

Civil Engineer
Vierbicher Associates, Inc.

999 Frontier Drive, Suite 201
 Madison, WI 53717
 608.626.0532 tel

Landscape Architect
Ken Saiki Design, Inc.

303 South Palomero Street, Suite 1
 Madison, WI 53703
 608.251.3000 tel

Structural Engineer, Technology and AVV
IMEG Corp.

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

MEP Engineer
MEP Associates, LLC

860 Blue Garden Road, Suite 175
 Elgin, WI 53121
 651.379.9120 tel

Fire Protection Engineer and Code Consultant
Summit Fire Consulting

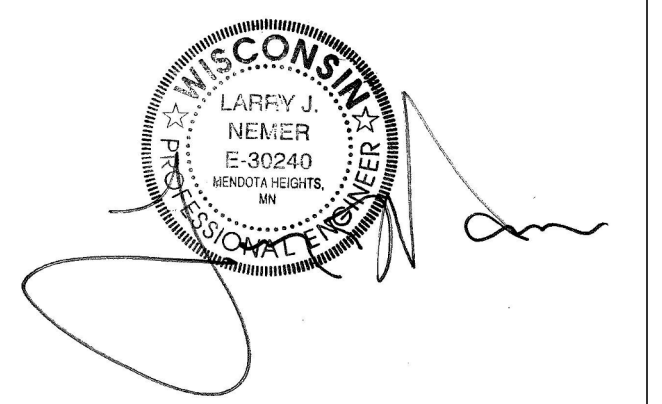
575 Minnehaha Ave West
 St. Paul, MN 55103
 651.251.1880 tel

Greenhouse Design
Rough Brothers, Inc.

5513 Vine Street
 Cincinnati, OH 45217
 513.242.0310 tel

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

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



Signature: _____
 Print Name: Larry Nemer
 Date: JUNE 4, 2018 License No.: E-30240

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PROJECT NO: 2017016
 PROJECT PHASE: BID DOCUMENTS
 DRAWN BY: MSR CHECKED BY: MSR
 Design: 2017 Copyright: MSR, Green & Roseville, LLC

PLUMBING TITLE SHEET

**EXHIBIT K
 P000**

PLUMBING ABBREVIATIONS			
AG	ABOVE GRADE	FCO	FLOOR CLEANOUT
ADD	ADDENDUM	FD	FLOOR DRAIN
ADJ	ADDITIONAL	FERT	FERTILIZER
ADJ	ADJUSTABLE	FFM	FEET PER MINUTE
AFF	ABOVE FINISH FLOOR	FT	FOOT (FEET)
AFS	ABOVE FINISH GRADE	FURN	FURNACE
ALT	ALTERNATE	GA	GAUGE/GAGE
APPRX	APPROXIMATE	GAL	GALLON
ARCH	ARCHITECT, ARCHITECTURAL	GALV	GALVANIZED
BG	BELOW GRADE	GC	GENERAL CONTRACTOR
BLDG	BUILDING	GPM	GALLONS PER MINUTE
B	BLACK IRON	GYP	GYP-SUM
BOP	BOTTOM OF PIPE	HA	HAMMER ARRESTOR
BOI	BOTTOM	HB	HOSE BIB
BSMT	BASEMENT	HORIZ	HORIZONTAL
BTWN	BETWEEN	HP	HORSEPOWER
CI	CAST IRON	HT	HEIGHT
CL	CENTERLINE	HW	HOT WATER
CLR	CLEAR	HWR	HOT WATER RETURN
CO	CLEANOUT	IE	INVERT ELEVATION
COL	COLLUM	IN	INCH
COMP	COMPRESSOR	INSUL	INSULATION
CONC	CONCRETE	T&B	TOP AND BOTTOM
COND	CONDENSATE	TEMP	TEMPERATURE OR TEMPERATURE
CONN	CONNECTION	TI	TEMPERED WATER
CONT	CONTINUOUS	TYP	TYPICAL
CW	COLD WATER	UNO	UNLESS NOTED OTHERWISE
DEPT	DEPARTMENT	MAX	MAXIMUM
DET	DETAIL	MC	MECHANICAL CONTRACTOR
DF	DRINKING FOUNTAIN	MECH	MECHANICAL
DIA OR	DIAMETER	MIN	MINIMUM
DN	DOWN	MFR	MANUFACTURER
DW	DEIONIZED WATER	NFC	NOT FOR CONSTRUCTION
DWG	DRAWING	NC	NOT IN CONTRACT
EC	ELECTRICAL CONTRACTOR	NTS	NOT TO SCALE
ECO	EXTERIOR CLEANOUT	OC	ON CENTER
EL	ELEVATION	OPNG	OPENING
ELEC	ELECTRICAL	OSD	OVERFLOW STORM DRAIN
EQ	EQUIPMENT	PC	PLUMBING CONTRACTOR
EQUIP	EQUIPMENT	PERP	PERPENDICULAR
EXIST	EXISTING	PLB	PLUMBING
		PW	PLANT WATER
		PSF	POUNDS PER SQUARE FOOT
		PSI	POUNDS PER SQUARE INCH
		PWR	POWER
		QTY	QUANTITY
		RD	ROOF DRAIN
		REQD	REQUIRED
		REV	REVERSE OR REVISION
		R.O.	REVERSE OSMOSIS
		RPM	REVOLUTIONS PER MINUTE
		SAN	SANITARY
		SCH	SCHEDULE
		SCW	SOFT COLD WATER
		SD	STORM DRAIN
		SF	SQUARE FEET
		SHT	SHEET
		SHWR	SHOWER
		SM	SMILAR
		SPEC	SPECIFICATIONS
		SQ	SQUARE
		SS	STAINLESS STEEL
		TEMP	TEMPERATURE OR TEMPERATURE
		TI	TEMPERED WATER
		TYP	TYPICAL
		UNO	UNLESS NOTED OTHERWISE
		V	VENT
		VAR	VARIABLE OR VARIES
		VERT	VERTICAL
		VOL	VOLUME
		VS	VENT STACK
		VTR	VENT THRU ROOF
		W	WITH
		WIN	WITHIN
		W/O	WITHOUT
		WC	WATER COLUMN (INCHES OF)
		WCO	WALL CLEANOUT
		WG	WATER GAUGE
		WP	WEATHER PROOF
		WT	WEIGHT

PLUMBING PIPING LINETYPES	
LINE TYPE	DESCRIPTION
----	DEMOLITION
----	GAS
----	SANITARY ABOVE GRADE
----	SANITARY BELOW GRADE
----	STORM ABOVE GRADE
----	STORM BELOW GRADE
----	VENT ABOVE GRADE
----	VENT BELOW GRADE
----	COLD WATER
----	COLD WATER BELOW GRADE
----	HOT WATER
----	HOT WATER BELOW GRADE
----	HOT WATER RETURN
----	TEMPERED WATER
----	PLANT WATER
----	FERTILIZER
----	RAIN WATER
----	R.O WATER

GENERAL PLUMBING NOTES

- THESE DRAWINGS SHALL NOT BE SCALED. SEE ARCHITECTURAL/CIVIL DRAWINGS FOR DIMENSIONAL INFORMATION. THIS ENGINEER WILL NOT BE LIABLE FOR MISCALCULATED PRODUCT TAKE-OFFS DUE TO SCALING OF DRAWINGS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY FITTINGS AS REQUIRED BY ALL APPLICABLE CODES AND GOVERNING AUTHORITIES.
- CONTRACTOR SHALL VERIFY ANY POSSIBLE DISCREPANCIES BETWEEN TYPE AND SIZE OF CONNECTION SPECIFIED IN PLUMBING FIXTURE SCHEDULE AND FIXTURES ACTUALLY INSTALLED ON AND CORRECT AS REQUIRED TO MEET ALL CODES AND REGULATIONS.
- ALL SANITARY PIPING SHALL HAVE A 1/8" PER FOOT SLOPE UNLESS OTHERWISE NOTED. 2" SANITARY OR SMALLER SHALL HAVE A 1/4" PER FOOT SLOPE.
- VENT PIPING SHOWN ON FLOOR PLANS IS DIAGRAMMATIC EXCEPT FOR VENT THRU ROOF (VTR) LOCATIONS.
- VALVES AND FITTINGS SHALL BE OF SAME SIZE AS THE LINE ON WHICH THEY ARE LOCATED, UNLESS OTHERWISE INDICATED ON DRAWINGS.
- CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER TRADES.
- CONTRACTOR SHALL FIELD VERIFY ALL GIVEN MEASUREMENTS PRIOR TO LAYING AND CONNECTING ALL SANITARY AND WASTE PIPING AND NOTIFY ARCHITECT OF ANY DISCREPANCIES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FIRE RATINGS AND WEATHERPROOFING INTEGRITY OF ALL PIPING AND PENETRATIONS.
- ALL WATER SUPPLY AND SANITARY LINES SHALL BE RUN AS CLOSE TO PLANS AS POSSIBLE WITH NO CHANGES IN SIZING.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY SUPPORTING DEVICES FOR ALL FIXTURES INCLUDED IN CONTRACT OR HEREIN SPECIFIED OR OTHERWISE.
- CHANGES IN THE DIRECTION OF SANITARY AND STORM DRAIN PIPING SHALL NOT BE MADE WITH FITTINGS WHICH WILL CAUSE EXCESSIVE REDUCTION IN THE VELOCITY OF FLOW OR CREATE ANY OTHER ADVERSE EFFECT UNLESS PHYSICALLY IMPOSSIBLE (I.E. USE OF SANITARY TEE IN A HORIZONTAL CONNECTION, USE OF A DOUBLE SANITARY TEE IN A VERTICAL STACK, IN GENERAL, USE OF SHORT-RADIUS FITTINGS FOR BRANCH TO HOUSE DRAIN OR STACK CONNECTION).
- CONTRACTOR SHALL GIVE 48 HOURS/24 HOUR EMERGENCY LOCATE NOTICE TO APPLICABLE UTILITY COMPANY PRIOR TO PERFORMING WORK INVOLVING UTILITIES.
- ALL DRAINAGE PIPING SHALL BE MARKED WITH THE SEAL OF APPROVAL OF THE NATIONAL SANITATION FOUNDATION.
- WHERE SANITARY SEWER LINES CROSS UNDERGROUND WATER SUPPLY LINES WITH LESS THAN 8" MINIMUM VERTICAL CLEARANCE, THE SANITARY SEWER SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE (10" EACH SIDE OF WATER MAIN) OR THE WATER LINES SHOULD BE MODIFIED TO PROVIDE 8" MINIMUM CLEARANCE.
- CONTRACTOR SHALL GIVE 48 HOUR NOTICE IN WRITING TO, AND RECEIVE WRITTEN APPROVAL, FROM THE BUILDING ADMINISTRATOR (OR HIS REPRESENTATIVE) PRIOR TO SHUT DOWN OF ANY SYSTEM OR DISRUPTION OF SERVICE TO ANY AREA. CONTRACTOR SHALL ALSO COORDINATE THE EXACT LOCATION AND TIMING OF SYSTEM(S) SHUT-DOWN POINTS WITH THE OWNER REPRESENTATIVE (I.E. ENGINEERING DEPARTMENT). CONTRACTOR SHALL MAKE EVERY EFFORT POSSIBLE TO MINIMIZE THE DURATION OF ANY DOWNTIME OR DISRUPTION PERIOD.
- ROUTE ALL PIPING CONCEALED ABOVE CEILING, WITHIN WALLS, OR IN CHASES. PIPING EXPOSED SHALL BE SLOPED AND PAINTED TO MATCH ARCHITECTURAL FINISHES. PIPING IN MECHANICAL ROOMS MAY BE EXPOSED.
- CONTRACTOR SHALL VERIFY INVERT ELEVATIONS OF SEWERS TO WHICH NEW SEWER LINES ARE TO BE CONNECTED BEFORE INSTALLATION OF NEW SEWER LINE.
- ALL VENTS THROUGH ROOF SHALL BE MIN. 10'-0" FROM ANY AIR INTAKES.
- CONTRACTOR SHALL ROUGH-IN ALL WASTES AND SUPPLIES TO SPECIAL EQUIPMENT ACCORDING TO MANUFACTURER'S SHOP DRAWINGS AND MAKE FINAL CONNECTIONS. ALL SUPPLIES SHALL BE VALVED. INSTALL VACUUM BREAKERS WHERE REQUIRED BY CODE.
- PROVIDE REDUCED PRESSURE BACKFLOW PREVENTERS FOR DOMESTIC WATER SUPPLIES AS REQUIRED BY LOCAL WATER PURVEYORS. TEST AND REGISTER WITH APPROPRIATE CODE OFFICIAL.
- COORDINATE EXACT LOCATION OF FLOOR DRAINS FOR HVAC EQUIPMENT WITH MECHANICAL CONTRACTOR.
- THE CONTRACTOR IS EXPECTED TO ORDER ALL MATERIALS IN SUFFICIENT TIME TO AVOID DELAYING THE COMPLETION OF THE PROJECT. DELAY IN DELIVERIES WILL NOT BE CONSIDERED A JUSTIFIABLE REASON FOR SUBMISSION OF SUBSTITUTE MATERIALS.
- ALL PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE IN PROVIDED CEILING SPACE.
- COORDINATE PIPING INSTALLATION AS TO NOT INTERFERE WITH HVAC EQUIPMENT ACCESS.
- ANY ERRORS OR AMBIGUITIES IN THE PLANS AND/OR SPECIFICATIONS THAT ARE DISCOVERED BY THE CONTRACTOR SHALL BE REPORTED TO THE ARCHITECT/ENGINEER BEFORE WORK IS STARTED. OMISSION OF PARTICULAR REFERENCE TO ANY ITEM NECESSARY FOR COMPLETE INSTALLATION AND PROPER OPERATION THEREOF SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF FURNISHING THE SAME AT NO EXTRA COST. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING ALL CONSTRUCTION DOCUMENTS FOR INFORMATION PRIOR TO BID.

PLUMBING SHEET INDEX

P000	PLUMBING TITLE SHEET
PD111	GREENHOUSE PLUMBING DEMOLITION PLAN - BELOW GRADE
PD112	GREENHOUSE PLUMBING DEMO PLAN - ABOVE GRADE
PD131	COMMONS AREA PLUMBING DEMOLITION PLAN
P100	LEARNING CENTER PLUMBING PLAN - BELOW GRADE
P101	LEARNING CENTER PLUMBING PLAN - ABOVE GRADE
P102	LEARNING CENTER PLUMBING ROOF PLAN
P111	GREENHOUSE PLUMBING PLAN - BELOW GRADE
P112	GREENHOUSE PLUMBING PLAN - ABOVE GRADE
P131	COMMONS AREA PLUMBING PLAN
P201	PLUMBING RISER DIAGRAM
P301	PLUMBING DETAILS
P401	PLUMBING SCHEDULES AND RAINRO SCHEMATIC

PLUMBING PIPING LEGEND

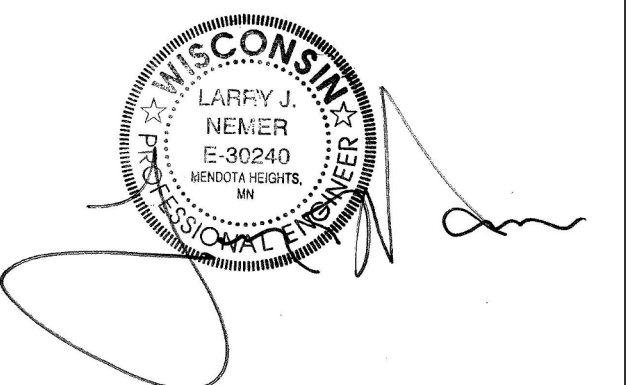
---	CIRCUIT SETTER
---	BALL VALVE OR SHUT-OFF VALVE
---	SPRING CHECK VALVE
---	PRESSURE REDUCING VALVE (PRV)
---	RPZ VALVE OR BACKFLOW PREVENTER
---	HAMMER ARRESTOR (PISTON TYPE)
---	HAMMER ARRESTOR (BELLOW TYPE)
---	PIPE REDUCER FITTING
---	END CAP
---	PIPE CONNECTION
---	FLOW DIRECTION ARROW
---	PIPING ELBOW DOWN
---	PIPING ELBOW UP OR PIPING RISER UP & DOWN
---	PIPING TEE DOWN
---	PIPING TEE UP OR PIPING RISER UP & DOWN
---	HOSE BIB OR WALL HYDRANT
---	FLOW METER
---	PRESSURE REGULATOR
---	CIRCULATING PUMP (HOT WATER RETURN)
---	NEW TO EXISTING PIPE CONNECTION
---	NEW TO EXISTING POINT OF CONNECTION SYMBOL
---	EXTENT OF DEMO

WATER CALCULATIONS WORKSHEET

- 1.50 DEMAND OF BUILDING IN GALLONS PER MINUTE.
 - 2.00 LOW PRESSURE AT THE CURBSTOP OR AT EXTERNAL PRESSURE TANK.
 - 5.0 FT DIFFERENCE IN ELEVATION FROM MAIN TO METER.
 - 2" SIZE OF WATER METER IN INCHES.
 - 50.0 FT DEVELOPED LENGTH FROM CURBSTOP TO METER.
 - 0.3 FIND PRESSURE LOSS DUE TO FRICTION IN 50 FT WATER SERVICE @ 6 (PSI/100 FT)
 - 2.17 FIND PRESSURE LOSS DUE TO ELEVATION, MAIN TO METER (OR EXTERNAL PRESSURE TANK TO BUILDING CONTROL VALVE). MULTIPLY THE DIFFERENCE BY 4.34 PSIF/FT.
 - 6.0 FIND THE PRESSURE LOSS DUE TO METER.
 - 83.53 SUBTRACT THE LOSS DUE TO FRICTION (STEP 6), LOSS DUE TO ELEVATION (STEP 7), AND LOSS DUE TO METER (STEP 8) FROM THE LOW MAIN PRESSURE (OR LOW PRESSURE AT EXTERNAL PRESSURE TANK). THIS CALCULATION IS THE AVAILABLE PRESSURE AFTER THE WATER METER (OR AT THE BUILDING CONTROL VALVE). THIS ANSWER IS ENTERED IN LINE 8, BELOW.
- INFORMATION NEEDED FOR WATER DISTRIBUTION SIZING:
 FORMULA: $A = B - (C + D + E) \times 100 / F$
- 2.2 PRESSURE AVAILABLE FOR UNIFORM LOSS (PSI/100' OF PIPE).
 - 83.53 AVAILABLE PRESSURE AFTER WATER METER (SEE ITEM 8, ABOVE).
 - 25 PRESSURE NEEDED AT CONTROLLING FIXTURE.
 - 5.2 DIFFERENCE IN ELEVATION BETWEEN WATER METER (BUILDING CONTROL VALVE OR INTERNAL PRESSURE TANK) AND CONTROLLING FIXTURE IN FEET $12 \times 4.34 \text{ PSIF/FT}$
 - 7.5 PRESSURE LOSS DUE TO WATER SOFTENERS, WATER TREATMENT DEVICES, INSTANTANEOUS WATER HEATERS AND BACKFLOW PREVENTORS.
 - 500 DEVELOPED LENGTH FROM WATER METER TO CONTROLLING FIXTURE IN FEET 330×1.5 .

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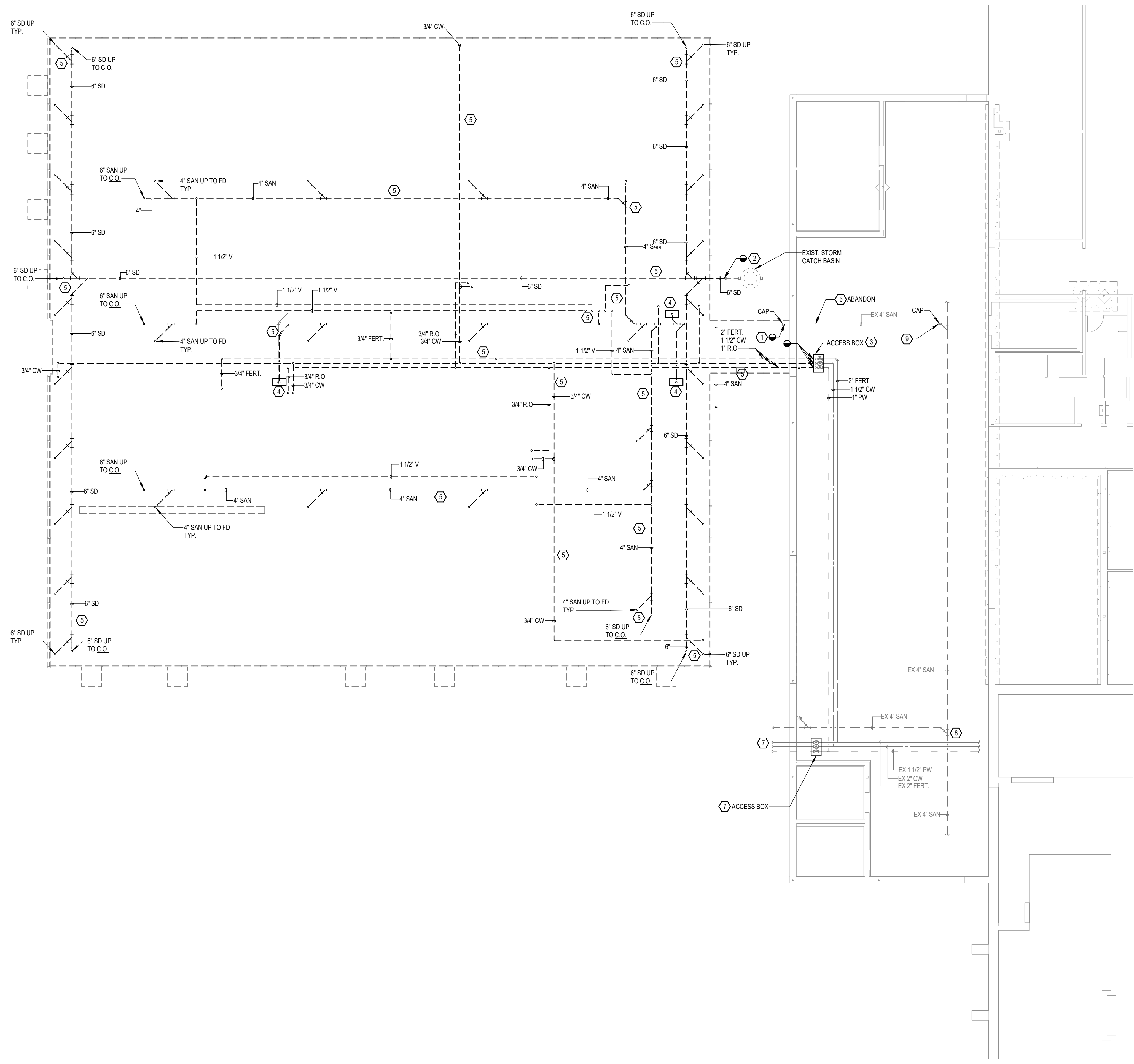


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PROJECT NO. 2017016
 PROJECT PHASE BID DOCUMENTS
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**GREENHOUSE
 PLUMBING
 DEMOLITION PLAN -
 BELOW GRADE**
**EXHIBIT K
 PD111**



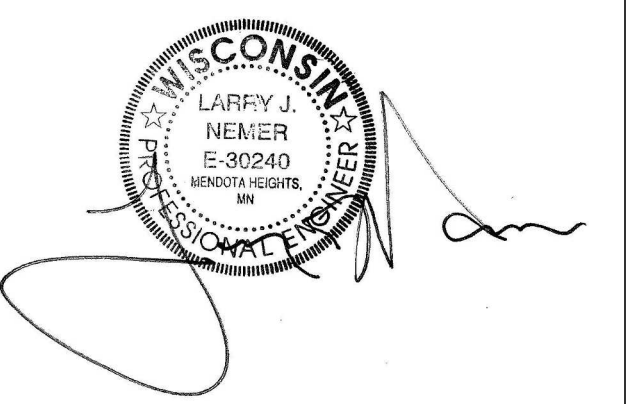
GENERAL NOTES
 A. EQUIPMENT, PIPING, ETC. SHOWN BOLD DASH IS TO BE DEMOLISHED.
 B. FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P001.
 C. PLUMBING EQUIPMENT, PIPING AND ASSOCIATED COMPONENTS LOCATED IN THE GREENHOUSE SHALL BE DEMOLISHED. COORDINATE WITH OTHER TRADES PRIOR TO START OF WORK.

- KEYED NOTES**
- SANITARY DRAIN SHALL BE CAPPED BELOW GRADE AT INDICATED LOCATIONS, AND ABANDONED. VERIFY INVERT ELEVATION PRIOR TO START OF WORK.
 - STORM DRAIN SHALL BE CAPPED AT EXISTING CATCH BASIN. INVERT ELEVATION OF CATCH BASIN INLET IS 2' 11" BFF. VERIFY INVERT ELEVATION PRIOR TO START OF WORK.
 - ALL IN-FLOOR DOMESTIC SUPPLY WATER, R.O AND FERTILIZER PIPING SHALL BE REMOVED BACK TO IN-FLOOR ACCESS BOX WITH SHUT-OFFS AS SHOWN. PIPING SHALL BE CAPPED IN/AT ACCESS BOX.
 - DEMOLISH EVAPORATIVE COOLER SUMP BASIN, SUMP PUMP AND ALL ASSOCIATED COMPONENTS.
 - REMOVE ALL PLUMBING EQUIPMENT AND ASSOCIATED COMPONENTS.
 - EXCAVATE SANITARY AND CAP OFF IN BOTH DIRECTION TO ELIMINATE EXTENDED DEAD-END.
 - EXISTING ACCESS BOX AND PIPING. PIPING WAS INSTALLED FOR FUTURE USE, BUT NEVER USED. LEAVE IN PLACE. NO WORK.
 - SANITARY INVERT ELEVATION IN THIS AREA IS 5' 3" BFF. VERIFY PRIOR TO START OF WORK.
 - SANITARY INVERT ELEVATION AT THIS LOCATION IS 3' 6" BFF. VERIFY INVERT ELEVATION PRIOR TO START OF WORK.

1 GREENHOUSE PLUMBING DEMOLITION PLAN- BELOW GRADE
 1/8" = 1'-0"

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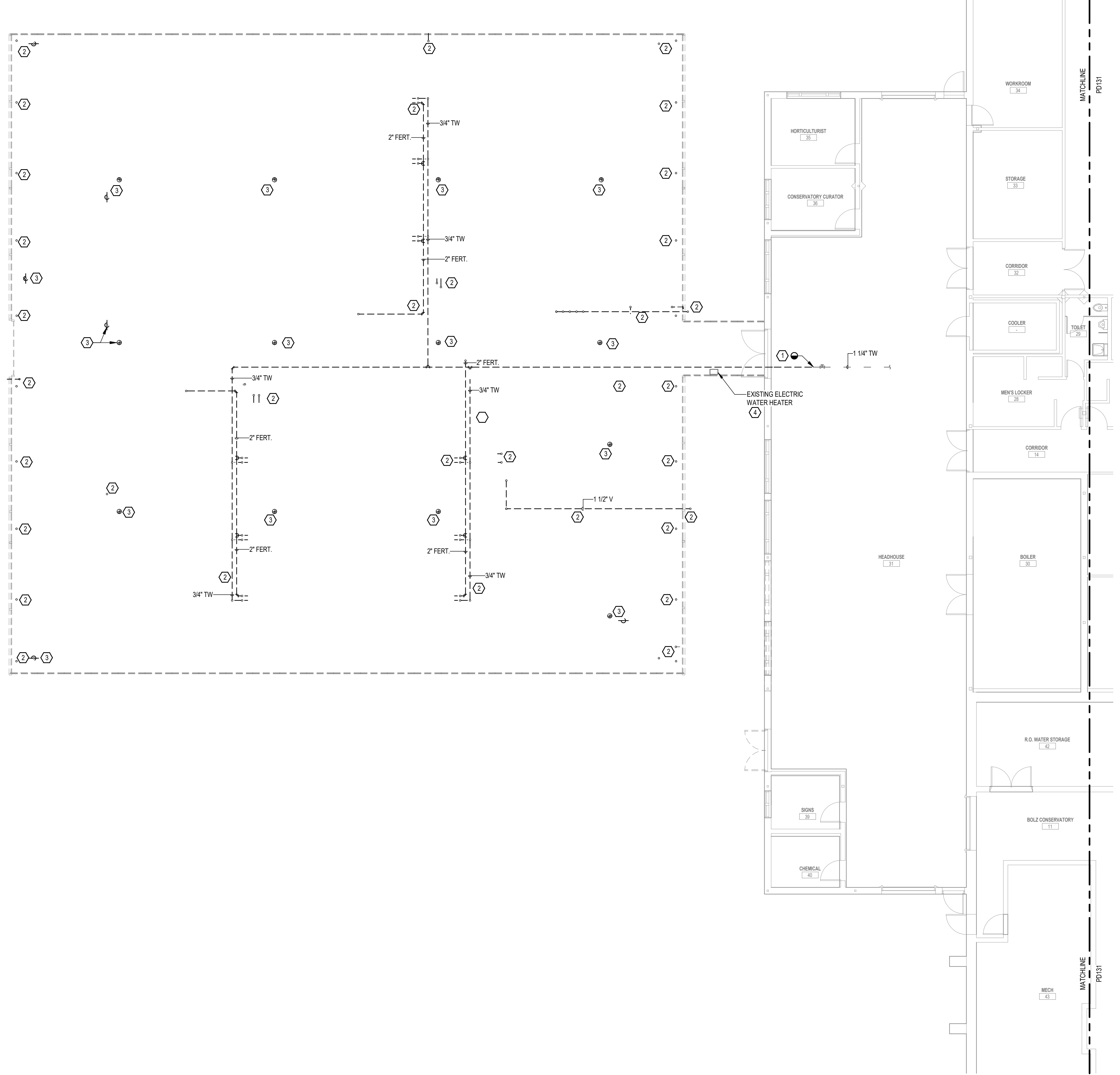
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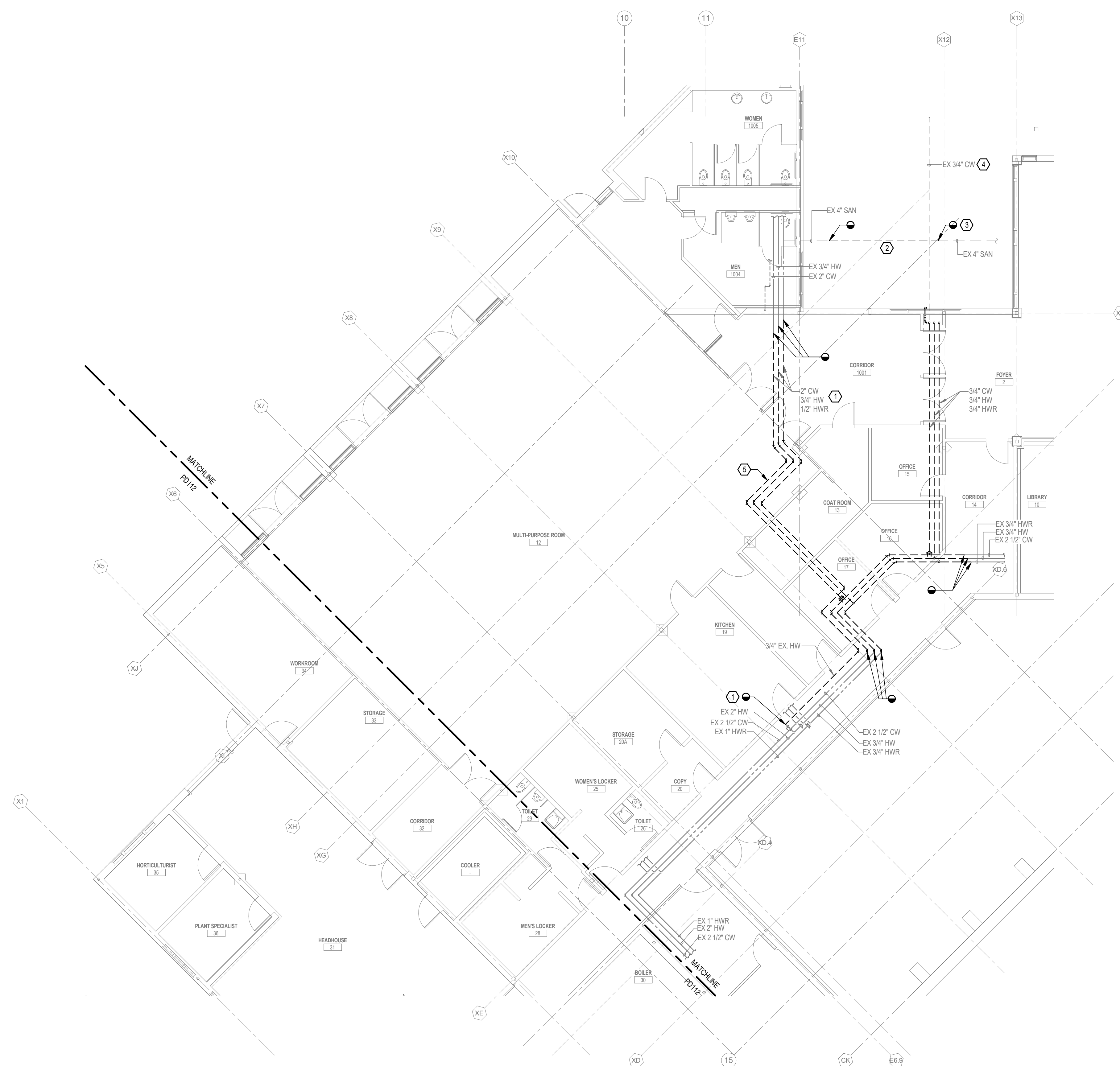
**GREENHOUSE
 PLUMBING DEMO
 PLAN - ABOVE
 GRADE**
**EXHIBIT K
 PD112**

- GENERAL NOTES**
- A. EQUIPMENT, PIPING, ETC. SHOWN BOLD DASH IS TO BE DEMOLISHED.
 - B. FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P001.
 - C. PLUMBING EQUIPMENT, PIPING AND ASSOCIATED COMPONENTS LOCATED IN THE GREENHOUSE SHALL BE DEMOLISHED. COORDINATE WITH OTHER TRADES PRIOR TO START OF WORK.

- KEYED NOTES**
- ① REMOVE TEMPERED WATER BACK TO VALVE, AS SHOWN. SEE P112 FOR NEW PLAN.
 - ② REMOVE PLUMBING PIPING AND ASSOCIATED COMPONENTS.
 - ③ REMOVE FLOOR DRAIN/FLOOR CLEANOUTS.
 - ④ DEMOLISH EXISTING ELECTRIC WATER HEATER, PUMP AND ASSOCIATED COMPONENTS.



1 GREENHOUSE PLUMBING DEMOLITION PLAN - ABOVE GRADE
 1/8" = 1'-0"



GENERAL NOTES

A. EQUIPMENT, PIPING, ETC. SHOWN BOLD DASH IS TO BE DEMOLISHED.
 B. FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P100.

KEYED NOTES

- REMOVE EXISTING DOMESTIC WATER LINE AS INDICATED ON PLAN. HW AND HWR PIPE WILL BE REPLACED WITH LARGER PIPE. SEE NEW PLAN. HANGERS NOT RE-USED SHALL BE REMOVED.
- REMOVE SECTION OF EXISTING SANITARY, AS SHOWN. SEE P100 FOR NEW WORK.
- INVERT ELEVATION AT THIS POINT IS 40" BFF. VERIFY PRIOR TO START OF WORK.
- 3/4" CW LINE SHALL BE REMOVED WITHIN NEW CONSTRUCTION ZONE. DRINKING FOUNTAIN IS LOCATED IN THE GARDENS. PIPE AND DRINKING FOUNTAIN SHALL BE PROTECTED AND RECONNECTED. REFER TO P100 FOR NEW PLANS.
- DEMOLITION OF WATER PIPING SHALL BE EXECUTED AFTER NEW PIPING IS INSTALLED (SEE NEW PLAN), TO MINIMIZE RESTROOM QUIT OF SERVICE TIME. COORDINATE DOWNTIME OF FACILITY WITH OWNER. REFER TO P000 GENERAL NOTES.

1 COMMONS AREA PLUMBING DEMOLITION PLAN
 1/8" = 1'-0"



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

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Vierbicher Associates, Inc.
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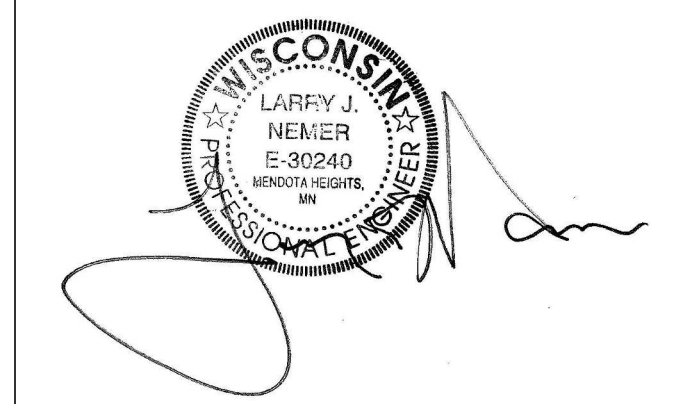
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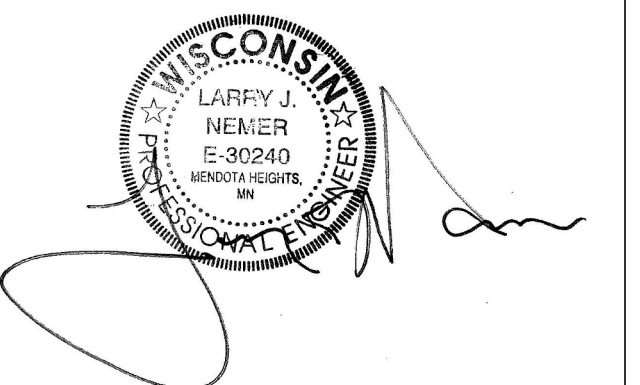
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**COMMONS AREA
 PLUMBING
 DEMOLITION PLAN**

**EXHIBIT K
 PD131**

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**LEARNING CENTER
 PLUMBING PLAN -
 BELOW GRADE**

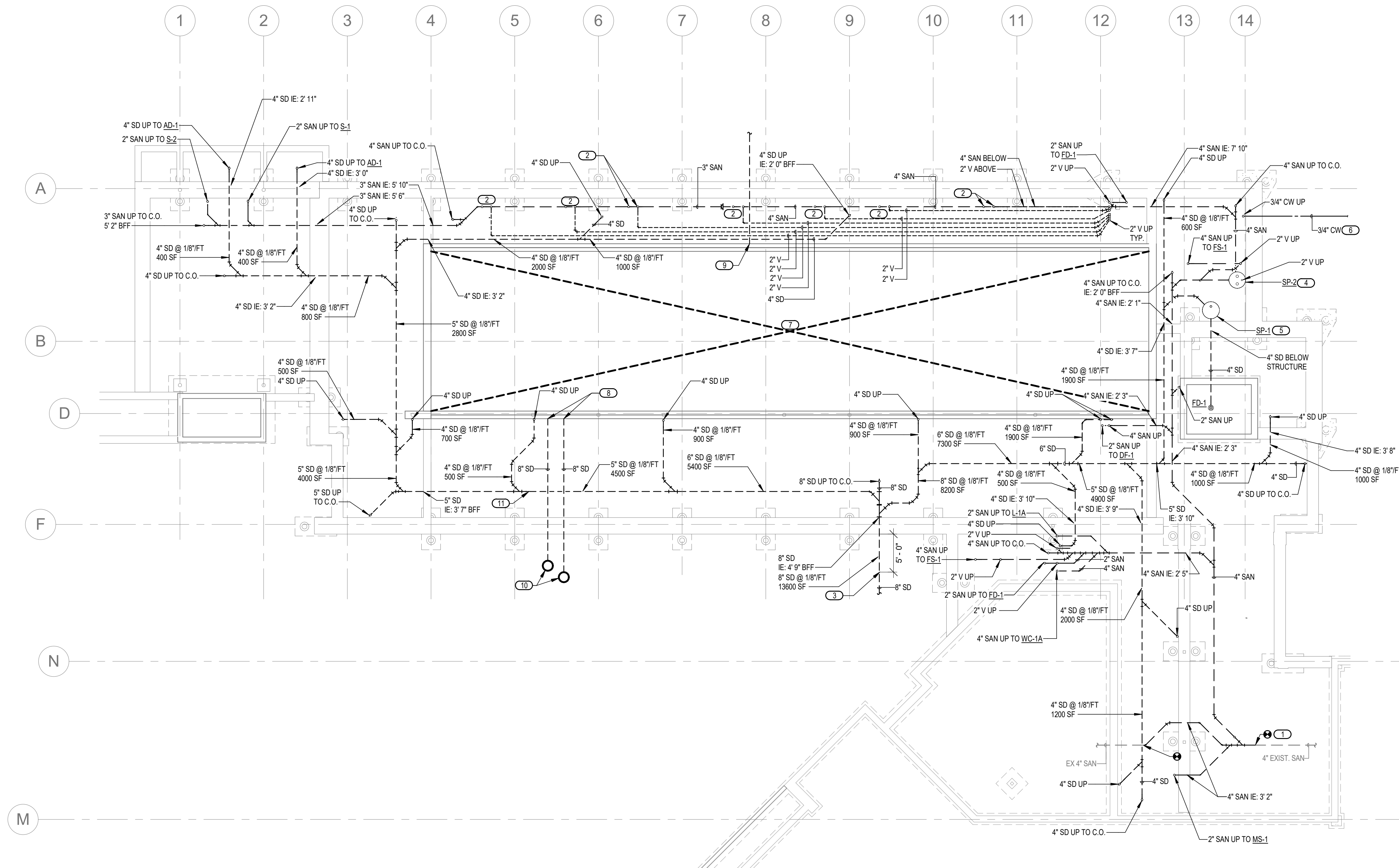
**EXHIBIT K
 P100**

GENERAL NOTES

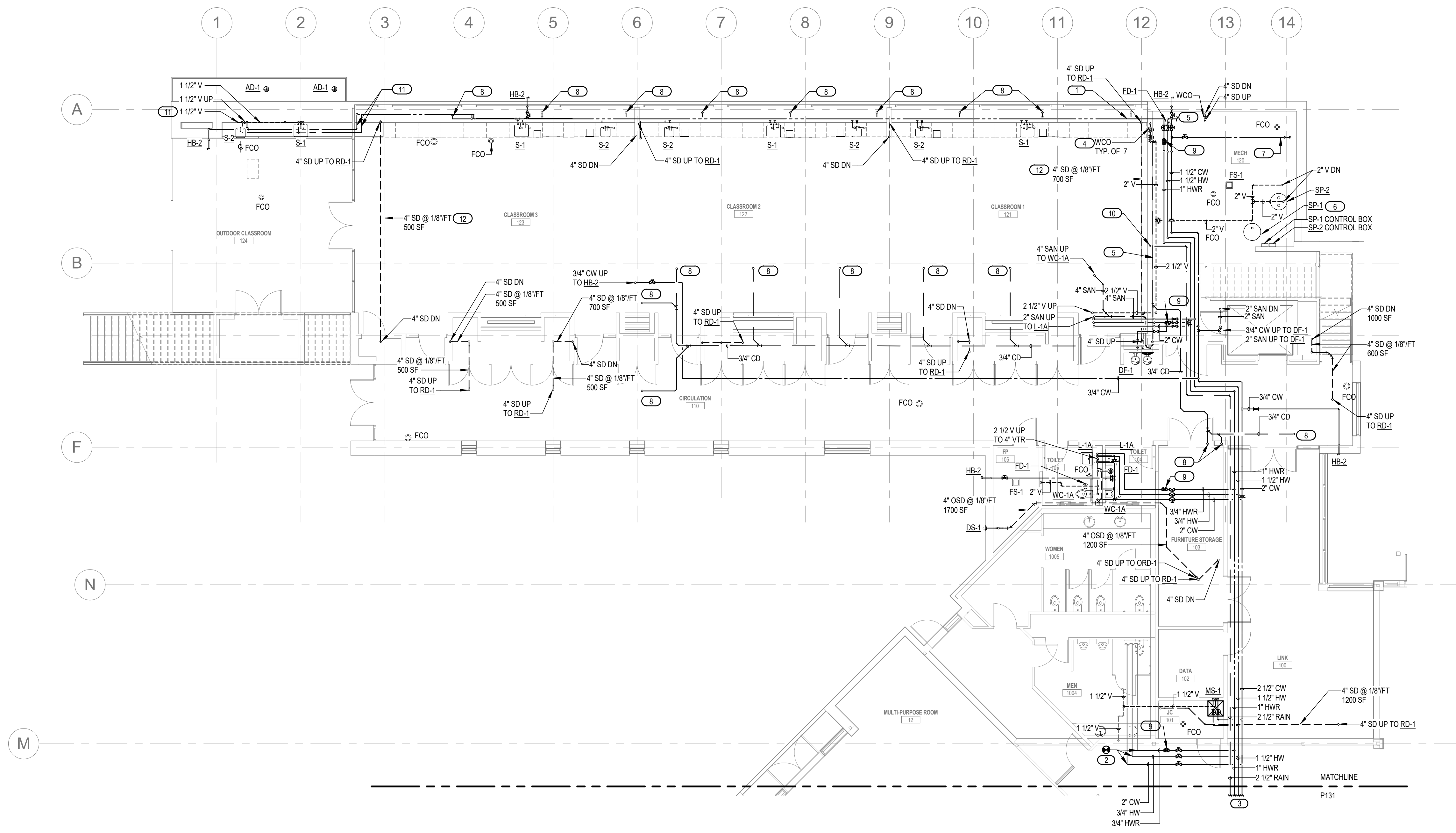
- FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P101.
- WATER CISTERN BELOW NEW LEARNING CENTER. SEE CIVIL PLANS. PLUMBING CONTRACTOR SHALL COORDINATE ALL WORK.
- RADIANT SLAB USED IN NEW LEARNING CENTER AREA. PLUMBING CONTRACTOR SHALL COORDINATE ALL BELOW GRADE WORK.
- ALL BELOW GRADE PIPING SHALL BE HUNG FROM THE FLOOR STRUCTURE.

KEYED NOTES

- CONNECT TO EXIST. 4" SANITARY IN THIS LOCATION. EXIST. SANITARY INVERT IS 40' BFF. CONTRACTOR SHALL FIELD VERIFY PRIOR TO START OF CONSTRUCTION.
- ISLAND VENT PER DETAIL, 1/P301.
- 8" STORM EXITS AT THIS POINT. INVERT ELEVATION IS 58' BFF. PLUMBING CONTRACTOR SHALL PROVIDE PIPE WITHIN 5' 0" FROM THE EXTERIOR OF BUILDING. CONTINUATION BY SITE CONTRACTOR. REFER TO CIVIL PLANS.
- SANITARY SLUMP, SP-2. SEE DETAIL, 7/P301. 4" SAN INLET IE AT 90' BFF. SANITARY OUTLET IE AT 23' BFF. PROVIDE VISUAL OR AUDIBLE ALARM SYSTEM WITH MANUAL RESET.
- STORM SLUMP, SP-1. SEE DETAIL, 6/P301. 4" SD INLET IE AT 90' BFF. SD OUTLET IE AT 42' BFF. PROVIDE VISUAL OR AUDIBLE ALARM SYSTEM WITH MANUAL RESET.
- 3/4" CW LINE, BELOW GRADE. ROUTE TO EXISTING DRINKING FOUNTAIN. PIPE INVERT SHALL BE 24' BFF.
- RAINWATER CISTERN BELOW GRADE IN THIS AREA. REFER TO CIVIL AND STRUCTURAL PLANS. COORDINATE ALL PIPING BELOW GRADE.
- 8" SD FROM EXTERIOR INTO CISTERN SYSTEM. 8" SD INVERT ELEVATION AT 42' BFF. STORM DRAIN SLOPE SHALL BE 1.08%.
- 12" SD FROM CISTERN SYSTEM TO EXTERIOR. 12" SD INVERT ELEVATION AT 48' BFF. STORM DRAIN SLOPE SHALL BE 1.35%. PLUMBING CONTRACTOR SHALL PROVIDE STORM DRAIN PIPE WITHIN 5' 0" FROM EXTERIOR OF BUILDING. COORDINATE WITH SITE/CIVIL CONTRACTOR PRIOR TO START OF CONSTRUCTION.
- STORM MANHOLE PROVIDED BY SITE CONTRACTOR. PLUMBING CONTRACTOR SHALL PROVIDE STORM DRAIN PIPE WITHIN 5' 0" FROM EXTERIOR OF BUILDING. COORDINATE WITH SITE/CIVIL CONTRACTOR PRIOR TO START OF CONSTRUCTION.
- CONTRACTOR SHALL DROP 5" SD TO ROUTE PIPE UNDERNEATH (2) 8" SD.

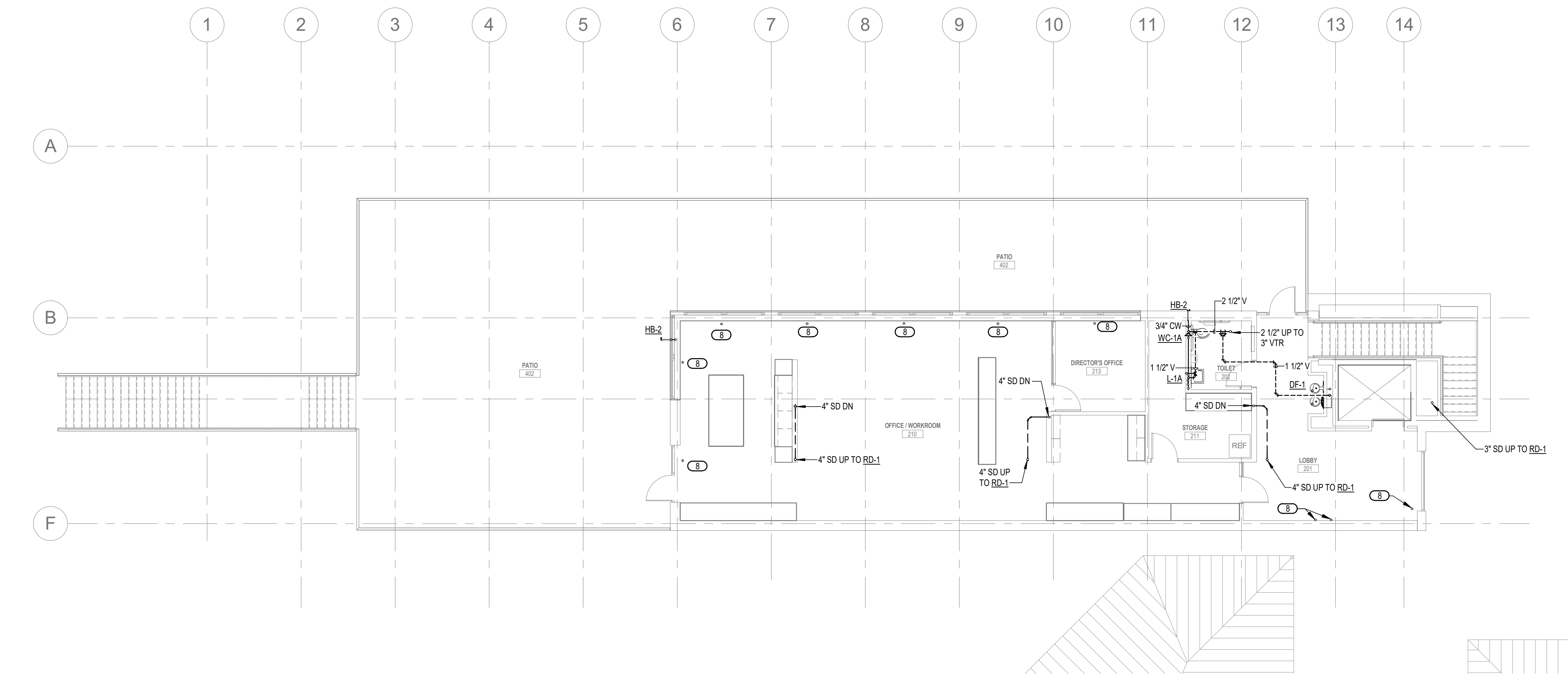


1 LEARNING CENTER PLUMBING PLAN - BELOW GRADE
 1/8" = 1'-0"



1 LEARNING CENTER PLUMBING PLAN LEVEL 1

1/8" = 1'-0"



2 LEARNING CENTER PLUMBING PLAN LEVEL 2

1/8" = 1'-0"

GENERAL NOTES

1. REFER TO MECHANICAL PLANS FOR IN-FLOOR PIPING. COORDINATE ALL BELOW GRADE PIPING.

KEYED NOTES

- 1 ROUTE WATER PIPING IN CABINETS/CHASE. COORDINATE WITH MECHANICAL DUCTWORK. REFER TO ARCHITECTURAL DETAIL, ISOMETRIC AND MECHANICAL SECTION VIEW.
- 2 CONNECT NEW 2" CW, 3/4" HW, AND 3/4" HWR TO EXISTING 2", 3/4" HW, AND 1/2" HWR THIS AREA.
- 3 REFER TO P131 FOR CONTINUATION.
- 4 WALL CLEANOUTS TO BE ON MECHANICAL ROOM SIDE OF WALL. REFER TO RISER DIAGRAM P201 AND DETAIL, UFS01.
- 5 ROUTE 3/4" CD TO FD-1.
- 6 REFER TO DETAIL 6/P301 FOR SP-1 PIPING AND ASSOCIATED COMPONENTS.
- 7 3/4" CW DOWN TIGHT TO WALL AND TO BELOW GRADE. SEE P100 FOR CONTINUATION. AT BASE OF DROP, INCLUDE QUICK DISCONNECT WITH SHUT-OFF VALVE, AND SHUT-OFF IMMEDIATELY UPSTREAM OF QUICK DISCONNECT TO ALLOW FOR COMPRESSED AIR CONNECTION AND WINTER BLOW-OUT OF LINE.
- 8 ROUTE 3/4" CD UP TO RECESSED FAN COIL UNIT.
- 9 HWR BALANCE VALVE SET TO 0.5 GPM. INSTALL ACCESSIBLE.
- 10 2 1/2" RAINWATER PIPE UP FROM OSTERN SUMP PUMP, BELOW CONTRACTOR SHALL CONNECT TO PUMPS (VALVING BY OTHERS), PENETRATE FLOOR WITH LINKSEAL, AND ROUTE AS SHOWN.
- 11 3/4" CW AND 3/4" HW OUT THROUGH EXTERIOR WALL, IN CABINETS, INTERIOR, TO EXTERIOR SINK STRUCTURE. AT EXIT, INCLUDE QUICK DISCONNECT WITH SHUT-OFF VALVE, AND SHUT-OFF IMMEDIATELY UPSTREAM OF QUICK DISCONNECT TO ALLOW FOR COMPRESSED AIR CONNECTION AND WINTER BLOW-OUT OF LINE.
- 12 OUTDOOR CLASSROOM VENT SHALL BE COPPER. TERMINATE VENT 12" BELOW DECK. DO NOT PENETRATE DECK/ROOF.
- 13 ROUTE PIPING BETWEEN GLUE LAM.

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

Civil Engineer
Vierbicher Associates, Inc.

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

Landscape Architect
Ken Saiki Design, Inc.

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

Structural Engineer, Technology and AV
IMEG Corp.

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

MEP Engineer
MEP Associates, LLC

850 Blue Garden Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

Fire Protection Engineer and Code Consultant
Summit Fire Consulting

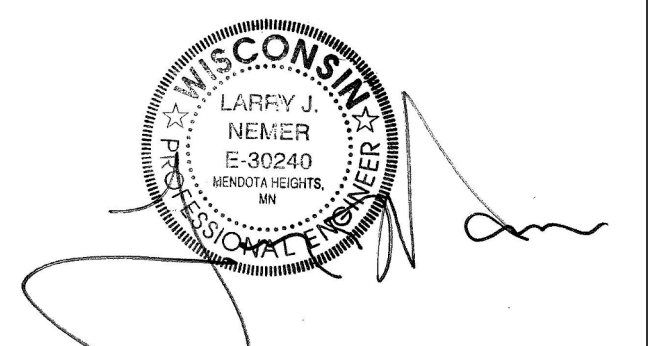
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St. Paul, MN 55103
651.251.1880 tel

Greenhouse Design
Rough Brothers, Inc.

5513 Vine Street
Cincinnati, OH 45217
513.242.0310 tel

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

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ENGINEER SEAL



Signature:
Print Names: Larry Nemer
Date: JUNE 4, 2018 License No.: E-30240

MARK	DATE	DESCRIPTION
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	12.08.2017	DD PRICING SET
	01.10.2018	DESIGN DEVELOPMENT SUBMISSION
	01.17.2018	UDC SUBMISSION
	03.31.2018	75% CD PRICING ISSUE
	05.04.2018	90% CONSTRUCTION DOCUMENTS
	06.01.2018	BID ISSUE
	06.04.2018	PERMIT ISSUE

PROJECT NO. 2017016

PROJECT PHASE BID DOCUMENTS

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**LEARNING CENTER
PLUMBING PLAN -
ABOVE GRADE**

**EXHIBIT K
P101**

Civil Engineer
Vierbicher Associates, Inc.

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

Landscape Architect
Ken Saiki Design, Inc.

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

Structural Engineer, Technology and AV
IMEG Corp.

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

MEP Engineer
MEP Associates, LLC

860 Blue Garden Road, Suite 175
 Elgin, WI 53121
 651.379.9120 tel

Fire Protection Engineer and Code Consultant
Summit Fire Consulting

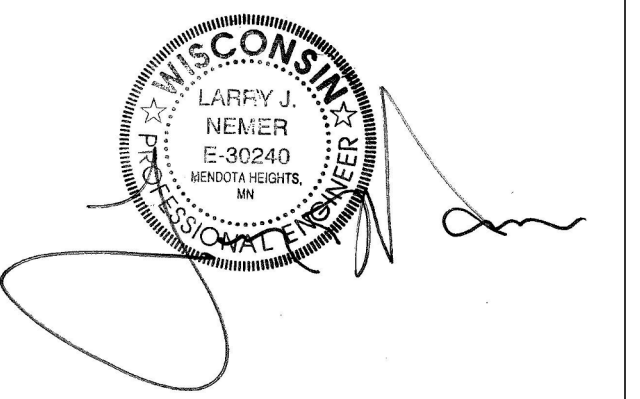
575 Minnehaha Ave West
 St. Paul, MN 55103
 651.251.1880 tel

Greenhouse Design
Rough Brothers, Inc.

5513 Vine Street
 Cincinnati, OH 45217
 513.242.0310 tel

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 3330 Atwood Avenue
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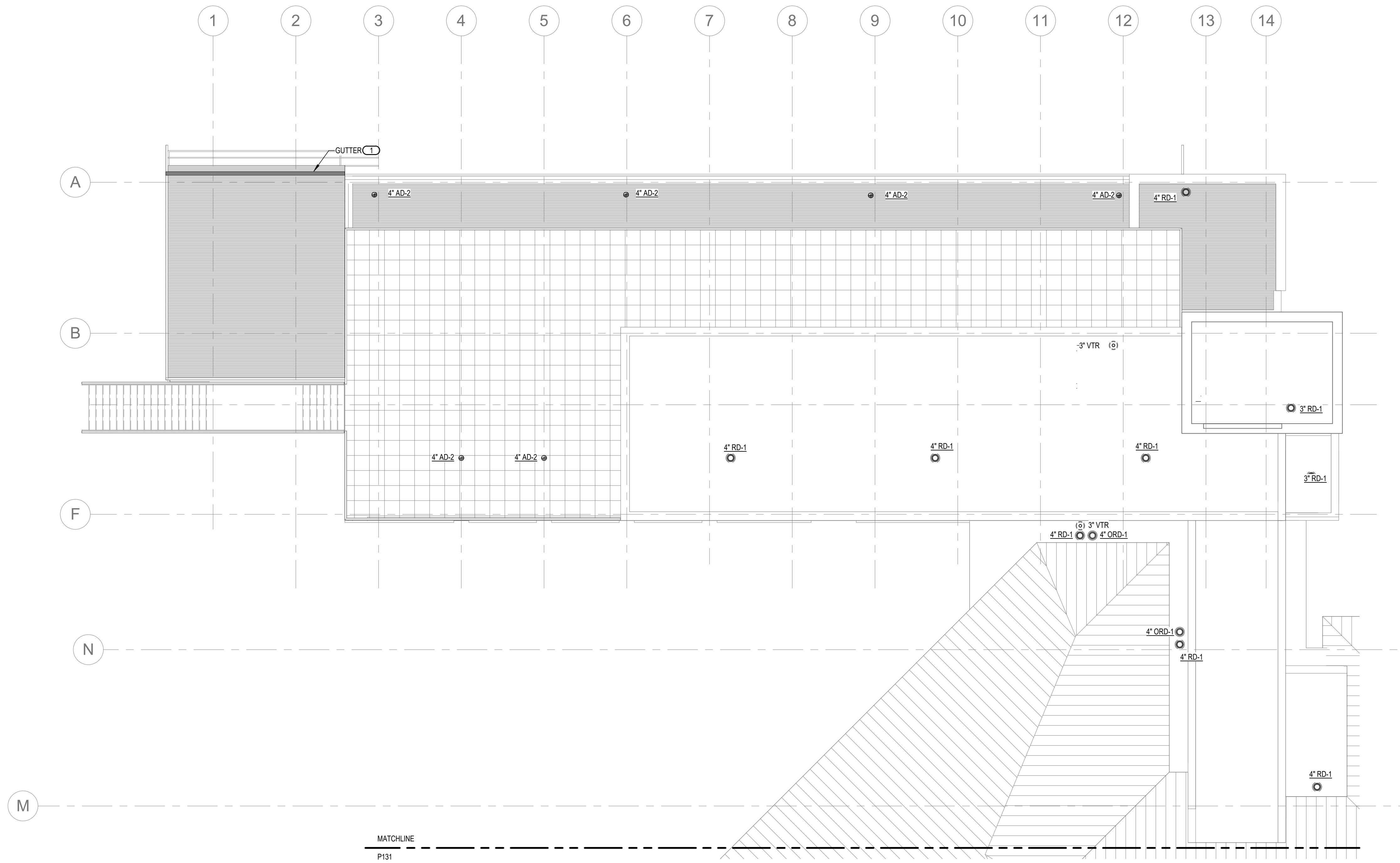
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**LEARNING CENTER
 PLUMBING ROOF
 PLAN**

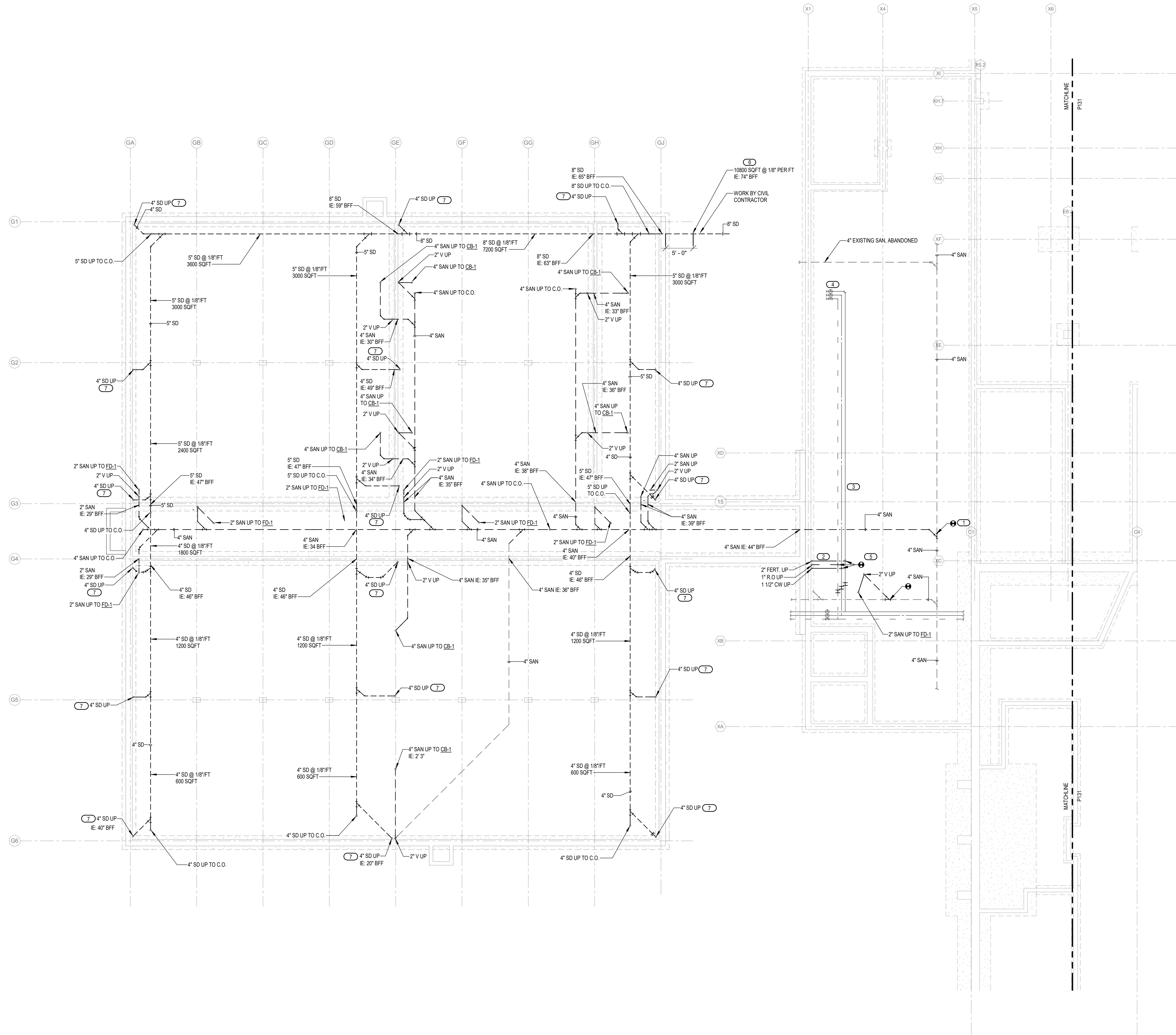
**EXHIBIT K
 P102**



GENERAL NOTES
 1. REFER TO P100 FOR GENERAL NOTES, LEGENDS AND ABBREVIATION.
 2. ALL OVERFLOW ROOF DRAINAGE IS BY SCUPPER/GUTTER. REFER TO ARCHITECTURAL PLANS.

KEYED NOTES
 ○ GUTTER PROVIDED BY ARCHITECT. REFER TO ARCHITECTURAL PLANS.

1 LEARNING CENTER PLUMBING ROOF PLAN
 1/8" = 1'-0"



GENERAL NOTES

A. FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P101.

B. RADIANT SLAB USED IN NEW GREENHOUSE AREA. PLUMBING CONTRACTOR SHALL COORDINATE ALL BELOW GRADE WORK.

C. ALL ABOVE GRADE PIPE PENETRATION SHALL BE THROUGH ALUMINUM PENETRATION PANEL.

D. ALL HOSE BE SHALL BE PROVIDED WITH LABELED TAGS, PER SPECIFICATIONS.

KEYED NOTES

1. CONNECT TO EXIST. 4\"/>

1 GREENHOUSE PLUMBING PLAN - BELOW GRADE

1/8" = 1'-0"

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

Civil Engineer
Vierbicher Associates, Inc.
 999 Fournier Drive, Suite 201
 Madison, WI 53717
 608.828.0532 tel

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

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

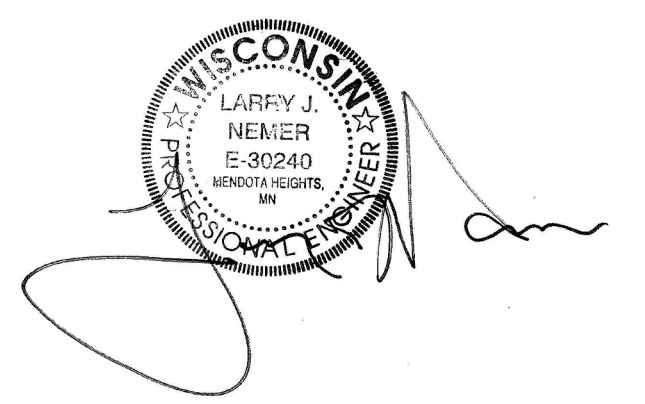
MEP Engineer
MEP Associates, LLC
 860 Blue Garden Road, Suite 175
 Elgin, IL 60121
 651.379.9120 tel

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

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

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

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 Date: JUNE 4, 2018 License No.: E-30240

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	05.04.2018	90% CONSTRUCTION DOCUMENTS
	06.01.2018	BID ISSUE
	06.04.2018	PERMIT ISSUE

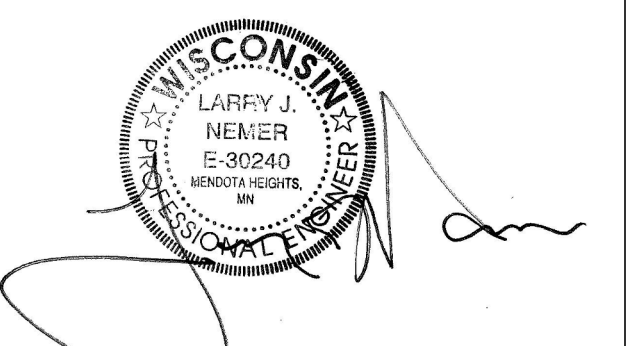
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**GREENHOUSE
 PLUMBING PLAN -
 BELOW GRADE**

**EXHIBIT K
 P111**

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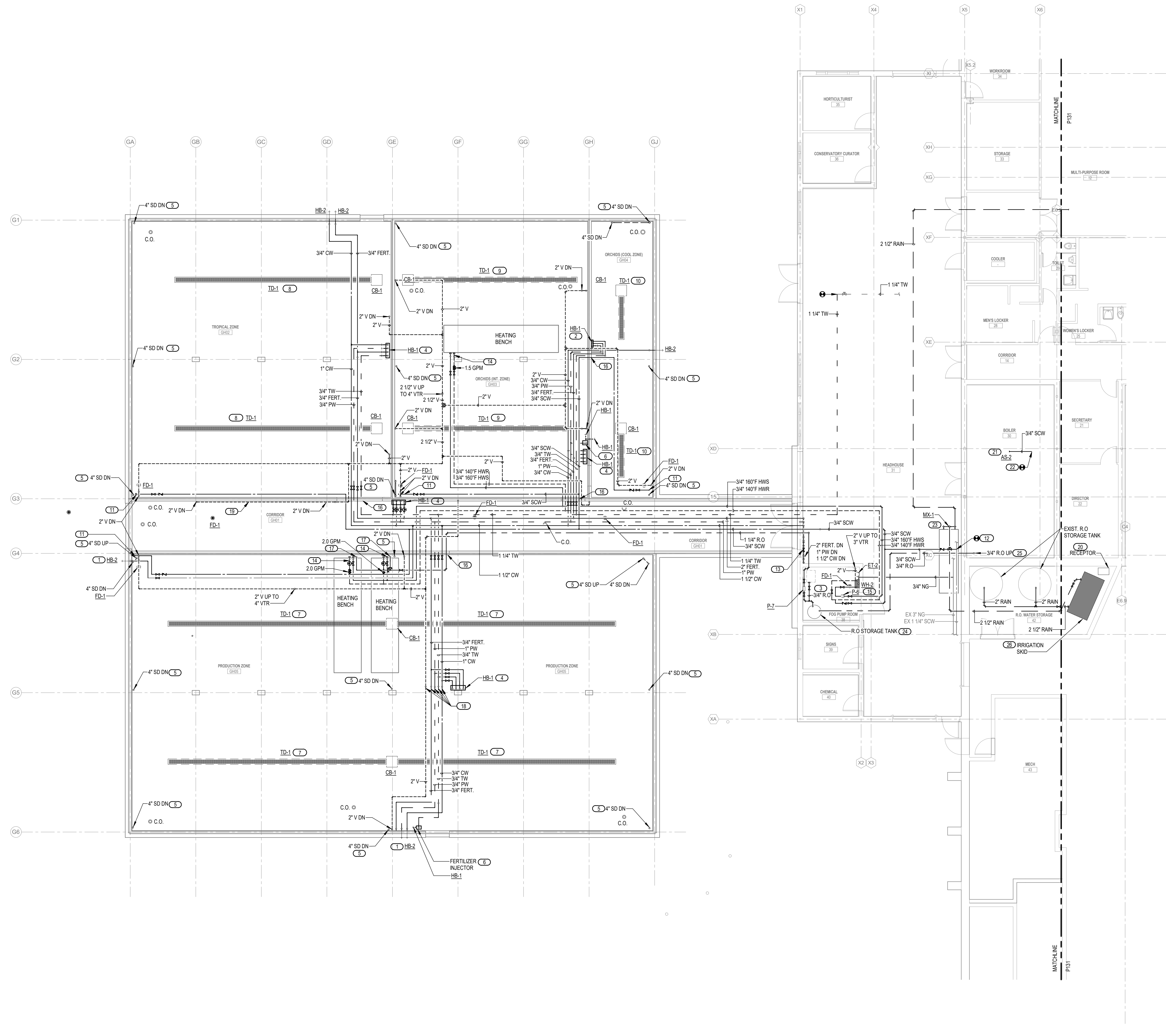
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GREENHOUSE PLUMBING PLAN - ABOVE GRADE

**EXHIBIT K
 P112**

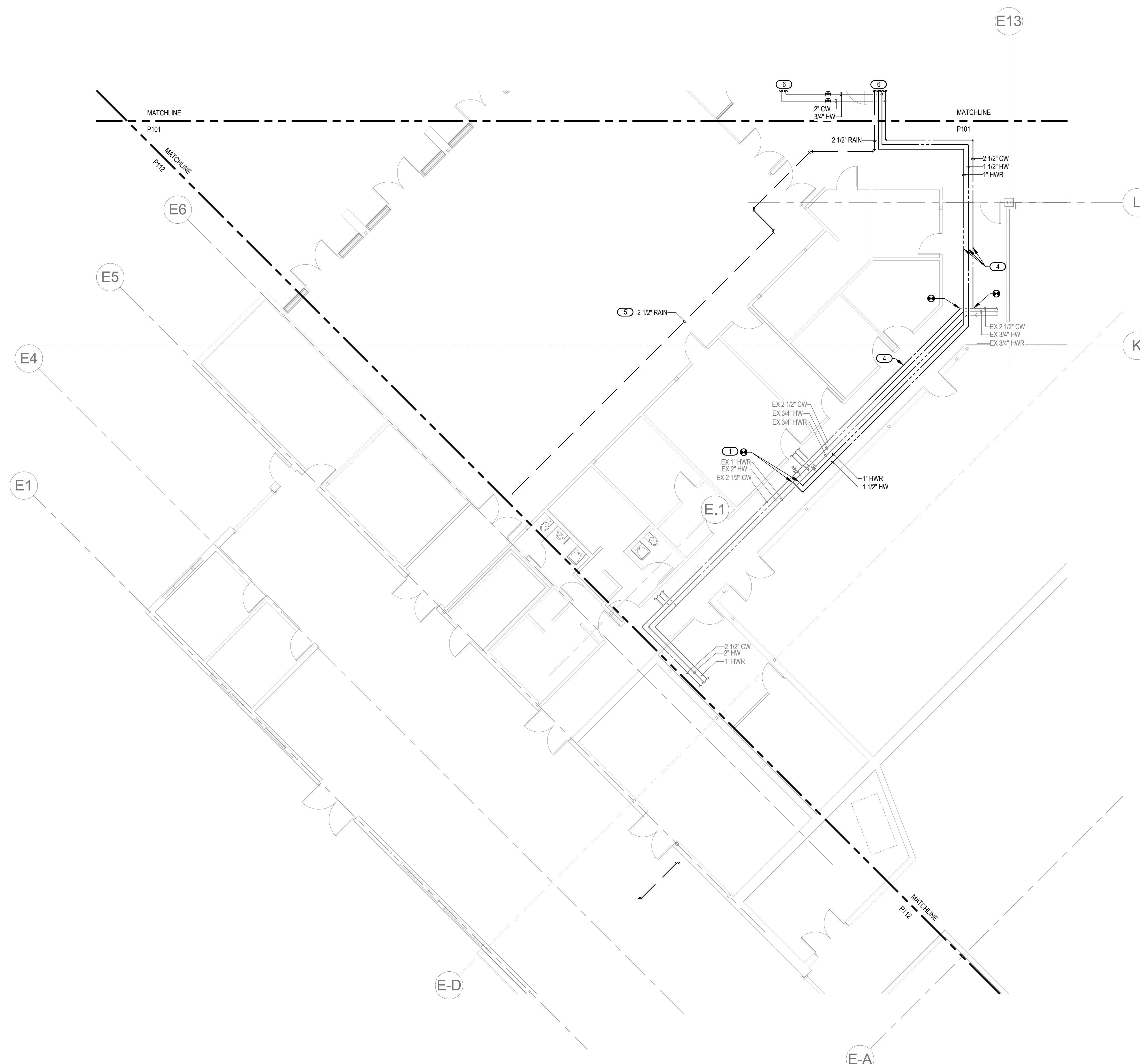


- GENERAL NOTES**
- FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P001.
 - RADIANT SLAB USED IN NEW GREENHOUSE AREA. PLUMBING CONTRACTOR SHALL COORDINATE ALL BELOW GRADE WORK.
 - ALL ABOVE GRADE PIPE PENETRATION SHALL BE THROUGH ALUMINUM PENETRATION PANEL.
 - ALL HOSE BE SHALL BE PROVIDED WITH LABELED TAGS, PER SPECIFICATIONS.

- KEYED NOTES**
- PLUMBING CONTRACTOR SHALL PROVIDE HB-2 (TOTAL OF 3).
 - CONTRACTOR SHALL PROVIDE INTERIOR HOSE BIBB, HB-1, FOR FERTILIZER, TEMPERED WATER AND R.O LINE (TOTAL OF 3).
 - PLUMBING CONTRACTOR SHALL PROVIDE VALVED AND CAPPED 3/4" R.O WATER.
 - CONTRACTOR SHALL PROVIDE INTERIOR HOSE BIBB, HB-1, FOR COLD WATER, TEMPERED WATER, FERTILIZER AND R.O LINE (TOTAL OF 4).
 - PLUMBING CONTRACTOR SHALL CONNECT TO ROOF DRAIN, ROOF DRAIN BY GREENHOUSE CONTRACTOR. REFER TO DETAIL 5/P301.
 - FERTILIZER INJECTION SYSTEM, PLUMBING CONTRACTOR SHALL ROUTE INDICATED LINE DOWN TO 3' 0" AFF. INJECTOR ASSEMBLY IS FURNISHED BY GREENHOUSE CONTRACTOR. PLUMBING CONTRACTOR SHALL INSTALL ON WALL, PER DETAIL. PLUMBING CONTRACTOR SHALL PROVIDE BACKFLOW PREVENTER UPSTREAM OF DOSATRON AND HOSE BIBB DOWNSTREAM OF DOSATRON. SEE DETAIL 4/P301.
 - TRENCH DRAIN SHALL BE 40' 0" LONG.
 - TRENCH DRAIN SHALL BE 36' 0" LONG.
 - TRENCH DRAIN SHALL BE 30' 0" LONG.
 - TRENCH DRAIN SHALL BE 6' 0" LONG.
 - PROVIDE VALVED AND CAPPED 3/4" SOFT COLD WATER FOR CONNECTION TO EVAPORATIVE COOLER. PLUMBING CONTRACTOR SHALL PROVIDE BACKFLOW PREVENTER.
 - CONNECT TO 1 1/4" SCW IN THIS AREA. PROVIDE BACK FROM PREVENTER.
 - PROVIDE SHUT-OFF VALVES ON WALL. REFER TO RISER DIAGRAM, P201. PIPING SHALL PENETRATE THROUGH ALUMINUM PENETRATION PANEL.
 - DROP HWS/R DOWN ALONG WALL. TERMINATE WITH VALVE AND TREADED CONNECTION. PROVIDE FLEXIBLE CONNECTOR 18" LONG WITH TREADED ENDS. AT TABLE, CONNECT TO TABLE HEATING SYSTEM. BALANCE TO INDICATED GPM. BENCH HEATING SYSTEM, 3-WAY VALVE AND OTHER ASSOCIATED COMPONENTS ARE PROVIDED BY GREENHOUSE CONTRACTOR.
 - REFER TO DETAIL 2/P301 FOR WH-2 PIPING AND ASSOCIATED COMPONENTS. PROVIDE CONCENTRIC VENT.
 - ALL PIPES IN THIS AREA SHALL PENETRATE THROUGH ALUMINUM PANEL.
 - DROP R.O WATER DOWN ALONG WALL. TERMINATE WITH VALVE AND TREADED CONNECTION. PROVIDE FLEXIBLE CONNECTOR 18" LONG WITH TREADED ENDS. AT TABLE, CONNECT TO BENCHTOP IRRIGATION SYSTEM.
 - INDICATED LINES SHALL BE BELOW BLACKOUT CURTAIN. COORDINATE WORK WITH GREENHOUSE CONTRACTOR.
 - VENT SHALL RUN AT KNEE HEIGHT. VENT SHALL NOT OBSTRUCT CORRIDOR SCREEN.
 - PROVIDE 4" PIPE CONNECTION TO IRRIGATION SKID IN THIS LOCATION. ROUTE TO, AND ELBOW DOWN INTO, CONCRETE RECEPTOR. RECEPTOR SHALL BE CAST CONCRETE, BY PLUMBING CONTRACTOR, 24"x24"x6" HIGH, WITH 4" OUTLET, ROUTED AS SHOWN, FLAT, ALONG FLOOR.
 - ROUTE 3/4" DOMESTIC SOFT COLD WATER TO CHILLED WATER FILL AT AIR SEPARATOR. SEE MECHANICAL. PROVIDE SHUT-OFF AND BACKFLOW PREVENTER TYPE ASSE 1013 AS WATTS 009.
 - CONNECT NEW 3/4" DOMESTIC SOFT COLD WATER TO EXISTING 3/4" DOMESTIC SOFT COLD WATER FILL LINE IN AREA OF EXISTING BOILER EXPANSION TANKS.
 - CONNECT 2 1/2" RAINWATER TO EXISTING CAPPED (FOR FUTURE) HEAT EXCHANGER, HX-3, AND SOLAR STORAGE TANK. BRING 2 1/2" RAINWATER OUT, AND ROUTE AS SHOWN.
 - R.O WATER STORAGE TANK PROVIDED BY GREENHOUSE CONTRACTOR.
 - CONNECT 3/4" NEW R.O WATER TO EXISTING R.O SYSTEM. EXISTING R.O SYSTEM LOCATED IN MEZZANINE.
 - IRRIGATION SKID PROVIDED BY IRRIGATION CONTRACTOR. PLUMBING CONTRACTOR SHALL PROVIDE VALVED AND CAPPED 2 1/2" RAIN WATER AS SHOWN ON PLAN.

1 GREENHOUSE PLUMBING PLAN - ABOVE GRADE
 1/8" = 1'-0"

Drawing: 2017-06-08-MSR - Greenhouse Plumbing Plan - Above Grade - P112
 C:\Users\larry.nemer\OneDrive\Documents\2017-06-08-MSR - Greenhouse Plumbing Plan - Above Grade - P112.dwg
 10/25/2017 10:00 AM



GENERAL NOTES
 A. FOR PLUMBING NOTES, LEGENDS AND ABBREVIATION, REFER TO P101.

- KEYED NOTES**
1. CONNECT NEW 1 1/2" HW AND 1" HWR TO EXIST. IN THIS AREA.
 2. CONNECT NEW 2" CW TO EXISTING 2 1/2" CW IN THIS AREA.
 3. RECONNECT EXISTING 2 1/2" CW, 3/4" HW, AND 3/4" HWR IN THIS AREA.
 4. NEW PIPING TO BE INSTALLED PRIOR TO DEMOLITION TO REDUCE DOWNTIME. SEE DEMOLITION PLAN.
 5. NEW PIPING TO BE INSTALLED IN CEILING/CATWALK AREA ABOVE COMMONS. COORDINATE WITH OWNER NEEDS FOR ACCESS IN THIS AREA. COORDINATE WITH MECHANICAL CONTRACTOR FOR ADDITIONAL PIPING IN THIS AREA.
 6. REFER TO P101 FOR CONTINUATION.

1 COMMONS AREA PLUMBING PLAN

1/8" = 1'-0"

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

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

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

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

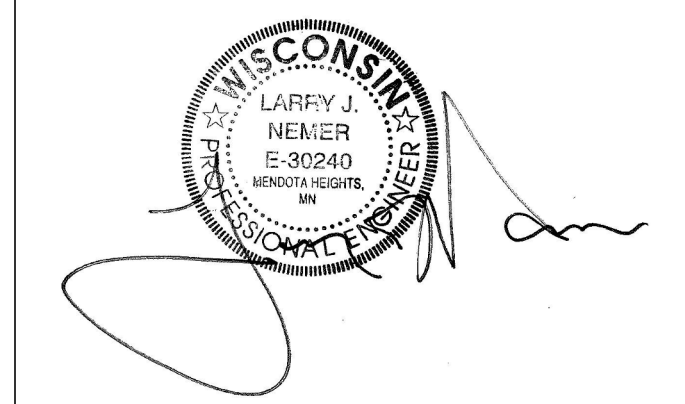
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MEP Associates, LLC
 860 Blue Garden Road, Suite 175
 Elgin, MN 55121
 651.379.9120 tel

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

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

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

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 ENGINEER SEAL



Signature: _____
 Print Names: Larry Nemer

Date: JUNE 4, 2018 License No. E-30240

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**COMMONS AREA
 PLUMBING PLAN**

**EXHIBIT K
 P131**

Civil Engineer
Vierbicher Associates, Inc.

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

Landscape Architect
Ken Saiki Design, Inc.

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

Structural Engineer, Technology and AV
IMEG Corp.

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

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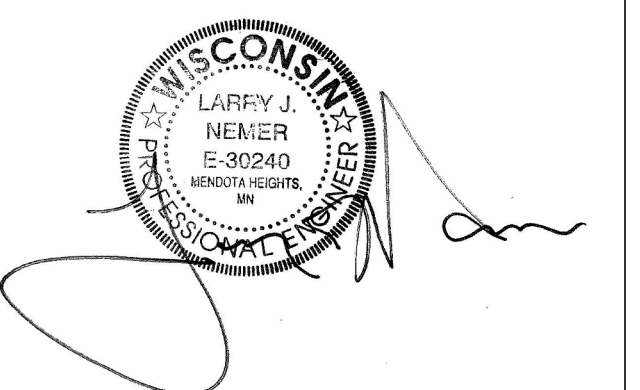
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 651.251.1880 tel

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Rough Brothers, Inc.

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 Cincinnati, OH 45217
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 Expansion Phase 1**
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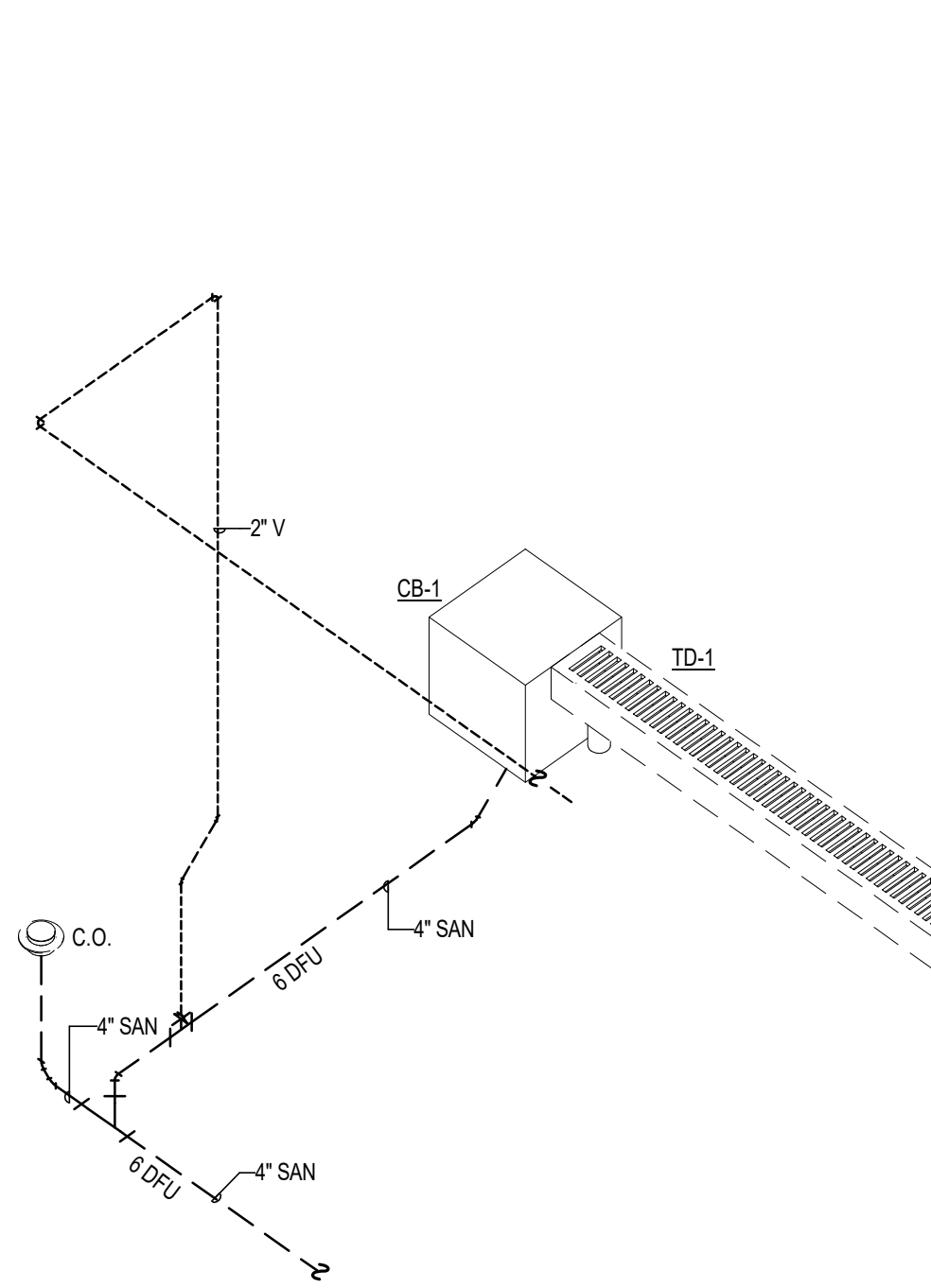
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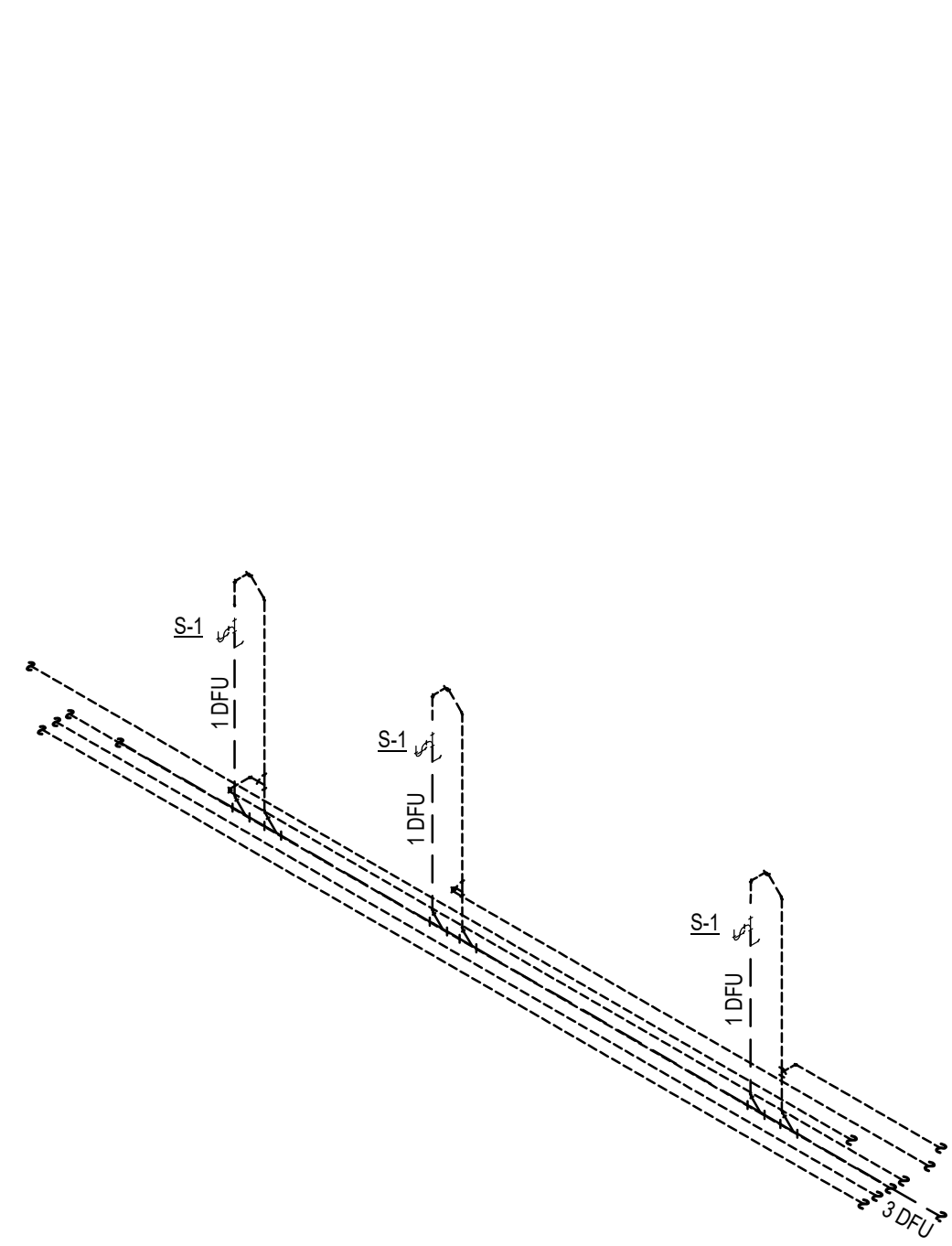
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PLUMBING RISER DIAGRAM

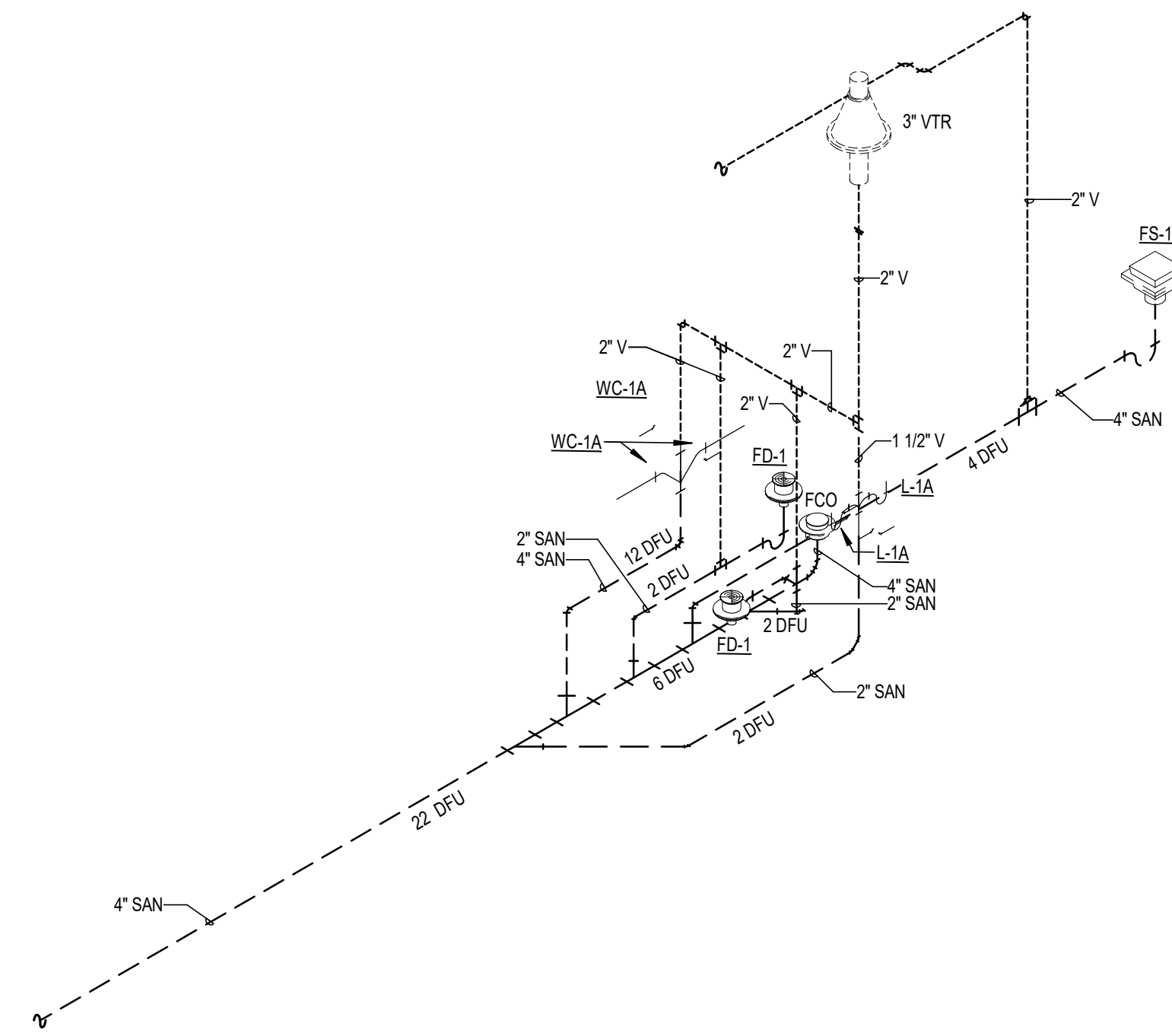
**EXHIBIT K
 P201**



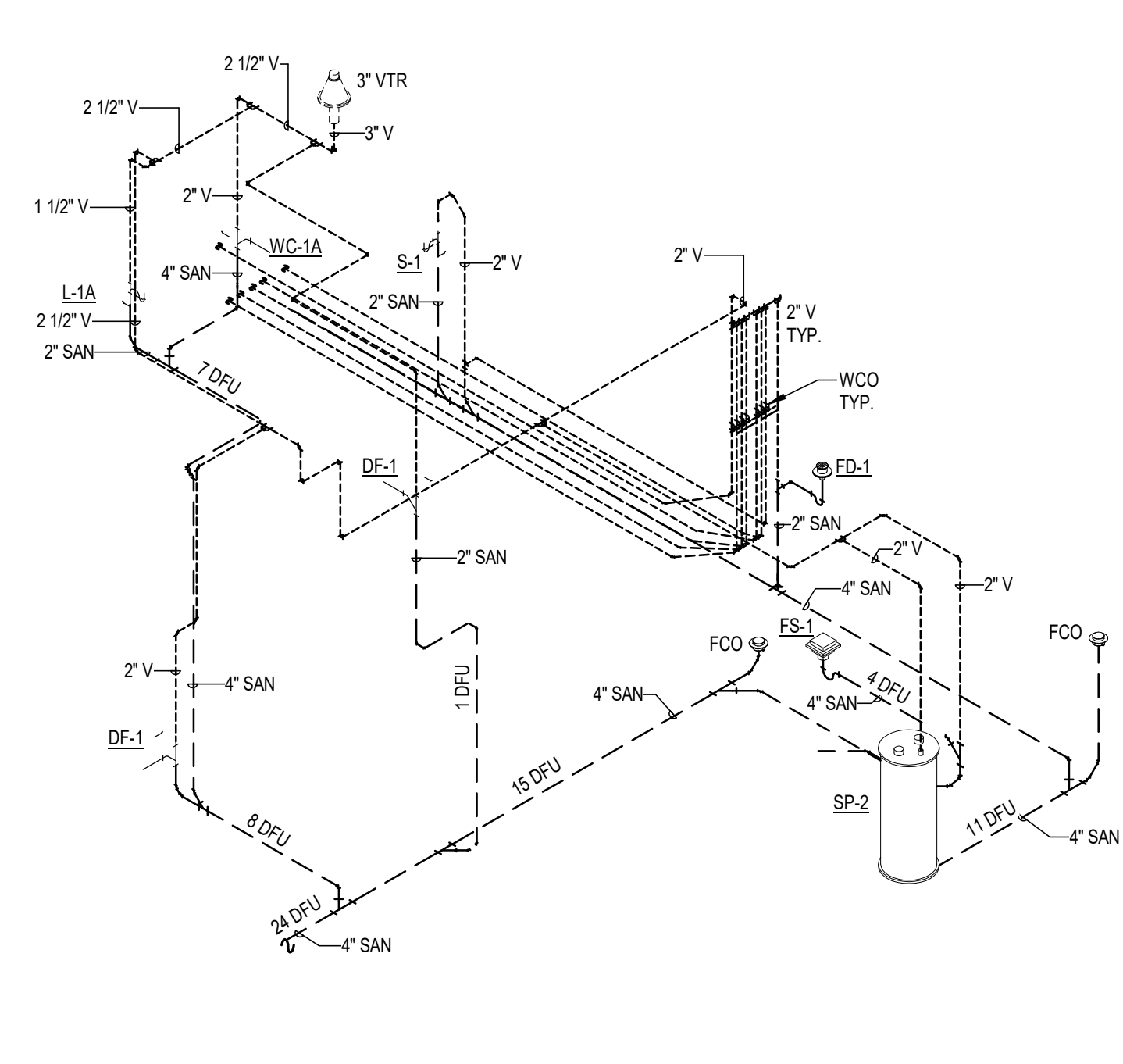
4 TYPICAL TRENCH DRAIN SANITARY RISER



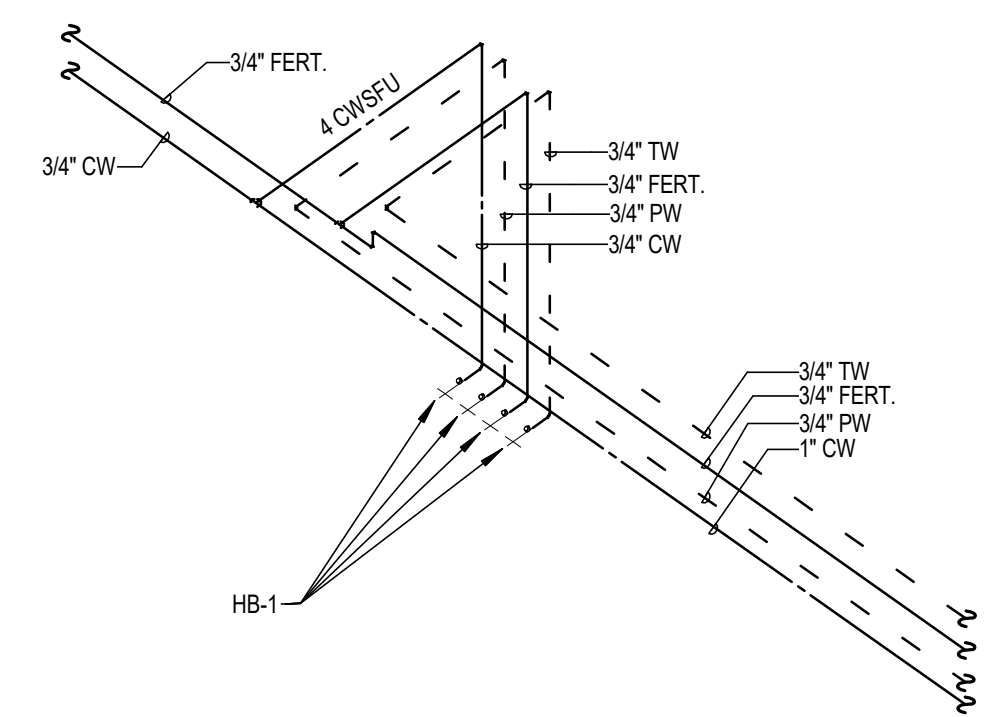
3 TYPICAL S-1 SANITARY RISER



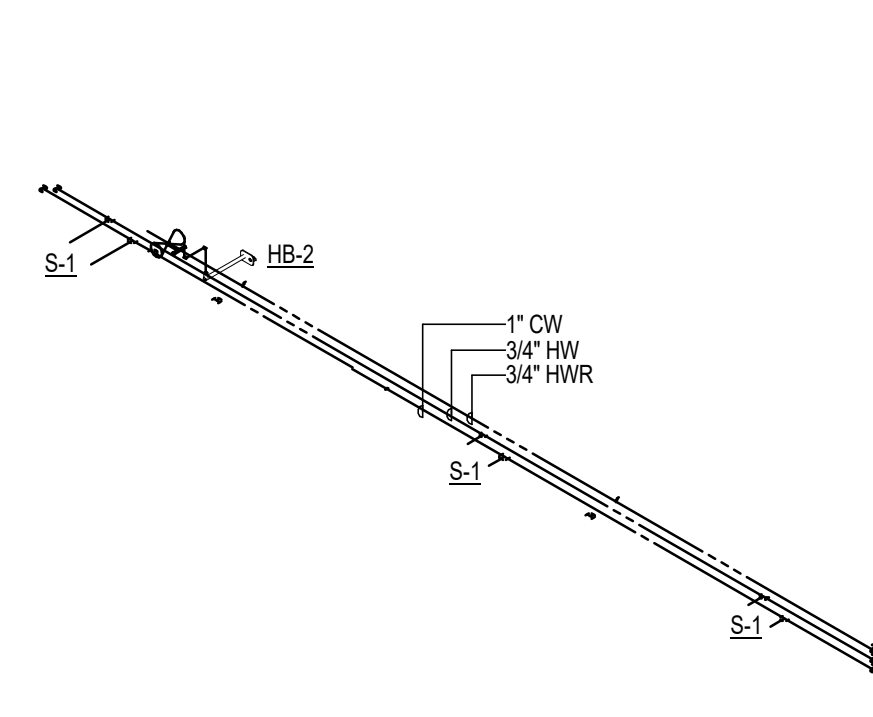
2 TOILET 386 & 387 SANITARY RISER



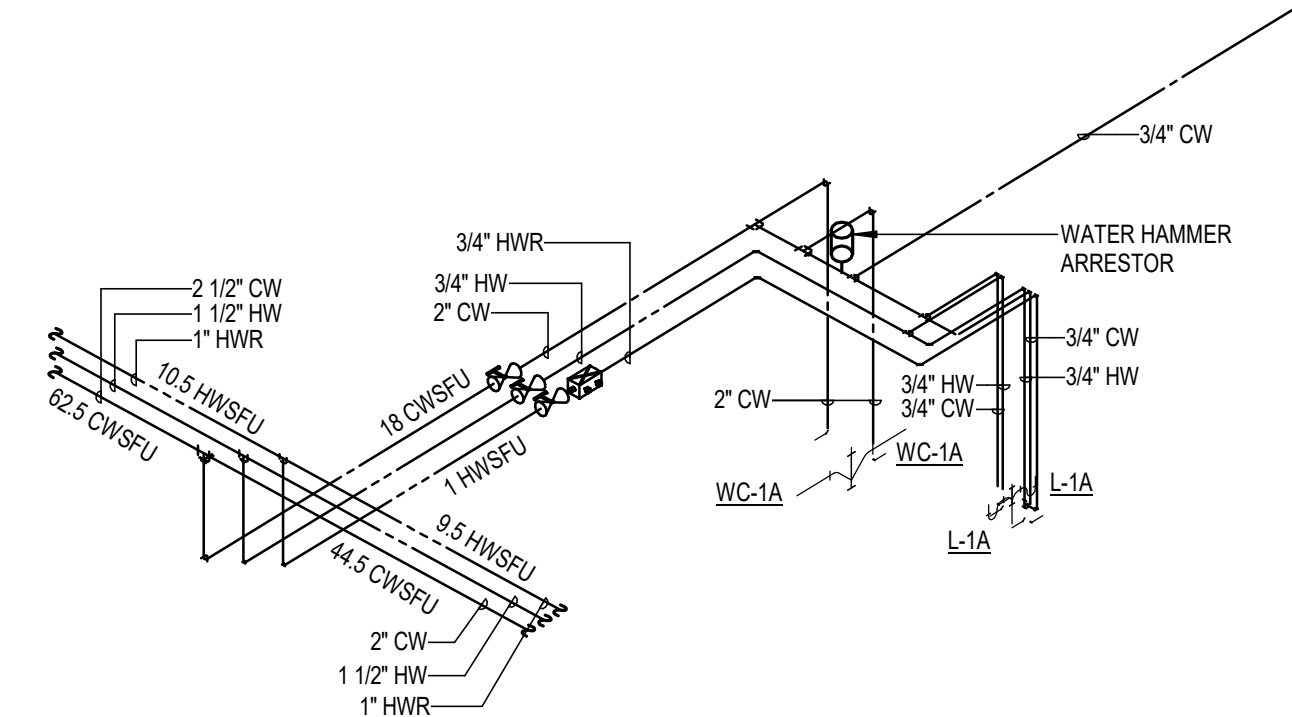
1 MECH ROOM & TOILET 401 SANITARY RISER



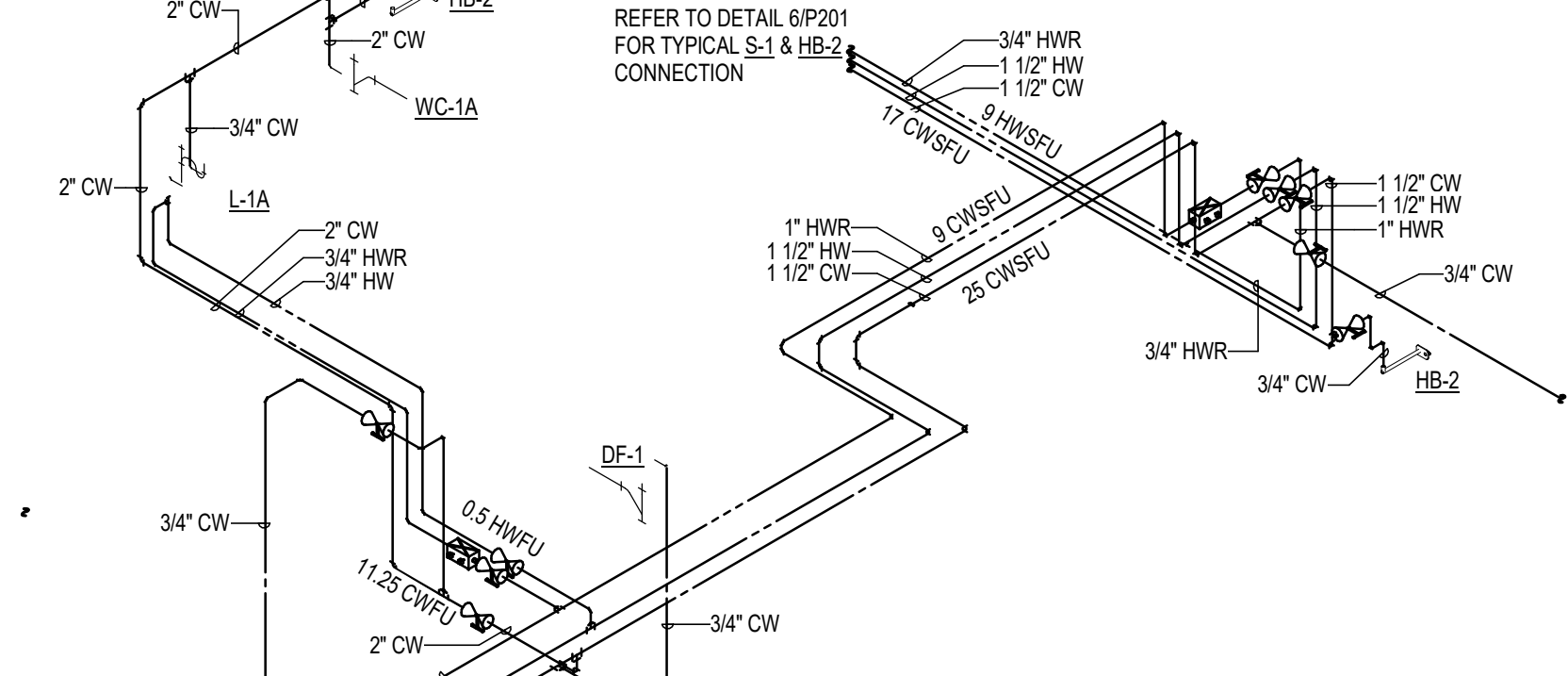
8 TYPICAL HOSE BIBB WATER SUPPLY RISER



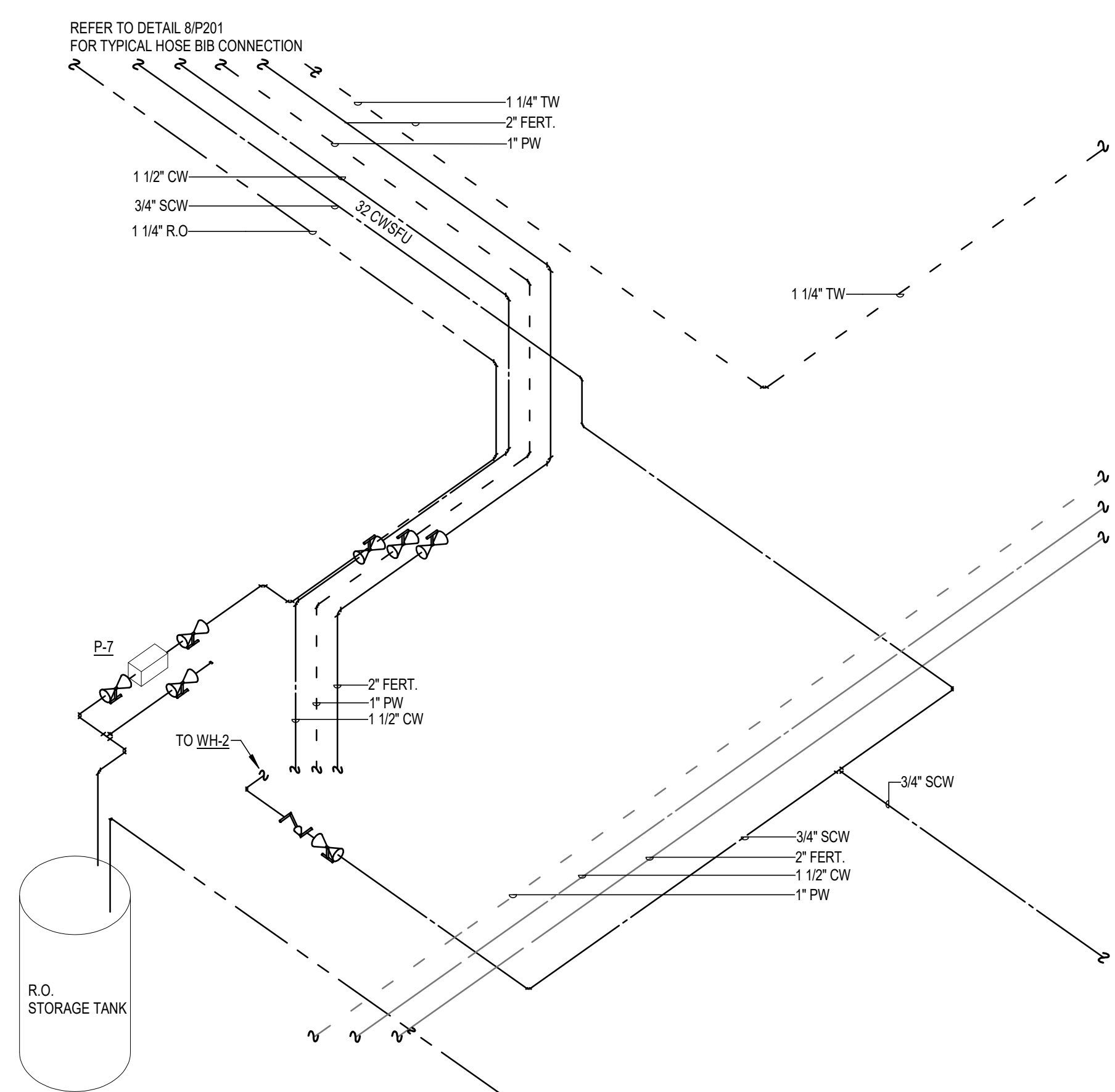
7 TYPICAL S-1 SUPPLY WATER RISER



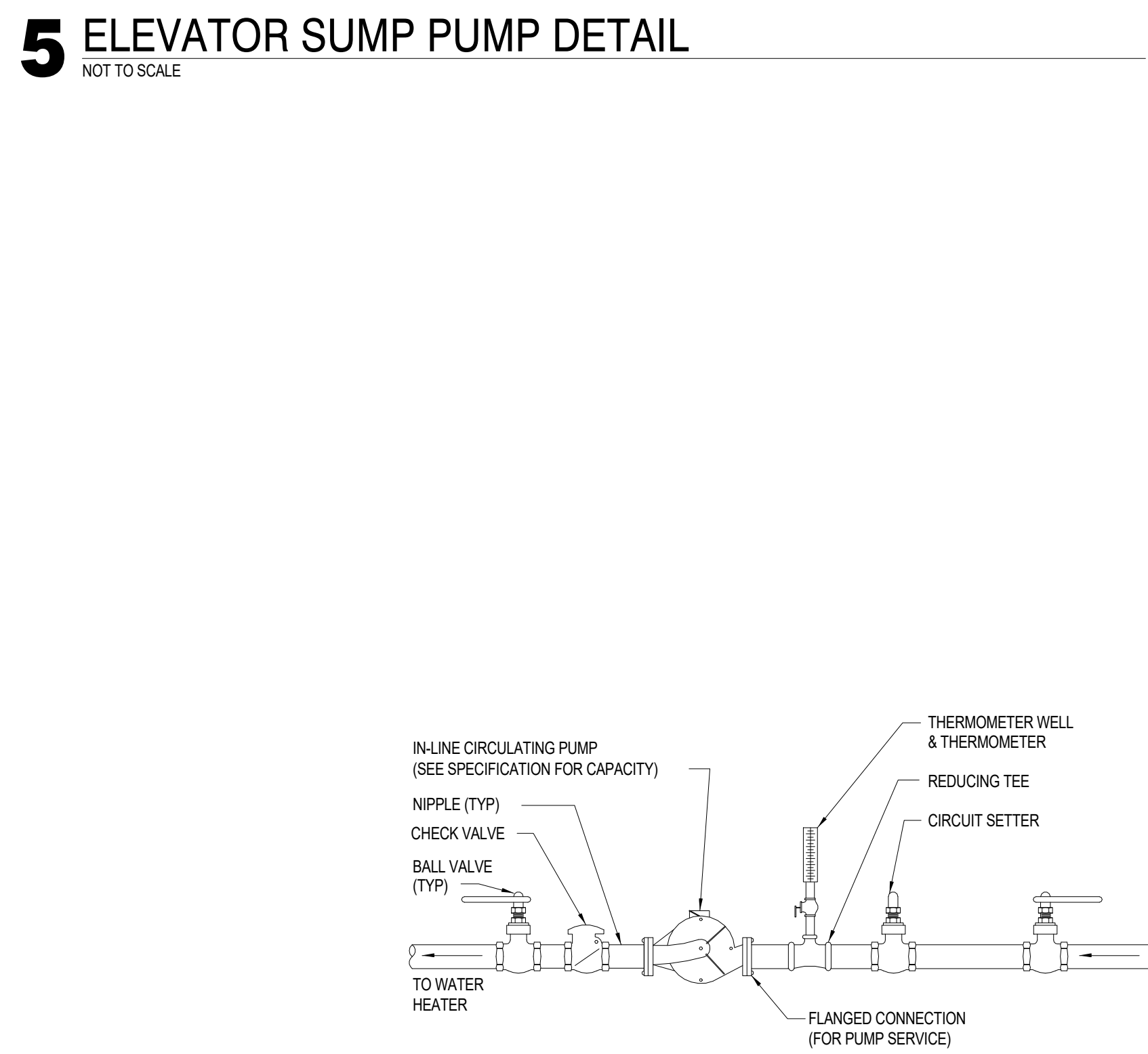
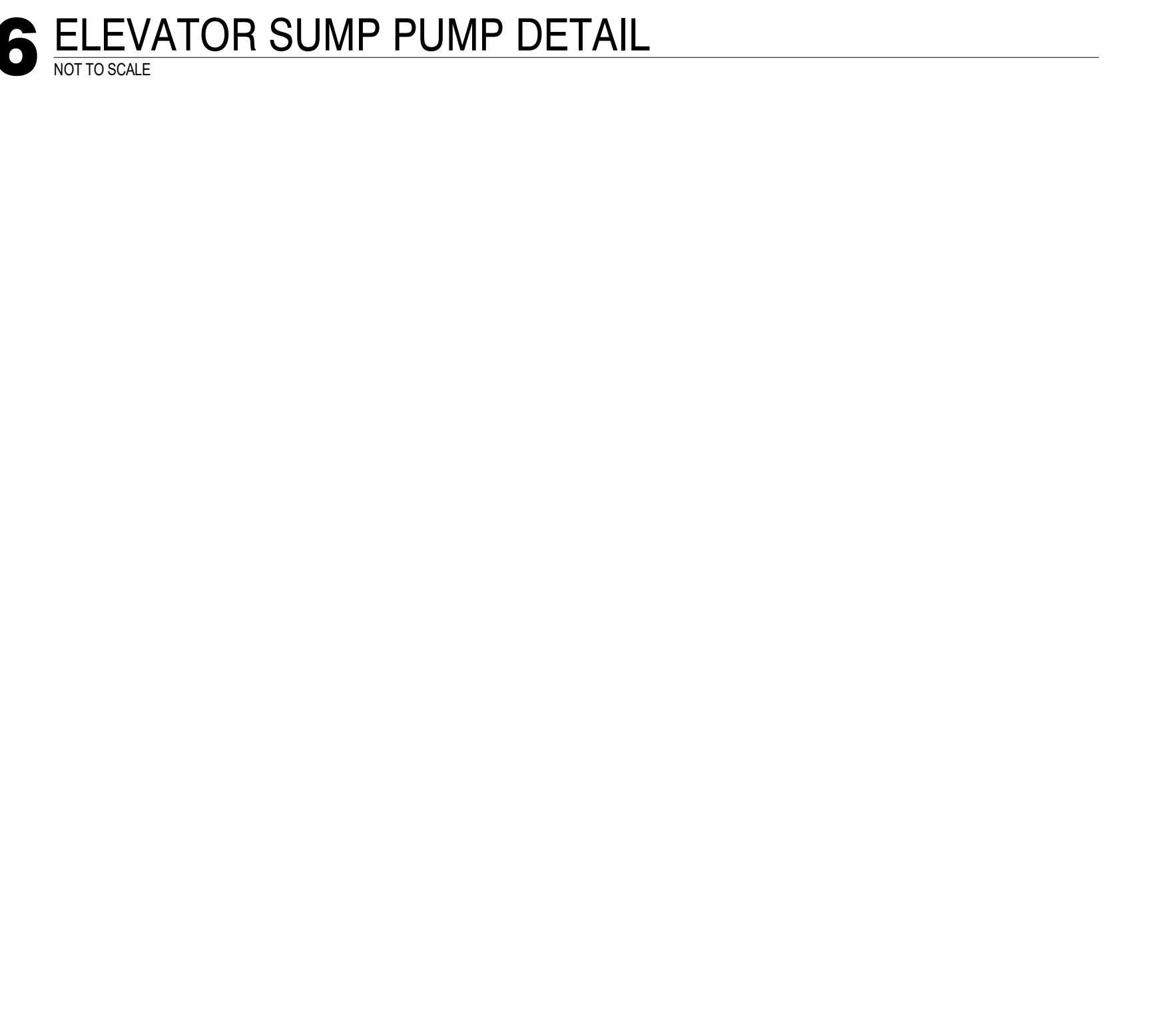
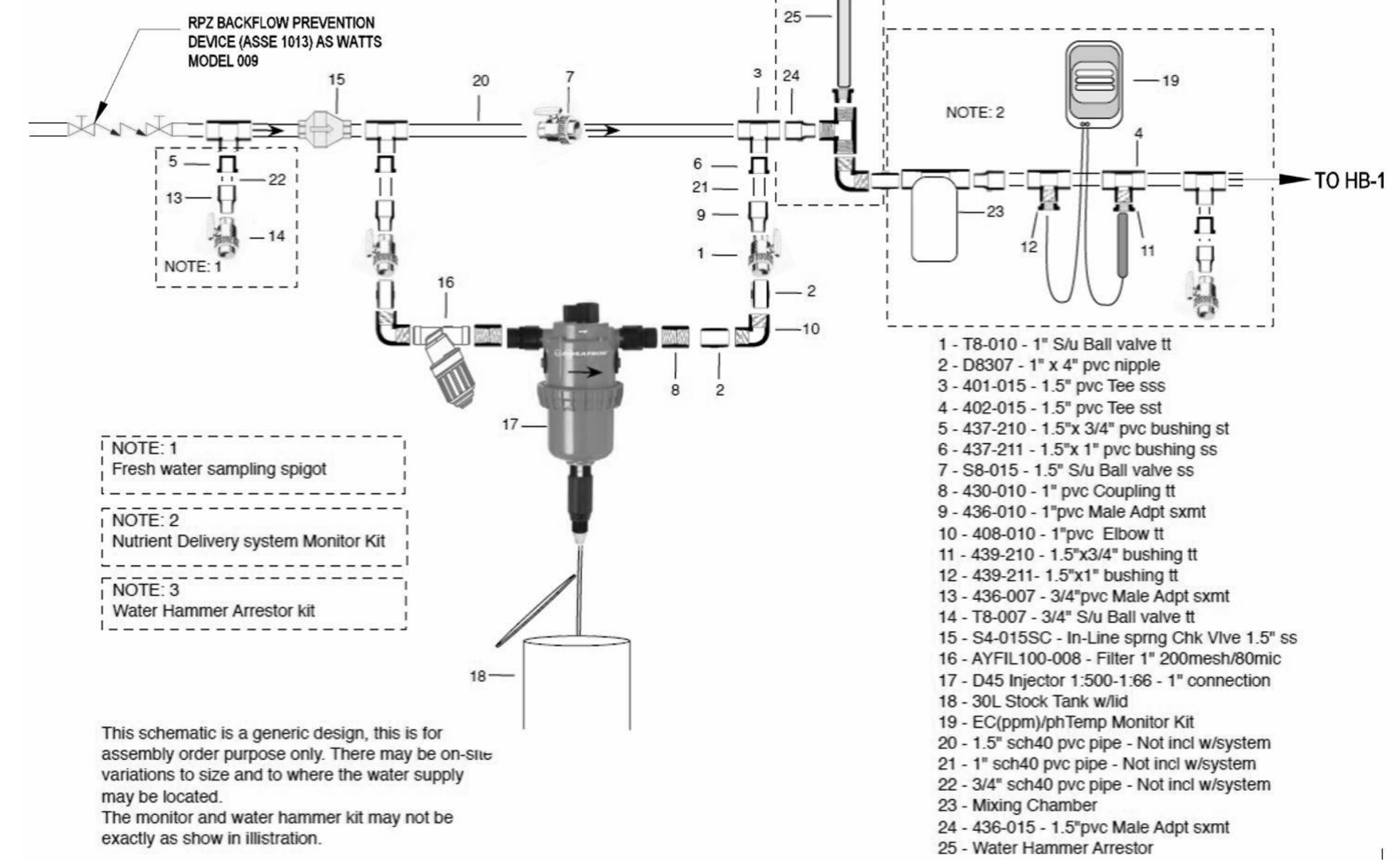
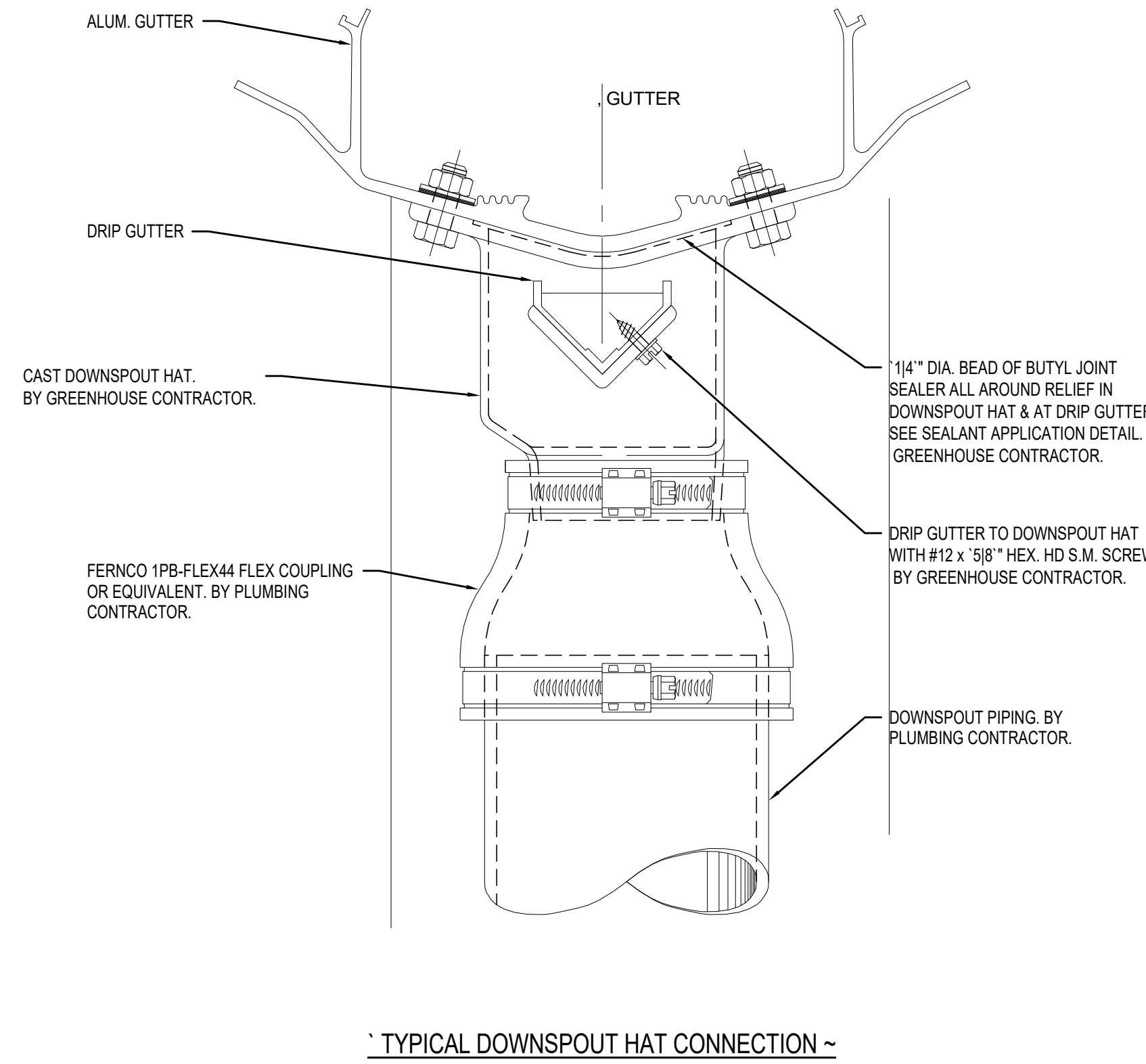
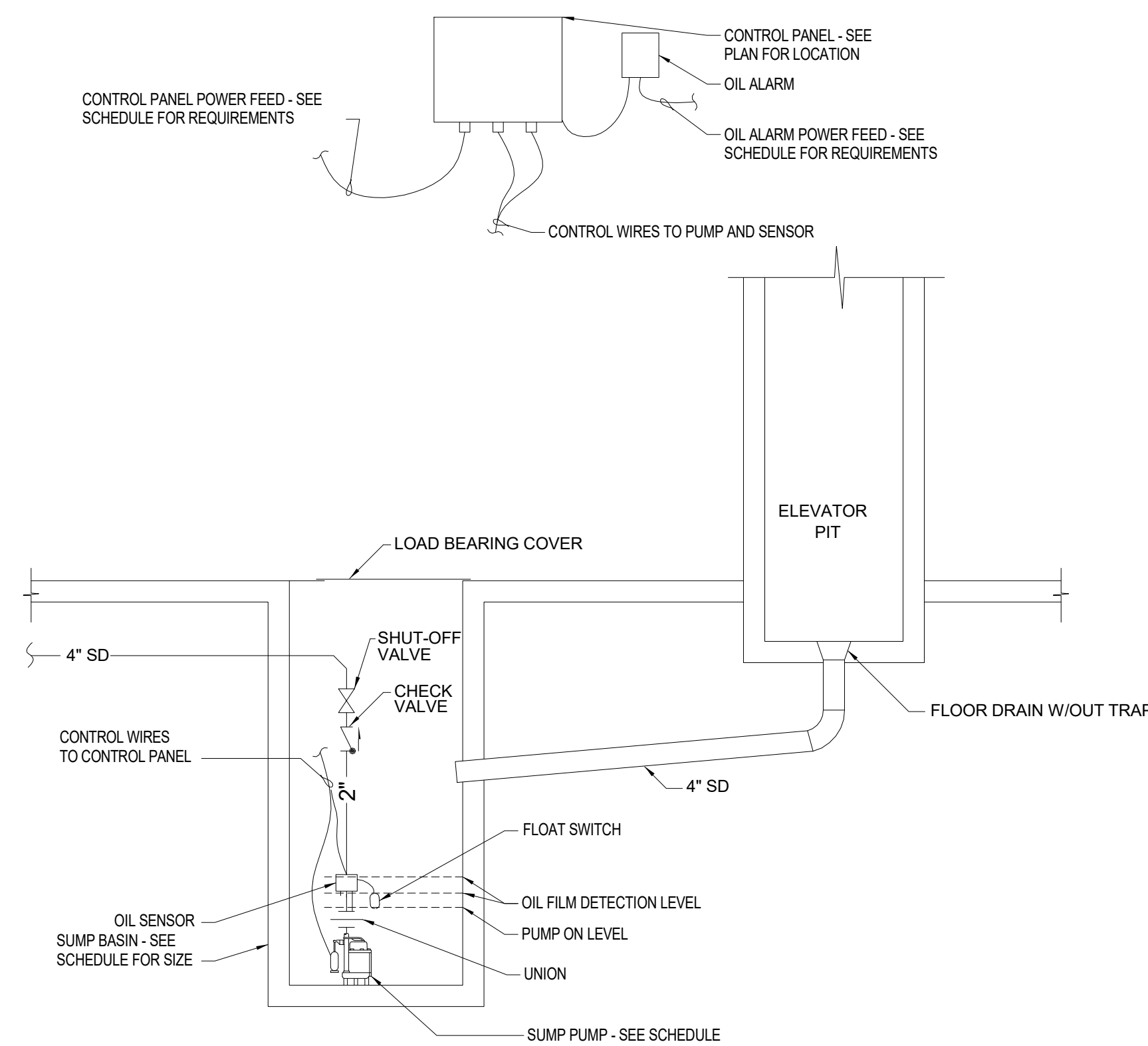
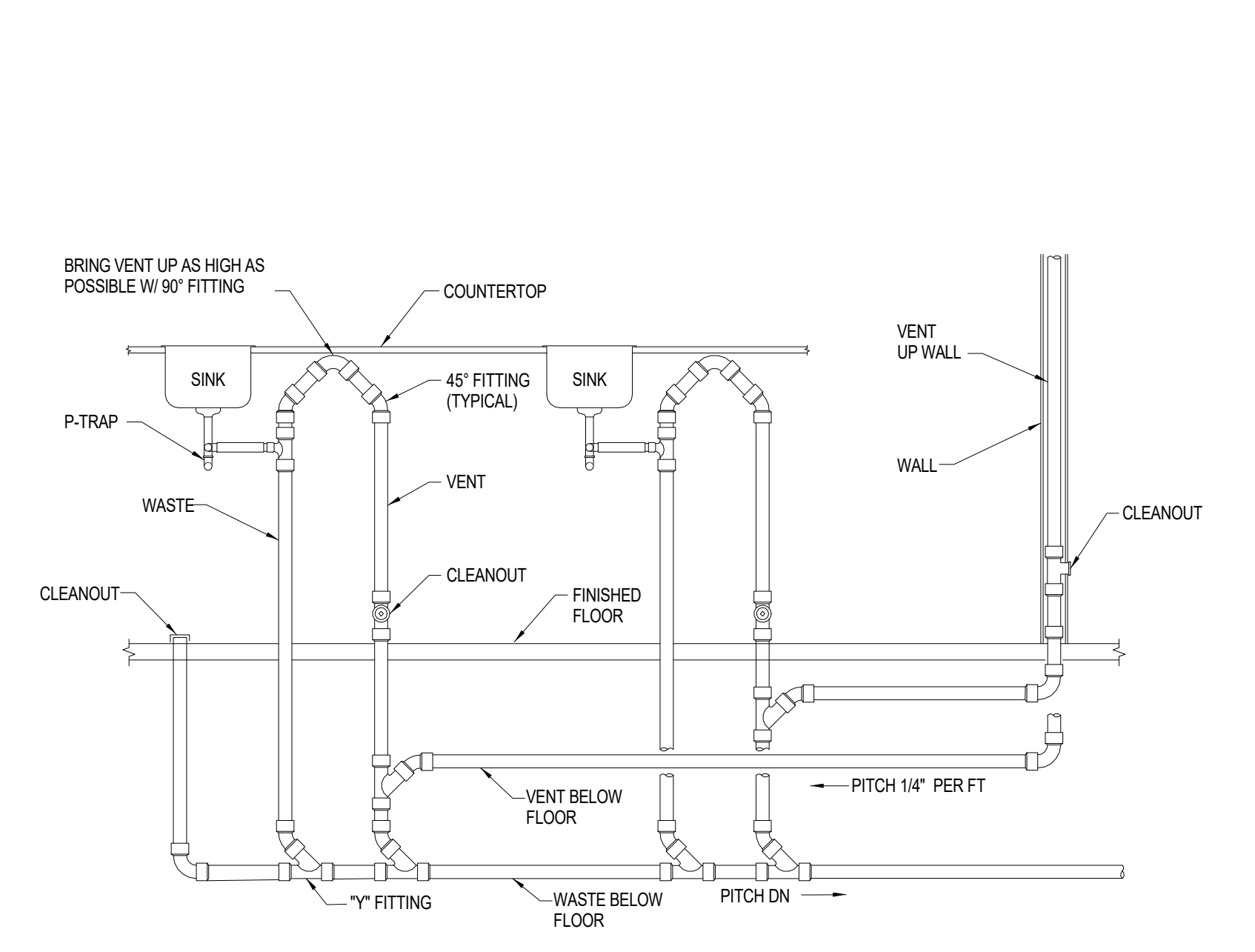
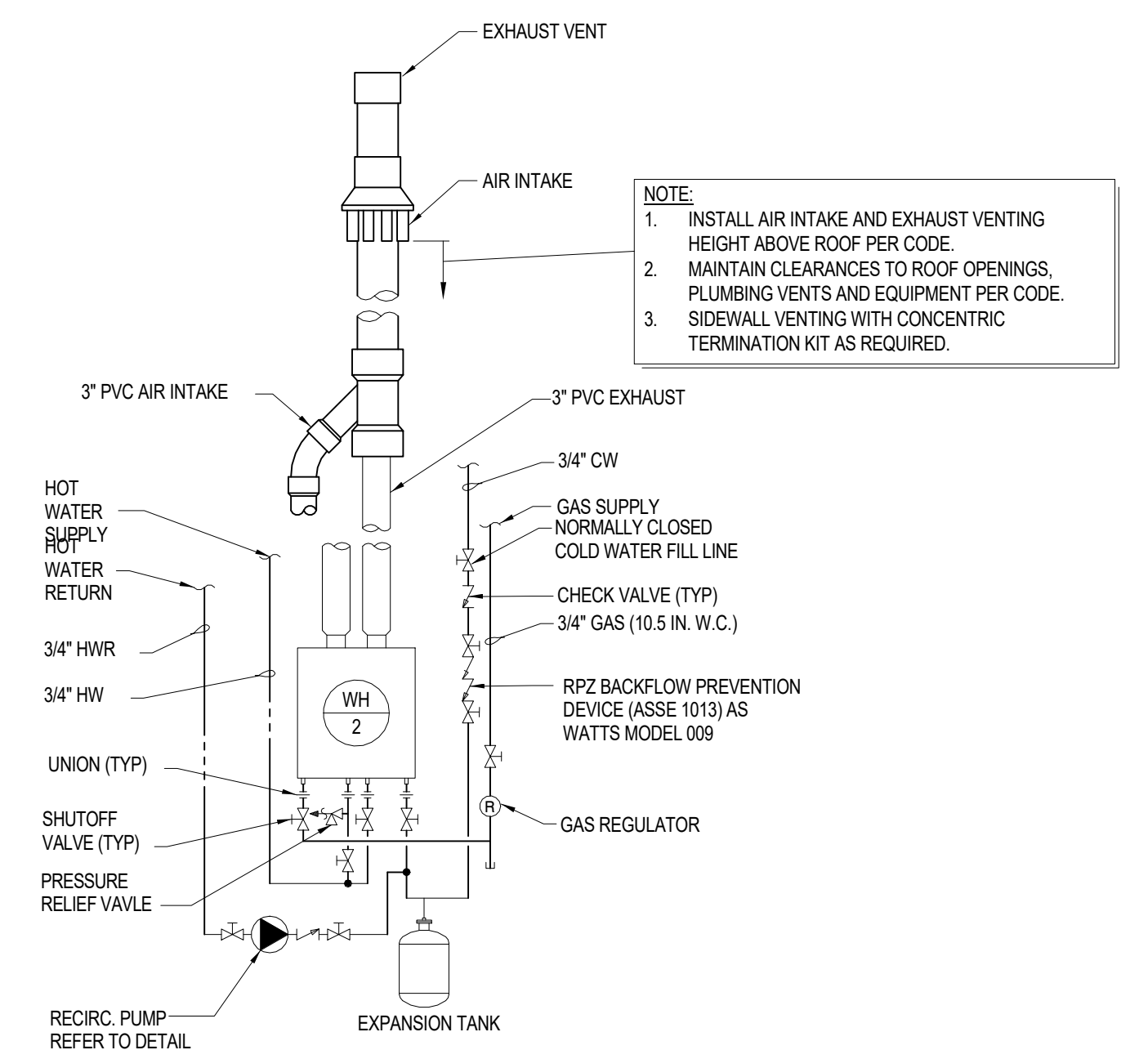
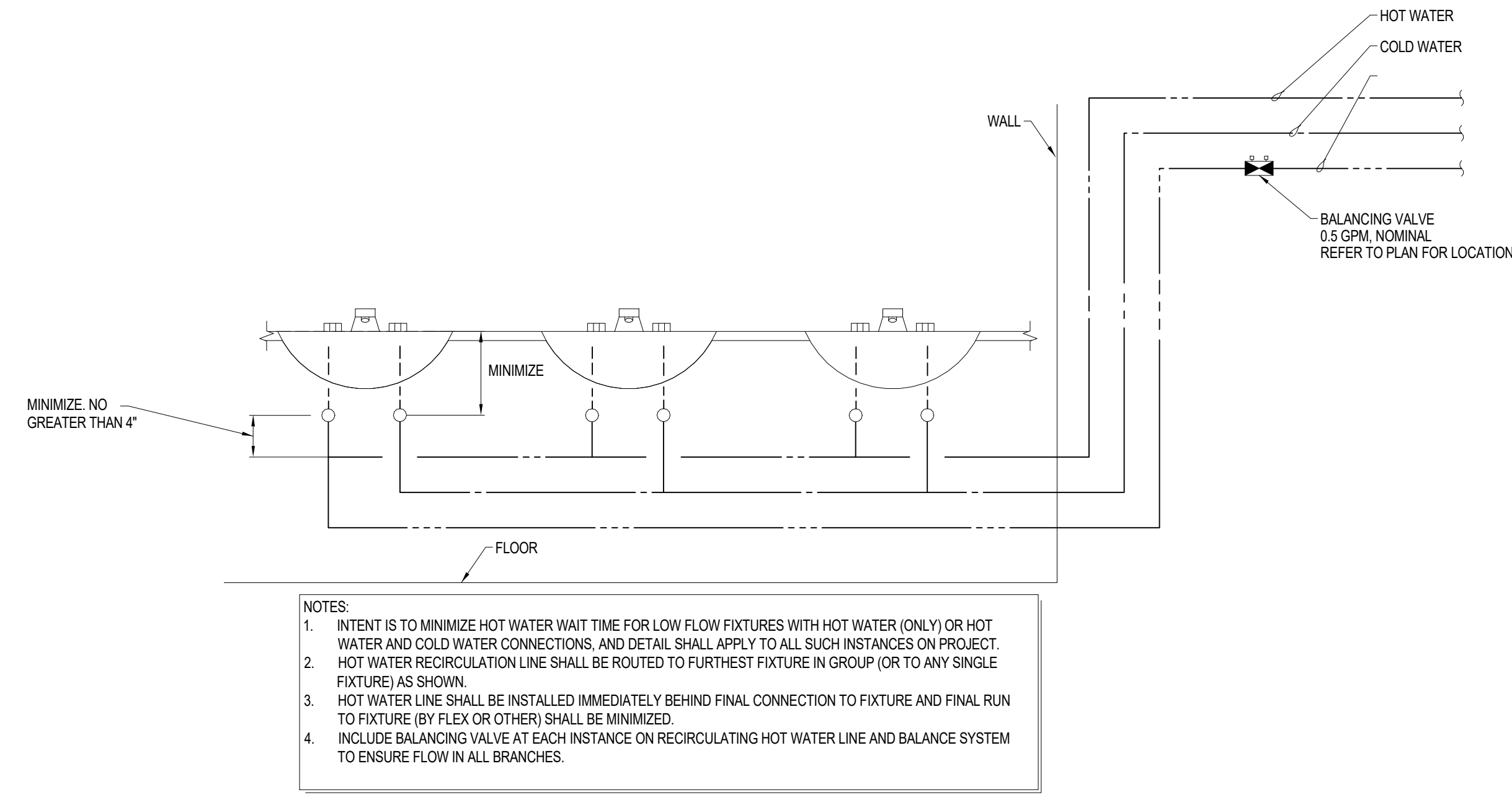
6 TOILET 386 & 387 SUPPLY WATER RISER



5 MECH ROOM & TOILET 401 SUPPLY WATER RISER



9 HEAD HOUSE SUPPLY WATER



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

Civil Engineer
Vierbicher Associates, Inc.
999 Fournier Drive, Suite 201
Madison, WI 53717
608.828.0532 tel

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

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

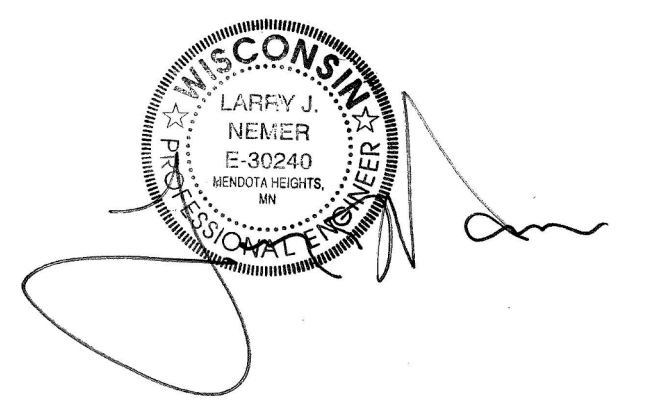
MEP Engineer
MEP Associates, LLC
860 Blue Garden Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

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

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

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

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



Signature: _____
Print Names: Larry Nemer
Date: JUNE 4, 2018 License No.: E-30240

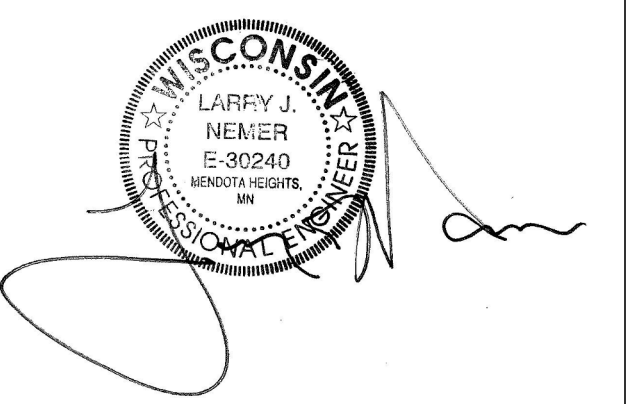
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		09.09.2017	SCHEMATIC DESIGN SUBMISSION
		12.08.2017	50% PRICING SET
		01.10.2018	DESIGN DEVELOPMENT SUBMISSION
		01.17.2018	UDC SUBMISSION
		03.31.2018	75% CD PRICING ISSUE
		05.04.2018	90% CONSTRUCTION DOCUMENTS
		06.01.2018	BID ISSUE
		06.04.2018	PERMIT ISSUE

PROJECT NO: 2017016
PROJECT PHASE: BID DOCUMENTS
DRAWN BY: MSR CHECKED BY: MSR
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PLUMBING DETAILS
**EXHIBIT K
P301**

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

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

Signature: 
 Print Name: Larry Nemer
 Date: JUNE 4, 2018 License No.: E-30240

ISSUE	MARK	DATE	DESCRIPTION
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		06.01.2018	BID ISSUE
		06.04.2018	PERMIT ISSUE

PROJECT NO. 2017016
 PROJECT PHASE BID DOCUMENTS
 DRAWN BY: MSR CHECKED BY: MSR
 Design: 2017 Copyright: MSR, Olbrich & Associates, LLC

**PLUMBING
 SCHEDULES AND
 RAIN/RO
 SCHEMATIC
 EXHIBIT K
 P401**

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	MANUFACTURER	MODEL	MOUNT	ROUGH-IN SCHEDULE				FITTINGS AND REMARKS
					COLD	HOT	WASTE	VENT	
WC-1A	MANUAL FLUSH VALVE WATER CLOSET	ZURN	Z5615-BWL	WALL	1-1/2"	-	4"	2"	WITH 1.28GPF MANUAL VALVE MODEL Z8000PL-HET, ELONGATED OPEN FRONT SEAT, Z1201 OR Z1202 EZCARRY CARRIER, WHERE TAGGED WC-1A, UNIT SHALL BE INSTALLED TO A.D.A. HEIGHT
L-1A	WALL HUNG LAVATORY	AMERICAN STANDARD	9024.00/EC	WALL	3/4"	3/4"	2"	1-1/2"	INCLUDE Z8950-XL-M-S HARD-WIRED FAUCET WITH 0.35 GPM VANDAL-RESISTANT NON-AERATED OUTLET
S-1	LEARNING CENTER CLASSROOM SINK	ELKAY	EFRU191610	UNDERMOUNT	3/4"	3/4"	2"	2"	PROVIDE ELKAY LK2432C 8" CENTRESET, CONCEALED DECK MOUNT FAUCET WITH 1.5 GPM FLOW RATE.
S-2	LEARNING CENTER CLASSROOM SINK	ELKAY	ELUH4D12125PD	UNDERMOUNT	3/4"	3/4"	2"	2"	PROVIDE ELKAY LK8738C SENSOR OPERATED AT 0.5 GPM FLOW.
MS-1	MOP SINK	MUSTEE	63M	FLOOR	3/4"	-	-	1 1/2"	PROVIDE 63.600A SERVICE FAUCET, 65.700 HOSE AND HOSE HOLDER, 65.600 MOP HANGER, AND 67.2424 WALL GUARDS.
DF-1	B4-LEVEL WITH BOTTLE FILLER	ELKAY	LZWS-LRPM2RK	WALL	3/4"	-	2"	1-1/2"	INSTALL TO COMPLY WITH A.D.A. REQUIREMENTS. PROVIDE FILTER; PROVIDE TWO ADDITIONAL FILTERS FOR REPLACEMENT.
HB-1	NON-FREEZELESS WALL FAUCET	WOODFORD	101P	WALL	3/4"	-	-	-	ANTI-SIPHON WALL FAUCET WITH INTEGRAL CHECK AND ATMOSPHERIC VENT.
HB-2	FREEZELESS WALL HYDRANT	WOODFORD	67	EXT. WALL	3/4"	-	-	-	ANTI-SIPHON, CHROME FINISH, EXPOSED WITH OPERATING KEY.

FLOOR AND ROOF DRAIN SCHEDULE

MARK	FIXTURE	MANUFACTURER	MODEL	MOUNT	ROUGH-IN SCHEDULE			FITTINGS AND REMARKS
					WASTE	VENT		
FD-1	FLOOR DRAIN	ZURN	Z5615-BWL	FLOOR	3"	2"		PROVIDE 3" OUTLET, WHERE FUNNELS ARE INDICATED ON PLAN, PROVIDE ZURN OVAL FUNNEL, FIELD WELDING OF FUNNELS TO STRAINERS IS NOT ALLOWED.
FS-1	FLOOR SINK	ZURN	Z1900	FLOOR	4"	2"		12X12IN PORCELAIN ENAMEL CAST IRON FLOOR SINK, PROVIDE WITH LOOSE SET 3/4" GRATE, ALUMINUM DOME BOTTOM STRAINER.
TD-1	TRENCH SYSTEM	ACO DRAIN	K100	FLOOR	-	-		UNIT SHALL BE MODULAR TRENCH DRAIN SYSTEM, PROVIDE SLOTTED STEEL, BOLTLSS LOCKING, NO SLIP AND ADA COMPLIANT GRATE, PROVIDE GRATE REMOVAL TOOL (TOTAL OF 4), TRENCH DRAIN CLEANING TOOL (TOTAL OF 4), ALL PARTS SHALL BE LEED CERTIFIED.
CB-1	CATCH BASIN	ACO DRAIN	K2-902G	FLOOR	4"	SEE PLAN		INLINE CATCH BASIN WITH 4" OUTLET AT 23.19" INVERT, INCLUDE INLINE TRASH BUCKET.
RD-1	ROOF DRAIN	ZURN	Z100	ROOF	SEE PLAN	-		WITH PLAIN BRONZE DOME.
ORD-1	OVERFLOW ROOF DRAIN	ZURN	Z199	ROOF	SEE PLAN	-		WITH PLAIN BRONZE DOME.
AD-1	AREA DRAIN	ZURN	Z507	ROOF	SEE PLAN	-		WITH DURA-COATED CAST IRON BODY AND TOP, INCLUDE SECONDARY STRAINER AND SEDIMENT BUCKET.
AD-2	AREA DRAIN	ZURN	Z1730	ROOF	SEE PLAN	-		STAINLESS STEEL CONSTRUCTION.

EXPANSION TANK SCHEDULE

EXPANSION TANK #	SYSTEM	LOCATION	SIZE		CAPACITY		PRE-CHARGE (PSIG)	MAXIMUM PRESSURE IN TANK (PSI)	SYSTEM WATER VOLUME (GAL)	SYSTEM CONNECTION SIZE (IN)	MANUFACTURER	MODEL	NOTES
			HEIGHT (IN)	DIAMETER (IN)	ACCEPT. VOLUME (GAL)	TANK VOLUME (GAL)							
ET-2	HOT WATER	FOG PUMP ROOM 38	11	8	1.48	2.1	20	150	10.6	3/4	WATTS	PLT-5	1,2

NOTES:
 1. PER DETAIL 2/P301.
 2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

SUMP PUMP SCHEDULE

Type Mark	MARK	DESCRIPTION	MANUFACTURER	SUMP MODE NUMBER	SUMP SIZE	STANDARD CONNECTIONS	ELECTRICAL			CHECK VALVE	GPM	CORD LENGTH	NOTES
							H.P.	VOLTS	PHASE				
SUMP	SP-1	POLY BASIN WITH SEALED STEEL COVER	WEIL	1411-055	30" x 120"	2"	1/2	115	1	2"	50 @ 15'	20'	1,2,3,4
SUMP	SP-2	POLY BASIN WITH SEALED STEEL COVER	WEIL	1408	36" x 144"	2"	1/2	115	1	2"	20 @ 15'	20'	1,2,3,5

NOTES:
 1. AUTOMATIC VERTICAL FLOAT SWITCH.
 2. SEE DETAIL 6/P301 AND 7/P301.
 3. PROVIDE WITH LOCAL CONTROL PANEL FROM MANUFACTURER, NO CONNECTION TO B.A.S.
 4. SIMPLEX INSTALLATION.
 5. DUPLEX INSTALLATION.

CIRCULATION PUMP SCHEDULE

MARK	SERVICE	MAXIMUM WORKING PRESSURE (PSI)	MAXIMUM OPERATING TEMP (°F)	ELECTRICAL CHAR.	HP	FLANGE SIZE (IN)	FLOW (GPM)	HEAD (FT)	MANUFACTURER & MODEL NO.	NOTES
P-6	GREENHOUSE HEATING TABLE	175	230	115/160	1/2	3/4	5.5	5.0	BELL AND OSSETT, ECOCIRC XL 20-35	1,2,3
P-7	GREENHOUSE MISTING TABLE	175	280	208/160	1/2	2.0	11	7.5	BELL AND OSSETT, ECOCIRC XL 20-140	1,2,3

NOTES:
 1. STAINLESS STEEL IMPELLER.
 2. SEE DETAIL 6/P301.
 3. DISCONNECT BY ELECTRICAL CONTRACTOR.

TANKLESS GAS WATER HEATER SCHEDULE

MARK	LOCATION	TEMPERATURE RISE (DEG F)	MBH INPUT	AIR INTAKE (IN)	FLUE EXHAUST	MANUFACTURER	MODEL	NOTES
WH-2	GREENHOUSE	20	160	2	2	BOSCH	T9800	1,2,3

NOTE:
 1. UNIT SHALL BE OUTDOOR RATED.
 2. PROVIDE CONCENTRIC VENT TERMINATION.
 3. INSTALL PER MANUFACTURER'S WRITTEN INSTRUCTIONS.

MIXING VALVE SCHEDULE

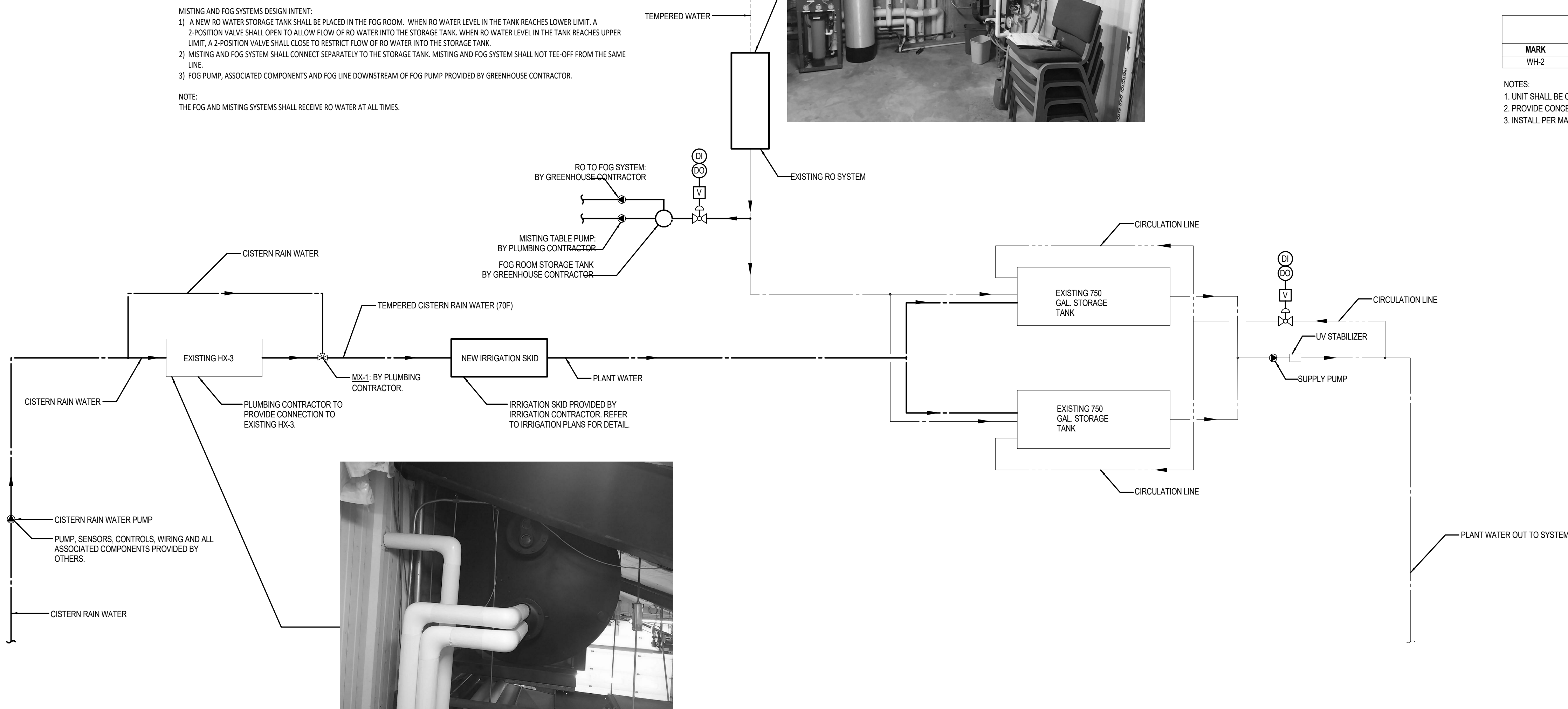
MARK	LOCATION	FLOW (GPM)	INLETS & OUTLETS (IN)	MANUFACTURER & MODEL NO.	NOTES
MIX-1	HEADHOUSE	50	1 1/4, 1 1/2	LAWLER, 803	1

NOTES:
 1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

RO/RAIN WATER SYSTEM DESIGN INTENT:
 1) IF RAIN WATER IS AVAILABLE IN THE CISTERN, RO WATER SHALL BE USED AS PRIMARY SOURCE OF WATER.
 a) CISTERN RAIN WATER PUMP SHALL TURN ON WHEN THE WATER LEVEL IN THE EXISTING STORAGE TANKS REACHES LOWER LIMIT. CISTERN RAIN WATER PUMP SHALL TURN OFF WHEN THE WATER LEVEL IN THE EXISTING STORAGE TANKS REACHES UPPER LIMIT.
 b) THE RAIN WATER SHALL BE ROUTED FROM THE CISTERN RAIN WATER PUMP TO AN EXISTING SOLAR THERMAL HEAT EXCHANGER.
 c) A THERMOSTATIC MIXING VALVE SHALL BE PROVIDED DOWNSTREAM OF SOLAR THERMAL HEAT EXCHANGER AS SHOWN ON SCHEMATIC DIAGRAM. THE MIXING VALVE SHALL BE SET TO DISCHARGE 70F TEMPERED WATER.
 d) THE TEMPERED WATER SHALL PASS THROUGH AN IRRIGATION SKID TO FILTER RAIN WATER. ONCE RAIN WATER PASSES THE FILTRATION SYSTEM, IT BECOMES PLANT WATER. PLANT WATER FROM OUTLET OF IRRIGATION SKID SHALL BE ROUTED TO EXISTING STORAGE TANKS.
 e) PLANT WATER SHALL FILL STORAGE TANKS TO UPPER LIMIT.
 f) IF THERE IS DEMAND OUT IN THE SYSTEM (A VALVE OPENS), THE SUPPLY PUMP SHALL DRAW PLANT WATER FROM BOTH EXISTING STORAGE TANKS TO PROVIDE SYSTEM PRESSURIZATION; SIMULTANEOUSLY, A 2-POSITION VALVE ON THE CIRCULATION LINE SHALL BE CLOSED. IF THERE IS NO DEMAND OUT IN THE SYSTEM (NO VALVE IS OPEN), THE 2-POSITION VALVE ON THE CIRCULATION LINE SHALL OPEN TO ALLOW CIRCULATION OF PLANT WATER BETWEEN THE EXISTING STORAGE TANKS.
 2) IF NO RAIN WATER IS AVAILABLE IN THE CISTERN, RO WATER SHALL BE USED AS PRIMARY SOURCE OF WATER.
 a) RO WATER SHALL FILL EXISTING STORAGE TANKS WHEN THE WATER LEVEL IN THE TANKS REACHES LOWER LIMIT.
 b) IF THERE IS DEMAND OUT IN THE SYSTEM (A VALVE OPENS), THE SUPPLY PUMP SHALL DRAW RO WATER FROM BOTH EXISTING STORAGE TANKS TO PROVIDE SYSTEM PRESSURIZATION; SIMULTANEOUSLY, A 2-POSITION VALVE ON THE CIRCULATION LINE SHALL BE CLOSED. IF THERE IS NO DEMAND OUT IN THE SYSTEM (NO VALVE IS OPEN), THE 2-POSITION VALVE ON THE CIRCULATION LINE SHALL OPEN TO ALLOW CIRCULATION OF RO WATER BETWEEN THE EXISTING STORAGE TANKS.
 c) IF THERE IS DEMAND OUT IN THE SYSTEM (A VALVE OPENS), THE SUPPLY PUMP SHALL DRAW PLANT WATER FROM BOTH EXISTING STORAGE TANKS TO PROVIDE SYSTEM PRESSURIZATION; SIMULTANEOUSLY, A 2-POSITION VALVE ON THE CIRCULATION LINE SHALL BE CLOSED. IF THERE IS NO DEMAND OUT IN THE SYSTEM (NO VALVE IS OPEN), THE 2-POSITION VALVE ON THE CIRCULATION LINE SHALL OPEN TO ALLOW CIRCULATION OF PLANT WATER BETWEEN THE EXISTING STORAGE TANKS.

MISTING AND FOG SYSTEMS DESIGN INTENT:
 1) A NEW RO WATER STORAGE TANK SHALL BE PLACED IN THE FOG ROOM. WHEN RO WATER LEVEL IN THE TANK REACHES LOWER LIMIT, A 2-POSITION VALVE SHALL OPEN TO ALLOW FLOW OF RO WATER INTO THE STORAGE TANK. WHEN RO WATER LEVEL IN THE TANK REACHES UPPER LIMIT, A 2-POSITION VALVE SHALL CLOSE TO RESTRICT FLOW OF RO WATER INTO THE STORAGE TANK.
 2) MISTING AND FOG SYSTEM SHALL CONNECT SEPARATELY TO THE STORAGE TANK. MISTING AND FOG SYSTEM SHALL NOT TEE-OFF FROM THE SAME LINE.
 3) FOG PUMP, ASSOCIATED COMPONENTS AND FOG LINE DOWNSTREAM OF FOG PUMP PROVIDED BY GREENHOUSE CONTRACTOR.

NOTE:
 THE FOG AND MISTING SYSTEMS SHALL RECEIVE RO WATER AT ALL TIMES.



2 RAIN/RO WATER SCHEMATIC
 NOT TO SCALE