PLUMBING ABBREVIATIONS

(E)	EXISTING
(N)	NEW
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
BFF	BELOW FINISHED FLOOR
C	CONDENSATE DRAIN
CO	CLEANOUT
CW	DOMESTIC COLD WATER
DF	DRINKING FOUNTAIN
DN	DOWN
DR	DRAIN
ELEV	ELEVATION
ET	EXPANSION TANK
EW	EYE WASH
EWH	ELECTRIC WATER HEATER
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FP	FIRE PUMP
FS	FLOOR SINK
HB	HOSE BIBB
HW	HOT WATER
HWR	HOT WATER RETURN
IE	INVERT ELEVATION
IW	INDIRECT WASTE
JP	JOCKEY PUMP
L	LAVATORY
MSB	MOP SINK BASIN
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OFD	OVERFLOW DRAIN
OS&Y	OUTSIDE SCREW & YOKE GATE VALVE
POC	POINT OF CONNECTION
PRV	PRESSURE REDUCING VALVE
RD	ROOF DRAIN
S	SINK
SAN	SANITARY WASTE
SH	SHOWER
SOI	SAND-OIL INTERCEPTOR
SP	SUMP PUMP
ST	STORM PIPING
TD	TRENCH DRAIN
TMV	TEMPERATURE MIXING VALVE
TP	TRAP PRIMER
UR	URINAL
V	VENT
VTR	VENT THROUGH ROOF
WC	WATER CLOSET
WCO	WALL CLEANOUT
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTOR

PLUMBING LEGEND

A	COMPRESSED AIR PIPING
C	CONDENSATE DRAIN PIPING
	DOMESTIC COLD WATER PIPING
	DOMESTIC HOT WATER PIPING
	DOMESTIC HOT WATER RETURN PIPING
G	NATURAL GAS PIPING
OST	OVERFLOW STORM PIPING
SAN	SANITARY (ABOVE FLOOR)
	SANITARY (BELOW FLOOR)
SP	SPRINKLER PIPING
	STORM DRAIN PIPING
	VENT PIPING
	PIPING TO BE DEMOLISHED
	CLEANOUT/PLUG
	PIPE DOWN
	PIPE UP
	PIPE CAP
	CHANGE IN PIPE ELEVATION
	INSULATED AND HEAT TRACED PIPING
	ACCESS PANEL FOR TRAP PRIMER
DCVA	DOUBLE CHECK VALVE ASSEMBLY
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
	BOTTOM PIPE CONNECTION
	CLEANOUT (TWO-WAY) (PROVIDE CONCRETE PAD OUTSIDE 18" X 24" X 4")
	FLOOR CLEANOUT/GRADE CLEANOUT
	P-TRAP
	TOP PIPE CONNECTION
	VALVE IN VERTICAL
	WALL HYDRANT
	ANGLE RELIEF VALVE
	AUTOMATIC AIR VENT
	AUTOMATIC CONTROL VALVE
	AUTOMATIC CONTROL VALVE (3-WAY)
	BUTTERFLY VALVE MANUAL
	BALL VALVE
	CALIBRATED BALANCING VALVE
	CHECK VALVE
	CHECK VALVE WITH A.B.D.
	FLEXIBLE CONNECTION
	GAS COCK VALVE
	GLOBE VALVE
	OS&Y (OUTSIDE SCREW & YOKE) VALVE
	PRESSURE REDUCING VALVE
	PRESSURE GAUGE AND COCK
	RELIEF SAFETY VALVE
	SOLENOID VALVE
	THERMOMETER
	TEMPERATURE MIXING VALVE
	WATER HAMMER ARRESTOR
	VACUUM BREAKER
	VALVE WITH TAMPER SWITCH
	Y-STRAINER WITH BLOW OFF VALVE
	HOSE BIBB
M	METER
	PUMP
	FLOW METER
	VENTURI METER
	POINT OF CONNECTION (NEW TO EXISTING)
EWH - 1-1	EQUIPMENT DESIGNATION

PLUMBING GENERAL NOTES

1	ALL SYSTEMS WILL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE CODES AND NATIONAL STANDARDS.
2	NO PVC PIPING SHALL BE INSTALLED IN A RETURN AIR PLENUM.
3	SUBCONTRACTOR SHALL PROVIDE A FULLY FUNCTIONAL, CODE COMPLIANT SYSTEM.
4	SUBCONTRACTOR SHALL TEST ALL SYSTEMS FOR FUNCTIONALITY BOTH BEFORE WORK IS STARTED AND ALSO AFTER CONTRACTED WORK IS FINISHED. REPORT ANY ISSUES TO THE ENGINEER AND TO THE BUILDING MANAGER.
5	INFORMATION ON THE DRAWINGS IS DIAGRAMMATIC IN NATURE. NOT ALL OFFSETS ARE SHOWN FOR CLARITY PURPOSES. SUBCONTRACTOR TO PROVIDE ALL OFFSETS AND FITTINGS TO MAKE A FULLY FUNCTIONAL SYSTEM.
6	SUBCONTRACTOR SHALL PROTECT ALL EXISTING BUILDING STRUCTURES, FLOORING, PIPING, FIXTURES, ETC. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE THEY CAUSE TO THE SITE, PLUMBING FIXTURES OR PIPING, ETC.
7	SUBCONTRACTOR TO COORDINATE ALL PLUMBING FIXTURE COMPATIBILITY WHEN MATCHING FIXTURES, FLUSH VALVES, FAUCETS, DRAINS, ETC.
8	PROVIDE ANY AND ALL DEMOLITION WORK REQUIRED TO INSTALL NEW EQUIPMENT. RETURN SURROUNDING AREA TO ORIGINAL CONDITION AFTER INSTALLATION IS COMPLETE. MAINTAIN PLUMBING SYSTEMS IN ADJACENT SPACES.
9	SUBCONTRACTOR TO VERIFY ARCHITECTURAL REQUIREMENTS AND COORDINATION WITH SPECIFIED PLUMBING FIXTURES. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ARCHITECTS AND ENGINEER'S ATTENTION.
10	SUBCONTRACTOR SHALL PROVIDE ALL MATERIAL, EQUIPMENT, ACCESSORIES, AND LABOR REQUIRED FOR INSTALLATION OF A COMPLETE AND OPERABLE SYSTEMS.
11	SUBCONTRACTOR SHALL COORDINATE ALL PIPE ROUTING AND EQUIPMENT LOCATIONS WITH OTHER TRADES AND EXISTING CONDITIONS. CONTRACTOR SHALL MODIFY EXISTING DESIGN CONDITIONS AS REQUIRED TO PROVIDE A FUNCTIONAL, CODE COMPLIANT INSTALLATION.
12	SUBCONTRACTOR TO COORDINATE ALL WORK WITH ARCHITECT'S AND ENGINEER'S PHASING PLANS. MAKE ALL NECESSARY ALLOCATIONS TO ACCOMMODATE PHASING AND PHASED CONSTRUCTION.
13	INSTALL ALL EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. MAINTAIN ALL REQUIRED CLEARANCES FOR MAINTENANCE AND ACCESS.
14	ALL PLUMBING FIXTURES SHALL MEET ADA REQUIREMENTS. FIXTURES SHALL BE INSTALLED TO MEET ADA HEIGHT AND CLEARANCE REQUIREMENTS. COORDINATE WITH ARCHITECTURAL DRAWING DIMENSIONS.
15	ROUTE ALL PIPING AS HIGH AS POSSIBLE AND TIGHT TO STRUCTURE. INSTALL PERPENDICULAR TO WALLS AND COLUMNS.
16	PROVIDE DIELECTRIC FITTINGS OR UNIONS BETWEEN PIPING OF DISSIMILAR METALS.
17	PROVIDE ACCESS PANELS AS REQUIRED TO SERVICE ALL VALVES AND EQUIPMENT. COORDINATE LOCATION OF ACCESS PANELS WITH ARCHITECTURAL CEILING AND WALL ELEVATION DRAWINGS.
18	DO NOT ROUTE PIPING THROUGH ELECTRICAL ROOMS/CLOSETS OR IT/DATA ROOMS. IF THE CONSTRUCTION SITUATION MAKES THIS UNAVOIDABLE, PROVIDE SECONDARY LEAK PROTECTION SLOPED DRAIN PAN UNDER PIPE. ROUTE DRAIN PAN LINE TO NEAREST FLOOR DRAIN OR SINK TAIL PIECE.
19	PROVIDE SHUT-OFF VALVES ON ALL PLUMBING BRANCH PIPING, EQUIPMENT, TOILET ROOM GROUPS, AND INDIVIDUAL FLOORS.
20	SLOPE PIPING AS REQUIRED TO MEET CODE REQUIREMENTS, AVOID LOW POINTS, AND ESTABLISH HIGH POINTS FOR AIR REMOVAL
21	PROVIDE TRAP GUARD ON ALL FLOOR DRAINS, AIR DRAINS AND FLOOR SINKS OR OTHER APPROVED TRAP SEALING DEVICE.
22	ALL WORK SHALL BE COMPLETED TO THE APPROVAL OF THE BUILDING ENGINEER.
23	SUBCONTRACTOR TO ACCOMMODATE ALL CLEARANCE AND DIMENSIONAL DIFFERENCES OF EQUIPMENT ACTUALLY PURCHASED FOR INSTALLATION.
24	SUBCONTRACTOR SHALL X-RAY SLAB AS REQUIRED TO VERIFY EXACT LOCATION OF EXISTING PIPING IN SLAB.

PLUMBING SHEET LIST

SHEET NUMBER	SHEET NAME
P0.01	PLUMBING COVER SHEET
P0.02	PLUMBING SCHEDULES
P0.03	PLUMBING SPECIFICATIONS
P0.04	PLUMBING SPECIFICATIONS
P2.00	PLUMBING UNDERFLOOR PLAN
P2.01	PLUMBING FLOOR PLAN
P2.02	ENLARGED PLUMBING FLOOR PLAN
P5.01	PLUMBING RISERS
P5.02	PLUMBING RISERS
P6.01	PLUMBING DETAILS

SHOCK ARRESTOR SCHEDULE

	MANUFACTURER & MODEL	FIXTURE UNITS	SIZE	MODEL NUMBER
A	PRECISION PLUMBING OR APPROVED EQUAL	1-11	1/2" NPT	SC-500
B	PRECISION PLUMBING OR APPROVED EQUAL	12-32	3/4" NPT	SC-750
C	PRECISION PLUMBING OR APPROVED EQUAL	33-60	1" NPT	SC-1000
D	PRECISION PLUMBING OR APPROVED EQUAL	61-113	1 1/4" NPT	SC-1250
E	PRECISION PLUMBING OR APPROVED EQUAL	114-154	1 1/2" NPT	SC-1500
F	PRECISION PLUMBING OR APPROVED EQUAL	155-330	2" NPT	SC-2000

NOTE:
PROVIDE SHOCK ARRESTORS AT ENDS OF DCW AND DHW PIPING RUNS; AT ALL QUICK-CLOSING FIXTURES SUCH AS SHOWERS, FLUSHVALVES, SOLENOID VALVES, SINGLE-HANDED FAUCETS, AND SENSOR OPERATED FAUCETS; AND, FOR ALL GROUPS OF FIXTURES. SHOCK ARRESTORS SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE LAST FIXTURE ON EACH PIPING RUN.

PIPING MATERIAL SCHEDULE

SYSTEM	BELOW GRADE	ABOVE GRADE
DOMESTIC COLD/ HOT WATER PIPING	SCHEDULE 40 PVC	PEX-A
SANITARY/ VENT PIPING	SCHEDULE 40 PVC	NO - HUB CAST IRON

CODE SUMMARY

A. **APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO:**
1. MISSOURI PLUMBING CODE: 2015 IPC, WITH AMENDMENTS
2. MISSOURI BUILDING CODE: 2015 IBC, WITH AMENDMENTS
3. MISSOURI COMMERCIAL ENERGY CONSERVATION CODE: 2009 IECC, WITH AMENDMENTS
4. MISSOURI FIRE CODE: 2015 IFC, WITH AMENDMENTS
5. MISSOURI FUEL GAS CODE: 2015 IFGC, WITH AMENDMENTS

MBA ENERGY & INDUSTRIAL

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HUCK FINN SOLAR OPERATIONS & MAINTENANCE BUILDING

Project Address:
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STATE OF MISSOURI
DEREK CHARLES GASKAMP
NUMBER PE-2019032920
PROFESSIONAL ENGINEER
06/21/2024

Sheet Content:
PLUMBING COVER SHEET

SCALE: NOT TO SCALE

Drawn By: JW
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PUMP SCHEDULE

TYPE	NUMBER	SERVICE	LOCATION	UNIT			GPM	HEAD (FT.)	RPM	HP	ELECTRICAL DATA			OPERATIONAL WEIGHT (LBS.)	VARIABLE SPEED	NOTES
				MANUFACTURER	MODEL	TYPE					VOLTAGE	PHASE	HERTZ			
CP	1	HOT WATER	BREAKROOM	TACO	006E3LC	INLINE CIRC.	1	10	3250	1/25	120	1	60	8	NO	1

NOTES:

1. TIME CLOCK - TORK MODEL EWZ120. TIME CLOCK SHALL BE PROVIDED BY PLUMBING CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.

ELECTRIC WATER HEATER SCHEDULE

EQUIPMENT				UNIT TYPE				ELECTRICAL DATA				
TYPE	NUMBER	SERVICE	LOCATION	MANUFACTURER	MODEL	STORAGE GALLONS	TEMPERATURE SETTING (°F)	kW	VOLTAGE	PHASE	HZ	NOTES
EWH	1	DOMESTIC HOT WATER	BREAKROOM CEILING	RHEEM	PROE50-T2-RH95	50	140	4.5	208	1	60	1

NOTES:

1. PROVIDE WITH HYDRAPRO H10000 EXPANSION TANK.

PLUMBING FIXTURE CONNECTION SCHEDULE

FIXTURE	CW	HW	MIN.TRAP SIZE & TRAP ARM	V	NOTES
WATER CLOSET (FLUSH TANK)	3/4"	-	4"	2"	1,2
LAV	3/4"	3/4"	1-1/2"	2"	2
SINK	3/4"	3/4"	1-1/2"	2"	2
MOP SERVICE BASIN	3/4"	3/4"	3"	2"	2
SHOWER	3/4"	3/4"	2"	2"	2

NOTES:

1. 2" MINIMUM WASTE AND 2" VENT PIPE BELOW GRADE.
2. TRAP SIZE TO BE CONSISTENT WITH FIXTURE OUTLET.

PLUMBING FIXTURE SCHEDULE

SYMBOL	MANUFACTURER & MODEL NUMBER	DESCRIPTION	NOTES
WC-1	VORTENS 3123-02-V OR APPROVED EQUAL	VITREOUS CHINA FLUSH TANK WATER CLOSET 1.28 GPF WITH OPEN FRONT LESS COVER SEAT. SUPPLY WITH STOP: MCGUIRE # 2169LK LOOSE KEY SUPPLY AND STOP KIT.	
LV-1	KOHLER K-2005-0 OR APPROVED EQUAL	WHT VC KINGSTN 211/4X181/8X121/43H WM 4CC LAV BASIN FAUCETS: MAINLINE 231E-PUCP POL CHROME CONTINENTAL 1.2GPM 3H DM 4CC SGL METAL LEVER HDL LAV FCT W/MPU ADA APPROVED LEAD FREE SUPPLY WITH STOP.TRAP: MAINLINE ML102EZ WHT LAV-GUARD TRAP & SUPPLY COVER F/ TUBULAR P-TRAP 2 ANGLE STOP & 2-SUPPLY ADA APPROVED. REFER TO ARCHITECTURAL FOR MOUNTING HEIGHT & LOCATION.	PROVIDE TMV-1
SK-1	MAINLINE MLGE25223 OR APPROVED EQUAL	22GA SS BR FINISH 25X22X53/8 3H SR SGL BOWL KITCHEN SINK W/ CTR DRAIN ADA COMPLIANT. FAUCET: MAINLINE 134E-CP POL CHROME CONTINENTAL 1.5 GPM 1H DM 8CC SGL METAL LEVER HDL KITCHEN FCT W/ PULL-OUT SPRAY ADA APPROVED LEAD FREESUPPLY WITH STOP: MCGUIRE # BV2165CC LOOSE KEY SUPPLY AND STOP KIT. TRAP: MCGUIRE # 8090 CAST P-TRAP WITH CLEANOUT.	PROVIDE TMV-1
MS-1	FIAT MSB2424100 OR APPROVED EQUAL	MOP SINK 24 X 24 X 10 INCH HIGH. RECEPTOR COMPOSED OF PEARL GREY MARBLE CHIPS AND WHITE PORTLAND CEMENT GROUND SMOOTH, GROUTED AND SEALED TO RESIST STAINS, FLOOR MOUNTED, WITH 1-1/4 INCH WIDE SHOULDERS, VINYL BUMPER GUARD, STAINLESS STEEL DOME STRAINER. FAUCET: MOEN 8230 RGH CHROME COMM M-DURA 2H WM 8CC. 2 LEVER HDL SVC SINK FCT W/ VAC BREAKER & 3/4" GARDEN HOSE THREAD.	
FD-1	SIOUX 832-4HNR 4 OR APPROVED EQUAL	6" DIAMETER NICKEL BRONZE STRAINER, ROUND FLOOR DRAIN-CAST IRON BODY WITH FLANGE, ADJUSTABLE NICKEL BRONZE STRAINER. TRAP GUARD AND NO-HUB OUTLET.	
FCO-1	JAY R. SMITH MODEL 4120A OR APPROVED EQUAL	FLOOR CLEANOUT-DUCTILE IRON BODY WITH THREADED ADJUSTABLE HOUSING, FLANGED FERRULE WITH BRONZE, GASKETED PLUG HAVING NEOPRENE GASKET. ROUND SCORIATED NICKEL BRONZE VENEER TRACTOR COVER, NO-HUB OUTLET.	
WCO-1	JAY R. SMITH MODEL 4710-05 OR APPROVED EQUAL	WALL CLEANOUT-CAST IRON BODY WITH SPIGOT INLET/OUTLET AND THREADED BRASS RAISED HEAD, DRILLED AND TAPPED FOR r-20 SCREW. PROVIDE WITH 8480R, ROUND, STAINLESS STEEL ACCESS COVER HAVING 1/4-20X3-1/2 CENTER SCREW.	
GCO-1	JAY R. SMITH MODEL 4220 OR APPROVED EQUAL	DOUBLE DUCO CAST IRON GRADE CLEANOUT WITH ROUND ADJUSTANBLE SCORIATED CAST IRON TOP.	
WH-1	JAY R. SMITH #5509QT OR APPROVED EQUAL	QUARTER TURN NON-FREEZE WALL HYDRANT WITH INTEGRAL VACUUM BREAKER AND STAINLESS STEEL BOX.	
TMV-1	MOEN 104424 OR APPROVED EQUAL	TEMPERING VALVE SIMILAR LEAD-FREE CERTIFIED DZR BRASS BODY, ASSE 1070 AT 0.25 GPM AND MAXIMUM SET POINT 115 DEGREE FAHRENHEIT, FACTOR SET AT 105 DEGREE FAHRENHEIT.	
SH-1	FIELD FABRICATED OR APPROVED EQUAL	HORIZONTAL STAINLESS STEEL L-SHAPED GRAB BAR, WHITE-CUSHIONED. L-SHAPED FOLD-UP SEAT; PRESSURE BALANCING MIXING VALVE, CENTER DRAIN, SHOWER FAUCET, SHOWER VALVE WITH LEVER HANDLE. SHOWER FLOOR DRAIN: JAY R. SMITH 2005 WITH TRAP GUARD.	
EW-1	SPEAKMAN SE-580-PT OR APPROVED EQUAL	AERATED EYEWASH W/ P-TRAP	
WB-1	GUY GRAY 88525 OR APPROVED EQUAL	STAINLESS STEEL ICE MAKER BOX, QUARTER-TURN ARRESTER VALVES WITH 1/2" MIP/SWEAT CONNECTION FURNISHED, VALVES COMPLY WITH ASME A112.18.1.	

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HUCK FINN SOLAR
OPERATIONS & MAINTENANCE BUILDING

Project Address:
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STATE OF MISSOURI
DEREK CHARLES GASKAMP
NUMBER PE-2019032920
PROFESSIONAL ENGINEER
06/21/2024

Sheet Content:
PLUMBING SCHEDULES

SCALE:

Drawn By: JW
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Plot Date: 10/18/23
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Sheet:
P0.02

PLUMBING SPECIFICATIONS

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

1. THE PLUMBING SYSTEMS WILL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE INCLUDING ANY STATE OR LOCAL AMENDMENTS.
2. ALL PERMITS AND INSPECTIONS WILL BE OBTAINED AS REQUIRED BY ALL LEGAL AUTHORITIES OF WORK INCLUDED IN THESE DOCUMENTS. MATERIAL WHICH ARE SPECIFIED BY REFERENCE TO FEDERAL, STATE, OR OWNER INSURANCE PROVIDERS. SPECIFICATION (I.E., ASTM,ASM, ANSI, TAS, FM GLOBAL, FGI OR AWWA SPECIFICATIONS). FEDERAL STANDARDS, OR OTHER STANDARD SPECIFICATIONS MUST COMPLY WITH THE LATEST EDITIONS UNLESS OTHERWISE NOTED WITHIN THE CONTRACT DOCUMENTS OR OTHER SPECIFICATION SECTIONS.
3. ALL MATERIALS AND EQUIPMENT WILL BE NEW AND WILL BE INSTALLED IN ACCORDANCE WITH INDUSTRY STANDARDS.
4. SUBMITTALS WILL BE PREPARED FOR ALL MATERIALS AND EQUIPMENT INDICATING PERFORMANCE DATA, CATALOG INFORMATION, INSTALLATION DETAILS, ETC. IN ADDITION, SOME AREAS WILL BE DETAILED ON SHOP DRAWINGS AND USED FOR COORDINATION. ALL SUBMITTALS AND SHOP DRAWINGS WILL BE REVIEWED AND APPROVED BY THE DESIGN ENGINEER.
5. AT THE COMPLETION OF THE WORK, BOUND SETS OF OPERATIONS AND MAINTENANCE MANUALS WILL BE PROVIDED. THESE MANUALS WILL INCLUDE EQUIPMENT PERFORMANCE DATA, INSTALLATION DETAILS, MAINTENANCE AND SERVICE INSTRUCTIONS, PARTS LISTS, WIRING AND CONTROLS DIAGRAMS.
6. A SET OF PLUMBING DRAWINGS WILL BE MAINTAINED AT THE JOB SITE A SEPARATE SET OF CLEAN CONTRACT DRAWINGS FOR THE SOLE PURPOSE OF RECORDING THE "AS-BUILT" CHANGES AND DIAGRAMS OF THOSE PORTIONS OF WORK IN WHICH ACTUAL CONSTRUCION IS SIGNIFICANTLY DIFFERENT FROM THE CONTRACT DOCUMENTS. AT THE END OF THE PROJECT, OBTAIN WITHOUT COST TO THE OWNER. A SET OF THE ORIGINAL PLUMBING DRAWINGS/CAD FILES INDICATING ALL CHANGES FROM THE CONTRACT DOCUMENTS FOR THE OWNERS RECORDS. DELIVERY OF THE AS-BUILT PRINTS AND CAD FILES IS A CONDITION OF FINAL ACCEPTANCE OF THE WORK COMPLETED.
7. COORDINATION WILL TAKE PLACE WITH OTHER TRADES DURING CONSTRUCTION. ANY INTERFERENCES FOUND DUE TO OTHER TRADES WILL BE BROUGHT TO THE ATTENTION OF THE GENERAL CONTRACTOR OR CONSTRUCTION MANAGER.
8. UPON COMPLETION OF THE WORK, AND AT TIMES DURING THE INSTALLATION, RUBBISH AND DEBRIS RESULTING FROM THE SCOPE OF THIS WORK WILL BE REMOVED TO A LOCATION ON SITE PROVIDED BY THE GENERAL CONTRACTOR AND THE AREA WILL BE LEFT IN A NEAT, ALL FLOOR DRAINS AND PLUMBING FIXTURE/EQUIPMENT SHALL BE CLEANED TO LIKE NEW CONDITIONS.
9. ALL EQUIPMENT AND MATERIALS FURNISHED AND INSTALLED UNDER THIS SCOPE OF WORK WILL BE GUARANTEED TO BE FREE FROM DEFECTS OF MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER THE DATE OF EQUIPMENT START-UP.
10. ANY OPENINGS REQUIRED THROUGH STRUCTURAL WALLS, FLOORS AND ROOFS WILL BE IDENTIFIED ON BLOCK OUT DRAWINGS AND PROVIDED TO THE GENERAL CONTRACTOR. ALL FORMING, CUTTING AND FRAMING TO THESE OPENINGS WILL BE BY THE GENERAL CONTRACTOR.
11. ARCHITECTURAL ACCESS DOORS REQUIRED IN CEILINGS AND WALLS WILL BE PROVIDED AND INSTALLED BY THE SUBCONTRACTOR.
12. PIPE SLEEVES WILL BE PROVIDED WHERE PIPING PASSES THROUGH WALLS AND FLOORS. SLEEVES WILL BE 18 GAUGE GALVANIZED STEEL FOR WALLS AND STEEL PIPE FOR FLOORS. FIRE STOP WILL BE PROVIDED WHERE THE FLOOR OR WALLS ARE FIRE RATED. SLEEVES WILL BE EXTENDED 2 INCHES ABOVE THE FLOOR IN "WET" AREAS.
13. **EXECUTION:**
    - A. INSTALLATION OF PIPING, VALVES AND EQUIPMENT
        - a. PITCH: HORIZONTAL SANITARY AND DRAIN PIPING WILL BE RUN AT AN UNIFORM GRADE OF 1/4" PER FOOT FOR 2-1/2" AND LESS PIPE SIZES. 1/8" PER FOOT FOR 3" THROUGH 6" SIZE. 1/16" PER FOOT FOR 8" AND ABOVE PIPE SIZES. CONTRACTOR SHALL INSTALL PLUMBING SYSTEM SLOPE PER CODE AND AUTHORITIES HAVING JURISDICTION.
        - b. WATER PIPING WITHIN WALLS AND ROUGH-INS FOR FIXTURES AND EQUIPMENT: COPPER PLATED STEEL SUPPORT SYSTEM SOLDERED TO PIPING AND SECURED TO BUILDING CONSTRUCTION SO THAT PIPES CANNOT BE DISPLACED. (HOLDRITE OR EQUIVALENT). HOT WATER PIPING INSULATION WITH STANDARD JACKETS, WITH OR WITHOUT VAPOR BARRIER, FACTORY APPLIED OR FIELD APPLIED. FITTINGS, JOINTS, AND VALVES WILL BE INSULATED WITH LIKE MATERIAL AND THICKNESS AS ADJOINING PIPE. PROVIDE REMOVABLE INSULATION AND COVER FOR ALL VALVES AND UNIONS.
        - c. WASTE AND VENT PIPING WITHIN WALLS AND ROUGH-INS FOR FIXTURES AND EQUIPMENT: COPPER PLATED STEEL SUPPORT SYSTEM FOR COPPER DWV PIPING OR GALVANIZED STEEL SUPPORT SYSTEM FOR CAST IRON OR GALVANIZED PIPING. SUPPORTS TO PIPING AND BUILDING CONSTRUCTION WILL BE SECURED SO THAT PIPES CANNOT BE DISPLACED. FELT STRIP ISOLATION WILL BE PROVIDED BETWEEN DISSIMILAR METALS. (HOLDRITE OR APPROVED EQUIVALENT)
        - d. UNDERGROUND PIPING: NO-HUB SOIL PIPE NOT PERMITTED.
        - e. UNION AND FLANGES: ON PIPING TO INLET AND OUTLET OF ALL APPARATUS AND EQUIPMENT TO FACILITATE REMOVAL OF EQUIPMENT, AND DOWNSTREAM OF ALL SHUTOFF VALVES.
        - f. WATER HAMMER ARRESTERS: WATER HAMMER ARRESTERS WILL BE INSTALLED AT ALL QUICK CLOSING VALVES SUCH AS FLUSH VALVES, FOOT CONTROL VALVES, FLOAT VALVES, SOLENOID VALVES, ETC. WATER HAMMER ARRESTERS WILL BE SIZED AND LOCATED AS RECOMMENDED BY PDI MANUAL WH 201.
    - B. CLEANOUTS WILL BE PROVIDED AND INSTALLED PER CPC SECTION 707.0 AND 719.0.
    - C. LABELS AND IDENTIFICATION: VALVE TAGS, PIPING SYSTEMS AND EQUIPMENT IDENTIFICATIONS AS SPECIFIED IN PLUMBING IDENTIFICATION.
    - D. PIPING SYSTEM LEAK TESTS:
        - a. POTABLE WATER PIPING WILL BE HYDROSTATICALLY PRESSURE TESTED FOR A DURATION OF FOUR HOURS AT A TEST PRESSURE OF 120 PSIG.
        - b. SANITARY DRAINAGE PIPING: ALL ABOVE GROUND PIPING WILL BE TESTED HYDROSTATICALLY BY CLOSING ALL OPENINGS IN THE PIPING SYSTEM, EXCEPT THE HIGHEST OPENING ABOVE THE ROOF, AND BY FILLING THE SYSTEM TO THE POINT OF OVERFLOWING. THE PRESSURE EXERTED ON THE SYSTEM WILL BE NO LESS THAN 10 FEET OF HEAD.

SECTION 22 05 13 - COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

1. TEST MOTORS IN ACCORDANCE WITH NEMA MG 1, INCLUDING WINDING RESISTANCE, NO-LOAD SPEED AND CURRENT, LOCKED ROTOR CURRENT, INSULATION HIGH-POTENTIAL TEST, AND MECHANICAL ALIGNMENT TESTS. INSTALL SECURELY ON FIRM FOUNDATION. MOUNT BALL BEARING MOTORS WITH SHAFT IN ANY POSITION. INSTALL ENGRAVED PLASTIC NAMEPLATES. GROUND AND BOND MOTORS.
2. SINGLE-PHASE MOTORS: PERMANENT SPLIT-CAPACITOR TYPE, WHERE AVAILABLE; OTHERWISE, USE SPLIT-PHASE START/CAPACITOR RUN OR CAPACITOR START/CAPACITOR RUN MOTOR. TERMINAL LUGS TO MATCH BRANCH CIRCUIT CONDUCTOR QUANTITIES, SIZES AND MATERIALS.
3. THREE-PHASE MOTORS: NEMA MG 1, DESIGN B, PREMIUM -EFFICIENCY SQUIRREL-CAGE INDUCTION MOTOR, WITH WINDINGS TO ACCOMPLISH STARTING METHODS AND NUMBER OF SPEEDS INDICATED. SERVICE FACTOR: 1.15 UNLESS OTHERWISE INDICATED ON DRAWINGS. ENCLOSURE: MEET CONDITIONS OF INSTALLATION UNLESS SPECIFIC ENCLOSURE IS SPECIFIED OR INDICATED. DESIGN FOR CONTINUOUS OPERATION IN 40 DEGREES C ENVIRONMENT, WITH TEMPERATURE RISE IN ACCORDANCE WITH NEMA MG 1 LIMITS FOR INSULATION CLASS, SERVICE FACTOR, AND MOTOR ENCLOSURE TYPE. INSULATION SYSTEM: NEMA CLASS F . MOTOR FRAMES: NEMA STANDARD T-FRAMES OF STEEL, ALUMINUM, OR CAST IRON WITH END BRACKETS OF CAST IRON OR ALUMINUM WITH STEEL INSERTS. THERMISTOR SYSTEM (MOTOR FRAME SIZES 254T AND LARGER): THREE PTC THERMISTORS EMBEDDED IN MOTOR WINDINGS AND EPOXY ENCAPSULATED SOLID STATE CONTROL RELAY WITH WIRING TO TERMINAL BOX. BEARINGS: GREASE LUBRICATED ANTI-FRICTION BALL BEARINGS WITH HOUSINGS EQUIPPED WITH PLUGGED PROVISION FOR RELUBRICATION, RATED FOR MINIMUM ABMA 9, L-10 LIFE OF 200,000 HOURS. CALCULATE BEARING LOAD WITH NEMA MINIMUM V-BELT PULLEY WITH BELT CENTER LINE AT END OF NEMA STANDARD SHAFT EXTENSION. STAMP BEARING SIZES ON NAMEPLATE. SOUND POWER LEVELS: CONFORM TO NEMA MG 1. TERMINAL LUGS TO MATCH BRANCH CIRCUIT CONDUCTOR QUANTITIES, SIZES AND MATERIALS.

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING

1. BRASS:
    - A. PRODUCTS: TWO-PIECE BRASS BALL VALVES WITH FULL PORT AND STAINLESS-STEEL TRIM.
    - B. MANUFACTURERS: NIBCO, KITZ CORPORATION, MILWAUKEE VALVE COMPANY.
    - C. DESCRIPTION: STANDARD: MSS SP-110, SWP RATING: 150 PSIG, CWP RATING: 600 PSIG, BODY DESIGN: TWO PIECE, BODY MATERIAL: FORGED BRASS, ENDS: THREADED, SEATS: PTFE, STEM: STAINLESS STEEL, BALL: STAINLESS STEEL, VENTED, PORT: FULL.
2. BRONZE:
    - A. PRODUCTS: TWO-PIECE LEAD FREE BRONZE BALL VALVES WITH FULL PORT AND STAINLESS-STEEL TRIM.
    - B. MANUFACTURERS: NIBCO, KITZ CORPORATION, WATTS.
    - C. DESCRIPTION: STANDARD: MSS SP-110, SWP RATING: 150 PSIG, CWP RATING: 600 PSIG, BODY DESIGN: TWO PIECE, BODY MATERIAL: FORGED BRONZE, ENDS: THREADED, SEATS: PTFE, STEM: STAINLESS STEEL, BALL: STAINLESS STEEL, VENTED, PORT: FULL.
3. SELECT VALVES WITH THE FOLLOWING END CONNECTIONS:
    - A. FOR COPPER TUBING, NPS 2 AND SMALLER: THREADED ENDS EXCEPT WHERE SOLDER-JOINT VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.
    - B. FOR STEEL PIPING, NPS 2 AND SMALLER: THREADED ENDS.

SECTION 22 05 23.14 – CHECK VALVES FOR PLUMBING PIPING

1. SOURCE LIMITATIONS FOR VALVES: OBTAIN EACH TYPE OF VALVE FROM SINGLE SOURCE FROM SINGLE MANUFACTURER.
2. COMPLY WITH ASME. COMPLY WITH AWWA C606 FOR GROOVED-END CONNECTIONS. NSF 61 ANNEX G AND NSF 372 FOR VALVE MATERIALS FOR POTABLE-WATER SERVICE.
3. BRONZE VALVES SHALL BE MADE WITH DEZINCIFICATION-RESISTANT MATERIALS. BRONZE VALVES MADE WITH COPPER ALLOY (BRASS) CONTAINING MORE THAN 15 PERCENT ZINC ARE NOT PERMITTED. VALVE PRESSURE-TEMPERATURE RATINGS: NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES. VALVE SIZES: SAME AS UPSTREAM PIPING UNLESS OTHERWISE INDICATED. VALVE BYPASS AND DRAIN CONNECTIONS: MSS SP-45.
4. BRONZE SWING CHECK VALVES
    - A. CLASS 125, BRONZE, SWING CHECK VALVES WITH BRONZE DISC.
    - B. MANUFACTURERS: NIBCO INC., WATTS.
    - C. DESCRIPTION: STANDARD: MSS SP-80, TYPE 3., CWP RATING: 300 PSIG., BODY DESIGN: HORIZONTAL FLOW., BODY MATERIAL: ASTM B 62, BRONZE., ENDS: THREADED OR SOLDERED. SEE VALVE SCHEDULE ARTICLES., DISC: BRONZE.

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

1. SINGLE PIPE HANGERS WILL BE MALLEABLE IRON OR CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING FOR PIPE SIZES UP TO 1 INCHES AND CARBON STEEL, ADJUSTABLE CLEVIS HANGERS FOR PIPE SIZES 2 INCHES AND OVER.
2. PROVIDE COPPER HANGERS OR WONDER TAPE AT ALL HANGERS FOR DISSIMILAR METALS.
3. MULTIPLE OR TRAPEZE HANGERS WILL BE UNISTRUT STEEL CHANNELS WITH UNISTRUT CLAMPS AND ALL-THREAD HANGER RODS AND DOUBLE NUTS. WHERE REQUIRED, UNISTRUT CHANNELS MAY BE REPLACED WITH STRUCTURAL STEEL CHANNELS OR I-BEAMS TO MEET STRUCTURAL LOADING.
4. WALL SUPPORTS WILL BE UNISTRUT BOLTED TO THE WALL WITH UNISTRUT PIPE CLAMPS FOR PIPE SIZES UP TO 3 INCHES AND WELDED STEEL BRACKETS AND STEEL CLAMPS FOR PIPE SIZES GREATER THAN 4 INCHES.
5. VERTICAL PIPE WILL BE SUPPORTED WITH STEEL RISER CLAMPS FOR STEEL PIPE AND COPPER RISER CLAMPS FOR COPPER PIPE.
6. GALVANIZED STEEL PIPE INSULATION SHIELDS WILL BE PROVIDED FOR PIPE SIZES UP TO 2 INCH. PRE-FABRICATED PIPE INSERTS AND SHIELDS WILL BE USED FOR PIPES SIZES OVER 2 INCHES.
7. HORIZONTAL PIPE WILL BE SUPPORTED WITH THE MAXIMUM SPACING:
8. ALL PIPING WILL BE BRACED IN ACCORDANCE WITH NFPA 13, ASME B31.1, ASCO 705, AND ASCE 7-10 STANDARDS FOR THE APPROPRIATE SEISMIC HAZARD LEVEL.
9. INSERTS WILL BE USED TO SUPPORT PIPING FROM CONCRETE STRUCTURES. WHERE INSERTS ARE NOT USED DRILL-IN EXPANSION BOLTS WILL BE USED. LOW VELOCITY SHOT PIN FASTENERS WILL ALSO BE USED WHERE PERMITTED. APPROPRIATE DRILL-IN ANCHORS WILL BE USED ON POST TENSION SLABS.

PIPE SIZE (INCH)	COPPER PIPE (FT.)	STEEL PIPE (FT.)
1/2"	6'	6'
3/4" TO 1"	6'	8'
1-1/4" TO 1-1/2"	6'	10'
2"	10'	10'
2-1/2" TO 4"	10'	10'
6" TO 8"	10'	10'

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

1. EQUIPMENT: PERMANENT LABEL (STENCIL, METAL TAG OR ENGRAVED PLASTIC) WITH UNIT TAG OR NAME AND AREA OR SPACE SERVED.
2. PIPING:
    - A. PIPING LABEL MANUFACTURERS: BRIMAR INDUSTRIES, INC., CRAFTMARK PIPE MARKERS., SETON IDENTIFICATION PRODUCTS.
    - B. GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS: PREPRINTED, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION ACCORDING TO ASME A13.1. PROVIDE PIPE MARKERS EVERY 20 FEET. IDENTIFY SERVICE AND FLOW DIRECTION. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING.
    - C. PRETENSIONED PIPE LABELS: PRECOILED, SEMIRIGID PLASTIC FORMED TO PARTIALLY COVER CIRCUMFERENCE OF PIPE AND TO ATTACH TO PIPE WITHOUT FASTENERS OR ADHESIVE.
    - D. SELF-ADHESIVE PIPE LABELS: PRINTED PLASTIC WITH CONTACT-TYPE, PERMANENT-ADHESIVE BACKING.
    - E. PIPE LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS USED ON DRAWINGS; ALSO INCLUDE PIPE SIZE AND AN ARROW INDICATING FLOW DIRECTION,
    - F. FLOW-DIRECTION ARROWS: INTEGRAL WITH PIPING SYSTEM SERVICE LETTERING TO ACCOMMODATE BOTH DIRECTIONS OR AS SEPARATE UNIT ON EACH PIPE LABEL TO INDICATE FLOW DIRECTION, LETTERING SIZE: SIZE LETTERS ACCORDING TO ASME A13.1 FOR PIPING.
    - G. UNDERGROUND PIPES: PROVIDE WARNING TAPE ABOVE PIPE FOR ENTIRE LENGTH. FOR NON-METALLIC PIPES PROVIDE TRACED WIRE ABOVE AND PARALLEL TO ENTIRE LENGTH AND STUBBED OUT ABOVE GRADE AT ONE END.
    - H. WARNING-TAGS: HOSE BIBS RECEIVING NON-POTABLE WATER SHALL BE MARKED WITH WARNING SIGNAGE BEARING THE WORDS "CAUTION: NONPOTABLE WATER, DO NOT DRINK" AND A PICTORIAL REPRESENTATION OF THE "BARRED CIRCLE" OVER A HOSE BIBB ABOVE A PARTIALLY FILLED WATER GLASS.
    - I. PIPE LABEL COLOR SCHEDULE:
        - a. DOMESTIC WATER PIPING:
            - BACKGROUND: SAFETY GREEN
            - LETTER COLORS: WHITE
        - b. SANITARY WASTE AND STORM DRAINAGE PIPING:
            - BACKGROUND: SAFETY BLACK
            - LETTER COLORS: WHITE

SECTION 22 07 19 - PLUMBING PIPING INSULATION

1. SUMMARY
    - A. PERFORM ALL WORK REQUIRED TO PROVIDE AND INSTALL PIPING INSULATION, JACKETS AND ACCESSORIES INDICATED BY THE CONTRACT DOCUMENTS WITH SUPPLEMENTARY ITEMS NECESSARY FOR PROPER INSTALLATION.
    - B. SECTION INCLUDES:
        - a. PIPE INSULATION
        - b. JACKETS AND ACCESSORIES.
2. QUALITY ASSURANCE
    - A. ALL PIPING REQUIREING INSULATION SHALL BE INSULATED HEREIN AND AS REQUIRED FOR A COMPLETE SYSTEM. IN EACH CASE, THE INSULATION SHALL BE EQUIVALENT TO THAT SPECIFIED AND MATERIAL APPLIED AND FINISHED AS DESCRIBED IN THESE SPECIFICATIONS.
    - B. ALL INSULATION, JACKET, ADHESIVES, MASTICS, SEALERS, ECT., UTILIZED IN THE FABRICATION OF THOSE SYSTTEM SHALL MEET NFPA FOR FIRE RESISTANT RATINGS (MAXIMUM OF 25 FLAME SPREAD AND 50 SMOKE DEVELOPED RATING) AND SHALL BE APPROVED BY THE INSULATION MANUFACTURER FOR GUARANTEED PERFORMANCE WHEN INCORPORATED INTO THEIR INSULATION SYSTEM, UNLESS A SPECIFIC PRODUCT IS SPECIFIED FOR A SPECIFIC APPLICATION AND IS STATED AS AN EXPCEPTION TO THIS REQUIREMENT. CERTIFICATES TO THIS EFFECT SHALL BE SUBMITTED ALONG WITH CONTRACTOR'S SUBMITTAL DATA FOR THIS SECTION OF THE SPECIFICATIONS. NO MATERIAL SHALL BE USED THAT, WHEN TESTED BY THE ASTM E84-89 TEST METHOD, IS FOUND TO MELT, DRIP OR DELAMINATE TO SUCH A DEGREE THAT THE CONTINUITY OF THE FLAME FRONT IS DESTROYED, THEREBY RESULTING IN AN ARTIFICIALLY LOW FLAME SPREAD RATING.
    - C. APPLICATION COMPANY QUALIFICATIONS: COMPANY PERFORMING THE WORK OF THIS SECTION SHALL HAVE A MINIMUM OF THREE (3) YEARS OF EXPERIENCE SPECIALIZING IN THE TRADE.
    - D. ALL INSULATION SHALL BE APPLIED BY MECHANICS SKILLED IN THIS PARTICULAR WORK AND REGULARLY ENGAGED IN SUCH OCCUPATION.
    - E. UNSIGHTLY, INADEQUATE, OR SLOPPY WORK WILL NOT BE ACCEPTABLE AND ALL SUCH WORK SHALL BE REMOVED AND REPLACE AS MANY TIMES AS NECESSARY TO ACHIEVE AN ACCEPTABLE INSTALLATION.
3. PIPE INSULATION WILL BE PROVIDED ON COLD WATER FIRST (20 FEET) TWENTY FEET, HOT WATER AND STORM PIPING.
    - A. INSULATION TYPE A: FIBERGLASS - DOMESTIC WATER PIPING
        - a. ACCEPTABLE PRODUCTS: OWENS CORNING SSL II OR EQUAL GLASS FIBER PIPING INSULATION.
        - b. THERMAL CONDUCTIVITY: K-VALUE OF 0.23 BTU-IN/HR.-DREGREE F OR LESS AT 75 DREGREE F AND 0.32 BTU-IN/HR.-DEGREE F OR LESS AT 250 DEGREE F.
        - c. RATED MAXIMUM SERVICE TEMPERATURE: 1000 DEGREE F.
        - d. DENSITY: 3.5-5.5 LBS/FT.
        - e. RATED AS MAXIMUM 25 FLAME SPREAD AND MAXIMUM 50 SMOLE DEVELOPED WHEN TESTED IN ACCORDANCE WITH ASTME84, UL 723, CAN/ULC-S102-M88 OR NFPA 255.
        - f. CERTIFIED TO MEET THE REQUIREMENTS OF ASTM C795 FOR USE OVER STAINLESS STEEL.
        - g. RATED AS NON-COMBUSTIBLE WHEN TESTED IN ACCORDANCE WITH ASTM E136.
        - h. INSULATION TREATED WITH WATER RESISTANT RESIN ON THE SURFACE AND WITHIN EACH LAYER OF THE INSULATION.
        - i. SHALL MEET OR EXCEED REQUIREMENTS OF ASTM C552, CLASS 1.
        - j. PAPER FREE ALL-SERVICE JACKET WITH DOUBLE ADHESIVE LAP SEAL AND A TWO-PART BUTT STRIP SEAL.
4. FITTINGS
    - A. PROVIDE PRE-MOLDED FITTING AND ELBOWS MOLDED IN TWO MATCHING HALF SECTIONS OF SAME INSULATION THICKNESS AS ADJOINING PIPING. AS AN ALTERNATIVE, PROVIDE MITERED SECTIONS OF INSULATION EQUIVALENT IN THICKNESS AND COMPOSTION TO THAT INSTALLED ON STRAIGHT PIPE RUNS. NO INSERT OR BLANKET INSULATION ALLOWED.
5. CEMENTS AND COATINGS:
    - A. TYPE A INSULATION (FIBERGLASS): DOMESTIC WATER PIPING
        - a. LAP ADHESIVE. FURNISH CHILDERS CP-82 OR FOSTER 85-20 TO SEAL LONGITUDINAL LAPS OF THE VAPOR BARRIER JACKET AND TO ADHERE BUTT JOINT COVERS.
        - b. FINISH: FURNISH CHLDERS CP-10/11 OR FOSTER 46-50 WEATHER BARRIER MASTIC WITH REINFORCING MESH.
        - c. CEMENT: FURNISH RYDER ON CAOT OR EQUAL ON INSULATED FITTINGS, FLANGES AND VALVES.
        - d. PRIMER AND FINISH: FURNISH CHILDERS CP-50A MV1 DILUTED 50% WITH WATER OR EQUAL TO PRIME CEMENT PRIOR TO APPLYING COATING.
        - e. LAGGING ASHESIVE: USED IN CONJUCTION WITH CANVAS OR GLASS LAGGING CLOTH TO PROTECT EQUIPMENT/PIPING INDOORS. FOSTER 30-36 SEALFAS, CHILDERS CP-50AMV1 CHIL SEAL OR APPROVED EQUAL.

INSULATION THICKNESS (IN.) FOR NOMINAL PIPE SIZES						
SYSTEM	TEMPERATURE RANGE (F)	1" AND LESS	1-1/4" TO 2"	2-1/2" TO 4"	6"	8" AND UP
DOMESTIC WATER	ALL	1"	1"	1"	1-1/2"	1-1/2"

SECTION 22 11 16 - DOMESTIC WATER PIPING

1. COPPER TUBE AND FITTINGS:
    - A. PIPING
        - a. UNDERGROUND: ASTM B-88 TYPE K SEAMLESS COPPER TUBING, SOFT ANNEALED, COATED AND WRAPPED WITH EXTRUDED HIGH DENSITY POLYETHYLENE TAPE. ABOVE GROUND: ASTM B-88 TYPE L SEAMLESS COPPER TUBING, HARD TEMPER, COLD DRAWN. PEX-a, ASTM F 876/877, SDR 9, CTS, ENGEL METHOD.
        - b. ABOVE GROUND:
            - ASTM B-88 TYPE L SEAMLESS COPPER TUBING, HARD TEMPER, COLD DRAWN.
            - PEX-a, ENGEL-METHOD CROSSLINKED POLYETHYLENE. ASTM F 876 AND 877, SDR 9, CTS, ENGEL METHOD.
        - c. CONDENSATE DRAINS FROM COOLING COILS: SEAMLESS COPPER TUBING, TYPE M, COLD DRAWN, HARD TEMPER, ASTM B-88.
    - B. FITTINGS
        - a. COPPER TUBING: ANSI B16.22 WROUGHT COPPER SOLDER SWEAT TYPE.
        - b. CAST-COPPER, SOLDER-JOINT FITTINGS: PRESSURE FITTINGS.
        - c. WROUGHT-COPPER, SOLDER-JOINT FITTINGS: WROUGHT-COPPER PRESSURE FITTINGS.
        - d. BRASS: ANSI B16.15 85% RED BRASS, CAST IRON PATTERN. SCREWED TYPE MAY BE USED WHERE CLOSE FITTING IS REQUIRED.
        - e. ADAPTERS WILL BE USED WHERE COPPER TUBING CONNECTS TO IRON PIPE SIZE BRASS PIPING.
        - f. PEX-a: CERTIFIED TO NSF 14 AND ASTM F1960 COLD-EXPANSION WITH PEX REINFORCING RING AND SHALL COMPLY WITH ASTM F876 AND ASTM F877. REINFORCING COLD-EXPANSION RINGS SHALL BE MANUFACTURED FROM THE SAME SOURCE AS PEX-a PIPING MANUFACTURER AND MARKED F1960.
        - g. FLANGES: VICTAULIC MECHANICAL GROOVED COUPLINGS.
        - h. COPPER UNIONS:
            - CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY; BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES; THREADED ENDS OR PROPRESS.
    - C. COPPER PRESSURE-SEAL-JOINT FITTINGS:
        - a. MANUFACTURERS: VIEGA LLC.
        - b. FITTINGS FOR NPS 2 AND SMALLER: WROUGHT-COPPER FITTING WITH EPDM-RUBBER, O-RING SEAL IN EACH END.
        - c. FITTINGS FOR NPS 2-1/2 TO NPS 4: CAST-BRONZE OR WROUGHT-COPPER FITTING WITH EPDM-RUBBER, O-RING SEAL IN EACH END.
    - D. APPURTENANCES FOR GROOVED-END COPPER TUBING:
        - a. MANUFACTURERS: VICTAULIC COMPANY.
        - b. BRONZE FITTINGS FOR GROOVED-END, COPPER TUBING: ASTM B 75 COPPER TUBE OR BRONZE CASTINGS.
2. PIPING JOINING MATERIALS:
    - A. PIPE-FLANGE GASKET MATERIALS:
        - a. RUBBER, FLAT FACE, 1/8 INCH THICK OR NONMETALLIC AND ASBESTOS FREE UNLESS OTHERWISE INDICATED;
        - b. FULL-FACE OR RING TYPE UNLESS OTHERWISE INDICATED.
    - B. METAL, PIPE-FLANGE BOLTS AND NUTS: CARBON STEEL UNLESS OTHERWISE INDICATED.
    - C. SOLDER FILLER METALS: LEAD-FREE ALLOYS.
    - D. FLUX: WATER FLUSHABLE.
    - E. BRAZING FILLER METALS: BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR GENERAL-DUTY BRAZING UNLESS OTHERWISE INDICATED.
3. TRANSITION FITTINGS:
    - A. SAME SIZE AS PIPES TO BE JOINED; PRESSURE RATING AT LEAST EQUAL TO PIPES TO BE JOINED; END CONNECTIONS COMPATIBLE WITH PIPES TO BE JOINED.
    - B. FITTING-TYPE TRANSITION COUPLINGS: MANUFACTURED PIPING COUPLING OR SPECIFIED PIPING SYSTEM FITTING. FITTINGS FOR FPS 1-1/2" AND SMALLER.
    - C. SLEEVE-TYPE TRANSITION COUPLING: MANUFACTURERS: JAY R. SMITH MFG. CO. FITTINGS FOR NPS 2" AND LARGER.
4. DIELECTRIC FITTINGS:
    - A. ASSEMBLY OF COPPER ALLOY AND FERROUS MATERIALS WITH SEPARATING NONCONDUCTIVE INSULATING MATERIAL. INCLUDE END CONNECTIONS COMPATIBLE WITH PIPES TO BE JOINED.
    - B. DIELECTRIC UNIONS:
        - a. MANUFACTURERS: ZURN INDUSTRIES, LLC.
        - b. STANDARD: ASSE 1079.
        - c. PRESSURE RATING: 150 PSIG.
        - d. END CONNECTIONS: SOLDER-JOINT COPPER ALLOY AND THREADED FERROUS.
    - C. DIELECTRIC FLANGES:
        - a. MANUFACTURERS: WATTS, WILKINS, ZURN INDUSTRIES, LLC.
        - b. STANDARD: ASSE 1079.
        - c. FACTORY-FABRICATED, BOLTED, COMPANION-FLANGE ASSEMBLY.
        - d. PRESSURE RATING: 150 PSIG.
        - e. END CONNECTIONS: SOLDER-JOINT COPPER ALLOY AND THREADED FERROUS; THREADED SOLDER-JOINT COPPER ALLOY AND THREADED FERROUS.
        - f. DIELECTRIC FITTINGS FOR NPS 2-1/2 AND LARGER.
    - D. DIELECTRIC-FLANGE INSULATING KITS:
        - a. MANUFACTURERS: CALPICO, INC., CENTRAL PLASTICS COMPANY, PIPELINE SEAL AND INSULATOR, INC.
        - b. NONCONDUCTING MATERIALS FOR FIELD ASSEMBLY OF COMPANION FLANGES.
        - c. PRESSURE RATING: 150 PSIG.
        - d. GASKET: NEOPRENE OR PHENOLIC.
        - e. BOLT SLEEVES: PHENOLIC OR POLYETHYLENE.
        - f. WASHERS: PHENOLIC WITH STEEL BACKING WASHERS.
        - g. DIELECTRIC FITTINGS FOR NPS 2-1/2 AND LARGER.
    - E. DIELECTRIC NIPPLES:
        - a. MANUFACTURERS: VICTAULIC COMPANY.
        - b. ELECTROPLATED STEEL NIPPLE.
        - c. PRESSURE RATING AND TEMPERATURE: 300 PSIG AT 225 DEG F.
        - d. DIELECTRIC FITTINGS FOR NPS 2 AND SMALLER.

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

1. VACUUM BREAKERS.
    - A. PIPE-APPLIED ATMOSPHERIC-TYPE VACUUM BREAKERS.
        - a. STANDARD: ASSE 1001
        - b. SIZE: NPS 1/4 TO NPS 3/4, AS REQUIRED TO MATCH CONNECTED PIPING.
        - c. BODY: BRONZE.
        - d. INTEL AND OUTLET CONNECTIONS: THREADED.
        - e. FINISH: ROUGH BRONZE.
    - B. HOSE-CONNECTION VACUUM BREAKERS
        - a. STANDARD: ASSE 1011.
        - b. BODY BRONZE, NONREMOVABLE, WITH MANUAL DRAIN.
        - c. OUTLET CONNECTION: GARDEN-HOSE THREADED COMPLYING WITH ASME B1.20.7
        - d. FINISH: CHROME OR ROUGH BRONZE.
2. BACKFLOW PREVENTERS.
    - A. REDUCING-PRESSURE PRINCIPLE BACKFLOW PREVENTERS
        - a. STANDARD: ASSE 1013.
        - b. OPERATION: CONTINUOUS-PRESSURE APPLICATIONS.
        - c. SIZE: NPS 1/2 TO NPS 2.
        - d. BODY: BRONZE FOR NPS 2 AND SMALLER.
        - e. END CONNECTION: THREADED FOR NPS 2 AND SMALLER.
        - f. ACCESSORIES:
            - VALVES NPS AND SMALLER: BALL TYPE WITH THREADED ENDS ON INLET AND OUTLET
            - AIR-GAP FITTING: ASME A112.1.2, MATCHING BACKFLOW-PREVENTER CONNECTION.
    - C. DUAL-CHECK VALVE BACKFLOW PREVNTERS
        - a. STANDARD: ASSE 1024.
        - b. OPERATION: CONTINOUS PRESSURE APPLICATIONS.
        - c. SIZE: NPS 1/2 TO NPS 1-1/4.
        - d. BODY: BRONZE WITH UNION INLET.
1. TEMPERATURE-ACTUATED, WATER MIXING VAVLES.
    - A. INDIVIDUAL FIXTURE WATER TEMPERING VALVE.
        - a. STANDARD: ASSE 1016, THERMOSTATICALLY CONTROL, WATER WATER TEMPERING VALVE.
        - b. PRESSURE RATING: 125 PSIG MINIMUM UNLESS OTHERWISE INDICATED.
        - c. BODY: BRONZE BODY WITH CORROSION-RESISTANT INTERIOR COMPONEMENTS.
        - d. TEMPERATURECONTROL: ADJUSTABLE.
        - e. INLET AND OUTELT: THREADED OR COMPRESSION FITING.
        - f. FINISHED: ROUGH OR CHROME-PLATED BRONZE.
        - g. TEMPERED-WATER SETTING: (INSERT DEG F).
        - h. TEMPERED-WATER DESIGN FLOW RATE: (INSERT GPM.)
2. HOSE BIBB:
    - A. HOSE BIBB
        - a. STANDARD: ASTME A112.18.1 FOR SEDIMENT FAUCETS.
        - b. BODY MATERIAL: BRONZE.
        - c. SEAT: BRONZE, REPLACEABLE.
        - d. SUPPLY CONNECTIONS: NPS 1/2 OR NPS 3/4 THREADED OR SOLDER-JOINT INLET
        - e. OUTLET CONNECTION: GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
        - f. PRESSURE RATING: 125 PSIG.
        - g. VACUUM BREAKER: INTEGRAL NONREMOVABLE, DRAINABLE, HOSE-CONNECTION VACUUM BREAKER COMPLYING WITH ASSE 1011.
        - h. FINISH FOR EQUIPMENT ROOMS: ROUGH BRONZE, CHROME OR NICKEL PLATED.
        - i. FINISH FOR SERVICE AREAS: ROUGH BRONZE, CHROME OR NICKEL PLATED.
        - j. OPERATION FOR EQUIPMENT ROOMS: WHEEL HANDLE OR OPERATING KEY.
        - k. OPERATION FOR SERVICE AREAS: WHEEL HANDLE OR OPERATING KEY.
        - l. INCLUDE OPERATING KEY WITH EACH OPERATING-KEY HOSE BIBB.
        - m. INCLUDE INTEGRAL WALL FLANGE WITH EACH CHROME OR NICKEL PLATED HOSE BIBB.
    - B. NON FREEZE WALL HYDRANTS
        - a. STANDARD: ASME A112.21.3M FOR CONCEALED-OUTLET, SELF-DRAINING WALL HYDRANTS.
        - b. PRESSURE RATING: 125 PSIG.
        - c. OPERATION: LOOSE KEY.
        - d. CASING AND OPERATING ROD: OF LENGTH REQUIRED TO MATCH WALL THINCKNESS. INCLUDE WALL CLAMP.
        - e. INLET: MPS3/4.
        - f. OUTLET: CONCEALED WITH INTERGRAL VACUUM BREAKER AND GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
        - g. BOX: DEEP FLUSH MOUNTED WITH COVER.
        - h. OUTLET: EXPOSED WITH INTEGRAL VACUUM BREAKER AND GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
        - i. NOZZLE AND WALL-PLATE FINISH: (POLISHED NICKEL BRONZE), (ROUGH BRONZE).
        - j. OPERATING KEYS(S): (ONE), (TWO) WITH EACH WALL HYDRANTS.
        - k. OPERATION FOR EQUIPMENT ROOMS: WHEEL HANDLE OR OPERATING KEY.
        - l. OPERATION FOR SERVICE AREAS: WHEEL HANDLE OR OPERATING KEY.
        - m. INCLUDE OPERATING KEY WITH EACH OPERATING-KEY HOSE BIBB.
        - n. INCLUDE INTEGRAL WALL FLANGE WITH EACH CHROME OR NICKEL PLATED HOSE BIBB.

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

1. PERFORMANCE REQUIREMENTS
    - A. COMPONENTS AND INSTALLATION SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING MINIMUM WORKING PRESSURE UNLESS OTHERWISE INDICATED:
        - a. SOIL, WASTE AND VENT PIPING: 10-FOOT HEAD OF WATER.
        - b. WASTE, FORCE-MAIN PIPING: 50 PSI.
2. HUBLESS CAST-IRON SOIL PIPE AND FITTINGS
    - A. MANUFACTURERS SHALL BE ISO 9001 ACCREDITED.
    - B. PIPE AND FITTINGS ABOVE GROUND:
        - a. CISPI 310 OR ASTM C 1277, CAST IRON NO-HUB SOIL PIPE AND FITTINGS WITH STAINLESS STEEL NO-HUB COUPLINGS.
        - b. ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE AND BE LISTED BY NSF INTERNATIONAL®
    - C. INDIRECT DRAIN:
        - a. TYPE M, ASTM B-88, SEAMLESS HARD TEMPER, COLD DRAWN COPPER TUBING WITH ANSI B16.29 WROUGHT COPPER SOLDER SWEAT DRAINAGE FITTINGS.
    - D. CAST IRON SOIL PIPE NO-HUB COUPLINGS:
        - a. CONFORMING TO ASTM C 1540. HEAVY DUTY, 24 GAUGE, TYPE 304 STAINLESS STEEL SHIELD AND CLAMP ASSEMBLY WITH ASTM C 564 NEOPRENE SEALING SLEEVE TORQUED TO A MINIMUM OF 100 INCH/LBS. COUPLING WILL BE FACTORY MUTUAL APPROVED PER STANDARD 1680, CLASS I. (HUSKY 4000 OR EQUIVALENT)
3. PVC PIPE AND FITTINGS
    - A. BELOW GROUND:
        - a. SOLID-WALL PVC PIPE ASTM D 2665 AND ASTM D1785, DRAIN, WASTE, AND VENT. ALL BURIED PVC PIPING SYSTEMS SHALL BE INSTALLED PER ASTM D2321.
    - B. PVC SOCKET FITTINGS:
        - a. ASTM D 2665, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE.
    - C. ADHESIVE PRIMER: ASTM F 656
        - a. ADHESIVE PRIMER SHALL HAVE A VOC OF 550G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
        - b. ADHESHIVE PRIMER "STANDARD PRACTICE FOR THE TESTING OF VOLATILE ORGANIC EMISSIONS FROM VARIOUS SOURCES USING SMALL-SCALE ENVIROMENTAL CHAMBERS".
    - D. SOLVENT CEMENT: ASTM D 2564
        - a. ADHESIVE PRIMER SHALL HAVE A VOC OF 550G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
        - b. ADHESHIVE PRIMER "STANDARD PRACTICE FOR THE TESTING OF VOLATILE ORGANIC EMISSIONS FROM VARIOUS SOURCES USING SMALL-SCALE ENVIROMENTAL CHAMBERS".
4. CORROSIVE WASTE:
    - A. IF REQUIRED ON THE PROJECT, CORROSIVE WASTE PIPING SHALL BE:
        - a. CPVC PIPE AND FITTINGS CONFORMING TO ASTM F2618. ALL COMPONENTS SHALL BE MANUFACTURED AS A SYSTEM FROM ONE MANUFACTURER AND BE CERTIFIED BY NSF INTERNATIONAL AND BEAR THE MARK NSF-CW
5. PIPING INSTALLATIONS
    - A. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL.
    - B. INSTALL PIPING TO PERMIT VALVE SERVICING.
    - C. INSTALL PIPING AT INDICATED SLOPES.
    - D. INSTALL PIPING FREE OF SAGS AND BENDS.
    - E. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
    - F. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
    - G. MAKE CHANGES IN DIRECTION FOR SOIL AND WASTE DRAINAGE AND VENT PIPING USING APPROPRIATE BRANCHES, BENDS, AND LONG-SWEEP BENDS. SANITARY TEES AND SHORT-SWEEP 1/4 BENDS MAY BE USED ON VERTICAL STACKS IF CHANGE IN DIRECTION OF FLOW IS FROM HORIZONTAL TO VERTICAL. USE LONG-TURN, DOUBLE Y-BRANCH AND 1/8-BEND FITTINGS IF TWO FIXTURES ARE INSTALLED BACK TO BACK OR SIDE BY SIDE WITH COMMON DRAIN PIPE. STRAIGHT TEES, ELBOWS, AND CROSSES MAY BE USED ON VENT LINES. DO NOT CHANGE DIRECTION OF FLOW MORE THAN 90 DEGREES. USE PROPER SIZE OF STANDARD INCREASERS AND REDUCERS IF PIPES OF DIFFERENT SIZES ARE CONNECTED. REDUCING SIZE OF DRAINAGE PIPING IN DIRECTION OF FLOW IS PROHIBITED.
    - H. LAY BURIED BUILDING DRAINAGE PIPING BEGINNING AT LOW POINT OF EACH SYSTEM. INSTALL TRUE TO GRADES AND ALIGNMENT INDICATED, WITH UNBROKEN CONTINUITY OF INVERT. PLACE HUB ENDS OF PIPING UPSTREAM. INSTALL REQUIRED GASKETS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR USE OF LUBRICANTS, CEMENTS, AND OTHER INSTALLATION REQUIREMENTS. MAINTAIN SWAB IN PIPING AND PULL PAST EACH JOINT AS COMPLETED.
6. FIELD QUALITY CONTROL
    - A. TEST SANITARY DRAINAGE AND VENT PIPING ACCORDING TO PROCEDURES OF AUTHORITIES HAVING JURISDICTION OR, IN ABSENCE OF PUBLISHED PROCEDURES, AS FOLLOWS:
        - a. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
        - b. LEAVE UNCOVERED AND UNCONCEALED NEW, ALTERED, EXTENDED, OR REPLACED DRAINAGE AND VENT PIPING UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.
        - c. ROUGHING-IN PLUMBING TEST PROCEDURE: TEST DRAINAGE AND VENT PIPING EXCEPT OUTSIDE LEADERS ON COMPLETION OF ROUGHING-IN. CLOSE OPENINGS IN PIPING SYSTEM AND FILL WITH WATER TO POINT OF OVERFLOW, BUT NOT LESS THAN 10-FOOT HEAD OF WATER (30 KPA). FROM 15 MINUTES BEFORE INSPECTION STARTS TO COMPLETION OF INSPECTION, WATER LEVEL MUST NOT DROP. INSPECT JOINTS FOR LEAKS.
        - d. FINISHED PLUMBING TEST PROCEDURE: AFTER PLUMBING FIXTURES HAVE BEEN SET AND TRAPS FILLED WITH WATER, TEST CONNECTIONS AND PROVE THEY ARE GASTIGHT AND WATERTIGHT. PLUG VENT-STACK OPENINGS ON ROOF AND BUILDING DRAINS WHERE THEY LEAVE BUILDING. INTRODUCE AIR INTO PIPING SYSTEM EQUAL TO PRESSURE OF 1-INCH WG (250 PA). USE U-TUBE OR MANOMETER INSERTED IN TRAP OF WATER CLOSET TO MEASURE THIS PRESSURE. AIR PRESSURE MUST REMAIN CONSTANT WITHOUT INTRODUCING ADDITIONAL AIR THROUGHOUT PERIOD OF INSPECTION. INSPECT PLUMBING FIXTURE CONNECTIONS FOR GAS AND WATER LEAKS.
        - e. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING, OR PORTION THEREOF, UNTIL SATISFACTORY RESULTS ARE OBTAINED.
        - f. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

1. QUALITY ASSURANCE
    - A. DRAINAGE PIPING SPECIALTIES .
    - B. ALL MATERIALS SHALL BE NEW, UNDAMAGED, AND FREE OF RUST. PROTECT INSTALLED PRODUCTS AND ASSOCIATED MATERIALS DURING PROGRESSION OF THE CONSTRUCTION PERIOD TO AVOID CLOGGING WITH DIRT, AND DEBRIS AND TO PREVENT DAMAGE, RUST, ETC. REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.
    - C. MANUFACTURER QUALIFICATIONS: COMPANY SHALL HAVE MINIMUM THREE YEARS DOCUMENTED EXPERIENCE SPECIALIZING IN MANUFACTURING THE PRODUCTS SPECIFIED IN THIS SECTION.
2. FLOOR DRAINS: (FD-1)
    - A. ALL FLOOR DRAINS SHALL BE FURNISHED AND INSTALLED WITH ALL OPTIONS AND ACCESSORIES REQUIRED FOR A WATERPROOF INSTALLATION WITHIN THE PARTICULAR CONSTRUCTION IN WHICH THEY ARE TO BE MOUNTED.
    - B. EACH FLOOR DRAIN SHALL BE PROVIDED WITH A DEEP-SEAL P-TRAP UNLESS NOTED OTHERWISE.
    - C. FLOOR DRAINS IN TOILET ROOMS, SHOWERS AND SIMILAR FINISHED AREAS (FD-1): CAST IRON BODY WITH FLANGE, ADJUSTABLE TOP AND SEDIMENT BUCKET, INTEGRAL REVERSIBLE CLAMPING COLLAR, SEEPAGE OPENINGS, 1/2" PLUGGED PRIMER TAP, AND 6" DIAMETER NICKEL BRONZE OR STAINLESS STEEL STRAINER WITH VANDAL PROOF SCREWS.
    - D. FLOOR DRAINS IN EQUIPMENT ROOMS FOR GENERAL AREA DRAINAGE (FD-2): WADE NO. 1210-27, CAST IRON BODY WITH PLUGGED 1/2" PRIMER TAP, INTEGRAL CLAMPING COLLAR, SEEPAGE OPENINGS, AND 11-1/2" DIAMETER DUCTILE IRON LOOSE SET TRACTOR GRATE AND SEDIMENT BUCKET.
    - E. ALL FLOOR DRAINS SHALL BE AS SIZED ON CONTRACT DRAWINGS.

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PLUMBING SPECIFICATIONS

3. FLOOR SINKS: (FS-1)
   - A. ALL FLOOR SINKS SHALL BE FURNISHED AND INSTALLED WITH ALL OPTIONS AND ACCESSORIES REQUIRED FOR A WATERPROOF INSTALLATION WITHIN THE PARTICULAR CONSTRUCTION IN WHICH THEY ARE TO BE MOUNTED.
   - B. EACH FLOOR SINK SHALL BE PROVIDED WITH A DEEP-SEAL P-TRAP UNLESS NOTED OTHERWISE.
   - C. FLOOR SINKS FOR GENERAL FLOOR AREA DRAINAGE (FS-1): WADE NO. 9010-26-6, 8" ROUND CAST IRON BODY WITH 6" SUMP, ACID RESISTANT ENAMEL INTERIOR, ALUMINUM DOME STRAINER, SEEPAGE FLANGE, MEMBRANE CLAMPING DEVICE AND 7-3/8" DIAMETER STAINLESS STEEL OR NICKEL BRONZE TOP.
   - D. FLOOR SINK FOR INDIRECT EQUIPMENT DISCHARGE: WADE NO. 9150-1-15-26-48, CAST IRON 12" SQUARE BODY WITH 8" SUMP, ACID RESISTANT ENAMEL INTERIOR, ALUMINUM DOME STRAINER, SEEPAGE FLANGE, MEMBRANE CLAMPING DEVICE AND STAINLESS STEEL TOP. TOP SHALL BE ½ GRATE AS SCHEDULED ON DRAWINGS.
   - E. ALL FLOOR SINKS SHALL BE AS SIZED ON CONTRACT DRAWINGS.
4. CLEANOUTS
   - A. CLEANOUTS SHALL BE THE SAME NOMINAL SIZE AS THE PIPE THEY SERVE UP TO FOUR INCHES.
   - B. CLEANOUTS SHALL HAVE CAST IRON BODY WITH TAPERED CAST BRASS OR BRONZE PLUG PROVIDING GAS AND WATERTIGHT SEAL.
   - C. INTERIOR FLOOR CLEANOUTS SHALL HAVE STAINLESS STEEL OR NICKEL BRONZE SCORIATED TOP. PROVIDE CARPET MARKER WHEN INSTALLED IN AREAS TO BE COVERED BY CARPET.
   - D. EXTERIOR CLEANOUTS AT GRADE SHALL HAVE SCORIATED CAST IRON TOP.
   - E. WALL CLEANOUTS SHALL BE PROVIDED WITH STAINLESS STEEL ACCESS COVERS OF ADEQUATE SIZE TO ALLOW RODDING OF DRAINAGE SYSTEM. WALL CLEANOUTS INCORPORATING COVER SCREWS THAT EXTEND COMPLETELY THROUGH THE ACCESS PLUG ARE NOT ACCEPTABLE.
5. TRAP PROTECTION INSERTS
   - A. TRAP SEAL PROTECTION INSERTS SHALL ONLY BE INSTALLED WHERE JOB CONDITIONS PREVENT THE INSTALLATION OF WATER SUPPLIED TRAP PRIMERS.
     - a. TRAP SEAL PROTECTION INSERT SHALL NOT BE INSTALLED IN DRAINS RECEIVING WASTE THAT MAY HAVE A TEMPERATURE GREATER THAN 140 DEGREES F.
     - b. TRAP SEAL PROTECTION INSERT SHALL NOT BE INSTALLED IN DRAINS RECEIVING WASTE DISCHARGE FLOW OF GREATER THAN 30 GALLONS PER MINUTE.
     - c. TRAP SEAL PROTECTION INSERT SHALL NOT BE INSTALLED IN DRAINS RECEIVING CORROSIVE OR CHEMICAL WASTE.
   - B. FLOOR DRAIN TRAP SEAL PROTECTION INSERT SHALL PROVIDE WATERTIGHT SEAL INSIDE THE FLOOR DRAIN AND PREVENT EMISSION OF SEWER GAS AND BACKUP OF SEWAGE.
   - C. INSERT MATERIAL SHALL BE RESISTANT TO COMMON CLEANING SOLUTIONS, LIME SCALE AND MICROBIOLOGICAL GROWTH AND INCORPORATE A ELASTOMERIC FLEXIBLE TUBE THAT CLOSES WHEN WATER IS NOT PASSING THROUGH AND OPENS TO PERMIT WATER FLOW FROM AN INTERMITTENT DRIP. INSERT SHALL PROVIDE NO RESTRICTION ON WATER FLOW UP TO 30 GALLONS PER MINUTE.
   - D. INSERT SHALL PROPERLY FUNCTIONS DESPITE LODGING OF COMMON DEBRIS SUCH AS MOP STRINGS, FOOD RESIDUE, ETC.
6. INSTALLATION
   - A. GENERAL
     - a. INSTALL PLUMBING SPECIALTIES IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTRUCTIONS.
   - B. DRAINS AND CLEANOUTS
     - a. EXTREME CARE SHALL BE USED TO SET THE TOP ELEVATION OF FLOOR DRAINS AND FLOOR SINKS TO MEET THE LOW POINT ELEVATION OF THE FINISHED FLOOR.
     - b. PIPE CONNECTIONS TO ROOF DRAINS, ABOVE GRADE FLOOR DRAINS AND FLOOR SINKS SHALL NOT DIRECTLY CONTACT OR BE ENCASED IN CONCRETE.
     - c. FINAL MOUNTING OF INTERIOR CLEANOUT TOP OR ACCESS COVER SHALL BE SET FLUSH WITH THE FINISHED FLOOR OR WALL SURFACE. LUBRICATE THREADED CLEANOUT PLUGS WITH MIXTURE OF GRAPHITE AND LINSEED OIL.
     - d. ENCASE EXTERIOR CLEANOUTS WITHIN 14" X 14" X 6" THICK REINFORCED CONCRETE PAD. SET TOP FLUSH WITH FINISHED GRADE SURFACE.
     - e. LOCATE CLEANOUTS WITH REQUIRED CLEARANCE FOR RODDING OF DRAINAGE SYSTEM.
7. PROTECTION
   - A. PROTECT DRAINS DURING REMAINDER OF CONSTRUCTION PERIOD TO AVOID CLOGGING WITH DIRT OR DEBRIS AND TO PREVENT DAMAGE FROM TRAFFIC OR CONSTRUCTION WORK.
   - B. PLACE PLUGS IN ENDS OF UNCOMPLETED PIPING AT END OF EACH DAY OR WHEN WORK STOPS.

SECTION 22 33 00 - ELECTRIC DOMESTIC WATER HEATER

1. COMMERCIAL, LIGHT-DUTY, STORAGE, ELECTRICAL, DOMESTIC-WATER HEATERS:
   - A. STANDARD: UL174
   - B. STORAGE-TANK CONSTRUCTION: STEEL, VERTICAL ARRANGEMENT.
     - a. TAPPINGS: ASME B1.20.1 PIPE THREAD.
     - b. PRESSURE RATING: 150 PSIG
     - c. INTERIOR FINISH: COMPLY WITH NSF 61 ANNEX G BARRIER MATERIAL FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING LINING MATERIAL INTO TAPPINGS.
   - C. FACTORY-INSTALLED STORAGE-TANK APPURTENANCES:
     - a. ANODE ROD: REPLACEABLE MAGNESIUM.
     - b. DIP TUBE: REQUIRED UNLESS COLD-WATER INTLET IS NEAR BOTTOM OF TANK.
     - c. DRAIN VALVE: ASSE 1005.
     - d. INSULATION: COMPLY WITH ASHRAE/IESNA 90.1.
     - e. JACKET: STEEL WITH ENAMELED FINISH.
     - f. HEAT TRAPFITTINGS: INTLET TYPE IN COLD-WATER INLET AND OUTLET IN HOT-WATER OUTLET.
     - g. HEATING ELEMENTS: TWO; ELECTRIC, SCREW-IN IMMERSION TYPE; WIRED FOR SIMULTANEOUS OPERATION UNLESS OTHERWISE INDICATED. LIMITED TO 12 KW TOTAL.
     - h. TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT.
     - i. SAFETY CONTROL: HIGH-TEMPERATURE-LIMIT CUT-OFF DEVICE OR SYSTEM.
     - j. RELIEF VALVE: ASME RATED AND STAMPED FOR COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVES. INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN DOMESTIC-WATER HEATER WORKING-PRESSURE RATING. SELECT RELIEF VALVE WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.
   - D. CAPACITY AND CHARACTERISTICS:
     - a. REFER TO PLUMBING ELECTRICAL WATER HEATER SCHEDULES FOR INFORMATION.
   - E. ELECTRICAL CHARACTERISTICS:
     - a. REFER TO PLUMBING ELECTRICAL WATER HEATER SCHEDULES FOR INFORMATION.
2. DOMESTIC WATER HEATER ACCESSORIES:
   - A. DOMESTIC WATER COMPRESSION TANKS:
     - a. DESCRIPTION: STEEL, PRESSURE-RATED TANK CONSTRUCTED WITH WELDED JOINTS AND FACTORY INSTALLED BUTYL-RUBBER DIAPHRAGM. INCLUDE AIR PRECHARGE TO MINIMUM SYSTEM-OPERATION PRESSURE TANK.
     - b. CONSTRUCTION:
       - TAPPING FACTORY FABRICATED STEEL, WELDED TO TANK BEFORE TESTING AND LABELING. INCLUDE ASME B1.20.1 PIPE THREAD.
       - INTERIOR FINISH: COMPLY WITH NSF 61 ANNEX G BARRIER MATERIALS FOR POTABLE WATER TANK LININGS, INCLUDING EXTENDING FINISH INTO AND THROUGH TANK FITTING AND OULETS.
       - AIR-CHARGING VALVE: FACTORY INSTALLED.
     - c. CAPACITY AND CHARACTERISTICS:
       - WORKING PRESSURE RATING: 150 PSIG.
       - CAPACITY ACCEPTABLE: 50 GAL. MINIMUM.
       - AIR PRECHARGE PRESSURE: 65 PSI.
   - A. DRAIN PANS: CORROSION-RESISTANT METAL WITH RAISED EDGE. COMPLY WITH ANSI/CSA LC 3. INCLUDE DIMENSIONS NOT LESS THAN BASE OF DOMESTIC-WATER HEATER, AND INCLUDE DRAIN OUTLET NOT LESS THAN NPS 3/4 (DN 20) WITH ASME B1.20.1 PIPE THREADS OR WITH ASME B1.20.7 GARDEN-HOSE THREADS.
   - B. PIPING TYPE HEAT TRAPS: FIELD FABRICATED PIPING ARRANGEMENT ACCORDING TO ASHRAE/IESNA 90.1. HEAT TRAP FITTINGS: ASHRAE 90.2.
   - C. MANIFOLD KITS: DOMESTIC WATER HEATER MANUFACTURER'S FACTORY FABRICATED INLET AND OUTLET PIPING FOR INSTALLATION, FOR MULTIPLE DOMESTIC WATER HEATER INSTALLATION. INCLUDE BALL OR BUTTERFLY-TYPE SHUTOFF VALVES TO ISOLATE EACH DOMESTIC WATER HEATER AND CALIBRATED BALANCING VALVES TO PROVIDE BALNCED FLOW THROUGH EACH DOMESTIC WATER HEATER.
     - a. COMPLY WITH REQUIREMENTS FOR BALL-, OR BUTTFLY SHUTOFF VALVES SPECIFIED IN SECTION 220523.12 "BALL VALVES FOR PLUMBING PIPING," SECTION 220523.13 "BUTTERFLY VALVES FOR PLUMBING PIPING."
     - b. COMPLY WITH REQUIREMENTS FOR BALANCING VALVES SPECIFIED IN SECTION 221119 "DOMESTIC WATER PIPING SPECIALTIES."
   - D. COMBINATION TEMPERATURE AND PRESSURE RELIEF VALVE: INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT AND INCLUDE PRESSURE SETTING LESS THAN DOMESTIC WATER HEATER WORKING PRESSURE RATING. SELECT RELIEF VALVES WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.
     - a. ELECTRICAL, DOMESTIC WATER HEATER:ANSI Z21.22/CSA 4.4-M.
   - E. PRESSURE RELIEF VALVES: INCLUDE PRESSURE SETTING LESS THAN DOMESTIC WATER HEATER WORKING PRESSURE RATING.
     - a. ELECTRICAL DOMESTIC WATER HEATER: ANSI Z21.22/CSA 4.4-M.
   - F. VACUUM RELIEF VALVES: ANSI Z21.22/CSA 4.4-M.
   - G. DOMESTIC WATER HEATER STANDS: MANUFACTURER'S FACTORY FABRICATED STEEL STAND FOR FLOOR MOUNTING, CAPABLE OF SUPPORTING DOMESTIC WATER HEATER AND WATER. PROVIDE DIMENSION THAT WILL SUPPORT BOTTOM OF DOMESTIC WATER HEATER A MINIMUM OF 18 INCHES ABOVE THE FLOOR.
   - H. DOMESTIC WATER HEATER MOUNTING BRACKETS: MANUFACTURER'S FACTORY FABRICATED STEEL BRACKET FOR WALL MOUNTING, CAPABLE OF SUPPORTING DOMESTIC WATER HEATER AND WATER.

1. DOMESTIC WATER HEATER INSTALLATION:
   - A. COMMERICAL DOMESTIC WATER HEATER MOUNTING: INSTALL COMMERICAL ELECTRICAL DOMESITC WATER HEATER ON CONCRETE BASE. COMPLY WITH REQUIREMENTS FOR CONCRETE BASES SPECIFIED IN SECTION 033000 "CAST IN PLACE CONCRETE." OR SECTION 033053 "MISCELLANEOUS CAST IN PLACE CONCRETE.
     - a. EXCEPTION: OMIT CONCRETE BASE FOR COMERICAL ELECTRIC DOMESTIC WATER HEATER IF INSTALLATION ON STAND, BRACKET, SUSPENDED PLATFORM OR DIRECTLY ON FLOOR IS INDICATED.
     - b. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES.
     - c. ARRANGE UNITS SO CONTROL AND DEVICES THAT REQUIRE SERVICING ARE ACCESSIBLE.
     - d. INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONRETE FLOOR. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 18 INCH CENTERS AROUND THE FULL PERIMETER OF CONRETE BASE.
   - B. INSTALL DOMESTIC WATER HEATER LEVEL AND PLUMB, ACCORDING TO LAYOUT DRAWINGS, ORIGINAL DESIGN AND REFERENCED STANDARDS. MAINTAIN MANUFACTRER'S RECOMMENDED CLEARANCES. ARRANGE UNITS SO CONTROLS AND DEVICES NEEDING SERVICE ARE ACCESSIBLE.
   - C. INSTALL PIPING-TYPE HEAT TRAPS ON INLETS AND OUTLET OF ELECTRIC, DOMESTIC-WATER HEATER STORAGE TANK WITHOUT INTEGRAL OF FITTING -TYPE HEAT TRAPS.
   - D. FILL ELECTRIC, DOMESTIC-WATER HEATERS WITH WATER.
   - E. CHARGE DOMESTIC-WATER COMPRESSION TANK WITH AIR.

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NUMBER PE-2019032920
PROFESSIONAL ENGINEER
06/21/2024

Sheet Content:

PLUMBING SPECIFICATIONS

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Drawn By: JW
Checked By: NB
Plot Date: 10/18/23
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Sheet:

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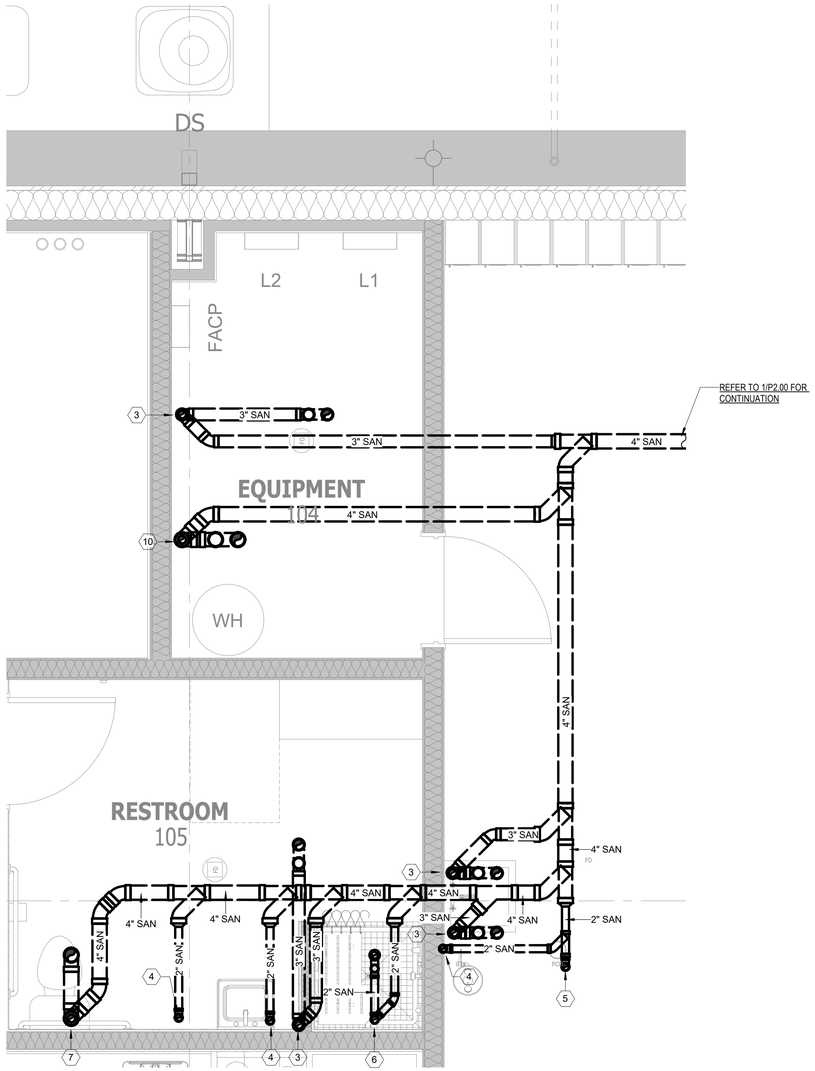
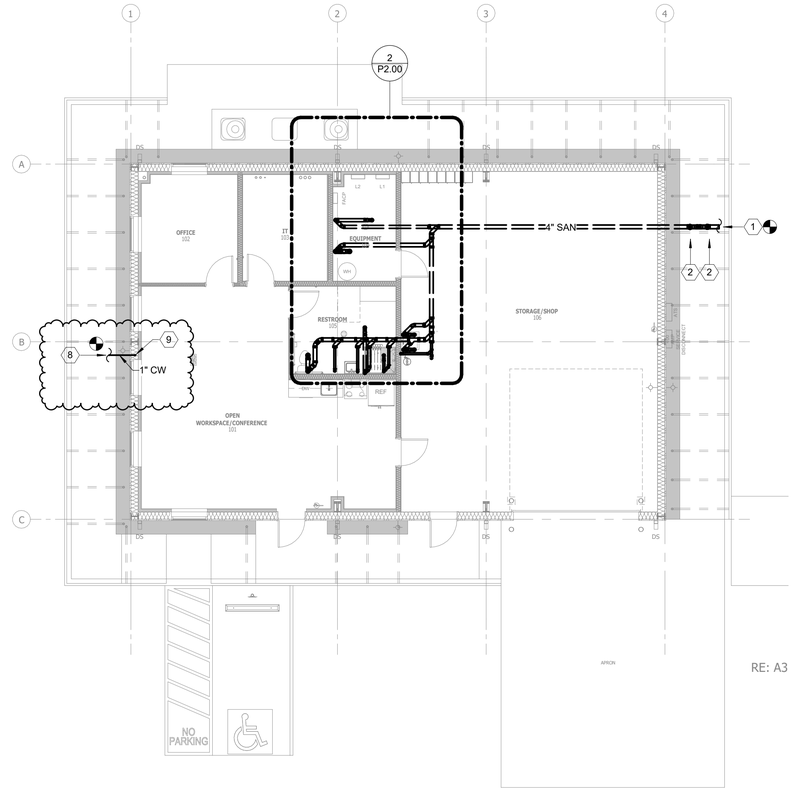
KEYNOTES

KEYNOTE	DESCRIPTION
1	STUB NEW 4" SANITARY 5'-0 OUTSIDE OF BUILDING AND CONNECT TO SEPTIC TANK. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION, SIZE, AND ELEVATION OF SEPTIC TANK TIE-IN BEFORE COMMENCING WORK.
2	ROUTE 4" SANITARY TO CLEANOUT DRAIN CONNECTION POINT.
3	ROUTE 2" SANITARY TO 3" P-TRAP. ROUTE 2" VENT THROUGH SLAB ABOVE.
4	ROUTE 2" SANITARY THROUGH SLAB ABOVE.
5	ROUTE 2" SANITARY TO CLEANOUT DRAIN CONNECTION POINT.
6	ROUTE 2" SANITARY TO 2" P-TRAP. ROUTE 2" VENT THROUGH SLAB ABOVE.
7	ROUTE 4" SANITARY TO FIXTURE FLOOR FLANGE. ROUTE 2" VENT THROUGH SLAB ABOVE.
8	CONNECT NEW 1" COLD WATER TO EXISTING COLD WATER PIPING. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION, SIZE, AND ELEVATION OF EXISTING PIPING PRIOR TO COMMENCING NEW WORK.
9	ROUTE 1" COLD WATER THROUGH SLAB ABOVE.
10	ROUTE 4" SANITARY TO 4" P-TRAP. ROUTE 2" VENT THROUGH SLAB ABOVE.



2 ENLARGED PLUMBING UNDERFLOOR PLAN

1/2" = 1'-0"



1 PLUMBING UNDERFLOOR PLAN

1/8" = 1'-0"

BUILDING ORIENTATION UPDATED.

1

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06/21/2024

Sheet Content:

PLUMBING UNDERFLOOR PLAN

SCALE: As indicated

Drawn By: JW
Checked By: NB
Plot Date: 01/29/24
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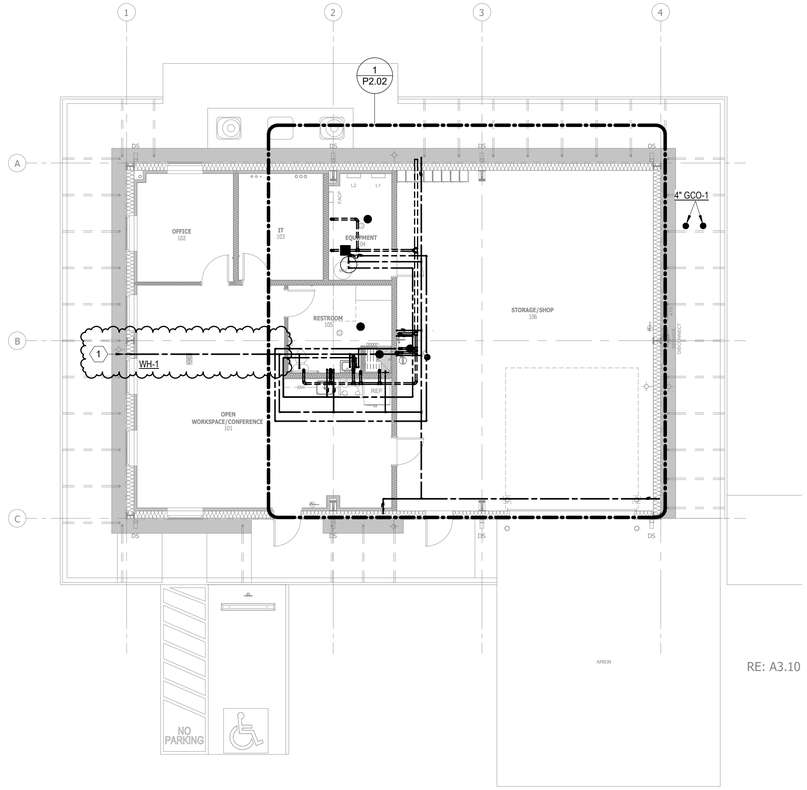
Sheet:

P2.00

KEYNOTES

KEYNOTE	DESCRIPTION
1	ROUTE 1" COLD WATER UP THROUGH SLAB. CONNECT TO WALL HYDRANT WATER CONNECTION POINT.



RE: A3.10

1 PLUMBING PLAN

1/8" = 1'-0"

BUILDING ORIENTATION UPDATED.

1

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HUCK FINN SOLAR
OPERATIONS & MAINTENANCE BUILDING

Project Address:
(39.322039, -91.541742) Vandalia, MO

STATE OF MISSOURI
DEREK CHARLES GASKAMP
NUMBER PE-2019032920
PROFESSIONAL ENGINEER
06/21/2024

Sheet Content:

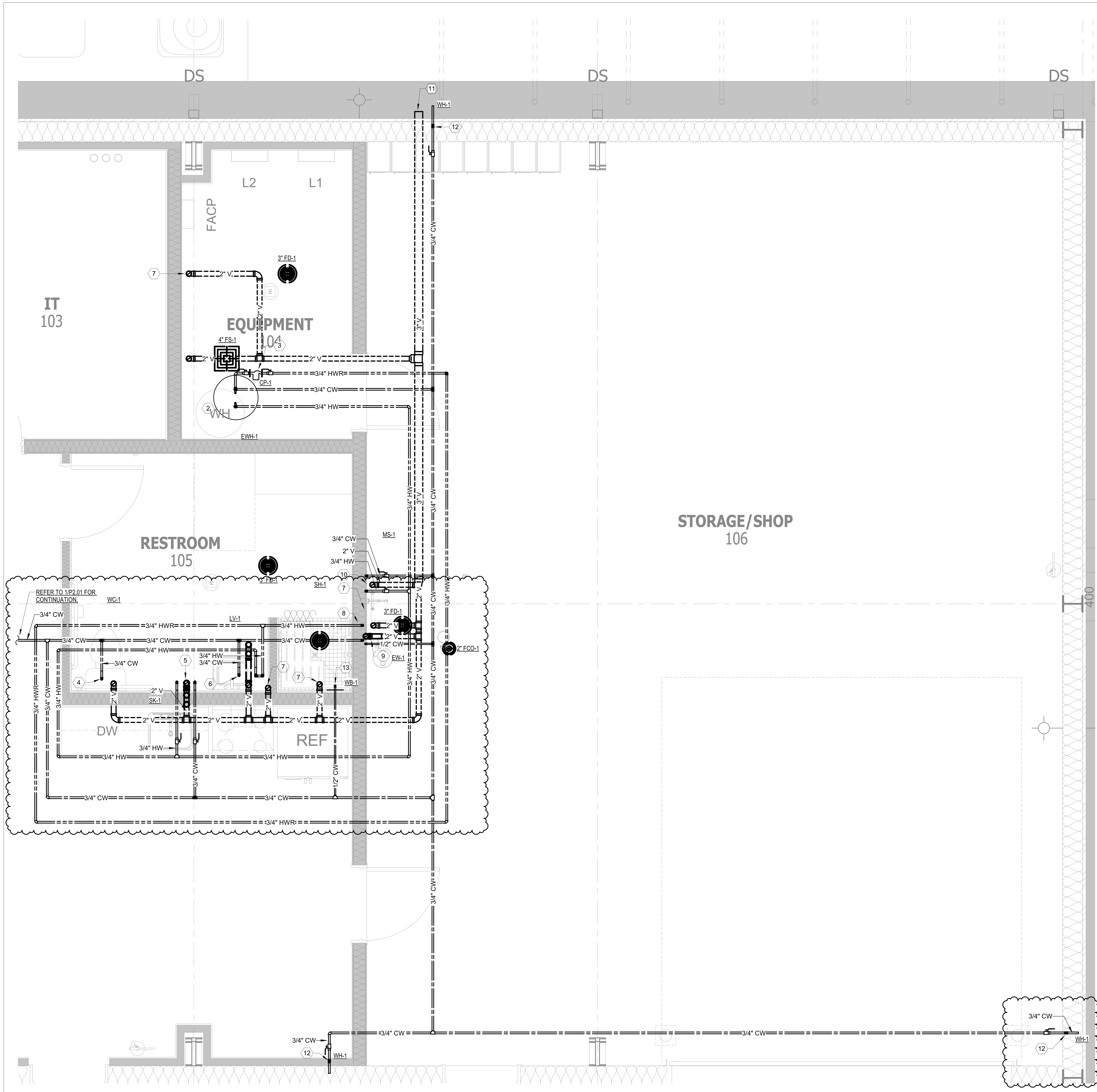
PLUMBING FLOOR PLAN

SCALE: 1/8" = 1'-0"

Drawn By: JW
Checked By: NB
Plot Date: 10/18/23
Project Number: H23233

Sheet:

P2.01



1 ENLARGED PLUMBING PLAN

1/2" = 1'-0"

KEYNOTES

KEYNOTE	DESCRIPTION
1	NOT USED.
2	NEW ELECTRIC WATER HEATER. ROUTE 3/4" COLD AND HOT WATER TO WATER HEATER INLET POINTS. ROUTE T&P AND DRAIN LINE TO FLOOR SINK. PROVIDE AIR GAP FITTING FOR INDIRECT WASTE.
3	CONTRACTOR SHALL PROVIDE IN-LINE RECIRCULATION PUMP TO HOT WATER RETURN PIPING PRIOR TO CONNECT TO COLD WATER SERVING WATER HEATER.
4	ROUTE 3/4" COLD WATER DOWN WITHIN WALL TO FIXTURE WATER CONNECTION POINT. ROUTE 2" VENT UP WITHIN WALL INTO CEILING AND CONNECT TO VENT SYSTEM.
5	ROUTE 2" SANITARY THROUGH SLAB BELOW TO FIXTURE DRAIN CONNECTION POINT. ROUTE 2" VENT UP WITHIN WALL INTO CEILING AND CONNECT TO VENT SYSTEM. ROUTE 3/4" COLD AND HOT WATER DOWN WITHIN WALL TO FIXTURE WATER CONNECTION POINT. EXTEND 3/8" HOT WATER TO DISHWASHER WATER CONNECTION POINT. ROUTE 3/4" DRAIN LINE FROM DISHWASHER TO SINK SANITARY BRANCH TAILPIECE. PROVIDE FUNNEL DRAIN UNDERNEATH SINK. CONNECT 2" SANITARY AND 2" VENT SERVING FUNNEL DRAIN TO SANITARY PIPING SERVING BREAKROOM SINK. PROVIDE AIR GAP FITTING FOR INDIRECT WASTE.
6	ROUTE 2" SANITARY THROUGH SLAB BELOW TO FIXTURE DRAIN CONNECTION POINT ROUTE 2" VENT WITHIN WALL AND CONNECT TO VENT SYSTEM. ROUTE 3/4" COLD AND HOT WATER DOWN WITHIN WALL TO FIXTURE WATER CONNECTION POINT. ROUTE 3/4" HOT WATER BACK UP WITHIN WALL INTO CEILING SPACE AND CONNECT TO HOT WATER PIPING.
7	ROUTE 2" VENT THROUGH SLAB BELOW WITHIN WALL INTO CEILING AND CONNECT TO VENT SYSTEM.
8	ROUTE 3/4" COLD AND HOT WATER DOWN WITHIN WALL TO SHOWER WATER CONNECITON POINTS.
9	ROUTE 2" SANITARY THROUGH SLAB BELOW TO FIXTURE DRAIN CONNECTION POINT. ROUTE 2" VENT UP WITHIN WALL INTO CEILING AND CONNECT TO VENT SYSTEM. ROUTE 1/2" COLD WATER DOWN WITHIN WALL TO FIXTURE WATER CONNECTION POINT.
10	ROUTE 2" VENT THROUGH SLAB BELOW WITHIN WALL INTO CEILING AND CONNECT TO VENT SYSTEM. ROUTE 3/4" COLD AND HOT WATER DOWN WITHIN WALL TO FIXTURE WATER CONNECTION POINTS.
11	ROUTE 3" VENT THROUGH EXTERIOR WALL OF BUILDING.
12	ROUTE 3/4" COLD WATER DOWN TO WALL HYDRANT WATER CONNECTION POINT.
13	ROUTE 1/2" COLD WATER DOWN WITHIN WALL TO WALL-BOX WATER CONNECTION POINT.

GENERAL NOTES

A	PROVIDE FIRE CAULK FOR ALL PIPING PENETRATING THROUGH FIRE RATED WALL.

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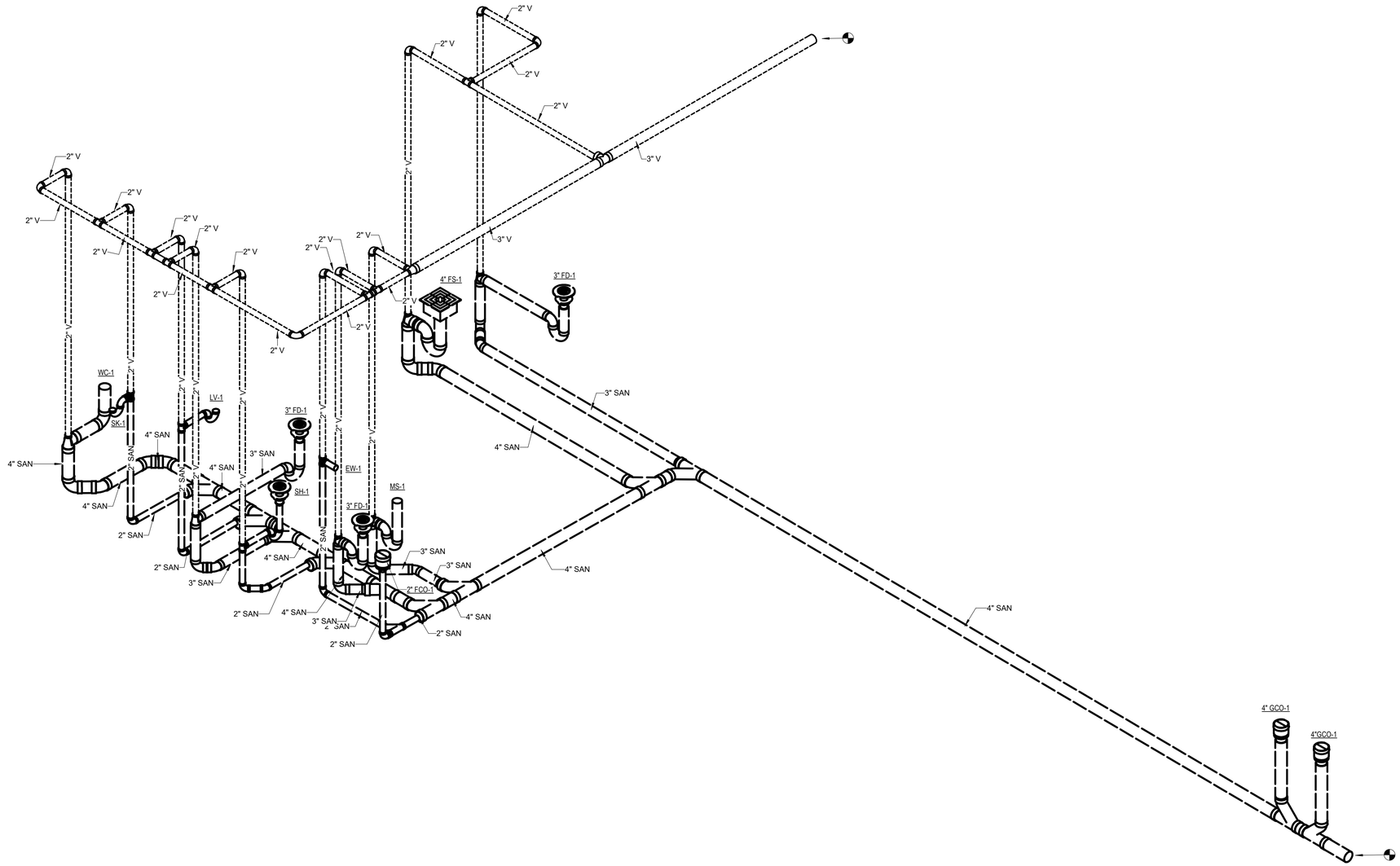
ENLARGED PLUMBING FLOOR PLAN

SCALE: 1/2" = 1'-0"

Drawn By: JW
Checked By: NB
Plot Date: 10/18/23
Project Number: H23233
Sheet:

P2.02



1 PLUMBING RISER - SANITARY & VENT

BUILDING ORIENTATION UPDATED.

1

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Sheet Content:

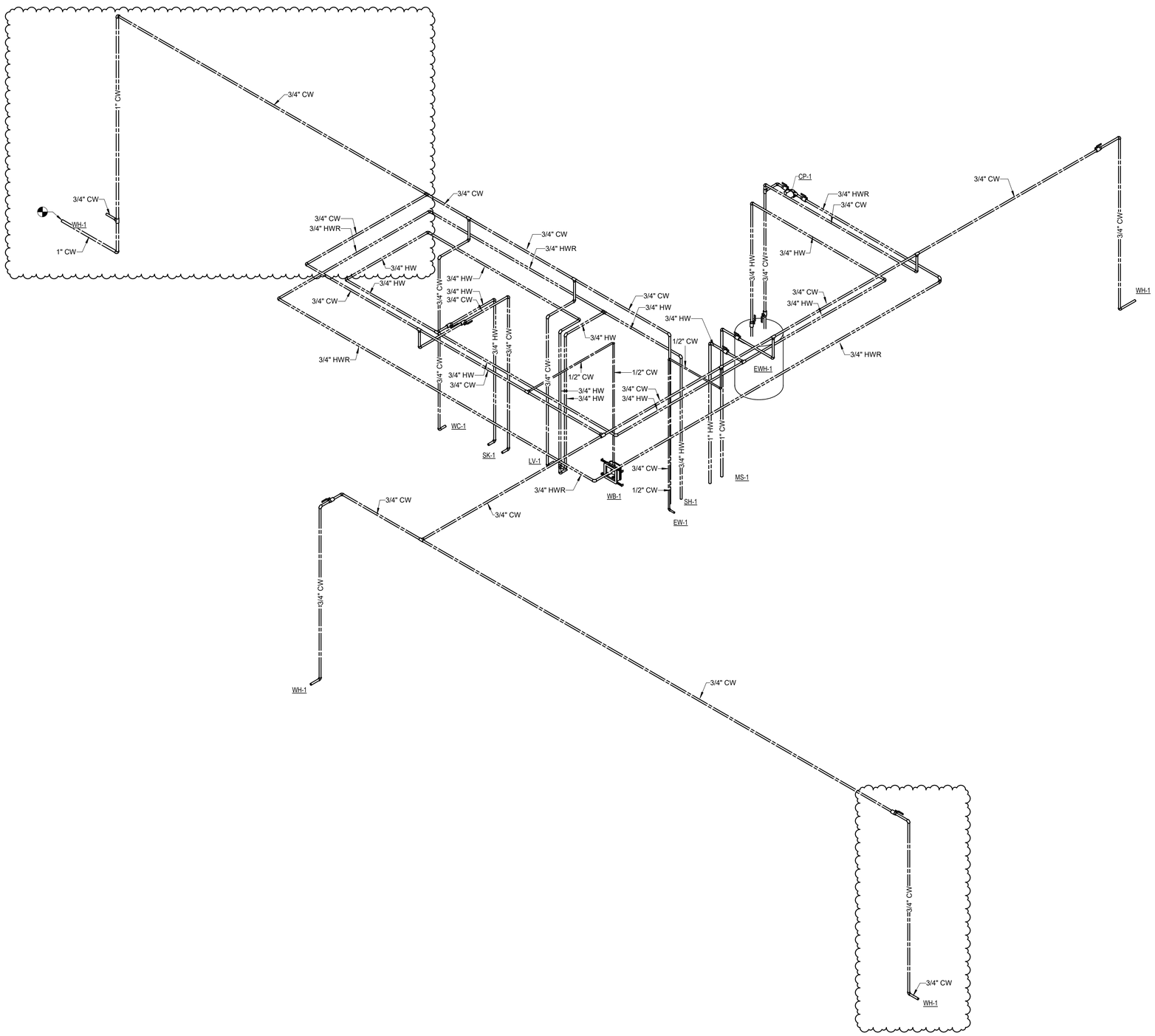
PLUMBING RISERS

SCALE:

Drawn By: JW
Checked By: NB
Plot Date: 02/23/2024
Project Number: H23233

Sheet:

P5.01



1 PLUMBING RISER - DOMESTIC WATER

BUILDING ORIENTATION UPDATED.

1

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Sheet Content:

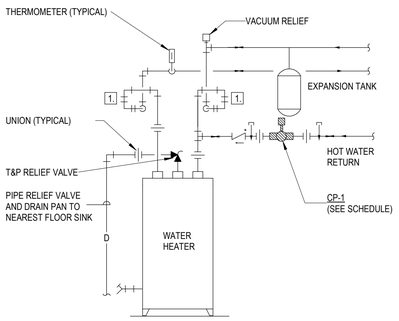
PLUMBING RISERS

SCALE:

Drawn By: JW
Checked By: NB
Plot Date: 02/23/2024
Project Number: H23233

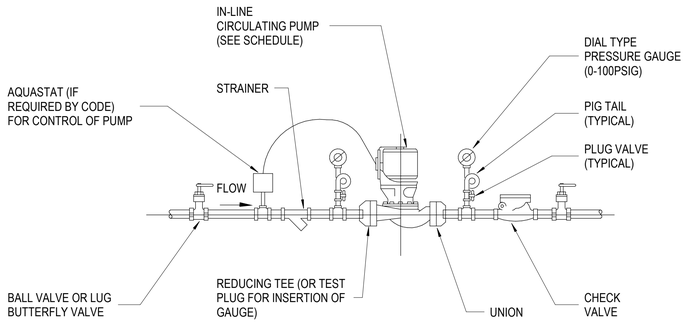
Sheet:

P5.02

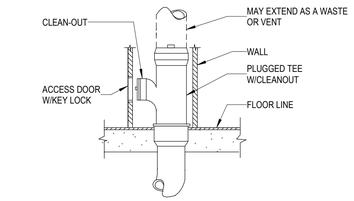


NOTES:
1. PROVIDE THERMAL HEAT TRAP LOOP ON SUPPLY AND DISCHARGE PIPING AS REQUIRED BY INTERNATIONAL ENERGY CONSERVATION CODE - 2015. RECOVERY RATE IS BASED ON 100 DEGREE FAHRENHEIT TEMPERATURE RISE.
2. HEATERS SHALL BE UL OR ETL LISTED AND SHALL MEET ALL ENERGY CONSERVATION CODE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION
3. REFER TO FLOOR PLANS AND RISER DIAGRAMS FOR PIPE SIZING.
4. INSULATE ALL HOT WATER PIPING.
5. INSULATE ALL COLD WATER PIPING WITHIN 8'-0" OF THE WATER HEATER PER 2000 IECC.

11 ELECTRIC WATER HEATER PIPING DIAGRAM-WITH CIRCULATING PUMP
NOT TO SCALE

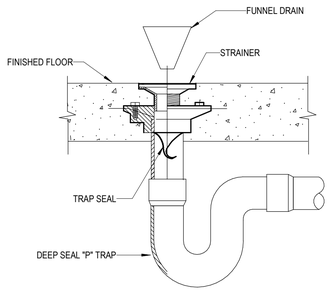


8 IN-LINE CIRCULATING PUMP DETAIL
NOT TO SCALE

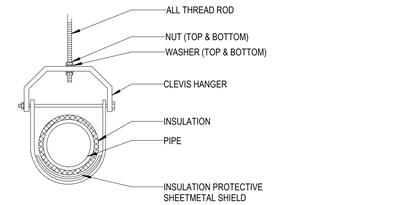


NOTES:
1. BALANCE OF PIPING SAME AS CLEANOUT TO GRADE.

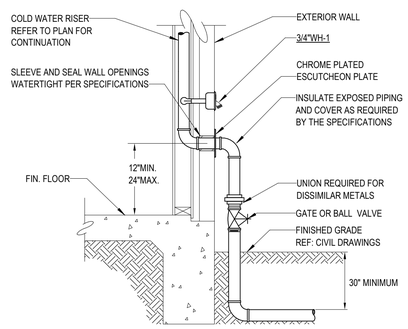
4 WALL CLEANOUT DETAIL
NOT TO SCALE



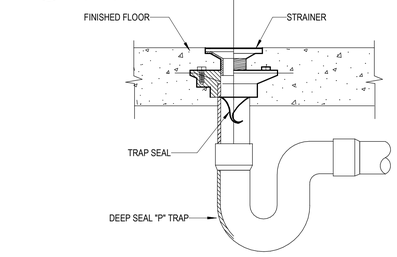
7 FUNNEL DRAIN DETAIL
NOT TO SCALE



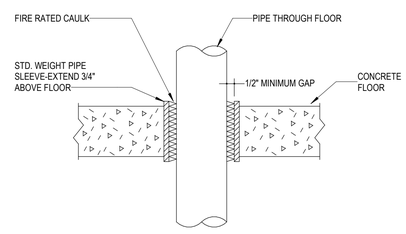
3 TYPICAL CLEVIS HANGER DETAIL
NOT TO SCALE



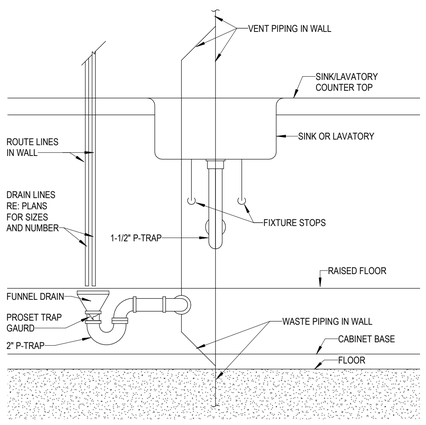
10 WATER PIPE ENTRY DETAIL
NOT TO SCALE



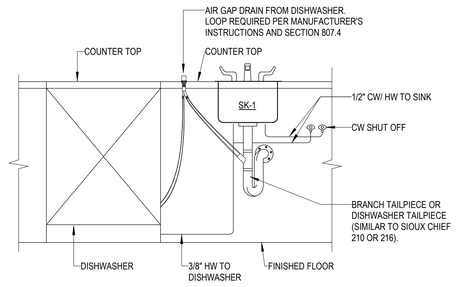
6 FLOOR DRAIN DETAIL
NOT TO SCALE



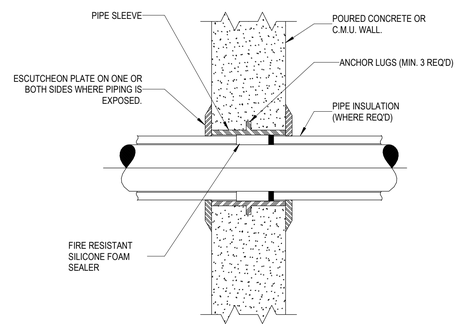
2 PIPE SLEEVE THROUGH FLOOR DETAIL
NOT TO SCALE



9 INDIRECT RECEPTOR DETAIL
NOT TO SCALE



5 DISHWASHER DRAIN TO SINK DETAIL
NOT TO SCALE



NOTES:
1. FOR INTERIOR WALLS AND BELOW GRADE GROUND TO GROUND WALLS.

1 PIPE SLEEVE THROUGH WALL DETAIL
NOT TO SCALE

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06/21/2024

Sheet Content:
PLUMBING DETAILS

SCALE: As indicated

Drawn By: JW
Checked By: NB
Plot Date: 01/29/24
Project Number: H23233

Sheet:
P6.01