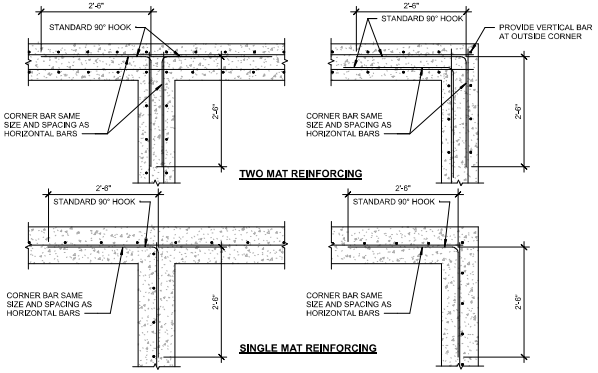
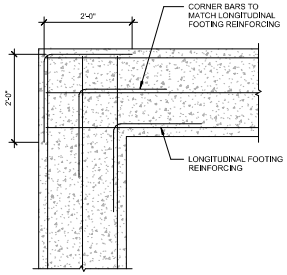
ATTACHMENT 2

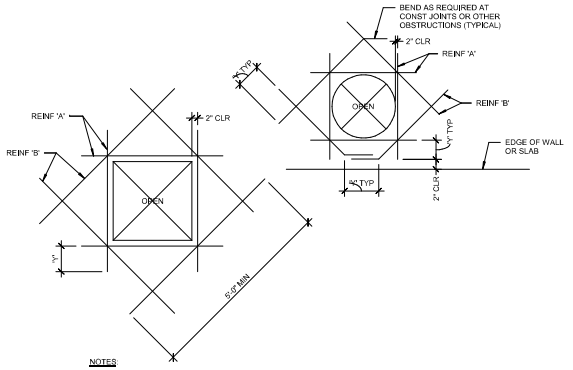
Plan Sheets: S500, S501, P101, P400, P600, P710, M101, M500, M600, M700



1 TYPICAL WALL CORNER DETAILS
3/4" = 1'-0"



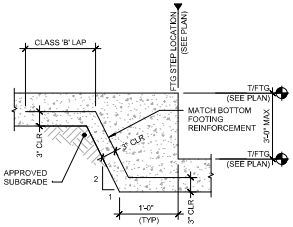
2 TYPICAL FOOTING CORNER BARS
3/4" = 1'-0"



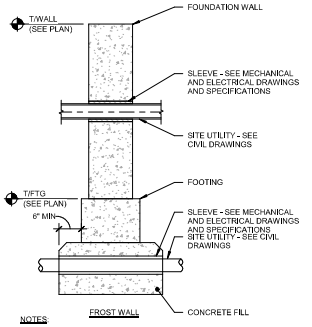
NOTES:

1. MINIMUM REINFORCING 'A' & 'B' AROUND ANY AND ALL OPENINGS SHALL BE #5 BAR.
2. Y = CLASS B LAP SPLICE FOR BAR SIZE USED.
3. MOVE REINFORCING MAX OF 2" TO CLEAR OPENING. CUT REMAINING BAR THROUGH OPENING. WHERE REINFORCING MUST BE CUT, ADD REINFORCING 'A' AT LEAST EQUAL IN AREA TO THAT WHICH WAS CUT AND EXTEND BEYOND OPENING DISTANCE 'Y'.
4. DIAGONAL BARS 'B' TO BE PLACED AT EACH FACE OF WALL WHERE TWO LAYERS OF REINFORCING ARE PROVIDED.

3 TYPICAL WALL OPENING REINFORCING DETAIL
1" = 1'-0"



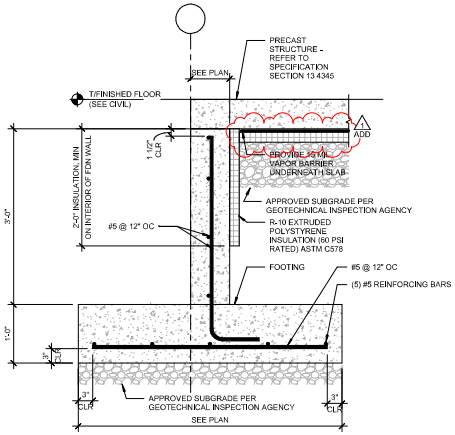
4 STEP FOOTING DETAIL
1" = 1'-0"



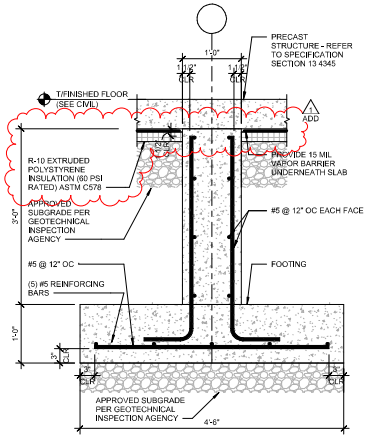
NOTES:

1. SEE UNDERGROUND PLUMBING, MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS FOR ALL LOCATIONS, ELEVATIONS, ETC., OF SITE UTILITIES.
2. DETAIL REQUIRED AT ALL UTILITIES HAVING A PLAN WIDTH UP TO 3'-0" FOR WIDTHS GREATER THAN 3'-0", SEE PLAN FOR LOCATIONS.
3. SLEEVES AND UTILITIES SHALL NOT BE ALLOWED BELOW COLUMN SPREAD FOOTINGS. WHEN SITE UTILITY IS EXPECTED TO CONFLICT WITH SPREAD FOOTINGS, THE GENERAL CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER AND ARCHITECT.

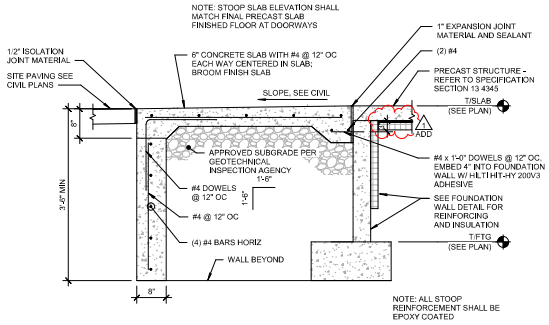
5 TYPICAL FOUNDATION DETAIL AT SITE UTILITIES
3/4" = 1'-0"



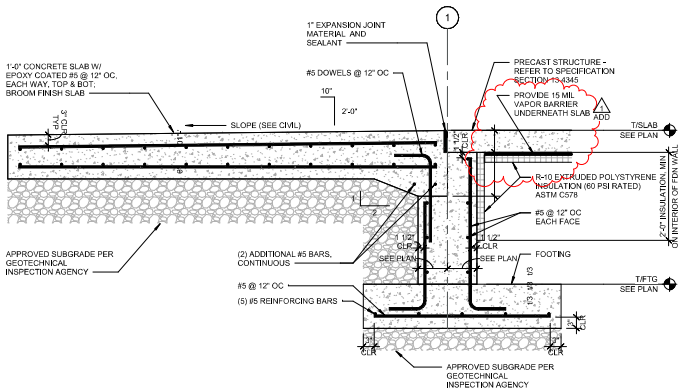
6 TYP EXTERIOR FOUNDATION WALL DETAIL
1" = 1'-0"



7 TYP INTERIOR FOUNDATION WALL DETAIL
1" = 1'-0"

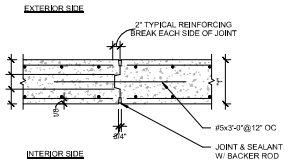


8 CONCRETE STOOP DETAIL
3/4" = 1'-0"



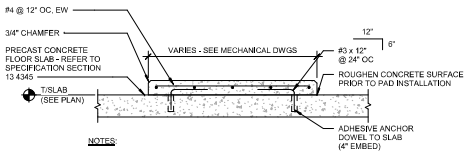
1 CONCRETE APPROACH SLAB DETAIL

3/4" = 1'-0"



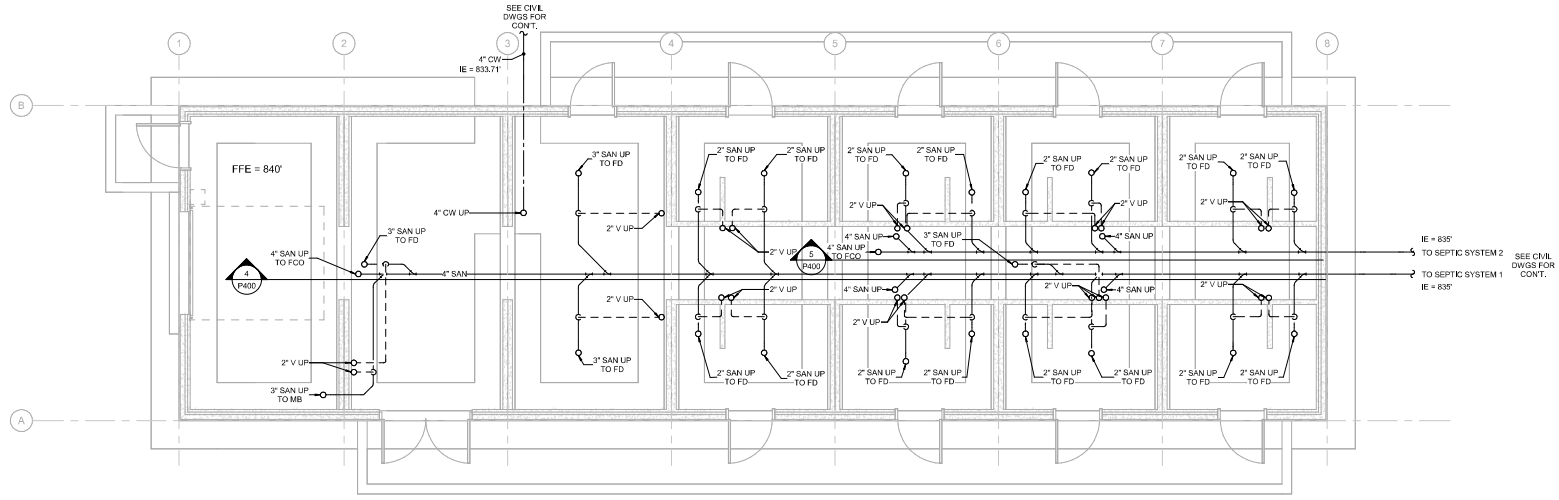
2 TYPICAL WALL CONSTRUCTION JOINT

3/4" = 1'-0"



3 TYPICAL HOUSEKEEPING PAD

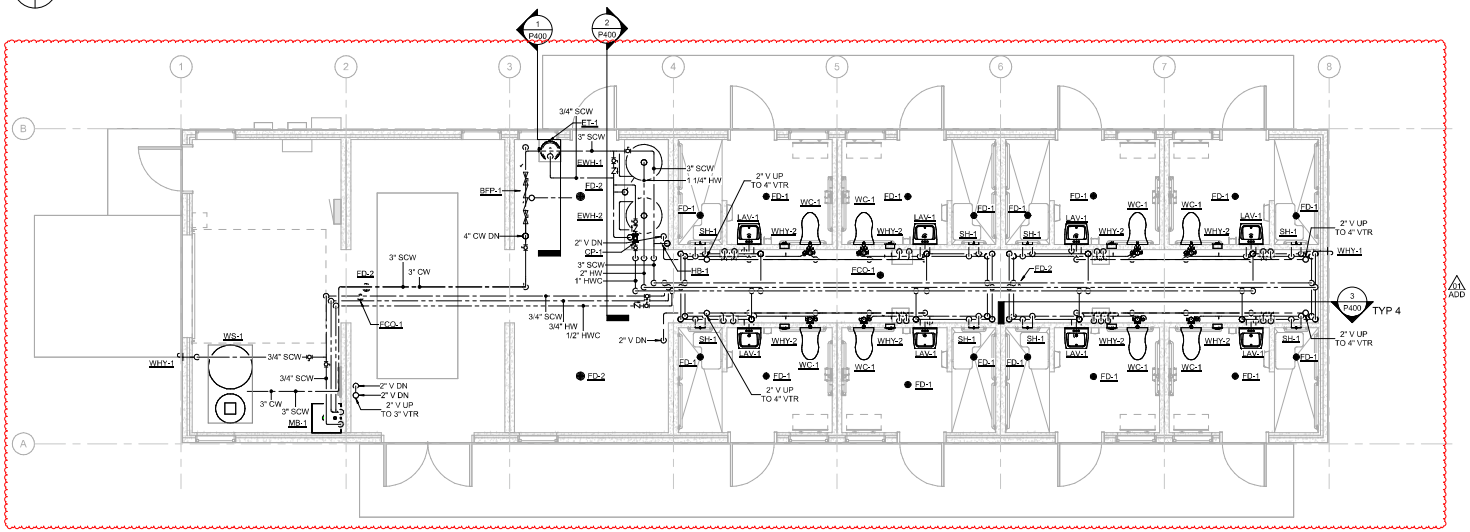
3/4" = 1'-0"



NORTH

1 UNDER SLAB PLUMBING PLAN

1/4" = 1'-0" 0 6'

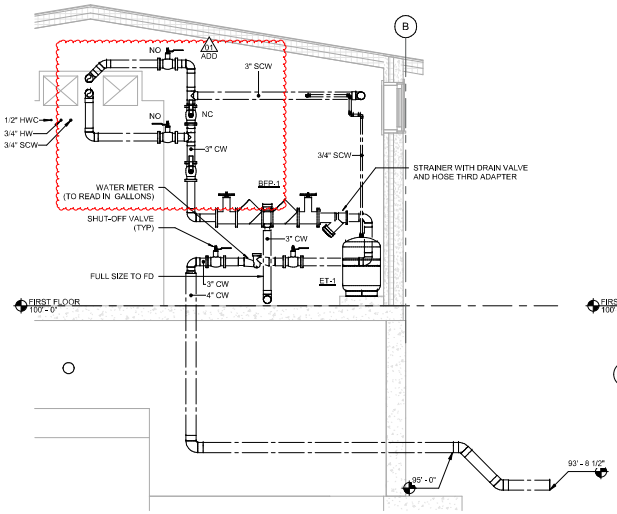


NORTH

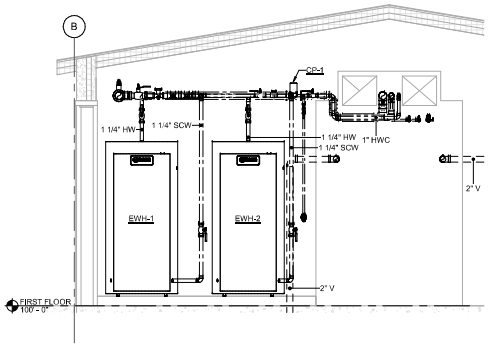
2 PLUMBING PLAN

1/4" = 1'-0" 0 6'

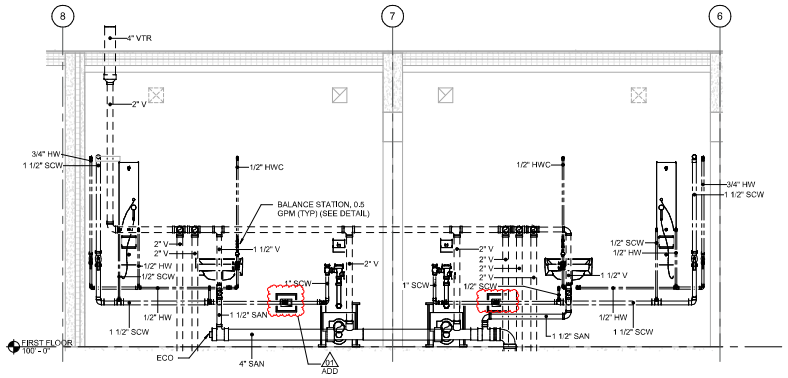
SHIVEHATTERY ARCHITECTURE+ENGINEERING	222 Third Avenue SE Suite 300 | Cedar Rapids, Iowa 52401 319.364.0227 | fax 319.364.4251 | www.shive-hattery.com Iowa | Illinois | Indiana | Nebraska | Wisconsin	JOHNSON COUNTY CONSERVATION	PROJECT NO.: 2250000910	ISSUED FOR: BID	DATE: 01/21/2026	SHEET NAME: PLUMBING PLANS	SHEET NO.: P101



1 PLUMBING SECTION - WATER SERVICE ENTERANCE
1/2" = 1'-0" 0 3'

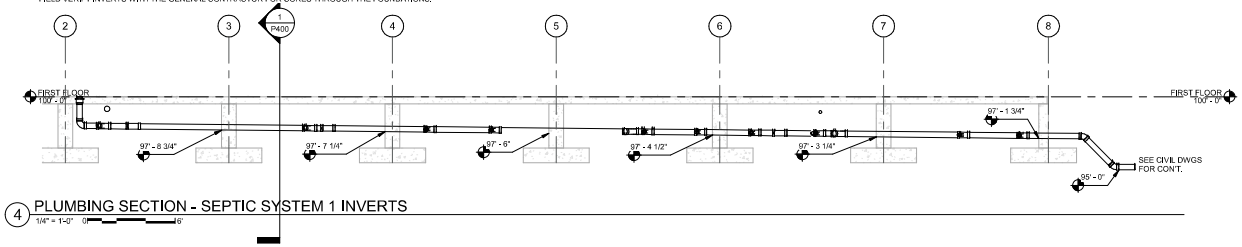


2 PLUMBING SECTION - WATER HEATERS
1/2" = 1'-0" 0 3'



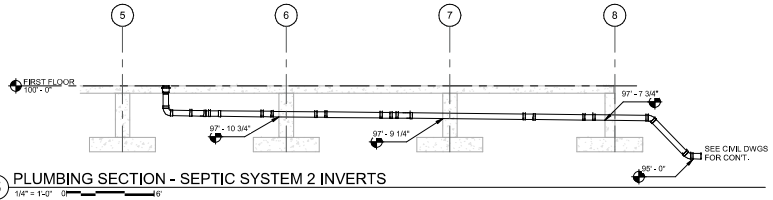
3 PLUMBING SECTION - CHASE PIPING (TYP 4)
1/2" = 1'-0" 0 3'

FIELD VERIFY INVERTS WITH THE GENERAL CONTRACTOR FOR CORES THROUGH THE FOUNDATIONS.



4 PLUMBING SECTION - SEPTIC SYSTEM 1 INVERTS
1/4" = 1'-0" 0 6'

FIELD VERIFY INVERTS WITH THE GENERAL CONTRACTOR FOR CORES THROUGH THE FOUNDATIONS.



5 PLUMBING SECTION - SEPTIC SYSTEM 2 INVERTS
1/4" = 1'-0" 0 6'

PLUMBING FIXTURE SCHEDULE

REMARKS:
1. WATER HAMMER ARRESTORS NOT SHOWN ON PLANS. REFER TO SPECIFICATIONS AND 2021 UPC. INSTALL ON BOTH COLD AND HOT WATER PIPING IN AN UPRIGHT POSITION. LOCATE AT THE ENDS OF PIPE RUNS OR NEAR A BATTERY OF FIXTURES. FOLLOW MANUFACTURER'S SPECIFICATIONS FOR LOCATION AND INSTALLATION. INSTALL IN AN ACCESSIBLE LOCATION. AIR CHAMBERS NOT ALLOWED.
2. NOT ALL CO, FCO, WCO, ECO ARE SHOWN ON PLANS, REFER TO SPECIFICATIONS AND 2021 UPC. CLEANOUT COVERS SHALL BE STAMPED OR ENGRAVED ON COVER AS "SAN". FIELD COORDINATE EXACT LOCATION OF FLOOR AND WALL CLEANOUTS WITH GENERAL CONTRACTOR.

		FIXTURE				FAUCET / FLUSH VALVE				PIPE CONNECTIONS / ROUGH-IN PIPE DIAMETER					ACCESSORIES
TAG	FIXTURE TYPE	MANUFACTURER	MODEL	MATERIAL	DESCRIPTION	MANUFACTURER	MODEL NO.	FINISH	DESCRIPTION	STM	SAN	VENT	CW	HW	COMMENTS
BFP-1	BACKFLOW PREVENTER	WATTS	LF909	CAST IRON	REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY, GATE VALVES, FDA EPOXY COATED WYE STRAINER, AIR GAP ACCESSORY.								3"		
FCO-1	FLOOR CLEANOUT - ROUND	SIOUX CHIEF	854-64NR	CAST IRON	ADJUSTABLE LEVELING FLOOR CLEANOUT, CAST IRON BODY, WITH GAS AND WATERTIGHT ABS TAPERED THREAD PLUG, AND ROUND SCORIATED SECURED NICKEL BRONZE LIGHT-DUTY TOP. INSTALL FLUSH WITH FINISHED FLOOR.						4"				
FD-1	FLOOR DRAIN - ROUND	SIOUX CHIEF	842	CAST IRON	FLOOR DRAIN, 4 1/2" DIAMETER ADJUSTABLE STRAINER HEAD, NICKEL BRONZE STRAINER DEEP CAST IRON P-TRAP. SET TOP OF STRAINER FLUSH WITH FINISHED FLOOR.						2"	2"			
FD-2	FLOOR DRAIN - ROUND	SIOUX CHIEF	842	CAST IRON	SAME AS FD-1 EXCEPT 6 1/2" DIAMETER ADJUSTABLE STRAINER HEAD.						3"	2"			
HB-1	HOSE BIB - END OF PIPE	NIBCO	74-CL	-	MULTI-TURN BOILER DRAIN.								3/4"		
LAV-1	LAVATORY - WALL HUNG - ADA	KOHLER	K-1722-0	WHITE VITREOUS CHINA	~~WALL MOUNT LAVATORY, 19 1/4" x 17-1/4", SINGLE CENTER HOLE, WHITE VITREOUS CHINA. MOUNT RIM AT 34"~~ AFF. PROVIDE CHROME PLATED TAILPIECE, GRID DRAIN AND P-TRAP. LOOSE KEY ANGLE STOPS AND SUPPLIES. MOUNT AT ADA COMPLIANT HEIGHT. INSULATE WATER AND WASTE TO MEET ADA REQUIREMENTS USING ADA INSULATION KIT, TRUEBRO OR EQUIVALENT.	MOEN	M8884	CHROME	SINGLE HANDLE FAUCET, 0.5 GPM, SINGLE HOLE INSTALLATION, VANDAL RESISTANT, ADA COMPLIANT.		1 1/2"	1 1/2"	1/2"	1/2"	PROVIDE WITH ZURN CONCEALED ARM CARRIER, MODEL AS REQUIRED. PROVIDE WITH LEONARD MODEL 270 THERMAL MIXING VALVE SET TO DELIVER A MIXED HOT WATER TEMPERATURE OF 110°F.
MB-1	MOP BASIN	PROFLO	PFMB24X24	MOLDED COMPOSITE	24" x 24" x 10", CORNER INSTALLATION, VINYL BUMBER GUARDS, STAINLESS STEEL WALL GUARDS ON TWO SIDES. DRAIN BODY SHALL BE FACTORY INSTALLED, STAINLESS STEEL FLAT STRAINER, LEAD CAULKED JOINT FOR 3" WASTE CONNECTION, DEEP SEAL CAST IRON P-TRAP.	CHICAGO FAUCET CO	835-369CP	CHROME	WALL MOUNTED, 6" CENTERS, TOP MOUNTED SUPPLIES, INTEGRAL STOPS AND VACUUM BREAKER SPOUT WITH PAIL HOOK AND WALL BRACE. VANDAL-PROOF, LEVER HANDLES.		3"	2"	3/4"	3/4"	PROVIDE STAINLESS STEEL MOP HANGER AND 3 RUBBER TOOL GRIPS, 30" LONG RUBBER HOSE WITH HOSE BRACKET AND RUBBER GRIP.
SH-1	SHOWER - FAUCET	-	-	-	-	ACORN	1741ADA	STAINLESS STEEL	42" X 11" SINGLE-PANEL WALL MOUNT, T/P TEMPERATURE/PRESSURE BALANCING MIXING VALVE, RECESSED SOAP DISH, UPPER SHOWER HEAD WITH LOWER HANDHELD SHOWER WITH 60" HOSE FOR ADA USE, VACUUM BREAKER, QUICK DISCONNECT, MOUNTING BRACKET, WALL SLEEVE. MOUNT AT ADA COMPLIANT HEIGHT.				1/2"	1/2"	
WC-1	WATER CLOSET - WALL HUNG - ADA	KOHLER	K-84454-0	WHITE VITREOUS CHINA	16 1/2" ELONGATED BOWL, WATERSENSE CERTIFIED 1.28 GPF, WHITE VITREOUS CHINA, 1 1/2" REAR SPUD. MOUNT RIM AT 17" AFF FOR ADA HEIGHT REQUIREMENTS.	SLOAN	S3914856	CHROME	CONCEALED MANUAL FLUSH VALVE, PUSH-BUTTON FLUSH ACTUATOR, 1.28 GPF, 1" I.P.S. WHEEL HANDLE ANGLE STOP, 14 1/2" ROUGH IN ABOVE FIXTURE, BACK-CHECK ANGLE STOP, VACUUM BREAKER, WALL AND SPUD FLANGE, ADA COMPLIANT.		4"	2"	1"		PROVIDE WITH ZURN ADJUSTABLE HORIZONTAL CARRIER, ZZ1203-N(L4/R4) MODEL AS REQUIRED. PROVIDE WITH BEMIS SEAT, ELONGATED, ANTI-MICROMBIAL SOLID PLASTIC, OPEN FRONT, WHITE, HEAVY DUTY SELF-SUSTAINING CHECK HINGE WITH BUMPERS, NO COVER.
WHY-1	EXTERIOR WALL HYDRANT	WOODFORD	B67	-	WALL HYDRANT, FREEZELESS, AUTOMATIC DRAINING, ASSE 1052 'NIDEL' 50HA HIGH FLOW DOUBLE CHECK BACKFLOW PREVENTER, WALL CLAMP AND LOCKABLE DOOR W/LOOSE TEE KEY. EXACT HEIGHT, LOCATION ~~AND FINISH TO BE COORDINATED WITH BUILDING MATERIALS, ARCHITECTURAL FINISHES AND G.C.~~								3/4"		
WHY-2	WALL HYDRANT	WOODFORD	B65	-	WALL HYDRANT, FREEZELESS, AUTOMATIC DRAINING, SINGLE CHECK HOSE CONNECTION, ANTI-SIPHON VACUUM BREAKER, CHROME FINISH, WALL CLAMP AND LOCKABLE DOOR W/LOOSE TEE KEY. INSTALL 18" ABOVE FINISHED FLOOR.								3/4"		

01 ADD

01 ADD

WATER HEATER SCHEDULE - ELECTRIC

REMARKS:
1. INSTALL ON 4" CONCRETE HOUSE KEEPING PAD.

			WATER (°F)				ELECTRICAL DATA					
MARK	STORAGE (GAL)	RECOVERY (GPH)	TUO		ELEMENT KW	# OF ELEMENTS	TOTAL KW	VOLTS	PHASE	CONTROL OR STARTER	DISCONNECT FURNISHED / INSTALLED	SIASBN GSDIE
EWH-1	120	99	40	140	4	3	12	240	1	INTERNAL	EC/EC	AO SMITH DRE-120-12
EWH-2	120	99	40	140	4	3	12	240	1	INTERNAL	EC/EC	AO SMITH DRE-120-12

WATER SOFTENER SCHEDULE

REMARKS:
1. TO BE USED IN THE SHOWER HOUSE TEMPORARILY AND RELOCATED TO THE PROPOSED TREATMENT BUILDING IN THE FUTURE.
2. ROUTE DRAIN LINE TO MOP SINK OR NEAREST FLOOR DRAIN.
3. WATER SOFTENER SKID, CONNECT WATER LINES TO PRE-PIPED CONNECTIONS. COORDINATE WITH MANUFACTUER'S REQUIREMENTS.

MARK	TYPE	PRESSURE VESSEL SIZE	MAX WORKING PRESSURE (PSI)	BRINE TANK SIZE	RESIN DEPTH	DESIGN BASIS
WS-1	ION EXCHANGE	24"x65"	100	30"x36"	36"	AQUATECHIX (FILTERTECH)

01 ADD

PLUMBING PUMP SCHEDULE

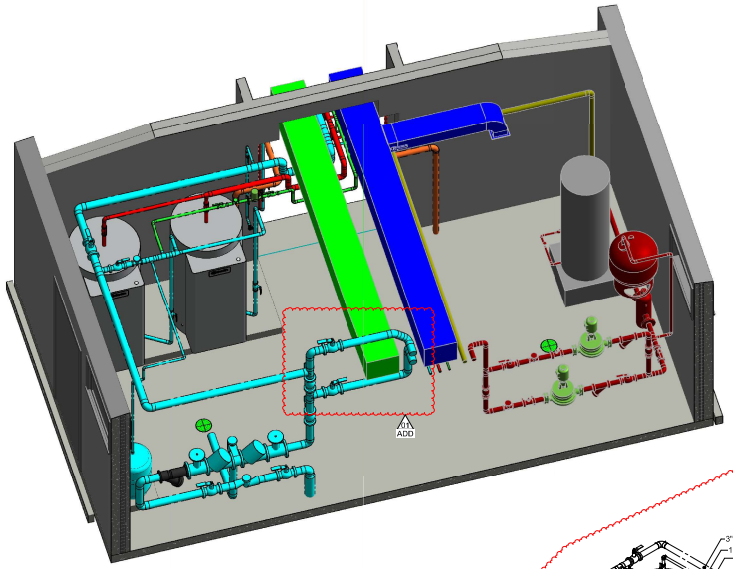
REMARKS:
1. PROVIDE WITH AQUASTAT AND TIMER. 115V, MAX 16A, COORDINATE WITH EC.
2. INSTALL PUMP PER MANUFACTURER'S INSTRUCTIONS.
3. STARTER, DISCONNECT AND TIMER INTERLOCK WIRING BY EC.

				ELECTRICAL DATA								
MARK	TYPE	GPM	SHEAD(FT)ALF	MRP	SLTVO	ESAHP			CONTROL OR STARTER	CONTROLLER OR STARTER FURNISHED / INSTALLED	DISCONNECT FURNISHED / INSTALLED	
CP-1	IN-LINE	4.5	10	92	0.8	2940	115	1	AQUASTAT	MC/EC	EC/EC	BELL&GOSSET NBF-22

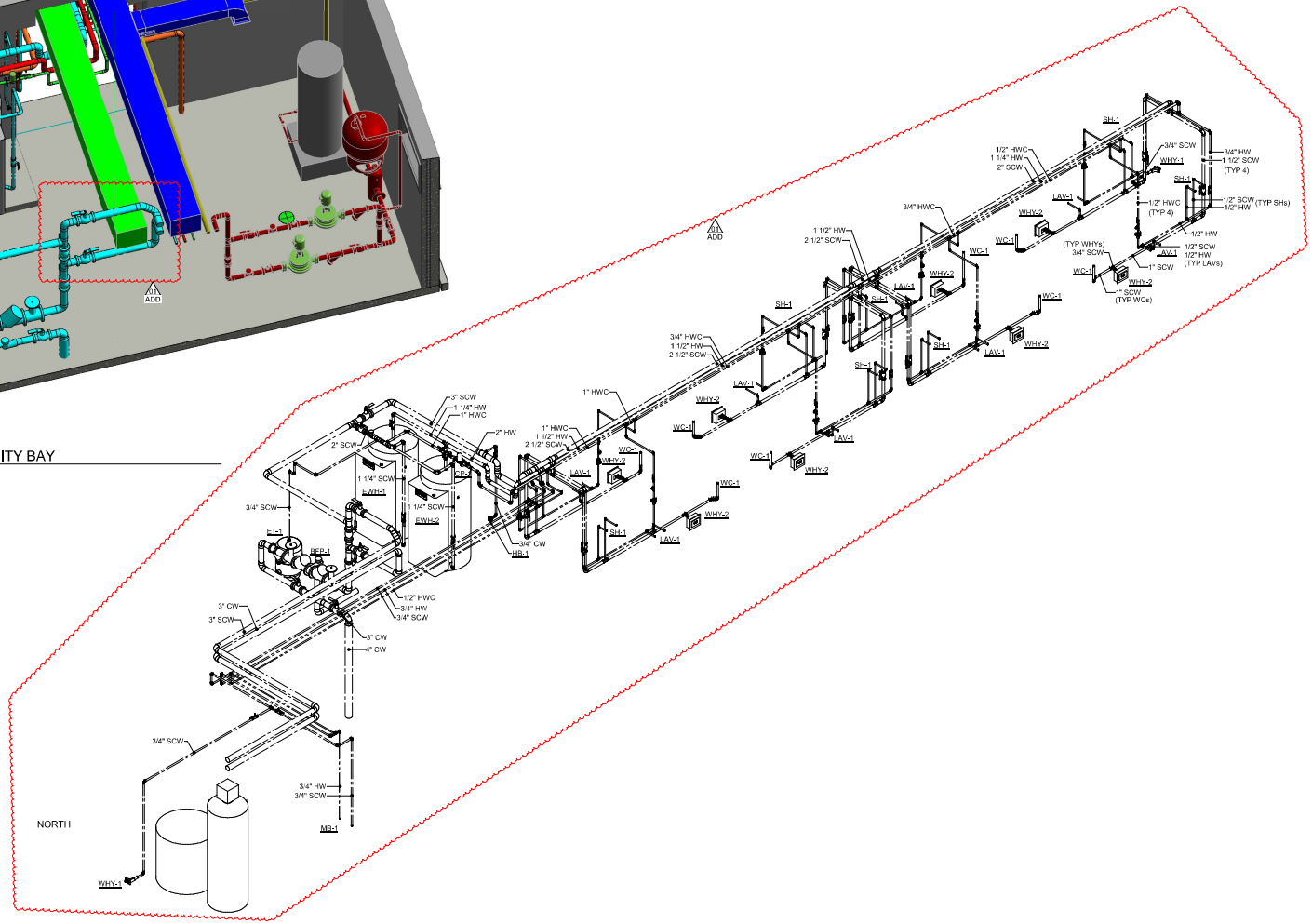
SIASBN GSDIE

PLUMBING EXPANSION TANK SCHEDULE

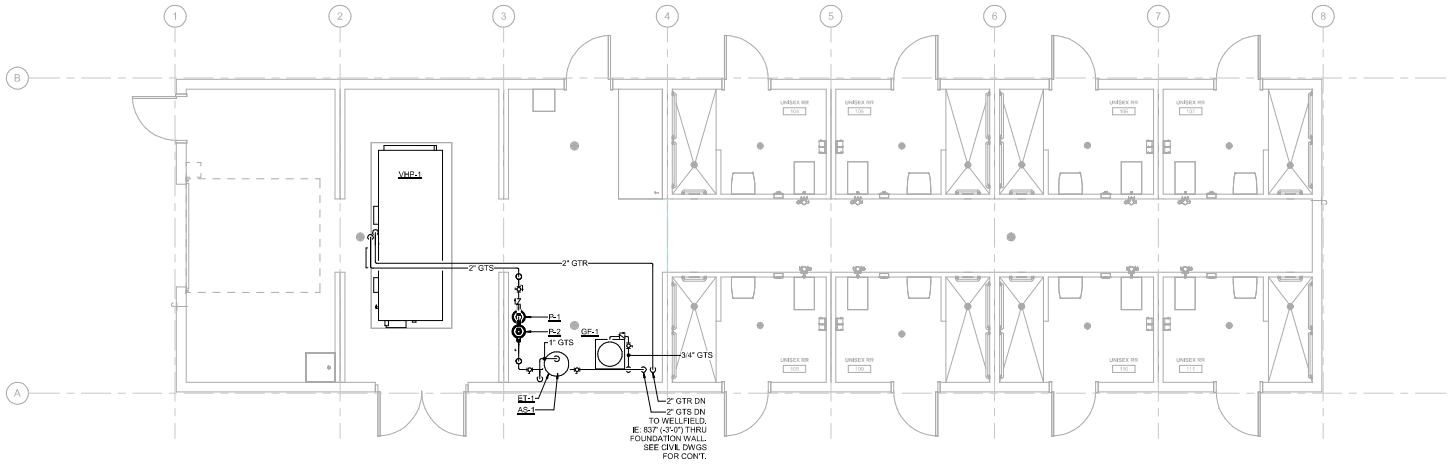
MARK	TYPE	TANK CAPACITY (GAL)	ACCEPTANCE CAPACITY (GAL)	DESIGN BASIS
ET-1	DIAPHRAGM	16.6	11.3	AMTROL ST-30VC-DD



2 PLUMBING ISOMETRIC - WATER UTILITY BAY
NOT TO SCALE



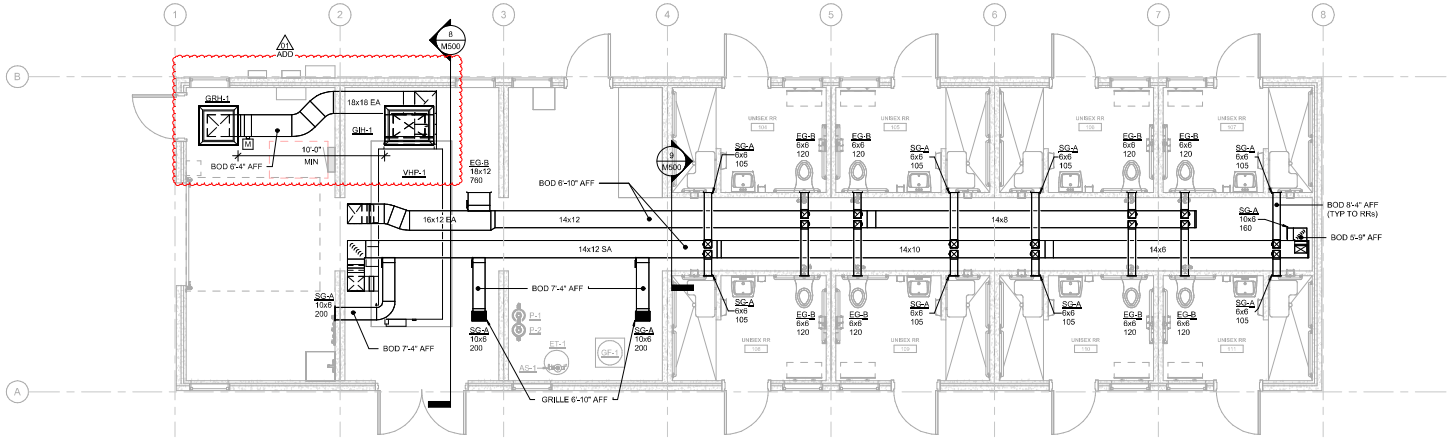
1 PLUMBING ISOMETRIC - DOMESTIC
NOT TO SCALE



NORTH

2 MECHANICAL PIPING PLAN

1/4" = 1'-0"



NORTH

1 MECHANICAL HVAC PLAN

1/4" = 1'-0"

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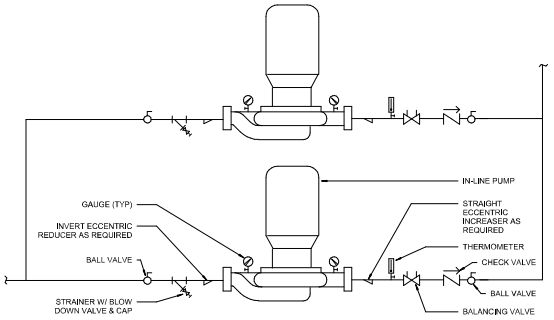
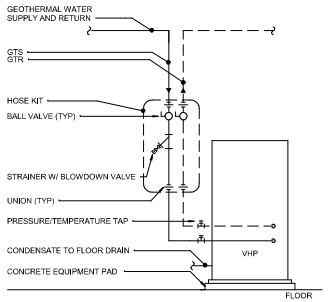
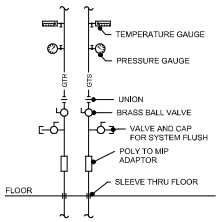


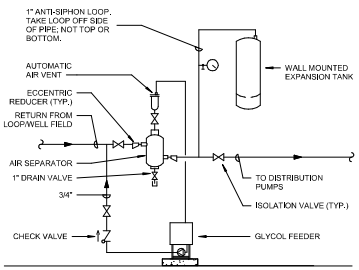
1 PIPING DIAGRAM - IN-LINE PUMP
NOT TO SCALE



2 HEAT PUMP PIPING DETAIL
NOT TO SCALE

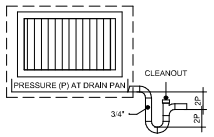


3 GEOTHERMAL LOOP HEADER DETAIL
NOT TO SCALE

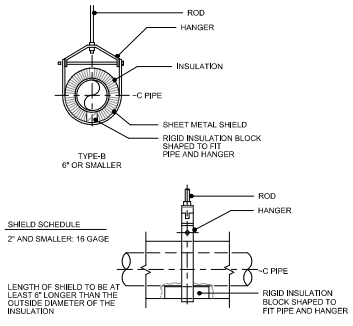


4 AIR SEPARATOR, EXPANSION TANK AND GLYCOL FEEDER DETAIL
NOT TO SCALE

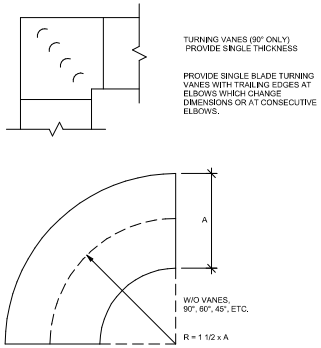
NOTE:
1. PIPING SHALL BE SLOPED IN THE DIRECTION OF FLOW AT 1/8" PER FOOT MINIMUM.
2. PIPING SHALL BE SUPPORTED INDEPENDENTLY OF THE COILS.
3. DRAIN LINES SHALL BE RUN FULL SIZE (MINIMUM) FROM THE DRAIN PAN CONNECTION.
4. "TRAP DEPTH" AND "THE DISTANCE BETWEEN THE TRAP AND TRAP OUTLET" SHALL BE TWICE (MINIMUM) THE STATIC PRESSURE IN THE DRAIN PAN SECTION.



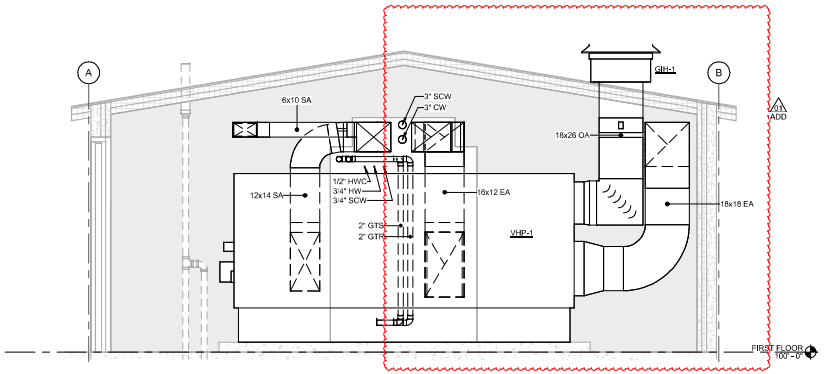
5 DRAIN PAN PIPING DETAIL
NOT TO SCALE



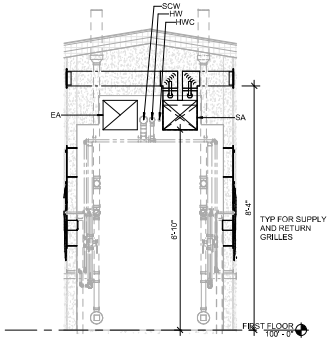
6 INSULATED PIPE HANGER DETAIL
NOT TO SCALE



7 ELBOW DETAILS
NOT TO SCALE



8 MECHANICAL SECTION - VHP
1/2" = 1'-0"



9 MECHANICAL SECTION - PIPE CHASE
1/2" = 1'-0"

SHIVEHATTERY ARCHITECTURE + ENGINEERING
222 Third Avenue SE Suite 300 | Cedar Rapids, Iowa 52401
319.364.0227 | fax 319.364.4251 | www.shive-hattery.com
Iowa | Illinois | Indiana | Nebraska | Wisconsin

JOHNSON COUNTY CONSERVATION | PROJECT NO.: 2250000910 | ISSUED FOR: BID | DATE: 01/21/2026 | SHEET NAME: MECHANICAL DETAILS & SECTIONS | SHEET NO.: M500

HEAT PUMP SCHEDULE - WATER SOURCE

REMARKS:
1. SENSIBLE ENERGY RECOVERY WHEEL WITH BYPASS DAMPER, WATER COOLED HEAT PUMP, AND ELECTRIC REHEAT.
2. ALL MOTORS SHALL BE NEMA PREMIUM EFFICIENCY.
3. PROVIDE FACTORY MOUNTED DISCONNECT.
4. VHP-1 COOLING IS BASED ON 90°F EWT, HEATING IS BASED ON 40°F EWT, 25% PROPYLENE GLYCOL.
5. EER AND COP VALUE BASED AHRI STANDARD CONDITIONS.
6. HEAT PUMP SHALL HAVE MODULATING CAPACITY WITH VFD. FANS SHALL BE VARIABLE SPEED ECM MOTORS.
7. ALL ALUMINUM INTERIOR.
8. PROVIDE WITH EXTRA SET OF FILTERS, REPLACE AT TIME OF OWNER ACCEPTANCE.

	SUPPLY FAN DATA			EXHAUST FAN DATA			WATER FLOW		HEAT PUMP - COOLING							HOT GAS REHEAT		HEAT PUMP - HEATING						ENERGY RECOVERY WHEEL																ELECTRICAL INFORMATION						
									EAT (°F)		LAT (°F)		CAPACITY (MBH)											SUMMER OPERATION								WINTER OPERATION													
MARK		EXTERNAL STATIC PRESSURE (IN. WG)	HP	CFM	EXTERNAL STATIC PRESSURE (IN. MPB/G)	HP		PD (FT H2O)	EWT (°F)	LWT (°F)	DB	WB	DB	WB	TOTAL	SENSIBLE	EER	LAT (°F)	MBH	EAT DB (°F)	LAT DB (°F)	EWT (°F)	LWT (°F)	TOTAL MBH	COP	ELECTRIC HEAT KW	ELECTRIC PRE-HEAT KW	OUTSIDE AIR EAT (°F) DB	OUTSIDE AIR EAT (°F) WB	EXHAUST AIR EAT (°F) DB	EXHAUST AIR EAT (°F) WB	TEMPERED AIR LAT (°F) DB	TEMPERED AIR LAT (°F) WB	EFFECTIVENESS %	TOTAL REC MBH	OUTSIDE AIR EAT (°F) DB	OUTSIDE AIR EAT (°F) WB	EXHAUST AIR EAT (°F) DB	EXHAUST AIR EAT (°F) WB	TEMPERED AIR LAT (°F) DB	TEMPERED AIR LAT (°F) WB	EFFECTIVENESS %	TOTAL REC MBH	SLTVO	ESAHP	ACM	PCOM	SIASBN GSDIE
VHP-1	1600	1	1	1720	1	1.5	20	8.2	90	103	80	68.1	45.7	45.7	100.9	59.2	16.5	70	18.9	51	101	40	33	89.6	3.8	15	10	95	76	75	63	80	67	71	53.91	-10	-11	70	58	52.8	46.2	74	124.9	240	3	83.7	100	TRANE GABF108D3

MECHANICAL PUMP SCHEDULE

1. WELLFIELD PRESSURE DROP ASSUMED TO BE 25 FEET. CONTRACTOR TO VERIFY PRIOR TO ORDERING PUMP.

MARK	SYSTEM SERVED	TYPE	GPM	HEAD (FT)	MOTOR DATA				SIASBN GSDIE
					SLTVO	ESAHP			
P-1	GEOTHERMAL	IN-LINE	20	40	1	1750	240	1	BELL & GOSSETT e-80 1.5x7C	VFD BY EC
P-2	GEOTHERMAL	IN-LINE	20	40	1	1750	240	1	BELL & GOSSETT e-80 1.5x7C	VFD BY EC

MECHANCAL PIPING EXPANSION TANK SCHEDULE

MARK	SYSTEM SERVED	TYPE	TANK CAPACITY (GAL)	ACCEPTANCE CAPACITY (GAL)	DESIGN BASIS
EXT-1	GEOTHERMAL	BLADDER	23	23	TACO CA-90

GRAVITY INTAKE/RELIEF HOOD SCHEDULE

REMARKS:
1. PROVIDE WITH INSECT SCREEN AND 12" CURB.
2. PROVIDE WITH MOTORIZED DAMPER, GREENHECK MODEL ICD-45 WITH 24V/1PH ACTUATOR (OR EQUAL).

MARK	CFM	THROAT SIZE (WxL) (IN)	THROAT VELOCITY (FPM)	MAX PD (IN)	DESIGN BASIS
GIH-1	1925	18X26	592	0.15	GREENHECK WIH-18X26
GRH-1	1925	18X18	856	0.15	GREENHECK WRH-18X18

DIFFUSERS REGISTERS AND GRILLES SCHEDULE

MARK	MATERIAL	DESCRIPTION	FACTORY FINISH	DESIGN BASIS
A	ALUMINUM	3/4" SPACING DBL DEF	WHITE	TITUS 350FS
B	ALUMINUM	3/4" SPACING 35° DEF	WHITE	TITUS 300FS

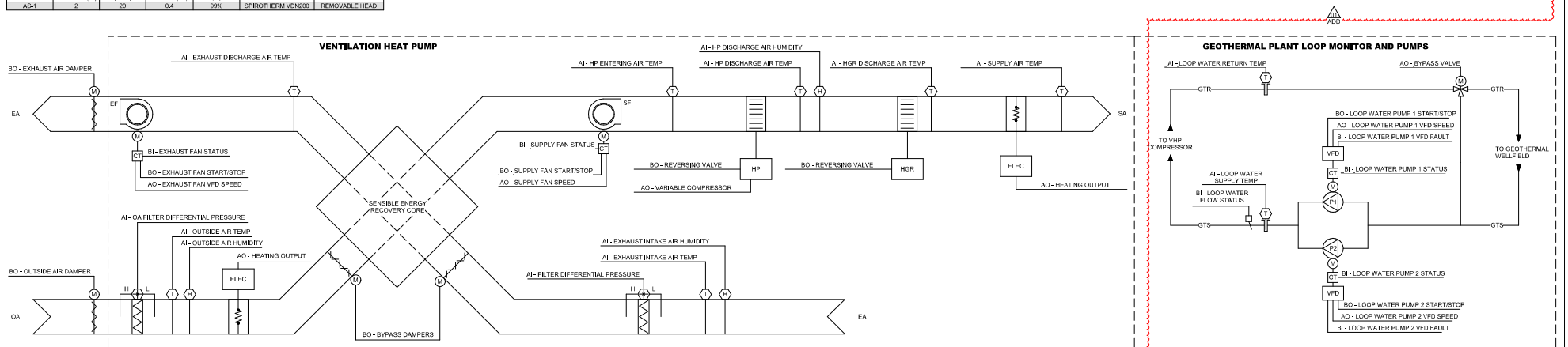
GLYCOL FEED SYSTEM SCHEDULE

MARK	SYSTEM SERVED	TANK VOLUME (GAL)	PRESSURE RANGES (PSI)		ELECTRICAL DATA			
			TUO TCU	SLTVO ESAHP	PH			
GF-1	GEOTHERMAL	50	10-45	20-60	120	1	0.33	NEPTUNE G-50-1

SIASBN GSDIE

AIR/DIRT SEPARATOR

MARK	PIPE SIZE (IN)	CAPACITY (GPM)	MAX PD (FT)	AIR REMOVAL (%)	DESIGN BASIS	REMARKS
AS-1	2	20	0.4	99%	SPIROTHERM VDN200	REMOVABLE HEAD



2 CONTROLS SCHEMATIC

NOT TO SCALE

VENTILATION HEAT PUMP:

RUN CONDITIONS - CONTINUOUS:
THE UNIT SHALL RUN CONTINUOUSLY BASED ON A USER DEFINED SCHEDULE.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN CONTINUOUSLY, UNLESS SHUTDOWN ON SAFETIES.
OCCUPIED MODE: FAN SHALL OPERATE AT FULL SCHEDULED AIRFLOW
UNOCCUPIED MODE: FAN SHALL OPERATE AT 30% SCHEDULED AIRFLOW

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS.
OCCUPIED MODE: FAN SHALL OPERATE AT FULL SCHEDULED AIRFLOW
UNOCCUPIED MODE: FAN SHALL OPERATE AT 30% SCHEDULED AIRFLOW

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

HEATING AND COOLING - VARIABLE COMPRESSOR:
THE CONTROLLER SHALL MODULATE THE COMPRESSOR TO MAINTAIN EXHAUST INTAKE AIR TEMPERATURE SETPOINT. THE COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.
- COOLING MODE: 75°F (ADJ.) OCCUPIED / 78°F (ADJ.) UNOCCUPIED RETURN AIR TEMPERATURE
- HEATING MODE: 70°F (ADJ.) OCCUPIED / 67°F (ADJ.) UNOCCUPIED RETURN AIR TEMPERATURE

THE HEATING SHALL BE ENABLED WHENEVER:
- EXHAUST INTAKE AIR TEMPERATURE IS 2°F (ADJ.) LESS THAN SETPOINT
- AND THE FAN STATUS IS ON.
- AND THE REVERSING VALVE IS IN HEAT MODE.

THE COOLING SHALL BE ENABLED WHENEVER:
- EXHAUST INTAKE AIR TEMPERATURE IS 2°F (ADJ.) MORE THAN SETPOINT
- AND THE FAN STATUS IS ON.
- AND THE REVERSING VALVE IS IN COOL MODE.

ON MODE CHANGE, THE COMPRESSOR SHALL BE DISABLED AND REMAIN OFF UNTIL AFTER THE REVERSING VALVE HAS CHANGED POSITION.

DEHUMIDIFICATION:
THE CONTROLLER SHALL MEASURE THE EXHAUST INTAKE AIR HUMIDITY AND OVERRIDE THE COOLING SEQUENCE WHEN THE EXHAUST INTAKE AIR HUMIDITY IS AT OR ABOVE 60% RH (ADJ.). THE FANS SHALL OPERATE AT FULL AIRFLOW WHEN IN DEHUMIDIFICATION MODE. THE HP DISCHARGE AIR TEMPERATURE SHALL BE MAINTAINED AT 51°F (ADJ.) AND THE HOT GAS REHEAT COIL VALVE SHALL MODULATE TO MAINTAIN EXHAUST INTAKE AIR TEMPERATURE SETPOINT. DEHUMIDIFICATION SHALL BE ENABLED WHENEVER THE SUPPLY FAN STATUS IS ON.

HGR DISCHARGE AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE HGR DISCHARGE AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE HGR DISCHARGE AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE HGR DISCHARGE AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

OUTSIDE AIR TEMPERATURE:
MONITOR THE OUTSIDE AIR TEMPERATURE.

OUTSIDE AIR HUMIDITY:
MONITOR THE OUTSIDE AIR HUMIDITY.

OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FILTER CHANGE REQUIRED: FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

EXHAUST INTAKE AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE EXHAUST INTAKE AIR TEMPERATURE AND USE AS REQUIRED FOR SETPOINT CONTROL

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH EXHAUST INTAKE AIR TEMP: IF THE EXHAUST INTAKE AIR TEMPERATURE IS GREATER THAN 95°F (ADJ.).
- LOW EXHAUST INTAKE AIR TEMP: IF THE EXHAUST INTAKE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.).

EXHAUST INTAKE AIR HUMIDITY:
THE CONTROLLER SHALL MONITOR THE EXHAUST INTAKE AIR HUMIDITY AND USE AS REQUIRED FOR HUMIDITY CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH EXHAUST INTAKE AIR HUMIDITY: IF THE EXHAUST INTAKE AIR HUMIDITY IS GREATER THAN 70% (ADJ.).
- LOW EXHAUST INTAKE AIR HUMIDITY: IF THE EXHAUST INTAKE AIR HUMIDITY IS LESS THAN 35% (ADJ.).

EXHAUST AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FILTER CHANGE REQUIRED: FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

EXHAUST DISCHARGE AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE EXHAUST DISCHARGE AIR TEMPERATURE.

ENERGY RECOVERY ECONOMIZER:
THE SENSIBLE ENERGY RECOVERY CORE BYPASS DAMPERS SHALL OPEN WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE EXHAUST INTAKE AIR TEMPERATURE BY A USER DEFINABLE AMOUNT (ADJ.) IN COOLING MODE.
THE SENSIBLE ENERGY RECOVERY CORE BYPASS DAMPERS SHALL OPEN WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE EXHAUST INTAKE AIR TEMPERATURE BY A USER DEFINABLE AMOUNT (ADJ.) IN HEATING MODE.

OUTSIDE AIR AND EXHAUST AIR DAMPERS:
THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE WHEN THE UNIT IS OFF.

FROST CONTROL:
MODULATE THE OUTSIDE AIR BYPASS DAMPER TO MAINTAIN AN EXHAUST DISCHARGE AIR TEMPERATURE AT OR ABOVE 35°F

ELECTRIC HEATING COIL:

THE CONTROLLER SHALL MEASURE THE EXHAUST INTAKE AIR TEMPERATURE AND MODULATE THE HEATING TO MAINTAIN ITS HEATING SETPOINT SHOULD THE COMPRESSORS NOT MEET THE HEATING DEMAND.

THE ELECTRIC DUCT HEATER SHALL BE ENABLED WHENEVER:
- THE HEAT PUMP IS IN HEATING MODE.
- AND THE EXHAUST INTAKE AIR TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE FAN IS ON.

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 40°F (ADJ.).

SUPPLEMENTAL HEATING - HIGH SUPPLY AIR TEMPERATURE LIMIT:
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND, ON RISING TEMPERATURE, LIMIT THE SUPPLEMENTAL HEATING AS FOLLOWS:
- AS THE SUPPLY AIR TEMPERATURE RISES FROM 90°F TO 120°F (ADJ.),THE CONTROLLER SHALL LIMIT THE HEATING OUTPUT FROM 100% TO 0% (ADJ.).

GEOTHERMAL PLANT LOOP MONITOR AND PUMPS

WATER SOURCE HEAT PUMP LOOP MONITOR - RUN CONDITIONS:
THE LOOP MONITOR SHALL RUN WHENEVER:
- THE BUILDING IS IN OCCUPIED MODE.
- THE VENTILATION HEAT PUMP IS CALLING FOR HEATING OR COOLING.

THE FOLLOWING LOOP WATER CONDITIONS SHALL BE MONITORED:
- FLOW STATUS.
- SUPPLY TEMPERATURE.
- RETURN TEMPERATURE.

ALARMS AND A HEAT PUMP SHUTDOWN SIGNAL SHALL BE GENERATED UPON ANY OF THE FOLLOWING LOOP WATER CONDITIONS:
- NO LOOP FLOW.
- HIGH LOOP WATER SUPPLY TEMP SHUTDOWN: IF THE LOOP WATER SUPPLY TEMPERATURE IS GREATER THAN 92°F (ADJ.).
- LOW LOOP WATER SUPPLY TEMP SHUTDOWN: IF THE LOOP WATER SUPPLY TEMPERATURE IS LESS THAN 38°F (ADJ.)

LOOP WATER PUMP LEAD/LAG OPERATION:
THE TWO LOOP WATER PUMPS SHALL OPERATE IN A LEAD/LAG FASHION.
- THE LEAD PUMP SHALL RUN FIRST.
- ON FAILURE OF THE LEAD PUMP, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF.
- ON LOOP WATER RETURN TEMPERATURE BEING +2°F OUTSIDE OF RANGE, THE LAG PUMP SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD PUMP TO MAINTAIN LOOP WATER RETURN TEMPERATURE SETPOINT.

THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):
- MANUALLY THROUGH A SOFTWARE SWITCH
- IF PUMP RUNTIME (ADJ.) IS EXCEEDED
- DAILY
- WEEKLY
- MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS FOR EACH PUMP:
- LOOP WATER PUMP
  - FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
  - RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
  - RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.
  - VFD FAULT.

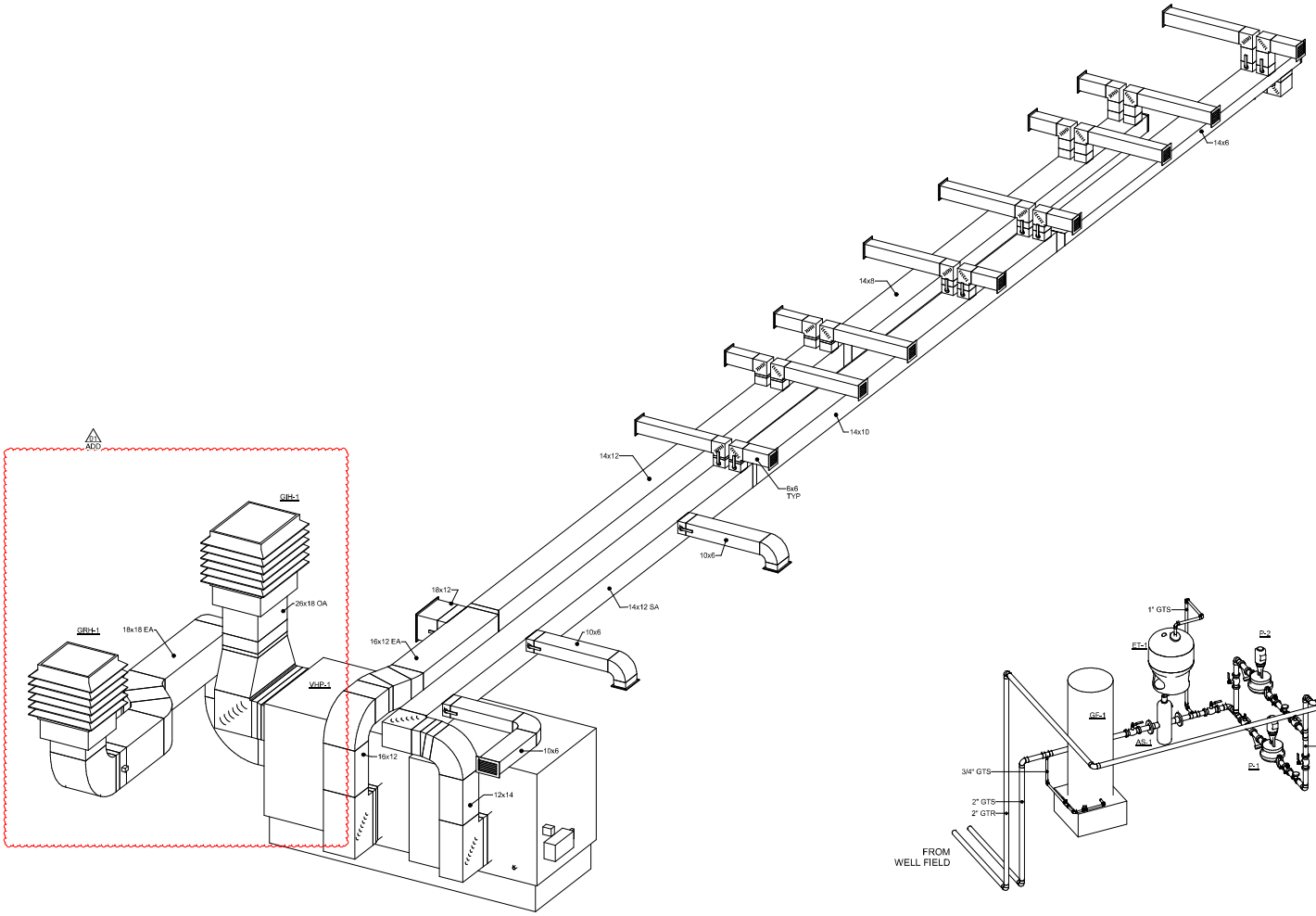
BYPASS VALVE:
A MODULATING 3-WAY, BYPASS CONTROL VALVE (FULL SIZED, BUTTERFLY STYLE), SHALL BE PROVIDED IN THE FULL SIZED LOOP FIELD BYPASS. THE VALVE AND PUMPS WILL BE PROGRAMMED TO OPERATE ACCORDING TO THE FOLLOWING SCHEDULE:

LOOP RETURN TEMPERATURE	VALVE POSITION (% OPEN TO BYPASS (ADJ.))	PUMP SPEED (ADJ)
≤ 40 F	0%	100%
41 TO 50 F	50%	75%
51 TO 70 F	100%	30%
71 TO 79 F	50%	75%
≥ 80 F	0%	100%

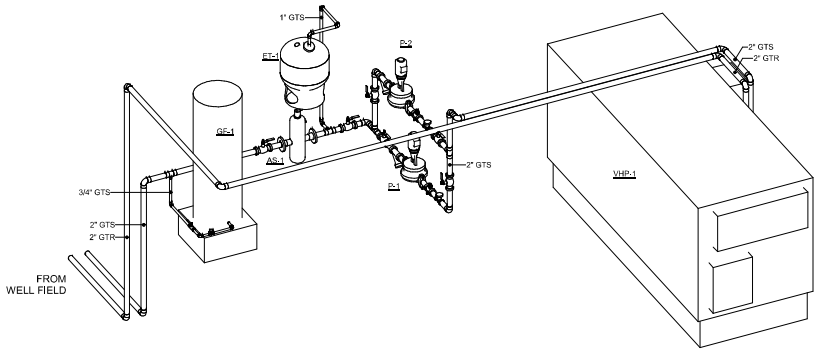
NOTE: MECHANICAL CONTRACTOR TO COORDINATE WITH WOODMAN CONTROLS. OWNER WILL PROCURE SERVICES FROM WOODMAN.

CONTACT ERIC MOBERG AT WOODMAN CONTROLS
EMOBERG@WOODMANINC.COM

01 ADD



2 MECHANICAL ISOMETRIC - DUCTWORK



NOTE: SEE DETAILS ON SHEET M500 FOR ADDITIONAL VALVE AND ACCESSORY REQUIREMENTS.

1 MECHANICAL ISOMETRIC - GEOTHERMAL PIPING
NOT TO SCALE

SHIVEHATTERY ARCHITECTURE+ENGINEERING	222 Third Avenue SE Suite 300 | Cedar Rapids, Iowa 52401 319.364.0227 | fax 319.364.4251 | www.shive-hattery.com Iowa | Illinois | Indiana | Nebraska | Wisconsin	JOHNSON COUNTY CONSERVATION	PROJECT NO.: 2250000910	ISSUED FOR: BID DATE: 01/21/2026	SHEET NAME: MECHANICAL ISOMETRICS	SHEET NO.: M700