DEMO NOTES

1. NOT ALL EXISTING CONDITIONS HAVE BEEN SHOWN. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO DEMO.
2. CONTRACTOR SHALL PROTECT ALL WORK AND EXISTING CONDITIONS ASSOCIATED WITH THIS CONTRACT FROM DAMAGE, COVER ENDS OF PIPING AND DUCTWORK NOT ACTIVELY BEING WORKED ON. IT IS THE CONTRACTOR RESPONSIBILITY TO REPAIR OR REPLACE ANY DAMAGED ITEMS THAT OCCURS DURING THIS CONSTRUCTION PROJECT AT NO COST TO THE OWNER.
3. DEMOLISH ALL REQUIRED EQUIPMENT, DUCTWORK, PIPING, HANGERS, CONTROLS AND ALL ASSOCIATED EXISTING SYSTEMS AS REQUIRED. TO REPLACE EACH SYSTEM, CONTRACTOR SHALL COORDINATE DEMOLITION WITH EXISTING SYSTEMS AND COMPONENTS TO REMAIN PRIOR TO WORK COMMENCING.
4. IT IS THE CONTRACTOR RESPONSIBILITY TO CLEAN UP ALL DEBRIS FROM SITE AT THE END OF EACH WORK DAY AND DISPOSE OFF EITHER IN LAY DOWN RECYCLE BINS PROVIDED BY THE CONTRACTOR OR OFFSITE ALL TOGETHER.
5. ALL DEMOLISHED EQUIPMENT SHALL BE TURNED OVER TO THE OWNER UNLESS DIRECTED OTHERWISE. IF NOT REQUIRED BY OWNER, DISPOSE AS REQUIRED.

SCOPE OF WORK

1. THE MECHANICAL PLANS INCLUDE THE ADDITION OF (5) 500 TON AIR-COOLED CHILLERS, AND (6) 536 TON FLUID COOLERS. EACH OF THE (5) CHILLERS IS FED WITH A PRIMARY CHILLED WATER PUMP, COOLING TOWER ARE FED WITH (4) PUMPS, (2) FOR (4) CELLS, AND (2) FOR (2). CHILLED WATER SYSTEMS SERVE ONLY PROCESS LOADS FOR WATER COOLED SERVER EQUIPMENT FURNISHED BY THE OWNER. (4) 1500 GPM SECONDARY CHILLED WATER PUMPS. PROCESS EQUIPMENT BEING INSTALLED INCLUDE A FILTER PUMP, BASIN HEATERS AND HEAT TRACE. A BUILDING AUTOMATION CONTROL SYSTEM SHALL PROVIDE CONTROL AND MONITORING OF THE NEW SYSTEMS, AND BE INTERGRATED INTO THE EXISTING.

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
SKinnear
01/21/2025
11:25:22 AM

Approval of submitted plans is not an approval of omissions or oversights by this office or non compliance with any applicable regulations of local government. The contractor is responsible for making sure that the building complies with all applicable codes and regulations of the local government.

The approved construction plans, documents, and all engineering must be posted on the job at all inspections in a visible and readily accessible location.

Full sized legible color plans are required to be provided by the permitee on site for inspection.

Separate Electrical Permit is required with the Washington State Department of Labor & Industries.
https://lni.wa.gov/licensing-permits/electrical/electrical-permits-fees-and-inspections
or call for Licensing Information:
1-800-647-0982

GENERAL NOTES

1. THE MECHANICAL PLANS ARE DIAGRAMMATIC IN NATURE AND ARE BASED ON ONE MANUFACTURER'S EQUIPMENT. THEY ARE NOT INTENDED TO SHOW EVERY ITEM IN ITS EXACT LOCATION, THE EXACT DIMENSIONS, OR ALL OF THE DETAILS FOR THE EQUIPMENT. THE MECHANICAL CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT AND ENSURE THAT IT WILL FIT IN THE AVAILABLE SPACE.
2. MECHANICAL CONTRACTOR RESPONSIBLE FOR INSTALLATION OF COMPLETED AND OPERATIONAL SYSTEMS WITH DUE RESPECT TO ALL APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION.
3. IT IS THE CONTRACTOR RESPONSIBILITY TO FIELD VERIFY ALL CONNECTION POINTS PRIOR TO INSTALL. NOT ALL CONNECTION SIZES ARE SHOWN, BUT THOSE THAT ARE APPROXIMATE AND TAKEN FROM EXISTING AS-BUILTS AND FIELD OBSERVATIONS.
4. COORDINATE PIPE ROUTING WITH DUCTWORK, SPRINKLER PIPING AND ELECTRICAL POWER/LIGHTING CIRCUITING AND STRUCTURAL MEMBERS PRIOR TO INSTALLATION.
5. CONTRACTORS TO VERIFY ALL GRADES, DIMENSIONS AND EXISTING CONDITIONS AT THE SITE BEFORE PROCEEDING WITH WORK. NOTIFY PRIME CONSULTANT OF ANY DISCREPANCIES BETWEEN DRAWINGS AND ACTUAL CONDITIONS BEFORE INSTALLATION.
6. EQUIPMENT AND SYSTEMS SHALL COMPLY WITH 2021 WASHINGTON STATE ENERGY AND MECHANICAL CODES.
7. COORDINATE INSTALLATION OF PIPING AND DUCTWORK WITH ELECTRICAL CONTRACTOR AND OTHER TRADES.
8. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS NEEDED TO CONSTRUCT WORK SHOULD IN THE CONSTRUCTION DOCUMENTS AND ACCOMPANYING SPECIFICATIONS.
9. IF THERE IS A CONFLICT BETWEEN THE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS, THE MOST STRINGENT WILL APPLY.
10. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURERS. CONTRACTOR TO PROVIDE ALL FITTINGS, TRANSITIONS, DAMPERS, VALVES, AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
11. SYSTEMS ADHERE TO 2021 WSEC SECTION C403.2.4 VARIABLE FLOW CAPACITY: FOR FAN AND PUMP MOTORS 5 HP AND GREATER, INCLUDING MOTORS IN OR SERVING CUSTOM AND PACKAGED AIR HANDLERS SERVING VARIABLE AIR VOLUME SYSTEMS, CONSTANT VOLUME FANS, HEATING AND COOLING HYDRONIC PUMPING SYSTEMS, AND OTHER PUMP OR FAN MOTORS WHERE VARIABLE FLOWS ARE REQUIRED SHALL BE EQUIPPED WITH VARIABLE SPEED DRIVES.
12. SYSTEMS ADHERE TO SECTION C403.3.2 HVAC EQUIPMENT PERFORMANCE REQUIREMENTS: EQUIPMENT SHALL MEET THE MINIMUM EFFICIENCY REQUIREMENTS OF TABLES C403.3.2(1) THROUGH C403.3.2(12) WHEN TESTED AND RATED IN ACCORDANCE WITH THE APPLICABLE TEST PROCEDURE.
13. SYSTEMS ADHERE TO C405.8 ELECTRIC MOTOR EFFICIENCY:
    A: ALL ELECTRIC MOTORS, FRACTIONAL OR OTHERWISE, SHALL MEET THE MINIMUM EFFICIENCY REQUIREMENTS OF TABLES C405.8(1) THOUGH C405.8(4) WHEN TESTED IN ACCORDANCE WITH DOE 10 CFR UNLESS OTHER EXCEPTIONS ARE QUALIFIED AND MET BY THIS SECTION.
    B: FRACTIONAL HP FAN MOTORS THAT ARE 1/12 HP OR GREATER AND LESS THAN 1 HP (BASED ON THE OUTPUT POWER) WHICH ARE NOT COVERED IN TABLES C405.8(3) AND C405.8(4) SHALL BE ELECTRONICALLY COMMUTATED MOTORS OR SHALL HAVE A MINIMUM MOTOR EFFICIENCY OF 70 PERCENT WHEN RATED IN ACCORDANCE WITH DOE 10 CFR 431.
14. PENETRATIONS OF DUCTS, PIPES, CONDUITS, ETC IN WALLS REQUIRING PROTECTED OPENINGS SHALL BE FIRE STOPPED, FIRE STOP MATERIAL, SHALL BE A UL/ULC-LISTED ASSEMBLY APPROPRIATE FOR FIRE OR SMOKE PENETRATIONS AS APPLICABLE AND AS APPROVED BY THE FIRE MARSHAL.
15. THE MECHANICAL CONTRACTOR SHALL PROVIDE FIRE RATED PENETRATIONS FOR PIPING TO COMMENSURATE WITH THE RATING OF THE WALL IN ALL PENETRATIONS OF FIRE WALLS, FIRE BARRIERS, FIRE PARTITIONS, SMOKE BARRIERS AND SMOKE PARTITION IN ALL PIPING THAT PENETRATES A HORIZONTAL OR VERTICAL FIRE PARTITION, OR AS OTHERWISE SHOWN ON THE DRAWINGS.
16. ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE OR METAL STRAPS TO SUPPORT PIPES WILL NOT BE PERMITTED. REFER TO SPECIFICATIONS FOR MINUMUM SPACING OF PIPE SUPPORTS.
17. ALL EQUIPMENT TO BE INSTALLED ON MIN 6" THICK CONCRETE HOUSEKEEPING PADS.
18. ALL EQUIPMENT, DUCTS PIPING, AND OTHER DEVICES AND MATERIALS INSTALLED OUTSIDE OF THE BUILDING OR OTHERWISE EXPOSED TO THE WEATHER SHALL BE COMPLETELY WEATHERPROOFED.
19. MECHANICAL EQUIPMENT, DUCTS AND PIPING ARE TO BE COORDINATED WITH STRUCTURAL JOISTS AND CROSS BRACING.
20. ALL EXPOSED PIPING IN OCCUPIED SPACES SUBJECT TO ARCHITECTURAL APPROVAL PRIOR TO INSTALLATION.
21. THE HVAC SYSTEMS SHALL BE TESTED AND BALANCED BY AN INDEPENDENT AGENCY, UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER PRIOR TO COMMISSIONING. A SEALED TYPE WRITTEN REPORT SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER.
22. A BUILDING COMMISSIONING PROCESS AND FUNCTIONAL TESTING OF MECHANICAL SYSTEMS SHALL BE CARRIED OUT BY A CERTIFIED COMMISSIONING PROFESSIONAL IN ACCORDANCE WITH 2018 WSEC SECTION C408. THE MECHANICAL, ELECTRICAL, PLUMBING, AND CONTROL CONTRACTORS ARE REQUIRED TO PERFORM FUNCTIONAL PERFORMANCE TESTING OF ALL EQUIPMENT PRIOR TO TESTING BY THE COMMISSIONING AGENT. CONTRACTORS SHALL PROVIDE THE NECESSARY ASSISTANCE TO THE COMMISSIONING AGENT TO PERFORM COMMISSIONING DUTIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING CORRECTIVE ACTION IF ANY DEFICIENCIES ARE FOUND DURING COMMISSIONING.
23. SYSTEMS ADHERE TO 2021 WSEC SECTION C408 SYSTEM COMMISSIONING:
    A. A CERTIFIED COMMISSIONING PROFESSIONAL (CCP) SHALL LEAD THE COMMISSIONING PROCESS. A CCP IS AN INDIVIDUAL WHO IS CERTIFIED BY AN ANSI/ISO/IEC 17024:2012 ACCREDITED ORGANIZATION TO LEAD, PLAN, COORDINATE, AND MANAGE COMMISSIONING TEAMS AND IMPLEMENT THE COMMISSIONING PROCESS.
    B. A CERTIFIED COMMISSIONING PROFESSIONAL SHALL PERFORM THE FOLLOWING:
        a. DEVELOP A COMMISSIONING PLAN.
        b. REVIEW BUILDING DOCUMENTATION AND CLOSE-OUT SUBMITTALS.
        c. PROVIDE A COMMISSIONING REPORT.
        d. LIST SPECIFIC EQUIPMENT, APPLIANCES AND SYSTEMS COMMISSIONED.
    C. FUNCTIONAL TESTING SHALL BE COMPLETED FOR THE FOLLOWING SYSTEMS AND THEIR ASSOCIATED CONTROL SYSTEMS:
        a. MECHANICAL SYSTEMS
        b. SERVICE WATER HEATING SYSTEMS
        c. CONTROLLED RECEPTACLE AND LIGHTING SYSTEMS
        d. EQUIPMENT APPLIANCE AND SYSTEMS
        e. ENERGY METERING
        f. REFRIGERATION SYSTEMS
    D. A COMMISSIONING REPORT SHALL BE DELIVERED TO THE BUILDING OWNER AND INCLUDE:
        a. RESULTS OF THE FUNCTIONAL PERFORMANCE TESTS
        b. LIST OF DEFICIENCIES AND CORRECTIVE MEASURES IMPLEMENTED OR PROPOSED.
        c. FUNCTIONAL PERFORMANCE TEST PROCEDURES.
        d. COMMISSIONING PLAN.
        e. TAB REPORT.
24. TESTING AND BALANCING: ALL HVAC SYSTEMS SHALL BE BALANCED BY A LICENSED CONTRACTOR IN ACCORDANCE WITH ACCEPTED ENGINEERING STANDARDS AND SPECIFICATIONS PRIOR TO COMMISSIONING.
25. OWNER TRAINING BY CONTRACTORS FOR EACH PIECE OF EQUIPMENT OR SYSTEM SHALL INCLUDE: SYSTEM/EQUIPMENT OVERVIEW (WHAT IT IS, WHAT IT DOES, AND WHICH OTHER SYSTEMS OR EQUIPMENT DOES IT INTERFACE WITH). REVIEW OF THE AVAILABLE O&M MATERIALS. REVIEW OF THE RECORD DRAWINGS ON THE SUBJECT SYSTEM/EQUIPMENT. HANDS-ON DEMONSTRATION OF ALL NORMAL MAINTENANCE PROCEDURES, NORMAL OPERATING MODES, AND ALL EMERGENCY SHUTDOWN AND START-UP PROCEDURES.
26. MECHANICAL DESIGN IS IN COMPLIANCE WITH WASHINGTON STATE ENERGY CODE FOR THE GENERAL PRESCRIPTIVE COMPLIANCE PATH. BUILDING SYTSTEMS FOR THIS PROJECT SERVE A DATA CENTER. PRESCRIPTIVE ENERGY CODE COMPLIANCE IS DEMONSTATED WITH MECHANICAL LOAD COEFFICIENT (MLC) CALCULATION SEE SHEET ON M.FT.012 PER C403.1.3 COMPLYING WITH SECTION 6 AND 8 OF ASHRAE STANDARD 90.4, AND ARE EXEMPT FROM SECTIONS C403.4 AND C403.5 PER EXCEPTION 2 TO C403.1. MINIMUM COMPLIANCE IS 0.14 FOR ZONE 4C, WHICH IS THE COMPLIANCE TARGET FOR THE MAXIMUM ANNUALIZED MLC. THIS PROJECT ATTAINS AN ANNUALIZED MLC OF 0.1354 WHICH USES LESS ENERGY AND THEREFORE COMPLIES.
27. NO ADDITIONAL C406 ENERGY EFFICIENCY CREDITS ARE REQUIRED FOR ALTERATIONS THAT DO NOT ADD MORE THAN 1,000 SQUARE FEET PER EXCEPTION 2 TO C401.3.3.

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PUYALLUP, WA 98374

JEFFREY M. LINCOLN — STATE OF WASHINGTON — 49176 — REGISTERED PROFESSIONAL ENGINEER
2024-12-27

Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024

PRCTI20242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL GENERAL NOTES

Sheet: **M.FT.002**

HVAC CIRCULATION PUMP SCHEDULE

UNIT IDENTIFICATION				PUMP TYPE	COUPLING TYPE	CONTROL	PERFORMANCE					PUMP MIN FLOW (GPM)	PUMP MOTOR			ELECTRICAL		OPERATING WEIGHT (LBS.)	MANUFACTURER	MODEL NUMBER	NOTES
MARK	NUMBER	SYSTEM SERVED	REDUNDANT				FLUID TYPE	FLUID TEMP (F)	FLOW (GPM)	PUMP HEAD (FT)	MIN EFFICIENCY (%)		BHP	HP	SPEED (RPM)	VOLTS	PHASE				
CHWP-FT	1	SECONDARY CHILLED WATER LOOP	N+1	END SUCTION	CLOSE	VFD	WATER	60	1,490.0	151	80	34	68.2	75	1,760	460	3	1520	TACO	FI 6013D	1,2,3
CHWP-FT	2	SECONDARY CHILLED WATER LOOP	N+1	END SUCTION	CLOSE	VFD	WATER	60	1,490.0	151	80	34	68.2	75	1,760	460	3	1520	TACO	FI 6013D	1,2,3
CHWP-FT	3	SECONDARY CHILLED WATER LOOP	N+1	END SUCTION	CLOSE	VFD	WATER	60	1,490.0	151	80	34	68.2	75	1,760	460	3	1520	TACO	FI 6013D	1,2,3
CHWP-FT	4	SECONDARY CHILLED WATER LOOP	N+1	END SUCTION	CLOSE	VFD	WATER	60	1,490.0	151	80	34	68.2	75	1,760	460	3	1520	TACO	FI 6013D	1,2,3
CHWP-FT	5	PRIMARY CHILLED WATER - CHILLER	N+1	IN-LINE	SPLIT	VFD	WATER	60	1,050.0	45	75	6.9	17.0	20	1,760	460	3	796	TACO	KV 6011D	2
CHWP-FT	6	PRIMARY CHILLED WATER - CHILLER	N+1	IN-LINE	SPLIT	VFD	WATER	60	1,050.0	45	75	6.9	17.0	20	1,760	460	3	796	TACO	KV 6011D	2
CHWP-FT	7	PRIMARY CHILLED WATER - CHILLER	N+1	IN-LINE	SPLIT	VFD	WATER	60	1,050.0	45	75	6.9	17.0	20	1,760	460	3	796	TACO	KV 6011D	2
CHWP-FT	8	PRIMARY CHILLED WATER - CHILLER	N+1	IN-LINE	SPLIT	VFD	WATER	60	1,050.0	45	75	6.9	17.0	20	1,760	460	3	796	TACO	KV 6011D	2
CHWP-FT	9	PRIMARY CHILLED WATER - CHILLER	N+1	IN-LINE	SPLIT	VFD	WATER	60	1,050.0	45	75	6.9	17.0	20	1,760	460	3	796	TACO	KV 6011D	2
CHWP-FT	10	PRIMARY CHILLED WATER - FLUID COOLER	PER (2) FLUID COOLERS	IN-LINE	SPLIT	VFD	WATER	60	1,340.0	45	80	6.9	19.1	20	1,160	460	3	1220	TACO	KS 8013D	2
CHWP-FT	11	PRIMARY CHILLED WATER - FLUID COOLER	PER (2) FLUID COOLERS	IN-LINE	SPLIT	VFD	WATER	60	1,340.0	45	80	6.9	19.1	20	1,160	460	3	1220	TACO	KS 8013D	2
CHWP-FT	12	PRIMARY CHILLED WATER - FLUID COOLER	PER FLUID COOLER	IN-LINE	SPLIT	VFD	WATER	60	670.0	45	83	3.4	8.7	10	1,760	460	3	905	TACO	KS 6011D	2
CHWP-FT	13	PRIMARY CHILLED WATER - FLUID COOLER	PER FLUID COOLER	IN-LINE	SPLIT	VFD	WATER	60	670.0	45	83	3.4	8.7	10	1,760	460	3	905	TACO	KS 6011D	2
FP-FT	1	FLUID COOLER FILTER PUMP	N/A	SKID	CLOSE	VFD	WATER	60	220.0	10				7.5		460	3		PUROFLUX	PF-64-030-AP	1,2

NOTES:
1. PROVIDE WITH INERTIA BASE.
2. PROVIDE WITH TEFC MOTOR.
3. PROVIDE WITH SHAFT GROUNDING RING.

AIR COOLED CHILLER SCHEDULE

UNIT IDENTIFICATION			CAPACITY AND PERFORMANCE							EVAPORATOR						COMPRESSOR				CONDENSERS				ELECTRICAL				PHYSICAL CHARACTERISTICS				MANUFACTURER	MODEL NUMBER	NOTES
MARK	NUMBER	AREA/UNIT SERVED	UNIT CAPACITY (TONS)	EER	2018 WSCEC REQUIRED EER	IPLV	2018 WSCEC REQUIRED IPLV	REFRIG TYPE	REFRIG CHARGE (LBS)	FLUID TYPE	FLUID (GPM)	EWT (F)	LWT (F)	MAX WPD (FT)	FOULING FACTOR	TYPE	NO OF COMP	NO OF CIRCUITS	NO OF STAGES	NO OF FANS	AIRFLOW PER FAN (CFM)	HP PER FAN	AMBIENT DESIGN TEMP (F)	MIN AMBIENT TEMP (F)	VOLTS	PHASE	MCA	MOP	OPERATING WEIGHT (LBS)	DIMENSIONS HEIGHT (IN)	DIMENSIONS WIDTH (IN)	DIMENSIONS LENGTH (IN)			
ACC-FT	1	CHILLED WATER	500.0	12.5	10.1	19.99	14	R-513A	353	WATER	1,002	72.0	60.0	10.1	0.0001	SCREW	2	2	VSD	26	12,866	4	95	4	460	3	872.0	1,200	31,665	94	90	600	YORK	YVAA0523JPK46BHVTXX	1,2,3,4,5,6
ACC-FT	2	CHILLED WATER	500.0	12.5	10.1	19.99	14	R-513A	353	WATER	1,002	72.0	60.0	10.1	0.0001	SCREW	2	2	VSD	26	12,866	4	95	4	460	3	872.0	1,200	31,665	94	90	600	YORK	YVAA0523JPK46BHVTXX	1,2,3,4,5,6
ACC-FT	3	CHILLED WATER	500.0	12.5	10.1	19.99	14	R-513A	353	WATER	1,002	72.0	60.0	10.1	0.0001	SCREW	2	2	VSD	26	12,866	4	95	4	460	3	872.0	1,200	31,665	94	90	600	YORK	YVAA0523JPK46BHVTXX	1,2,3,4,5,6
ACC-FT	4	CHILLED WATER	500.0	12.5	10.1	19.99	14	R-513A	353	WATER	1,002	72.0	60.0	10.1	0.0001	SCREW	2	2	VSD	26	12,866	4	95	4	460	3	872.0	1,200	31,665	94	90	600	YORK	YVAA0523JPK46BHVTXX	1,2,3,4,5,6
ACC-FT	5	CHILLED WATER	500.0	12.5	10.1	19.99	14	R-513A	353	WATER	1,002	72.0	60.0	10.1	0.0001	SCREW	2	2	VSD	26	12,866	4	95	4	460	3	872.0	1,200	32,308	94	90	600	YORK	YVAA0523JPK46BHVTXX	2,3,4,5,6

NOTES:
1. OFCI.
2. PERFORMANCE BASED ON WATER.
3. PROVIDE SINGLE POINT ELECTRICAL CONNECTION, AND 65 kA SHORT CIRCUIT RATING.
4. PROVIDE WITH BACNET MSTP CONNECTION, OPTIVIEW CONTROL PANEL AND DISPLAY, AND CONDENSER FAN MONITORING PACKAGE.
5. PROVIDE WITH FLOW SWITCH.
6. PROVIDE WITH NEOPRENE PADS AS REQUIRED FOR INSTALLATION BY CONTRACTOR, NOTE OFCI CHILLERS ARE FURNISHED WITH PADS.

SUMP PUMP SCHEDULE

UNIT IDENTIFICATION			PUMP							MINIMUM VAULT DIMENSIONS			ELECTRICAL			MANUFACTURER	MODEL NUMBER	NOTES
MARK	NUMBER	LOCATION	TYPE	QUANTITY	FLOW (GPM)	HEAD (FT)	HP	SPEED (RPM)	DISCHARGE PIPE (IN)	WIDTH (IN)	LENGTH (IN)	HEIGHT (IN)	VOLTS	PHASE	CONNECTIONS			
SP	1	SOUTH YARD	DUPLEX	1	100	32	2	1750	3	42"	42"	36"	460	3	2	WEIL	2515	1

NOTES
1. PROVIDED WITH AIR FILLED EXPLOSION PROOF MOTORS, MOISTURE SENSING AND TEMPERATURE LIMITER PROBES, 25 FT. POWER/SENSOR CALBES, 20 FT. STAINLESS STEEL LIFTING CABLE, MODEL 2613-2" DUPLEX BCB REMOVAL SYSTEM WITH DISCHARGE FLOOR ELBOWS, BRONZE SLIDING BRACKET AND BCB DUPLEX GUIDE BRACKET, MODEL 2613KS02 SUB BASE FOR DUPLEX INSTALLATION, MODEL 2613KB01 LEVEL CONTROL LIFTING ASSEMBLY, MODEL 8233-AS INTRINSICALLY SAFE FLOAT SWITCHES WITH 20 FT. CORD LENGHT, MODEL 8162 NEMA 4 CONTROL PANEL, UL LISTED, DOUBLE DOOR DEAD FRONT, LOCKABLE DISCONNECTS, MAG CONTACTORS, OVERLOAD PROTECTION, T-O-A SWITCHES, TRANSFORMER, PILOT LIGHTS, HOUR METERS, TEMPERATURE LIMITER CIRCUIT, INTRINSICALLY SAFE MOISTURE SENSOR RELAY FLOAT CIRCUITRY, HWA HORN/LIGHT AND ISOLATED CONTACTS, INCLUDES NECESSARY INLET/OUTLET CONNECTIONS.

CLOSED CIRCUIT FLUID COOLERS SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	NOMINAL CAPACITY (TONS)	CONDENSER WATER FLOW (GPM)	CONDENSER WATER EWT (°F)	CONDENSER WATER LWT (°F)	AMBIENT AIR FLOW (CFM)	AMBIENT AIR WB (°F)	FAN MOTOR QTY	FAN MOTOR HP	FAN MOTOR V/Ø/HZ	PUMP QTY	PUMP HP	PUMP FLOW (GPM)	PUMP V/Ø/HZ	HEATERS QTY	HEATERS KW	UNIT SIZE HEIGHT	UNIT SIZE WIDTH	UNIT SIZE LENGTH	SPRAY PRESS. (PSI)	EVAP. RATE (GPM)	OPER WEIGHT (LBS)	NOTES
FC-FT-1	EVAPCO	ESW4 12-44O18-SF	536	670	72	60	155,600	53	1	50	460/3/60	2	5	506	460/3/60	2	9	242 IN	131 IN	216 IN.	2.7	4.04	44,310	1,2,3,4
FC-FT-2	EVAPCO	ESW4 12-44O18-SF	536	670	72	60	155,600	53	1	50	460/3/60	2	5	506	460/3/60	2	9	242 IN	131 IN	216 IN.	2.7	4.04	44,310	1,2,3,4
FC-FT-3	EVAPCO	ESW4 12-44O18-SF	536	670	72	60	155,600	53	1	50	460/3/60	2	5	506	460/3/60	2	9	242 IN	131 IN	216 IN.	2.7	4.04	44,310	1,2,3,4
FC-FT-4	EVAPCO	ESW4 12-44O18-SF	536	670	72	60	155,600	53	1	50	460/3/60	2	5	506	460/3/60	2	9	242 IN	131 IN	216 IN.	2.7	4.04	44,310	1,2,3,4
FC-FT-5	EVAPCO	ESW4 12-44O18-SF	536	670	72	60	155,600	53	1	50	460/3/60	2	5	506	460/3/60	2	9	242 IN	131 IN	216 IN.	2.7	4.04	44,310	1,2,3,4
FC-FT-6	EVAPCO	ESW4 12-44O18-SF	536	670	72	60	155,600	53	1	50	460/3/60	2	5	506	460/3/60	2	9	242 IN	131 IN	216 IN.	2.7	4.04	44,310	1,2,3,4

NOTES:
1. PROVIDE FLUID COOLER WITH STAINLESS STEEL BASIN, SUMP SWEEPER PIPING, AND S-PROBE WATER LEVEL CONTRL FANS SHALL BE PROVIDED WITH VFD AND A NEMA 3R ENCLOSURE.
2. MANUFACTURER SHALL FURNISH THE FOLLOWING ACCESSORIES: BASIN IMMERSION HEATER COMPONENTS & CONTROLS; BASIN WATER LEVEL COMPONENTS & CONTROLS; VIBRATION CUT-OUT SWITCH; VFD'S; MAKE-UP WATER SOLENOID VALVES.
3. INSTALLATION OF CONDUIT & WIRING OF THE FOLLOWING ACCESSORIES FROM THE CONTROL ENCOSURE SHALL BE PROVIDED BY THE EC: (2) BASIN IMMERSION HEATERS, (2) PUMPS, (1) FAN.
4. FLUID COOLERS SHALL COMPLY WITH 2021 WSEC TABLE C403.3.2(7) FOR REQUIRED COOLING TOWER INSTITUTE (CTI ATC-105S AND CTI STD-201 RS) RATING CONDITIONS.

AIR HANDLING UNIT CHILLED WATER COOLING COIL SCHEDULE

UNIT IDENTIFICATION			COIL					AIR							FLUID							OPERATING WEIGHT (LBS.)	NOTES
MARK	NUMBER	UNIT SERVED	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	NUMBER OF ROWS	FPI	FIN TYPE	TOTAL AIRFLOW (CFM)	EDB (F)	EWB (F)	LDB (F)	LWB (F)	FACE VELOCITY (FPM)	MAX APD (IN-WG)	FLUID TYPE	FLUID FLOW (GPM)	EWT (F)	LWT (F)	TUBE VELOCITY (FPS)	FOULING FACTOR	MAX WPD (FT)		
CW	1	AHU-FT-1	421.6	313.1	5	9	WAFFLE	10,000	81.4	66.5	52.3	52.0	359	0.38	CHW	84.0	45	55	4.2	0.0001	15.7	757.0	
CW	2	AHU-FT-1	421.6	313.1	5	9	WAFFLE	10,000	81.4	66.5	52.3	52.0	359	0.38	CHW	84.0	45	55	4.2	0.0001	15.7	757.0	

NOTES:

AIR AND DIRT SEPARATOR SCHEDULE

UNIT IDENTIFICATION			TYPE	CONNECTION SIZE (IN)	DIAMETER (IN)	HEIGHT (IN)	WEIGHT (LBS)	FLOW (GPM)	MAX WPD (FT)	MANUFACTURER	MODEL NUMBER	NOTES
MARK	NUMBER	SYSTEM SERVED										
AS-FT	1	CHILLED WATER	IN-LINE	14	28	140	1,890	4,470.0	9.0	SPIROTHERM	VHDT1400FA	

NOTES:

AIR HANDLING UNIT COMPONENT SCHEDULE

UNIT IDENTIFICATION				AIRFLOW	GENERAL				COMPONENTS						MANUFACTURER	NOTES
MARK	NUMBER	LOCATION	AREA SERVED	MAX SUPPLY AIR (CFM)	UNIT OPERATING WEIGHT (LBS)	MAX UNIT DIMENSIONS HEIGHT (IN)	MAX UNIT DIMENSIONS WIDTH (IN)	MAX UNIT DIMENSIONS LENGTH (IN)	POSITION NUMBER 1	POSITION NUMBER 2	POSITION NUMBER 3	POSITION NUMBER 4	POSITION NUMBER 5			
AHU-FT	1	L3	FUTURE TENANT RACKS	20,000	14,627	96	120	273	PLENUM	FILTERS	CHW COIL	ELECTRIC HEAT	FANS	NORTEK		1

NOTES:
1. UNIT SHALL BE MOUNTED ON A LEVEL PAD.
2. PROVIDE WASHINGTON STATE STAMPED SIESMIC TIEDOWN CALCULATIONS PER 2018 INTERNATIONAL BUILDING AND MECHANICAL CODES WITH WASHINGTON STATE AMENDMENTS. ALL EQUIPMENT, PIPING, AND DUCTWORK TO BE ATTACHED PER ASCE 7 AS REFERENCED BY IBC.

AIR HANDLING UNIT FAN SCHEDULE

UNIT IDENTIFICATION			SYSTEM				FAN WHEEL (EACH)			FAN MOTOR (EACH)					ELECTRICAL				NOTES
MARK	NUMBER	UNIT SERVED	MAX AIRFLOW (CFM)	TSP (IN-WG)	ESP (IN-WG)	CONTROL	TOTAL NO OF FANS	MAX AIRFLOW (CFM)	FAN CLASS	FAN SPEED (RPM)	BHP	HP	SPEED (RPM)	DRIVE TYPE	FEI	TOTAL SYSTEM HP	VOLTS	PHASE	FLA PER FANWALL	
FWT	1	AHU-FT-1	10,000	4.8	3.6	VFD PER FAN	2	10,000	III	1,829	11.7	15	2,669	DIRECT	1.35	30	460	3	38	1,2
FWT	2	AHU-FT-1	10,000	4.8	3.6	VFD PER FAN	2	10,000	III	1,829	11.7	15	2,669	DIRECT	1.35	30	460	3	38	1,2

NOTES:
1. FAN SHALL HAVE INLET AIRFLOW PROBE.
2. FAN ARRAY APPLICATIONS SHALL HAVE FANS WIRED TO A FACTORY INSTALLED CONTROL PANEL EACH FAN SHALL HAVE MANUAL MOTOR PROTECTION AND FUSING.

AIR HANDLING UNIT ELECTRIC HEATING COIL SCHEDULE

UNIT IDENTIFICATION			AIR						ELEMENT	ELECTRICAL		NOTES
MARK	NUMBER	UNIT SERVED	TOTAL AIRFLOW (CFM)	HEATING AIRFLOW (CFM)	EDB (F)	LDB (F)	FACE VELOCITY (FPM)	MAX APD (IN-WG)	KW	VOLTS	PHASE	
HC	1	AHU-FT-1	10,000	10,000	53.0	55.0	498	0.01	10.0	460	3	
HC	2	AHU-FT-1	10,000	10,000	53.0	55.0	498	0.01	10.0	460	3	

NOTES:

HVAC EXPANSION TANK SCHEDULE

UNIT IDENTIFICATION			TANK							SYSTEM						NOTES
MARK	NUMBER	SYSTEM SERVED	TYPE	ASME CONSTRUCTION	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	DIAMETER (IN)	HEIGHT (IN)	WEIGHT (LBS)	ESTIMATED SYSTEM VOLUME (GAL)	FLUID TYPE	OPERATING TEMPERATURE MIN TEMP (F)	OPERATING TEMPERATURE MAX TEMP (F)	OPERATING PRESSURE MIN PRESS (PSIG)	OPERATING PRESSURE MAX PRESS (PSIG)			
ET-FT	1	CHILLED WATER	BLADDER	STEEL	160.0	61.0	30	68	515	15,000	WATER	40	85	5.0	125.0	TACO	CBX600-125	1
ET-FT	2	CHILLED WATER	BLADDER	STEEL	160.0	61.0	30	68	515	15,000	WATER	40	85	5.0	125.0	TACO	CBX600-125	1

NOTES:
1. PROVIDE ASME RATED TANK.

PIPING SYSTEM APPLICATION SCHEDULE

SYSTEM	PIPE SIZE (IN)	DESIGN MAX VELOCITY (FPS)	DESIGN MAX FRICTION (FT/100')	CONSTRUCTION OPERATING TEMP (F)	CONSTRUCTION MIN WORKING PRESSURE (PSIG)	CONSTRUCTION MIN TEMP RATING (F)	CONSTRUCTION TEST PRESSURE (PSIG)	CONSTRUCTION TES DURATION (HRS)	LOCATION	MATERIAL COPPER TYPE K	MATERIAL COPPER TYPE L	MATERIAL A53 BS ERW SCH 40	MATERIAL A53 BS ERW STD	MATERIAL SCH 10 TYPE 316 STAINLESS STEEL	MATERIAL SCH 10 TYPE 304 STAINLESS STEEL	MATERIAL HDPE	MATERIAL PEX-A	JOINTS SOLDERED	JOINTS BRAZED	JOINTS THREADED	JOINTS WELDED	JOINTS PRESSURE FITTINGS	JOINTS GROOVED	HEAT TRACE QUANTITY OF WIRES	HEAT TRACE MIN WATTS PER LINEAR FT	INSULATION MINERAL FIBER, PREFORMED	INSULATION FLEXIBLE ELASTOMERIC	INSULATION THICKNESS (IN)	FACTORY JACKET ASJ	FACTORY JACKET ASJ-SS	FACTORY JACKET FSK	FACTORY JACKET VINYL	FIELD JACKET PVC - ALL	FIELD JACKET PVC - FITTINGS	FIELD JACKET PVC - TO 10 FEET AFF	FIELD JACKET ALUMINUM	FIELD JACKET STAINLESS STEEL	NOTES
CHILLED WATER & FLUID COOLER BASIN SWEEPER WATER	2 AND LESS	4	4.0	44-56	125	200	125	2.5	CONCEALED		X							X	X								X	1		X			X			1
									EXPOSED		X							X	X								X	1		X			X			1
									MECHANICAL ROOM		X							X	X								X	1		X			X	X		1
									OUTDOOR		X							X	X					1	5		X	1		X				X		1,2
									UNDERGROUND		X							X	X								X	1		X				X	X	1
	2-1/2 - 8	8	4.0	44-56	125	200	125	2.5	CONCEALED			X									X						X	1		X			X			1
									EXPOSED			X									X						X	1		X			X	X		1
									MECHANICAL ROOM			X									X						X	1		X			X	X		1
									OUTDOOR			X									X			1	8		X	1		X				X		1,2
									UNDERGROUND			X									X						X	1		X				X	X	1
	9 - 10	8	4.0	44-56	125	200	125	2.5	CONCEALED			X									X						X	1		X			X			1
									EXPOSED			X									X						X	1		X			X	X		1
									MECHANICAL ROOM			X									X						X	1		X			X	X		1
									OUTDOOR			X									X			1	10		X	1		X				X		1,2
									UNDERGROUND			X									X						X	1		X				X	X	1
	12 - 16	8	4.0	44-56	125	200	125	2.5	CONCEALED			X									X						X	1		X			X			1
									EXPOSED			X									X						X	1		X			X	X		1
									MECHANICAL ROOM			X									X						X	1		X			X	X		1
									OUTDOOR			X									X			2	5		X	1		X				X		1,2
									UNDERGROUND			X									X						X	1		X				X	X	1

NOTES:
1. PIPE INSULATION THICKNESS BASED ON 2021 WSEC
2. PROVIDE WITH SELF REGULATING HEAT TRACE CABLE MONITORED BY THE BAS.

DUCT SYSTEM APPLICATION SCHEDULE

SYSTEM	APPLICATION	LOCATION	DESIGN CRITERIA MAX VELOCITY (FPM)	DESIGN CRITERIA MAX FRICTION (IN-WG/100')	CONSTRUCTION DESIGN SYSTEM PRESSURE (IN-WG)	CONSTRUCTION SEAL CLASS	CONSTRUCTION MAX LEAKAGE RATE	PRODUCT SINGLE WALL	PRODUCT DOUBLE WALL SOLID LINER	PRODUCT DOUBLE WALL PERF LINER	MATERIAL G90 GALV SHEET	MATERIAL G90 PVC COATED GALV SHEET STEEL	MATERIAL 16 GA CARBON STEEL	MATERIAL ALUMINUM	MATERIAL 304 STAINLESS STEEL	MATERIAL 316 STAINLESS STEEL	MATERIAL FABRIC	LINER FIBERGLASS	LINER FLEXIBLE ELASTOMERIC	LINER NATURAL FIBER	LINER THICKNESS (IN)	LINER DENSITY (LB/FT³)	INSULATION FIBERGLASS BLANKET	INSULATION FIBERGLASS BOARD	INSULATION FLEXIBLE ELASTOMERIC	INSULATION FIRE RATED WRAP	INSULATION FIRE RATED BOARD	INSULATION INSULATION MINIMUM R-VALUE	INSULATION THICKNESS (IN)	INSULATION DENSITY (LB/FT³)	FACTORY JACKET ASJ	FACTORY JACKET ASJ-SS	FACTORY JACKET FSK	FACTORY JACKET VINYL	FIELD JACKET FABRIC	FIELD JACKET PVC	FIELD JACKET ALUMINUM	FIELD JACKET STAINLESS STEEL	FIELD JACKET SELF ADHESIVE	NOTES
SUPPLY AIR	ALL	CONCEALED	1,000	0.10	2	A	6	X			X												X					R-3.3	1.5	1.5			X							1
		EXPOSED	1,000	0.10	2	A	6	X			X													X				R-3.3	1	2.25			X							1
		MECHANICAL ROOM	1,200	0.10	6	A	6	X			X													X				R-3.3	1	2.25			X							1
RETURN AND TRANSFER AIR	ALL	CONCEALED	1,000	0.10	2	A	6	X			X																						X							1
		EXPOSED	1,000	0.10	2	A	6	X			X																						X							1
		MECHANICAL ROOM	1,200	0.10	6	A	6	X			X													X				R-8	2	2.25			X							1
GENERAL EXHAUST	ALL	CONCEALED	1,000	0.10	2	A	6	X			X																						X							1
		EXPOSED	1,000	0.10	2	A	6	X			X																						X							1
		LOUVER CAN	1,200	0.10	6	A	6	X			X													X				R-16	5	2.25			X							1
		MECHANICAL ROOM	1,200	0.10	6	A	6	X			X													X				R-8	2	2.25			X							1
OUTSIDE AIR	ALL	LOUVER CAN	1,200	0.10	6	A	6	X			X													X				R-16	5	2.25			X							1
		MECHANICAL ROOM	1,200	0.10	6	A	6	X			X													X				R-8	2	2.25			X							1

NOTES:
1. DUCT INSULATION THICKNESS BASED ON 2021 WSEC

BUFFER TANK SCHEDULE

UNIT IDENTIFICATION			VOLUME (GAL)	ASME CONST	DIAMETER (IN)	HEIGHT (IN)	ARRANGEMENT	SYSTEM FLUID	SYSTEM TEMP (F)	WEIGHT (LBS)	MANUFACTURER	MODEL NUMBER	NOTES
MARK	NUMBER	SYSTEM SERVED											
BT-FT	1	CHILLED WATER	500	YES	42	90	14" FLANGED	WATER	60.0	TBD	CEMLINE	V500CWB14-F-SL-05-I	1, 2
BT-FT	2	CHILLED WATER	500	YES	42	90	14" FLANGED	WATER	60.0	TBD	CEMLINE	V500CWB14-F-SL-05-I	1, 2
BT-FT	3	CHILLED WATER	500	YES	42	90	14" FLANGED	WATER	60.0	TBD	CEMLINE	V500CWB14-F-SL-05-I	1, 2

NOTES:
1. PROVIDE TANK COATING.
2. UNIT SHALL BE FACTORY INSULATED.

City of Puyallup
Development & Permitting Services
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MECHANICAL DRAWINGS

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JEFFREY M. LINCOLN — STATE OF WASHINGTON — 49574 — REGISTERED PROFESSIONAL ENGINEER
2024-12-27

PRCTI20242004

Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024
2	FUTURE TENANT PERMIT COMMENTS	10/01/2024
3	FUTURE TENANT REVISIONS	12/03/2024
4	FUTURE TENANT PERMIT REVISIONS	12/27/2024

Drawn By: RM
Checked By: JL

Title: MECHANICAL SCHEDULES

Sheet: M.FT.010

MECHANICAL ENERGY AT 25% ITE LOAD CALCULATION

AMBIENT TEMPERATURE WB (°F)	AMBIENT MEAN COINCIDENT DB (°F)	ASHRAE TMY HOURS	NUMBER OF OPERATING CHILLERS	CHILLER CAPACITY (TONS)	CHILLER ENERGY (KW)	CHILLER ENERGY USAGE (KWH)	NUMBER OF OPERATING FLUID COOLERS	FLUID COOLER OPERATING CAPACITY (%)	FLUID COOLER FAN (HP)	FLUID COOLER FAN MOTOR EFFICIENCY (%)	FLUID COOLER FAN DRIVE EFFICIENCY (%)	FLUID COOLER FAN VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER FAN ENERGY (KW)	FLUID COOLER FAN (KWH)	FLUID COOLER PUMP (HP)	FLUID COOLER PUMP WATER FLOW (GPM)	NUMBER OF FLUID COOLER PUMPS PER FLUID COOLER	FLUID COOLER PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER PUMP TOTAL (KW)	FLUID COOLER PUMP TOTAL (KWH)
74	82.2	1	1	440	312.2	312																
72	89.6	27	1	440	365.1	9,858																
70	84.6	41	1	440	322.5	13,223																
68	81.9	105	1	440	312.2	32,781																
66	78.2	148	1	440	294	43,512																
64	74.7	191	1	440	275	52,525																
62	71.9	256	1	440	266.5	68,224																
60	67.8	293	1	440	251.3	73,631																
58	65.4	426	1	440	246.2	104,881																
56	62.4	440	1	440	239.4	105,336																
54	60.6	588	1	440	237.1	139,415																
52	57.4	530					2	100%	50	0.945	0.97	0.97	83.87	44,449	5	505	2	0.875	0.97	0.97	18.12	9,601
50	54.7	498					2	100%	50	0.945	0.97	0.97	83.87	41,766	5	505	2	0.875	0.97	0.97	18.12	9,021
48	52.3	517					2	100%	50	0.945	0.97	0.97	83.87	43,359	5	505	2	0.875	0.97	0.97	18.12	9,366
46	50.3	557					2	100%	50	0.945	0.97	0.97	83.87	46,714	5	505	2	0.875	0.97	0.97	18.12	10,090
44	48.1	468					2	100%	50	0.945	0.97	0.97	83.87	39,250	5	505	2	0.875	0.97	0.97	18.12	8,478
42	45.7	698					2	100%	50	0.945	0.97	0.97	83.87	58,539	5	505	2	0.875	0.97	0.97	18.12	12,644
40	43.3	771					2	100%	50	0.945	0.97	0.97	83.87	64,661	5	505	2	0.875	0.97	0.97	18.12	13,967
38	41.2	674					2	100%	50	0.945	0.97	0.97	83.87	56,526	5	505	2	0.875	0.97	0.97	18.12	12,210
36	39.3	518					2	100%	50	0.945	0.97	0.97	83.87	43,443	5	505	2	0.875	0.97	0.97	18.12	9,384
34	37.2	465					2	100%	50	0.945	0.97	0.97	83.87	38,998	5	505	2	0.875	0.97	0.97	18.12	8,424
32	35.3	228					2	100%	50	0.945	0.97	0.97	83.87	19,122	5	505	2	0.875	0.97	0.97	18.12	4,130
30	33.3	118					2	100%	50	0.945	0.97	0.97	83.87	9,896	5	505	2	0.875	0.97	0.97	18.12	2,138
28	31.6	99					2	100%	50	0.945	0.97	0.97	83.87	8,303	5	505	2	0.875	0.97	0.97	18.12	1,793
26	29.4	46					2	100%	50	0.945	0.97	0.97	83.87	3,858	5	505	2	0.875	0.97	0.97	18.12	833
24	27.6	29					2	100%	50	0.945	0.97	0.97	83.87	2,432	5	505	2	0.875	0.97	0.97	18.12	525
22	25.9	13					2	100%	50	0.945	0.97	0.97	83.87	1,090	5	505	2	0.875	0.97	0.97	18.12	235
20	24.2	15					2	100%	50	0.945	0.97	0.97	83.87	1,258	5	505	2	0.875	0.97	0.97	18.12	272

AMBIENT TEMPERATURE WB (°F)	FLUID COOLER CHILLED WATER PRIMARY PUMP FLOW (GPM)	FLUID COOLER CHILLED WATER PRIMARY PUMPS POWER (HP)	FLUID COOLER PRIMARY PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIEN...	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KW)	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KWH)	TOTAL AIR HANDLER FAN ENERGY (KW)	TOTAL AIR HANDLER FAN ENERGY (KWH)	NUMBER OF CHILLER PRIMARY PUMPS	CHILLER PRIMARY PUMP CAPACITY (%)	CHILLER PRIMARY PUMP FLOW (GPM)	CHILLER PRIMARY PUMP BRAKE POWER (BHP)	CHILLER PRIMARY PUMP MOTOR EFFICIENCY (%)	CHILLER PRIMARY PUMP DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP ENERGY (KW)	CHILLER PRIMARY PUMP ENERGY (KWH)	NUMBER OF SECONDARY PUMPS	SECONDARY PUMP CAPACITY (%)	SECONDARY PUMP FLOW (GPM)	SECONDARY PUMP BRAKE POWER (HP)	SECONDARY PUMP MOTOR EFFICIENCY (%)	SECONDARY PUMP DRIVE EFFICIENCY (%)	SECONDARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	SECONDARY PUMP ENERGY (KW)	SECONDARY PUMP ENERGY (KWH)
74								8.337	8.337	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	20	1	70%	1043	23.39	0.902	0.83	0.98	23.78	24
72								8.337	225.099	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	545	1	70%	1043	23.39	0.902	0.83	0.98	23.78	642
70								8.337	341.817	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	827	1	70%	1043	23.39	0.902	0.83	0.98	23.78	975
68								8.337	875.385	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	2,118	1	70%	1043	23.39	0.902	0.83	0.98	23.78	2,496
66								8.337	1233.876	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	2,986	1	70%	1043	23.39	0.902	0.83	0.98	23.78	3,519
64								8.337	1592.367	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	3,853	1	70%	1043	23.39	0.902	0.83	0.98	23.78	4,541
62								8.337	2134.272	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	5,164	1	70%	1043	23.39	0.902	0.83	0.98	23.78	6,087
60								8.337	2442.741	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	5,911	1	70%	1043	23.39	0.902	0.83	0.98	23.78	6,966
58								8.337	3551.562	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	8,593	1	70%	1043	23.39	0.902	0.83	0.98	23.78	10,128
56								8.337	3668.28	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	8,876	1	70%	1043	23.39	0.902	0.83	0.98	23.78	10,461
54								8.337	4902.156	1.0	100%	1,050	17	0.855	0.75	0.98	20.17	11,861	1	70%	1043	23.39	0.902	0.83	0.98	23.78	13,980
52	670	8.7	0.84	0.83	0.98	18.99	20,130	8.337	4418.61										1	70%	1043	23.39	0.902	0.83	0.98	23.78	12,601
50	670	8.7	0.84	0.83	0.98	18.99	18,914	8.337	4151.826										1	70%	1043	23.39	0.902	0.83	0.98	23.78	11,840
48	670	8.7	0.84	0.83	0.98	18.99	19,636	8.337	4310.229										1	70%	1043	23.39	0.902	0.83	0.98	23.78	12,292
46	670	8.7	0.84	0.83	0.98	18.99	21,155	8.337	4643.709										1	70%	1043	23.39	0.902	0.83	0.98	23.78	13,243
44	670	8.7	0.84	0.83	0.98	18.99	17,775	8.337	3901.716										1	70%	1043	23.39	0.902	0.83	0.98	23.78	11,127
42	670	8.7	0.84	0.83	0.98	18.99	26,510	8.337	5819.226										1	70%	1043	23.39	0.902	0.83	0.98	23.78	16,595
40	670	8.7	0.84	0.83	0.98	18.99	29,283	8.337	6427.827										1	70%	1043	23.39	0.902	0.83	0.98	23.78	18,331
38	670	8.7	0.84	0.83	0.98	18.99	25,599	8.337	5619.138										1	70%	1043	23.39	0.902	0.83	0.98	23.78	16,025
36	670	8.7	0.84	0.83	0.98	18.99	19,674	8.337	4318.566										1	70%	1043	23.39	0.902	0.83	0.98	23.78	12,316
34	670	8.7	0.84	0.83	0.98	18.99	17,661	8.337	3876.705										1	70%	1043	23.39	0.902	0.83	0.98	23.78	11,056
32	670	8.7	0.84	0.83	0.98	18.99	8,660	8.337	1900.836										1	70%	1043	23.39	0.902	0.83	0.98	23.78	5,421
30	670	8.7	0.84	0.83	0.98	18.99	4,482	8.337	983.766										1	70%	1043	23.39	0.902	0.83	0.98	23.78	2,806
28	670	8.7	0.84	0.83	0.98	18.99	3,760	8.337	825.363										1	70%	1043	23.39	0.902	0.83	0.98	23.78	2,354
26	670	8.7	0.84	0.83	0.98	18.99	1,747	8.337	383.502										1	70%	1043	23.39	0.902	0.83	0.98	23.78	1,094
24	670	8.7	0.84	0.83	0.98	18.99	1,101	8.337	241.773										1	70%	1043	23.39	0.902	0.83	0.98	23.78	689
22	670	8.7	0.84	0.83	0.98	18.99	494	8.337	108.381										1	70%	1043	23.39	0.902	0.83	0.98	23.78	309
20	670	8.7	0.84	0.83	0.98	18.99	570	8.337	125.055										1	70%	1043	23.39	0.902	0.83	0.98	23.78	357

MECHANICAL ENERGY AT 50% ITE LOAD CALCULATION

AMBIENT TEMPERATURE WB (°F)	AMBIENT MEAN COINCIDENT DB (°F)	ASHRAE TMY HOURS	NUMBER OF OPERATING CHILLERS	CHILLER CAPACITY (TONS)	CHILLER ENERGY (KW)	CHILLER ENERGY USAGE (KWH)	NUMBER OF OPERATING FLUID COOLERS	FLUID COOLER OPERATING CAPACITY (%)	FLUID COOLER FAN (HP)	FLUID COOLER FAN MOTOR EFFICIENCY (%)	FLUID COOLER FAN DRIVE EFFICIENCY (%)	FLUID COOLER FAN VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER FAN ENERGY (KW)	FLUID COOLER FAN (KWH)	FLUID COOLER PUMP (HP)	FLUID COOLER PUMP WATER FLOW (GPM)	NUMBER OF FLUID COOLER PUMPS PER FLUID COOLER	FLUID COOLER PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER PUMP TOTAL (KW)	FLUID COOLER PUMP TOTAL (KWH)
74	82.2	1	2	440	312.2	624																
72	89.6	27	2	440	365.1	19,715																
70	84.6	41	2	440	322.5	26,445																
68	81.9	105	2	440	312.2	65,562																
66	78.2	148	2	440	294	87,024																
64	74.7	191	2	440	275	105,050																
62	71.9	256	2	440	266.5	136,448																
60	67.8	293	2	440	251.3	147,262																
58	65.4	426	2	440	246.2	209,762																
56	62.4	440	2	440	239.4	210,672																
54	60.6	588	2	440	237.1	278,830																
52	57.4	530					3	100%	50	0.945	0.97	0.97	125.80	66,674	5	505	2	0.875	0.97	0.97	27.17	14,402
50	54.7	498					3	100%	50	0.945	0.97	0.97	125.80	62,648	5	505	2	0.875	0.97	0.97	27.17	13,532
48	52.3	517					3	100%	50	0.945	0.97	0.97	125.80	65,039	5	505	2	0.875	0.97	0.97	27.17	14,048
46	50.3	557					3	100%	50	0.945	0.97	0.97	125.80	70,071	5	505	2	0.875	0.97	0.97	27.17	15,135
44	48.1	468					3	100%	50	0.945	0.97	0.97	125.80	58,874	5	505	2	0.875	0.97	0.97	27.17	12,717
42	45.7	698					3	100%	50	0.945	0.97	0.97	125.80	87,808	5	505	2	0.875	0.97	0.97	27.17	18,967
40	43.3	771					3	100%	50	0.945	0.97	0.97	125.80	96,992	5	505	2	0.875	0.97	0.97	27.17	20,950
38	41.2	674					3	100%	50	0.945	0.97	0.97	125.80	84,789	5	505	2	0.875	0.97	0.97	27.17	18,314
36	39.3	518					3	100%	50	0.945	0.97	0.97	125.80	65,164	5	505	2	0.875	0.97	0.97	27.17	14,075
34	37.2	465					3	100%	50	0.945	0.97	0.97	125.80	58,497	5	505	2	0.875	0.97	0.97	27.17	12,635
32	35.3	228					3	100%	50	0.945	0.97	0.97	125.80	28,682	5	505	2	0.875	0.97	0.97	27.17	6,195
30	33.3	118					3	100%	50	0.945	0.97	0.97	125.80	14,844	5	505	2	0.875	0.97	0.97	27.17	3,206
28	31.6	99					3	100%	50	0.945	0.97	0.97	125.80	12,454	5	505	2	0.875	0.97	0.97	27.17	2,690
26	29.4	46					3	100%	50	0.945	0.97	0.97	125.80	5,787	5	505	2	0.875	0.97	0.97	27.17	1,250
24	27.6	29					3	100%	50	0.945	0.97	0.97	125.80	3,648	5	505	2	0.875	0.97	0.97	27.17	788
22	25.9	13					3	100%	50	0.945	0.97	0.97	125.80	1,635	5	505	2	0.875	0.97	0.97	27.17	353
20	24.2	15					3	100%	50	0.945	0.97	0.97	125.80	1,887	5	505	2	0.875	0.97	0.97	27.17	408

AMBIENT TEMPERATURE WB (°F)	FLUID COOLER CHILLED WATER PRIMARY PUMP FLOW (GPM)	FLUID COOLER CHILLED WATER PRIMARY PUMPS POWER (HP)	FLUID COOLER PRIMARY PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIEN...	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KW)	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KWH)	TOTAL AIR HANDLER FAN ENERGY (KW)	TOTAL AIR HANDLER FAN ENERGY (KWH)	NUMBER OF CHILLER PRIMARY PUMPS	CHILLER PRIMARY PUMP CAPACITY (%)	CHILLER PRIMARY PUMP FLOW (GPM)	CHILLER PRIMARY PUMP BRAKE POWER (BHP)	CHILLER PRIMARY PUMP MOTOR EFFICIENCY (%)	CHILLER PRIMARY PUMP DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP ENERGY (KW)	CHILLER PRIMARY PUMP ENERGY (KWH)	NUMBER OF SECONDARY PUMPS	SECONDARY PUMP CAPACITY (%)	SECONDARY PUMP FLOW (GPM)	SECONDARY PUMP BRAKE POWER (HP)	SECONDARY PUMP MOTOR EFFICIENCY (%)	SECONDARY PUMP DRIVE EFFICIENCY (%)	SECONDARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	SECONDARY PUMP ENERGY (KW)	SECONDARY PUMP ENERGY (KWH)
74								8.337	8.337	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	40	2	70%	1043	23.39	0.902	0.83	0.98	47.55	48
72								8.337	225.099	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	1,089	2	70%	1043	23.39	0.902	0.83	0.98	47.55	1,284
70								8.337	341.817	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	1,654	2	70%	1043	23.39	0.902	0.83	0.98	47.55	1,950
68								8.337	875.385	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	4,236	2	70%	1043	23.39	0.902	0.83	0.98	47.55	4,993
66								8.337	1233.876	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	5,971	2	70%	1043	23.39	0.902	0.83	0.98	47.55	7,038
64								8.337	1592.367	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	7,706	2	70%	1043	23.39	0.902	0.83	0.98	47.55	9,082
62								8.337	2134.272	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	10,328	2	70%	1043	23.39	0.902	0.83	0.98	47.55	12,173
60								8.337	2442.741	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	11,821	2	70%	1043	23.39	0.902	0.83	0.98	47.55	13,933
58								8.337	3551.562	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	17,187	2	70%	1043	23.39	0.902	0.83	0.98	47.55	20,257
56								8.337	3668.28	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	17,752	2	70%	1043	23.39	0.902	0.83	0.98	47.55	20,923
54								8.337	4902.156	2.0	100%	1,050	17	0.855	0.75	0.98	40.34	23,723	2	70%	1043	23.39	0.902	0.83	0.98	47.55	27,960
52	670	8.7	0.84	0.83	0.98	28.49	45,292	8.337	4418.61										2	70%	1043	23.39	0.902	0.83	0.98	47.55	25,202
50	670	8.7	0.84	0.83	0.98	28.49	42,557	8.337	4151.826										2	70%	1043	23.39	0.902	0.83	0.98	47.55	23,681
48	670	8.7	0.84	0.83	0.98	28.49	44,181	8.337	4310.229										2	70%	1043	23.39	0.902	0.83	0.98	47.55	24,584
46	670	8.7	0.84	0.83	0.98	28.49	47,599	8.337	4643.709										2	70%	1043	23.39	0.902	0.83	0.98	47.55	26,486
44	670	8.7	0.84	0.83	0.98	28.49	39,993	8.337	3901.716										2	70%	1043	23.39	0.902	0.83	0.98	47.55	22,254
42	670	8.7	0.84	0.83	0.98	28.49	59,648	8.337	5819.226										2	70%	1043	23.39	0.902	0.83	0.98	47.55	33,191
40	670	8.7	0.84	0.83	0.98	28.49	65,887	8.337	6427.827										2	70%	1043	23.39	0.902	0.83	0.98	47.55	36,662
38	670	8.7	0.84	0.83	0.98	28.49	57,597	8.337	5619.138										2	70%	1043	23.39	0.902	0.83	0.98	47.55	32,050
36	670	8.7	0.84	0.83	0.98	28.49	44,266	8.337	4318.566										2	70%	1043	23.39	0.902	0.83	0.98	47.55	24,632
34	670	8.7	0.84	0.83	0.98	28.49	39,737	8.337	3876.705										2	70%	1043	23.39	0.902	0.83	0.98	47.55	22,111
32	670	8.7	0.84	0.83	0.98	28.49	19,484	8.337	1900.836										2	70%	1043	23.39	0.902	0.83	0.98	47.55	10,842
30	670	8.7	0.84	0.83	0.98	28.49	10,084	8.337	983.766										2	70%	1043	23.39	0.902	0.83	0.98	47.55	5,611
28	670	8.7	0.84	0.83	0.98	28.49	8,460	8.337	825.363										2	70%	1043	23.39	0.902	0.83	0.98	47.55	4,708
26	670	8.7	0.84	0.83	0.98	28.49	3,931	8.337	383.502										2	70%	1043	23.39	0.902	0.83	0.98	47.55	2,187
24	670	8.7	0.84	0.83	0.98	28.49	2,478	8.337	241.773										2	70%	1043	23.39	0.902	0.83	0.98	47.55	1,379
22	670	8.7	0.84	0.83	0.98	28.49	1,111	8.337	108.381										2	70%	1043	23.39	0.902	0.83	0.98	47.55	618
20	670	8.7	0.84	0.83	0.98	28.49	1,282	8.337	125.055										2	70%	1043	23.39	0.902	0.83	0.98	47.55	713

MECHANICAL ENERGY AT 75% ITE LOAD CALCULATION

AMBIENT TEMPERATURE WB (°F)	AMBIENT MEAN COINCIDENT DB (°F)	ASHRAE TMY HOURS	NUMBER OF OPERATING CHILLERS	CHILLER CAPACITY (TONS)	CHILLER ENERGY (KW)	CHILLER ENERGY USAGE (KWH)	NUMBER OF OPERATING FLUID COOLERS	FLUID COOLER OPERATING CAPACITY (%)	FLUID COOLER FAN (HP)	FLUID COOLER FAN MOTOR EFFICIENCY (%)	FLUID COOLER FAN DRIVE EFFICIENCY (%)	FLUID COOLER FAN VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER FAN ENERGY (KW)	FLUID COOLER FAN (KWH)	FLUID COOLER PUMP (HP)	FLUID COOLER PUMP WATER FLOW (GPM)	NUMBER OF FLUID COOLER PUMPS PER FLUID COOLER	FLUID COOLER PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER PUMP TOTAL (KW)	FLUID COOLER PUMP TOTAL (KWH)
74	82.2	1	3	440	312.2	937																
72	89.6	27	3	440	365.1	29,573																
70	84.6	41	3	440	322.5	39,668																
68	81.9	105	3	440	312.2	98,343																
66	78.2	148	3	440	294	130,536																
64	74.7	191	3	440	275	157,575																
62	71.9	256	3	440	266.5	204,672																
60	67.8	293	3	440	251.3	220,893																
58	65.4	426	3	440	246.2	314,644																
56	62.4	440	3	440	239.4	316,008																
54	60.6	588	3	440	237.1	418,244																
52	57.4	530					5	100%	50	0.945	0.97	0.97	209.67	111,123	5	505	2	0.875	0.97	0.97	45.29	24,003
50	54.7	498					5	100%	50	0.945	0.97	0.97	209.67	104,414	5	505	2	0.875	0.97	0.97	45.29	22,553
48	52.3	517					5	100%	50	0.945	0.97	0.97	209.67	108,398	5	505	2	0.875	0.97	0.97	45.29	23,414
46	50.3	557					5	100%	50	0.945	0.97	0.97	209.67	116,784	5	505	2	0.875	0.97	0.97	45.29	25,225
44	48.1	468					5	100%	50	0.945	0.97	0.97	209.67	98,124	5	505	2	0.875	0.97	0.97	45.29	21,195
42	45.7	698					5	100%	50	0.945	0.97	0.97	209.67	146,347	5	505	2	0.875	0.97	0.97	45.29	31,611
40	43.3	771					5	100%	50	0.945	0.97	0.97	209.67	161,653	5	505	2	0.875	0.97	0.97	45.29	34,917
38	41.2	674					5	100%	50	0.945	0.97	0.97	209.67	141,315	5	505	2	0.875	0.97	0.97	45.29	30,524
36	39.3	518					5	100%	50	0.945	0.97	0.97	209.67	108,607	5	505	2	0.875	0.97	0.97	45.29	23,459
34	37.2	465					5	100%	50	0.945	0.97	0.97	209.67	97,495	5	505	2	0.875	0.97	0.97	45.29	21,059
32	35.3	228					5	100%	50	0.945	0.97	0.97	209.67	47,804	5	505	2	0.875	0.97	0.97	45.29	10,326
30	33.3	118					5	100%	50	0.945	0.97	0.97	209.67	24,741	5	505	2	0.875	0.97	0.97	45.29	5,344
28	31.6	99					5	100%	50	0.945	0.97	0.97	209.67	20,757	5	505	2	0.875	0.97	0.97	45.29	4,484
26	29.4	46					5	100%	50	0.945	0.97	0.97	209.67	9,645	5	505	2	0.875	0.97	0.97	45.29	2,083
24	27.6	29					5	100%	50	0.945	0.97	0.97	209.67	6,080	5	505	2	0.875	0.97	0.97	45.29	1,313
22	25.9	13					5	100%	50	0.945	0.97	0.97	209.67	2,726	5	505	2	0.875	0.97	0.97	45.29	589
20	24.2	15					5	100%	50	0.945	0.97	0.97	209.67	3,145	5	505	2	0.875	0.97	0.97	45.29	679

AMBIENT TEMPERATURE WB (°F)	FLUID COOLER CHILLED WATER PRIMARY PUMP FLOW (GPM)	FLUID COOLER CHILLED WATER PRIMARY PUMPS POWER (HP)	FLUID COOLER PRIMARY PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIEN...	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KW)	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KWH)	TOTAL AIR HANDLER FAN ENERGY (KW)	TOTAL AIR HANDLER FAN ENERGY (KWH)	NUMBER OF CHILLER PRIMARY PUMPS	CHILLER PRIMARY PUMP CAPACITY (%)	CHILLER PRIMARY PUMP FLOW (GPM)	CHILLER PRIMARY PUMP BRAKE POWER (BHP)	CHILLER PRIMARY PUMP MOTOR EFFICIENCY (%)	CHILLER PRIMARY PUMP DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP ENERGY (KW)	CHILLER PRIMARY PUMP ENERGY (KWH)	NUMBER OF SECONDARY PUMPS	SECONDARY PUMP CAPACITY (%)	SECONDARY PUMP FLOW (GPM)	SECONDARY PUMP BRAKE POWER (HP)	SECONDARY PUMP MOTOR EFFICIENCY (%)	SECONDARY PUMP DRIVE EFFICIENCY (%)	SECONDARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	SECONDARY PUMP ENERGY (KW)	SECONDARY PUMP ENERGY (KWH)
74								12.5055	12.5055	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	61	3	70%	1043	23.39	0.902	0.83	0.98	71.33	71
72								12.5055	337.6485	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	1,634	3	70%	1043	23.39	0.902	0.83	0.98	71.33	1,926
70								12.5055	512.7255	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	2,481	3	70%	1043	23.39	0.902	0.83	0.98	71.33	2,924
68								12.5055	1313.0775	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	6,354	3	70%	1043	23.39	0.902	0.83	0.98	71.33	7,489
66								12.5055	1850.814	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	8,957	3	70%	1043	23.39	0.902	0.83	0.98	71.33	10,556
64								12.5055	2388.5505	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	11,559	3	70%	1043	23.39	0.902	0.83	0.98	71.33	13,623
62								12.5055	3201.408	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	15,492	3	70%	1043	23.39	0.902	0.83	0.98	71.33	18,260
60								12.5055	3664.1115	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	17,732	3	70%	1043	23.39	0.902	0.83	0.98	71.33	20,899
58								12.5055	5327.343	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	25,780	3	70%	1043	23.39	0.902	0.83	0.98	71.33	30,385
56								12.5055	5502.42	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	26,628	3	70%	1043	23.39	0.902	0.83	0.98	71.33	31,384
54								12.5055	7353.234	3.0	100%	1,050	17	0.855	0.75	0.98	60.52	35,584	3	70%	1043	23.39	0.902	0.83	0.98	71.33	41,940
52	670	8.7	0.84	0.83	0.98	47.48	125,810	12.5055	6627.915										3	70%	1043	23.39	0.902	0.83	0.98	71.33	37,803
50	670	8.7	0.84	0.83	0.98	47.48	118,214	12.5055	6227.739										3	70%	1043	23.39	0.902	0.83	0.98	71.33	35,521
48	670	8.7	0.84	0.83	0.98	47.48	122,724	12.5055	6465.3435										3	70%	1043	23.39	0.902	0.83	0.98	71.33	36,876
46	670	8.7	0.84	0.83	0.98	47.48	132,219	12.5055	6965.5635										3	70%	1043	23.39	0.902	0.83	0.98	71.33	39,729
44	670	8.7	0.84	0.83	0.98	47.48	111,093	12.5055	5852.574										3	70%	1043	23.39	0.902	0.83	0.98	71.33	33,381
42	670	8.7	0.84	0.83	0.98	47.48	165,690	12.5055	8728.839										3	70%	1043	23.39	0.902	0.83	0.98	71.33	49,786
40	670	8.7	0.84	0.83	0.98	47.48	183,018	12.5055	9641.7405										3	70%	1043	23.39	0.902	0.83	0.98	71.33	54,993
38	670	8.7	0.84	0.83	0.98	47.48	159,993	12.5055	8428.707										3	70%	1043	23.39	0.902	0.83	0.98	71.33	48,074
36	670	8.7	0.84	0.83	0.98	47.48	122,962	12.5055	6477.849										3	70%	1043	23.39	0.902	0.83	0.98	71.33	36,947
34	670	8.7	0.84	0.83	0.98	47.48	110,381	12.5055	5815.0575										3	70%	1043	23.39	0.902	0.83	0.98	71.33	33,167
32	670	8.7	0.84	0.83	0.98	47.48	54,122	12.5055	2851.254										3	70%	1043	23.39	0.902	0.83	0.98	71.33	16,263
30	670	8.7	0.84	0.83	0.98	47.48	28,011	12.5055	1475.649										3	70%	1043	23.39	0.902	0.83	0.98	71.33	8,417
28	670	8.7	0.84	0.83	0.98	47.48	23,500	12.5055	1238.0445										3	70%	1043	23.39	0.902	0.83	0.98	71.33	7,061
26	670	8.7	0.84	0.83	0.98	47.48	10,919	12.5055	575.253										3	70%	1043	23.39	0.902	0.83	0.98	71.33	3,281
24	670	8.7	0.84	0.83	0.98	47.48	6,884	12.5055	362.6595										3	70%	1043	23.39	0.902	0.83	0.98	71.33	2,068
22	670	8.7	0.84	0.83	0.98	47.48	3,086	12.5055	162.5715										3	70%	1043	23.39	0.902	0.83	0.98	71.33	927
20	670	8.7	0.84	0.83	0.98	47.48	3,561	12.5055	187.5825										3	70%	1043	23.39	0.902	0.83	0.98	71.33	1,070

MECHANICAL ENERGY AT 100% ITE LOAD CALCULATION

AMBIENT TEMPERATURE WB (°F)	AMBIENT MEAN COINCIDENT DB (°F)	ASHRAE TMY HOURS	NUMBER OF OPERATING CHILLERS	CHILLER CAPACITY (TONS)	CHILLER ENERGY (KW)	CHILLER ENERGY USAGE (KWH)	NUMBER OF OPERATING FLUID COOLERS	FLUID COOLER OPERATING CAPACITY (%)	FLUID COOLER FAN (HP)	FLUID COOLER FAN MOTOR EFFICIENCY (%)	FLUID COOLER FAN DRIVE EFFICIENCY (%)	FLUID COOLER FAN VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER FAN ENERGY (KW)	FLUID COOLER FAN (KWH)	FLUID COOLER PUMP (HP)	FLUID COOLER PUMP WATER FLOW (GPM)	NUMBER OF FLUID COOLER PUMPS PER FLUID COOLER	FLUID COOLER PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER PUMP TOTAL (KW)	FLUID COOLER PUMP TOTAL (KWH)
74	82.2	1	4	440	312.2	1,249																
72	89.6	27	4	440	365.1	39,431																
70	84.6	41	4	440	322.5	52,890																
68	81.9	105	4	440	312.2	131,124																
66	78.2	148	4	440	294	174,048																
64	74.7	191	4	440	275	210,100																
62	71.9	256	4	440	266.5	272,896																
60	67.8	293	4	440	251.3	294,524																
58	65.4	426	4	440	246.2	419,525																
56	62.4	440	4	440	239.4	421,344																
54	60.6	588	4	440	237.1	557,659																
52	57.4	530					6	100%	50	0.945	0.97	0.97	251.60	133,348	5	505	2	0.875	0.97	0.97	54.35	28,803
50	54.7	498					6	100%	50	0.945	0.97	0.97	251.60	125,297	5	505	2	0.875	0.97	0.97	54.35	27,064
48	52.3	517					6	100%	50	0.945	0.97	0.97	251.60	130,077	5	505	2	0.875	0.97	0.97	54.35	28,097
46	50.3	557					6	100%	50	0.945	0.97	0.97	251.60	140,141	5	505	2	0.875	0.97	0.97	54.35	30,270
44	48.1	468					6	100%	50	0.945	0.97	0.97	251.60	117,749	5	505	2	0.875	0.97	0.97	54.35	25,434
42	45.7	698					6	100%	50	0.945	0.97	0.97	251.60	175,617	5	505	2	0.875	0.97	0.97	54.35	37,933
40	43.3	771					6	100%	50	0.945	0.97	0.97	251.60	193,983	5	505	2	0.875	0.97	0.97	54.35	41,900
38	41.2	674					6	100%	50	0.945	0.97	0.97	251.60	169,578	5	505	2	0.875	0.97	0.97	54.35	36,629
36	39.3	518					6	100%	50	0.945	0.97	0.97	251.60	130,329	5	505	2	0.875	0.97	0.97	54.35	28,151
34	37.2	465					6	100%	50	0.945	0.97	0.97	251.60	116,994	5	505	2	0.875	0.97	0.97	54.35	25,271
32	35.3	228					6	100%	50	0.945	0.97	0.97	251.60	57,365	5	505	2	0.875	0.97	0.97	54.35	12,391
30	33.3	118					6	100%	50	0.945	0.97	0.97	251.60	29,689	5	505	2	0.875	0.97	0.97	54.35	6,413
28	31.6	99					6	100%	50	0.945	0.97	0.97	251.60	24,908	5	505	2	0.875	0.97	0.97	54.35	5,380
26	29.4	46					6	100%	50	0.945	0.97	0.97	251.60	11,574	5	505	2	0.875	0.97	0.97	54.35	2,500
24	27.6	29					6	100%	50	0.945	0.97	0.97	251.60	7,296	5	505	2	0.875	0.97	0.97	54.35	1,576
22	25.9	13					6	100%	50	0.945	0.97	0.97	251.60	3,271	5	505	2	0.875	0.97	0.97	54.35	706
20	24.2	15					6	100%	50	0.945	0.97	0.97	251.60	3,774	5	505	2	0.875	0.97	0.97	54.35	815

AMBIENT TEMPERATURE WB (°F)	FLUID COOLER CHILLED WATER PRIMARY PUMP FLOW (GPM)	FLUID COOLER CHILLED WATER PRIMARY PUMPS POWER (HP)	FLUID COOLER PRIMARY PUMP MOTOR EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP DRIVE EFFICIENCY (%)	FLUID COOLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KW)	FLUID COOLER CHILLED WATER PRIMARY PUMPS (KWH)	TOTAL AIR HANDLER FAN ENERGY (KW)	TOTAL AIR HANDLER FAN ENERGY (KWH)	NUMBER OF CHILLER PRIMARY PUMPS	CHILLER PRIMARY PUMP CAPACITY (%)	CHILLER PRIMARY PUMP FLOW (GPM)	CHILLER PRIMARY PUMP BRAKE POWER (BHP)	CHILLER PRIMARY PUMP MOTOR EFFICIENCY (%)	CHILLER PRIMARY PUMP DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	CHILLER PRIMARY PUMP ENERGY (KW)	CHILLER PRIMARY PUMP ENERGY (KWH)	NUMBER OF SECONDARY PUMPS	SECONDARY PUMP CAPACITY (%)	SECONDARY PUMP FLOW (GPM)	SECONDARY PUMP BRAKE POWER (HP)	SECONDARY PUMP MOTOR EFFICIENCY (%)	SECONDARY PUMP DRIVE EFFICIENCY (%)	SECONDARY PUMP VARIABLE SPEED DRIVE EFFICIENCY (%)	SECONDARY PUMP ENERGY (KW)	SECONDARY PUMP ENERGY (KWH)
74								16.674	16.674	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	81	3	100%	1490	68.20	0.902	0.83	0.98	207.95	208
72								16.674	450.198	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	2,179	3	100%	1490	68.20	0.902	0.83	0.98	207.95	5,615
70								16.674	683.634	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	3,308	3	100%	1490	68.20	0.902	0.83	0.98	207.95	8,526
68								16.674	1750.77	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	8,472	3	100%	1490	68.20	0.902	0.83	0.98	207.95	21,835
66								16.674	2467.752	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	11,942	3	100%	1490	68.20	0.902	0.83	0.98	207.95	30,777
64								16.674	3184.734	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	15,412	3	100%	1490	68.20	0.902	0.83	0.98	207.95	39,718
62								16.674	4268.544	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	20,657	3	100%	1490	68.20	0.902	0.83	0.98	207.95	53,235
60								16.674	4885.482	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	23,642	3	100%	1490	68.20	0.902	0.83	0.98	207.95	60,929
58								16.674	7103.124	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	34,374	3	100%	1490	68.20	0.902	0.83	0.98	207.95	88,587
56								16.674	7336.56	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	35,504	3	100%	1490	68.20	0.902	0.83	0.98	207.95	91,498
54								16.674	9804.312	4.0	100%	1,050	17	0.855	0.75	0.98	80.69	47,446	3	100%	1490	68.20	0.902	0.83	0.98	207.95	122,275
52	670	8.7	0.84	0.83	0.98	56.97	181,167	16.674	8837.22										3	100%	1490	68.20	0.902	0.83	0.98	207.95	110,214
50	670	8.7	0.84	0.83	0.98	56.97	170,228	16.674	8303.652										3	100%	1490	68.20	0.902	0.83	0.98	207.95	103,559
48	670	8.7	0.84	0.83	0.98	56.97	176,723	16.674	8620.458										3	100%	1490	68.20	0.902	0.83	0.98	207.95	107,510
46	670	8.7	0.84	0.83	0.98	56.97	190,396	16.674	9287.418										3	100%	1490	68.20	0.902	0.83	0.98	207.95	115,828
44	670	8.7	0.84	0.83	0.98	56.97	159,974	16.674	7803.432										3	100%	1490	68.20	0.902	0.83	0.98	207.95	97,321
42	670	8.7	0.84	0.83	0.98	56.97	238,593	16.674	11638.452										3	100%	1490	68.20	0.902	0.83	0.98	207.95	145,149
40	670	8.7	0.84	0.83	0.98	56.97	263,546	16.674	12855.654										3	100%	1490	68.20	0.902	0.83	0.98	207.95	160,330
38	670	8.7	0.84	0.83	0.98	56.97	230,389	16.674	11238.276										3	100%	1490	68.20	0.902	0.83	0.98	207.95	140,158
36	670	8.7	0.84	0.83	0.98	56.97	177,065	16.674	8637.132										3	100%	1490	68.20	0.902	0.83	0.98	207.95	107,718
34	670	8.7	0.84	0.83	0.98	56.97	158,948	16.674	7753.41										3	100%	1490	68.20	0.902	0.83	0.98	207.95	96,697
32	670	8.7	0.84	0.83	0.98	56.97	77,936	16.674	3801.672										3	100%	1490	68.20	0.902	0.83	0.98	207.95	47,413
30	670	8.7	0.84	0.83	0.98	56.97	40,335	16.674	1967.532										3	100%	1490	68.20	0.902	0.83	0.98	207.95	24,538
28	670	8.7	0.84	0.83	0.98	56.97	33,841	16.674	1650.726										3	100%	1490	68.20	0.902	0.83	0.98	207.95	20,587
26	670	8.7	0.84	0.83	0.98	56.97	15,724	16.674	767.004										3	100%	1490	68.20	0.902	0.83	0.98	207.95	9,566
24	670	8.7	0.84	0.83	0.98	56.97	9,913	16.674	483.546										3	100%	1490	68.20	0.902	0.83	0.98	207.95	6,031
22	670	8.7	0.84	0.83	0.98	56.97	4,444	16.674	216.762										3	100%	1490	68.20	0.902	0.83	0.98	207.95	2,703
20	670	8.7	0.84	0.83	0.98	56.97	5,127	16.674	250.11										3	100%	1490	68.20	0.902	0.83	0.98	207.95	3,119

2

MECH ENERGY SUMMARY

	COOLING ENERGY (KWH)	AIR-HANDLER FAN ENERGY (KWH)	HEAT REJECTION FAN ENERGY (KWH)	PUMP ENERGY (KWH)	TOTAL (KWH)
25% ITE LOAD MECH ENERGY	643,697	73,032	523,663	609,289	1,849,682
50% ITE LOAD MECH ENERGY	1,287,395	73,032	785,494	1,221,311	3,367,232
75% ITE LOAD MECH ENERGY	1,931,092	109,548	1,309,157	2,542,050	5,891,847
100% ITE LOAD MECH ENERGY	2,574,789	146,064	1,570,989	4,498,341	8,790,183

MLC CHECK 100% = FULL CAPACITY

ITE LOAD (%)	ITE LOAD (KW)	ANNUALIZED ITE LOAD (KWH)	PROJECT ANNUALIZED MLC
25%	1625.0	14,235,000	
50%	3250.0	28,470,000	
75%	4875.0	42,705,000	
100%	6500.0	56,940,000	
TOTALS:		**142,350,000**	**0.1397889**

2

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MECHANICAL DRAWINGS

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JEFFREY M. LYNCH
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
2024-12-27

Revision No.	Description	Date
1	FUTURE TENANT PERMIT	6/30/2024
2	FUTURE TENANT PERMIT REVISIONS	12/27/2024

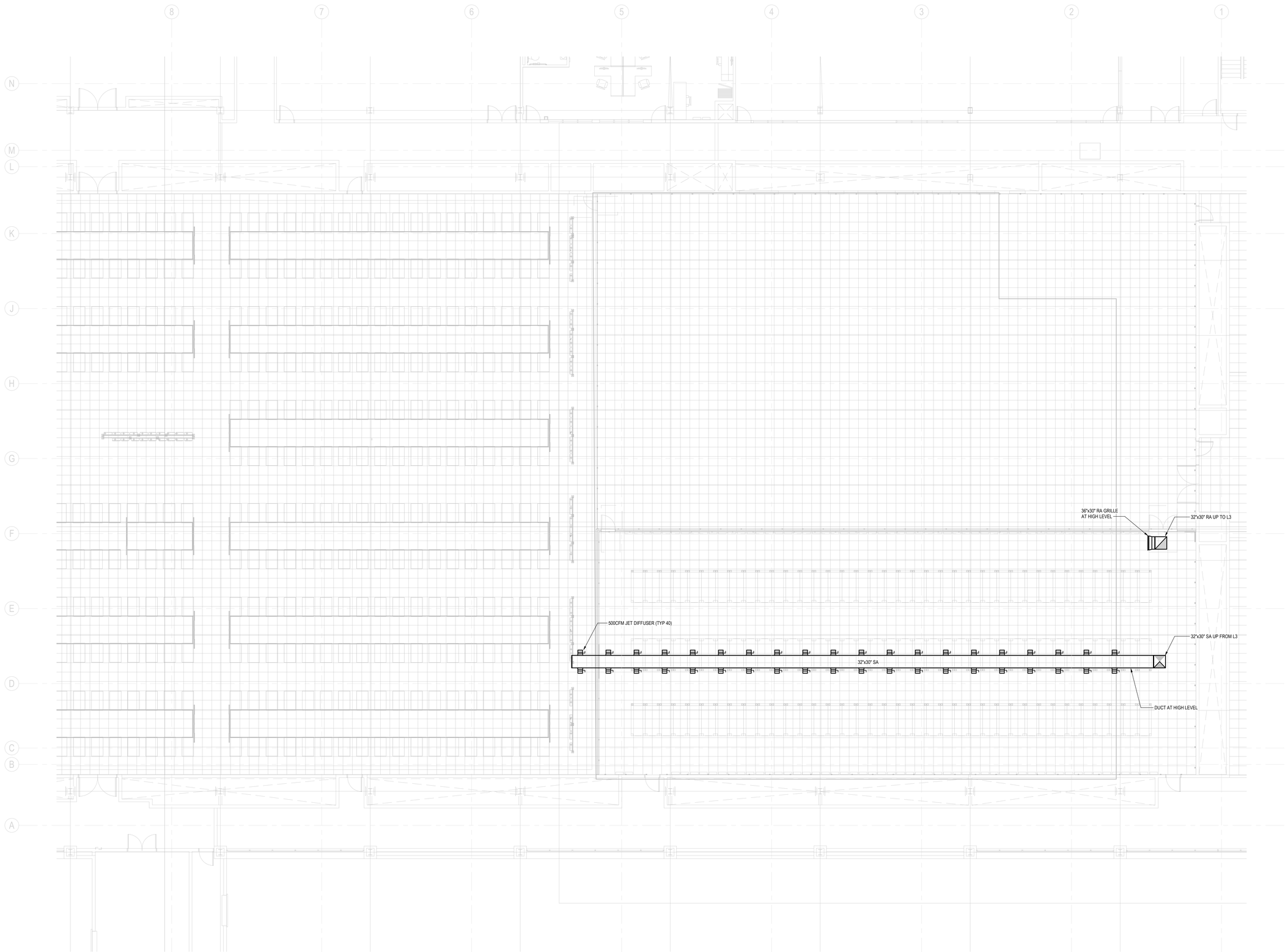
PRCTI20242004

Drawn By: RM
Checked By: JL

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Title: MECHANICAL CALCULATIONS

Sheet: M.FT.012



1 **MECHANICAL LEVEL 2 PLAN**
M.FT.103 1/8" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER
2024-12-27

Revision No.	Description	Date
1	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCTI20242004

Drawn By: RM
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Title: MECHANICAL LEVEL 2 PLAN

Sheet: M.FT.103

City of Puyallup
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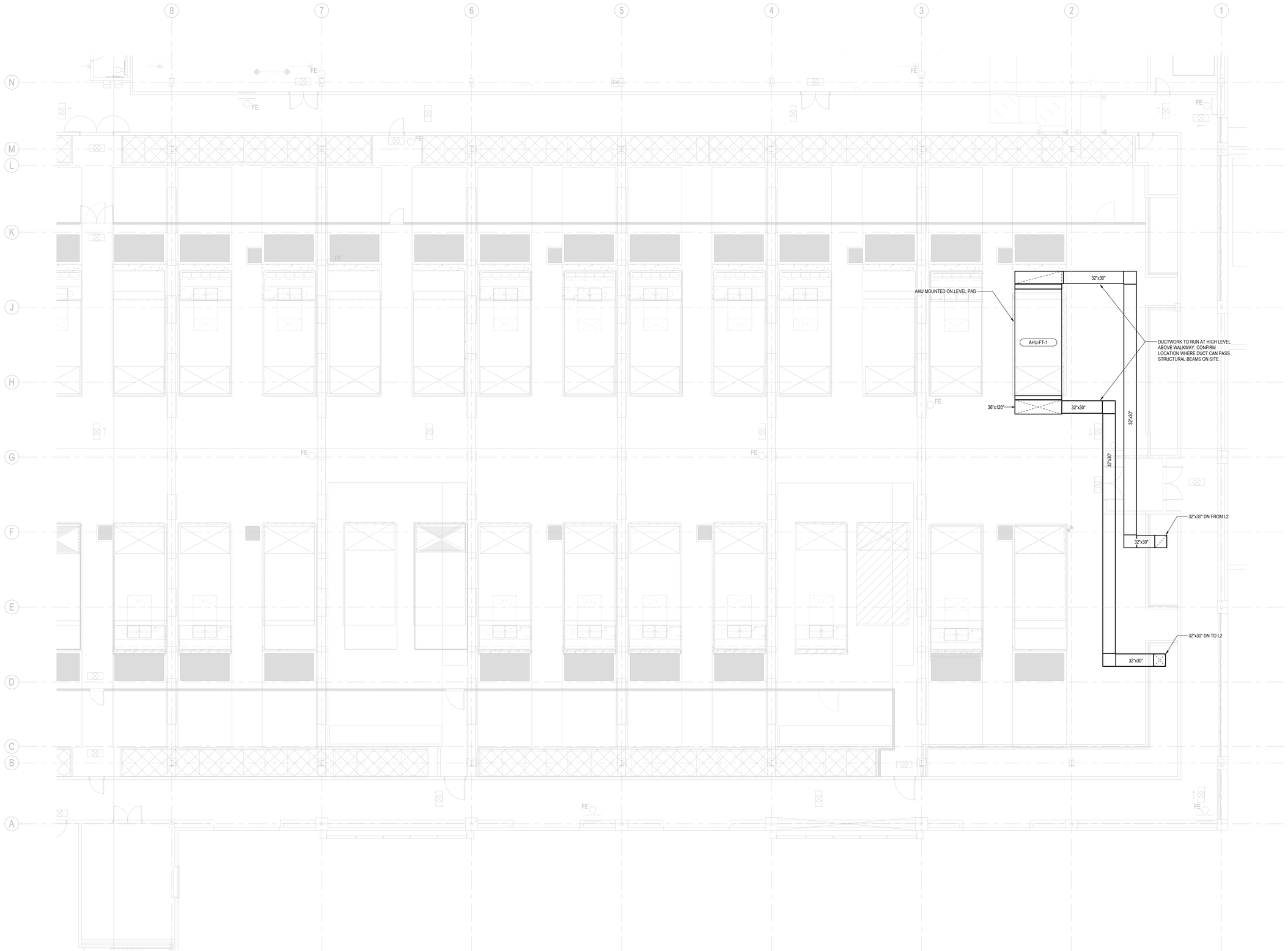
Engineering	Public Works
Fire	Traffic



1 MECHANICAL LEVEL 3 PIPING PLAN

M.FT.104 1/8" = 1'-0"

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2024-12-27

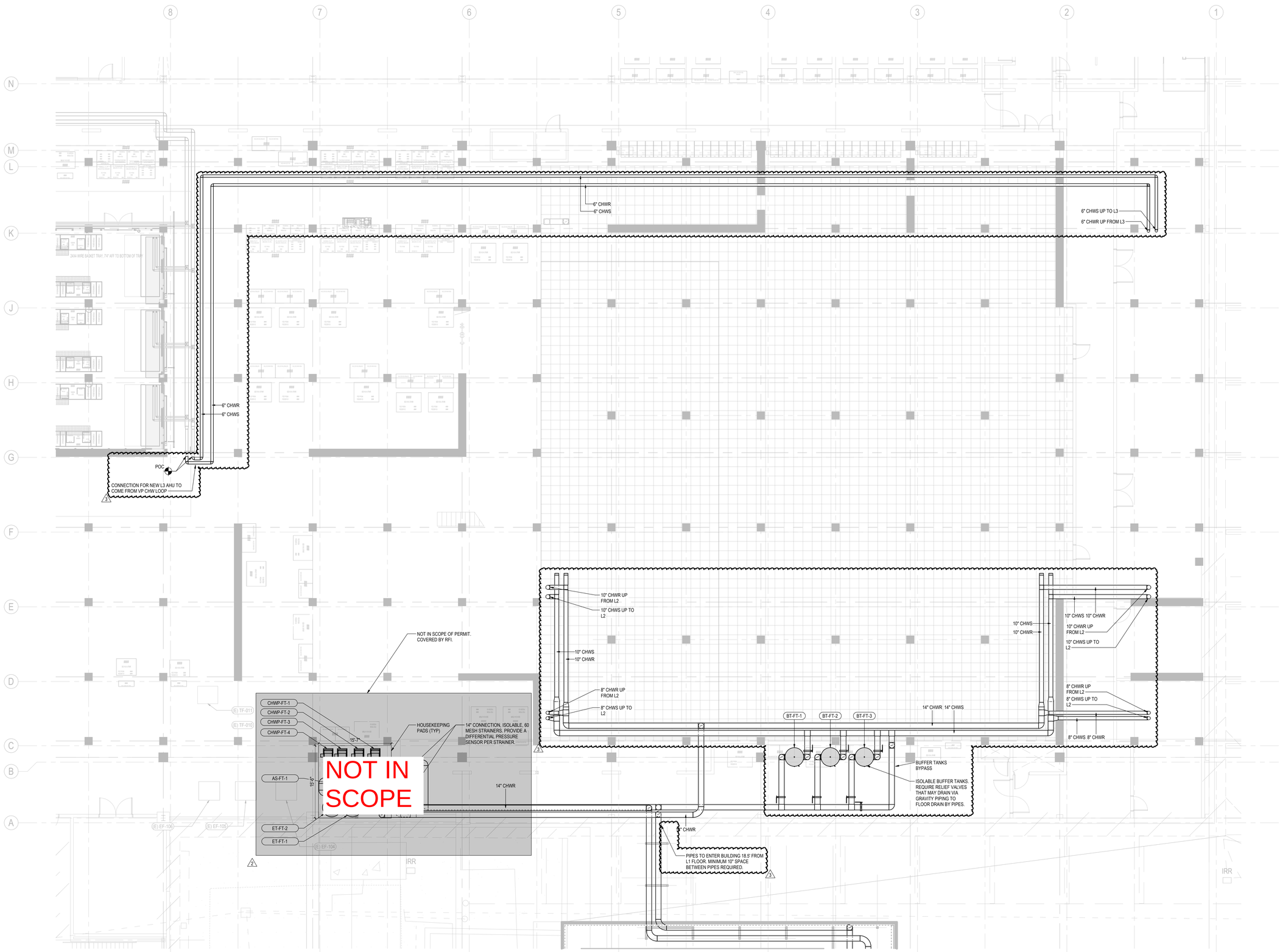
Revision No.	Description	Date
1	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCTI20242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL LEVEL 3 PLAN

Sheet: M.FT.104



1 M.FT.202

MECHANICAL LEVEL 1 PIPING PLAN

1/8" = 1'-0"

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Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024
2	FUTURE TENANT REVISIONS	12/03/2024
3	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCTI20242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL LEVEL 1 PIPING PLAN

Sheet: M.FT.202

City of Puyallup
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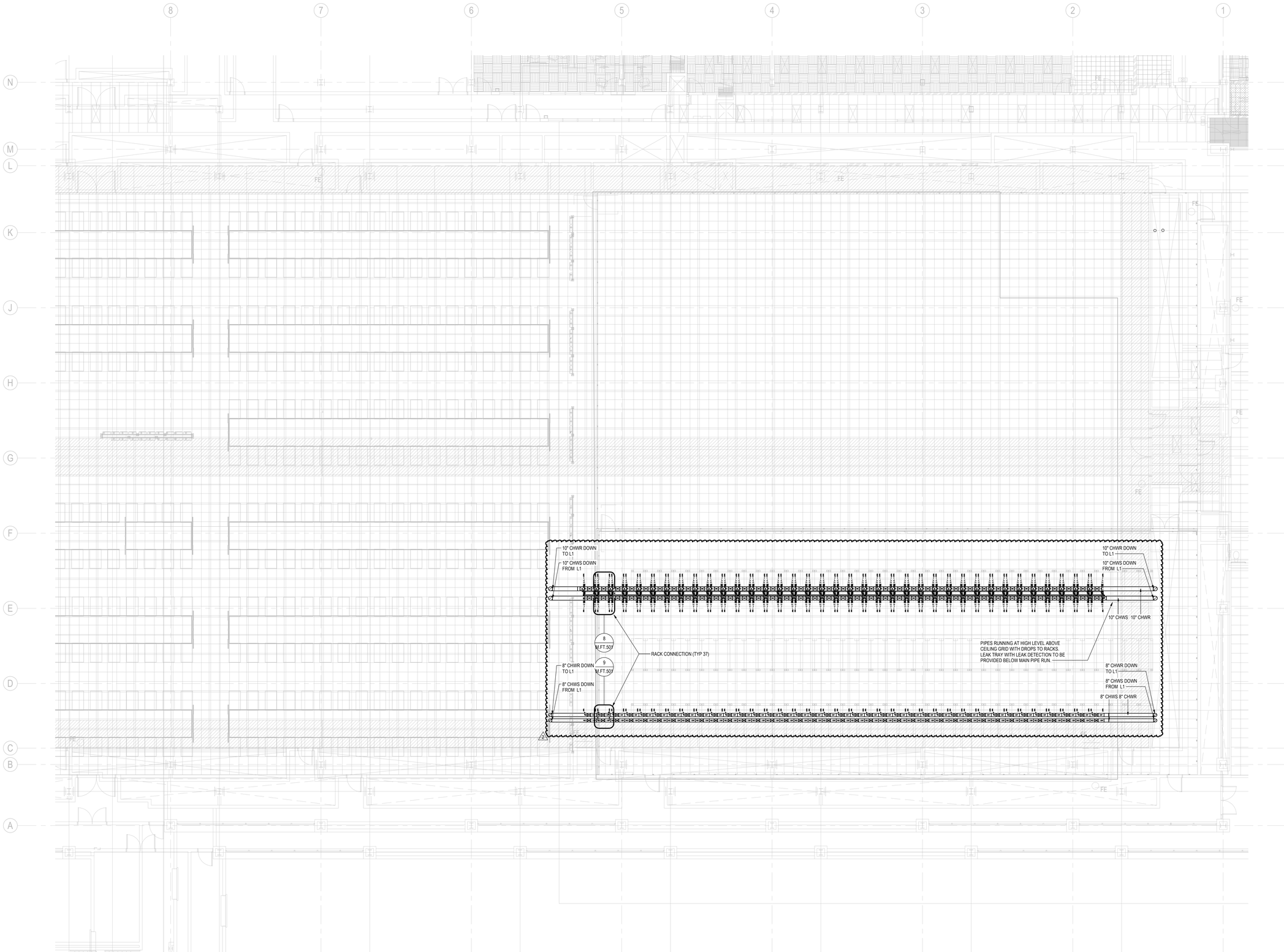
Building	Planning
Engineering	Public Works
Fire	Traffic



1 M.FT.203 **MECHANICAL LEVEL 2 PIPING PLAN**

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Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024
2	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCT120242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL LEVEL 2 PIPING PLAN

Sheet: **M.FT.203**

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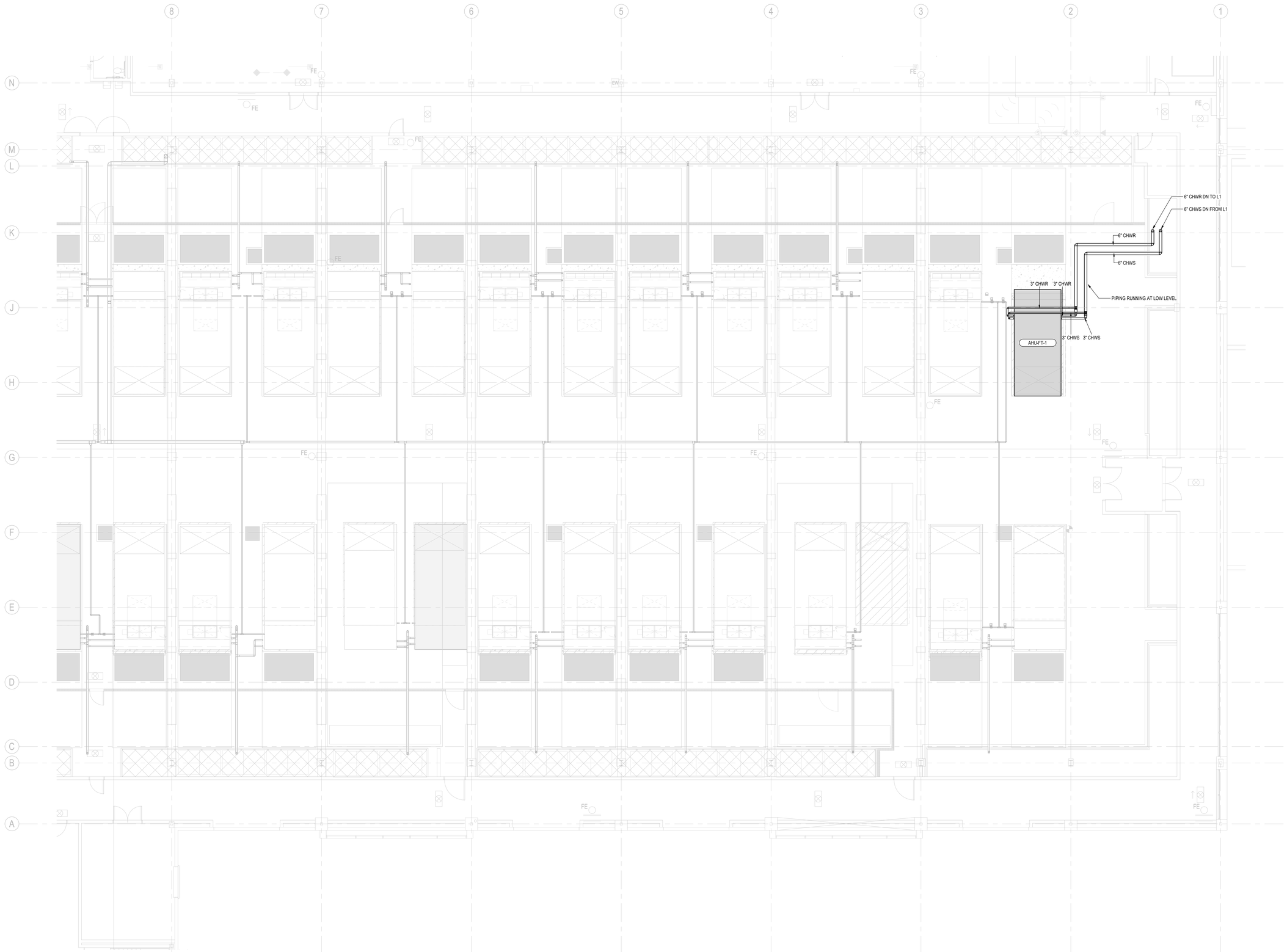
Fire | Traffic



1 M.FT.204 **MECHANICAL LEVEL 3 PIPING PLAN**

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Revision No.	Description	Date
1	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCTI20242004

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Title: MECHANICAL LEVEL 3 PIPING PLAN

Sheet: M.FT.204

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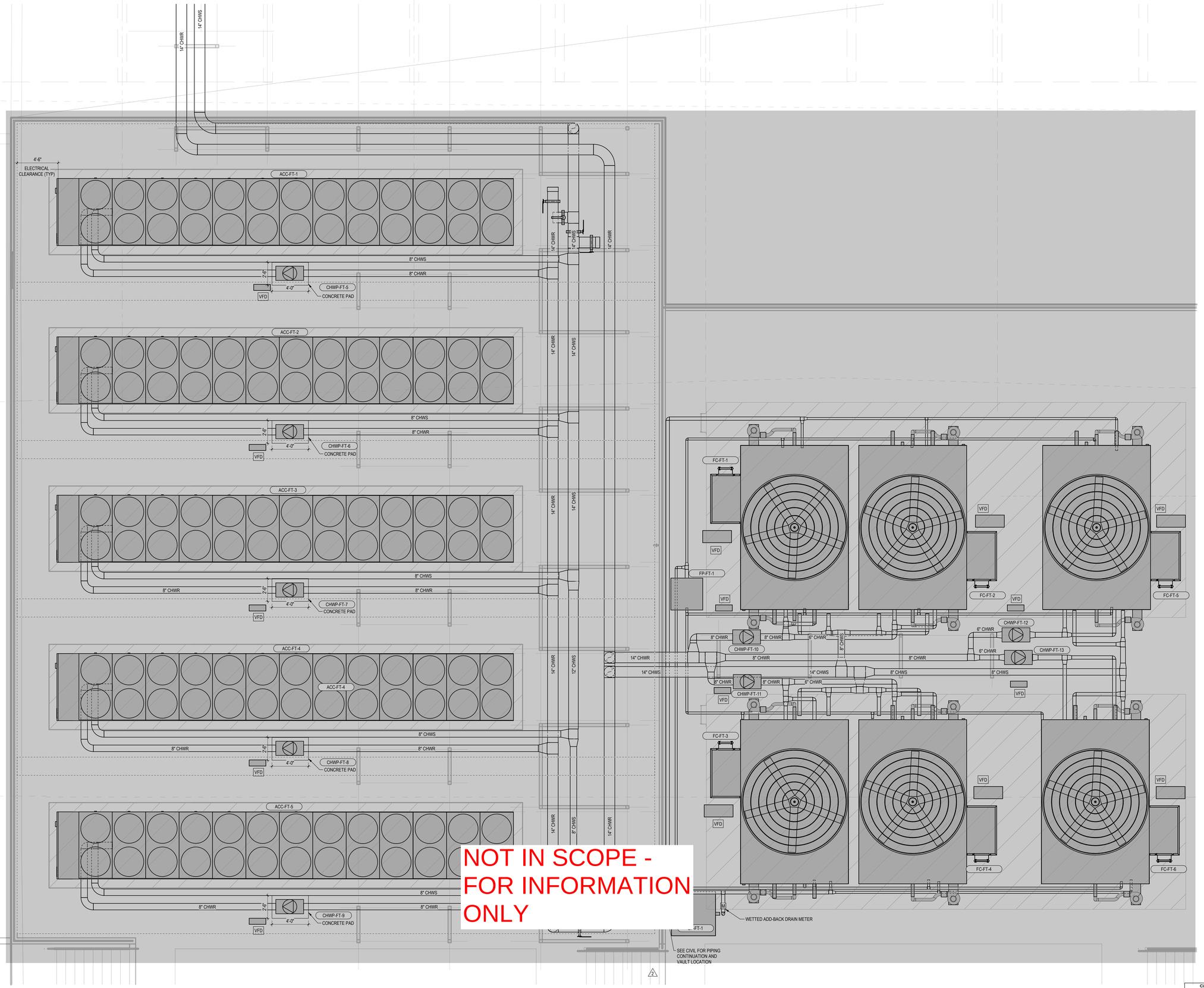

2 M.FT.301 **FT MECHANICAL SOUTH YARD PLAN** 3
1/4" = 1'-0"

City of Puyallup Development & Permitting Services ISSUED PERMIT	
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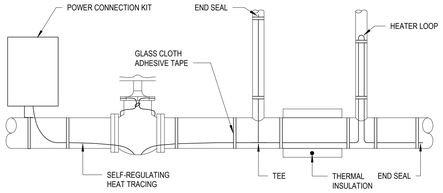
Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024
2	FUTURE TENANT REVISIONS	12/03/2024
3	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCT120242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL SOUTH YARD PLAN 3

Sheet: **M.FT.301**

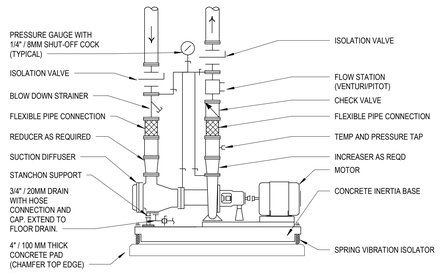


NOTES:

1. PROVIDE HEAT TRACE FOR ALL WATER PIPING LOCATED OUTDOORS
2. INSULATE THE PIPING.
3. REFER TO THE CONTRACT DOCUMENTS FOR PIPE MATERIAL AND INSULATION REQUIREMENTS.
4. FOLLOW MFRS INSTALLATION DETAILS FOR THE REQUIRED CABLE COVERAGE TO FULLY PROTECT THE SYSTEM.

5 HEAT TRACE DETAIL FT

M.FT.501 NTS

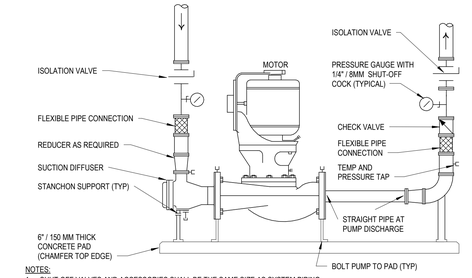


NOTES:

1. SHUT OFF VALVES AND ACCESSORIES SHALL BE THE SAME SIZE AS SYSTEM PIPING.
2. PROVIDE A SPOOL SECTION BETWEEN THE SUCTION DIFFUSER AND PUMP INLET AS REQUIRED.
3. AFTER START-UP AND THE COMPLETION OF THE SYSTEM FLUSHING, REMOVE THE START-UP STRAINER FROM THE SUCTION DIFFUSER.
4. PROVIDE REMOVABLE INSULATION FOR CHILLED WATER PUMPS TO PREVENT CONDENSATION.
5. ISOLATION VALVES ARE SHOWN AS BUTTERFLY VALVES, REFER TO THE SPECIFICATIONS FOR THE SPECIFIC VALVE TYPE BASED ON THE PIPE SIZE AND APPLICATION.
6. PIPING ASSOCIATED WITH THE PRESSURE GAUGES SHALL BE RUN SO AS TO NOT BLOCK THE REMOVAL OF THE PUMP OR BLOCK ACCESS TO ANY COMPONENT. PROVIDE ADDITIONAL SHUT OFF VALVES AS REQUIRED TO FACILITATE THE REMOVAL AND RE-INSTALLATION OF THE SENSING LINES AS NEEDED.

4 BASE MOUNT PUMP DETAIL - VARIABLE SPEED FT

M.FT.501 NTS

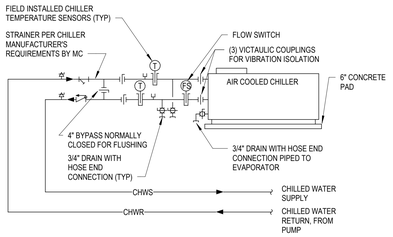


NOTES:

1. SHUT OFF VALVES AND ACCESSORIES SHALL BE THE SAME SIZE AS SYSTEM PIPING.
2. PROVIDE A SPOOL SECTION BETWEEN THE SUCTION DIFFUSER AND PUMP INLET AS REQUIRED.
3. AFTER START-UP AND THE COMPLETION OF THE SYSTEM FLUSHING, REMOVE THE START-UP STRAINER FROM THE SUCTION DIFFUSER. CLEAN THE STRAINER, AND THEN REINSTALL.
4. PROVIDE REMOVABLE INSULATION FOR CHILLED WATER PUMPS TO PREVENT CONDENSATION.
5. ISOLATION VALVES ARE SHOWN AS BUTTERFLY VALVES, REFER TO THE SPECIFICATIONS FOR THE SPECIFIC VALVE TYPE BASED ON THE PIPE SIZE AND APPLICATION.
6. SMALL BORE PIPING SHALL BE ENCASED IN INSULATION AND HEAT TRACE, PIPE LENGTHS SHALL BE LIMITED 2-3".
7. PROVIDE MINIMUM LENGTH OF STRAIGHT PIPE AT PUMP DISCHARGE AS PER MANUFACTURER'S RECOMMENDATIONS.

3 LARGE INLINE PUMP DETAIL - VARIABLE SPEED FT

M.FT.501 NTS

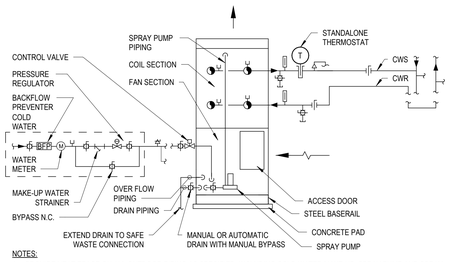


NOTES:

1. HEAT TRACE ALL EXTERIOR CHILLED WATER PIPING AND CHILLER BUNDLE.
2. LOCATE PIPING TO FACILITATE THE REQUIRED ACCESS AND REMOVAL OF CHILLER COMPONENTS.
3. COORDINATE THE COIL PULL SIDE WITH THE PIPING LAYOUT AND ALLOCATED ACCESS AREAS.
4. SHUT OFF VALVES AND ACCESSORIES SHALL BE THE SAME SIZE AS THE SYSTEM PIPING. TRANSITION TO THE CHILLER INLET/OUTLET SIZES AT THE CHILLER
5. QUICK CONNECT KITS ARE NOT TO BE USED. ALL VALVES SHALL BE INDEPENDENT COMPONENTS.
6. CHILLER AUXILIARY COOLING AND PUMPING SYSTEM SHALL BE FILLED WITH MIN GLYCOL FOR FREEZE-PROTECTION AS REQUIRED BY CHILLER MANUFACTURER.
7. CHILLER SHALL BE INSTALLED PER MANUFACTURERS INSTRUCTIONS, AND ALL CHILLER CHECKS MADE TO PREVENT VOID OF CHILLER WARRANTY BY MC.
8. SMALL BORE PIPING SHALL BE ENCASED IN INSULATION AND HEAT TRACE, PIPE LENGTHS SHALL BE LIMITED 2-3".

1 AIR COOLED CHILLERS DETAIL FT

M.FT.501 NTS

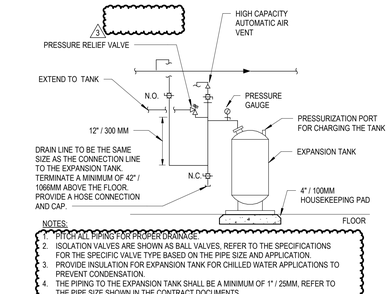


NOTES:

1. PROVIDE HEAT TRACE ON ALL OUTDOOR PIPING AS SPECIFIED, INCLUDING COLD WATER MAKE-UP, SPRAY PUMP AND SPRAY PIPING AND CONDENSER AND/OR CHILLED WATER PIPING.
2. LOCATE PIPING TO FACILITATE THE REQUIRED ACCESS AND REMOVAL OF COMPONENTS.
3. SHUT OFF VALVES AND ACCESSORIES SHALL BE THE SAME SIZE AS THE SYSTEM PIPING. TRANSITION TO THE COOLER INLET/OUTLET SIZES AT THE EQUIPMENT CONNECTION
4. ISOLATION VALVES ARE SHOWN AS BUTTERFLY VALVES, REFER TO THE SPECIFICATIONS FOR THE SPECIFIC VALVE TYPE BASED ON THE PIPE SIZE AND APPLICATION.
5. LOCATE THE COLD WATER MAKE-UP ASSEMBLY IN A HEATED SPACE UNLESS SHOWN OTHERWISE ON THE CONTRACT DOCUMENTS.
6. REFER TO THE CONTRACT DOCUMENTS FOR THE QUANTITY OF UNITS.
7. QUICK CONNECT KITS ARE NOT TO BE USED. ALL VALVES SHALL BE INDEPENDENT COMPONENTS.

2 CLOSED CIRCUIT EVAPORATIVE COOLER DETAIL FT

M.FT.501 NTS



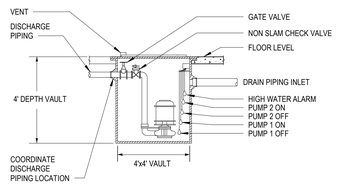
NOTES:

1. PITCH ALL PIPING FOR PROPER DRAINAGE.
2. ISOLATION VALVES ARE SHOWN AS BALL VALVES, REFER TO THE SPECIFICATIONS FOR THE SPECIFIC VALVE TYPE BASED ON THE PIPE SIZE AND APPLICATION.
3. PROVIDE INSULATION FOR EXPANSION TANK FOR CHILLED WATER APPLICATIONS TO PREVENT CONDENSATION.
4. THE PIPING TO THE EXPANSION TANK SHALL BE A MINIMUM OF 1" / 25MM, REFER TO THE PIPE SIZE SHOWN IN THE CONTRACT DOCUMENTS.

3

6 EXPANSION TANK W/ FILL FT

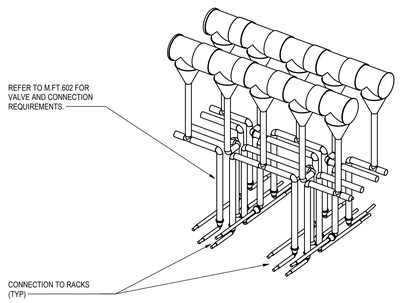
M.FT.501 NTS



7 SUBMERSIBLE DUPLEX SUMP PUMP

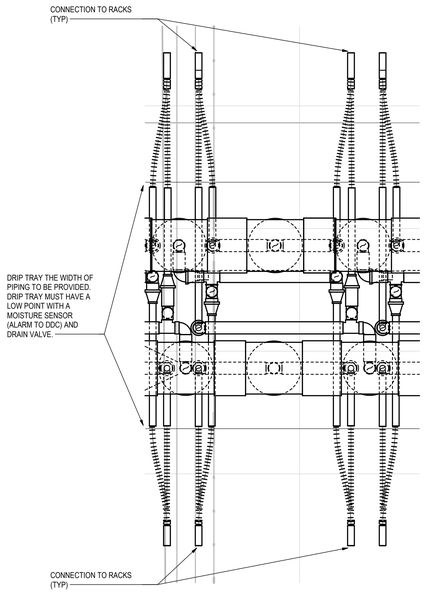
M.FT.501 NTS

2



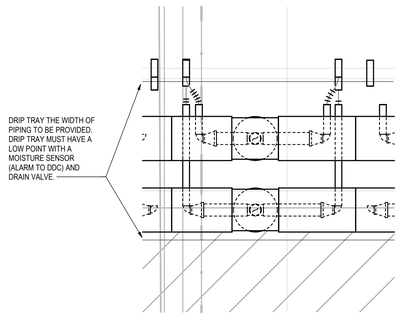
10 MECHANICAL LEVEL 2 ISOMETRIC RACK CONNECTION - DOUBLE SIDED

M.FT.501



8 MECHANICAL LEVEL 2 ENLARGED RACK CONNECTION - DOUBLE SIDED

M.FT.501 1" = 1'-0"



9 MECHANICAL LEVEL 2 ENLARGED RACK CONNECTION - SINGLE SIDED

M.FT.501 1" = 1'-0"

centeris

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MECHANICAL DRAWINGS

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VOLTAGE PARK UPS
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JEFFREY M. LINCOLN — STATE OF WASHINGTON — 40574 — REGISTERED PROFESSIONAL ENGINEER
2024-12-27

Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024
2	FUTURE TENANT REVISIONS	12/03/2024
3	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCTI20242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL DETAILS

Sheet: M.FT.501

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

SEQUENCE OF OPERATIONS

1.0 CONTROLS GENERAL
THIS SEQUENCE OF OPERATION IS WRITTEN FOR CONTROLLING THE CENTERIS FUTURE TENANT HEATING VENTILATING AND AIR CONDITIONING (HVAC) SYSTEMS ON THE BUILDING EXTERIOR AT 1019 39TH AVE, PUYALLUP, WA.

A. THE EXISTING ALERTON BUILDING AUTOMATION SYSTEM (BAS) AS PROVIDED BY ATS SHALL BE EXPANDED UPON FOR THE EXTERIOR FUTURE TENANT HVAC SYSTEMS. THE CONTROL SYSTEM IS PROGRAMMED TO SEQUENCE THE OPERATION DESCRIBED WITHIN THE CONTRACT DOCUMENTS. ATS SHALL PROVIDE AND INSTALL ALL NECESSARY COMPONENTS AND ACCESSORIES FOR A COMPLETE AND OPERATIONAL SYSTEM INCLUDING, BUT NOT LIMITED TO SENSORS, RELAYS, GATEWAYS, COMMUNICATION WIRING AND CONDUIT, AND ALL NECESSARY ELECTRICAL DEVICES, WIRING, AND CONDUIT.

B. ALL POINTS IDENTIFIED IN THE CONSTRUCTION DOCUMENTS WILL BE DISPLAYED ON THE USER'S GRAPHIC INTERFACE. ALARMS AND OTHER SYSTEM NOTIFICATIONS REPORT TO SYSTEM USERS.

C. THE ARCHITECTURE OF THE BAS SHALL BE SO THAT COMMUNICATION FAILURE WITH AN INDIVIDUAL EQUIPMENT CONTROLLER SHALL NOT DISABLE EQUIPMENT FROM BEING ABLE TO OPERATE ON THE LOCAL CONTROLLER SETPOINTS FOR STANDALONE OPERATION SHALL BE ESTABLISHED WITH THE OWNER.

D. SYSTEMS CONTROLLED
   a. THE CONTROL SYSTEM SHALL EXECUTE CONTROL FUNCTIONS OVER THE FOLLOWING NEW SYSTEMS:
      i. FLUID COOLER / CHILLED WATER PRODUCTION AND DISTRIBUTION
      ii. FLUID COOLERS (FC-FT)
      iii. AIR-COOLED CHILLERS (ACC-FT)
      iv. PRIMARY CHILLED WATER PRODUCTION PUMPS
      v. SECONDARY CHILLED WATER DISTRIBUTION PUMPS
   b. OTHER POINTS MONITORED
      i. AMBIENT DRY BULB AND WET BULB TEMPERATURES
      ii. HEAT TRACE STATUS
      iii. SUMP PUMP STATUS
      iv. STANDBY POWER STATUS.
      v. NORMAL POWER STATUS
      vi. FIRE ALARM STATUS.

2.0 CHILLED WATER SYSTEM FUTURE TENANT (FT)

A. GENERAL
   a. THE CHILLED WATER SYSTEM FOR FUTURE TENANT INCLUDES (5) 500 TON AIR COOLED CHILLERS, PROVIDING N+1 COOLING, (6) FLUID COOLERS PROVIDING N COOLING IN WATER SIDE ECONOMIZER OPERATION. ASSOCIATED PUMPS INCLUDE (4) SECONDARY DISTRIBUTION PUMPS PROVIDING N+1 (3) PUMP FOR EACH CHILLER, (1) PUMP FOR EACH (2) OF THE FLUID COOLERS, AND (2) PUMPS SERVING (2) FLUID COOLERS EACH.
   b. THE CHILLED WATER SYSTEM IS INTENDED TO MATCH OTHER CHILLED WATER SYSTEMS FOR THE FACILITY, AND USE WATER AS THE HEAT TRANSFER MEDIUM. PROVISIONS TO PROVIDE FREEZE PROTECTION SHALL BE INCORPORATED BY THE DESIGN, CONTRACTING AND CONTROLS TEAMS. SEE FREEZE PROTECTION SEQUENCES BELOW.

B. CHILLED WATER DISTRIBUTION SYSTEM
   a. THE CHILLED WATER PRODUCED WILL BE DISTRIBUTED TO A FUTURE TENANT INCLUDING RACK COOLED EQUIPMENT. CHILLED WATER DISTRIBUTION PUMPS (CHWP-FT-1-1 THRU CHWP-FT-1-4) ARE PIPED IN A PARALLEL ARRANGEMENT DOWNSTREAM OF THE FLUID COOLERS. EACH MAIN DISTRIBUTION PUMP HAS THE SAME FLOW CAPACITY, AND THE ARRANGEMENT IS DESIGNED TO PROVIDE MAXIMUM FLOW CAPACITY TO THE BUILDING WITH (3) DISTRIBUTION PUMPS OPERATING IN A LEAD-LAG-STANDBY SEQUENCE. AT LEAST ONE PUMP SHALL OPERATE CONTINUOUSLY.
   b. THE SECONDARY DISTRIBUTION PUMPS ARE CONTROLLED BY THE BAS. THE BACS MODULATES THE SPEED OF THE LEAD SECONDARY PUMP TO MAINTAIN A CONSTANT DIFFERENTIAL PRESSURE SETPOINT INITIALLY 25 PSI (ADJ) ACROSS THE CHILLED WATER LOOP OR OPERATES AT MINIMUM SPEED PER BELOW.
      i. THE DIFFERENTIAL PRESSURE SETPOINT SHALL BE ADJUSTABLE AND DETERMINED BY THE TEST AND BALANCE TECHNICIAN WITH A FULL FLOW TEST, AND THE BYPASS FULLY CLOSED.
   c. ONLY IF ONE SECONDARY DISTRIBUTION PUMP IS AT MINIMUM SPEED (30HZ) 50% FULL SPEED (ADJ), DOES THE BAS MODULATE THE BYPASS TO MAINTAIN THE PRIMARY DIFFERENTIAL PRESSURE SETPOINT ACROSS THE CHILLED WATER LOOP.
      i. THE MINIMUM PUMP SPEED SETPOINT SHALL BE DETERMINED BY THE TEST AND BALANCE TECHNICIAN BY CLOSING ALL SYSTEM VALVES AND OPERATING THE BYPASS VALVE TO MAINTAIN THE DIFFERENTIAL DETERMINED ABOVE. THE MINIMUM PUMP SPEED SETPOINT SHALL BE THE SPEED AT WHICH (1) PUMP MAINTAINS THE SCHEDULED MINIMUM PUMP FLOW AS TESTED IN THIS CONDITION.
   d. IF THE LEAD SECONDARY DISTRIBUTION PUMP IS AT (57HZ) 95% MAXIMUM SET SPEED (ADJ), THEN THE BAS ENABLES THE LAG PUMP. THE LAG PUMP SHALL START WITH THE MINIMUM SPEED COMMAND AND RAMP UP TO THE SPEED OF THE LEAD PUMP AT A RATE OF 10 HZ PER MINUTE. ONCE THE LAG PUMP IS WITHIN 1 HZ OF THE LEAD PUMP THE TWO SHALL BE PROVIDED THE SAME SPEED SIGNAL TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT ACROSS THE CHILLED WATER LOOP.
   e. IF (2) DISTRIBUTION PUMPS ARE COMMANDED TO OPERATE TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT AND BOTH ARE AT OR BELOW (42HZ) 70% MAXIMUM SET SPEED (ADJ), THEN THE BAS MODULATES OTHER PUMPS AND DISABLES ONE LAG PUMP. THE LAG PUMP SHALL REDUCE TO THE MINIMUM SPEED BY RAMPING DOWN TO THE MINIMUM SPEED AT A RATE OF 10 HZ PER MINUTE, AND THEN BE DISABLED. THE LEAD PUMP SHALL CONTINUOUSLY MODULATE TO MAINTAIN THE PRIMARY DIFFERENTIAL PRESSURE SETPOINT ACROSS THE CHILLED WATER LOOP.
   f. IF (3) DISTRIBUTION PUMPS ARE COMMANDED TO OPERATE TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT AND ALL ARE AT OR BELOW (48HZ) 80% MAXIMUM SET SPEED (ADJ), THEN THE BAS MODULATES OTHER PUMP AND DISABLES ONE LAG PUMP. THE LAG PUMP SHALL REDUCE TO THE MINIMUM SPEED BY RAMPING DOWN TO THE MINIMUM SPEED AT A RATE OF 10 HZ PER MINUTE, AND THEN BE DISABLED. THE LEAD PUMP SHALL CONTINUOUSLY MODULATE TO MAINTAIN THE PRIMARY DIFFERENTIAL PRESSURE SETPOINT ACROSS THE CHILLED WATER LOOP.
   g. THE STANDBY PUMP SHALL BE COMMANDED OFF IN THE BAS. IF THE LEAD PUMP FAILS THE BACS WILL ENABLE ONE LAG PUMP AS THE LEAD PUMP, AND THE FAILED PUMP SHALL BECOME THE STANDBY PUMP. IF THE LAG PUMP FAILS THE BACS WILL ENABLE THE STANDBY PUMP AS THE LAG PUMP, AND THE FAILED PUMP SHALL BECOME THE STANDBY PUMP. PUMP FAILURE SHALL BE DETERMINED BY THE PARAMETERS AND SIGNALS ON THE VFD, OR IF THE COMMANDED ON CONDITION DOES NOT MATCH STATUS. AN IN-HAND ALARM SHALL BE GENERATED IF NOT IN AUTO.
   h. SECONDARY WATER FLOW METER IS FOR MONITORING ONLY.

CHILLERS (ACC-FT-1-1 THRU ACC-FT-1-5)

   a. THE FIVE AIR COOLED CHILLERS SHALL OPERATE IN LEAD-LAG-STANDBY OPERATION.
   b. EACH CHILLER SHALL BE ASSIGNED A STAGE (1 TO 5), THE CHILLER(S) ASSIGNED A STAGE 1 SHALL BE THE LEAD CHILLER, AND THE CHILLER ASSIGNED TO STAGE 5 SHALL BE THE STANDBY CHILLER. THE STAGES OF CHILLERS SHALL BE ADJUSTABLE AT THE OPERATOR WORKSTATION, EDITS SHALL NOT BE ALLOWED IF THERE IS NO STAGE 1 OR STAGE 5 CHILLER, I.E. THERE SHALL ALWAYS BE A LEAD CHILLER AND THERE SHALL ALWAYS BE A STANDBY CHILLER.
   c. TO PREVENT AN OVERLOADED POWER CONDITIONS A MAXIMUM OF FOUR CHILLERS SHALL BE ENABLED AT ANYTIME. ONCE PER WEEK THE ASSIGNMENT OF STAGES SHALL SWITCH, THE CHILLER ASSIGNED STAGE 4 SHALL BECOME THE CHILLER WITH THE MOST RUNTIME, AND AFTERWARDS THE STAGE 5 (STANDBY) CHILLER SHALL SWITCH TO BECOME THE STAGE 4 CHILLER. THIS SWITCH SHALL NOT OCCUR IF A GENERATOR IS OPERATING DURING THE TIME SCHEDULED FOR THE CHILLERS TO SWITCH. THE PUMP FOR THE STANDBY CHILLER SHALL OPERATE 2 MINUTES (ADJ) PRIOR TO DISABLING THE STAGE 4 CHILLER. DURING TESTING DETERMINE THE OPTIMUM DELAY BETWEEN SHUTDOWN TO. MINIMUM THE TIME BETWEEN DISABLING CHILLER 4 AND ENABLING CHILLER 5.
   d. IF A POWER OUTAGE OCCURS, ONCE POWER IS CONFIRMED ON AGAIN, THE BAS SHALL RETURN TO THE STAGE OF OPERATION THAT IT WAS IN PRIOR TO THE POWER OUTAGE (I.E. ALL STAGES 1-4 STAGES) SIMULTANEOUSLY WITHOUT ADDITIONAL DELAYS.
   e. IF ANY CHILLER HAS A CRITICAL FAILURE, INCLUDING THE STATUS DOES NOT MATCH THE COMMAND, OR THERE IS AN ASSOCIATED CHILLER PUMP FAILURE, BUT NOT LOSS OF COMMUNICATION, THEN THE FAILED CHILLER SHALL BE DISABLED, AND THE STANDBY CHILLER SHALL AUTOMATICALLY BE ASSIGNED AS THE STAGE 4 CHILLER, AND ASSIGNMENTS SHALL BE MODIFIED WITHOUT STARTING OR STOPPING CHILLERS. A CHILLER FAILURE ALARM IS GENERATED. THE BAS SHALL NOT BE ABLE TO ASSIGN A CHILLER A STAGE OF 1 THOUGH 4 IF IT HAS HAD A CRITICAL FAILURE, 1 CHILLER SHALL ALWAYS BE ASSIGNED STAGE 5 AS A PRIORITY TO ANY OTHER ASSIGNMENTS.
   f. WHENEVER A CHILLER IS ENABLED THEN START THE ASSOCIATED PUMP 2 MINUTES (ADJ) PRIOR TO ENABLING THE CHILLER, AND CONTINUE OPERATION OF THE ASSOCIATED PUMP FOR 5 MINUTES (ADJ) AFTER DISABLING THE CHILLER.
   g. EACH CHILLER HAS TWO COMPRESSORS. THE STATUS OF THESE COMPRESSORS SHALL BE USED FOR CONTROL. BAS SHALL PROVIDE CURRENT SENSOR (FOR EACH AS APPLICABLE OR OTHER HARD-WIRED MEANS AS DIRECTED BY THE CHILLER MANUFACTURERS TO DETECT STATUS. STATUS SHALL BE AVAILABLE BY OTHER MEANS IN ADDITION TO OVER THE BACNET CONNECTION. COORDINATE WITH CHILLER MANUFACTURER FOR INSTALLATION OF CURRENT SENSORS.
   h. THE BAS SHALL START THE LEAD (STAGE 1) CHILLER(S) IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ):
      i. IF THE SECONDARY CHILLED WATER TEMPERATURE DOWNSTREAM OF THE FLUID COOLERS IS GREATER THAN 65ºF (ADJ).
      ii. IF THE SECONDARY CHILLED WATER TEMPERATURE DOWNSTREAM OF THE FLUID COOLERS IS GREATER THAN 62.5ºF (ADJ), AND ALL OPERATIONAL FLUID COOLER FANS ARE ABOVE 57HZ/95% (ADJ). FAILURES OF ANY INDIVIDUAL FLUID COOLER SHALL BE NOT BE CONSIDERED OPERATIONAL.
      iii. IF THE MEASURED AMBIENT WET BULB TEMPERATURE IS GREATER THAN 58ºF (ADJ).
      iv. IF A CRITICAL FAILURE ALARM HAS OCCURRED WITH THE FLUID COOLERS SYSTEM (ADJ.). THERE SHALL BE NO DELAY ON THIS CONDITION, AND THE LEAD CHILLER SHALL START PER b. ABOVE.
   i. THE BAS SHALL STAGE ON A LAG CHILLER (STAGE 2-4) CHILLER(S) IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ):
      i. IF THE SECONDARY CHILLED WATER SUPPLY TEMPERATURE DOWNSTREAM OF THE CHILLERS IS GREATER THAN 65ºF (ADJ).
      ii. IF THE SECONDARY CHILLED WATER SUPPLY TEMPERATURE DOWNSTREAM OF THE CHILLERS IS GREATER THAN 62.5ºF (ADJ), AND ALL (ADJ) AVAILABLE COMPRESSORS ON ENABLED CHILLERS ARE OPERATING.
      iii. IF THE CURRENT STATUS FOR THE HIGHEST STAGE OF OPERATING CHILLER IS NEAR MAXIMUM (95%).
   j. THE BAS SHALL STAGE OFF A LAG CHILLER (STAGES 2-4) IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ):
      i. IF THE TOTAL OPERATIONAL COMPRESSORS IS 2 (ADJ) LESS THAN THE TOTAL AVAILABLE ON OPERATING CHILLERS, AND SECONDARY CHILLED WATER TEMPERATURE DOWNSTREAM OF THE CHILLERS IS LESS THAN 61ºF (ADJ).
      ii. IF THE SECONDARY CHILLED WATER RETURN TEMPERATURE IS BELOW 65ºF (ADJ), AND THE MEASURE CHILLED WATER TEMPERATURE WITH ALL OPERATING CHILLERS IS LESS THAN 65ºF (ADJ).
   k. THE BAS SHALL ENABLE FLUID COOLERS (IMMEDIATE) AND STOP THE LEAD CHILLER AFTER A 15 MINUTE (ADJ) DELAY, IF NO CRITICAL FAILURE OF THE FLUID COOLER SYSTEM (INCLUDE NO THE NORMAL POWER FAILURES) EXISTS, AND ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ), AND:
      i. THE CHILLER(S) HAVE NOT OPERATED ANY COMPRESSORS FOR 30 MINUTES, AND THE CHILLED WATER SUPPLY TEMPERATURE IS WITHIN 1 ºF (ADJ) OF SETPOINT.
      ii. IF THE MEASURED AMBIENT WET BULB TEMPERATURE IS BELOW THAN 53ºF (ADJ), AND THERE IS NO ACTIVE FLUID COOLER SYSTEM ALARM.
   l. THE BAS SHALL OPERATE CHILLERS TO MAINTAIN THE SUPPLY WATER SETPOINT AT A CONSTANT CHILLED WATER TEMPERATURE OF 60ºF (ADJ).
   m. THE BAS SHALL COMMUNICATE WITH EACH CHILLER, WITH AN BACNET MSTP CONNECTION.

FLUID COOLER (FC-FT-1-1 THRU FC-FT-1-6)

   a. THE FLUID COOLER SHALL HAVE STANDALONE CONTROLS THAT MONITOR WATER LEVEL AND FILL THE SYSTEM, AND ALSO OPEN A DRAIN VALVE UPON HIGH CONDUCTIVITY LEVEL. THIS SYSTEM SHALL BE COORDINATED WITH THE CHEMICAL TREATMENT SYSTEM PROVIDED WITH THE FLUID COOLERS TO OPERATE WITHOUT BAS. E.
   b. THE BAS SHALL OPERATE THE (6) FLUID COOLERS IN LEAD LAG STAGES OF OPERATION (1-4), AND TO START/STOP BASIN PUMPS AND MODULATE FLUID COOLER FAN SPEED TO MAINTAIN SECONDARY SUPPLY WATER TEMPERATURE DOWNSTREAM OF THE FLUID COOLERS.
   c. START AND STOP EACH PRIMARY PUMP ASSOCIATED WITH EACH FLUID COOLER SIMULTANEOUSLY WITH ENABLING THE FLUID COOLER FAN(S), AND BASIN PUMP. PRIMARY PUMPS OPERATE AT A CONSTANT SPEED. FLUID COOLERS FC-FT-1-1 & FC-FT-1-2 ARE OPERATED AS ONE (STAGE 2, INITIALLY). FLUID COOLERS FC-FT-1-3 & FC-FT-1-4 ARE OPERATED AS ONE (STAGE 4, INITIALLY). THE FAN SPEED SHALL BE THE SAME FOR ALL OPERATING FLUID COOLERS.
   d. THE BAS SHALL START THE BASIN PUMPS AND MODULATE THE FLUID COOLER FAN(S) SPEED.
   e. THE BAS SHALL MONITOR LEAVING CHILLED WATER TEMPERATURE, BASIN TEMPERATURE AND BASIN WATER HIGH AND LOW LEVELS ON EACH FLUID COOLER.
   f. THE BAS SHALL START THE LEAD (STAGE 1) FLUID COOLER IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ), AND THE CHILLER STAGE IS 3 OR LESS (ADJ), FLUID COOLERS FC-FT-1-5 OR FC-FT-1-6 SHALL BE ASSIGNED AS STAGE 1:
      i. IF THE SECONDARY RETURN CHILLED WATER TEMPERATURE UPSTREAM OF THE FLUID COOLERS IS 5 ºF (ADJ) GREATER THAN AMBIENT WETBULB TEMPERATURE.
      ii. IF THE MEASURED AMBIENT WET BULB TEMPERATURE IS LESS THAN 55ºF (ADJ).
   g. THE BAS SHALL STAGE UP TO STAGES (2&3) THE LAG FLUID COOLERS AND ASSOCIATED PUMPS IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ) AND THE CHILLER STAGE IS 3 OR LESS (ADJ), FLUID COOLERS FC-FT-1-1 & FC-FT-1-2 ARE OPERATED AS STAGE 2, INITIALLY. FLUID COOLERS FC-FT-1-6 (STAGE 3 INITIALLY):
      i. IF THE SECONDARY RETURN CHILLED WATER TEMPERATURE UPSTREAM OF THE FLUID COOLERS IS ABOVE 55 ºF (ADJ) AND THE FLUID COOLER FAN SPEEDS ARE ABOVE 90% FULL SPEED.
   h. THE BAS SHALL STAGE UP TO STAGE 4 THE LAG FLUID COOLER AND ASSOCIATED PUMPS IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ) AND THE CHILLER STAGE IS 2 OR LESS (ADJ), FLUID COOLERS FC-FT-1-3 & FC-FT-1-4 ARE OPERATED AS STAGE 4, INITIALLY:
      i. IF THE SECONDARY RETURN CHILLED WATER TEMPERATURE UPSTREAM OF THE FLUID COOLERS IS ABOVE 55 ºF (ADJ) AND THE FLUID COOLER FAN SPEEDS ARE ABOVE 90% FULL SPEED.
   i. THE BAS SHALL STAGE DOWN THE LAG FLUID COOLER AND ITS ASSOCIATED PUMP AFTER A 15 MINUTE DELAY IF ANY OF THE FOLLOWING ARE TRUE
      i. AFTER A 15 MINUTES (ADJ) DELAY THE FAN SPEED OF FLUID COOLERS IS LESS THAN 40%(ADJ), AND THE CHILLED WATER SUPPLY TEMPERATURE IS LESS THAN SETPOINT BY 1ºF.
      ii. WITHOUT DELAY, IF THE BAS REQUIRES THAT A CHILLER STAGE BE ENABLED IN THE CHILLER SEQUENCE THAT IS GREATER THAN 3 PER (g.) OR GREATER THAN 2 PER (h.).
   j. THE BAS SHALL STOP THE LEAD FLUID COOLER AFTER A 15 MINUTE DELAY IF ANY OF THE FOLLOWING ARE TRUE FOR 15 MINUTES (ADJ).
      i. IF THE MEASURED AMBIENT WET BULB TEMPERATURE IS ABOVE THAN 53ºF (ADJ), AND BOTH CHILLERS DO NOT HAVE AN ACTIVE ALARM.
   k. IF THERE IS AN ALARM THE BAS SHALL NOT REVISE THE STAGE ASSIGNMENTS OF THE FLUID COOLERS AS SET UP IN COMMISSIONING.
   l. THE BAS SHALL OPERATE THE LEAD AND THE LAG FLUID COOLER USING EQUIVALENT SIGNALS TO MAINTAIN THE SECONDARY SUPPLY WATER SETPOINT DOWNSTREAM OF THE FLUID COOLERS AT A CONSTANT CHILLED WATER TEMPERATURE OF 60ºF (ADJ) USING THE FOLLOWING STAGES:
      i. ENABLE THE BASIN WATER PUMP.
      ii. AFTER 5 MINUTE DELAY AND A CONTINUED RISE IN CHILLED WATER TEMPERATURE START FLUID COOLER FANS AT 6 HZ.
      iii. UTILIZE A PI LOOP TO FURTHER RAMP UP FANS WITH A CONTINUED RISE IN SUPPLY SECONDARY CHILLED WATER TEMPERATURE.
      iv. IF THE PI LOOP HAS THE FLUID COOLER FAN AT 6 HZ FOR 15 MINUTES, DISABLE FAN.
   m. THE BAS SHALL COMMUNICATE WITH EACH FLUID COOLER'S VFD OVER AN RS485 BACNET CONNECTION.

THE BAS MONITORS SYSTEM PRESSURE. IF SYSTEM PRESSURE FALLS BELOW 20 PSI (ADJ) OR IS ABOVE 30 PSI (ADJ), THE BAS ACTIVATES A LOW OR HIGH LOOP PRESSURE ALARM.

F. THE OPERATION OF THE SIDE STREAM FILTER PUMP AND PUMP SHALL OPERATE ON A TIMER INITIALLY CONTINUOUSLY. THE SYSTEM THAT WOULD OPEN THE DRAIN VALVE ON THE ASSOCIATED FILTER ASSEMBLY SHALL BE MANUAL.

G. THE BAS SHALL OPEN SWEEPER SYSTEM CONTROL VALVES (TYPICAL OF 2 PER CELL) TO ONE CELL AT A TIME, AND CYCLE THROUGH TOWERS EVERY 2 HOURS. IT SHALL OPEN THE NEXT CELL VALVES PRIOR TO CLOSING VALVES ON THE VALVES ON THE PREVIOUS CELL. CLOSE VALVES AFTER A DELAY OF INITIALLY ONE MINUTE.

H. FREEZE PROTECTION SEQUENCE
   a. IF THE OUTSIDE AIR TEMPERATURE IS BELOW 32ºF (ADJ), THE BAS SHALL OPERATE ALL PUMPS EXCEPT FLUID COOLER SPRAY PUMPS THAT WERE TO BE CONTROLLED OFF PER ABOVE AT 30 HZ/50% (ADJ) FULL SPEED. ENABLE FILTER FEEDER PUMPS AT FULL SPEED.
   b. THE FLUID COOLER BASIN SHALL HAVE STANDALONE CONTROLS THAT MONITOR BASIN WATER TEMPERATURE, AND CONTROL THE STAGES AND SAFETIES ON THE ELECTRIC BASIN HEATERS. THIS SYSTEM SHALL OPERATE WITHOUT BAS.
   c. EACH HEAT TRACE SYSTEM CIRCUIT SHALL BE PROVIDED WITH A FAULT DETECTION MONITOR. IF A CURRENT SENSOR IS USED, IT SHALL BE CALIBRATED FOR A LINEAR RESPONSE IF ALSO AUTOREGULATING HEAT TRACE IS USED. AN ALARM AT LOW CURRENT SIGNAL SHALL BE GENERATED AT 32ºF (ADJ) AT LOW SIGNAL AND AT A HIGHER LOW CURRENT SIGNAL AT 40ºF (ADJ) AMBIENT FOR EACH CIRCUIT.

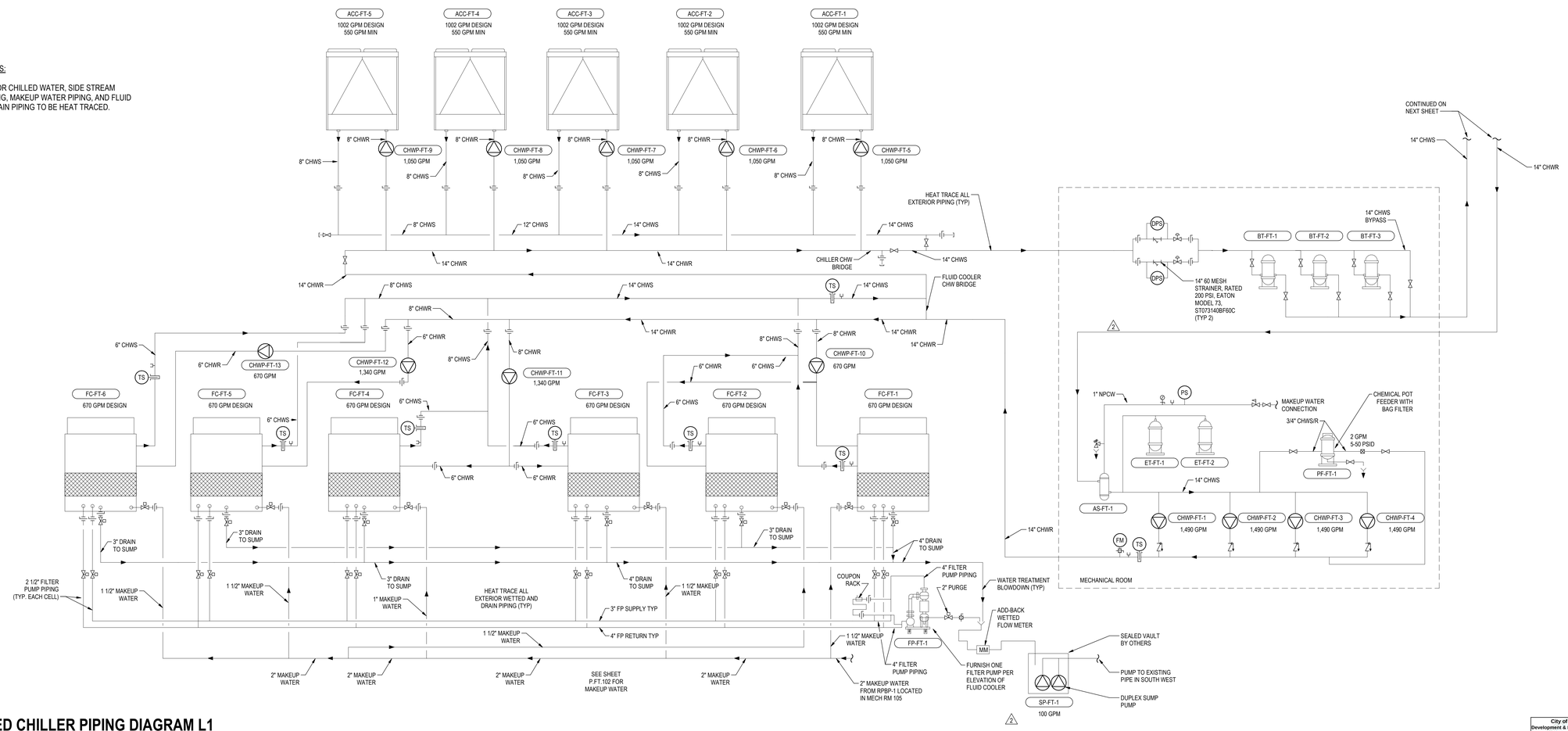
I. STRAINER VALVE SEQUENCE
   a. ONE STRAINER CONTROL VALVE SHALL BE MANUALLY OPERATED AS THE ONE CLOSED AT THE WORKSTATION, IF MANUALLY ACTUATED CLOSED THE OTHER STRAINER VALVE SHALL OPERATE OPEN FIRST. THERE SHALL BE A POP-UP INDICATING ARE YOU SURE YOU WANT TO DO THIS.
   b. THE SYSTEM SHALL AUTOMATICALLY OPEN A SECOND STRAINER CONTROL VALVE IF THE OPEN STRAINER HAS A HIGH DIFFERENTIAL PRESSURE, 0.5 PSI OR ABOVE INITIALLY. THERE SHALL BE A MANUAL MAINTENANCE BYPASS THAT INHIBITS THE OPENING OR CLOSING OF ANY VALVES. DETERMINE WITH OPERATOR AND CLEANEST BEST OPERATION IF HAVING THE SYSTEM WITH THE HIGH DIFFERENTIAL PRESSURE CLOSE AFTER OPENING THE SECOND VALVE IS NECESSARY OR MANUAL OPERATION FROM THE WORKSTATION IS BEST.

J. CHILLED WATER SYSTEM ALARM LIST
   a. HIGH SUPPLY CHILLED WATER TEMPERATURE
   b. HIGH RETURN CHILLED WATER TEMPERATURE
   c. LOW FLUID COOLER BASIN TEMPERATURE
   d. HIGH CHILLED WATER FILL PRESSURE
   e. LOW CHILLED WATER FILL PRESSURE
   f. HIGH FLUID COOLER BASIN WATER LEVEL
   g. LOW FLUID COOLER BASIN WATER LEVEL
   h. HEAT TRACE FAILURE ALARM
   i. PUMP FAILURE ALARM
   j. CHILLER FAILURE ALARM
   k. CHILLER COMPRESSOR FAILURE ALARM
   l. CHILLER LOW FLOW ALARM
   m. CHILLER CONDENSER FAN FAILURE ALARM
   n. FLUID COOLER FAN ALARM
   o. DIFFERENTIAL PRESSURE OUT OF RANGE ALARM
   p. DISTRIBUTION WATER FLOW OUT OF RANGE ALARM
   q. HIGH STRAINER DIFFERENTIAL PRESSURE
   r. DISTRIBUTION WATER FLOW OUT OF RANGE ALARM

K. AIR HANDLING UNIT (AHU-FT-1)
   a. THE NEW AIR HANDLING UNIT SERVES THE L2 FUTURE TENANT SPACE. THE UNIT IS SIZED FOR N CAPACITY WITH TWO EQUAL INDEPENDENT SIDES FOR REDUDANCY. THE UNIT HAS A CHILLED WATER COIL AND ELECTRIC REHEAT COIL PER SIDE.
   b. THE AIR HANDLING UNIT SHALL BE COMMANDED ON BY THE BAS CONTINUOUSLY. WHEN THE UNIT IS SHUTDOWN THE FANS ARE OFF AND VALVES ARE CLOSED. CONDENSATE PUMPS AND CONDENSATE DETECTION SYSTEMS SHALL NOT BE DISABLED. SHUTDOWN CAN OCCUR FOR ANY OF THE FOLLOWING, AND GENERATES AN ALARM:
      i. MANUAL SHUTDOWN.
      ii. SCHEDULED MAINTENANCE.
   c. UPON ENABLING THE AIR HANDLING UNIT THE FAN MAXIMUM SPEED SHALL BE 67% (ADJ) TO PROVIDE 10,000 CFM EACH PER AHU SIDE. FAN MINIMUM SPEED WITH THE VFD'S SHALL BE 12% (ADJ) OF FULL FLOW.
   d. THE BAS SHALL DEVELOP A COOLING DEMAND SIGNAL USED TO MODULATE THE CHILLED WATER VALVE TO MAINTAIN THE TEMPERATURE OF THE SPACE HIGHEST ABOVE SETPOINT AT 75ºF (OR AS INDIVIDUALLY SET AT THE BAS, ADJ) IN THE SERVER ROOM.
   e. DISCHARGE AIR TEMPERATURE IS FOR MONITORING ONLY.
   f. LEAVING WATER TEMPERATURE IS FOR MONITORING ONLY.
   g. THE BAS SHALL CONNECT TO THE AHU WITH A RS485 MODBUS RTU CONNECTION.
   h.

GENERAL NOTES:

1. ALL EXTERIOR CHILLED WATER, SIDE STREAM FILTER PIPING, MAKEUP WATER PIPING, AND FLUID COOLER DRAIN PIPING TO BE HEAT TRACED.



1 M.FT.601 **FT AIR-COOLED CHILLER PIPING DIAGRAM L1**
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MECHANICAL DRAWINGS

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JEFFREY M. LINCOLN — STATE OF WASHINGTON — 48576 — REGISTERED PROFESSIONAL ENGINEER
2024-12-27

PRCTI20242004

Revision No.	Description	Date
1	FUTURE TENANT PERMIT	8/30/2024
2	FUTURE TENANT REVISIONS	12/03/2024

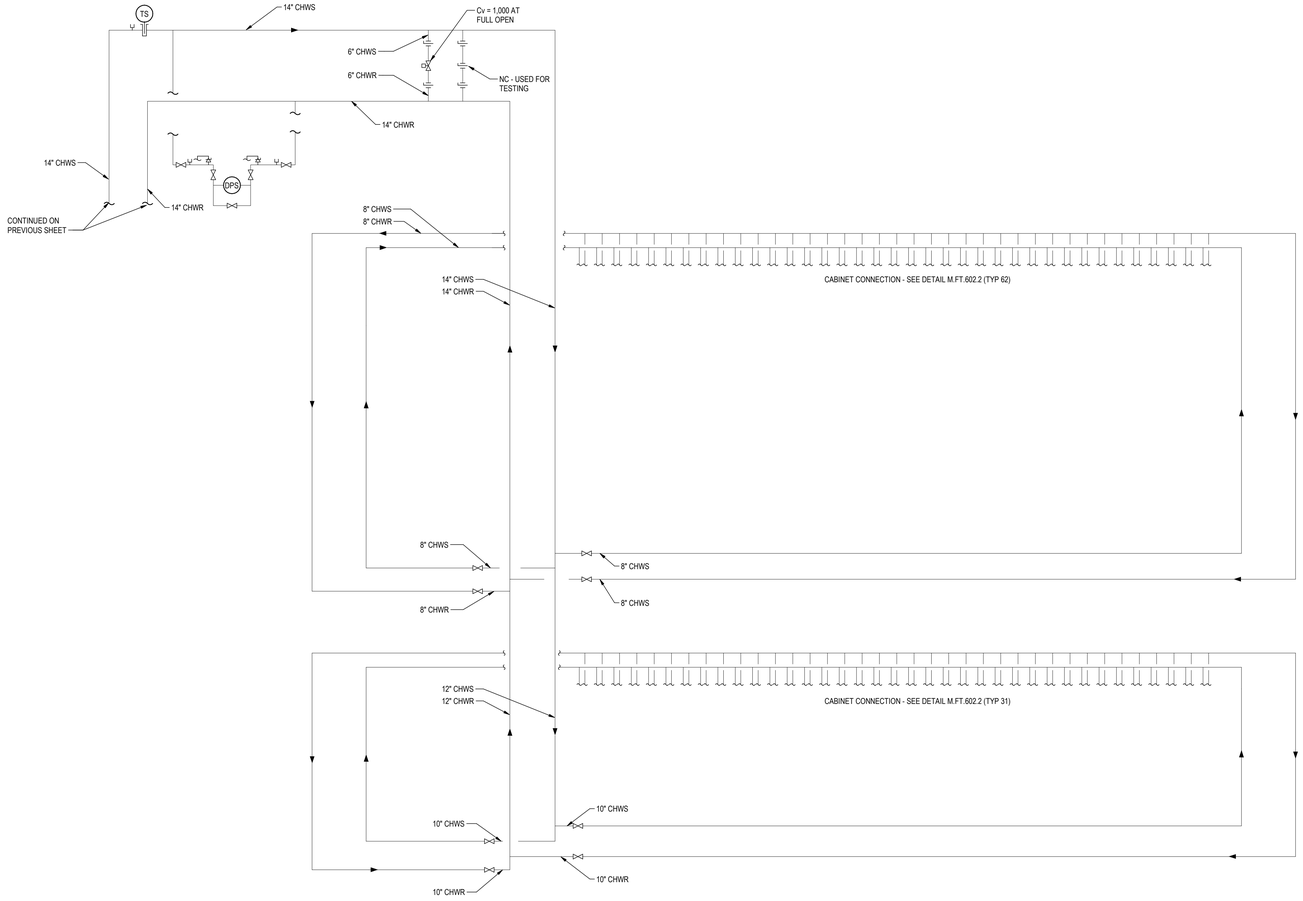
Drawn By: RM
Checked By: JL

Title: MECHANICAL DIAGRAMS

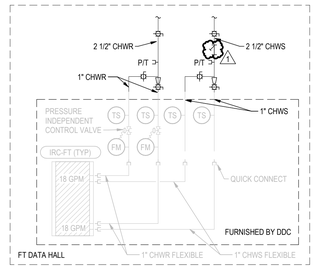
Sheet: M.FT.601

GENERAL NOTES:

1. ALL EXTERIOR CHILLED WATER, SIDE STREAM FILTER PIPING, MAKEUP WATER PIPING, AND FLUID COOLER DRAIN PIPING TO BE HEAT TRACED.



1 M.FT.602 **FT AIR-COOLED CHILLER PIPING DIAGRAM L2**
NTS



2 M.FT.602 **FT CABINET CONNECTION PIPING DIAGRAM**
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Revision No.	Description	Date
1	FUTURE TENANT PERMIT REVISIONS	12/27/2024

PRCTI20242004

Drawn By: RM
Checked By: JL

Title: MECHANICAL DIAGRAMS

Sheet: **M.FT.602**

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