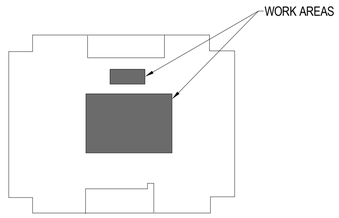
MONTANA STATE UNIVERSITY - COBLEIGH HALL - BOZEMAN, MT

COLD CHAMBERS COOLING TOWER REPLACEMENT

PPA NO. - 18-2194



BUILDING OUTLINE
NOT TO SCALE

PROJECT TEAM:

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ELECTRICAL ENGINEER:
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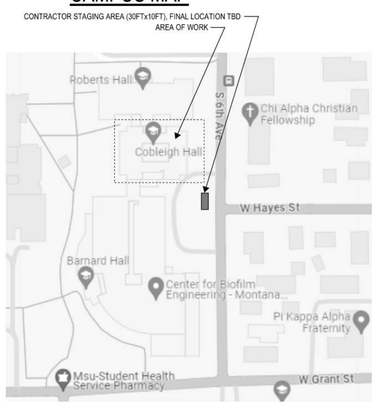
SHEET INDEX

CAMPUS MAP



GENERAL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE TO VISIT THE SITE AND DETERMINE THE EXACT EXTENT OF WORK, COORDINATION, DEMOLITION, ETC., NECESSARY TO COMPLETE THE PROJECT AS INDICATED IN THE CONTRACT DOCUMENTS.
2. INTERRUPTIONS OF SERVICES (POWER, WATER, HVAC, ETC.) AND WORK IN OCCUPIED TENANT SPACES MUST BE SCHEDULED THRU THE BUILDING MANAGER A MINIMUM OF 2 BUSINESS DAYS IN ADVANCE. ANY INTERRUPTIONS OR CONSTRUCTION WHICH WILL AFFECT NORMAL OPERATION OF THE BUILDING OR TENANTS MUST BE SCHEDULED, WITH THE MCKINSTRY CONSTRUCTION MANAGER'S APPROVAL, ON AN AFTER-HOURS BASIS.
3. VERIFY PHYSICAL DIMENSIONS OF EQUIPMENT. COORDINATE THE EXACT LOCATIONS OF NEW MECHANICAL AND PLUMBING EQUIPMENT WITH THE LOCATIONS OF LIGHTING FIXTURES, PIPING, AND OTHER CONSTRUCTION, TO ALLOW FOR PROPER ACCESS TO SERVICE AND MAINTAIN EQUIPMENT PRIOR TO START OF CONSTRUCTION.
4. COORDINATE THE LOCATION OF PIPING WITH OTHER TRADES. PROVIDE OFFSETS IN PIPING AS REQUIRED AT NO ADDITIONAL COST TO OWNER.
5. SUPPORT CONDUIT AND PIPING INDEPENDENTLY. SUPPORTS ARE INDEPENDENT OF PARTITION AND CEILING SYSTEM SUPPORTS.
6. CUTTING, CORE-DRILLING, FRAMING, PATCHING, AND PAINTING OF WALL, CEILING, AND FLOOR OPENINGS SHALL BE BY THE CONTRACTOR REQUIRING THE OPENING.
7. REFER TO STRUCTURAL DRAWINGS FOR EQUIPMENT SUPPORTS
8. UNIT WEIGHTS AND LOCATIONS HAVE BEEN COORDINATED TO DETERMINE BUILDING STRUCTURAL ADEQUACY. IF IT IS NECESSARY TO RELOCATE A UNIT, NOTIFY MCKINSTRY ENGINEERING DEPARTMENT FOR RE-COORDINATION.
9. PROVIDE SEISMIC RESTRAINTS AND ANCHORAGE PER SMACNA AND THE INTERNATIONAL BUILDING CODE FOR PIPING, AND EQUIPMENT.
10. CUTTING, PATCHING AND FLASHING OF ROOF EQUIPMENT AND PIPING SUPPORTS SHALL BE BY THE CONTRACTOR REQUIRING THE OPENING. MAINTAIN ALL REQUIRED ROOF WARRANTIES AND SUBMIT SUPPORTING DOCUMENTATION.
11. SLEEPERS, HOUSEKEEPING PADS, EMBED PLATES, AND CANT STRIPS SHALL BE BUILT AND FASTENED TO THE ROOF BY THE CONTRACTOR PROVIDING THE EQUIPMENT. TOP OF THE CURB MUST BE FLAT TO PROVIDE AN ACCEPTABLE SEALING SURFACE. MAXIMUM ALLOWABLE DEVIATION FROM LEVEL SHALL BE 1/8" IN 10'. ROOF CURBS AND SLEEPERS MUST BE SECURELY FASTENED TO STRUCTURAL SUPPORT MEMBERS.
12. PROVIDE PIPE, VALVE AND EQUIPMENT LABELING FOR IDENTIFICATION. MATCH OWNERS EXISTING LABELING SCHEME IF APPLICABLE. PIPE LABELING SHALL INCLUDE FLOW DIRECTIONAL ARROWS.

CONTROLS SYSTEM AND GRAPHIC NOTES:

1. A NEW UNITARY CONTROLLER SHALL BE PROVIDED BY THE TEMPERATURE CONTROLS CONTRACTOR FOR THE MONITORING OF THE ADIABATIC EVAPORATIVE FLUID COOLER (BACNET INTERFACE), CONDENSER WATER SUPPLY AND RETURN TEMPERATURES AND CONTROL OF THE MODULATING BY-PASS VALVE. THE EXSTING BAS CONTROLLER SERVING THE INDOOR EVAPORATIVE TOWER, SPRAY TREE PUMPS AND REMOTE SUMP SHALL REMAIN IN PLACE FOR A 90 DAY RUN PERIOD AND A GRAPHICAL PUSHBUTTON ON THE BAS SHALL BE PROVIDED TO RENABLE THE SYSTEM FOR EMERGENGENCY USE. FOLLOWING THE 90 DAY RUN PERIOD, CONTROLS FOR THE EXISTING SPRAY TREE PUMPS/EVAPORATIVE COOLER SHALL BE REMOVED FROM THE PENTHOUSE ALONG WITH THEIR ASSOCIATED GRAPHICS. THE ABILITY TO MANIPULATE THE ASPECTS OF SCHEDULING AND SET POINTS FOR THE FACILITY SHALL BE INCORPORATED INTO THE CONTROLS DELIVERABLE.
2. GRAPHICS SHALL BE LINKABLE TO SPECIFIC EQUIPMENT, SYSTEM POINTS AND OPERATING PARAMETERS WHICH ALLOW FOR 'ONE CLICK' DIAGNOSIS WHEN ISSUES ARE IDENTIFIED.
3. GRAPHICS SHALL HAVE DROP DOWN WINDOWS LINKING REFERENCES TO THE CONTROL DRAWINGS, SEQUENCES OF OPERATION, CONTROL PARAMETERS AND SPECIFIC EQUIPMENT/SYSTEM INFORMATION.
4. REFERENCE THE SEQUENCE OF OPERATION CONTAINED WITHIN THESE CONSTRUCTION DOCUMENTS FOR ADDITIONAL CONTROLS REQUIREMENTS.

ELECTRICAL COORDINATION NOTES:

1. PIPING SUBCONTRACTOR SHALL PROVIDE SELF-LIMITING HEAT TAPE ON OUTDOOR CONDENSER WATER PIPING AND NON-POTABLE WATER EVAPORATIVE MEDIA MAKE-UP WATER PIPING. HEAT TAPE SHALL BE SELF REGULATING BASED ON PIPE TEMPERATURE.
2. WHERE INDICATED ON THE EQUIPMENT SCHEDULES, THE EQUIPMENT COMES COMPLETE FROM THE FACTORY WITH MOTOR CONTROLS AS REQUIRED. ELECTRICIAN SHALL PROVIDE SERVICE AND A DISCONNECT PER CODE, AND POWER WIRING, INCLUDING CONNECTING TO EQUIPMENT.

PIPING NOTES:

1. INSTALL AIR VENTS AT HIGH POINTS IN CONDENSER WATER PIPING. INSTALL DRAIN VALVES IN LOW POINTS IN CONDENSER WATER PIPING.
2. PROVIDE FLANGES OR UNIONS AT PIPING CONNECTIONS TO EQUIPMENT, COILS, TRAPS, CONTROL VALVES, AND OTHER COMPONENTS TO ALLOW FOR MAINTENANCE.
3. PROVIDE REDUCERS AS REQUIRED FROM LINE PIPE SIZE TO EQUIPMENT, COIL, AND CONTROL VALVE CONNECTION SIZES.
4. PROVIDE OFFSETS FOR BRANCH LINES TO EQUIPMENT TO ALLOW FOR SERVICE AND MAINTENANCE OF EQUIPMENT.
5. PROVIDE DIELECTRIC NIPPLES (BRASS) OR DIELECTRIC FLANGES AT CONNECTIONS OF DISSIMILAR PIPE MATERIALS.
6. PROVIDE PRESSURE AND TEMPERATURE TEST PORTS AT SUPPLY AND RETURN PIPING CONNECTIONS TO EQUIPMENT.
7. TEMPERATURE WELLS, THERMOMETER WELLS, ECT.. SHALL BE MOUNTED HORIZONTALLY TO AVOID AIR TRAPPING.
8. SYSTEM FILL AND ANTI-FREEZE:
   A. AFTER COMPLETION OF PIPING SYSTEM INSTALLATION AND PRESSURE TESTING, AND BEFORE MAKING CONNECTIONS TO EQUIPMENT. PROVIDE TEMPERARY BY-PASSES AS REQUIRED. REMOVE TRACES OF DIRT, OIL, PIPE JOINT COMPOUND, ETC. BY FLUSHING PIPE SYSTEM WITH MCKINSTRY APPROVED CLEANER AND RUNNING CIRCULATION PUMPS. DRAIN, RE-FILL, AND RE-FLUSH SYSTEM IN ORDER TO REMOVE ALL TRACES OF CHEMICAL CLEANER.
   B. AFTER NEW PIPING SYSTEM HAS BEEN THOROUGHLY CLEANED AND PRESSURE TESTED, THE EXISTING GLYCOL MIXTURE SYSTEM FOR THE **ENTIRE CONDENSER WATER SYSTEM** SHALL BE DRAINED AND FLUSHED IN ITS ENTIRETY. FOLLOWING SYSTEM FLUSHING, FILL THE CONDENSER WATER SYSTEM WITH A PREMIXTURE OF PROPYLENE GYCOL (35%) AND APPROPRIATE INHIBITORS AND DISTILLED WATER.
   C. RUN PUMPS TO CIRCULATE UNTIL THOROUGHLY MIXED AND AIR HAS BEEN PURGED FROM SYSTEM. THEN, DRAW A SAMPLE OF GLYCOL-WATER MIXTURE AND SEND TO MANUFACTURER'S LABORATORY FOR ANALYSIS. ADD GLYCOL AND/OR INHIBITOR AS DIRECTED BY LAB REPORT. SUBMIT FINAL LAB REPORT TO MCKINSTRY ENGINEERING DEPARTMENT.
   D. PRESSURIZE SYSTEM ACCORDING TO THE FOLLOWING SCHEDULE:
      a. CLOSED CONDENSER WATER SYSTEM PRESSURE: SHALL BE 5 PSIG AT SYSTEM HIGH POINT WITH THE CONDENSER WATER PUMPS DE-ENERGIZED.
      b. SET THE GLYCOL FEEDER PRESSURE REGULATING VALVE TO 45 PSIG.

ABBREVIATIONS

GENERAL

AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
BHP	BRAKE HORSEPOWER
BOP	BOTTOM OF PIPE
BOT	BOTTOM
C/L	CENTER LINE
CSR	CURRENT SENSING RELAY
DN	DOWN
DS	DISCONNECT SWITCH; DOOR SWITCH
(E)	EXISTING
EA	EACH
(F)	FUTURE
FLEX	FLEXIBLE
FLR	FLOOR
GC	GENERAL CONTRACTOR
HP	HORSEPOWER; HIGH PRESSURE
HTG	HEATING
HTR	HEATER
ID	INSIDE DIAMETER/DIMENSION
IN WC	INCHES WATER COLUMN
LS	LEVEL SENSOR
MC	MECHANICAL CONTRACTOR
MFR	MANUFACTURER
MTD	MOUNTED
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN; NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
POC	POINT OF CONNECTION
QTY	QUANTITY
(R)	RELOCATED
REQD	REQUIRED
SECT	SECTION
SPEC	SPECIFICATION
STD	STANDARD
TBD	TO BE DETERMINED
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
VFD	VARIABLE FREQUENCY DRIVE
VSD	VARIABLE SPEED DRIVE
W/	WITH
W/O	WITHOUT
WC	WATER COLUMN
WG	WATER GAUGE

PIPING

CNDS	CONDENSATE
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
EWT	ENTERING WATER TEMPERATURE
5# G	NATURAL GAS - LOW PRESSURE, 5 PSI
SCW	SOFTENED COLD WATER
SRV	STEAM RELIEF VENT
TOP	TOP OF PIPE

GENERAL INFORMATION SYMBOLS

- NEW SCOPE
- FUTURE SCOPE
- DEMOLISHED SCOPE
- EXISTING SYSTEMS
- POINT OF CONNECTION
- POINT OF DEMOLITION
- CENTERLINE
- KEY NOTE REFERENCE
- PIPING RISER CALLOUT (CHW; HW)
- PIPING RISER #
- DETAIL OR DIAGRAM NUMBER
- SHEET NUMBER WHERE DETAIL/DIAGRAM SHOWN
- SECTION NUMBER
- SHEET NUMBER WHERE SECTION SHOWN
- REVISION NUMBER
- REVISION CLOUD - DENOTES AREA OF CHANGE
- DETAIL REFERENCE OUTLINE WITH NUMBER AND SHEET LOCATION

PIPING IDENTIFICATION

CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
CTS	COOLING TOWER WATER SPRAY SUPPLY
CTR	COOLING TOWER WATER SPRAY RETURN
NPW	NON-POTABLE WATER

PIPING FITTINGS

	TEE UP
	TEE DOWN
	TEE DN W/ ELBOW
	TEE UP W/ ELBOW
	90° ELBOW UP
	90° ELBOW DN
	CAP
	UNION
	FLANGE
	FLEX HOSE CONNECTION
	DOUBLE BELLOWS FLEX CONNECTION
	SINGLE BELLOWS FLEX CONNECTION
	FLOW ARROW
	REDUCER
1%	SLOPE SYMBOL
	BREAK OR CONTINUATION SYMBOL
	DOWN SPOUT NOZZLE
	CLEANOUT

INSTRUMENTATION AND CONTROLS

	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	PRESSURE REDUCING VALVE
	PNEUMATIC CONTROL VALVE
	RELIEF VALVE
	BALL VALVE
	3-WAY GATE VALVE
	BUTTERFLY VALVE
	DIAPHRAGM VALVE
	CHECK VALVE
	NEEDLE VALVE
	GLOBE VALVE
	GLOBE VALVE ANGLE
	GLOBE VALVE 3-WAY
	GATE VALVE
	PLUG VALVE
	BALANCING VALVE
	HOSE BIBB
	AUTO FLOW VALVE
	PUMP
MV	MANUAL AIR VENT
AV	AUTOMATIC AIR VENT
HAV	HIGH CAPACITY AIR VENT
A	SHOCK ARRESTOR
FS	FLOW SWITCH
VB	VACUUM BREAKER
	PRESSURE GAUGE
T	TEMPERATURE SENSOR
T	HYDRONIC TEMPERATURE SENSOR
	TEMPERATURE INDICATOR
	Y STRAINER W/ BALL VALVE
	PIPE SLEEVE
	PETES PLUG
	SUCTION DIFFUSER W/ STRAINER
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
DP	HYDRONIC DIFFERENTIAL PRESSURE SENSOR
	LEAK DETECTOR / MOISTURE SENSOR
T	SPACE TEMPERATURE SENSOR
NO2	SPACE NITROGEN DIOXIDE SENSOR
T	OUTDOOR AIR TEMPERATURE SENSOR
VFD	VARIABLE FREQUENCY DRIVE
MS	MOTOR STARTER
C	CONTROL RELAY
	CURRENT SENSORY
PT	PRESSURE TRANSDUCER

01/04/2024 - 100% CONSTRUCTION DOCUMENTS

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DRAWN BY: M. JUDY
REVIEWED BY: P. FALLON

REV.	DESCRIPTION	DATE

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PHILIP J. FALLON
REG. 14421 PE

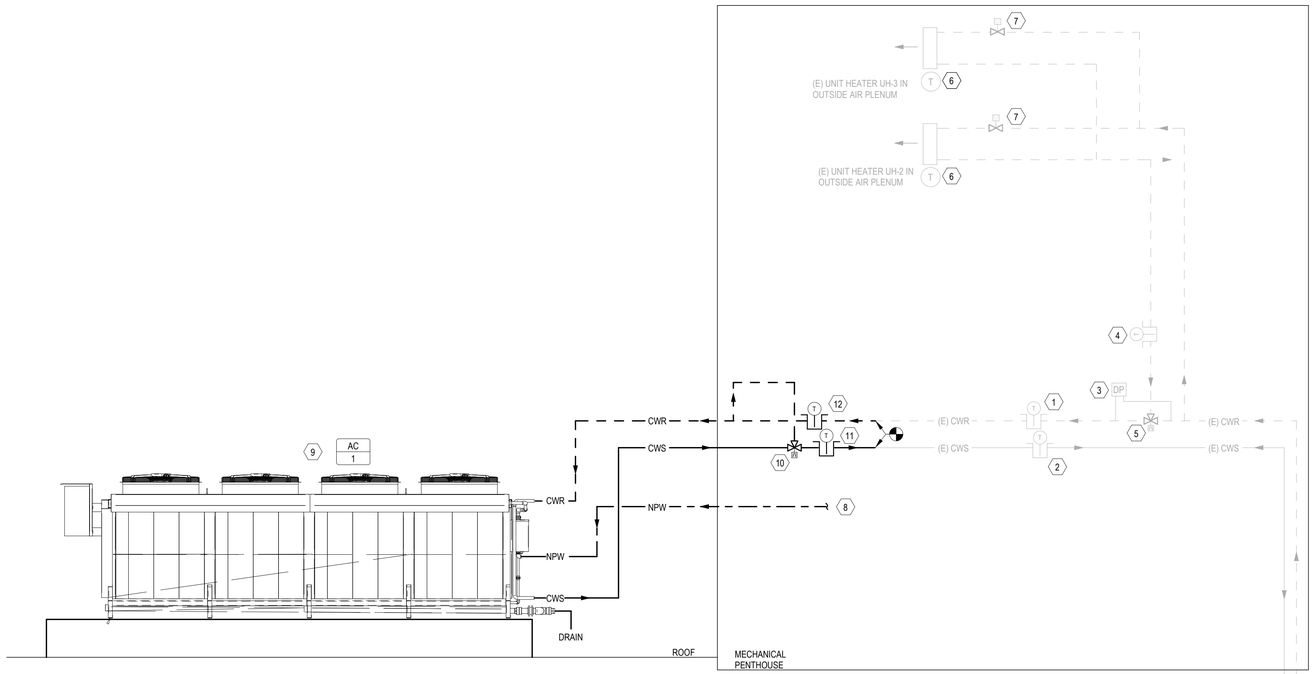
PPA#18-2194

MCKINSTRY#207626

SHEET TITLE
MECHANICAL LEGEND & ABBREVIATIONS

SHEET
M-001

DATE
01-04-2024



1 ADIABATIC COOLING TOWER CONTROLS DIAGRAM

SCALE: 12" = 1'-0"

ADIABATIC CLOSED CIRCUIT COOLER — SEQUENCES OF OPERATION

GENERAL:

THE ROOF MOUNTED CLOSED CIRCUIT ADIABATIC COOLER ON THE ROOF OF THE BUILDING SERVES TO REJECT HEAT FROM THE BUILDING CONDENSER WATER LOOP SERVING THE COLD STORAGE CONDENSING UNITS.

CONDENSER WATERSIDE SYSTEM:

THE BUILDING CONDENSER WATERSIDE SYSTEM LOOP CONSISTS OF TWO CIRCULATING PUMPS (CWP-1 & CWP-2, CONTROLLED IN A LEAD/STAND-BY ARRANGEMENT), ONE CLOSED CIRCUIT ADIABATIC COOLER MOUNTED ON THE ROOF, AND A HEAT RECOVERY SYSTEM WHICH PRE-HEATS OUTSIDE AIR FOR THE BUILDINGS AIR HANDLING SYSTEMS. THE TEMPERATURE CONTROLS CONTRACTOR SHALL MODIFY THE SYSTEM AND CURRENT SEQUENCE OF OPERATIONS AS FOLLOWS:

1. INCREASE THE CONDENSER WATER DIFFERENTIAL PRESSURE SETTING FROM 35 PSIG TO 40 PSIG. TO CONTROL THE PUMP SPEED COMMAND.
2. MODIFY THE PARAMETERS OF THE VARIABLE SPEED DRIVES TO PROVIDE A MINIMUM SPEED OF 45 HZ REGARDLESS BAS SPEED COMMAND.
3. MODIFY THE VFD PARAMETERS OF ALLOW AN OVERSPEED (UP TO 110%, 66 HZ) WITH PROGRAMMED LIMITATION THAT PUMP FLA DOES NOT EXCEED MOTOR NAMEPLATE RATINGS.
4. PUMP LEAD/LAG ARRANGEMENT TO REMAIN AS CURRENTLY PROGRAMMED.
5. THE HEAT RECOVERY VALVE DIFFERENTIAL PRESSURE SETPOINT IN THE MECHANICAL PENTHOUSE IS CURRENTLY FIXED AT 10 PSIG. T.C.C. SHALL MODIFY SETPOINT TO RESET TO 0 PSIG AT AMBIENT TEMPERATURES ABOVE 55 DEG. F.

THE HEAT REJECTION SYSTEM (ADIABATIC FLUID COOLER AFC-1) SHALL BE IN THE OCCUPIED MODE CONTINUOUSLY TO MAINTAIN THE CONDENSER WATER SUPPLY TEMPERATURE (INITIALLY SET FOR 80 DEG. F.) THRU ITS INTEGRAL CONTROLS BY CYCLING THE EC MOTORS AND CONTROLLING NON-POTABLE WATERFLOW. THE DDC SYSTEM SHALL MODULATE THE 3-WAY MIXING VALVE INSIDE THE PENTHOUSE MECHANICAL SYSTEM TO MAINTAIN A MINIMUM OF 72 DEG. F. AS MEASURED BY THE TEMPERATURE WELL LOCATED DOWNSTREAM FROM ITS POSITION.

THE DDC SYSTEM SHALL INTEGRATE THRU THE BACNET MSTP COMMUNICATION CARD (CONFIRM COMMUNICATIONS MODULE TYPE WITH TEMPERATURE CONTROLS CONTRACTOR PRIOR TO UNIT RELEASE) TO THE ADIABATIC FACTORY CONTROLLER TO MONITOR AND TREND AT A MINIMUM THE FOLLOWING PARAMETERS:

1. FAN RPM.(EACH).
2. FAN ALARM (EACH).
3. % AIR VOLUME.
4. DIGITAL OUTPUT (STATUS).
5. SETPOINT.
6. FLUID COOLER SUPPLY AND RETURN TEMPERATURE.
7. WATER REGULATING VALVE MODULATION POSITION.

ADDITIONALLY, THE DDC SYSTEM SHALL PICK-UP THE FOLLOWING HARD WIRED DIGITAL OUTPUTS FROM THE FACTORY CONTROLLER:

1. PRIORITY 1 FAULTS (DO OUTPUT NO.1).
2. PRIORITY 2 WARNINGS (DO OUTPUT NO.2).
3. WATER SYSTEM IS IN OPERATION (DO OUTPUT NO.3).

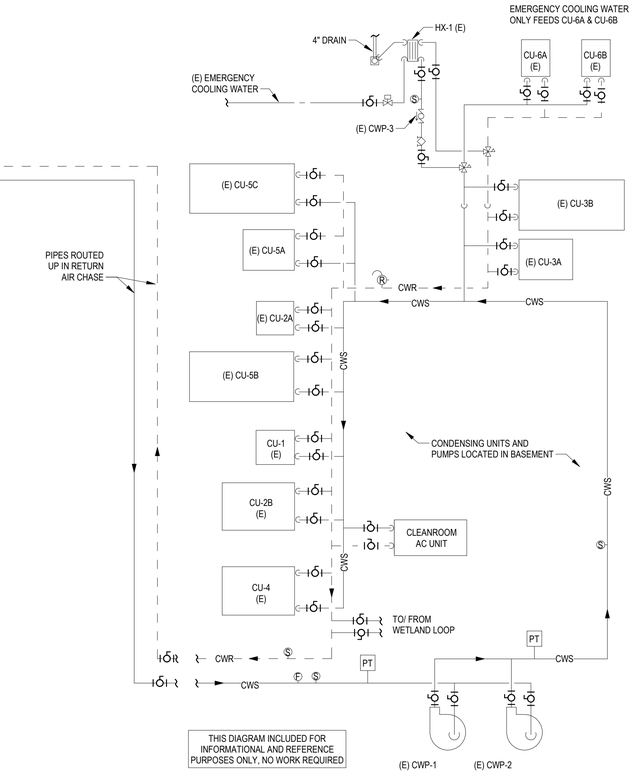
THE OPERATORS WORKSTATION SHALL RECEIVE AN ALARM REQUIRING ACKNOWLEDGMENT WHENEVER THE FOLLOWING CONDITIONS OCCUR:

1. THE CONDENSER LOOP SUPPLY WATER TEMPERATURE HAS DROPPED BELOW 55 DEG. OR HAS RISEN ABOVE 90 DEG. FOR A 5-MINUTE TIME PERIOD.
2. UPON AN ALARM NOTIFICATION RECEIVED VIA THE BACNET MSTP INTERFACE WITH THE ADIABATIC FLUID COOLER CONTROLLER.
3. UPON ALARM NOTIFICATION FROM FACTORY CONTROLLER ON DIGITAL OUTPUTS NO.1 AND NO.2.

REFERENCE FACTORY SEQUENCE OF OPERATIONS PUBLISHED IN IOM MANUAL FOR UNIT SPECIFIC SOO.

ADIABATIC COOLER WATERSIDE SYSTEM:

THE TEMPERATURE CONTROLS CONTRACTOR SHALL FURNISH THE 3-WAY, 2-POSITION, BI-DIRECTIONAL, FAST ACTING AUTOMATIC VALVE TO DRAIN THE NON-POTABLE DOMESTIC WATER FROM THE EXTERIOR PIPING FEEDING THE OUTDOOR ADIABATIC COOLER WHEN OUTSIDE AIR TEMPERATURE DROPS BELOW 40 DEG. F. VALVE OPERATION SHALL NOT BE TIED INTO THE BAS SYSTEM, A LINE (120V) OR LOW (24V) VALVE AND ASSOCIATED THERMOSTAT WITH OUTDOOR AIR SENSING BULB SHALL AUTOMATICALLY CONTROL VALVE OPERATION AS DESCRIBED IN THE DOCUMENTS. VALVE INSTALLATION BY THE MECHANICAL CONTRACTOR, ALL WIRING LINE OR LOW VOLTAGE BY THE T.C.C.



2 LOWER LEVEL CONTROLS DIAGRAM

SCALE: 12" = 1'-0"

KEYNOTES

1. EXISTING CONDENSER WATER RETURN TEMPERATURE SENSOR. SENSOR TO REMAIN ON EXISTING BAS CONTROLLER FOR BACK-UP SYSTEM.
2. EXISTING CONDENSER WATER SUPPLY TEMPERATURE SENSOR. SENSOR TO REMAIN ON EXISTING BAS CONTROLLER FOR BACK-UP SYSTEM.
3. EXISTING PRESSURE DIFFERENTIAL TRANSMITTER.
4. EXISTING CONDENSER WATER RETURN SENSOR (FROM OA PLENUM UNIT HEATERS.
5. EXISTING 2" HEAT RECOVERY 3-WAY VALVE TO REMAIN.
6. EXISTING SPACE (OA PLENUM) TEMPERATURE SENSOR.
7. EXISTING TWO-WAY T.C. VALVE.
8. NON-POTABLE WATER FROM SOFTENING SYSTEM.
9. ADIABATIC FLUID COOLER, PIPE PER DETAIL.
10. 3" FULLY MODULATING DDC MOTORIZED 3-WAY GLOBE STYLE MIXING VALVE (CV=90).
11. DDC TEMPERATURE SENSOR FOR CONDENSER WATER SUPPLY TO NEW BAS CONTROLLER. SENSOR SHALL BE USED FOR CONTROL OF BY-PASS VALVE.
12. DDC TEMPERATURE SENSOR FOR CONDENSER WATER RETURN TO NEW BAS CONTROLLER.

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DRAWN BY : M. JUDY
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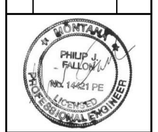


PPA#18-2194

MCKINSTRY#207626

SHEET TITLE
MECHANICAL CONTROLS

SHEET
M-002

DATE
01-04-2024

BOOSTER PUMP SCHEDULE

DESCRIPTION							PHYSICAL INFO				PERFORMANCE					ELECTRICAL										SPECIFIC NOTES
EQUIPMENT CLASSIFICATION	EQUIPMENT ID	LOCATION	SYSTEM SERVED	MANUFACTURER	MODEL	TYPE AND ARRANGEMENT	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	CONNECTION SIZE (HEADER)	MAX. DESIGN PUMP FLOW (GPM)	MINIMUM PUMP FLOW (GPM)	SUCTION PRESSURE (PSIG)	DISCHARGE PRESSURE (PSIG)	MAXIMUM FLUID TEMPERATURE (°F)	QUANTITY OF ELECTRICAL CONNECTIONS	VOLTAGE (V)	PHASE (Ø)	FULL LOAD AMPS (A)	STARTER PROVIDED BY	VFD PROVIDED BY	MOTOR HORSEPOWER (HP)	VARIABLE FREQUENCY DRIVES	DISCONNECT PROVIDED BY	CONTROL METHOD	
-	BP-1	PENTHOUSE	ADIABATIC COOLER	GRUNFOSS	CMBE TWIN 1-44	DUPLEX	20	21	18	(2) @ 1.5"	6	0	30	50	140	1	120	1	16 (MAX.)	N/A	INTERGRAL (MFGR.)	(2) @ 1HP EACH	YES	PLUG-IN	INTEGRAL	1 THRU 8

SPECIFIC NOTES:
1 NEMA 1 UL LISTED CONTROL PANEL, INLET PRESSURE SWITCHES, NON-RETURN VALVSE, SINGLE POINT POWER CONNECTION (CABLE AND PLUG-IN).
2 DIAPHRAM TANKS INCLUDED.
3 STAINLESS STEEL PUMP SLEEVES, IMPELLER, NOZZLE & PUMP SHAFTS
4 MANUAL SETPOINT ADJUSTMENT.
5 INTEGRAL VARIABLE FREQUENCY DRIVES, MOTORS RATED FOR VARIABLE SPEED.
6 PROVIDE WITH PRESSURE GAUGES, PRESSURE SENSORS.
7 PROVIDE WITH FACTORY AUTHORIZED STARTUP

HVAC EXPANSION TANK SCHEDULE

TAG #	ET-1
LOCATION (FLOOR #, GRID INTERSECTION)	BASEMENT MECH. AREA
QUANTITY	1
TYPE AND ARRANGEMENT (DIAPHRAGM/BLADDER, HORIZ/VERT)	DIAPHRAGM
SYSTEM SERVED	CONDENSER WATER SYSTEM
BASIS OF DESIGN	
MANUFACTURER	WESSELS
MODEL NUMBER	NTA-20
TYPE / HORIZONTAL OR VERTICAL	VERTICAL
PHYSCIAL DIMENSIONS AND WEIGHT	
DIAMETER x HEIGHT - INCHES	12" X 25"
INLET SIZE - INCHES	0.75"
INLET CONNECTION TYPE	NPT
TANK WEIGHT (LBS)	52 LBS.
PERFORMANCE	
FLUID TYPE	30% PROPYLENE GLYCOL
SYSTEM VOLUME (GALLONS)	TBD
TANK VOLUME REQUIRED (GALLONS)	11
TANK ACCEPTANCE VOLUME REQUIRED (GALLONS)	8.8
SYSTEM TEMPERATURE RANGE (F)	60-90
SYSTEM PRESSURE RANGE AT TANK CONNECTION (PSIG)	45
RELIEF VALVE SETTING (PSIG)	125
ASME RATING REQUIRED	YES
CONSTRUCTION MATERIALS	
SHELL	STEEL
MAXIMUM WORKING PRESSURE - PSIG	125
MAXIMUM OPERATING TEMPERATURE - F	240
NOTES:	
1 CONFIRM PRECHARGE TO MINIMUM OPERATING PRESSURE (45 PSIG) AT TANK LOCATION (COLD WITH PUMPS OFF) PRIOR TO INSTALLATION.	

WATER SOFTENER SCHEDULE

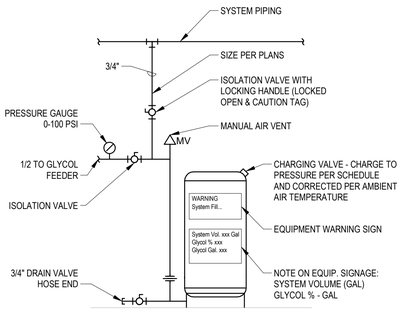
-	
UNIQUE TAG #	WS-1
LOCATION	PENTHOUSE
TYPE AND ARRANGEMENT	DUPLEX
AREA / SYSTEM SERVED	NON-POTABLE COLD WATER TO COOLER
MANUFACTURER DATA	
SUPPLIER	PURE WATER TECHNOLOGIES
MANUFACTURER/MODEL NUMBER	EVOLVE EVR-844TW
MATERIALS OF CONSTRUCTION - VESSEL	FIBER GLASS
ASME BOILER & PRESS VESSEL CODE CONSTRUCTION (SECTION VIII DI...	NA
PHYSICAL CHARACTERISTICS	
WIDTH X DEPTH X HEIGHT (MEDIA TANKS TOTAL)	27"W x 52"H
WIDTH X DEPTH X HEIGHT (BRINE TANK)	18"W x33" H
QUANTITY OF RESIN TANKS	2
QUANTITY OF BRINE TANKS	1
COLD WATER CONNECTION - INCHES	1"
PERFORMANCE CHARACTERISTICS	
CONTINUOUS FLOW (GPM) / PRESSURE DROP (PSI)	5 GPM @ 5.4 PSI
PEAK FLOW (GPM) / PRESSURE DROP (PSI)	11.4 GPM @ 15 PSI
WATER PRESSURE RANGE	30 - 100 PSI
OPERATING TEMPERATURE RANGE	33-100
MAXIMUM OPERATING PRESSURE - (PSIG)	75
CAPACITY (MIN. / MED. / MAX.) (GRAINS/LBS. NaCL)	15,000 @ 3.0 / 21,600 @ 6.0 / 25,600 @ 9.0
ELECTRICAL	
QUANTITY OF ELECTRICAL CONNECTIONS	1 (PLUG - 5')
VOLTAGE / PHASE	120 / 1
MINIMUM OVERCURRENT PROTECTION (MOCP, AMPS)	NA
CONTROLS	
CONTROLLER	UNIT MOUNTED

NOTES:
1. ELECTRICAL OUTLET BY ELECTRICAL CONTRACTOR TO BE WITHIN 5' OF UNIT
2. INSTALL SIPHON BREAK ON DRAIN. SEE DETAIL. ROUTE DRAIN TO FLOOR SINK BY PLUMBING CONTRACTOR
3. IF SYSTEM USES FRP TANKS, INSTALL A VACUUM BREAKER ON EACH TANK.
4. PROVIDE FACTORY CERTIFIED START-UP.

ADIABATIC FLUID COOLER SCHEDULE

DESCRIPTION	
TAG	AFC-1
LOCATION	ROOF
SITE ELEVATION	5000 FT
TYPE AND ARRANGEMENT	OUTDOOR, CLOSED CIRCUIT ADIABATIC FLUID COOLER WITH EVAPORATIVE COOLING MEDIA ON INLET AIR TO COOLING COILS
AREA / SYSTEM SERVED	CONDENSER WATER SYSTEM
MANUFACTURER DATA / BASIS OF DESIGN	
MANUFACTURER	GUNTNER - HYDROBLU
MODEL NUMBER	GFW 090.2A04/6AA-E355L/04P.M
PHYSICAL DIMENSIONS	
OVERALL LENGTH / WIDTH / HEIGHT	56"W x 234"L x 69" H
SHIPPING WEIGHT / OPERATING WEIGHT	4,533 LBS. / 4,301 LBS.
PERFORMANCE / SELECTION CRITERIA	
WET PERFORMANCE CAPACITY (MBH)	672 MBH
WET PERFORMANCE CAPACITY (EWT / LWT) (40% PROP. GLYCOL).	90 / 80 DEG. F.
WET PERFORMANCE CAPACITY (EAT DB/WB)	95 / 63 DEG. F.
DRY PERFORMANCE (FULL CAPACITY SWITCH)	71.2 DEG. F.
# OF FANS	QTY. OF 4
MOTOR TYPE	ELECTRONICALLY COMMUTATED EC MOTORs
TOTAL FAN POWER IN/OUT	14.2 KW / 17.5 HP
COIL FLOW RATE	145 GPM
COIL EWT / LWT, FLUID	90 DEG. F / 80 DEG. F., 35% PROP. GLYCOL
PRESSURE DROP THRU COIL @ 145 GPM	7.9 PSIG
COIL CONNECTIONS INLET	(2) @ 2"
COIL CONNECTIONS OUTLET	(2) @ 2"
DRAIN CONNECTION SIZE	(1) @ 2"
WATER CONNECTION SIZE	(1) @ 1"
WATER FLOWRATE DESIGN / MAXIMUM (EVAP PAD)	3.4 / 6.2 GPM
WATER FLOW PRESSURE INLET REQUIREMENT	20 TO 60 PSI
ELECTRICAL	
QUANTITY OF ELECTRICAL CONNECTIONS	1
UNIT VOLTAGE	460V, 3-PHASE
UNIT FLA	21.6 AMPS
UNIT MCA	22.95 AMPS
UNIT MOCP	25 AMPS
CONTROLS	
CONTROLS	FACTORY

REMARKS:
1. FURNISH WITH BACNET MSTP FOR DDC SYSTEM INTEGRATION (FOR MONITORING PURPOSES ONLY).
2. PROVIDE WITH INTEGRAL CONTROLS TO CYCLE FANS/MODULATE FAN SPEED AND CYCLING OF EVAP PAD WATER VALVE TO MAINTAIN LEAVING WATER TEMPERATURE SETPOINT.
3. PROVIDE WITH GUNTNER STREAMERS , SHIPPED LOOSE FOR HINGED FAN PANELS.
4. PROVIDE WITH VIBRATION DAMPERS.
5. PROVIDE WITH FIN AND PAD GUARD.
6. PROVIDE WITH FLANGE CONNECTIONS, ANSI 150#.
7. PROVIDE WITH BALL VALVES FOR VENT AND DRAIN.
8. PROVIDE WITH ELECTRIC HEATER, FAN AND THERMOSTAT IN NEMA 4 ENCLOSURE/CONTROL PANEL.
9. PROVIDE SEISMIC CALCULATIONS AND WIND LOADING FOR UNIT CONSTRUCTION AND ANCHORAGE SPECIFIC TO MOUNTING LOCATION.
10. FURNISH WITH ONE SPARE EC FAN MOTOR / ASSEMBLY, SHIPPED LOOSE.
11. PROVIDE WITH STRAINER AND CONTROL VALVE FOR EVAP WATER.
12. PROVIDE WITH FACTORY AUTHORIZED START-UP AND PROGRAMMING.



NOTE: PIPE EXPANSION TANK TO SUCTION SIDE OF CONDENSER WATER PUMP HEADER. CONTRACTOR MAY UTILIZE EXISTING 3/4" CONNECTION FROM EXISTING TO REMAIN GLYCOL FEEDER AND PROVIDE ADDITIONAL FITTINGS AS REQUIRED.

1 EXPANSION TANK DETAIL
SCALE: 12" = 1'-0"

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DRAWN BY: M. JUDY		
REVIEWED BY: P. FALLON		
REV.	DESCRIPTION	DATE

MONTANA PHILIP J. FALLON 14421 PE LICENSED PROFESSIONAL ENGINEER

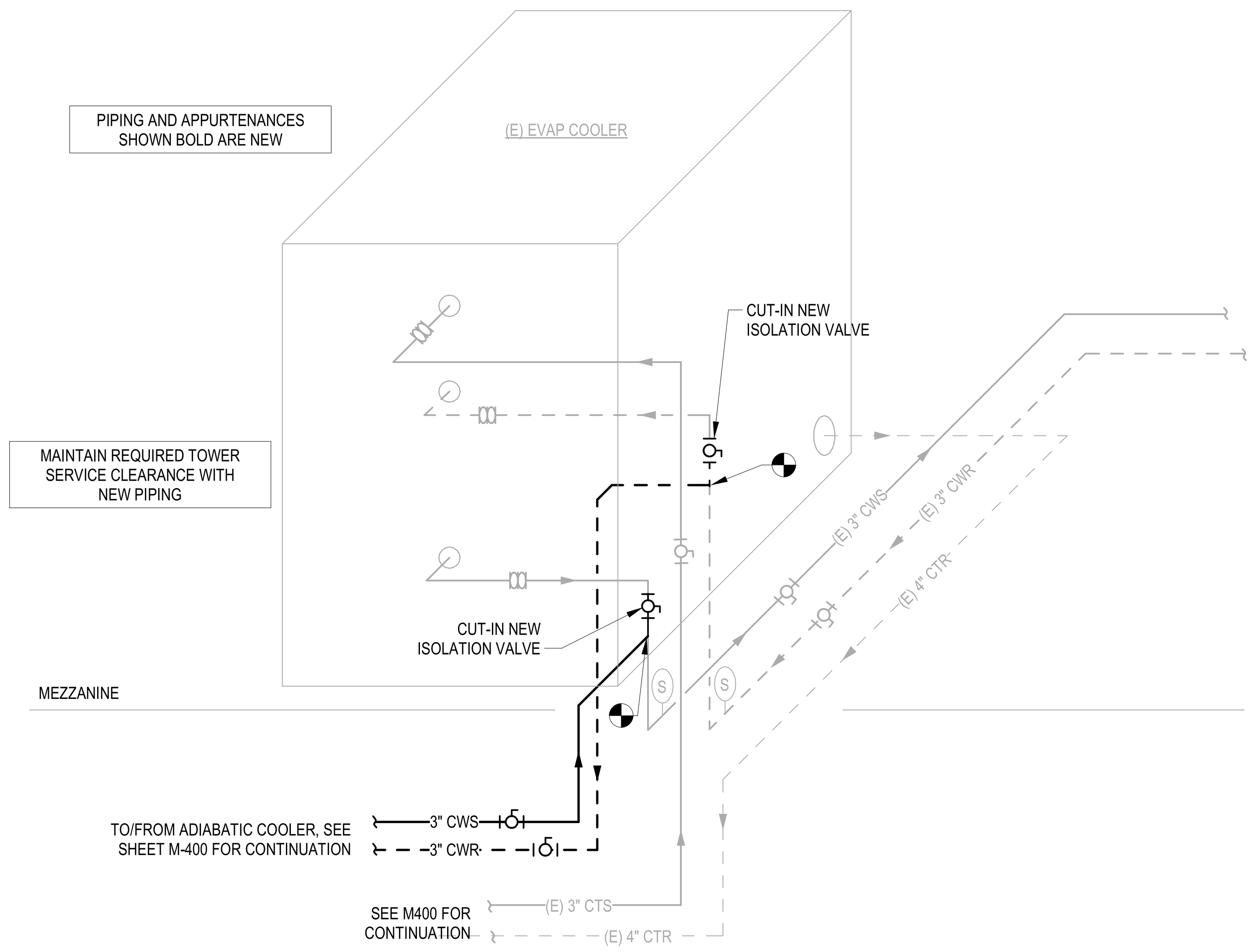
PPA#18-2194

MCKINSTRY#207626

SHEET TITLE
MECHANICAL SCHEDULES AND DETAILS

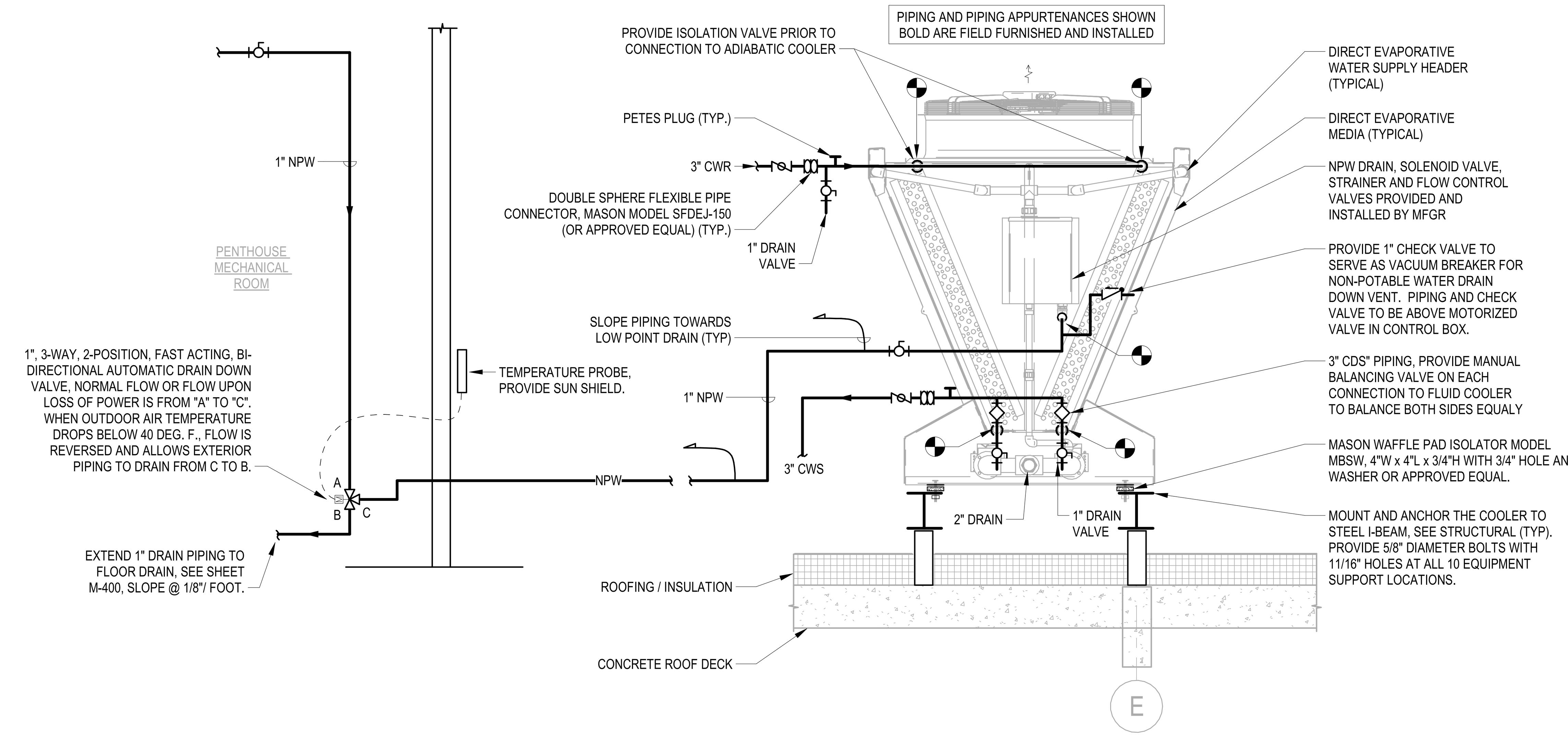
SHEET
M-060

DATE
01-04-2024



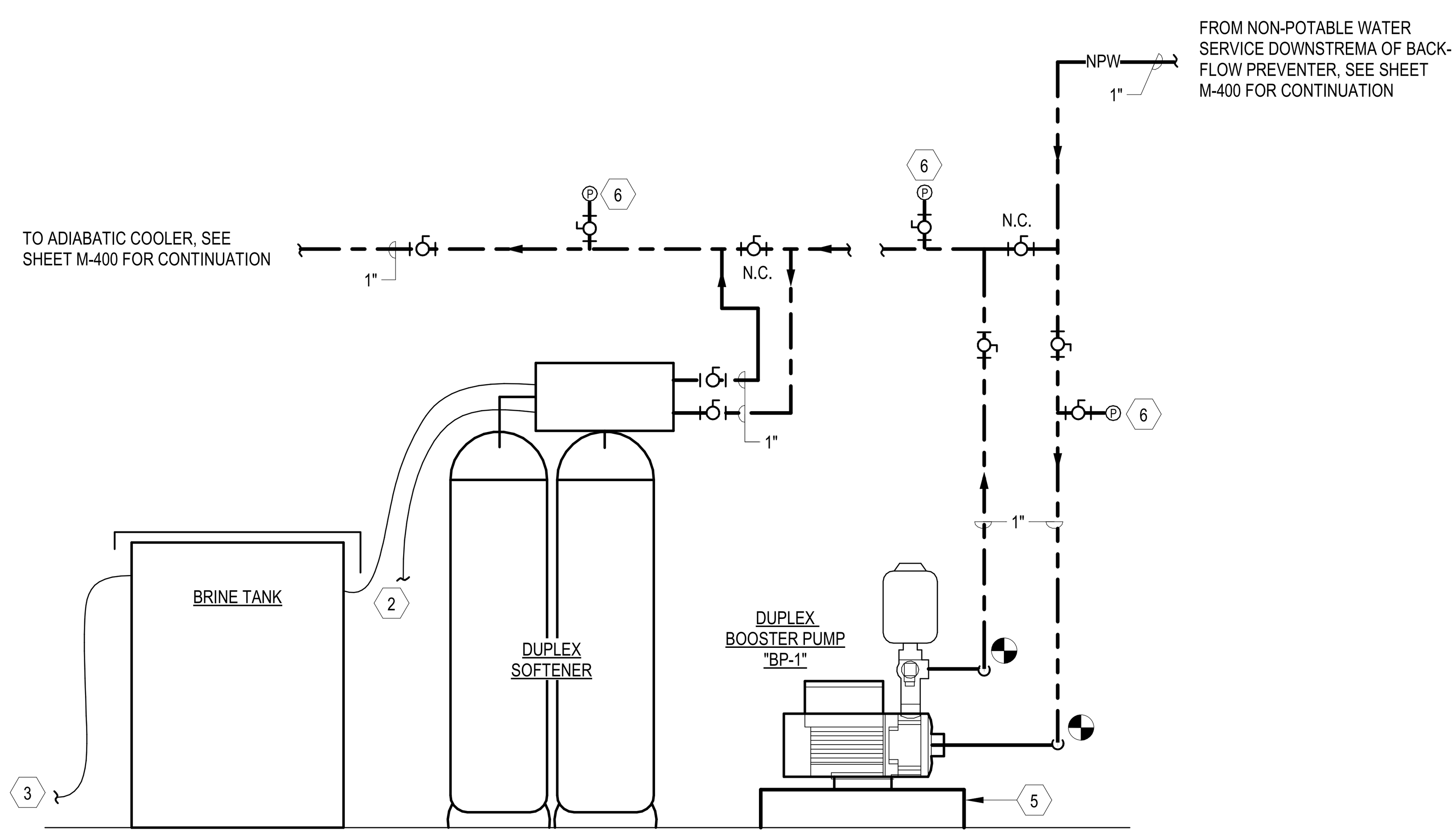
1 PIPING CONNECTIONS AND MODIFICATIONS AT EXISTING EVAPORATIVE COOLER DETAIL

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



3 ADIABATIC COOLER PIPING DETAIL

SCALE: 12" = 1'-0"

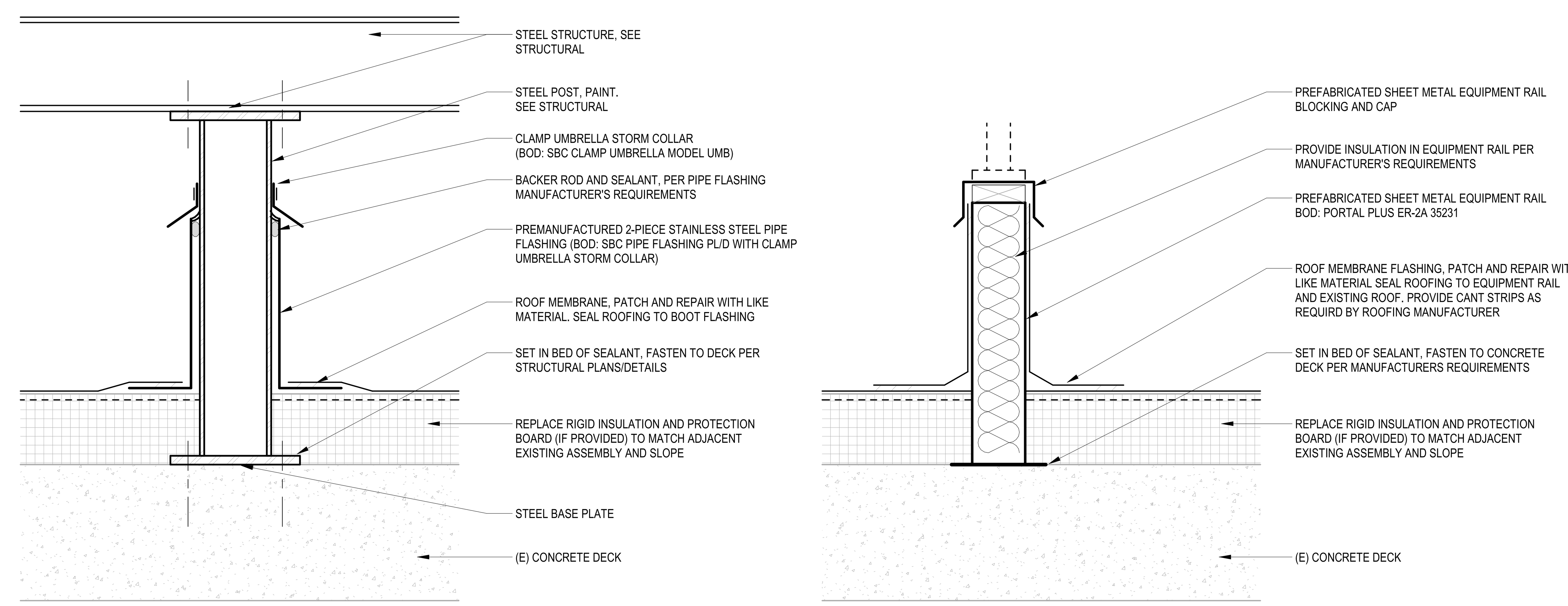


NOTES:

1. EXTEND TO EXISTING NON-POTABLE WATER PIPING DOWNSTREAM OF REDUCED PRESSURE BACKFLOW PREVENTER FEEDING REMOTE SUMP. SEE FLOOR PLAN.
2. BACKWASH (3/4" ID TUBING), TERMINATE AT EXISTING FLOOR DRAIN, PIPE INDIRECT.
3. BRINE TANK OVERFLOW (1/2" ID TUBING) TERMINATE AT EXISTING FLOOR DRAIN, PIPE INDIRECT. DO NOT CONNECT TO BACKWASH PIPING.
4. TO ADIABATIC FLUID COOLER, SEE FLOOR PLAN.
5. ANCHOR DUPLEX BOOSTER PUMP TO 4" CONCRETE HOUSEKEEPING PAD.
6. PRESSURE GAUGE (0-100 PSIG)

2 BOOSTER PUMP AND WATER SOFTENER PIPING DETAIL

SCALE: 12" = 1'-0"



4 ROOFING DETAILS

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

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DRAWN BY : M. JUDY
REVIEWED BY: P. FALLON

REV.	DESCRIPTION	DATE

MONTANA PHILIP J. FALLON No. 14421 PE LICENSED PROFESSIONAL ENGINEER

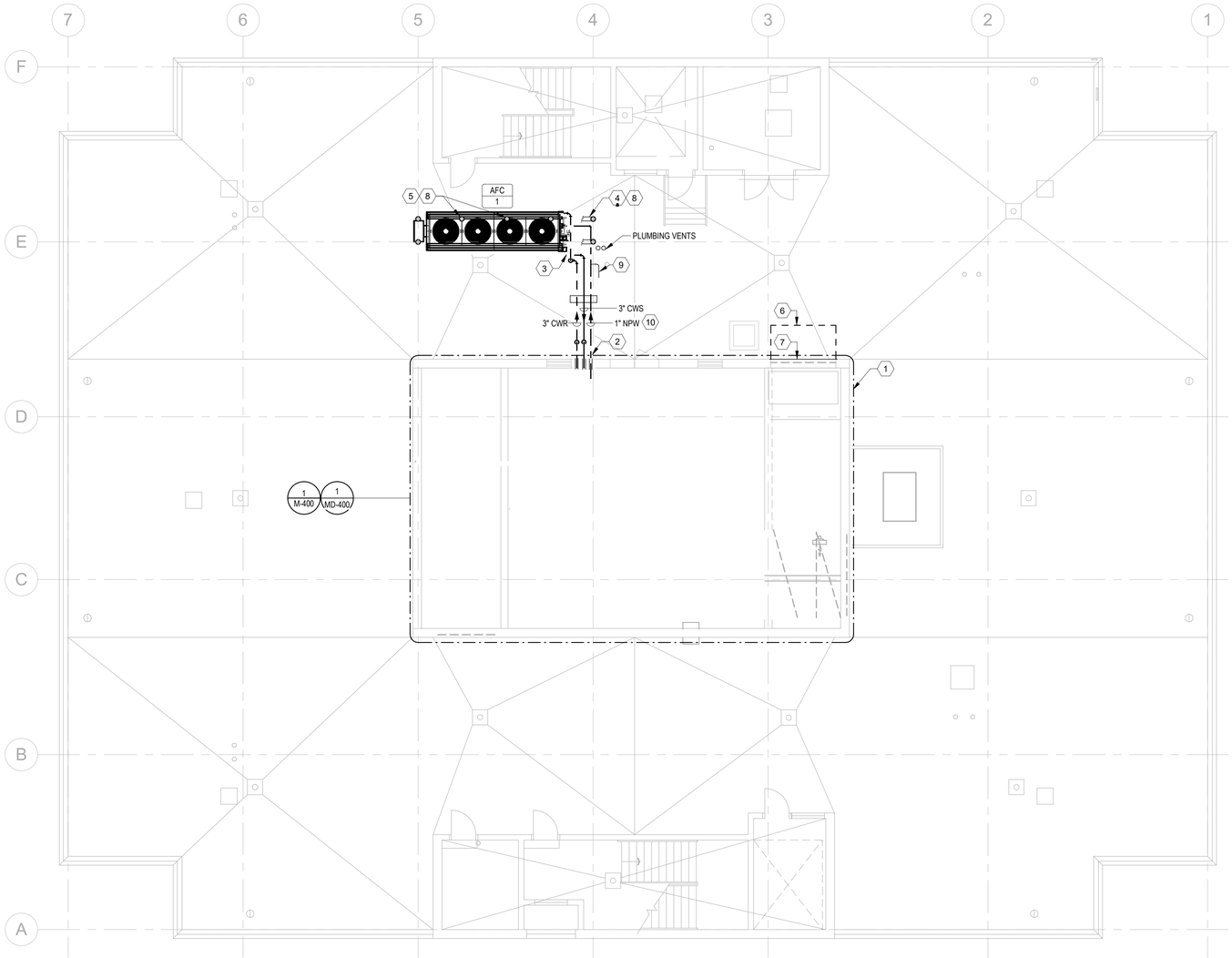
PPA#18-2194

MCKINSTRY#207626

SHEET TITLE
MECHANICAL DETAILS

SHEET
M-061

DATE
01-04-2024



1 ROOF PIPING PLAN

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

0 4' 8' 16'

KEYNOTES

1 SEE ENLARGED PENTHOUSE PLAN FOR WORK IN THIS AREA.
2 OFFSET PIPING BEYOND MISCELLANEAOUS INSTRUMENTATION ON EXTERIOR WALL.
3 INSTALL/PIPE PER DETAIL 3, SHEET M-061.
4 COOLER TO SET ATOP STRUCTURAL BEAM WHICH SPANS BETWEEN COLUMNS "3" & "4" ALONG THE ENTIRE LENGTH OF COLUMN "E". NOTE TOP OF BEAM APPROX. 12 INCHES ABOVE FINISHED ROOF. SEE STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
5 STRUCTURAL POST UP, TYPICAL OF 7 LOCATIONS, SEE STRUCTURAL.
6 REMOVE INTAKE HOOD (APPROXIMATELY 96"W x 64"H x 42"D IN ITS ENTIRETY.
7 PROVIDE 20 GAUGE INSULATED COVER OVER BOTH LOUVERED OPENINGS AND SEAL WATERTIGHT. PROVIDE DRIP EDGE ALONG TOP. APPROXIMATE TOTAL SHEETMETAL COVER DIMENSIONS = 96"W x 128"H (FIELD VERIFY). PREP AND PAINT SHEETMETAL COVER TO MATCH ADJACENT FINISH. INSULATION SHALL BE 1" UNFACED POLY-ISOCYANURATE OR EQUAL.
8 FLASH AROUND STRUCTURAL POST-UPS PER DETAIL 4, SHEET M-061.
9 SLOPE NON-POTABLE DOMESTIC WATER BACK TOWARDS 3-WAY AUTOMATIC DRAIN VALVE LOCATED IN MECHANICAL PENTHOUSE.
10 PROVIDE HEAT TRACING ON EXTERIOR NPW PIPING.

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REV.	DESCRIPTION	DATE

MONTANA PHILIP J. FALLON 14421 PE LICENSED PROFESSIONAL ENGINEER

PPA#18-2194

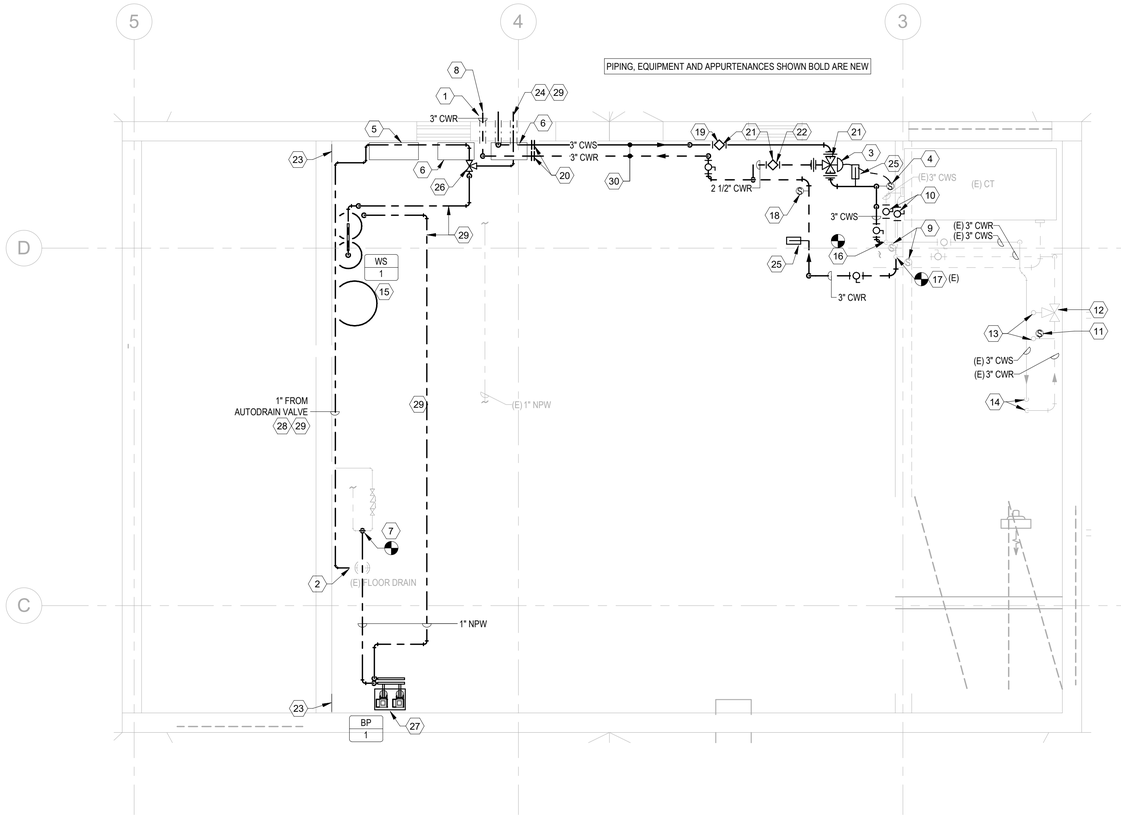
MCKINSTRY#207626

SHEET TITLE
MECHANICAL - ROOF PLAN

SHEET
MP101

DATE
01-04-2024

1/5/2024 9:40:42 AM Autodesk Docs://Cobleigh Hall – Cooling Tower Replacement/MSU_COBLEIGH_MCK_ENG_MECH_V22.rvt



1 MECHANICAL - ENLARGED PENTHOUSE PLAN

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

KEYNOTES

1 CORE DRILL THRU EXTERIOR WALL AND PROVIDE PIPE SLEEVE, SEAL WATERTIGHT AROUND PIPE SLEEVE AND ANNULAR SPACE BETWEEN PIPING INSULATION AND SLEEVE (TYP.), SEE MP-101 FOR CONTINUATION.WALL PENETRATIONS SHALL NOT CUT THE EXISTING REINFORCEMENT THRU THE 8" THICK CONCRETE PENTHOUSE WALL. REINFORCEMENT ACCORDING TO THE ORIGINAL STRUCTURAL DRAWINGS IS #4 REBAR @10" HORIZONTAL AND #4 REBAR @ 16" VERTICAL. CONTRACTOR SHALL X-RAY WALL AS REQUIRED TO AVOID CUTTING REINFORCEMENT.

2 TERMINATE 1" DRAIN PIPING WITH AIR-BREAK AT FLOOR DRAIN.

3 PROVIDE FULLY MODULATING 3-WAY GLOBE STYLE MIXING VALVE, SIZED FOR 145 GPM @ 5 PSI PD. FOR SUPPLEMENTAL CONTROL OF CONDENSER WATER TEMPERATURE.

4 PROVIDE TEMPERATURE WELL AND DDC TEMPERATURE SENSOR.

5 JOHNSON CONTROLS COOLING TOWER CONTROLLERS TO REMAIN OPERATIONAL, THRU THE CONSTRUCTION PERIOD, UNTIL 90 DAY RUN PERIOD HAS BEEN COMPLETED, SEE PLAN SHEET MD-401.

6 AVAILABLE ENCLOSURE FOR ADDITIONAL BAS CONTROLLERS AND OR INPUT OUTPUT MODULES AS NEEDED.

7 CONNECT TO EXISTING NON-POTABLE DOMESTIC COLD WATER PIPING DOWNSTREAM OF BACKFLOW PREVENTER AT THIS LOCATION.

8 CONDENSER WATER PIPING (CWS/CWR) OUT TO ROOF MOUNTED TOWER, SEE ROOF PLAN FOR CONTINUATION.

9 EXISTING BAS TEMPERATURE SENSORS/WELLS TO REMAIN ON CONDENSER WATER SUPPLY AND RETURN PIPING.

10 CUT-IN ISOLATION VALVES ON CONDENSER WATER SUPPLY AND RETURN (CWS/CWR) PIPING TO EXISTING EVAPORATIVE COOLER. SEE DETAIL 1 SHEET M-061.

11 EXISTING BUILDING AUTOMATION TEMPERATURE SENSOR/WELL ON CONDENSER WATER RETURN PIPING FROM UNIT HEATERS "HEAT RECOVERY" OUTSIDE AIR PLENUMS TO REMAIN.

12 EXISTING 2" HEAT RECOVERY 3-WAY VALVE TO REMAIN.

13 EXISTING PIPING UP TO HEAT RECOVERY SYSTEM.

14 CONDENSER WATER SUPPLY AND RETURN PIPING DOWN TO BUILDING.

15 PROVIDE WATER SOFTENER AS SCHEDULED, INSTALL PER DETAIL 2, SHEET M-061.

16 CONNECT NEW CWS TO EXISTING CWS VERTICAL PIPE SERVING EVAPORATIVE COOLER, SEE PIPING DETAIL 1 SHEET M-061.

17 CONNECT NEW CWR TO EXISTING CWR VERTICAL PIPE SERVING EVAPORATIVE COOLER, SEE PIPING DETAIL 1 SHEET M-061.

18 CONDENSER WATER RETURN SENSOR.

19 PROVIDE BALANCE VALVE WITH MEMORY STOP, VALVE SHALL BE SET TO FULL OPEN POSITION. TACO ACCU FLO MODEL ACUF-300-F 3" FLANGED.

20 TRANSITION FROM SCHEDULE 80 PVC PRESSURE PIPING (INTERIOR PIPING) TO SCHEDULE 40 STEEL PIPE (EXTERIOR PIPING) AT THIS LOCATION.

21 BYPASS PIPING, ISOLATION AND BALANCE VALVE SHALL BE INSTALLED IN READILY ACCESSIBLE LOCATION, APPROX 9' A.F.F.

22 PROVIDE BALANCE VALVE WITH MEMORY STOP, SET FOR EQUAL FLOW AT FULL BY-PASS AS THRU TOWER WITH FULL FLOW TO COOLER. TACO ACCU FLO MODEL ACUF-300-F 3" FLANGED.

23 MAINTAIN CLEARANCE AT ACCESS DOOR.

24 NON-POTABLE SOFTENED DOMESTIC WATER OUT TO ROOF MOUNTED ADIABATIC, SEE MECHANICAL ROOF PLAN MP-101 FOR CONTINUATION.

25 PROVIDE THERMOMETER IN CONDENSER WATER PIPING AT THIS LOCATION.

26 3-WAY AUTOMATIC DRAIN DOWN VALVE, MOUNT APPROX. 12" A.F.F., FIELD VERIFY ELEVATIONS FOR PROPER DRAINAGE OF EXTERIOR AND INTERIOR NON-POTABLE DOMESTIC WATER.

27 PROVIDE DUPLEX BOOSTER PUMP SKID AS SCHEDULED, ANCHOR TO 4" HOUSEKEEPING PAD, PIPE PER DETAIL 2, SHEET M-061.

28 SLOPE PIPING AT 1/8" PER FOOT FROM AUTODRAIN VALVE TOWARDS FLOOR DRAIN.

29 NPW PIPING SHALL BE TYPE "L" COPPER WITH SOLDERED JOINTS.

30 PROVIDE MANUAL AIR VENTS AT HIGH POINT IN CONDENSER PIPING. AIR VENTS SHALL BE 3/8" BALL VALVE WITH 18" LONG SOFT COPPER "CANDY CANE" SOFT COPPER AT OUTLET.

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DRAWN BY: M. JUDY
REVIEWED BY: P. FALLON

REV.	DESCRIPTION	DATE

STATE OF MONTANA
PHILIP J. FALLON
No. 14421 PE
LICENSED PROFESSIONAL ENGINEER

PPA#18-2194

MCKINSTRY#207626

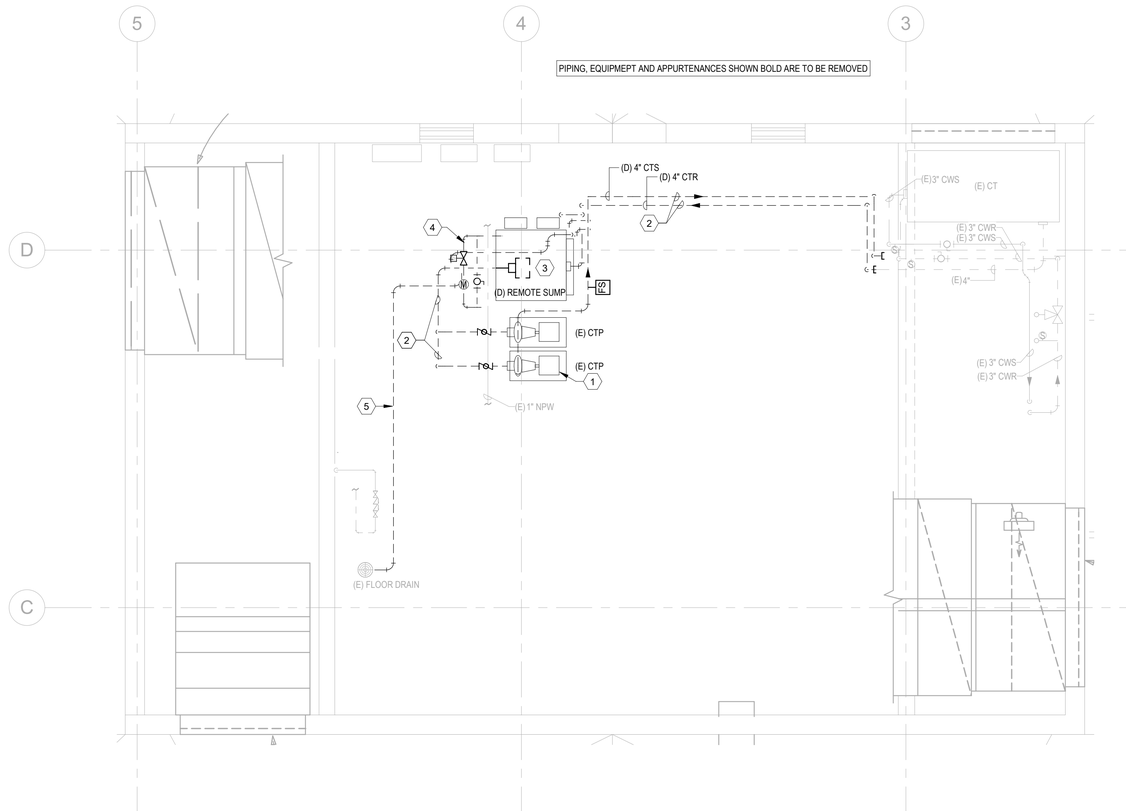
SHEET TITLE
ENLARGED PENTHOUSE PLAN

SHEET
M-400

DATE
01-04-2024

KEYNOTES

1. FOLLOWING 90 DAY RUN PERIOD OF NEW CONDENSER WATER COOLER, REMOVE SPRAY TREE PUMP AND CONCRETE ISOLATION BASE.
2. FOLLOWING 90 DAY RUN PERIOD OF NEW CONDENSER WATER COOLER, REMOVE SPRAY TREE PIPING AND CAP WHERE INDICATED.
3. FOLLOWING 90 DAY RUN PERIOD OF NEW CONDENSER WATER COOLER, REMOVE REMOTE SUMP AND ASSOCIATED CHEMICAL TREATMENT PIPING AND CONTROLS. TURN OVER CONTROLLER TO MSU.
4. FOLLOWING 90 RUN PERIOD, REMOVE 1" NON-POTABLE WATER PIPING DROP TO WATER METER AND BYPASS SERVING REMOTE SUMP AND CAP PIPING AT MAIN OVERHEAD.
5. FOLLOWING 90 RUN PERIOD, REMOVE BLOWDOWN AND SUMP OVERFLOW PIPING BETWEEN REMOTE SUMP/PUMP SUCTION HEADER AND FLOOR DRAIN.



1 MECHANICAL - ENLARGED PENTHOUSE DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

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DRAWN BY : M. JUDY
REVIEWED BY: P. FALLON

REV.	DESCRIPTION	DATE

MONTANA PHILIP J. FALLON REG. 14421 PE PROFESSIONAL ENGINEER

PPA#18-2194

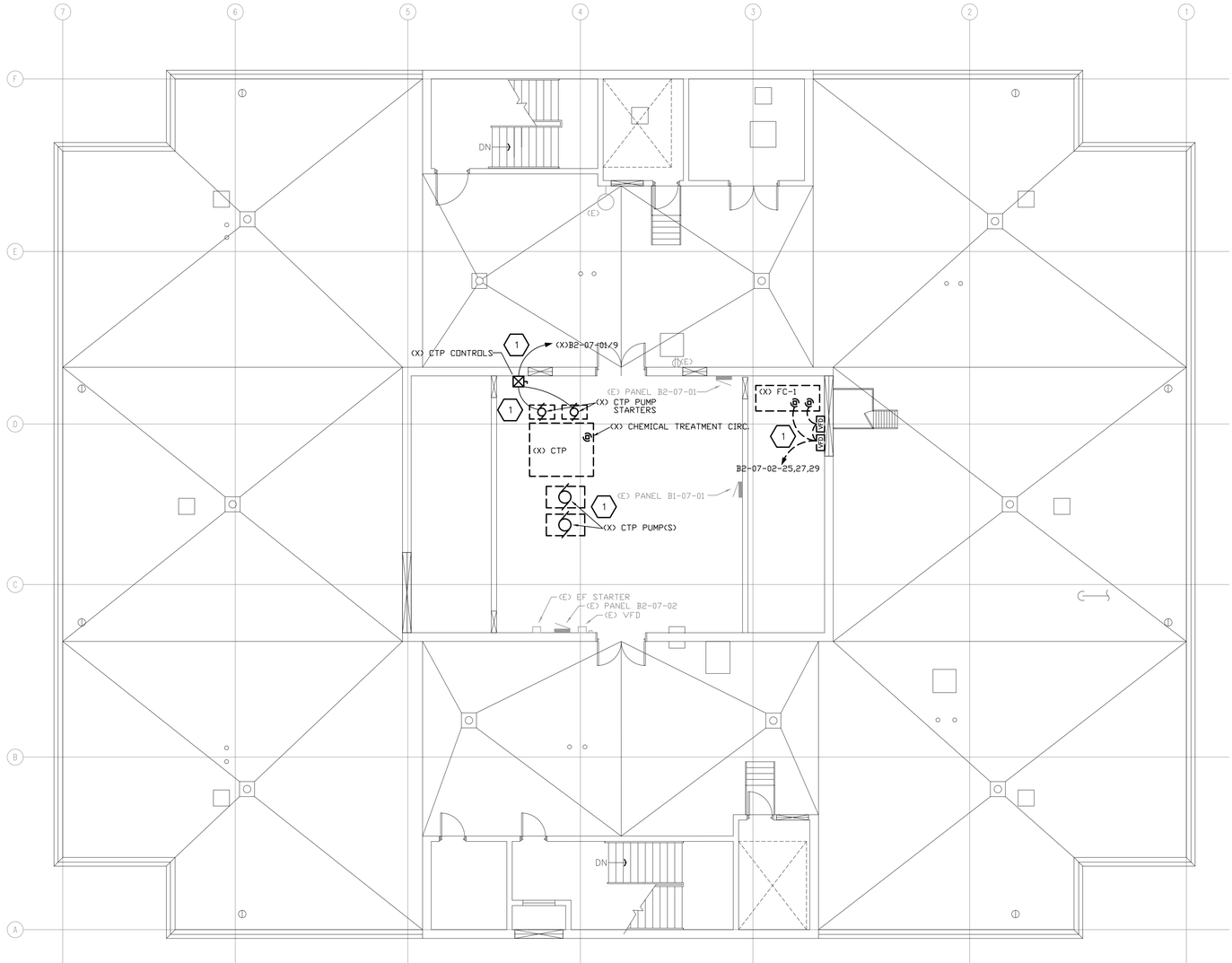
MCKINSTRY#207626

SHEET TITLE
ENLARGED PENTHOUSE DEMOLITION PLAN

SHEET
MD-400

DATE
01-04-2024

IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INCLUDING EQUIPMENT SUPPLIERS TO COORDINATE WITH EACH OTHER AND TO VERIFY THAT THERE ARE NO CONFLICTS IN LOCATIONS OF DUCTS, CONDUITS, SPRINKLER HEADS, SPRINKLER PIPING, DIFFUSERS, ELECTRICAL BOXES AND OTHER ITEMS THROUGHOUT THIS PROJECT BEFORE FINAL PLACEMENT OF MATERIALS.



N

ROOF PLAN - POWER DEMO

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

GENERAL NOTES

1. IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INCLUDING EQUIPMENT SUPPLIERS TO COORDINATE WITH EACH OTHER AND TO VERIFY THAT THERE ARE NO CONFLICTS IN LOCATIONS OF DUCTS, CONDUITS, PIPING, DIFFUSERS, ELECTRICAL BOXES AND OTHER ITEMS THROUGHOUT THIS PROJECT, BEFORE FINAL PLACEMENT OF MATERIALS.
2. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION: DETAILED EQUIPMENT REQUIREMENTS, INSTALLATION INSTRUCTIONS, PERFORMANCE REQUIREMENTS, CONTROL SEQUENCES AND ALL OTHER PROJECT DETAILS.
3. EXISTING CONDUITS STUBBED THROUGH THE FLOOR THAT ARE NOT REUSED OR ARE ABANDONED SHALL BE CUT AT THE FLOOR SURFACE, GROUND FLUSH AND FILLED WITH GROUT. FLOOR FINISH SHALL MATCH THAT OF EXISTING.
4. ELECTRICAL WORK IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. PATCHING AND PAINTING IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
5. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH NEC, STATE AND LOCAL BUILDING CODE.
6. RETURN ANY USABLE/ SALVAGEABLE ELECTRICAL DEVICES TO OWNER INCLUDING BUT NOT LIMITED TO: LIGHT FIXTURES, ELECTRICAL HEATERS, PANELS, CIRCUIT BREAKERS ETC. CONFIRM WITH OWNER ITEMS THAT ARE DESIRABLE FOR RETENTION.
7. ALL DASHED ITEMS ON DEMOLITION PLANS ARE TO BE REMOVED UNLESS NOTED OTHERWISE. SOLID ITEMS ARE TO REMAIN. NOTE – ITEMS SHOWN IN THE DEMOLITION PLANS ARE BASED ON "EXISTING AS-BUILTS", ADDITIONAL ELECTRICAL ITEMS MAY BE ENCOUNTERED THAT ARE NOT SHOWN – ALL GENERAL ELECTRICAL ITEMS IN THE AREA OF REMODEL ARE TO BE REMOVED THAT ARE NOT SHOWN. REFER TO ABBREVIATIONS FOR DETAILED DESCRIPTION OF DEMOLITION TAGS.

CONSTRUCTION NOTES

1. EXISTING COOLING TOWER AND ASSOCIATED EQUIPMENT TO REMAIN OPERATIONAL THRU THE CONSTRUCTION PERIOD, AFTER 90 DAY RUN PERIOD HAS BEEN COMPLETED THE COOLING TOWER AND ASSOCIATED EQUIPMENT IS TO BE REMOVED IN ITS ENTIRETY.

(E) PANEL B2-07-02

225 AMPS MCB 480Y/277V VOLT 3 PHASE 4 WIRE SURFACE MOUNTING

BREAKER AMPS	BREAKER POLES	DESCRIPTION	CIRCUIT VA	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT VA	DESCRIPTION	BREAKER AMPS	BREAKER POLES
20	3	EXHAUST FAN #2		1	0			2		EXHAUST FANS 23,31,35,42	20	3
-	-	----		3		0		4		----	-	-
-	-	----		5			0	6		----	-	-
20	3	EXHAUST FAN 39&5		7	0			8		EXHAUST FANS 14,30,36,41	20	3
-	-	----		9		0		10		----	-	-
-	-	----		11			0	12		----	-	-
20	3	H&V #2		13	0			14		EXHAUST FANS 13,19,27,40	20	3
-	-	----		15		0		16		----	-	-
-	-	----		17			0	18		----	-	-
20	3	EXHAUST FAN 28,12,20,38		19	0			20		COOLING TOWER FAN	30	3
-	-	----		21		0		22		----	-	-
-	-	----		23			0	24		----	-	-
30	**3**	**(X) FC-1**		**25**	0			26		SPARE	70	3
-	-	----		**27**		0		28		----	-	-
-	-	----		**29**			0	30		----	-	-
-	-	PROVISION		31	0			32		SOUTH ELEVATOR	100	3
20	1	HEAT TAPE		33		0		34		----	-	-
		PROVISION		35			0	36		----	-	-
		PROVISION		37	0			38		PROVISION		
		PROVISION		39		0		40		PROVISION		
		PROVISION		41			0	42		PROVISION		
					0	0	0					

TOTAL LOADS: 0 VA
DEMAND:
0 AMPS

(E) PANEL B1-07-01

100 AMPS MLO 208Y/120V VOLT 3 PHASE 4 WIRE SURFACE MOUNTING

BREAKER AMPS	BREAKER POLES	DESCRIPTION	CIRCUIT VA	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT VA	DESCRIPTION	BREAKER AMPS	BREAKER POLES
30	1	FANS 43, 44, 45, 46		1	0			2		ELEV RM LIGHTS, CAB HEATER	20	1
20	**1**	**(X) PUMPS FOR COOL TOWER**		**3**		0		4		SO. ELEV RM EXFANS	20	1
30	1	FANS 6, 8, 37		5			0	6		SW STAIR SECTION	20	1
20	1	S. PENTHOUSE CAB. HEAT		7	0			8		FL DYE PANEL/ JU PANEL	20	1
50	2	WELDING RCPT		9		0		10		PENTHOUSE LIGHTS	20	1
-	-	----		11			0	12		BOOSTER PUMP W/O H20	20	1
20	1	CONTROL POWER PUMP C-1		13	0			14		PENTHOUSE RCPT, SHAFT LIGHT	20	1
20	1	CHILLER "TRACKSET" PAN		15		0		16		JCT TEMP CONTROL PANELS	20	1
20	1	RCPT LTS NO. PENTHOUSE		17			0	18		FAN 48	20	1
					0	0	0					

TOTAL LOADS: 0 VA
DEMAND:
0 AMPS

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MSU - COBLEIGH HALL
COLD CAMBERS COOLING TOWER REPLACEMENT

01/04/2024 - 100% CONSTRUCTION DOCUMENTS

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DRAWN BY: SE		
REVIEWED BY: SE		
REV.	DESCRIPTION	DATE

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WWW.CDSENGINEERING.COM

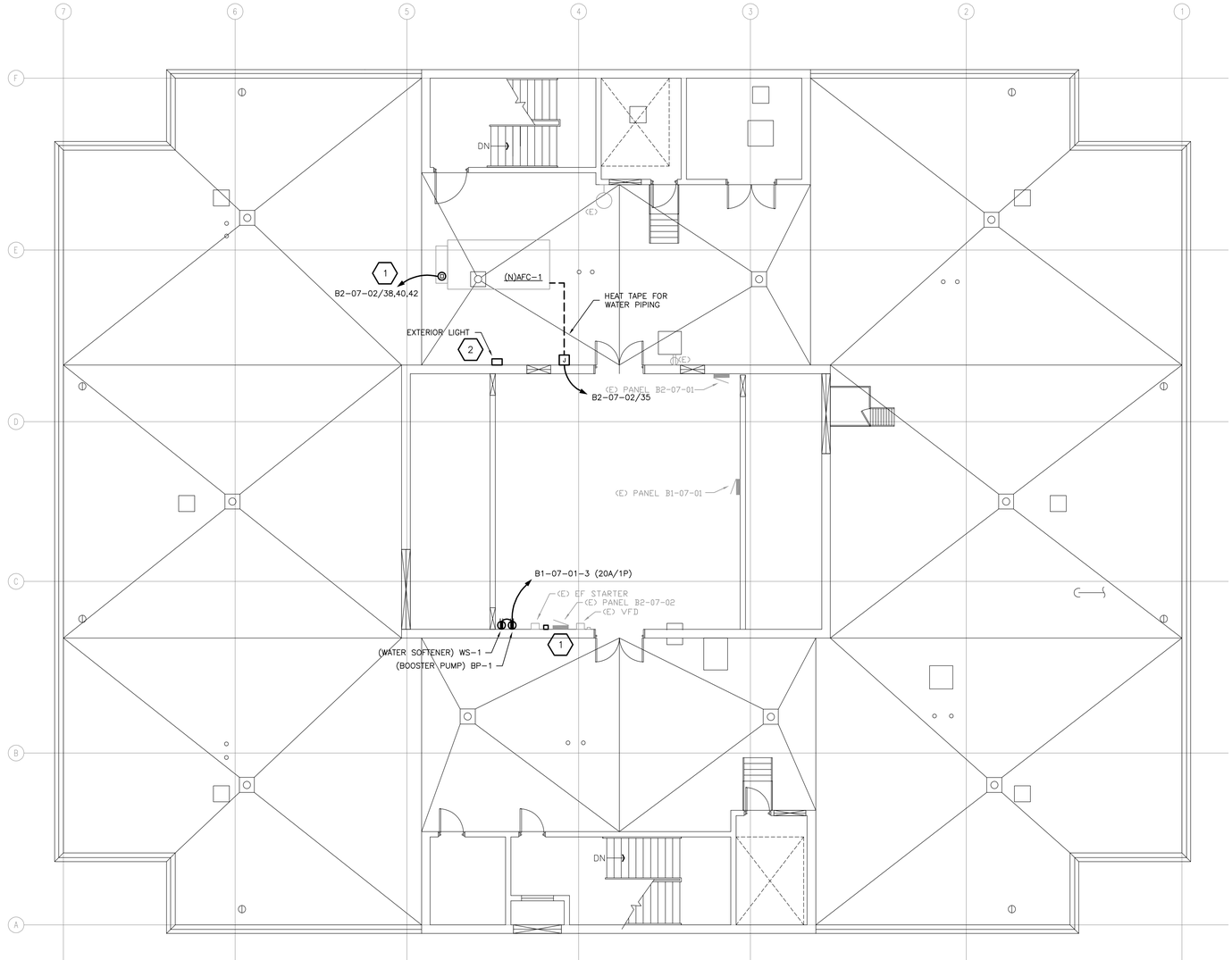
PPA#18-2194

SHEET TITLE
ROOF PLAN - POWER DEMO

SHEET
ED1.1

DATE
01-04-24

MONTANA
Scott T. Elders
No. 29029PE
REGISTERED PROFESSIONAL ENGINEER



ROOF PLAN - POWER REMODEL
SCALE: 1/8" = 1'-0"

IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INCLUDING EQUIPMENT SUPPLIERS TO COORDINATE WITH EACH OTHER AND TO VERIFY THAT THERE ARE NO CONFLICTS IN LOCATIONS OF DUCTS, CONDUITS, SPRINKLER HEADS, SPRINKLER PIPING, DIFFUSERS, ELECTRICAL BOXES AND OTHER ITEMS THROUGHOUT THIS PROJECT BEFORE FINAL PLACEMENT OF MATERIALS.

GENERAL NOTES

1. IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INCLUDING EQUIPMENT SUPPLIERS TO COORDINATE WITH EACH OTHER AND TO VERIFY THAT THERE ARE NO CONFLICTS IN LOCATIONS OF DUCTS, CONDUITS, SPRINKLER HEADS, SPRINKLER PIPING, DIFFUSERS, ELECTRICAL BOXES AND OTHER ITEMS THROUGHOUT THIS PROJECT, BEFORE FINAL PLACEMENT OF MATERIALS.
2. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION: DETAILED EQUIPMENT REQUIREMENTS, INSTALLATION INSTRUCTIONS, PERFORMANCE REQUIREMENTS, CONTROL SEQUENCES AND ALL OTHER PROJECT DETAILS.
3. INSTALL ALL NEW WORK TO MEET CURRENT CODES AND INSTALLATION STANDARDS.
4. NEW CONDUCTORS SHALL BE COPPER AND A MINIMUM OF #12 GAUGE.
5. LIGHT FIXTURES SHOWN WITH A HEIGHT CALLOUT (XX') SHALL BE INSTALLED AS DESCRIBED HERE. THE HEIGHT CALLOUT SHALL BE THE DISTANCE FROM FINISHED FLOOR/GRADE TO THE BOTTOM OF THE RESPECTIVE LIGHT FIXTURE.
6. EMERGENCY BATTERY BALLASTS, AND EXIT SIGNS SHALL BE PROVIDED WITH AN UN-SWITCHED HOT CONDUCTOR FROM THE SAME CIRCUIT AS THE RESPECTIVE SWITCH-LEG.
7. 0-10V DIMMING CABLE IS NOT SHOWN ON THE PLANS. PROVIDE CABLING BETWEEN 0-10V DIMMER(S) AND THE THEIR RESPECTIVE DIMMING BALLAST WHICH THEY CONTROL PER THE DIMMER MANUFACTURER'S REQUIREMENTS.
8. CIRCUITRY SHOWN IN SOLID LINETYPE SHALL BE NORMAL POWER. THE CIRCUITRY SHOWN IN A DASHED LINETYPE SHALL BE LOW-VOLTAGE CABLING FOR THE LIGHTING CONTROLS. PROVIDE AND INSTALL PER THE MANUFACTURER'S REQUIREMENTS.
9. INSTALL AND PROGRAM LIGHTING CONTROLS PER THE LIGHTING CONTROL INTENT. ROOM CONTROLLERS ARE TO BE INSTALLED ABOVE ACCESSIBLE CEILINGS.
10. LOW-VOLTAGE SWITCHES AND LIGHTING CONTROL DEVICES SHALL BE PROGRAMMED TO CONTROL THE LIGHTS WITHIN THE RESPECTIVE SPACE PER THE LETTER DESIGNATIONS SHOWN.

CONSTRUCTION NOTES

1. PROVIDE A NEW GE (25A/3P) 'TED136025' BREAKER AND MOUNTING HARDWARE WITHIN THE EXISTING GE 'NHB' PANELBOARD TO FEED THE NEW 'AFC-1' ADIABATIC DRY COOLER. PROVIDE A PLACARD AT THE PANEL TO INFORM USERS TO KEEP THE EXISTING COOLING TOWER BREAKER OFF UNLESS NEEDED.
2. PROVIDE A GARDCO '121-16L-530-WW-3-UNV-DD-PCB-F1-BK' EXTERIOR WALL MOUNT LIGHT FIXTURE MOUNTED 12'-0" ABOVE THE ROOF LEVEL. LIGHT TO BE FED FROM THE CIRCUIT NOTED AND CONTROLLED BY AN LIGHT SWITCH AT THE SERVICE PLATFORM ACCESS LADDER IN A WEATHER PROOF BOX.

(R) PANEL B2-07-02

225 AMPS MCB 480Y/277V VOLT 3 PHASE 4 WIRE SURFACE MOUNTING

BREAKER AMPS	BREAKER POLES	DESCRIPTION	CIRCUIT VA	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT VA	DESCRIPTION	BREAKER AMPS	BREAKER POLES
20	3	EXHAUST FAN #2		1	0			2		EXHAUST FANS 23,31,35,42	20	3
-	-	----		3		0		4		----	-	-
-	-	----		5			0	6		----	-	-
20	3	EXHAUST FAN 39&5		7	0			8		EXHAUST FANS 14,30,36,41	20	3
-	-	----		9		0		10		----	-	-
-	-	----		11			0	12		----	-	-
20	3	H&V #2		13	0			14		EXHAUST FANS 13,19,27,40	20	3
-	-	----		15		0		16		----	-	-
-	-	----		17			0	18		----	-	-
20	3	EXHAUST FAN 28,12,20,38		19	0			20		COOLING TOWER FAN	30	3
-	-	----		21		0		22		----	-	-
-	-	----		23			0	24		----	-	-
30	**3**	**SPARE**		25	0			26		SPARE	70	3
-	-	----		27		0		28		----	-	-
-	-	----		29			0	30		----	-	-
-	-	PROVISION		31	0			32		SOUTH ELEVATOR	100	3
20	1	HEAT TAPE		33		0		34		----	-	-
20	**1**	**(N) HEAT TAPE (30mA GFCI)**		35			0	36		----	-	-
-	-	PROVISION		37	5986			38	5986	**(N)AFC-1**	**25**	**3**
-	-	PROVISION		39		5986		40	5986	**----**	**-**	**-**
-	-	PROVISION		41			5986	42	5986	**----**	**-**	**-**
					5986	5986	5986					

TOTAL LOADS: 17958 VA
DEMAND:
50 AMPS

(R) PANEL B1-07-01

100 AMPS MLO 208Y/120V VOLT 3 PHASE 4 WIRE SURFACE MOUNTING

BREAKER AMPS	BREAKER POLES	DESCRIPTION	CIRCUIT VA	CIRCUIT #	PHASE LOADS A	PHASE LOADS B	PHASE LOADS C	CIRCUIT #	CIRCUIT VA	DESCRIPTION	BREAKER AMPS	BREAKER POLES
30	1	FANS 43, 44, 45, 46		1	0			2		ELEV RM LIGHTS, CAB HEATER	20	1
20	**1**	**(R) WATER SOFTENER & BOOSTERPUMP**	**1200**	**3**		1200		4		SO. ELEV RM EX FANS	20	1
30	1	FANS 6, 8, 37		5			0	6		SW STAIR SECTION	20	1
20	1	S. PENTHOUSE CAB. HEAT		7	0			8		FL DYE PANEL/ JU PANEL	20	1
50	2	WELDING RCPT		9		0		10		PENTHOUSE LIGHTS	20	1
-	-	----		11			0	12		BOOSTER PUMP W/ O H20	20	1
20	1	CONTROL POWER PUMP C-1		13	0			14		PENTHOUSE RCPT, SHAFT LIGHT	20	1
20	1	CHILLER "TRACKSET" PAN		15		0		16		JCT TEMP CONTROL PANELS	20	1
20	1	RCPT LTS NO. PENTHOUSE		17			0	18		FAN 48	20	1
					0	1200	0					

TOTAL LOADS: 1200 VA
DEMAND:
3 AMPS

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PPA#18-2194

SHEET TITLE
ROOF PLAN - POWER REMODEL

SHEET
E1.1

DATE
01-04-24

MONTANA
Scott T. Elders
No. 29029PE
REGISTERED PROFESSIONAL ENGINEER

STRUCTURAL SPECIFICATIONS

DESIGN LOADING CRITERIA

A. APPLICABLE BUILDING CODES:
   I. 2021 INTERNATIONAL BUILDING CODE (IBC): REFERENCED IN DRAWINGS AS "ADOPTED BUILDING CODE"
   II. ASCE 7-16 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES

B. RISK CATEGORY: III

C. DEAD LOADS: SELF WEIGHT OF THE STRUCTURE PLUS A MAXIMUM COLLATERAL/ AUXILIARY LOADS OF:
   I. SPRINKLERS = 1.0 PSF
   II. MECHANICAL DUCTS = 1.5 PSF
   III. ELECTRICAL CONDUIT = 1.0 PSF

D. LIVE LOADS
   I. ROOF LIVE LOADS
      a. CONSTRUCTION = 20 PSF (REDUCIBLE)

E. SNOW LOAD DATA
   I. SNOW IMPORTANCE FACTOR, I_s= 1.10
   II. THERMAL FACTOR, C_t = 1.0
   III. SNOW EXPOSURE FACTOR, C_e = 0.9
   IV. GROUND SNOW LOAD: P_g = 40 PSF
   V. FLAT ROOF SNOW LOAD: P_f = 30 PSF
   VI. DRIFTING, SLIDING AND UNBALANCED SNOW LOADS: IN ACCORDANCE WITH ASCE 7.

F. WIND LOAD DATA
   I. WIND EXPOSURE CATEGORY = C
   II. BASIC DESIGN WIND SPEED: V = 114 MPH, 3 SECOND GUST
   III. NOMINAL DESIGN WIND SPEED: V_{asd} = 89 MPH, 3 SECOND GUST
   IV. APPLICABLE INTERNAL PRESSURE COEFFICIENT: GC_{pi} = +/- 0.18

G. EARTHQUAKE DESIGN DATA
   I. SEISMIC IMPORTANCE FACTOR, I_e = 1.25
   II. SEISMIC DESIGN CATEGORY = D
   III. SITE CLASS = D
   IV. SPECTRAL RESPONSE ACCELERATION:
      a. SHORT PERIOD, S_S = 0.679
      b. 1 SECOND PERIOD, S_1 = 0.213
   V. DESIGN SPECTRAL RESPONSE ACCELERATION:
      a. SHORT PERIOD, S_{DS} = 0.569
      b. 1 SECOND PERIOD, S_{D1} = 0.309

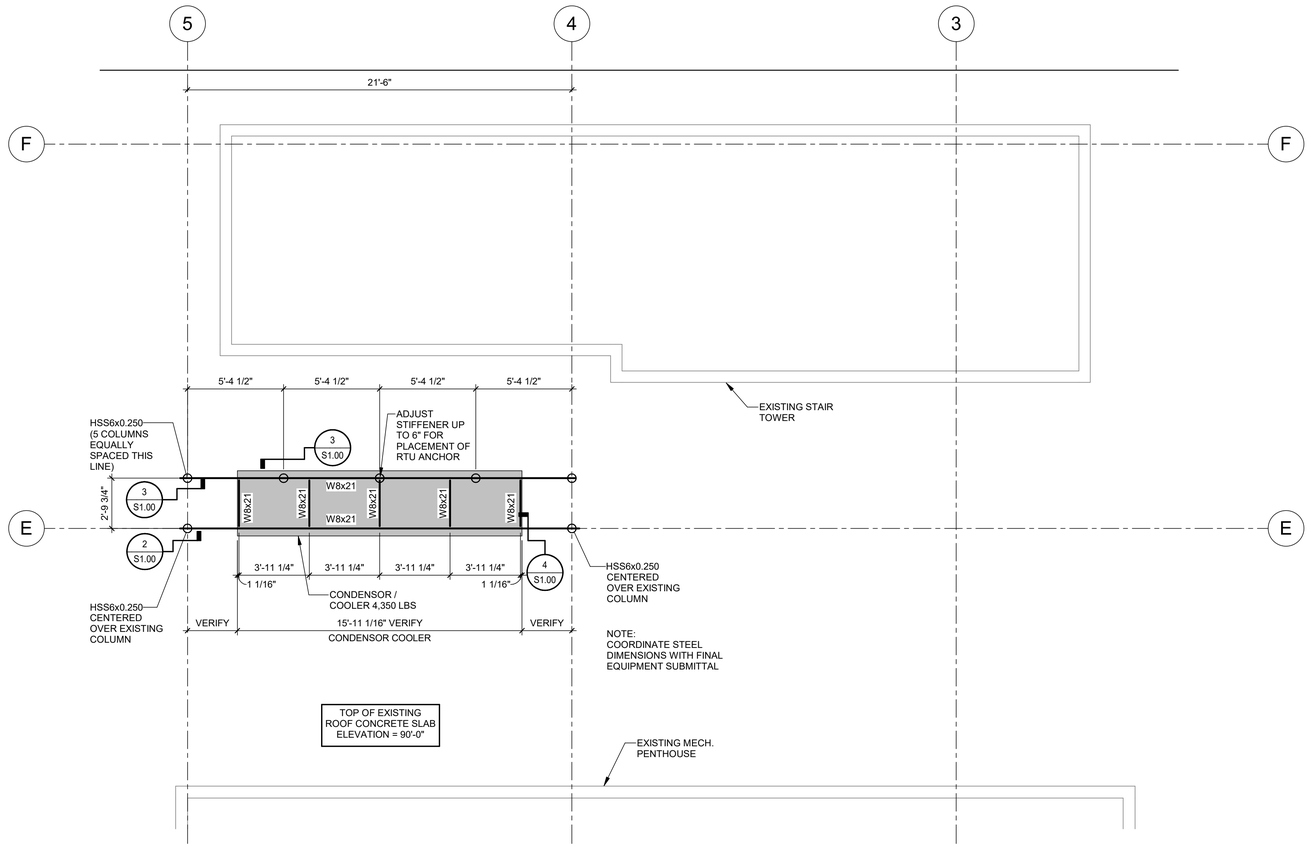
STEEL

A. GENERAL
   I. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH ADOPTED BUILDING CODE CHAPTER FOR "STEEL" AND THE FOLLOWING:
      a. AISC 360-16 SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.
      b. AWS D1.1 STRUCTURAL WELDING CODE STEEL.
   II. ALL WELDING SHALL CONFORM TO CURRENT AMERICAN WELDING SOCIETY STANDARDS AND TO BE PERFORMED BY CERTIFIED WELDERS.

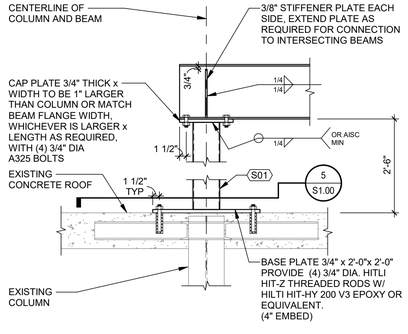
B. STRUCTURAL STEEL SHAPES
   I. W-SHAPES SHALL BE ASTM A992
   II. PLATES, ANGLES, CHANNELS, M-SHAPE, S-SHAPE, MC SHAPE AND BARS SHALL BE ASTM A36.
   III. ROUND HSS SHAPES SHALL BE ASTM A500-GRADE B (F_y=46 ksi) OR GRADE C (F_y=50 ksi)

C. WELDING
   I. WELDING ELECTRODES SHALL BE E70XX, UNLESS NOTED OTHERWISE
   II. ALL FILLET WELD SHALL BE PER AISC. MINIMUM SIZES ARE BASED ON THICKNESS OF MATERIALS JOINED, UNLESS NOTED OTHERWISE.

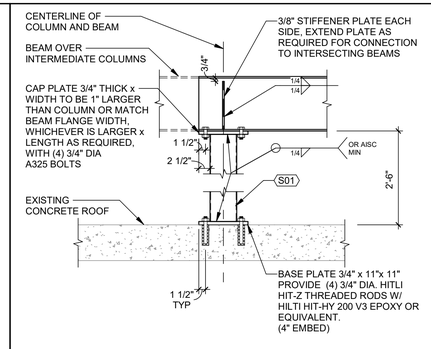
D. BOLTS AND CONNECTIONS
   I. BOLTS IN STANDARD STEEL TO STEEL CONNECTIONS SHALL BE ASTM F3125, GRADE A325, TYPE 1. IF WEATHER OR CORROSION RESISTANCE BOLTS ARE REQUIRED, USE ASTM F3125, GRADE A325, TYPE 3 BOLTS.
   II. NUTS SHALL BE ASTM A563
   III. WASHERS SHALL BE F436. DIRECT-TENSION-INDICATOR WASHERS SHALL BE F959.
   IV. THREADED RODS SHALL BE ASTM A36.
   V. TYPICAL BOLT HOLES IN STEEL SHALL BE 1/16" LARGER THAN BOLT DIAMETER, UNLESS NOTED OTHERWISE ON DRAWINGS. BOLT HOLES FOR ANCHOR BOLTS SHALL BE OVERSIZED PER THE AISC.



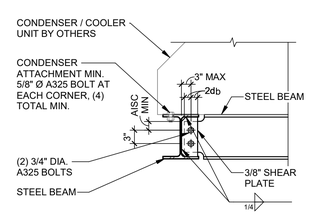
1 MECHANICAL PLATFORM FRAMING PLAN
SCALE: 1/4" = 1'-0"



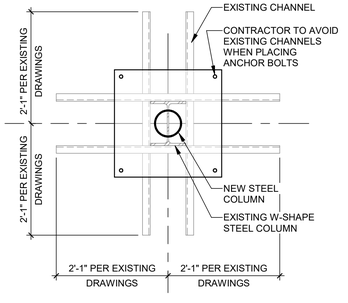
2 STEEL COLUMN TO EXISTING CONCRETE SLAB OVER EXISTING COLUMN
SCALE: NTS



3 STEEL COLUMN TO EXISTING CONCRETE SLAB
SCALE: NTS



4 BEAM TO BEAM CONNECTION
SCALE: NTS



5 NEW BASE PLATE AT EXISTING COLUMN
SCALE: NTS

SHEET INDEX

SHEET NUMBER	SHEET TITLE	ORIGINAL DATE	REVISION NUMBER	REVISION DATE
S1.00	MECH PLATFORM FRAMING PLAN, NOTES, AND DETAILS	01/04/2024		

GENERAL NOTES

GENERAL NOTES:

G1 THE DIMENSIONS SHOWN HERE APPLY TO STRUCTURAL ELEMENTS ONLY, SEE ARCHITECTURAL PLANS FOR ANY DIMENSIONS NOT SHOWN.

G2 CONTRACTOR SHALL FIELD VERIFY EXISTING STRUCTURAL CONDITIONS. IF ANY DISCREPANCY OCCURS BETWEEN EXISTING CONDITIONS AND PROPOSED ALTERATIONS, CONTRACTOR SHALL CONTACT ARCHITECT AND STRUCTURAL ENGINEER BEFORE PERFORMING ALTERATION WORK.

LEGEND:

- 1 / S0.00 — SECTION REFERENCE
- 1 / S0.00 — ELEVATION REFERENCE
- 1 / S0.00 — GENERAL VIEW REFERENCE
- 1 — REVISION CLOUD AND NUMBER
- NEW CONSTRUCTION
- EXISTING CONSTRUCTION OR PROVIDED BY OTHERS
- ELEMENT BEYOND/ OPTIONAL
- MASONRY (CMU)
- CONCRETE
- EARTH

X## KEYNOTES

S01 STEEL HSS *

KEYNOTE SYMBOL LEGEND:

WA WHERE APPLICABLE

* DENOTES ELEMENT SIZE AND INFORMATION IS PROVIDED ON PLAN AND/OR APPLICABLE SCHEDULES.

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REVIEWED BY: JC

REV	DESCRIPTION	DATE

MONTANA
JOSEPH L. CHAPMAN
No. 20356 PE
LICENSED PROFESSIONAL ENGINEER
01/04/2024 EXP: 06/30/24

PPA#18-2194

SHEET TITLE
MECH PLATFORM FRAMING PLAN, NOTES, AND DETAILS

SHEET
S1.00

DATE
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