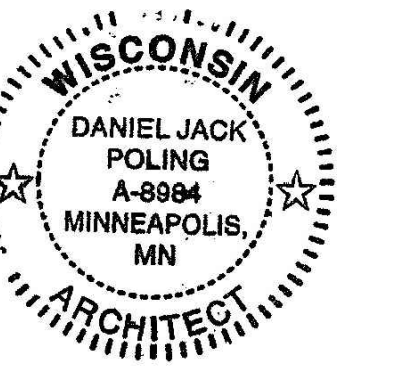
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H3



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 Expansion Phase 1**  
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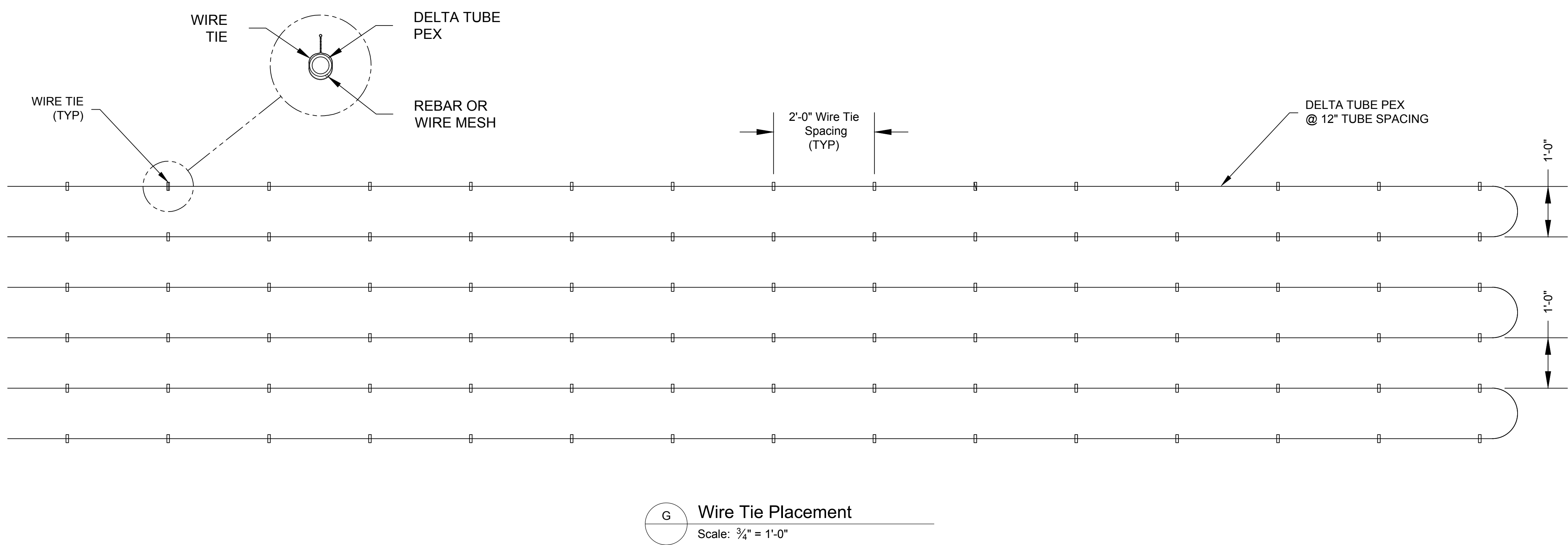
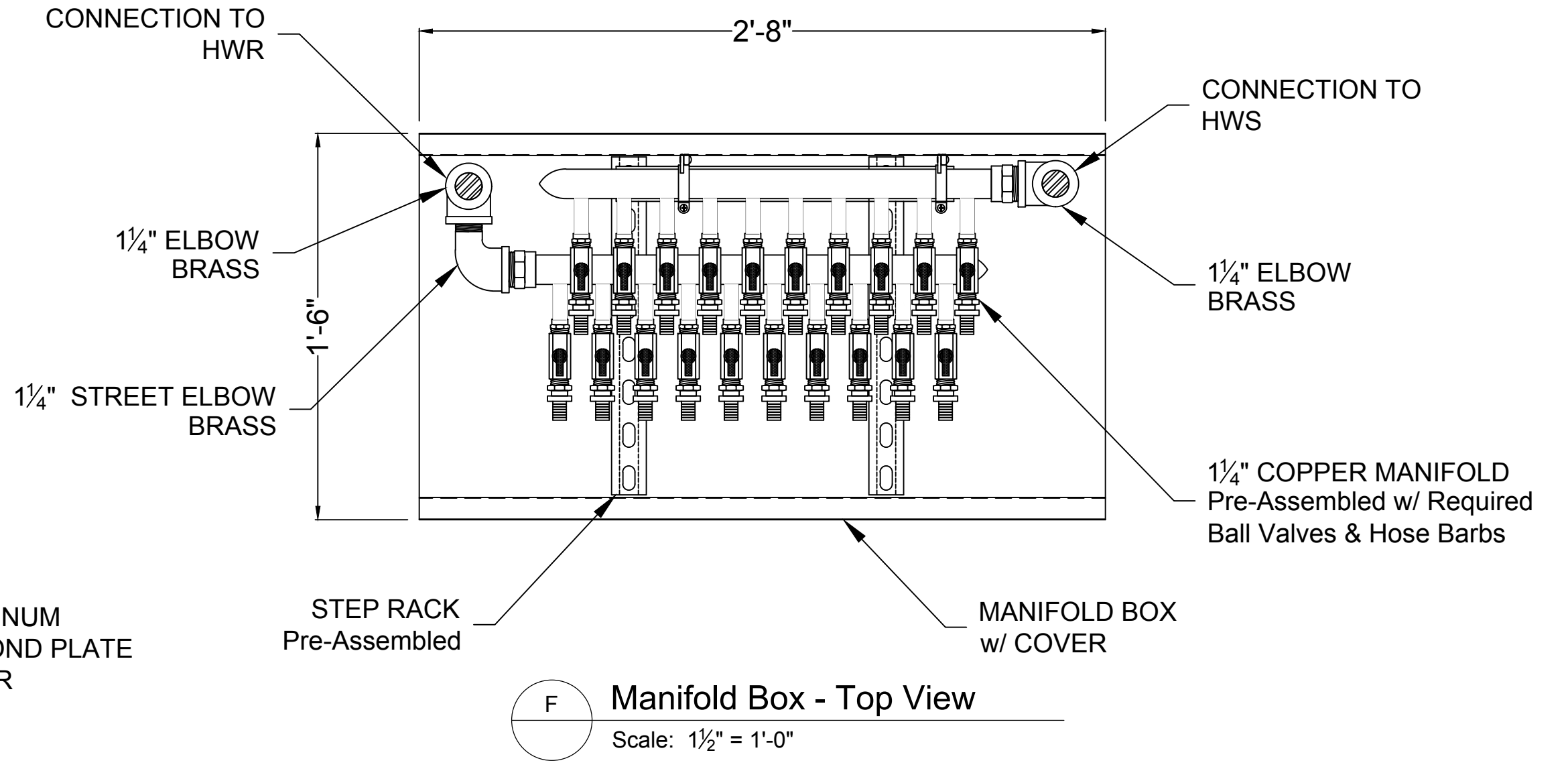
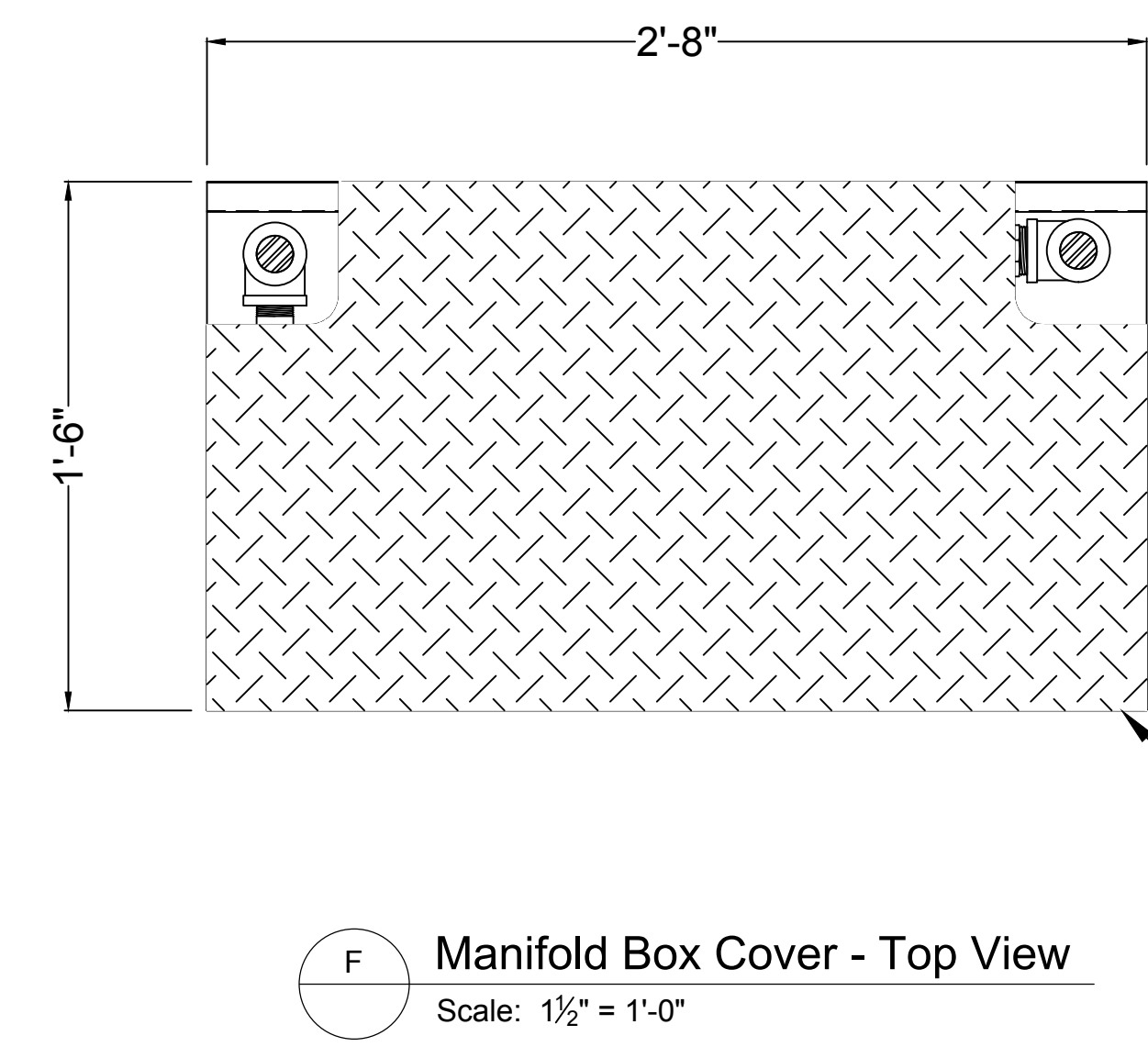
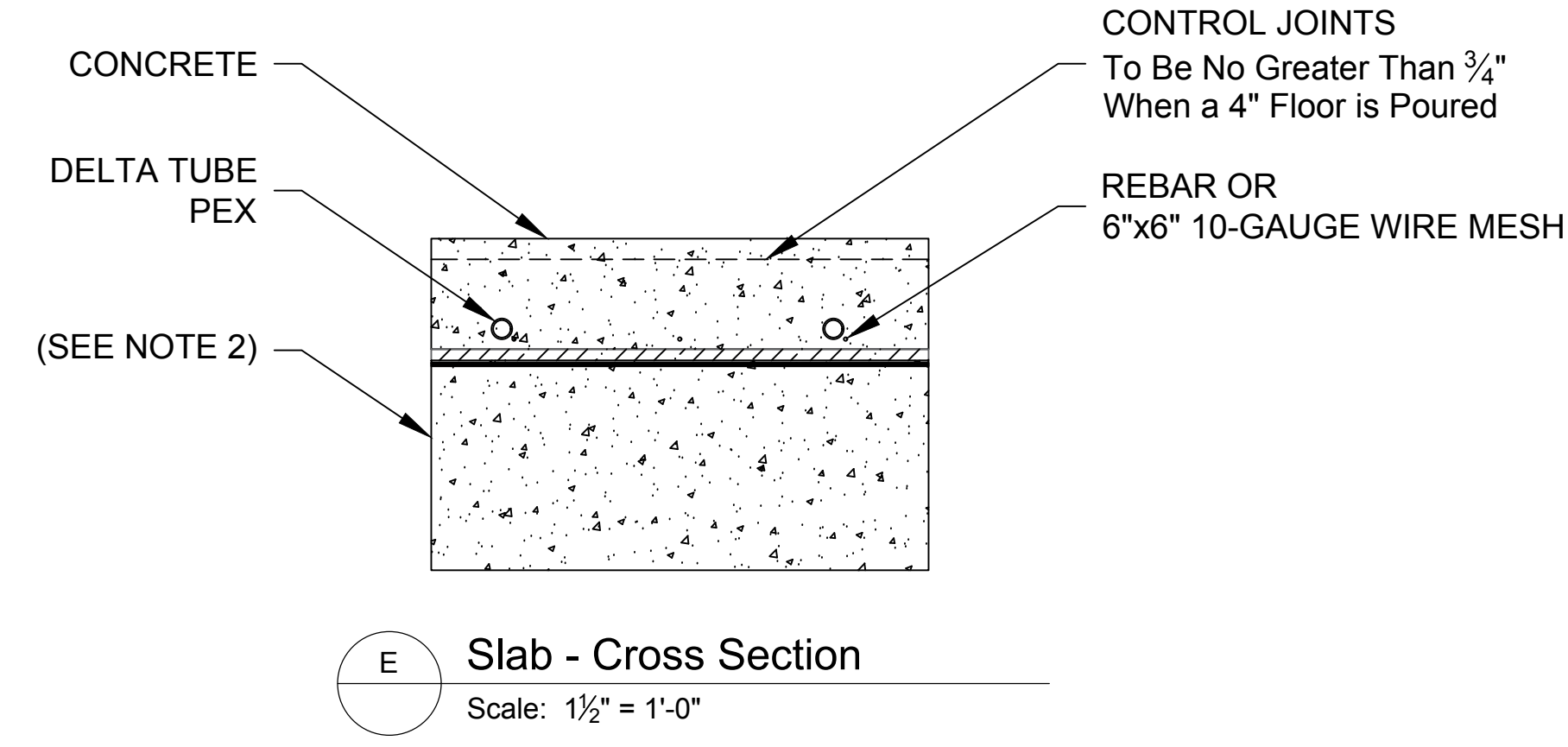
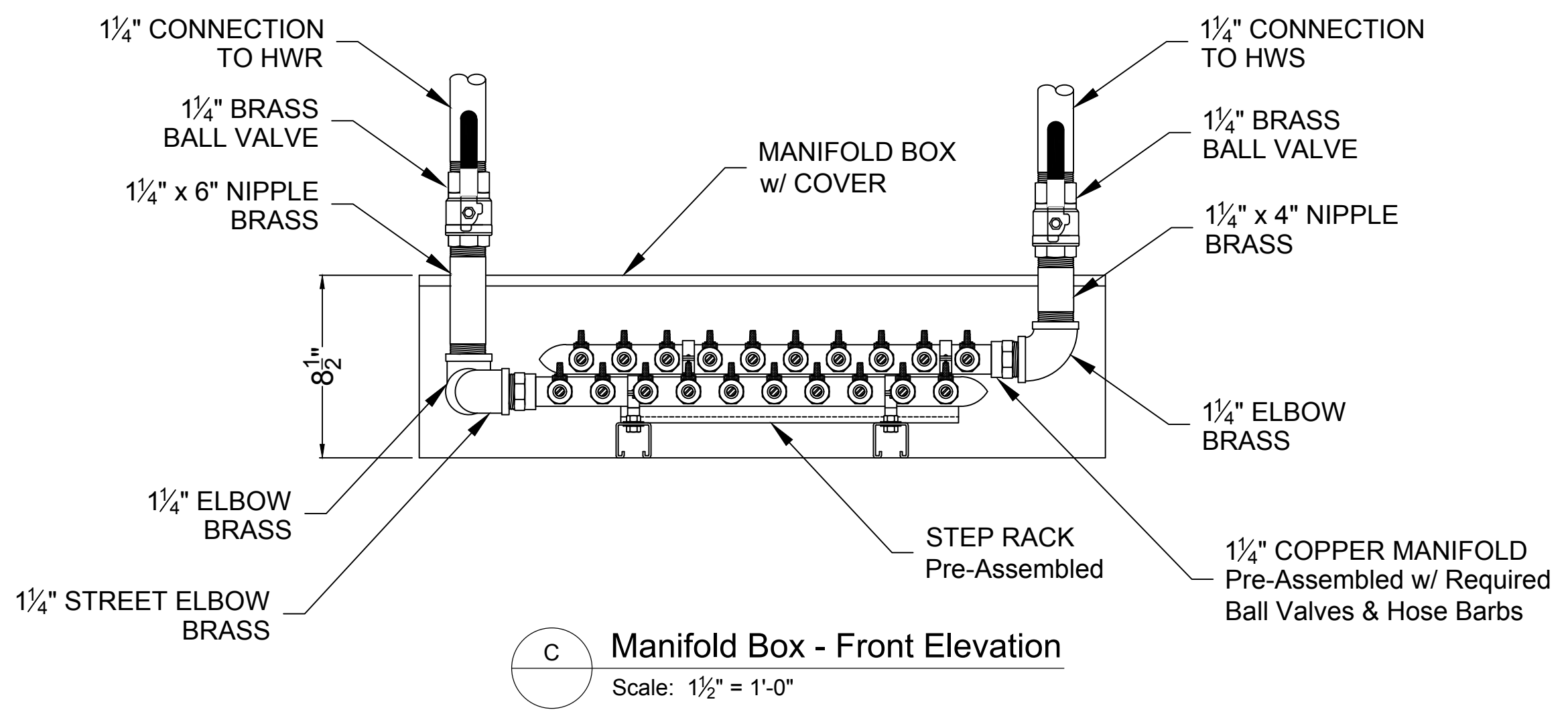
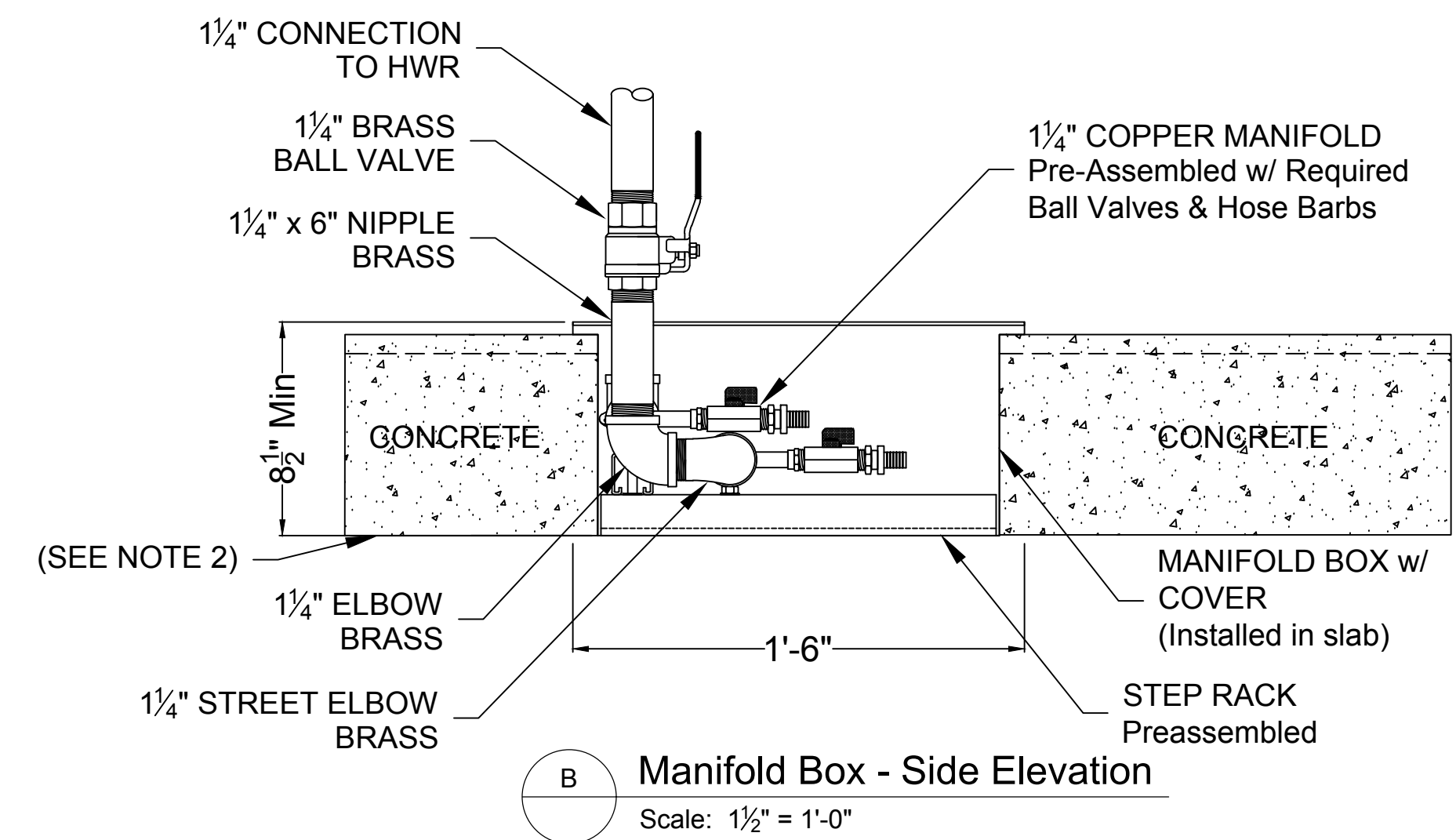
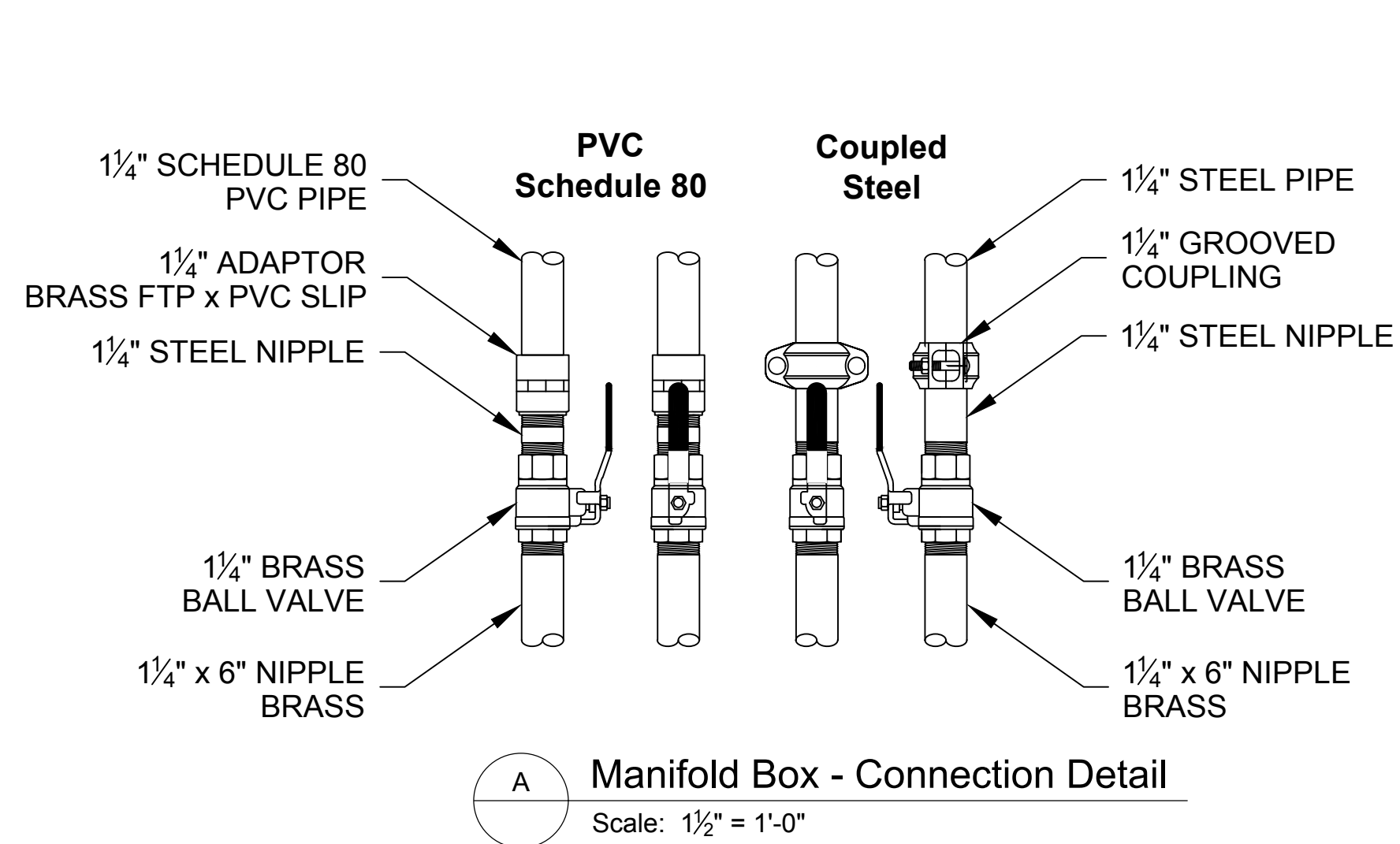
Signature: *Daniel Jack Poling*  
 Print Name: Jack Poling  
 Date: JUNE 4, 2018 License No.: A-9384

ISSUE	DATE	DESCRIPTION
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	12.08.2017	DD PRICING SET
	01.10.2018	DESIGN DEVELOPMENT SUBMISSION
	01.17.2018	UDC SUBMISSION
	03.30.2018	70% CD PRICING ISSUE
	04.08.2018	PARKING LOT AND SITE PLAN SUBMISSION
	05.04.2018	90% CD SUBMISSION
	06.01.2018	BID ISSUE
	06.04.2018	PERMIT ISSUE

PROJECT NO:  
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 PROJECT PHASE:  
**BID DOCUMENTS**  
 DRAWN BY:  
**JP** CHECKED BY:  
**JP**  
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**GREENHOUSE  
 HEATING SYSTEM  
 PEX DETAILS**

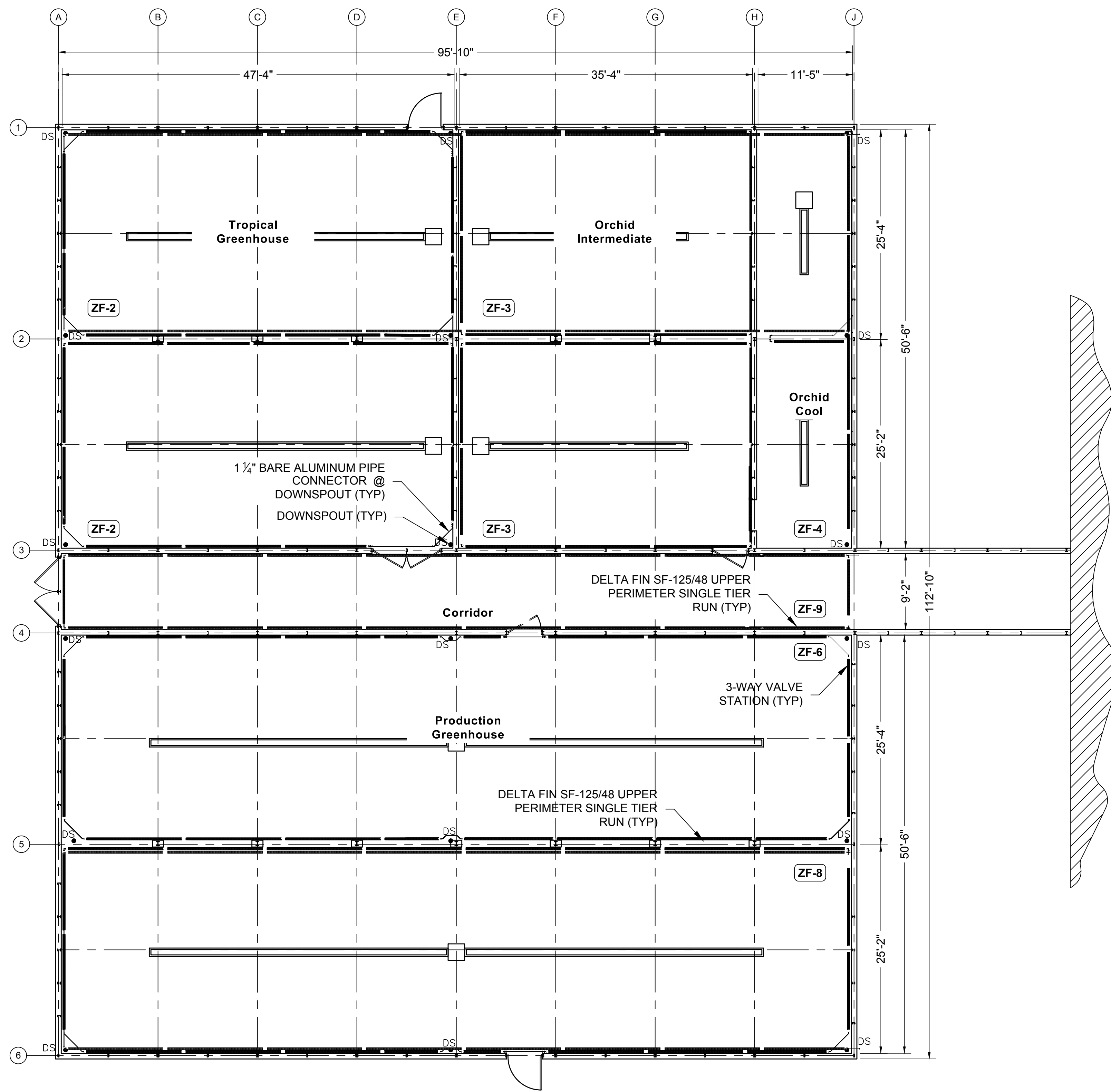
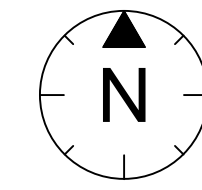
**EXHIBIT I  
 H3A**



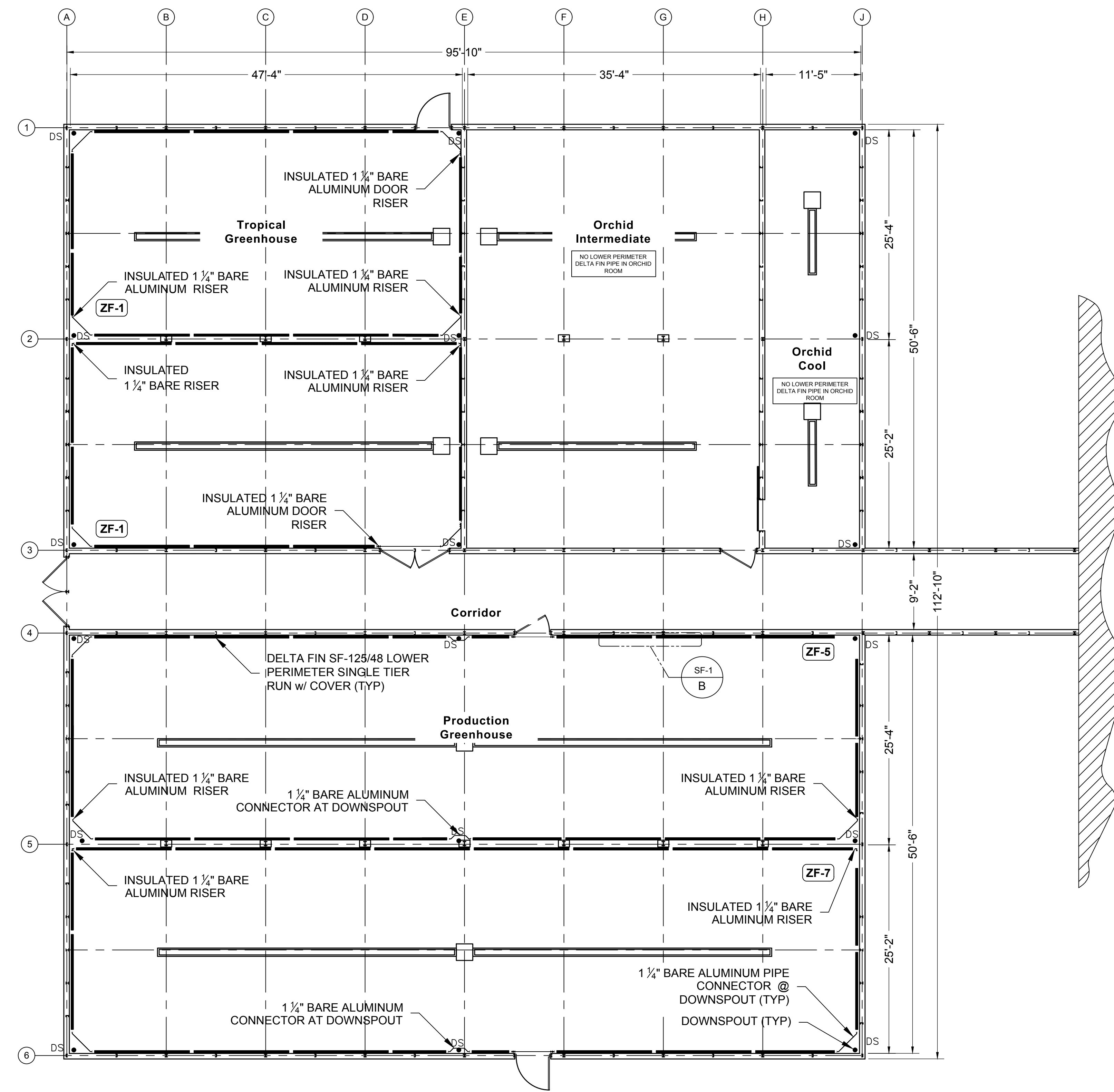
**Notes** (Unless Otherwise Specified)

1	Floor Heat Water System is designed for 130°F - <b>DO NOT EXCEED THIS TEMPERATURE.</b> Failure to comply will result in System Damage
2	For slab details refer to <b>S-Series Drawings</b> and sheet G002 FL-1
3	All tubing loops to be one piece - <b>DO NOT SPLICE TUBING IN CONCRETE FLOOR.</b>
4	Install tubing on 12 inch center with a minimum radius of 6 Inch on all loops.
5	Install all tubing 6" to 12" from all outside walls and floor drains.
6	Tie tubing to rebar or 6"x6" 10-gauge wire mesh every 2.0 Feet
7	<b>PRESSURE TEST TUBING WITH 40 PSI AIR PRIOR AND DURING CONCRETE POUR BY INSTALLING SUBCONTRACTOR</b>
8	Installation to follow all state and local codes where applicable.
9	This Drawing to be used in conjunction with Delta T Installation & Operating Instructions for PEX Tube by installing subcontractor.

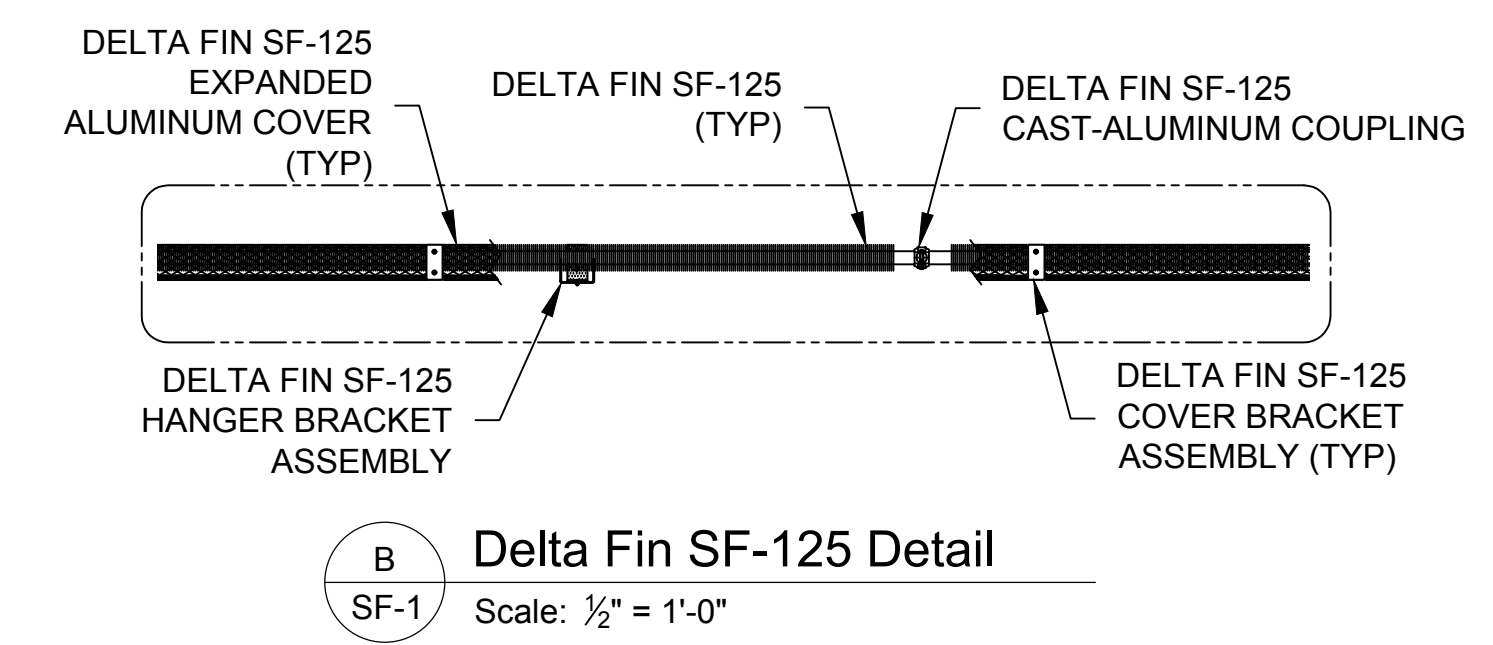




Upper Fin Tube Layout  
Scale: 1/8" = 1'-0"



Lower Fin Tube Layout  
Scale: 1/8" = 1'-0"



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Interiors and 612.342.2216 fax  
Urban Design www.msrdesign.com

Civil Engineer  
**Vierbicher Associates, Inc.**  
999 Fournier Drive, Suite 201  
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608.826.0532 tel

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Madison, WI 53703  
608.251.3600 tel

Structural Engineer, Technology and AV  
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Middleton, WI 53562  
608.223.9600 tel

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**MEP Associates, LLC**  
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Cajon, MN 55121  
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**Expansion Phase 1**  
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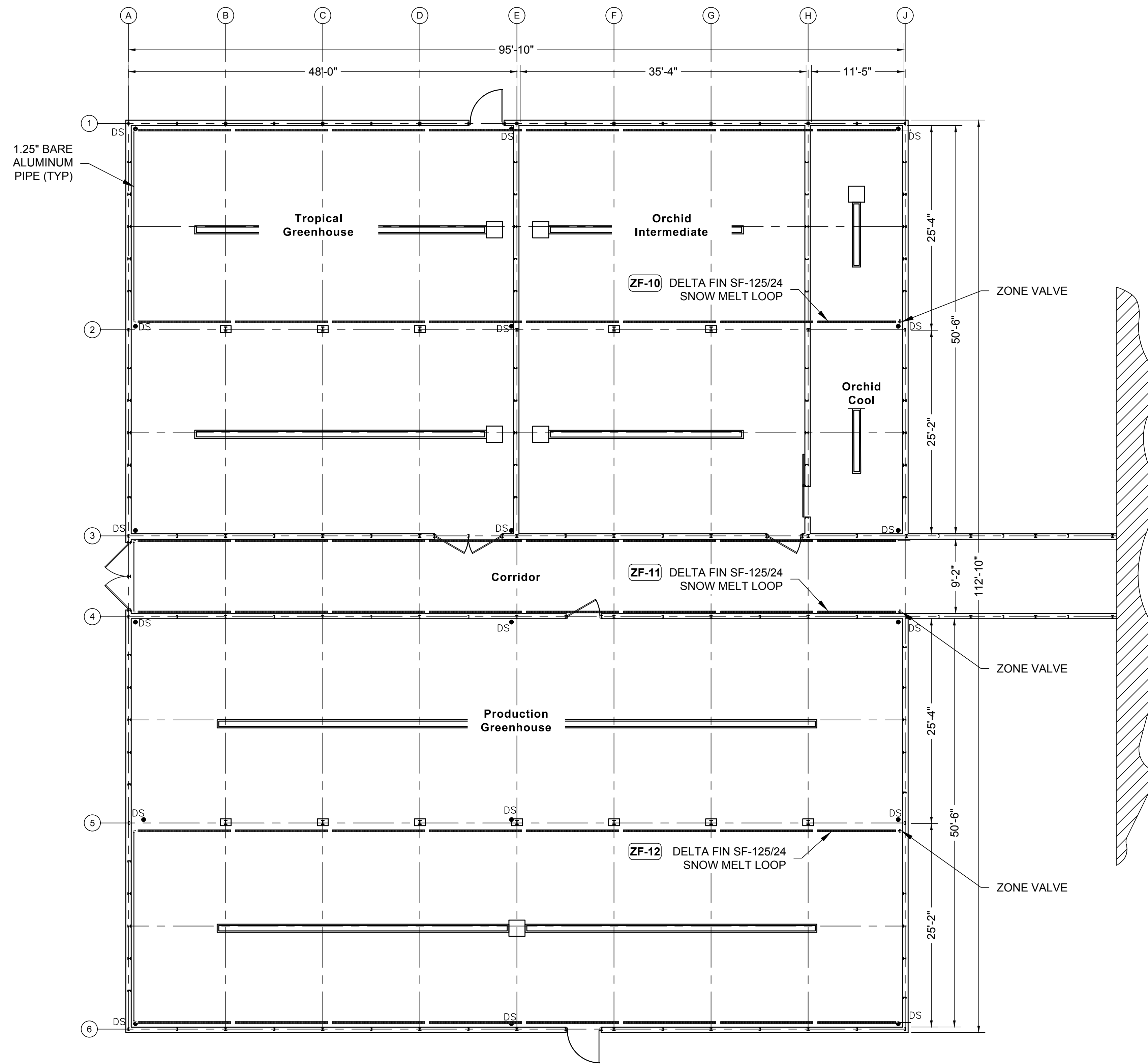
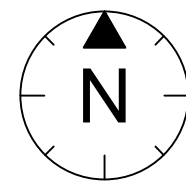
Signature: *Daniel Jack Poling*  
Print Name: Jack Poling  
Date: JUNE 4, 2018 License No.: A-9984

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**GREENHOUSE HEATING UPPER & LOWER FIN TUBE LAYOUT**

EXHIBIT I  
**H4**



Snow Melt Fin Tube Layout  
Scale: 1/8" = 1'-0"

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Architecture 612.375.0336 tel  
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Civil Engineer  
**Verbicher Associates, Inc.**  
999 Fourier Drive, Suite 201  
Madison, WI 53717  
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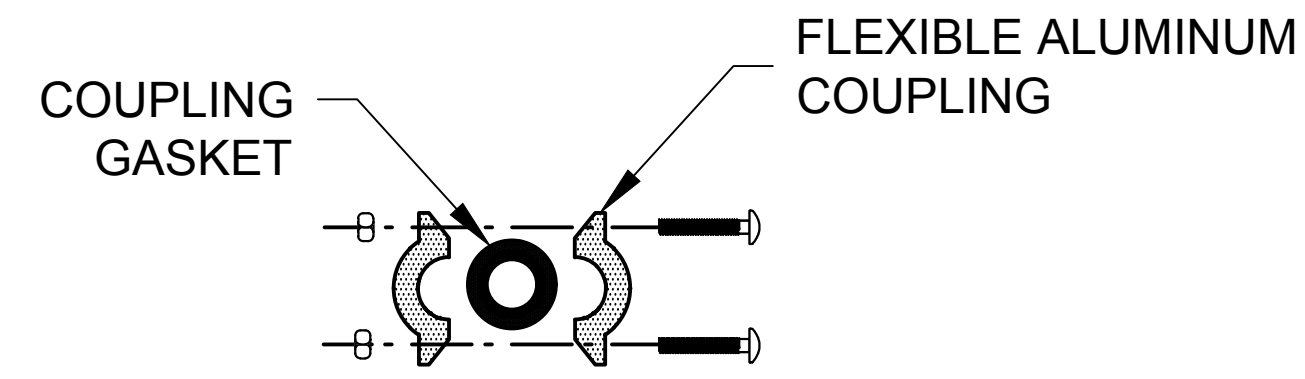
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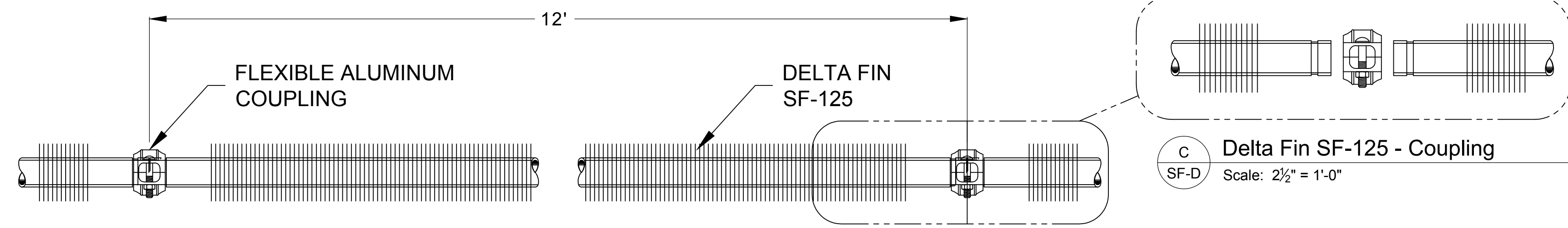
**GREENHOUSE  
SNOW MELT FIN  
TUBE LAYOUT**

EXHIBIT I  
**H4A**



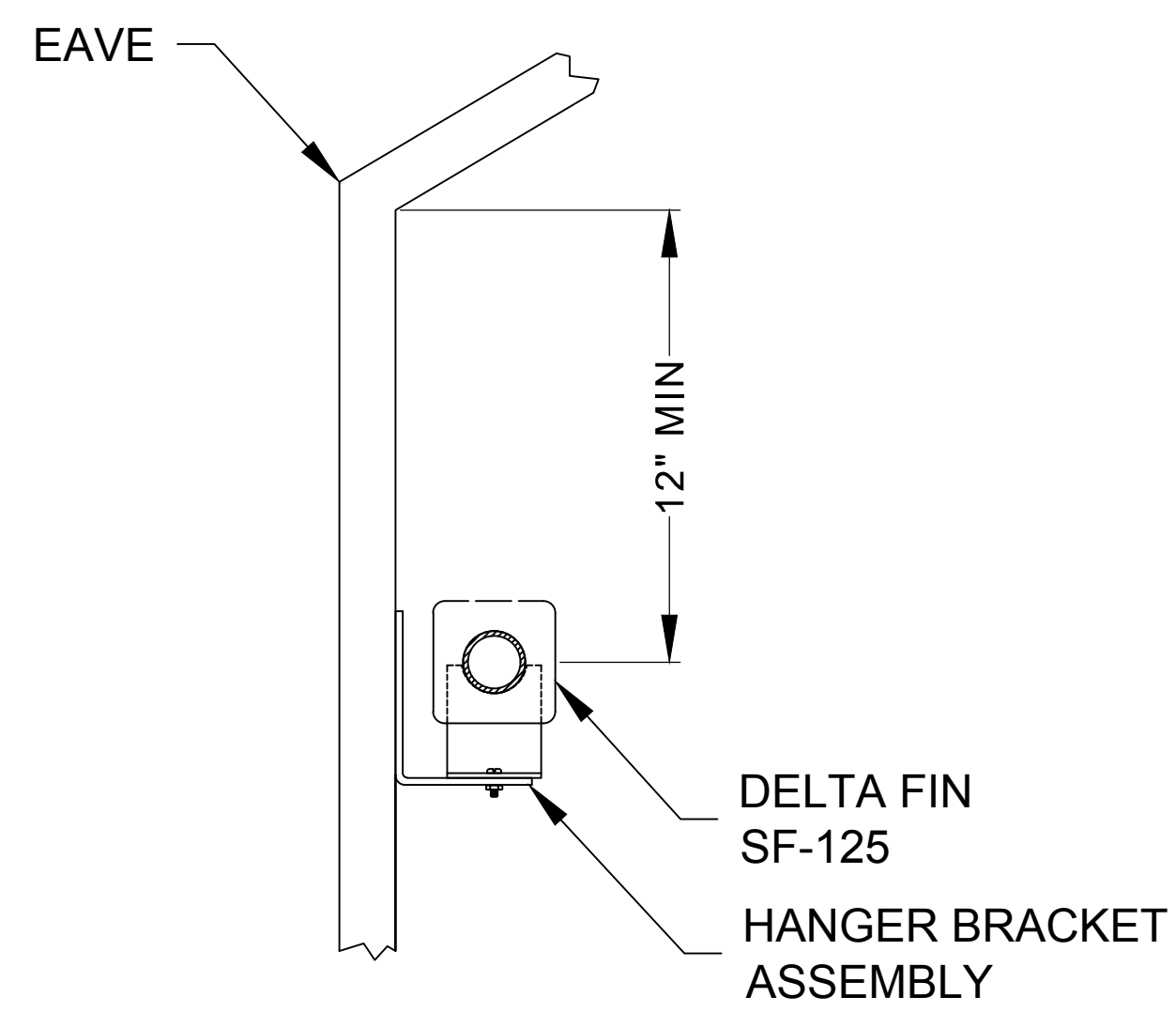


A Delta Fin SF-125 - Coupling  
Scale: 2 1/2" = 1'-0"

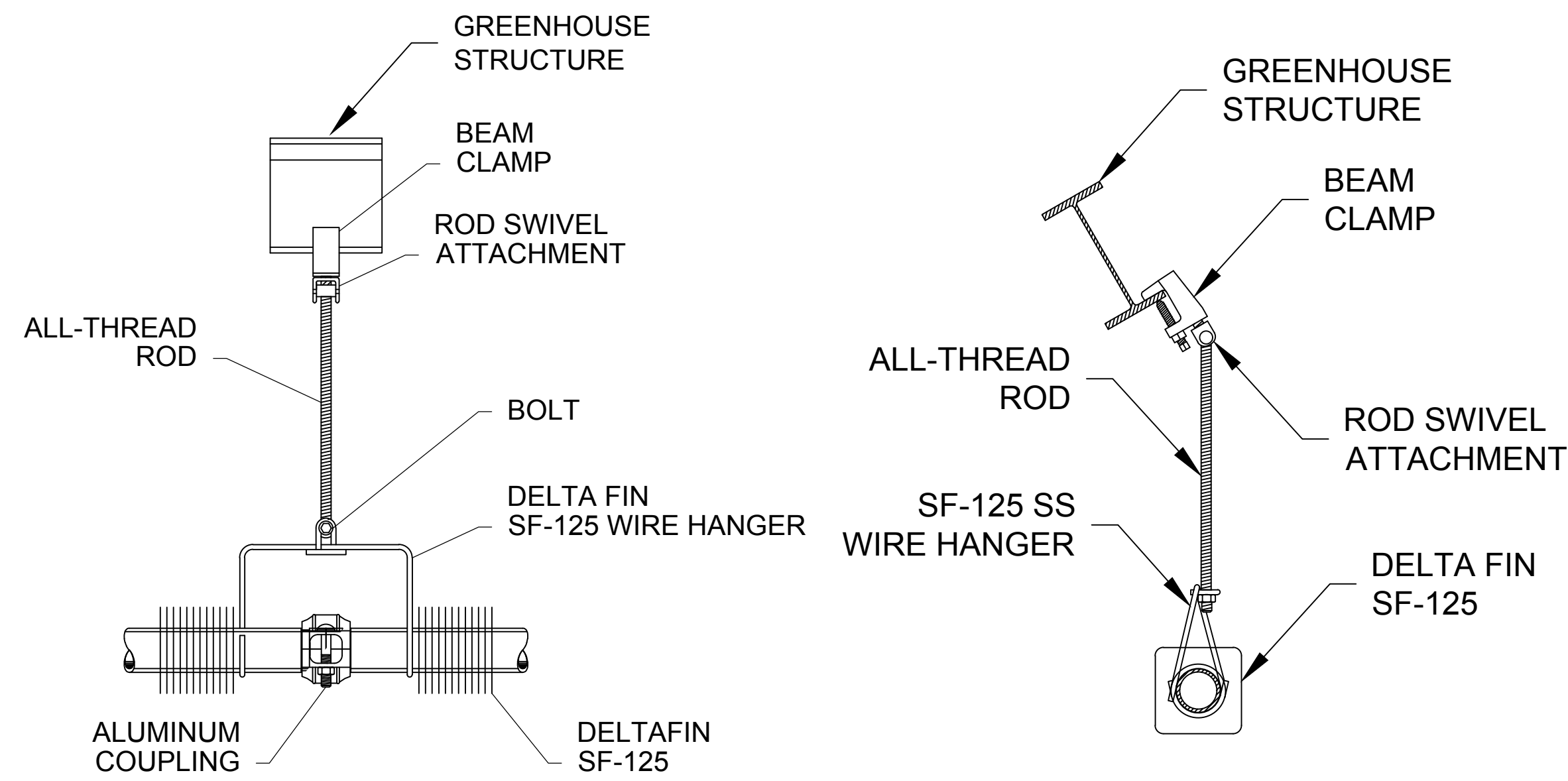


B Delta Fin SF-125 - Fin Pipe  
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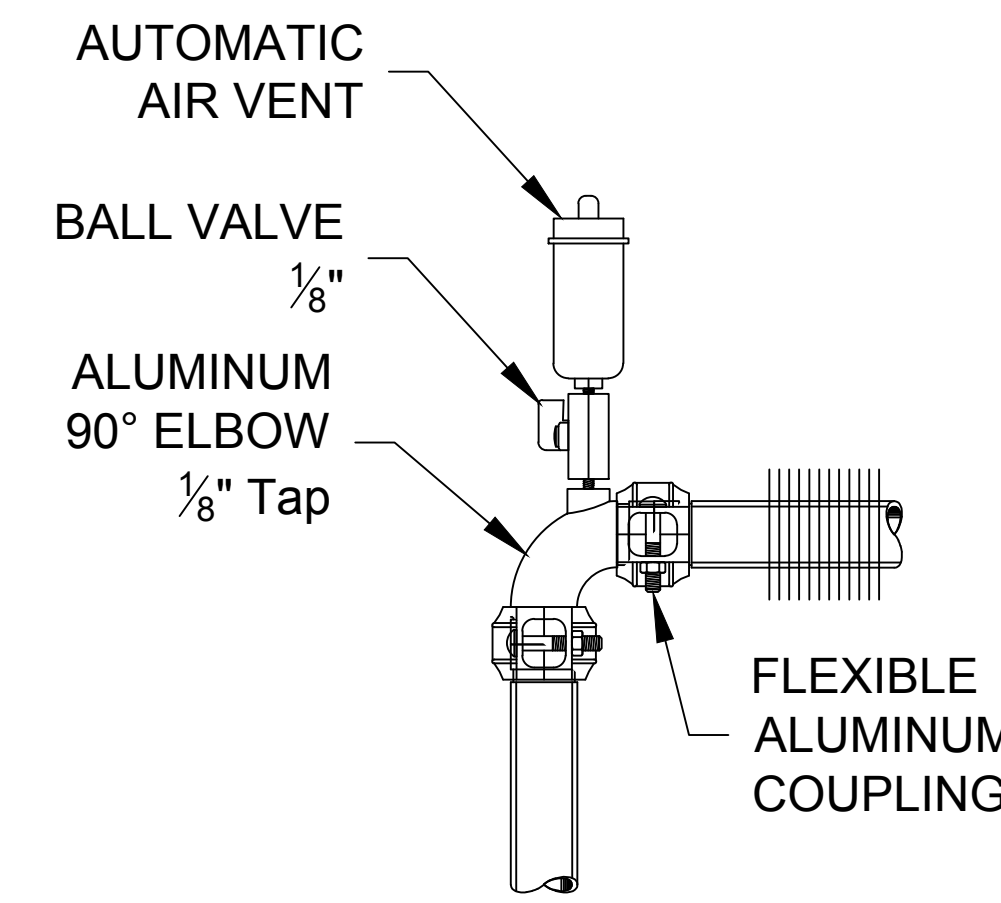
C Delta Fin SF-125 - Coupling  
Scale: 2 1/2" = 1'-0"



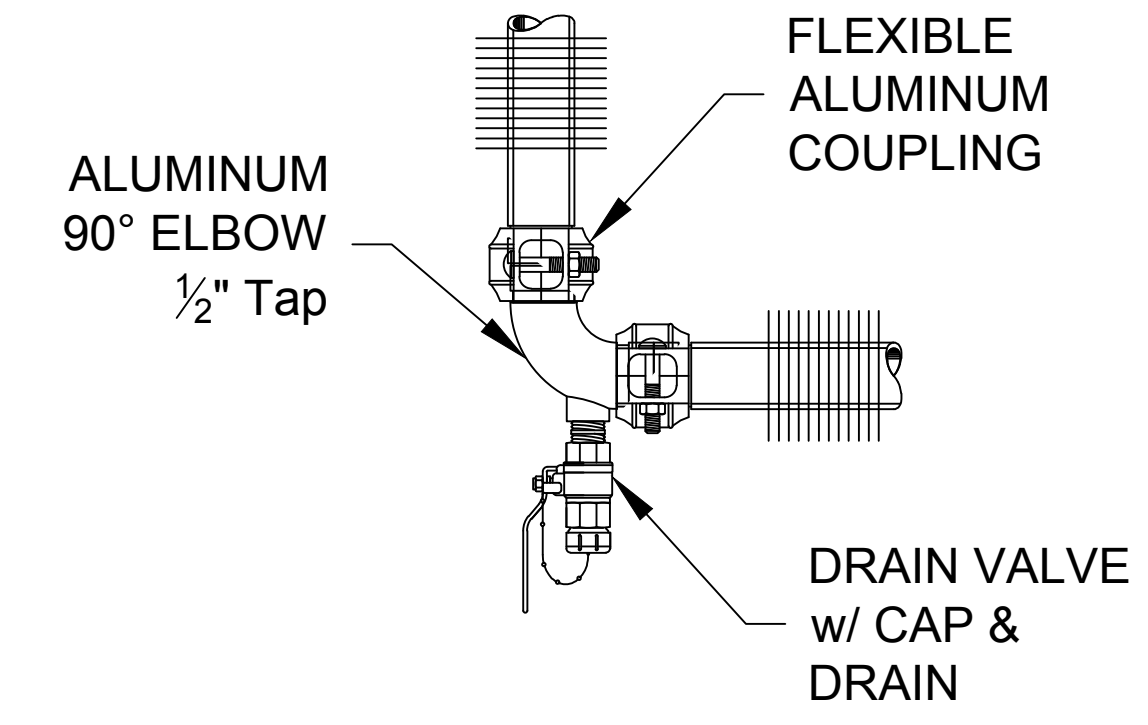
D Delta Fin SF-125 - Upper Run  
Scale: 2 1/2" = 1'-0"



E Delta Fin SF-125 - Hanger Bracket w/ Side View  
Scale: 2 1/2" = 1'-0"

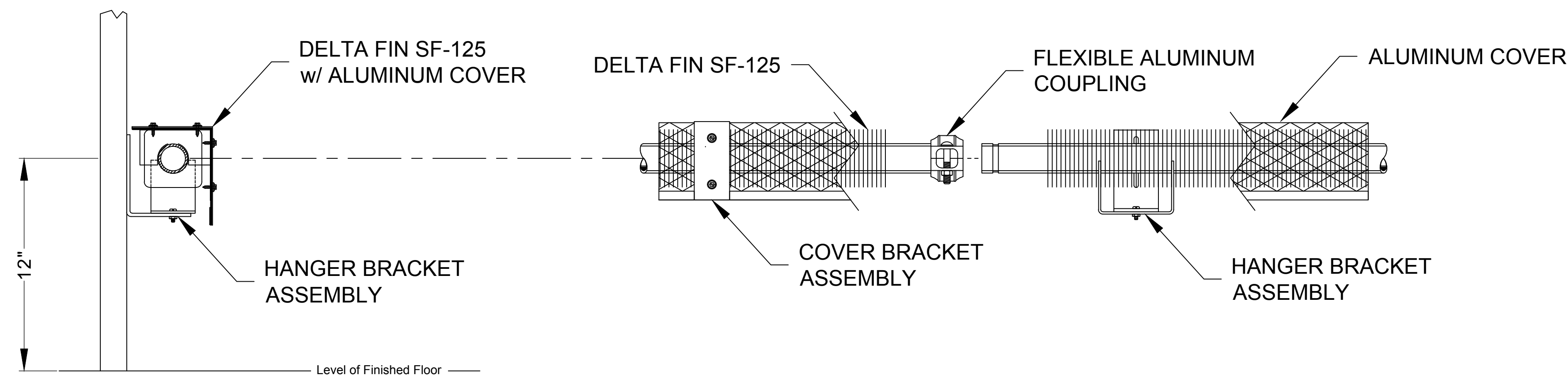


F Delta Fin SF-125 - Air Vent  
Scale: 2 1/2" = 1'-0"

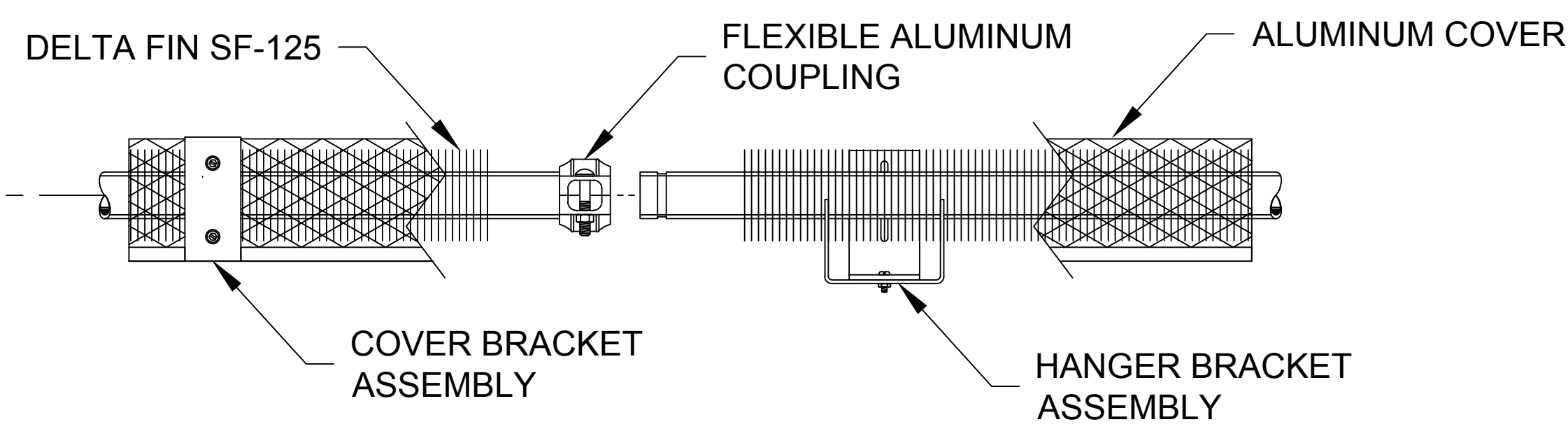


G Delta Fin SF-125 - Drain Valve  
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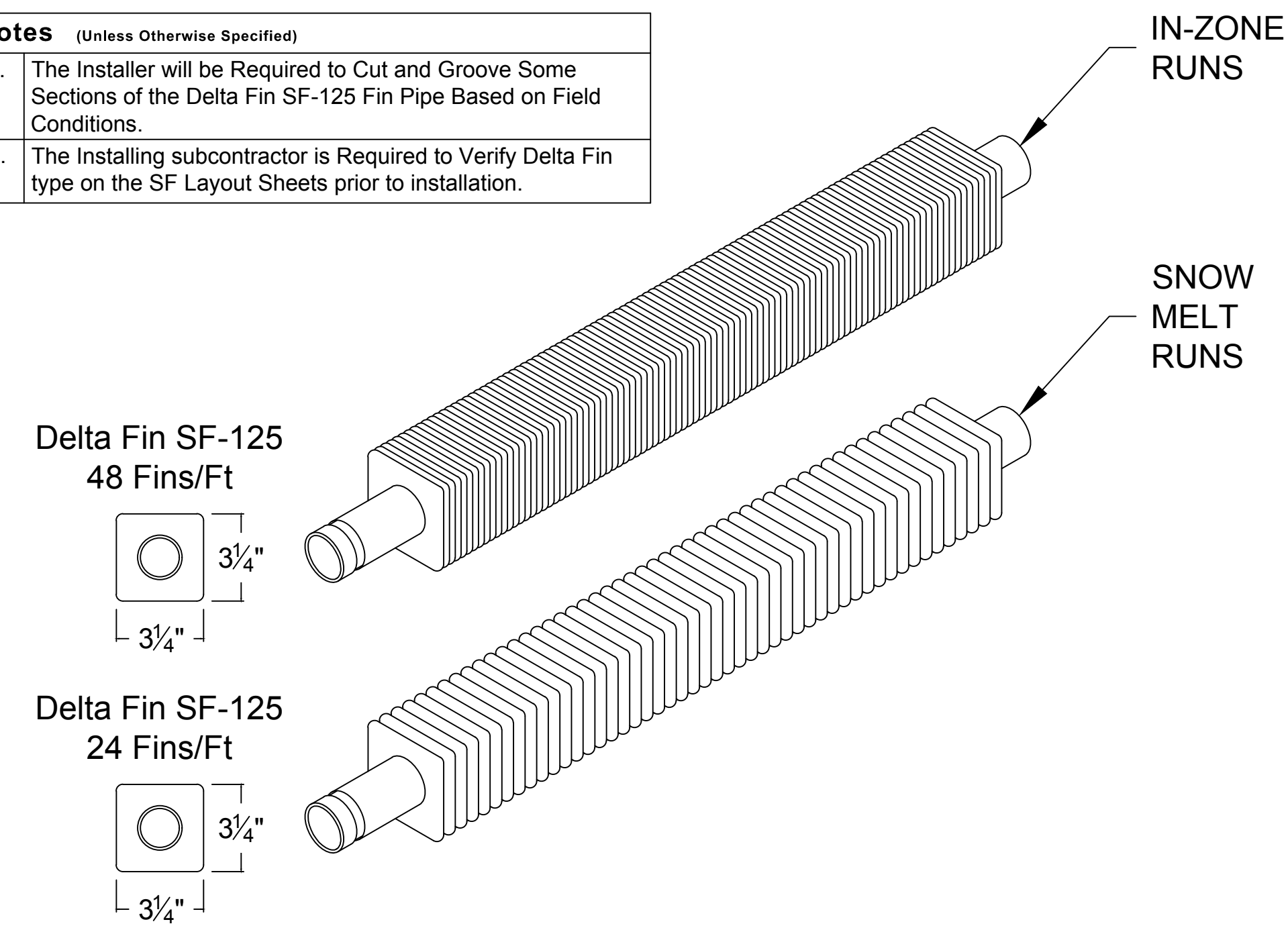
- Notes** (Unless Otherwise Specified)
- The installer will be required to cut and groove some sections of the Delta Fin SF-125 Fin Pipe based on field conditions.
  - The installing subcontractor is required to verify Delta Fin type on the SF Layout Sheets prior to installation.



H Delta Fin SF-125 - Lower Run  
Scale: 2 1/2" = 1'-0"



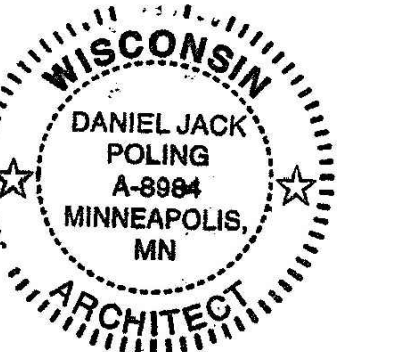
I Delta Fin SF-125 - Cover  
Scale: 2 1/2" = 1'-0"



J Delta Fin SF-125 - Sizes  
Scale: 2 1/2" = 1'-0"

**Olbrich Botanical Gardens  
Expansion Phase 1**  
BPW Project # 8162  
3330 Atwood Avenue  
Madison, WI 53704

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Signature: *[Signature]*  
Print Name: Jack Poling  
Date: JUNE 4, 2018 License No.: A-8984

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FIN TUBE DETAILS

EXHIBIT I  
H4B



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 Expansion Phase 1**  
 BPW Project # 8162  
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PROJECT PHASE:  
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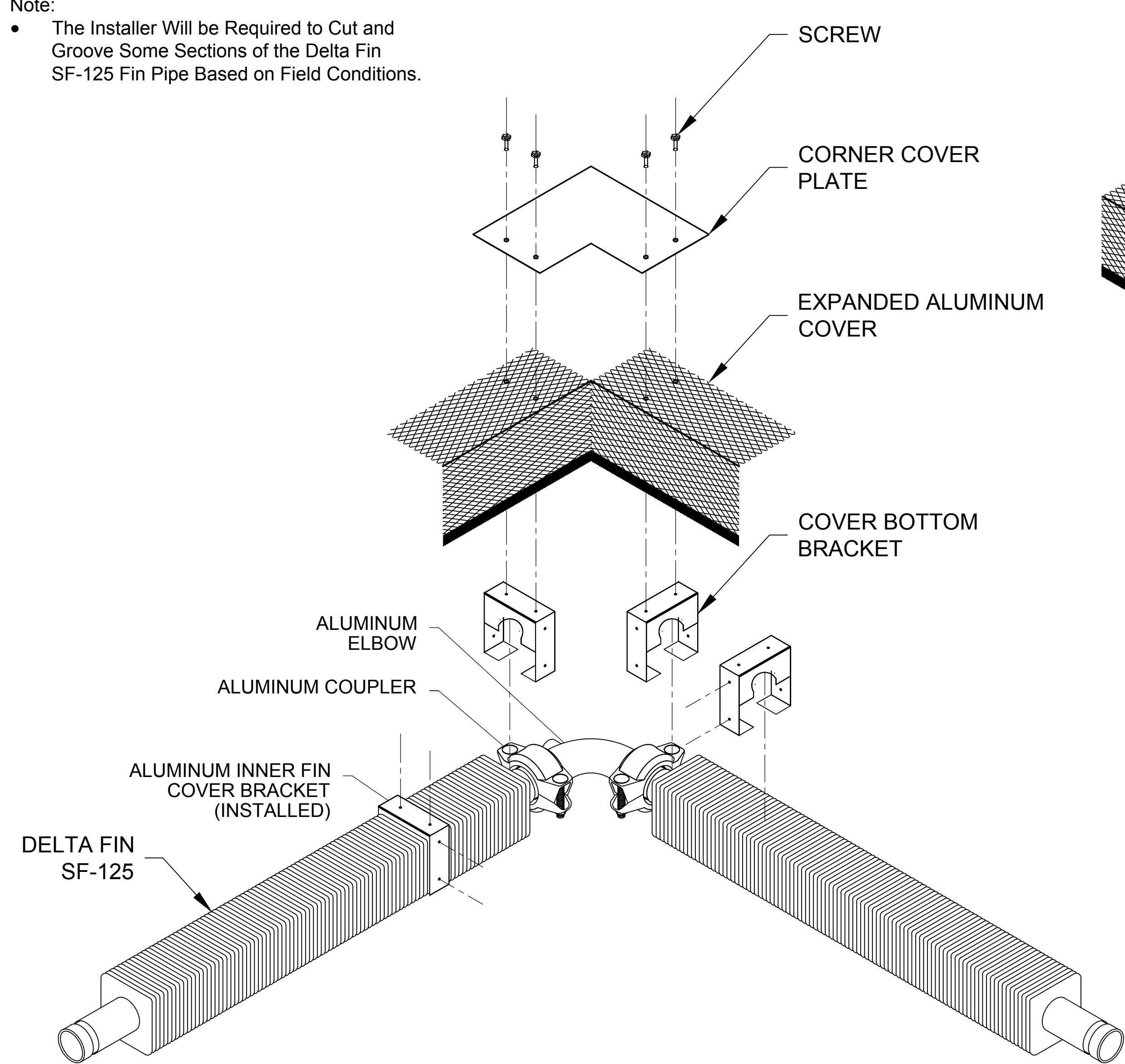
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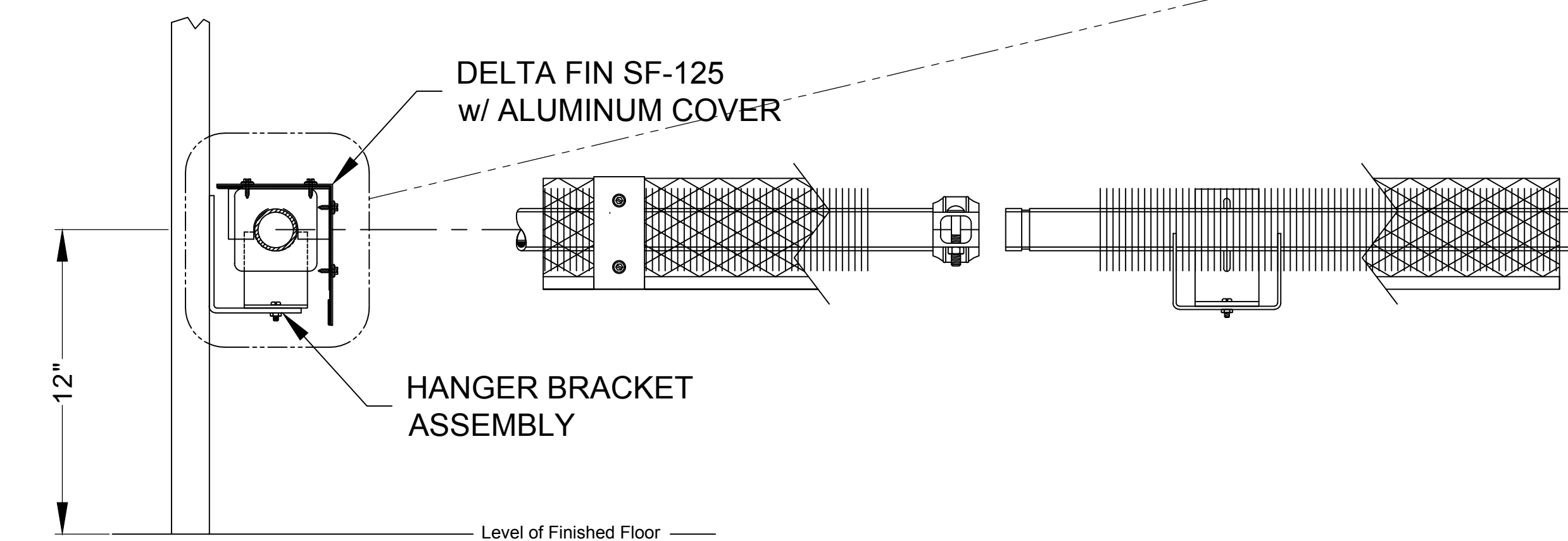
**FIN TUBE COVER &  
 INSULATION DETAILS**

**EXHIBIT I  
 H4C**

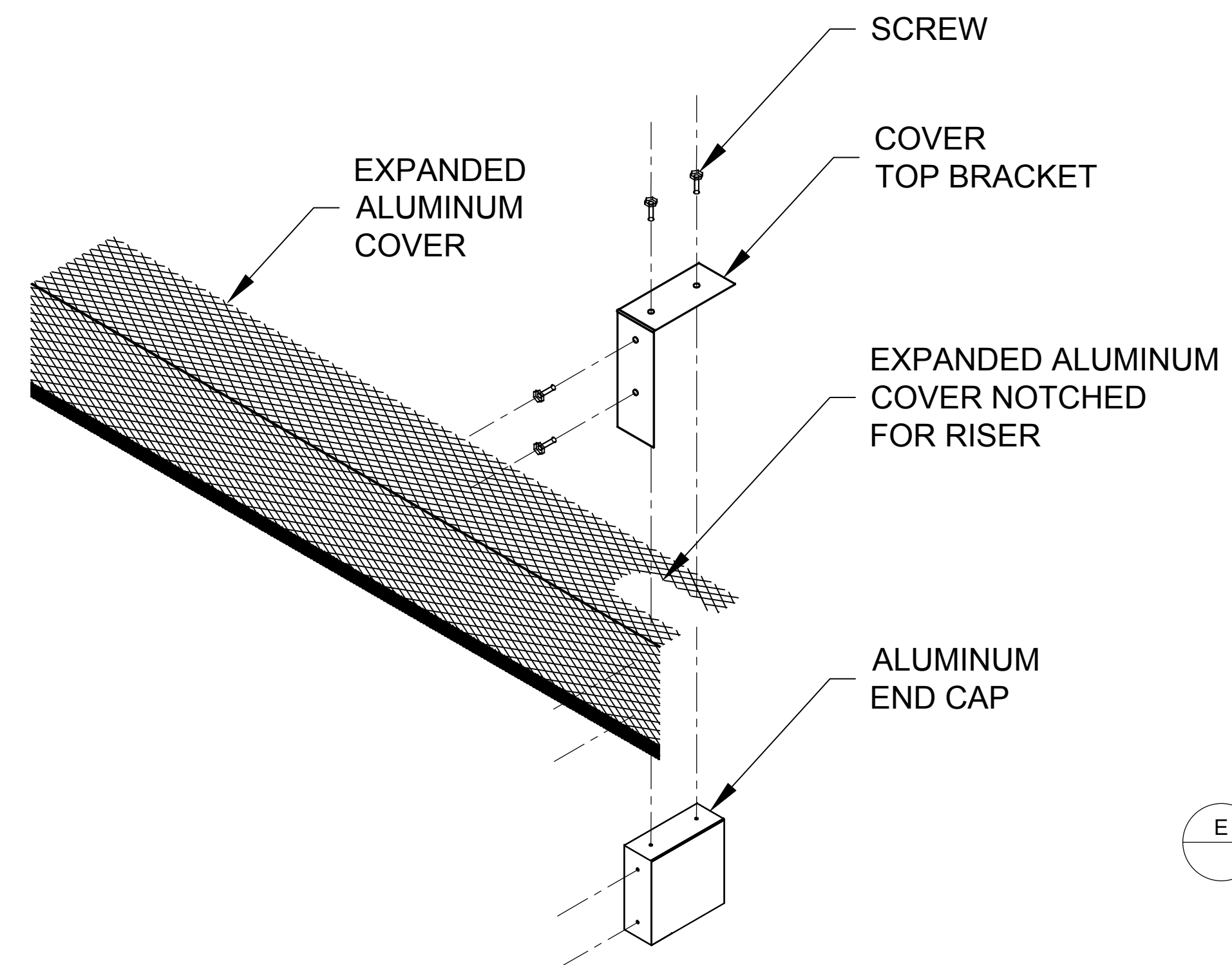
Note:  
 • The Installer Will be Required to Cut and Groove Some Sections of the Delta Fin SF-125 Fin Pipe Based on Field Conditions.



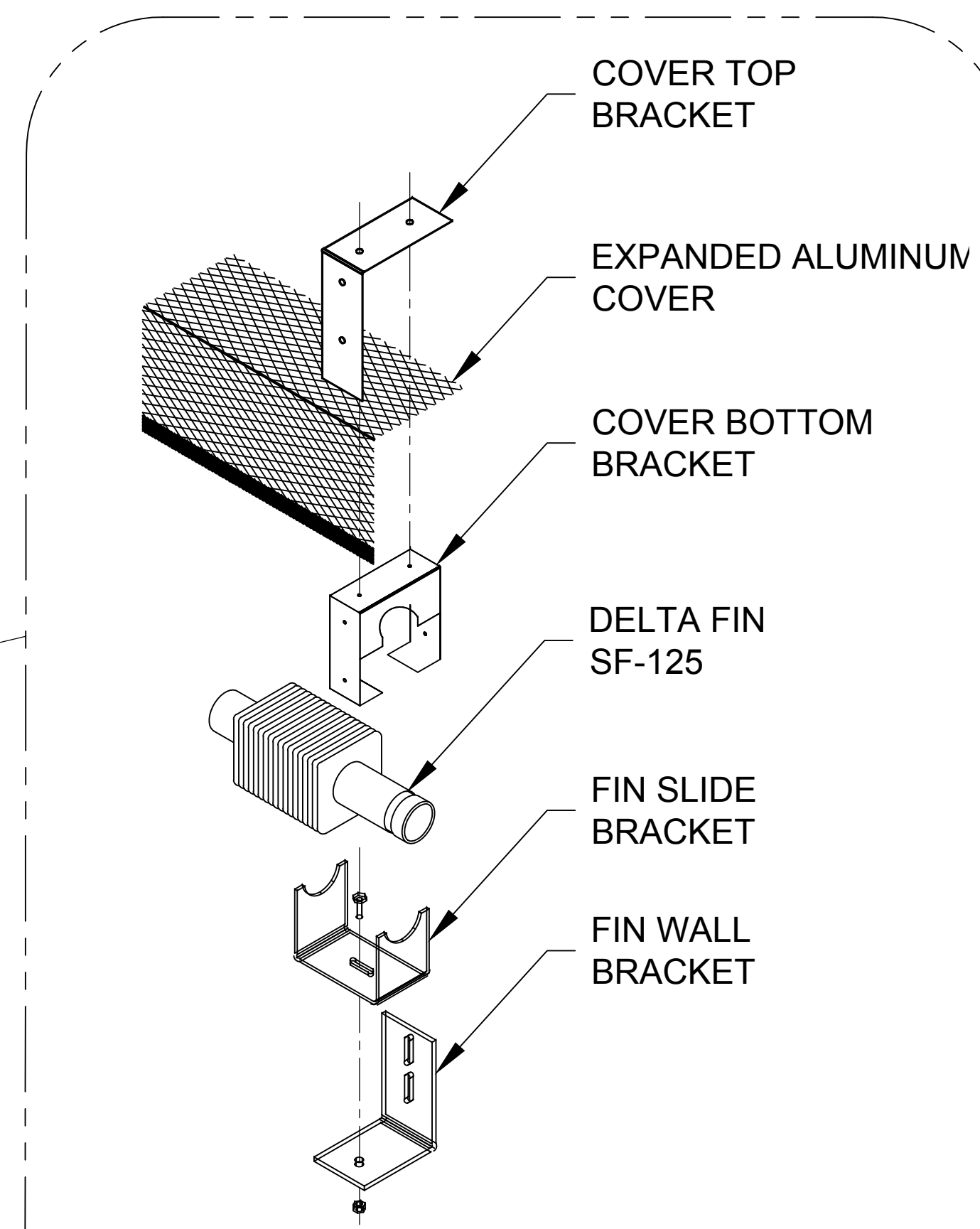
**A** Delta Fin SF-125 Lower Run Cover Corner Detail  
 Scale: 2 1/2" = 1'-0"



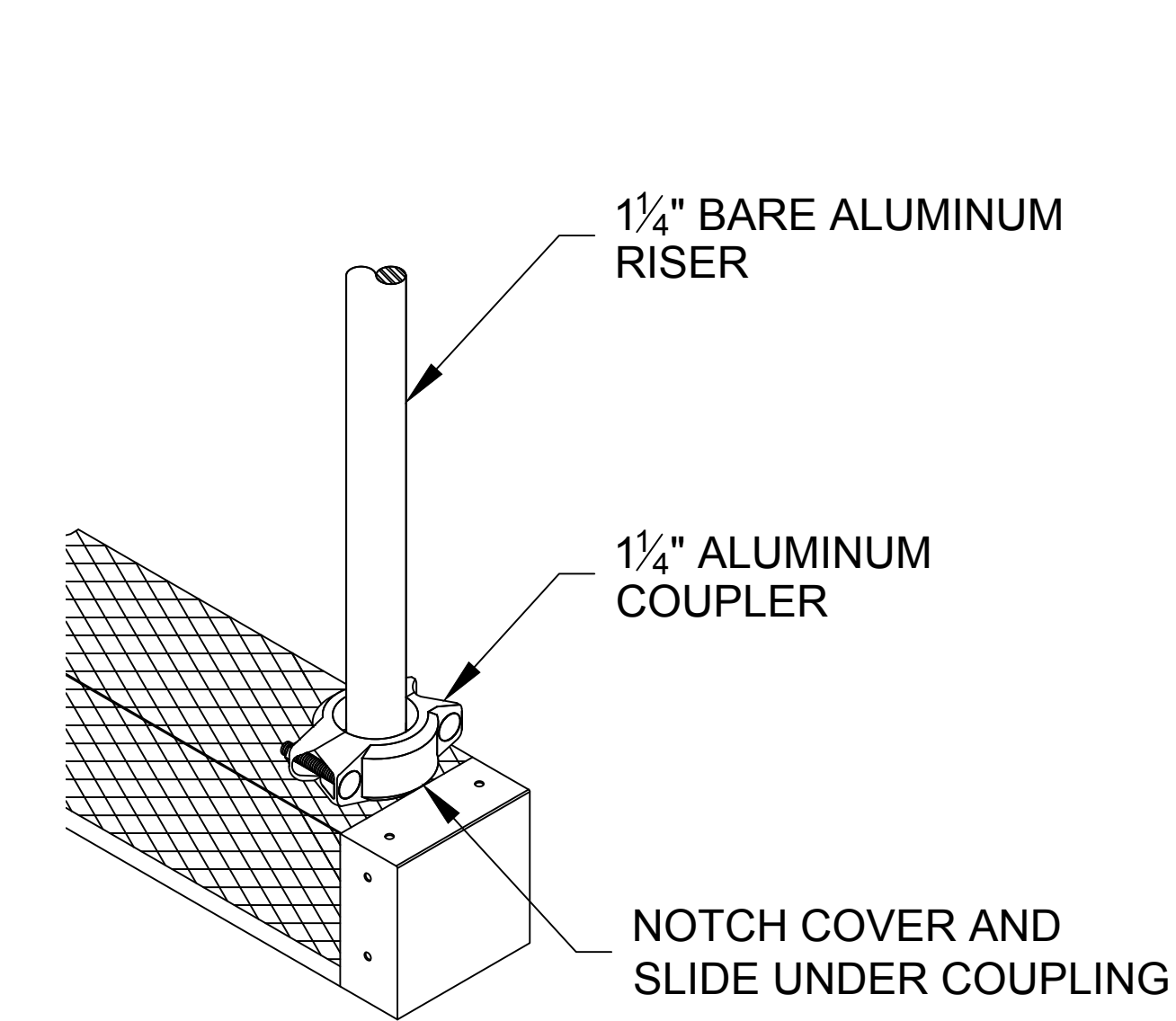
**B** Delta Fin SF-125 Lower Run Cover Detail  
 Scale: 2 1/2" = 1'-0"



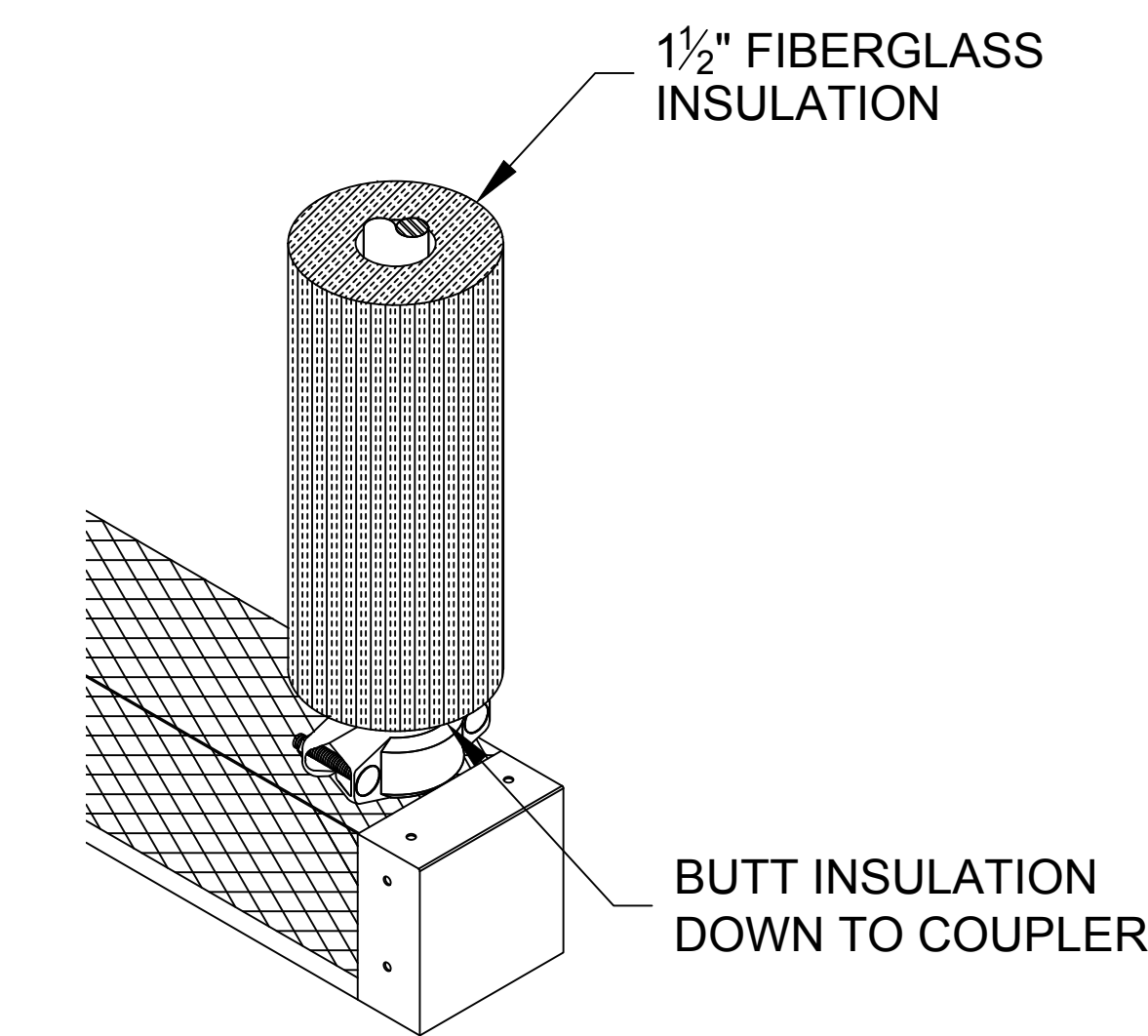
**D** Delta Fin SF-125 Lower Run End Cap Detail  
 Scale: 2 1/2" = 1'-0"



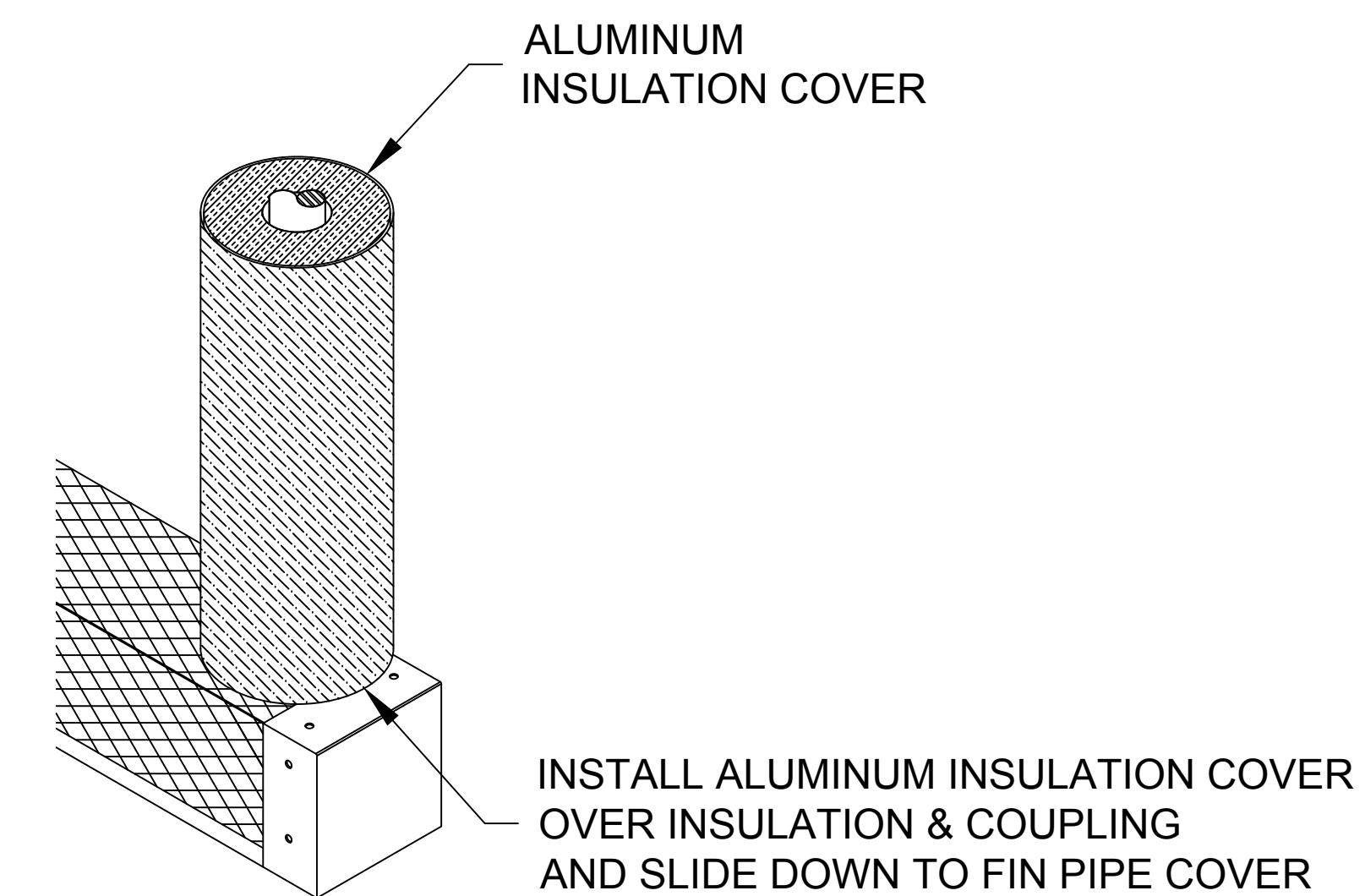
**C** Delta Fin SF-125 Lower Run Bracket Detail  
 Scale: 2 1/2" = 1'-0"



**E** Delta Fin SF-125 Lower Run - Bare Riser  
 Scale: 2 1/2" = 1'-0"

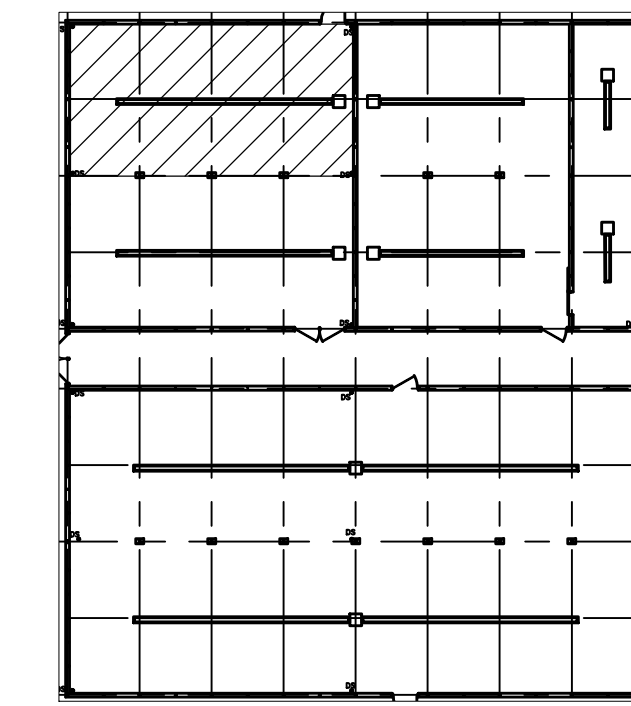
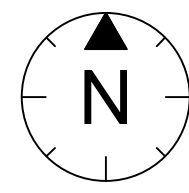


**F** Delta Fin SF-125 Lower Run - Insulated Riser  
 Scale: 2 1/2" = 1'-0"

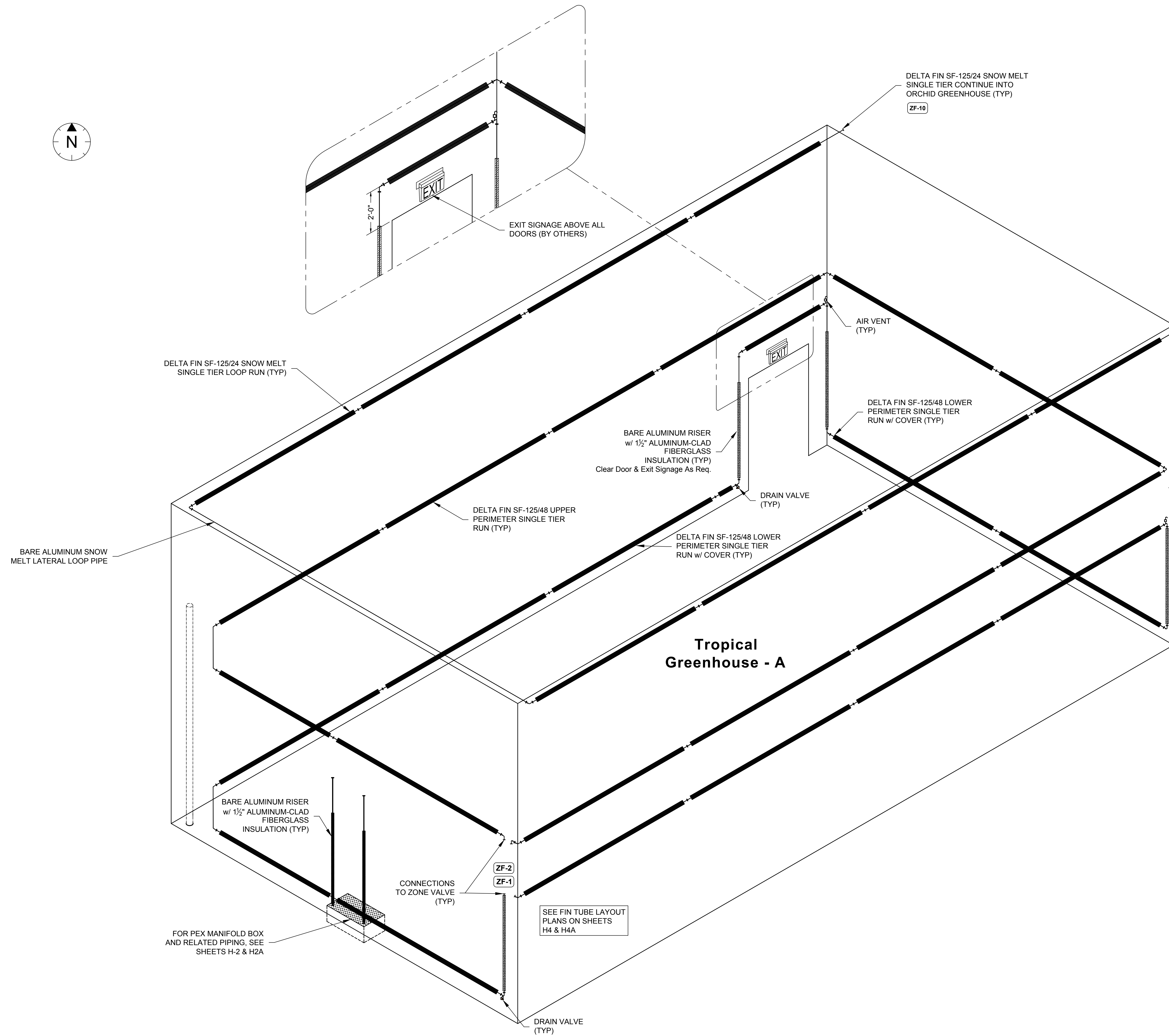


**G** Delta Fin SF-125 Lower Run - Insulated Riser w/Cover  
 Scale: 2 1/2" = 1'-0"





Key Plan



Piping Elevation  
Scale: 3/8" = 1'-0"

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Minneapolis, Minnesota 55401-2282  
Architecture 612.375.0336 tel  
Interiors and 612.342.2216 fax  
Urban Design www.msrdesign.com

Civil Engineer  
**Verbicher Associates, Inc.**  
999 Fournier Drive, Suite 201  
Madison, WI 53717  
608.826.0532 tel

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Structural Engineer, Technology and AV  
**IMEG Corp.**  
1800 Deming Way, Suite 200  
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Eagan, MN 55121  
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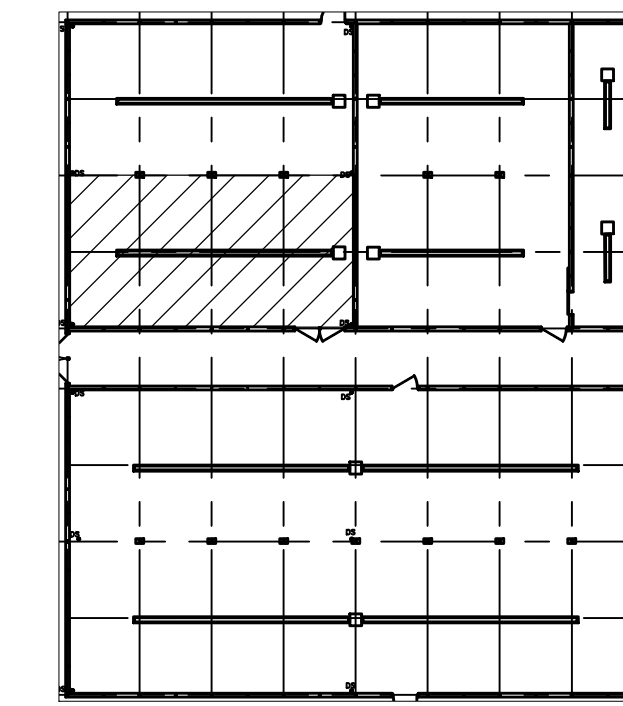
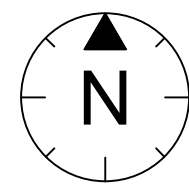
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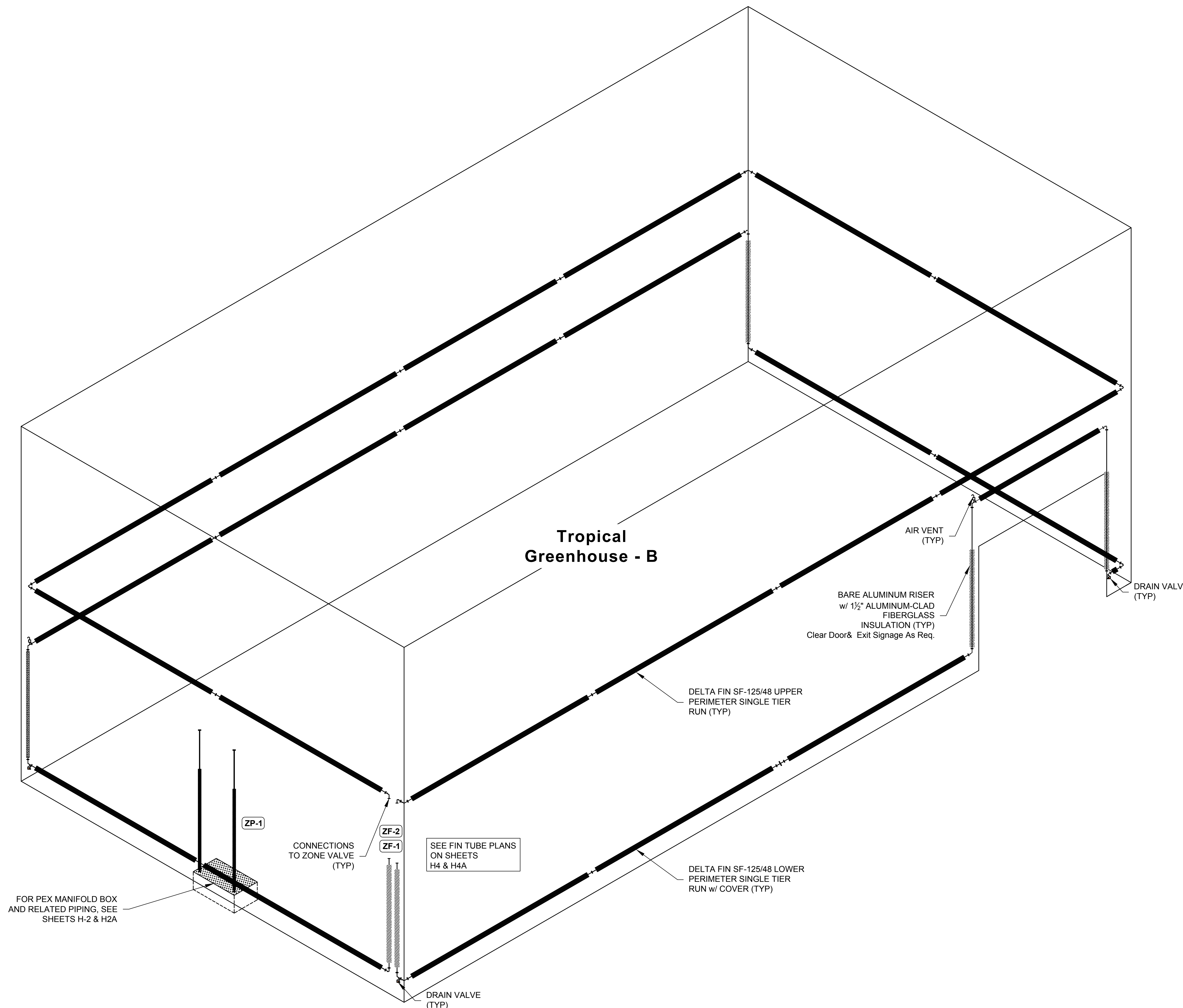
**TROPICAL GHSE. A  
PIPING ELEVATION**

EXHIBIT I  
**H5**





Key Plan



FOR PEX MANIFOLD BOX AND RELATED PIPING, SEE SHEETS H-2 & H2A

SEE FIN TUBE PLANS ON SHEETS H4 & H4A

Piping Elevation  
Scale: 3/8" = 1'-0"

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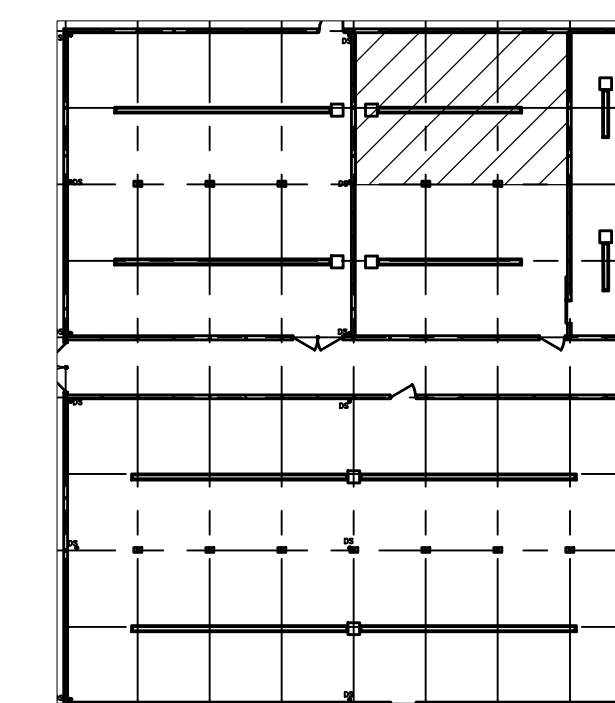
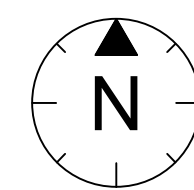
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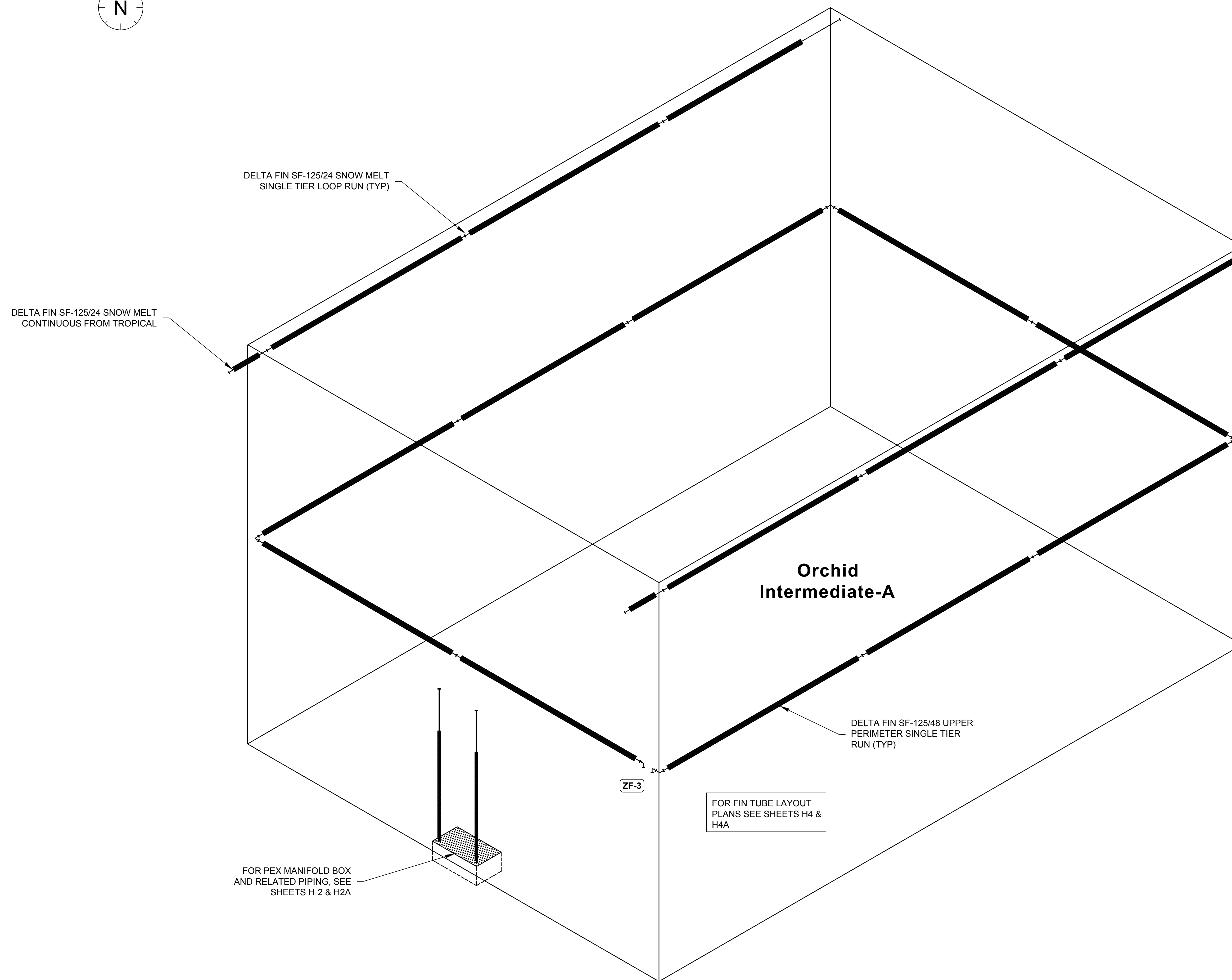
**TROPICAL GHSE. B**  
**PIPING ELEVATION**

EXHIBIT I  
**H5A**





Key Plan



Piping Elevation  
Scale: 3/8" = 1'-0"

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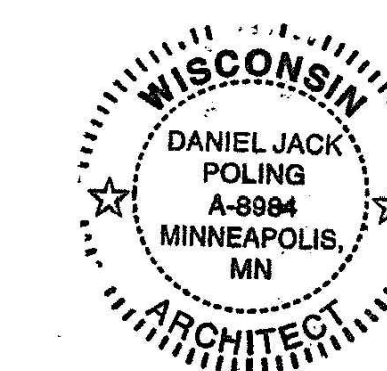
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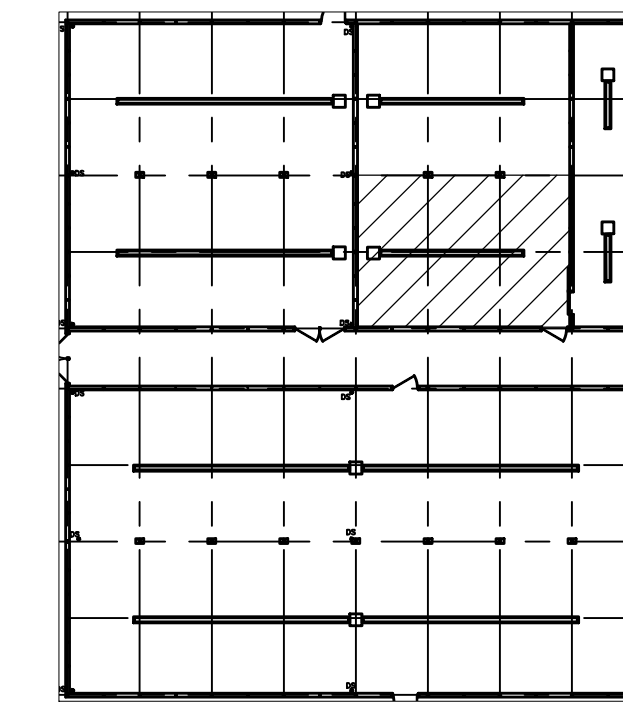
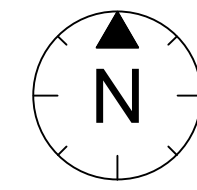
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	06-01-2018	BID ISSUE
	06-04-2018	PERMIT ISSUE

PROJECT NO:  
2017016  
PROJECT PHASE:  
BID DOCUMENTS  
DRAWN BY:  
JP  
CHECKED BY:

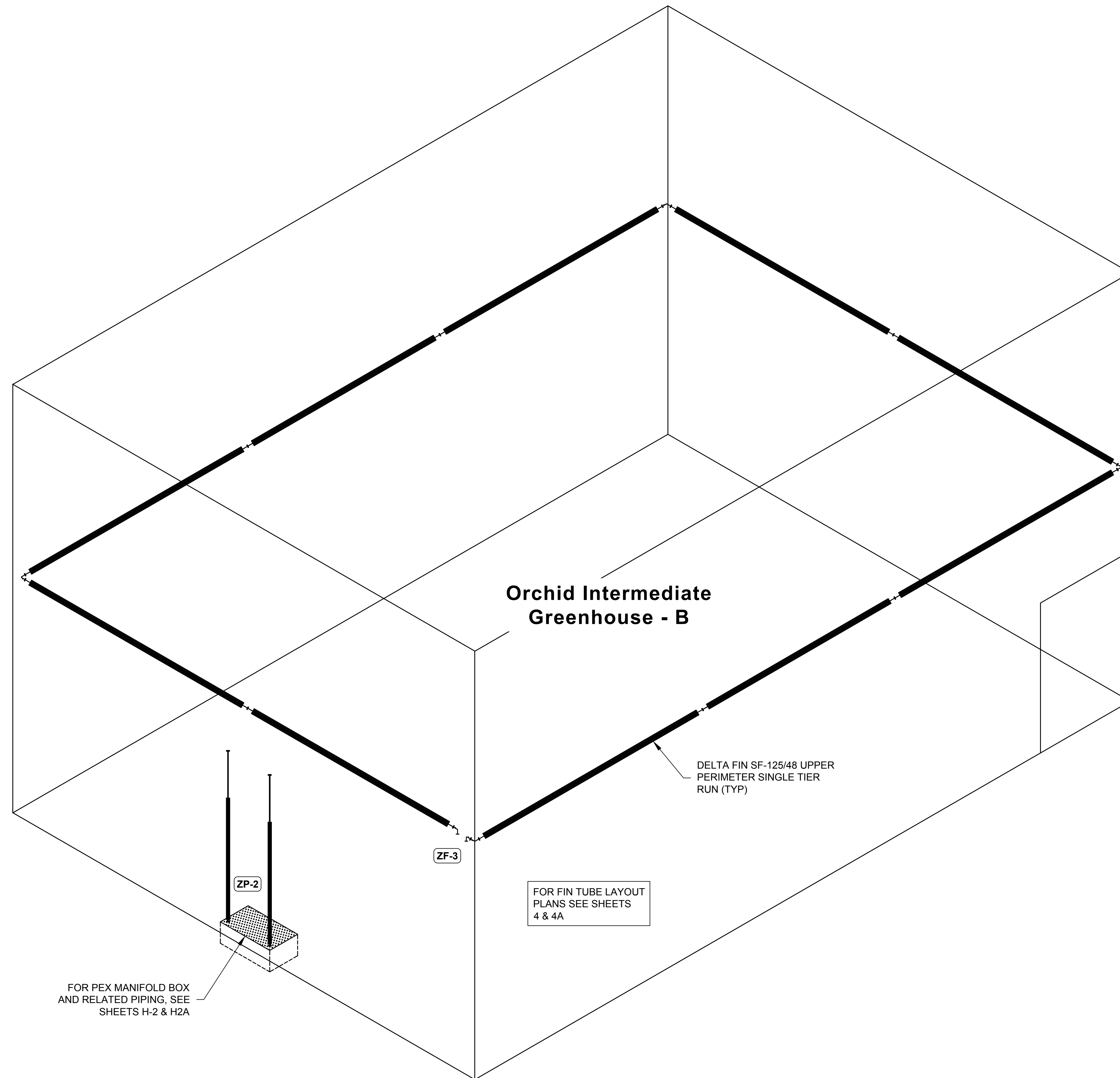
**ORCHID INT. GHSE. A  
PIPING ELEVATION**

EXHIBIT I  
**H5B**





Key Plan



Orchid Intermediate Greenhouse - B

DELTA FIN SF-125/48 UPPER PERIMETER SINGLE TIER RUN (TYP)

ZF-3

ZP-2

FOR FIN TUBE LAYOUT PLANS SEE SHEETS 4 & 4A

FOR PEX MANIFOLD BOX AND RELATED PIPING, SEE SHEETS H-2 & H2A

Piping Elevation  
Scale: 1/8" = 1'-0"

**MSR** 710 South 2nd Street, 8th Floor  
Minneapolis, Minnesota 55401-2282  
Architecture 612.375.0336 tel  
Interiors and 612.342.2216 fax  
Urban Design www.msrdesign.com

Civil Engineer  
**Vierbicher Associates, Inc.**  
999 Fournier Drive, Suite 201  
Madison, WI 53717  
608.826.0532 tel

Landscape Architect  
**Ken Saiki Design, Inc.**  
303 South Paterson Street, Suite 1  
Madison, WI 53703  
608.251.3600 tel

Structural Engineer, Technology and AV  
**IMEG Corp.**  
1800 Deming Way, Suite 200  
Middleton, WI 53562  
608.223.9600 tel

MEP Engineer  
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860 Blue Garden Road, Suite 175  
Eagan, MN 55121  
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**Summit Fire Consulting**  
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St. Paul, MN 55103  
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Greenhouse Design  
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513.242.0310 tel

**Olbrich Botanical Gardens**  
**Expansion Phase 1**  
BPW Project # 8162  
3330 Atwood Avenue  
Madison, WI 53704

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ARCHITECT SEAL



Signature: *Jack Poling*  
Print Name: Jack Poling  
Date: JUNE 4, 2018 License No.: A-8984

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PROJECT NO:  
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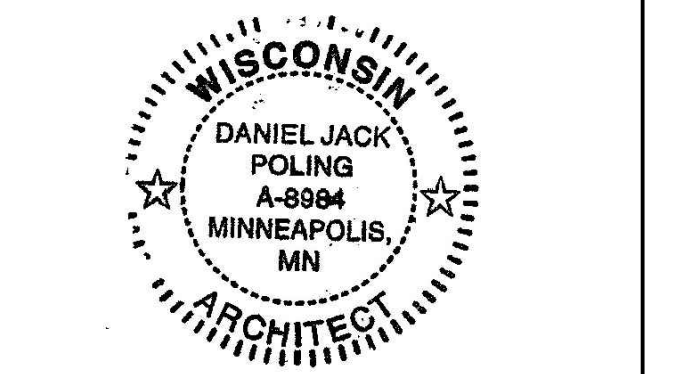
**ORCHID INT. GHSE. B  
PIPING ELEVATION**

EXHIBIT I  
**H5C**



**Olbrich Botanical Gardens  
 Expansion Phase 1**  
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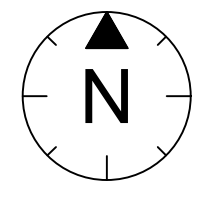
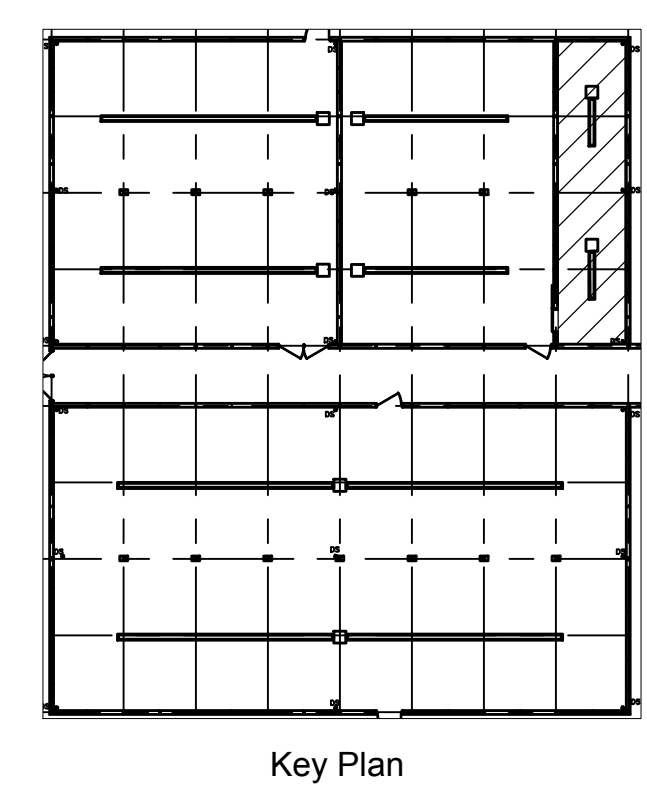
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**ORCHIDS COOL GHSE.  
 PIPING ELEVATION**

**EXHIBIT I  
 H5D**



DELTA FIN SF-125/24 SNOW MELT  
 SINGLE TIER LOOP RUN (TYP)

DELTA FIN SF-125/24 SNOW MELT  
 SINGLE TIER LOOP RUN (TYP)

DELTA FIN SF-125/48 UPPER  
 PERIMETER SINGLE TIER  
 RUN (TYP)

**Orchid  
 Cool**

CONNECTIONS  
 TO ZONE VALVE  
 (TYP)

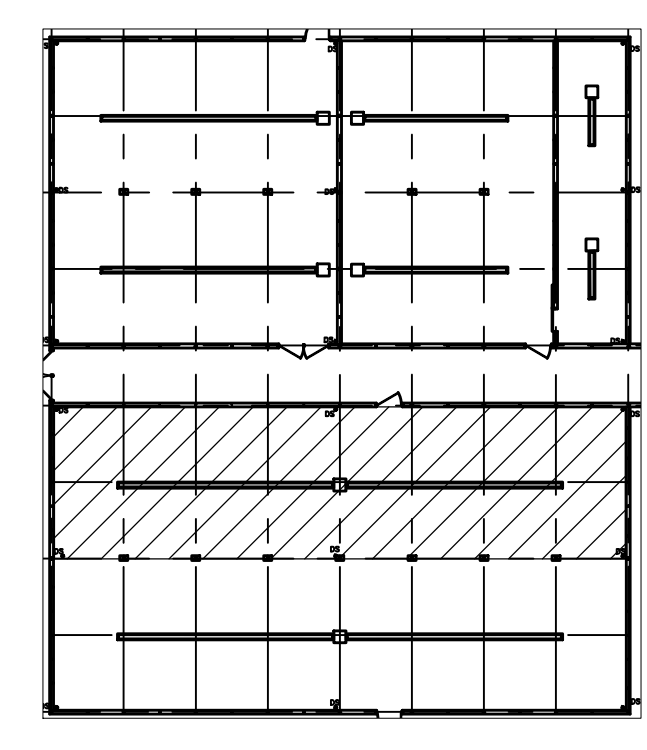
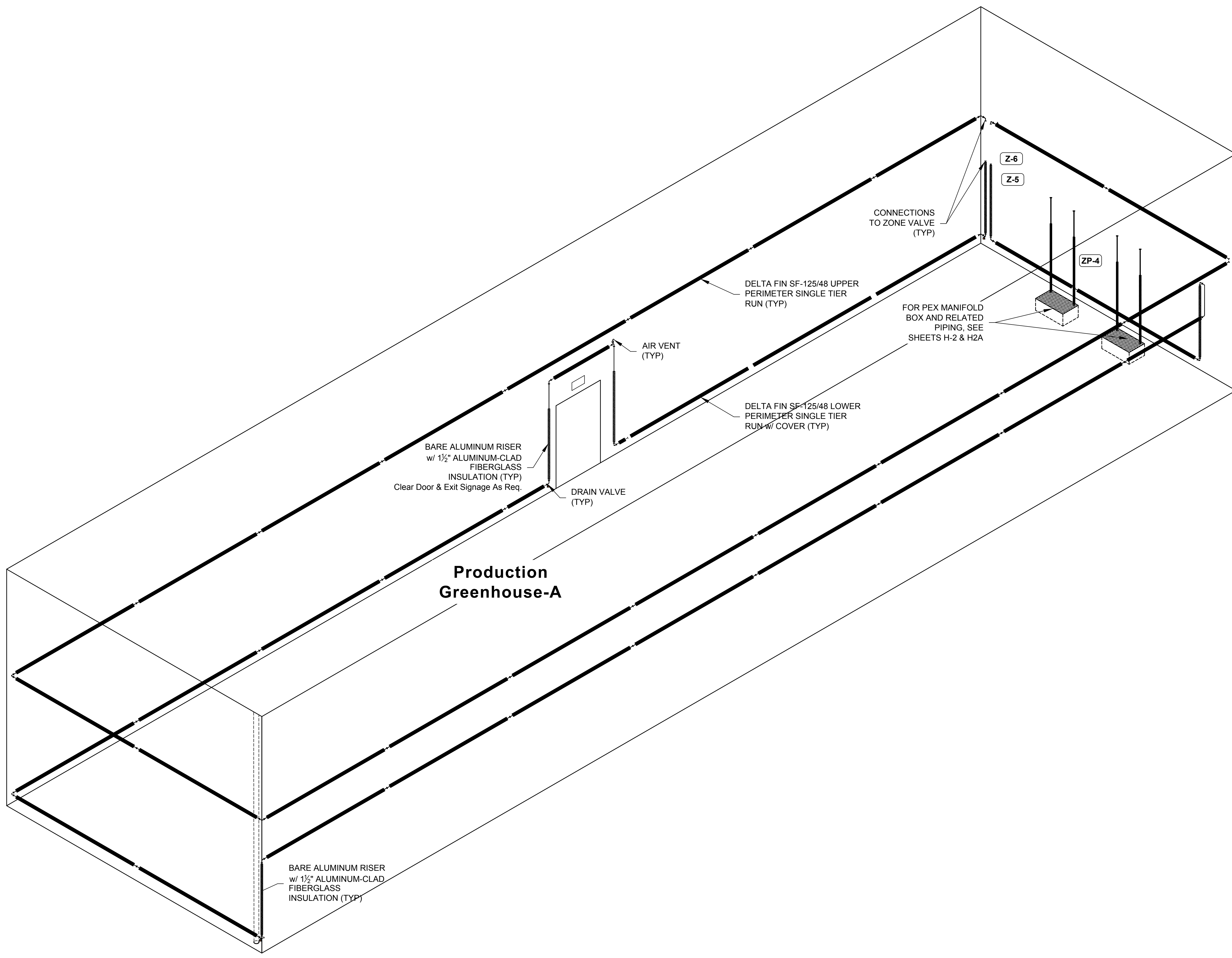
FOR FIN TUBE LAYOUT  
 PLANS SEE SHEETS  
 H4 & H4A

FOR PEX MANIFOLD BOX AND  
 RELATED PIPING, SEE SHEETS  
 H-2 & H2A

Piping Elevation  
 Scale: 3/8" = 1'-0"

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Key Plan

Piping - Elevation  
Scale: 1/4" = 1'-0"

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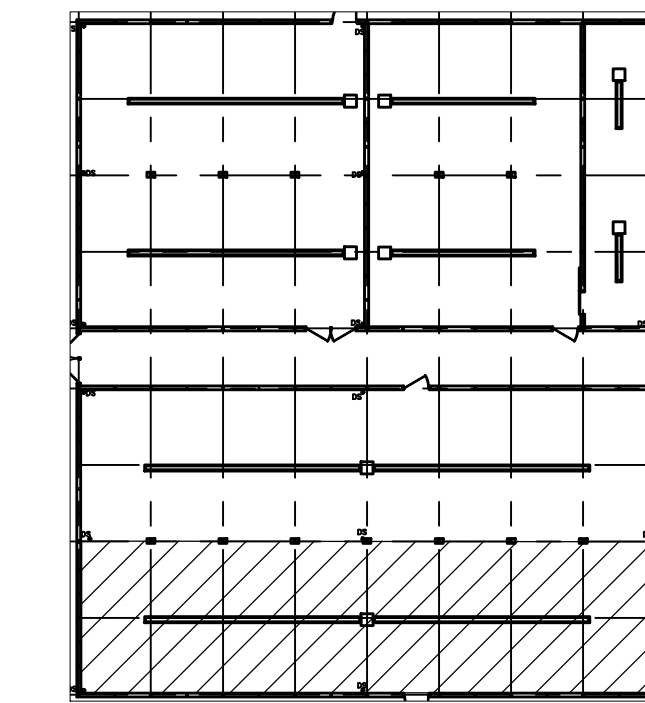
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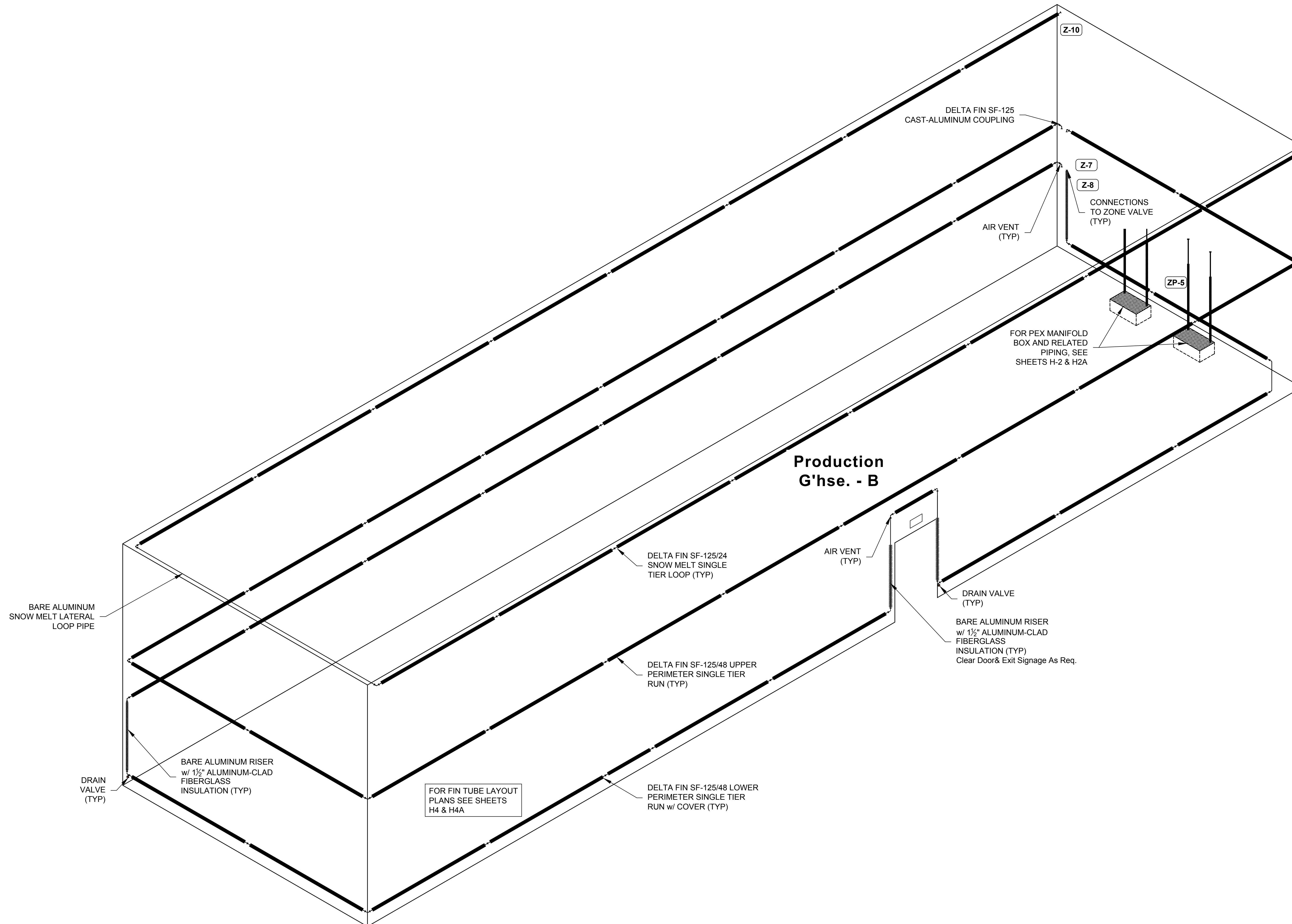
**PRODUCTION GHSE. A**  
**PIPING ELEVATION**

EXHIBIT I  
**H5E**





Key Plan



Piping Elevation  
Scale: 3/8" = 1'-0"

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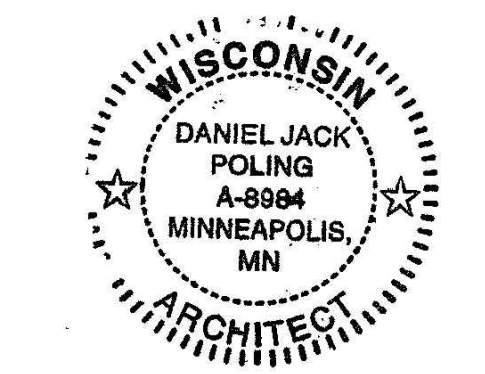
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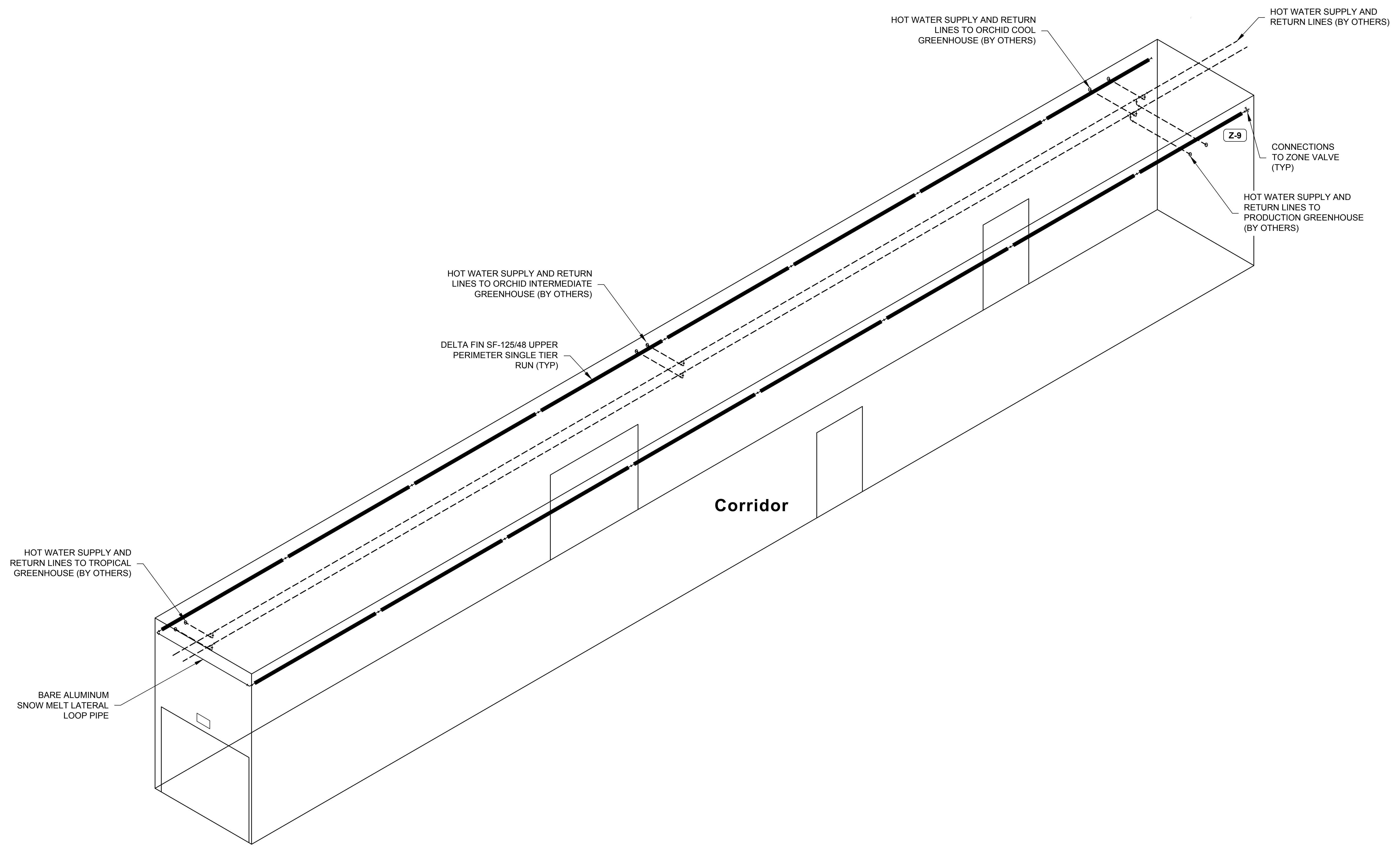
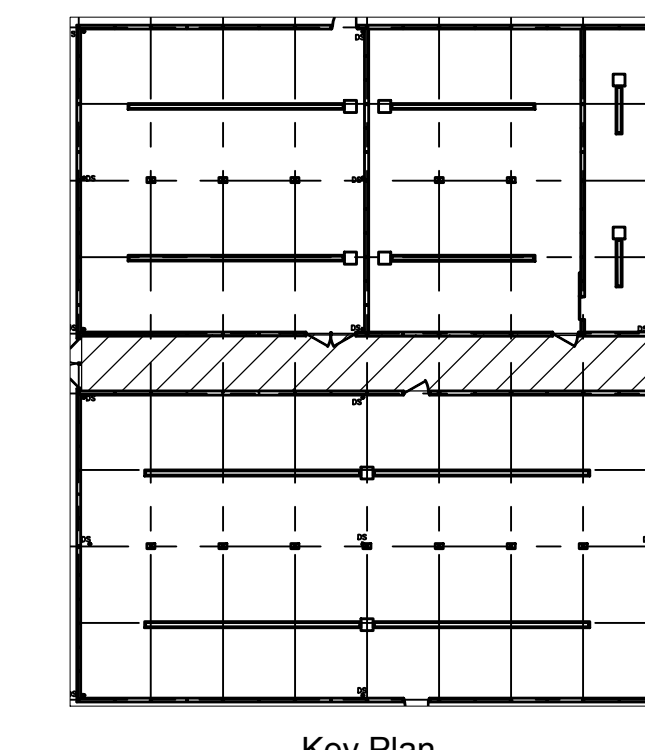
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BID DOCUMENTS  
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CHECKED BY:

**PRODUCTION GHSE. B**  
**PIPING ELEVATION**

EXHIBIT I  
**H5F**





FOR FIN TUBE LAYOUT  
PLAN SEE SHEETS  
H4A

Piping Elevation  
Scale: 1/4" = 1'-0"

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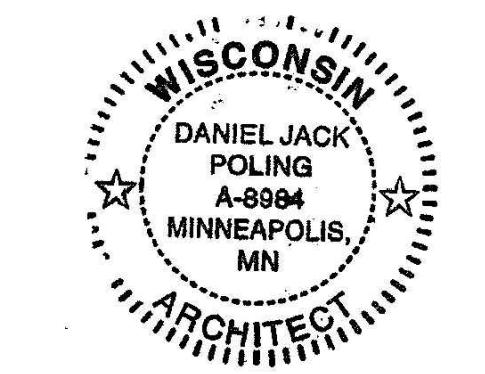
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PROJECT NO:  
2017016  
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BID DOCUMENTS  
DRAWN BY:  
JP  
CHECKED BY:

**CORRIDOR PIPING  
ELEVATION**

**EXHIBIT I  
H5G**

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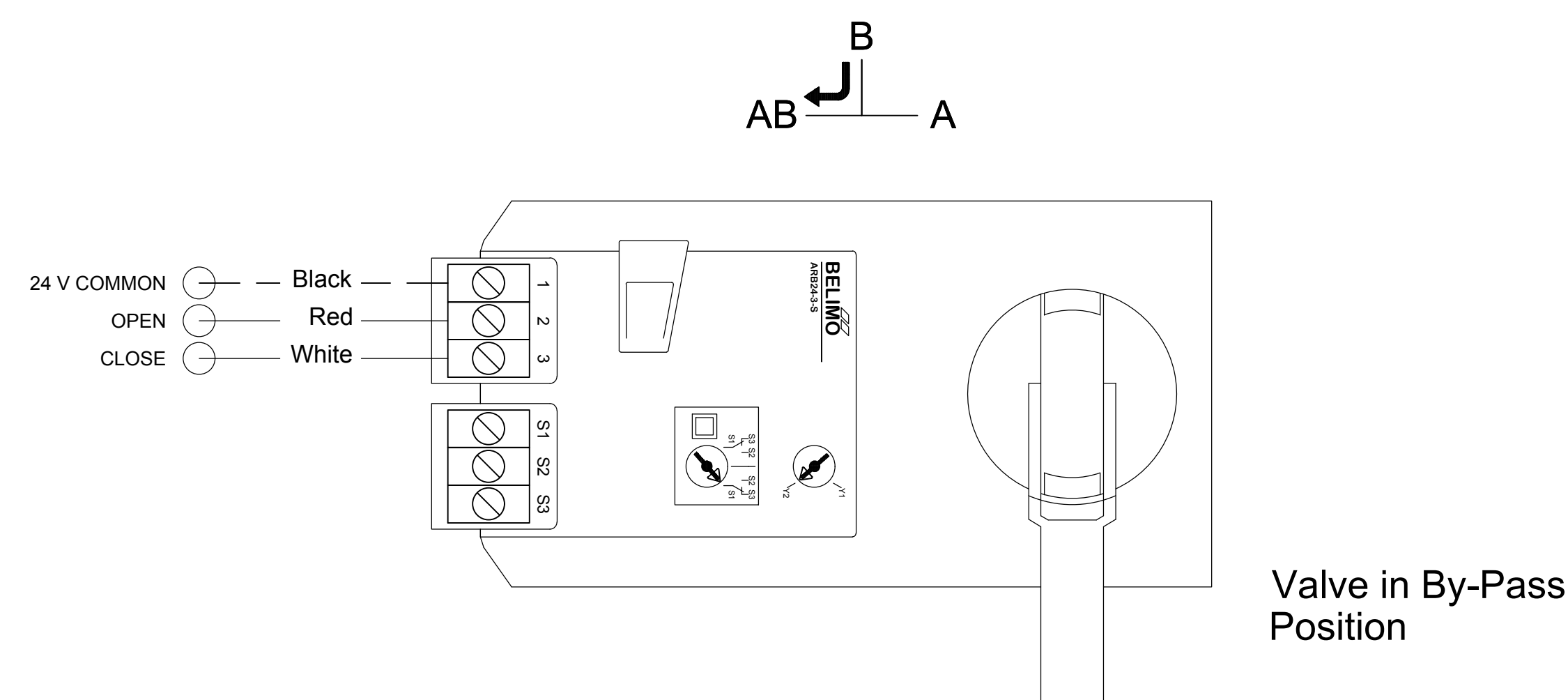
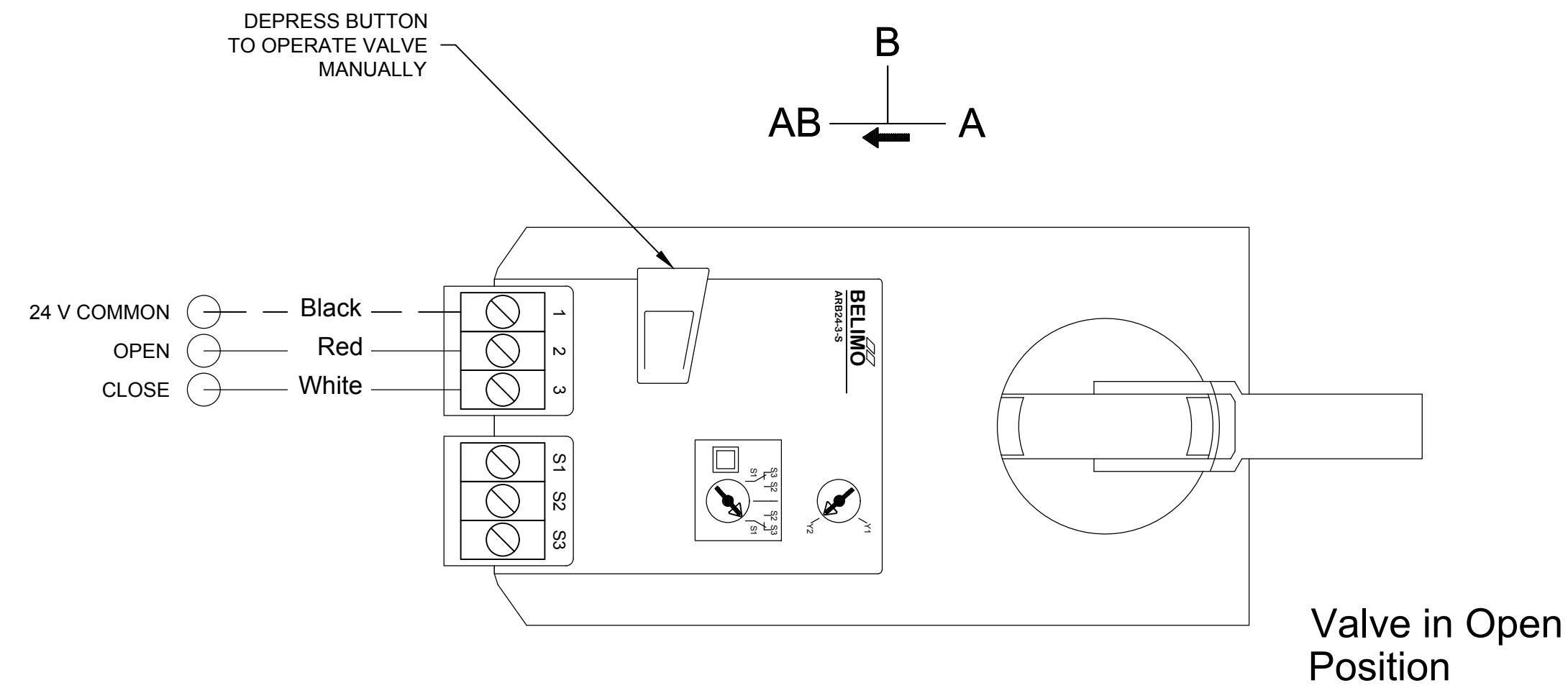


Equipment Schedule			
Item	Description	Part No.	Qty
1	VALVE, 3-WAY 1.25"	PER DESIGN	1
2	PRIMARY PUMP 1.25"	PER DESIGN	1
3	THERMOMETER	DET25	2
4	HIGH LIMIT AQUASTAT	DEAQ	1
5	CONTROL SENSOR	BY OTHERS	1

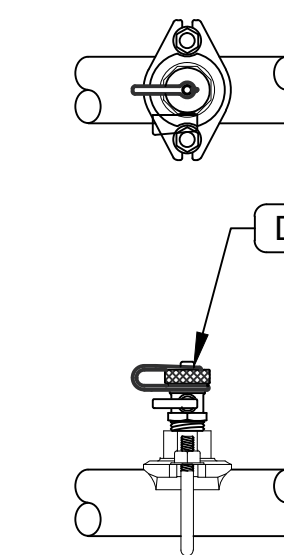
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Item	Description	Part No.	Qty
P	PIPE, STL GROOVED 1.25"	DSP12510-252R	AR
T	TEE GROOVED 1.25"	DST125	1
Tr	TEE-REDUCING HCxF 1.25"x0.50"	DSTR125050	7
A	ADAPTER GROOVEDxMTP 1.25" ST	DSA125-04ST	6
C	COUPLING GROOVED RIGID 1.25"	DSCR125	7
BV	BALL VALVE FPT 1.25"	DSV125	2
CV	CHECK VALVE MPT 1.25"	DSCV125T	1
FL	CAST IRON 125# NPT FLANGE 1.25"	DEFC12	2
N	NIPPLE GALV 1.25"x2.00"	DSNG125020	2
S1	CHANNEL GALVANIZED 1.6250x40"	DSMU-040	2
S2	STRUT CLAMP PLATED 1.25"	DSMC125	4
HB	HOSE BIB MPTX HOSE 0.50"	DSHB050	1
SW	SENSOR WELL	-	2

Drain Valve w/ Cap (Optional)			
Item	Description	Part No.	Qty
DV	DRAIN VALVE 0.50" W/ CAP	DSV050HTDC	1

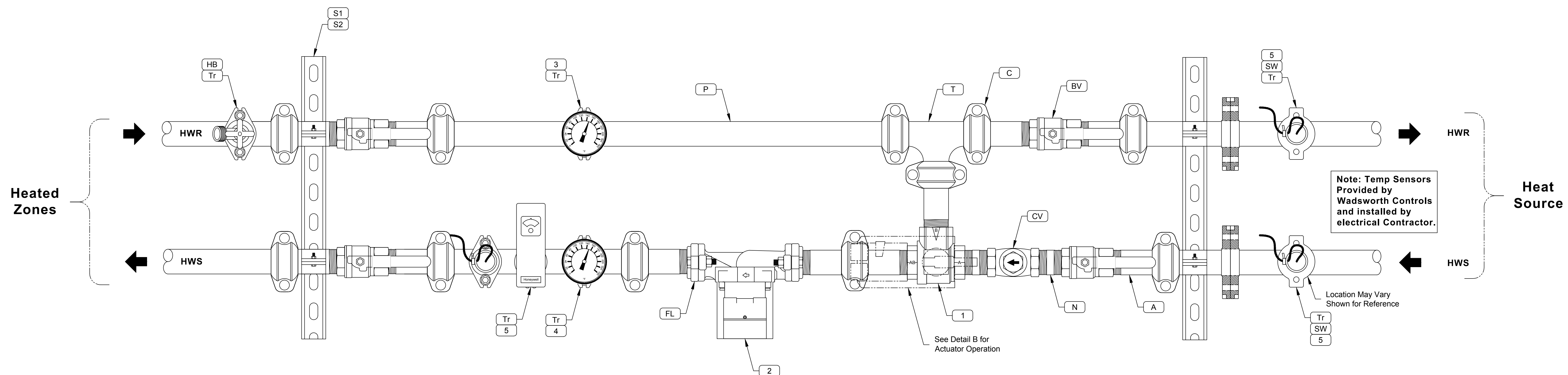
3-Way Valve Actuator



**B** Control Valve Actuator  
Scale: 8" = 1'-0"



**C** Optional Drain Valve w/ Cap - Detail  
Scale: 2 1/2" = 1'-0"



**A** 3-Way Mixing Group  
Scale: 3" = 1'-0"

**MSR** 710 South 2nd Street, 8th Floor  
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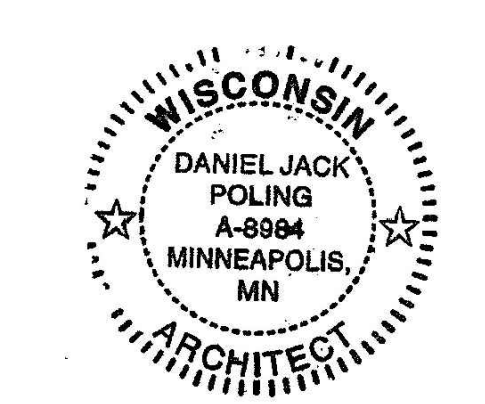
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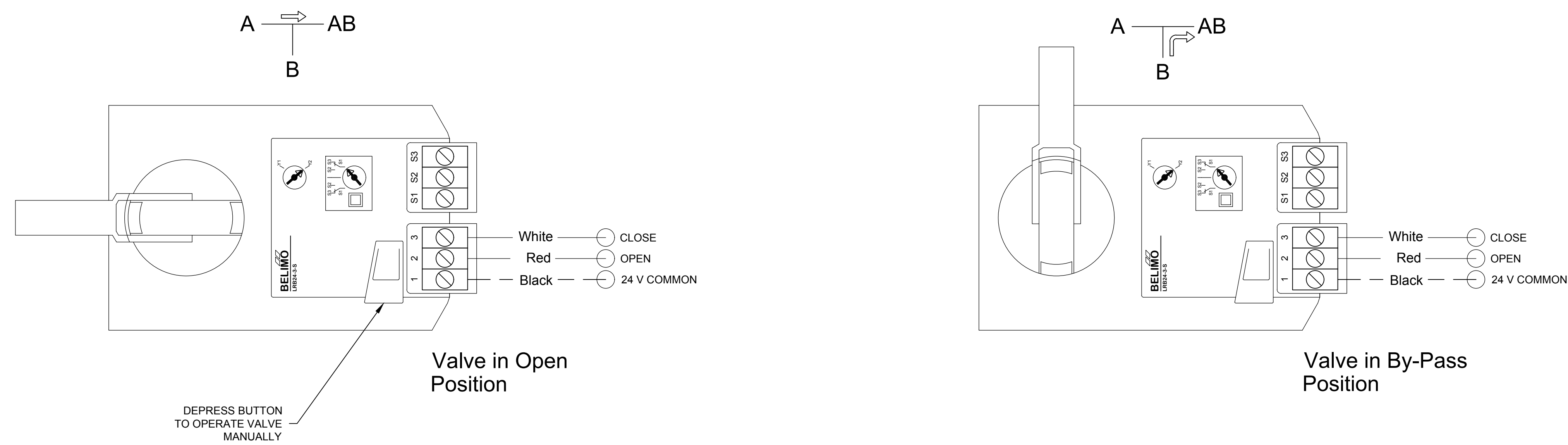
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**MIXING VALVE  
DETAILS**

**EXHIBIT I  
H6**



3-Way Valve Actuator

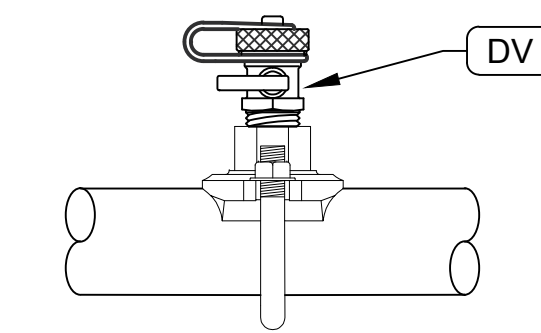
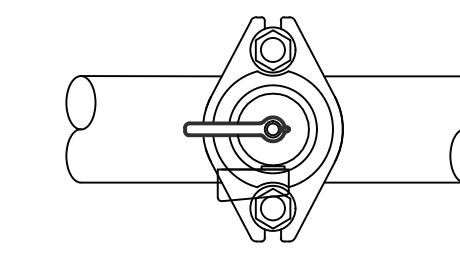


**B**  
H6A Control Valve - Actuator Detail  
Scale: 8" = 1'-0"

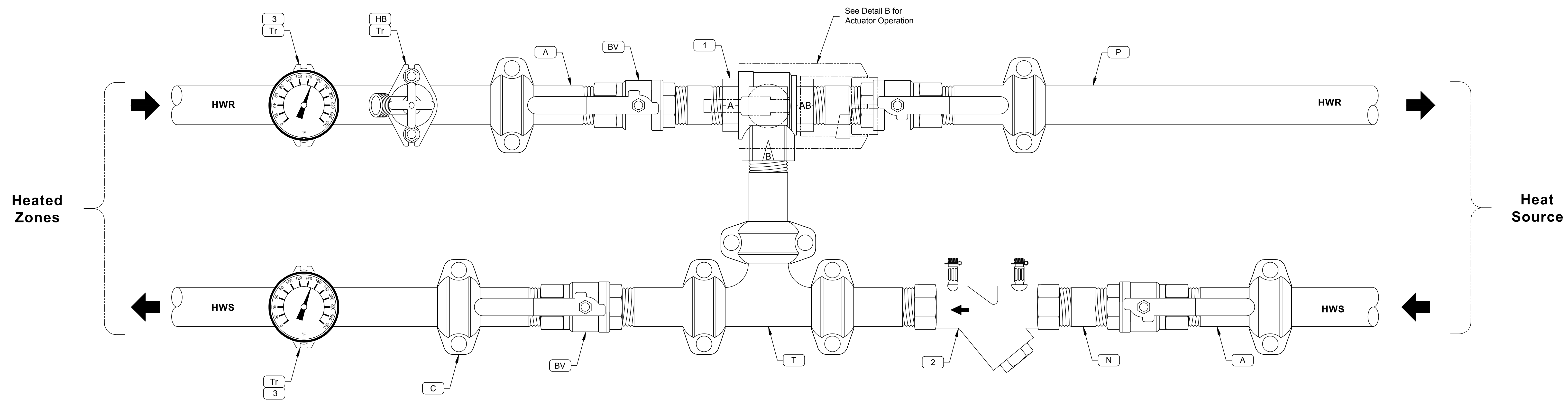
Equipment Schedule			
Item	Description	Part No.	Qty
1	VALVE, 3-WAY, 24V, 1-1/4" BELIMO	DEVS3125	1
2	FLOW REGULATOR, 1-1/4" AUTOFLOW	YRH125-2300	1
3	THERMOMETER	DET25	2

Piping Schedule (Provided w/ Optional Piping Package)			
Item	Description	Part No.	Qty
P	PIPE STEEL GROOVED 1.25"	DSP12510-252R	AR
T	TEE GROOVED 1.25"	DST125	1
Tr	TEE-REDUCING HCxF 1.25"x0.50"	DSTR125050	3
A	ADAPTER GROOVEDxMPT 1.25"	DSA125-04ST	6
C	COUPLING GROOVED 1.25"	DSCR125	7
BV	BALL VALVE FPT 1.25"	DSV125	4
N	NIPPLE GALV. 1.25"x2.00"	DSNG125020	3
HB	HOSE BIB MPTxHOSE 0.50"	DSHB050	1

Piping Schedule (Provided w/ Optional Drain Valve)			
Item	Description	Part No.	Qty
DV	DRAIN VALVE 0.50" W/ CAP	DSV050HTDC	1



**B**  
H6A Optional Drain Valve w/ Cap - Detail  
Scale: 4" = 1'-0"



**A**  
H6A 3-Way Zone Control Valve - Piping Detail  
Scale: 4" = 1'-0"

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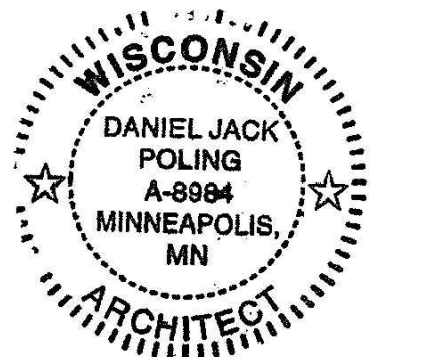
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PROJECT PHASE  
BID DOCUMENTS

DRAWN BY: J.P. CHECKED BY: J.P.

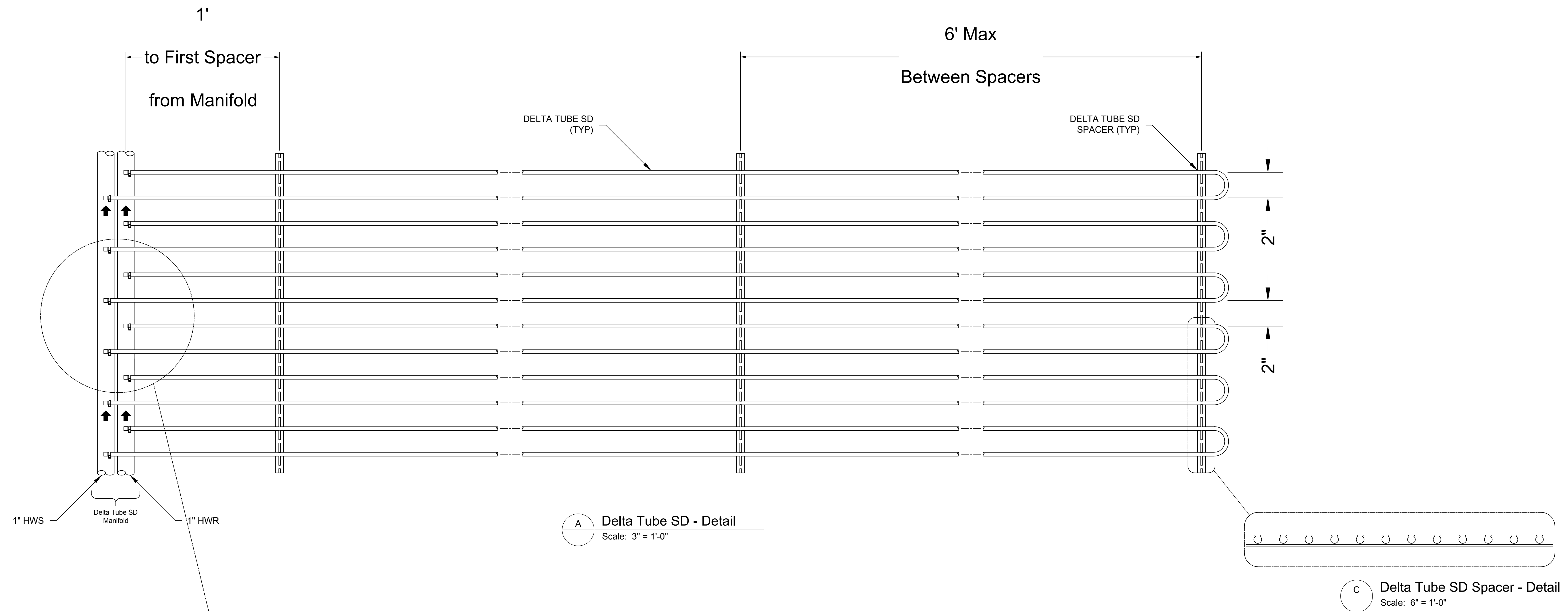
**ZONE CONTROL  
VALVE DETAILS**

EXHIBIT I  
**H6A**



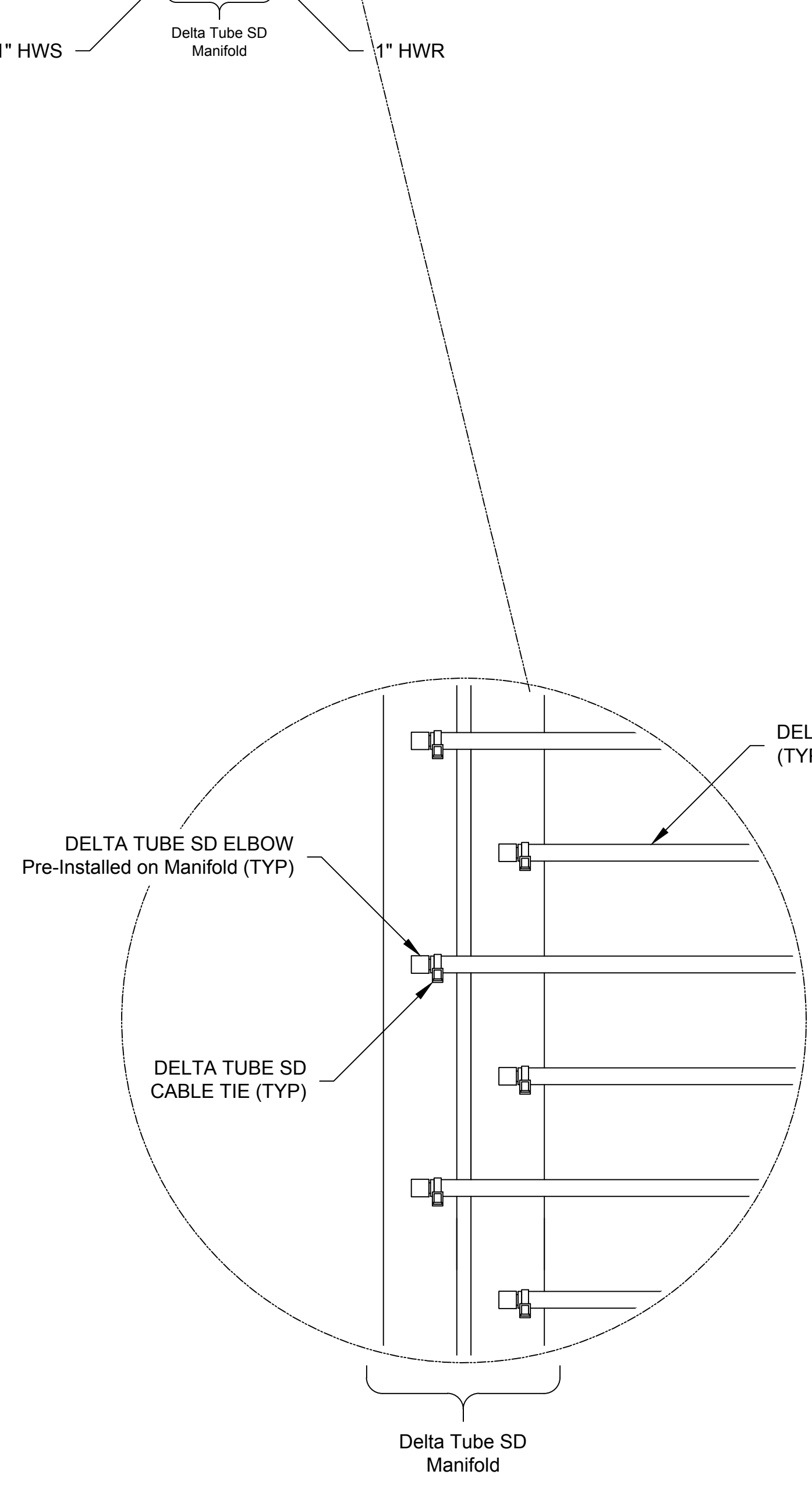




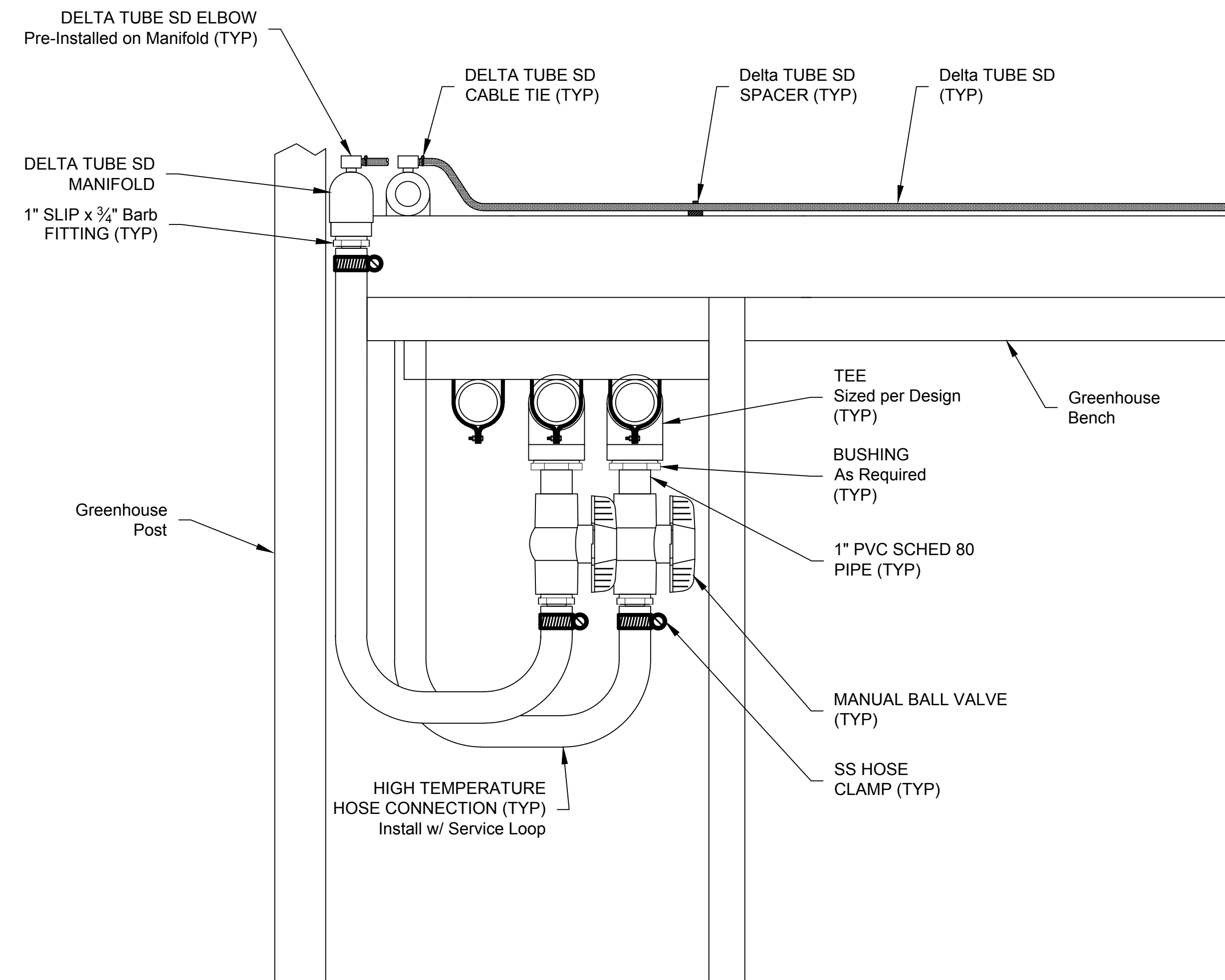


**A** Delta Tube SD - Detail  
Scale: 3" = 1'-0"

**C** Delta Tube SD Spacer - Detail  
Scale: 6" = 1'-0"



**B** Delta Tube SD - Detail  
Scale: 6" = 1'-0"



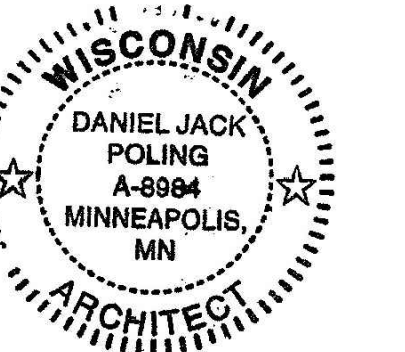
**D** Delta Tube SD - Connection Detail  
Scale: 2" = 1'-0"

**Note:**

- All Pipe, Fittings, Hangers, Valves and Hoses Connecting to the Delta Tube SD Manifolds are to be Provided By Others

**Olbrich Botanical Gardens  
Expansion Phase 1**  
BPW Project # 8162  
3330 Atwood Avenue  
Madison, WI 53704

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the Laws of the State of Wisconsin. ARCHITECT SEAL



Signature: *Jack Poling*  
Print Name: Jack Poling  
Date: JUNE 4, 2018 License No: A-8984

ISSUE	DATE	DESCRIPTION
	09.29.2017	SCHEMATIC DESIGN SUBMISSION
	12.08.2017	DD PRICING SET
	01.10.2018	DESIGN DEVELOPMENT SUBMISSION
	01.17.2018	UDC SUBMISSION
	03.30.2018	70% CD PRICING ISSUE
	04.06.2018	PARKING LOT AND SITE PLAN SUBMISSION
	05.04.2018	90% CD SUBMISSION
	06.01.2018	BID ISSUE
	06.04.2018	PERMIT ISSUE

PROJECT NO:  
2017016

PROJECT PHASE  
BID DOCUMENTS

DRAWN BY: JIP CHECKED BY:

**BENCHTOP HEATING  
DETAILS**

**H7A**

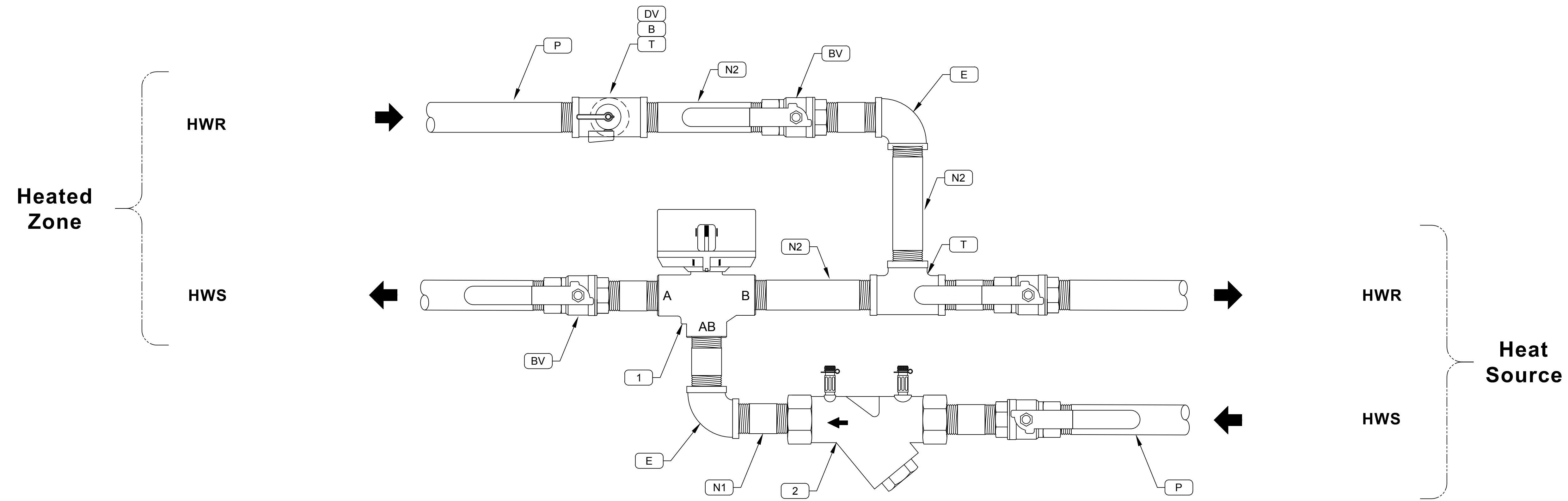


**Equipment Schedule**

Item	Description	Part No	Qty
1	VALVE, 3-WAY, 24V, 1.00" HONEYWELL	DEV3100	1
2	FLOW REGULATOR, 1.00" AUTOFLOW	DEFRL100-0100	1

**Piping Schedule** (Provided w/ Optional Piping Package)

Item	Description	Part No	Qty
E1	ELBOW GALV. FPT 1.00"	DSEG100	1
T	TEE GALV. FPT 1.00"	DST100	2
BV	BALL VALVE FPT 1.00"	DSV100	4
B	BUSHING PVC SCH 80 1.00"x0.50"	DPB100050F	1
N1	NIPPLE, GALVE. 1.00"x2.00"	DSNG100020	6
N2	NIPPLE, BRASS 1.00"x6.00"	DSNG100060	3
DV	DRAIN VALVE 0.50" w/ CAP AND CHAIN	DSV050HTDC	1



**A**  
**H7B** 3-Way Zone Control Valve - Piping Detail  
Scale: 4" = 1'-0"

**MSR** 710 South 2nd Street, 8th Floor  
Minneapolis, Minnesota 55401-2282

Architecture 612.375.0336 tel  
Interiors and 612.342.2216 fax  
Urban Design www.msrdesign.com

Civil Engineer  
**Verbicher Associates, Inc.**

999 Fournier Drive, Suite 201  
Madison, WI 53717  
608.826.0532 tel

Landscape Architect  
**Ken Saiki Design, Inc.**

303 South Paterson Street, Suite 1  
Madison, WI 53703  
608.251.3600 tel

Structural Engineer, Technology and AV  
**IMEG Corp.**

1800 Deming Way, Suite 200  
Middleton, WI 53562  
608.223.9600 tel

MEP Engineer  
**MEP Associates, LLC**

860 Blue Gersten Road, Suite 175  
Capin, MN 55121  
651.379.9120 tel

Fire Protection Engineer and Code Consultant  
**Summit Fire Consulting**

575 Minnehaha Ave West  
St. Paul, MN 55103  
651.251.1880 tel

Greenhouse Design  
**Rough Brothers, Inc.**

5513 Vine Street  
Cincinnati, OH 45217  
513.242.0310 tel

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PROJECT NO:  
2017016

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BID DOCUMENTS

DRAWN BY: JP CHECKED BY:

**BENCH TOP  
ZONE CONTROL  
VALVE DETAILS**

EXHIBIT I  
**H7B**