SYMBOL & ABBREVIATIONS

SYMBOL	ABBREVIATION	DESCRIPTION
-	AD	ACCESS DOOR
-	AFF	ABOVE FINISHED FLOOR
-	AP	ACCESS PANEL
-	BDD	BACKDRAFT DAMPER
-	BHP	BRAKE HORSEPOWER
-	BTU	BRITISH THERMAL UNIT
-	CA	COMBUSTION AIR
-	CFM	CUBIC FEET PER MINUTE
-	℄	CENTERLINE
-	DB	DRY BULB TEMPERATURE
-	DIA. OR Ø	DIAMETER
-	DX	DIRECT EXPANSION
-	EA	EXHAUST AIR
-	EAT	ENTERING AIR TEMPERATURE
-	EF-	EXHAUST FAN
-	EL	ELEVATION
-	ER	EXHAUST REGISTER
-	ESP	EXTERNAL STATIC PRESSURE
-	EWT	ENTERING WATER TEMPERATURE
-	FPM	FEET PER MINUTE
-	FPS	FEET PER SECOND
-	GPM	GALLONS PER MINUTE
-	HP	HORSE POWER
-	LAT	LEAVING AIR TEMPERATURE
-	LF	LINEAR FEET
-	LWT	LEAVING WATER TEMPERATURE
-	MBH	1000 BRITISH THERMAL UNITS PER HOUR
-	MER	MECHANICAL EQUIPMENT ROOM
-	NC	NORMALLY CLOSED
-	NIC	NOT IN CONTRACT
-	NO	NORMALLY OPEN
-	OAI	OUTSIDE AIR INTAKE
-	PSI	POUNDS PER SQUARE INCH
-	RPM	REVOLUTIONS PER MINUTE
-	SP	STATIC PRESSURE
-	TDH	TOTAL DYNAMIC HEAD
-	TSP	TOTAL STATIC PRESSURE
-	TYP.	TYPICAL
-	U.O.N.	UNLESS OTHERWISE NOTED
-	WB	WET BULB TEMPERATURE
-	WG	INCHES OF WATER GAUGE
-	WMS	WIRE MESH SCREEN
-	-	3-WAY VALVE
-	-	STEEL BRAIDED FLEXIBLE CONNECTION
-	-	2-WAY VALVE
-	-	PLUG VALVE
-	-	LOCK SHIELD VALVE
-	-	GATE VALVE
-	-	GLOBE VALVE
-	-	TEE DOWN
-	-	ELBOW DOWN
-	-	TEE UP
-	-	ELBOW UP
-	-	CONCENTRIC REDUCER
-	-	ECCENTRIC REDUCER
-	-	OS&Y GATE VALVE
-	-	RISING STEM GATE VALVE
-	-	PIPE GUIDE
-	-	PIPE ANCHOR
-	-	STRAINER
-	-	DRAWING KEY NOTE
-	-	PRESSURE REDUCING VALVE
-	-	BUTTERFLY VALVE
-	-	TWIN SPHERE NEOPRENE FLEXIBLE CONNECTION
-	-	SINGLE SPHERE NEOPRENE FLEXIBLE CONNECTION
-	-	FLOW LIMITER VALVE
M	-	MOTORIZED BUTTERFLY VALVE
-	-	FLOW ARROW
6 2	-	BUTTERFLY VALVE
3 1	-	BALANCING VALVE

SYMBOL	ABBREVIATION	DESCRIPTION
-	-	MANUAL AIR VENT
S	-	SOLENOID VALVE
M	-	MOTORIZED VALVE
-	-	ANGLE GLOBE VALVE
-	-	ANGLE GATE VALVE
-	-	T&P RELIEF VALVE
-	-	FILTER DRYER
-	-	FILTER
-	-	FLOAT AND THERMOSTATIC TRAP
-	-	FLOAT TRAP
-	-	BALL VALVE
-	-	PRESSURE GAGE
-	-	TERMOMETER
-	-	CHECK VALVE
-	-	UNION
	EX.	EXISTING TO REMAIN
	NEW	NEW WORK
	DEM.	EXISTING TO BE REMOVED
CHWS	-	CHILLED WATER SUPPLY
CHWR	-	CHILLED WATER RETURN
CWS	-	CONDENSER WATER SUPPLY
CWR	-	CONDENSER WATER RETURN
D	-	DRAIN
OD	-	OVERFLOW DRAIN
DTS	-	DUAL TEMPERATURE SUPPLY
DTR	-	DUAL TEMPERATURE RETURN
HWS	-	HOT WATER SUPPLY
HWR	-	HOT WATER RETURN
PD	-	PUMP DISCHARGE, CONDENSATE
CD	-	CONDENSATE DRAIN
LPS	-	LOW PRESSURE STEAM
T	-	THERMOSTAT
H	-	HUMIDISTAT
L	-	REFRIGERANT LEAK DETECTOR
A	-	REFRIGERANT ALARM / HORN STROBE
M	-	MOTORIZED DAMPER
M	-	MOTORIZED VALVE
S	-	SMOKE DETECTOR
-	-	DOOR UNDER CUT
-	-	DOOR LOUVER
-	-	AIR INTO REGISTER
S	-	SPEED CONTROLLER
-	-	POINT OF CONNECTION DISCONNECTION
-	TR	TOP REGISTER SUPPLY
-	TR	TOP REGISTER RETURN
-	UH	UNIT HEATER
-	P-1	PUMP
-	-	SUPPLY DUCT UP
-	-	SUPPLY DUCT DOWN
-	-	RETURN DUCT UP
-	-	RETURN DUCT DOWN
-	-	TRANSITION FROM SQUARE TO ROUND DUCT
-	-	TRANSITION
-	-	DUCT TRANSITION
-	VD	VOLUME DAMPER
-	FD	FIRE DAMPER
6x8	-	DUCT SIZE - 1ST FIGURE IS SIDE SHOWN
-	FC	FLEXIBLE CONNECTION
XXX XX	-	SECTION CALLOUT
XXX XX	-	DETAIL CALLOUT
XXX XX	-	EQUIPMENT TAG

DESIGN INTENT NOTES

IT IS THE INTENT OF THIS PROJECT TO REPLACE THE EXISTING HEATING AND COOLING PLANT, STAND-BY POWER GENERATOR SYSTEM, THE ELECTRICAL DISTRIBUTION EQUIPMENT, PLANT AREA LIGHTING SYSTEMS AND FIRE ALARM SYSTEMS. THESE SYSTEMS SHALL BE REPLACED IN TOTALITY.

THIS WORK SHALL TAKE PLACE IN A PHASED APPROACH THAT WILL ALLOW UNINTERRUPTED HEATING / COOLING AND POWER TO ALL THE BUILDINGS AND EQUIPMENT. THE CONTRACT DOCUMENTS INDICATE THE MINIMUM PHASING REQUIREMENTS TO CONVEY THE DESIGN INTENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL PHASING OF WORK INCLUDING ALL NECESSARY LABOR AND MATERIALS, TEMPORARY WORK, PIPING FEEDERS AND EQUIPMENT IN ORDER TO PROPERLY PHASE THE WORK AND MEET THE DESIGN INTENT.

THE SCOPE OF WORK SHALL INCLUDE TEMPORARY SERVICES. THE CONTRACTOR SHALL PROCURE TEMPORARY BOILERS AND CHILLERS FOR AS LONG AS IS NECESSARY IN ORDER TO PROVIDE TEMPORARY HOT WATER AND CHILLED WATER. THE CONTRACTOR SHALL PROVIDE TEMPORARY POWER FOR EQUIPMENT INCLUDING GENERATORS FOR POWER AND ALL FUEL REQUIRED. PROVIDE TEMPORARY PIPING CONNECTIONS AND MODIFICATIONS TO EXISTING PIPING SYSTEMS. PROVIDE TEMPORARY CONTROLS AND MODIFICATIONS TO EXISTING CONTROLS IN ORDER TO FACILITATE THE INTEGRATION OF TEMPORARY AND NEW SYSTEMS SO THAT THE BUILDINGS ARE CONTINUALLY SERVED WITH HOT WATER AND OR CHILLED WATER. ALL TEMPORARY EQUIPMENT SHALL BE SIZED TO MATCH EXISTING EQUIPMENT INCLUDING FLOW RATES, PRESSURE REQUIREMENTS, ETC. SUCH THAT EXISTING BUILDING OPERATION IS MAINTAINED.

IN GENERAL, IT WILL BE NECESSARY TO DEMOLISH ALL ABANDONED MECHANICAL, PLUMBING, AND ELECTRICAL EQUIPMENT PIPING AND CONDUITS IN THE MAIN PLANT AND IN THE ORIGINAL PLANT TO MAKE SPACE FOR NEW EQUIPMENT. THE INTENT IS TO INSTALL THE NEW CHILLER AND BOILER PLANT AS WELL THE NEW PRIMARY/SECONDARY PIPING SYSTEMS AS WELL AS ALL NECESSARY SUNDRY ITEMS SUCH AS PUMPS, COOLING TOWERS, BREECHING, COMBUSTION AIR DAMPERS, FUEL OIL PIPING, GAS PIPING, OIL PUMPS, POWER, AND CONTROLS SO THAT THE NEW PLANT IS FULLY FUNCTIONAL BEFORE REMOVAL OF THE TEMPORARY HEATING AND COOLING EQUIPMENT. THE EXISTING BUILDINGS AND SECONDARY PUMPS SHALL REMAIN CONNECTED TO EXISTING PIPING AND TEMPORARY HEATING/COOLING PLANT UNTIL SUCH TIME AS THE PLANT IS OPERATIONAL. THE CONTRACTOR SHALL PROVIDE AN ADD ALTERNATE PRICE FOR TEMPORARY HEATING AND A SEPARATE ALTERNATE PRICE FOR TEMPORARY COOLING. TEMPORARY HEATING/COOLING PRICING SHALL INCLUDE LUMP SUM PRICING FOR EQUIPMENT SET UP START, POWER PIPING CONTROLS AND ALL LABOR AND MATERIAL. IT SHALL INCLUDE UNIT PRICING ON A MONTHLY BASIS FOR OPERATION. FUEL OIL FOR THE TEMPORARY HEATING PLANT SHALL BE CONNECTED TO THE EXISTING PLANT FUEL TANK. THE OWNER WILL PAY FOR FUEL. THE ALTERNATE PRICING SHALL INCLUDE (8) EIGHT MONTHS OF HEATING AND (6) SIX MONTH OF COOLING PLANT COST.

WHEN THE NEW HEATING/COOLING PLANT IS OPERATIONAL INCLUDING SECONDARY PUMPS AND CONTROLS, EACH BUILDING'S SECONDARY PIPING SYSTEM CAN BE CONNECTED TO THE NEW SECONDARY PIPING SYSTEMS AND PUMP SETS SO AS TO CAUSE THE MINIMUM AMOUNT OF SYSTEM DOWN TIME FOR EACH BUILDING. WHEN ALL BULDINGS ARE CONNECTED TO THEIR NEW SECONDARY PUMP SETS AND THE NEW PLANT, DEMOLITION OF THE REMAINING EXISTING PUMPS, POWER AND CONTROLS CAN BEGIN.

WHEN DEMOLITION OF THE EXISTING ABANDONED EQUIPMENT IS COMPLETE THE NEW DOMESTIC WATER HEATING SYSTEM SHALL BE CONSTRUCTED ALONG WITH MODIFICATIONS TO THE DOMESTIC WATER, SANITARY, STORM AND GAS SYSTEMS. WHEN THE NEW DOMESTIC WATER HEATING SYSTEM HAS BEEN CONSTRUCTED AND IS FULLY OPERATIONAL AND CONNECTED TO THE EXISTING DISTRIBUTION SYSTEM, THE EXISTING HEATING SYSTEM MAY BE DEMOLISHED.

IN SUPPORT OF THE PROJECT'S MECHANICAL, PLUMBING AND ELECTRICAL WORK THERE IS A CERTAIN AMOUNT OF GENERAL CONSTRUCTION THAT IS REQUIRED. THIS WORK SHALL BE PHASED AS NECESSARY IN ORDER TO FACILITATE THE CONSTRUCTION OF NEW MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AND SYSTEMS. THIS SHALL INCLUDE SITE WORK AND RESTORATION AS WELL AS CUTTING, PATCHING, PAINTING, CONCRETE, FIRE STOPPING, DOORS AND HARDWARE.

GENERAL NOTES

1. CONTRACT DRAWINGS, AS FAR AS THEY RELATE TO THE GENERAL ARRANGEMENT AND LOCATION OF EQUIPMENT, SHEET METAL, AND PIPING, SHALL BE UNDERSTOOD AS DIAGRAMMATIC. ANY CHANGES TO EQUIPMENT, SHEET METAL, AND PIPING LOCATIONS NECESSARY TO AVOID INTERFERENCE WITH OTHER TRADES SHALL BE MADE AT NO EXTRA COST, AND MUST BE APPROVED BY THE ENGINEER.
2. PROVIDE ALL PIPE OPENINGS THROUGH PARTITIONS WITH PIPE SLEEVES. FOR PIPES PENETRATING FIRE RATED PARTITIONS, THE SPACE BETWEEN THE PIPE AND THE SLEEVE SHALL BE SEALED WITH FIRE STOPPING MATERIAL. PENETRATIONS FOR PIPING SHALL BE MADE BY CORE DRILLING WHENEVER POSSIBLE.
3. ALL MOTOR STARTERS AND DISCONNECT SWITCHES FOR HVAC EQUIPMENT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED. ALL STARTERS IN THE MCC SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
4. THE MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO THE BEGINNING OF WORK, AND SHALL COORDINATE ALL WORK WITH OTHER TRADES.
5. DUCT DIMENSIONS SHOWN ON MECHANICAL DRAWINGS REFER TO INSIDE CLEAR DUCT DIMENSIONS. WHERE DUCTWORK IS LINED, THE MECHANICAL CONTRACTOR SHALL INCREASE THE SIZE OF DUCT TO COMPENSATE FOR LINING.
6. LOCATE THERMOSTATS AND TEMPERATURE SENSORS 5'-6" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. COORDINATE LOCATION WITH FURNITURE, CABINETS, ETC. FURNISH LOCKING TAMPERPROOF COVER FOR ALL NEW THERMOSTATS IN PUBLIC AREAS.
6. THE CONTRACTS SHALL SUBMIT FOR REVIEW AND APPROVAL A COMPOSITE SHOP DRAWING, FULLY COORDINATED WITH ALL OTHER TRADES INDICATING ALL DUCTWORK, MECHANICAL EQUIPMENT, PIPING, ELECTRICAL EQUIPMENT, PLUMBING PIPING AND EQUIPMENT, LIGHTS, CONDUITS, DIFFUSERS, GRILLES AND FIRE ALARM DEVICES.
7. PROVIDE LOOSE LINTELS OVER ALL OPENINGS IN EXTERIOR AND INTERIOR WALLS AS LISTED BELOW EXCEPT WHERE OTHERWISE DETAILED ON DRAWINGS.
8. MASONRY OPENING / LINTEL

   4'-11" OR LESS — 4"x3-1/2"x5/16"
   5'-0" TO 7'-0" — 5"x3-1/2"x5/16"

   A.) 3-1/2" LEGS ARE HORIZONTAL.
   B.) PROVIDE ONE ANGLE FOR EACH 3-3/4" OF WALL THICKNESS OR LESS. PROVIDE 5x5x5/16" ANGLE FOR 5-5/8" OR 6" THICK WALLS OR PARTITIONS.
   C.) LENGTH OF LINTELS = MASONRY OPENINGS + 12".
9. ALL WORK SHALL COMPLY WITH THE PREVAILING NY STATE BUILDING CODE, LOCAL BUILDING CODE, AND ENERGY CODE REQUIREMENTS. IN CASE OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND A GOVERNING CODE OR ORDINANCE, THE MORE STRINGENT STANDARD SHALL APPLY.
10. THE OWNER'S PERMANENT HVAC EQUIPMENT (NEW AND EXISTING) SHALL NOT BE USED BY ANY CONTRACTOR DURING CONSTRUCTION FOR TEMPORARY HEATING, COOLING, OR VENTILATION. IF TEMPORARY HEATING, COOLING, OR VENTILATION IS REQUIRED AT ANY POINT DURING CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE TEMPORARY HEATING, COOLING, OR VENTILATION EQUIPMENT, DUCTWORK, CONTROLS, AND POWER AT HIS OWN EXPENSE.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY VENTILATION AND EXHAUST AIR WHEN WELDING OR SOLDERING OPERATIONS ARE PERFORMED, AS REQUIRED BY OSHA.
12. WHERE EXISTING BUILDING STRUCTURAL COMPONENTS HAVE FIREPROOF MATERIAL, ANY AREA THAT IS DISTURBED OR DAMAGED AS A RESULT OF MECHANICAL WORK, INCLUDING THE INSTALLATION OF HANGERS FOR PIPING, DUCTWORK, OR EQUIPMENT, SHALL BE PATCHED WITH UL AND FM APPROVED FIREPROOFING TO MATCH EXISTING.
13. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL NECESSARY PERMITS AND FOR PAYING RELATED FEES.
14. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL CUTTING, PATCHING, CORE DRILLING, ACCESS PANELS, PAINTING, AND FINAL RESTORATION REQUIRED TO FACILITATE THE INSTALLATION OF HVAC DUCTWORK, CONTROL CONDUITS, AND PIPING, INCLUDING ABOVE CEILINGS AND IN SHAFTS THAT WILL NOT BE REPLACED OR OPENED UNDER ANY OTHER SCOPE OF WORK RELATED TO THIS PROJECT. CONTRACTOR TO REMOVE AND REPLACE CEILINGS, AND OPEN AND PATCH SHAFTS AND WALLS, AS REQUIRED TO EXECUTE THE MECHANICAL WORK.
15. ALL ROOF WORK ASSOCIATED WITH NEW PENETRATIONS FOR PIPING & CONTROL WIRING SHALL BE MADE BY THE BONDED ROOF CONTRACTOR.
16. THIS PROJECT SHALL BE COMPLETED IN PHASES. REFER TO THE BID DOCUMENTS FOR PHASING REQUIREMENTS. THIS CONTRACTOR SHALL COMPLETE THE MECHANICAL WORK IN SEQUENCE WITH THOSE REQUIREMENTS. PLAN AND SCHEDULE NEW WORK, DEMOLITION, EQUIPMENT DELIVERIES, SHUT DOWNS, AND START UP OF SYSTEMS ACCORDINGLY.
17. WHERE THE DEMOLITION OF EXISTING PNEUMATIC CONTROL EQUIPMENT, THERMOSTATS, AND TUBING IS INDICATED IN THE PLANS, THE CONTRACTOR SHALL CAP THE ENDS OF ALL EXISTING TO REMAIN PNEUMATIC LINES AIRTIGHT.

COMMISSIONING SCOPE NOTES

1. REFER TO SPECIFICATION SECTION 19113 FOR GENERAL CX REQUIREMENTS, AND SECTION 230800 FOR COMMISSIONING OF MECHANICAL SYSTEMS. THE OWNER SHALL HIRE A THIRD PARTY COMMISSIONING AGENT.
2. PRIOR TO COMMISSIONING, THE CONTRACTOR SHALL PROVIDE A STATEMENT CONFIRMING THAT ALL SYSTEMS ARE FULLY OPERATIONAL AND ALL PRE-FUNCTIONAL TESTS AND CHECKS LISTED BELOW HAVE BEEN SUCCESSFULLY COMPLETED. SUBMIT A COPY OF ALL CHECK SHEETS FOR ENGINEER REVIEW AND APPROVAL.
3. PRE-FUNCTIONAL TESTS AND CHECKS (PREREQUISITES FOR COMMISSIONING):

   THE CONTRACTOR SHALL PERFORM THE FOLLOWING INCLUDING BUT NOT LIMITED TO -
   - ENSURE THAT ALL SUBMITTALS ARE COMPLETED AND APPROVED BY ENGINEER AND COMMISSIONING AGENT.
   - CERTIFY THAT ALL SYSTEMS TO BE COMMISSIONED, SUBSYSTEMS AND EQUIPMENT HAVE BEEN INSTALLED, CALIBRATED AND STARTED; ACCORDING TO THE CONTRACT DOCUMENTS COMPLETE. ALL MANUFACTURER STARTUP REQUIREMENTS.
   - CERTIFY THAT ALL RELEVANT INSTRUMENTATION AND CONTROL SYSTEMS HAVE BEEN COMPLETED AND CALIBRATED; ARE OPERATING ACCORDING TO CONTRACT DOCUMENTS; AND THAT PRETEST SET POINTS HAVE BEEN RECORDED.
   - SET SYSTEMS, SUBSYSTEMS AND EQUIPMENT TO OPERATING MODE TO BE TESTED (E.G., NORMAL SHUT DOWN, NORMAL AUTO POSITION, NORMAL MANUAL POSITION, AND ALARM CONDITIONS).
   - VERIFY EACH OF THE SYSTEMS ONCE IT IS OPERATING IN A STEADY STATE CONDITION. REFER TO THE SEQUENCE OF OPERATIONS.
   - INSPECT AND VERIFY THE POSITION OF EACH DEVICE AND INTERLOCK IDENTIFIED ON CHECKLISTS. SIGN OFF EACH ITEM AS ACCEPTABLE OR FAILED. REPEAT THIS TEST FOR EACH OPERATING CYCLE THAT APPLIES TO SYSTEM BEING TESTED.
   - SIMULATE CONDITIONS REQUIRED IN ORDER TO TEST ALL SAFETY CUTOUTS, ALARMS AND INTERLOCKS WITH LIFE SAFETY SYSTEMS DURING EACH MODE OF OPERATION WHEN APPLICABLE.
   - ANNOTATE CHECKLIST OR DATA SHEET WHEN A DEFICIENCY IS OBSERVED.
   - VERIFY EQUIPMENT INTERFACE WITH MONITORING AND CONTROL SYSTEM.
4. AFTER PRE-FUNCTIONAL TESTING IS COMPLETE, THE CONTRACTOR SHALL PERFORM FUNCTIONAL TESTING IN THE PRESENCE OF THE COMMISSIONING AGENT FOR THE SYSTEMS LISTED BELOW IN ACCORDANCE WITH THE COMMISSIONING SPECIFICATIONS:
   - BOILERS
   - BOILER CIRCULATION PUMPS
   - CHILLERS
   - CHILLER CIRCULATION PUMPS
   - COOLING TOWERS
   - CONDENSER WATER PUMPS
   - DUAL TEMPERATURE SECONDARY PUMPS
   - SIDESTREAM SEPARATOR
   - UNIT HEATERS
5. AFTER FUNCTIONAL TESTING, THE COMMISSIONING AGENT (CX) SHALL ISSUE A REPORT OF TEST RESULTS AND DOCUMENT ANY DEFICIENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CORRECTION OF ALL DEFICIENCIES. THE CONTRACTOR SHALL SEND A WRITTEN RESPONSE TO THE OWNER/ENGINEER/CX AGENT THAT AN OPEN ISSUE HAS BEEN RECTIFIED. THE DEFICIENCY SHALL NOT BE CONSIDERED RESOLVED UNTIL THE APPROPRIATE RETESTING IS PERFORMED WITH THE CX AGENT.
6. PRIOR TO TURNOVER (OWNER ACCEPTANCE), A COMPLETE AND SUCCESSFUL DEMONSTRATION OF ALL SYSTEM OPERATING FUNCTIONS AND ALARMS SHALL BE PERFORMED BY THIS CONTRACTOR IN THE PRESENCE OF THE OWNERS REPRESENTATIVE AND COMMISSIONING AGENT.
7. IN ADDITION TO THE ABOVE, THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE FOLLOWING:
   - PARTICIPATE IN MAINTENANCE ORIENTATION AND INSPECTION MEETING.
   - PARTICIPATE IN PROCEDURES MEETING FOR TESTING.
   - EXECUTE INSTALLATION PRE-FUNCTIONAL CHECK SHEETS.
   - SUPPORT FUNCTIONAL TESTING WITH QUALIFIED TECHNICIANS.
   - RESPOND TO CX DEFICIENCIES IN ACCORDANCE WITH OWNER SCHEDULE.
   - PARTICIPATE IN FINAL REVIEW AT ACCEPTANCE MEETING.
   - NOTIFY COMMISSIONING AGENT AT MINIMUM TWO WEEKS IN ADVANCE OF ANY TESTING.

ADD#5-1

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KEYPLAN

CAMPUS - KEYPLAN

NO.	DESCRIPTION	DATE
2	RE-ISSUED FOR BID	07/24/2022
1	ISSUED FOR BID	11/01/2021

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PROJECT
CAPITAL PROJECT 4466
BUILDING E UTILITY PLANT
RENOVATION & IMPROVEMENTS
DR. ROBERT L. YEAGER HEALTH CENTER
50 SANATORIUM ROAD,
POMONA, NY 10970

DRAWING TITLE
MECHANICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

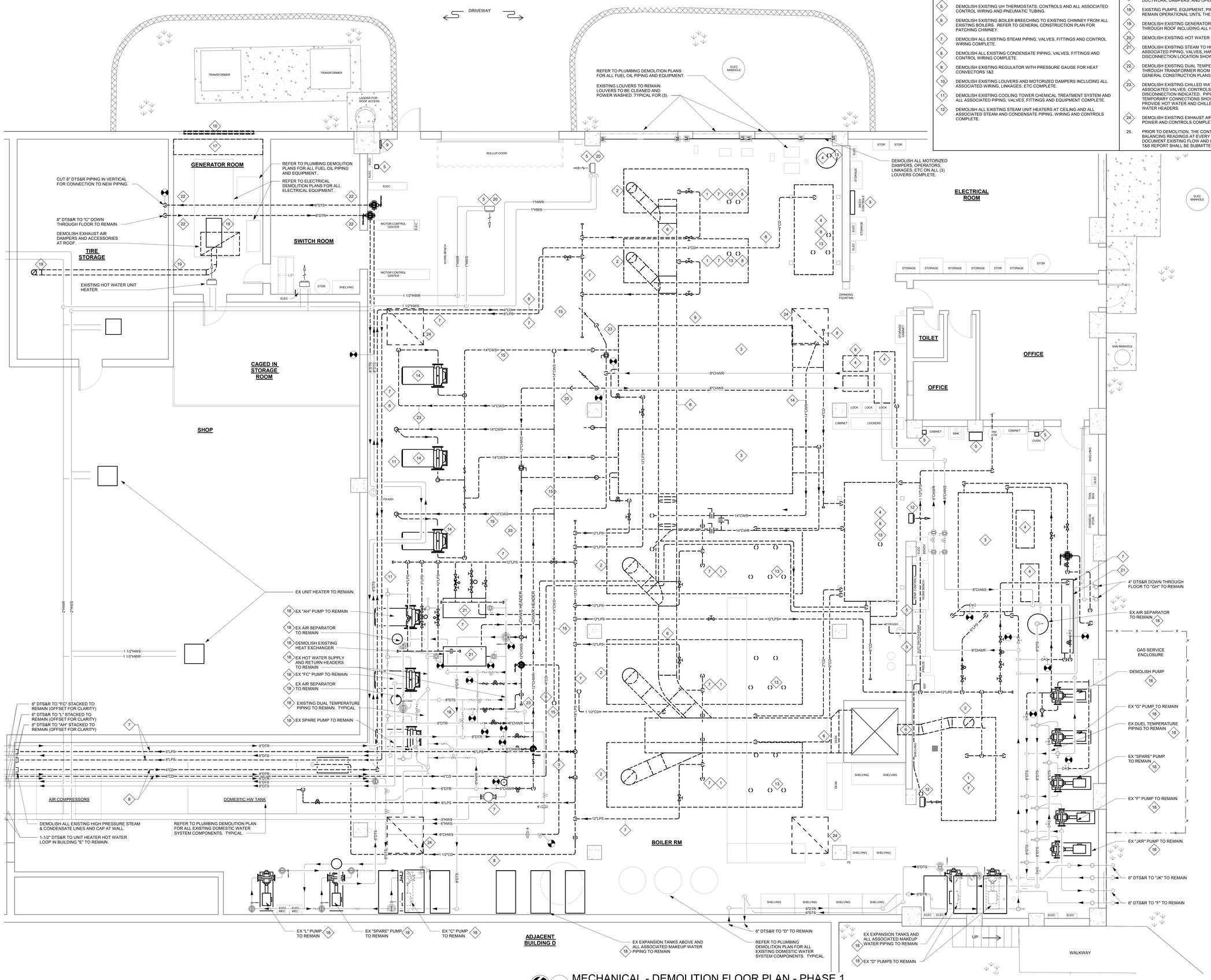
SEAL

SCALE NONE	PROJECT NO. NRCK0016.00
DRAWN BY NW	DRAWING NO.
CHECKED BY RS	M0.1
DATE 04-28-2020	

MECHANICAL DEMOLITION NOTES

1. DEMOLISH EXISTING STEAM BOILERS AND ALL ASSOCIATED STEAM AND CONDENSATE PIPING, VALVES, FITTINGS AND WIRING COMPLETE.
2. DEMOLISH EXISTING BURNER, BURNER CONTROLS, CONTROL CABINETS, CONDUITS AND WIRING. COMPLETE.
3. DEMOLISH EXISTING CHILLERS AND ALL ASSOCIATED CHILLED WATER AND CONDENSER WATER PIPING, VALVES, FITTINGS AND WIRING COMPLETE.
4. DEMOLISH EXISTING CONDENSATE RETURN AND BOILER FEED TANKS AND ALL ASSOCIATED PUMPS, PIPING, VALVES, FITTINGS AND WIRING COMPLETE.
5. DEMOLISH EXISTING UH THERMOSTATS, CONTROLS AND ALL ASSOCIATED CONTROL WIRING AND PNEUMATIC TUBING.
6. DEMOLISH EXISTING BOILER BREECHING TO EXISTING CHIMNEY FROM ALL EXISTING BOILERS. REFER TO GENERAL CONSTRUCTION PLAN FOR PATCHING CHIMNEY.
7. DEMOLISH ALL EXISTING STEAM PIPING, VALVES, FITTINGS AND CONTROL WIRING COMPLETE.
8. DEMOLISH ALL EXISTING CONDENSATE PIPING, VALVES, FITTINGS AND CONTROL WIRING COMPLETE.
9. DEMOLISH EXISTING REGULATOR WITH PRESSURE GAUGE FOR HEAT CONVECTORS 1&2.
10. DEMOLISH EXISTING LOUVERS AND MOTORIZED DAMPERS INCLUDING ALL ASSOCIATED WIRING, LINKAGES, ETC COMPLETE.
11. DEMOLISH EXISTING COOLING TOWER CHEMICAL TREATMENT SYSTEM AND ALL ASSOCIATED PIPING, VALVES, FITTINGS AND EQUIPMENT COMPLETE.
12. DEMOLISH ALL EXISTING STEAM UNIT HEATERS AT CEILING AND ALL ASSOCIATED STEAM AND CONDENSATE PIPING, WIRING AND CONTROLS COMPLETE.
13. DEMOLISH EXISTING RELIEF PIPING AND ALL ASSOCIATED VALVES AND SPECIALTIES UP THROUGH ROOF STRUCTURE. TYPICAL FOR ALL RELIEF PIPING WHETHER SHOWN ON THIS DRAWING OR NOT. REFER TO GENERAL CONSTRUCTION PLAN FOR ROOF PATCHING.
14. DEMOLISH EXISTING CONDENSER WATER PUMPS AND ALL ASSOCIATED PIPING, VALVES, FITTINGS, WIRING AND CONTROLLERS COMPLETE.
15. DEMOLISH EXISTING CONDENSER WATER PIPING, VALVES, FITTINGS AND CONTROL WIRING IN MER AND ON ROOF COMPLETE.
16. DEMOLISH EXISTING (ABANDONED) PUMP AND ALL ASSOCIATED PIPING, VALVES, FITTINGS, WIRING AND CONTROLLERS COMPLETE. BLANK OFF PIPING.
17. DEMOLISH EXISTING GENERATOR RADIATOR INTAKE PLENUM AND ALL DUCTWORK, DAMPERS, AND OPERATORS COMPLETE.
18. EXISTING PUMPS, EQUIPMENT, PIPING, VALVES SHOWN AS EXISTING SHALL REMAIN OPERATIONAL UNTIL THEIR REMOVAL IN DEMOLITION PHASE 2.
19. DEMOLISH EXISTING GENERATOR MUFFLER AND ALL EXHAUST PIPING UP THROUGH ROOF INCLUDING ALL HANGERS AND SUPPORTS COMPLETE.
20. DEMOLISH EXISTING HOT WATER UNIT HEATERS.
21. DEMOLISH EXISTING STEAM TO HOT WATER HEAT EXCHANGER AND ALL ASSOCIATED PIPING, VALVES, HANGERS, AND SUPPORTS TO PIPING DISCONNECTION LOCATION SHOWN.
22. DEMOLISH EXISTING DUAL TEMPERATURE SUPPLY AND RETURN PIPING THROUGH TRANSFORMER ROOM AND GENERATOR ROOM. REFER TO GENERAL CONSTRUCTION PLANS FOR PATCHING HOLES.
23. DEMOLISH EXISTING CHILLED WATER SUPPLY AND RETURN PIPING AND ALL ASSOCIATED VALVES, CONTROLS AND SPECIALTIES TO POINTS OF DISCONNECTION INDICATED. PIPING SHALL BE REMOVED SUCH THAT ALL TEMPORARY CONNECTIONS SHOWN ON PHASE 1 NEW WORK PLAN SHALL PROVIDE HOT WATER AND CHILLED WATER THROUGH THE EXISTING HOT WATER HEADERS.
24. DEMOLISH EXISTING EXHAUST AIR DUCTWORK UP TO ROOF DAMPER, FAN, POWER AND CONTROLS COMPLETE.

25. PRIOR TO DEMOLITION, THE CONTRACTOR SHALL PERFORM TESTING AND BALANCING READINGS AT EVERY PUMP TO BE DEMOLISHED, IN ORDER TO DOCUMENT EXISTING FLOW AND PRESSURE IN EACH SYSTEM. PRE-DEMO T&B REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR RECORD.



NORTH 1 MECHANICAL - DEMOLITION FLOOR PLAN - PHASE 1
SCALE: 1/4" = 1'-0"

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KEYPLAN
BUILDING E AREA OF WORK

CAMPUS - KEYPLAN
NORTH

NO.	DESCRIPTION	DATE
2	RE-ISSUED FOR BID	07/24/2022
1	ISSUED FOR BID	11/01/2021

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CAPITAL PROJECT 4466
BUILDING E UTILITY PLANT
RENOVATION & IMPROVEMENTS
DR. ROBERT L. YEAGER HEALTH CENTER
50 SANATORIUM ROAD,
POMONA, NY 10970

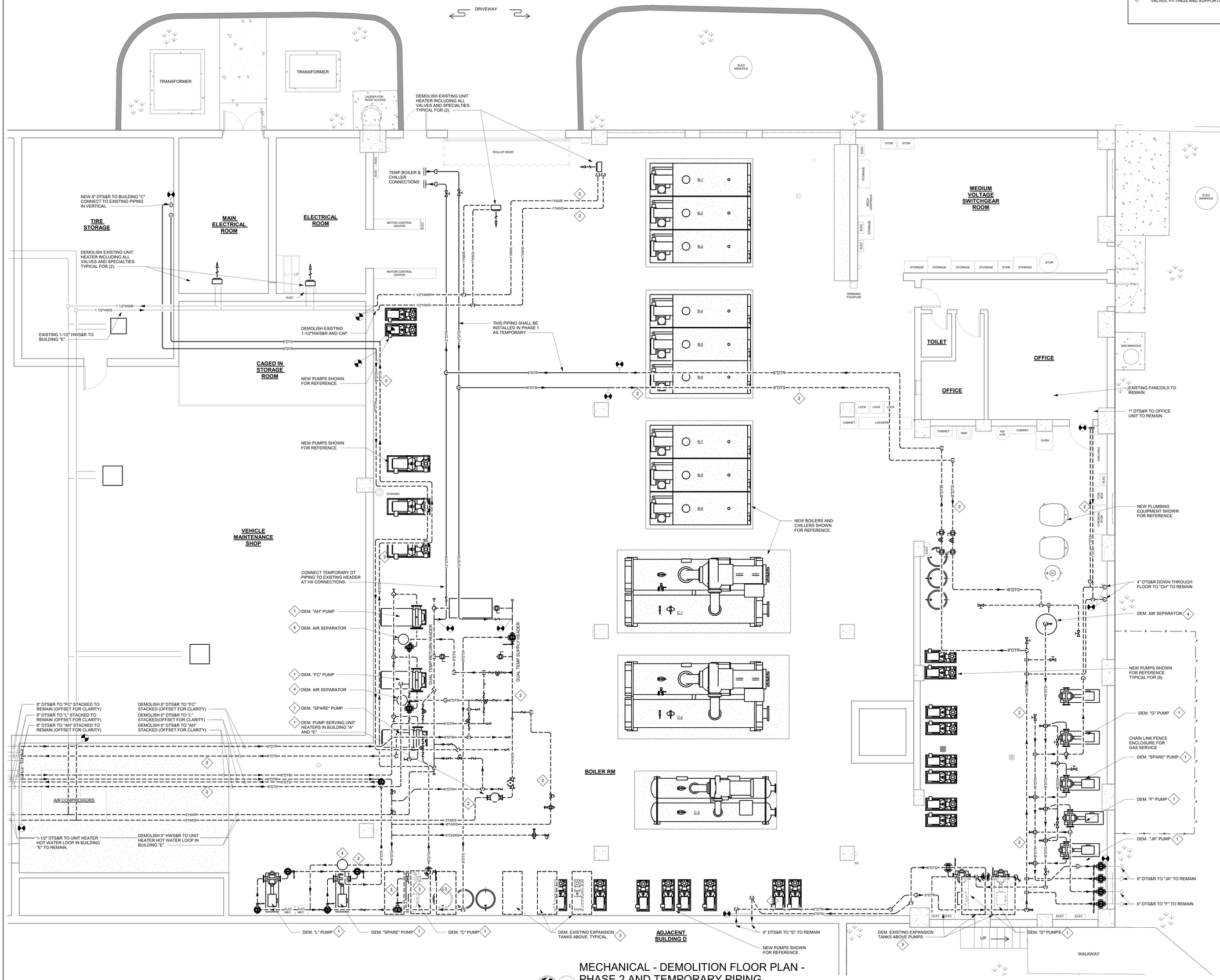
DRAWING TITLE
MECHANICAL DEMOLITION FLOOR PLAN - PHASE 1

SEAL

SCALE	1/4" = 1'-0"
PROJECT NO.	NRCK0016.00
DRAWN BY	NW
CHECKED BY	RS
DATE	04-28-2020
DRAWING NO.	M1.1

MECHANICAL DEMOLITION NOTES

1. DEMOLISH EXISTING DUAL TEMPERATURE BUILDING PUMPS AND ALL ASSOCIATED PIPING, VALVES, FITTINGS, WIRING AND CONTROLS THAT WERE NOT DEMOLISHED DURING PHASE 1.
2. DEMOLISH EXISTING DUAL TEMPERATURE SUPPLY AND RETURN WATER PIPING AND ALL ASSOCIATED VALVES, FITTINGS, CONTROL WIRING, HANGERS COMPLETE.
3. DEMOLISH EXISTING EXPANSION TANKS AT CEILING AND ALL ASSOCIATED PIPING, VALVES, FITTINGS AND SUPPORTS COMPLETE.
4. DEMOLISH EXISTING AIR SEPARATORS AND ALL ASSOCIATED PIPING VALVES, FITTINGS AND SUPPORTS COMPLETE.



MECHANICAL - DEMOLITION FLOOR PLAN - PHASE 2 AND TEMPORARY PIPING

NORTH 1

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

CLIENT

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KEYPLAN

BULDING E AREA OF WORK

CAMPUS - KEYPLAN

NORTH

NO.	DESCRIPTION	DATE
2	RE-ISSUED FOR BID	07/24/2022
1	ISSUED FOR BID	11/01/2021

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MECHANICAL DEMOLITION FLOOR PLAN - PHASE 2 AND TEMPORARY PIPING

SEAL

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1/4" = 1'-0"	NRCK0016.00
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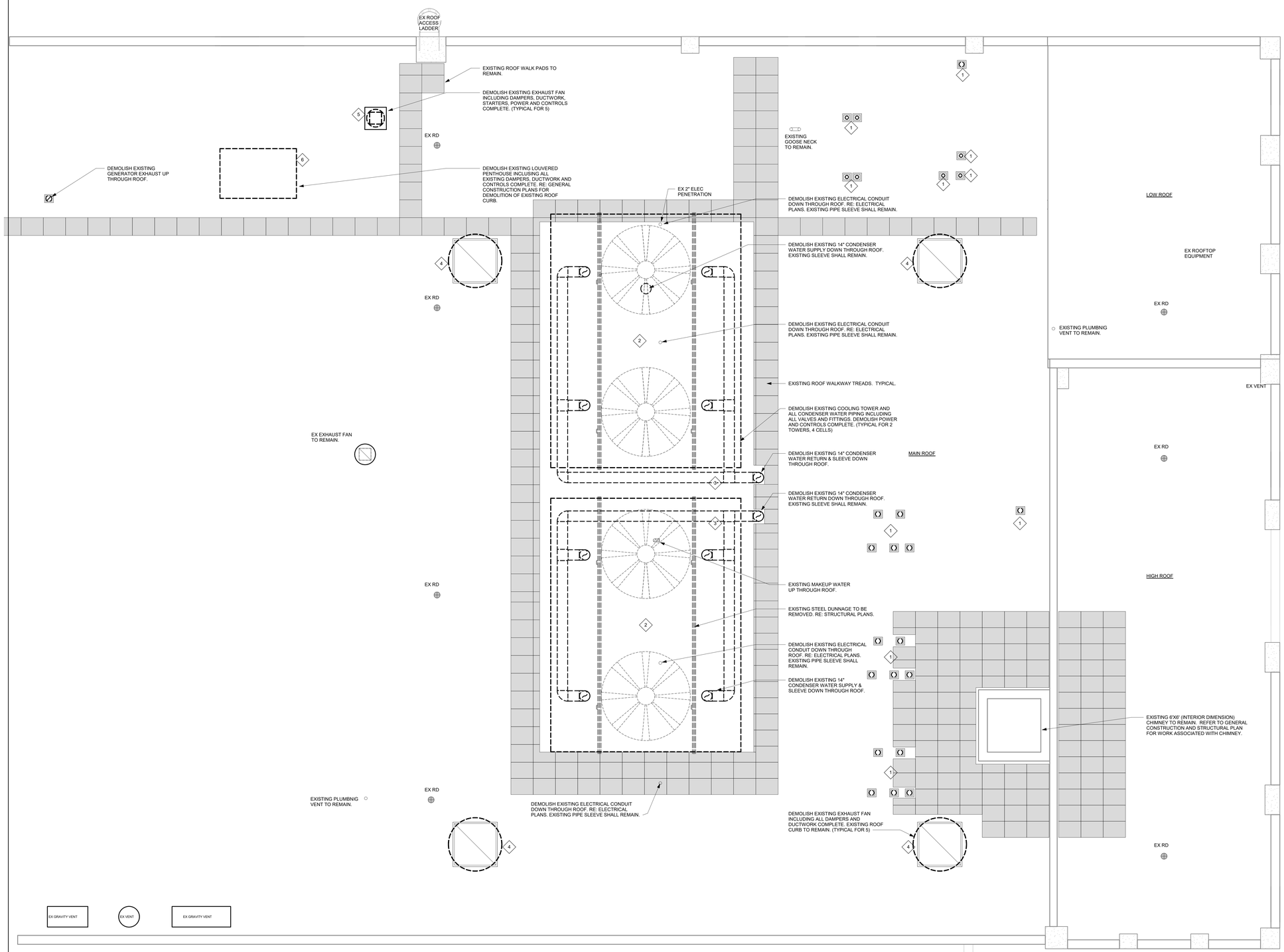
CHECKED BY: Checker	M1.2
DATE: 04-28-2020	

MECHANICAL DEMOLITION NOTES

1. DEMOLISH EXISTING PRESSURE RELIEF PIPES ON ROOF. REFER TO GENERAL CONSTRUCTION FOR ROOF PATCHING. TYPICAL FOR 24.
2. DEMOLISH EXISTING COOLING TOWERS AND ALL ASSOCIATED PIPING AND WIRING COMPLETE. REFER TO STRUCTURAL DRAWINGS FOR STEEL FRAMING WORK.
3. DEMOLISH EXISTING CONDENSER WATER, VALVES, FITTINGS, CONTROL WIRING COMPLETE. PATCH ROOF TO MATCH ADJACENT ROOFING.
4. DEMOLISH EXISTING EXHAUST FANS ON ROOF. EXISTING ROOF CURBS SHALL REMAIN.
5. DEMOLISH EXISTING EXHAUST FAN SERVING THE EXISTING SWITCH ROOM. EXISTING ROOF CURB SHALL REMAIN.
6. DEMOLISH EXISTING EXHAUST PENTHOUSE LOUVER FOR THE GENERATOR. REMOVE DAMPERS AND ALL MECHANICAL EQUIPMENT AND CONTROLS COMPLETE.



NORTH

1 MECHANICAL - DEMOLITION ROOF PLAN

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

THE ROOF SHALL BE PROTECTED DURING ALL PHASES OF WORK. PROVIDE MINIMUM 1/2" PLYWOOD SHEETS LAYED END-TO-END IN ALL AREAS OF WORK. COORDINATE ALL WORK WITH ROOF DRAIN LOCATIONS SO ROOF DRAINAGE IS NOT AFFECTED. DO NOT STORE MATERIALS ON ROOF.

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MECHANICAL DEMOLITION ROOF PLAN

SEAL

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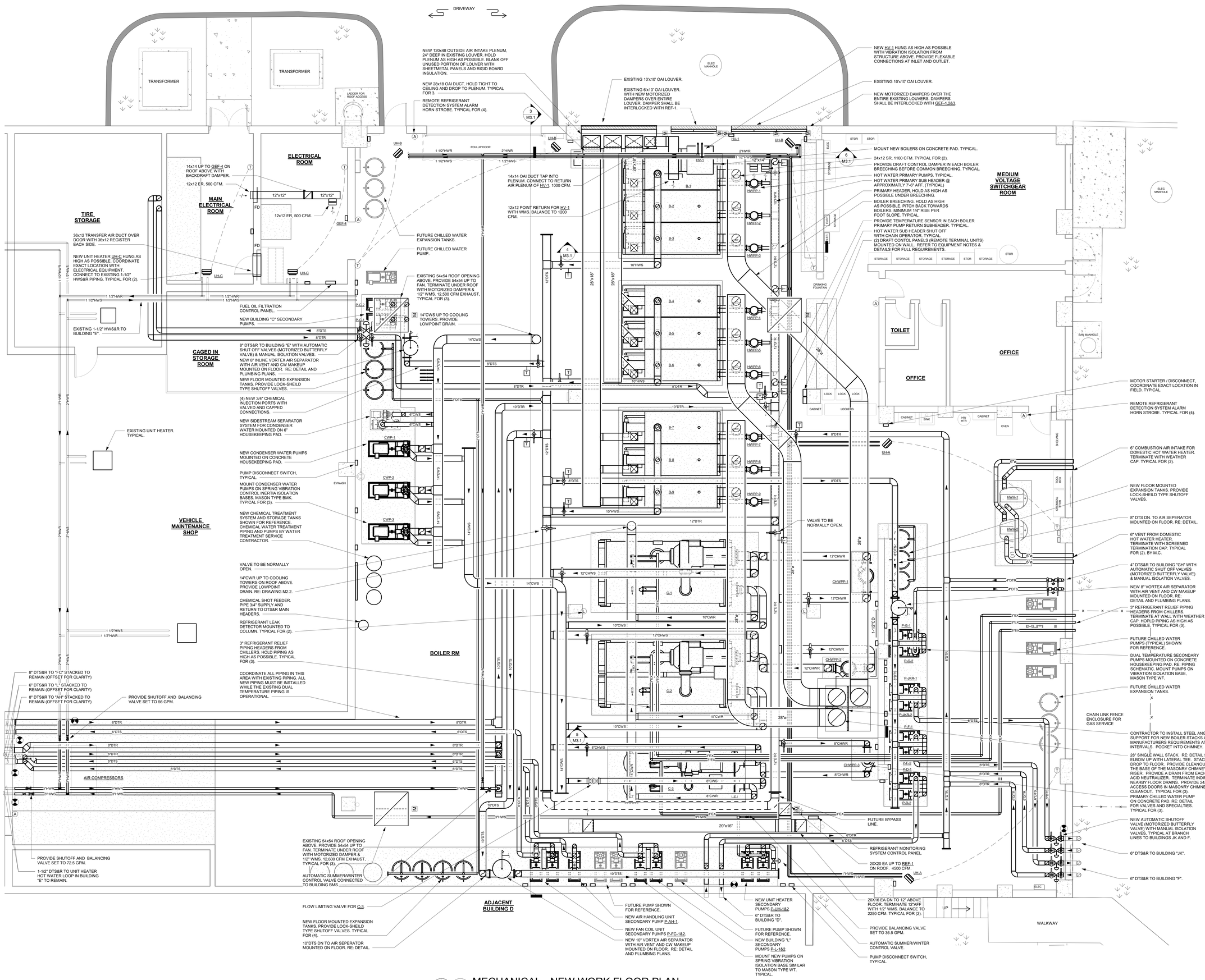
DRAWING NO.	M1.3



MECHANICAL - NEW WORK FLOOR PLAN

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

NORTH

NOTES:
- ALL VALVES LOCATED HIGHER THAN 7'-0" AFF SHALL BE PROVIDED WITH CHAIN OPERATORS.
- ALL PUMP VARIABLE FREQUENCY DRIVES ARE TO BE INCLUDED IN THE MOTOR CONTROL CENTER AND ARE TO BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. A LOCAL DISCONNECT SWITCH SHALL BE FURNISED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

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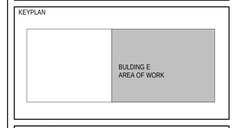
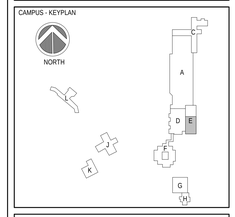


CAMPUS - KEYPLAN



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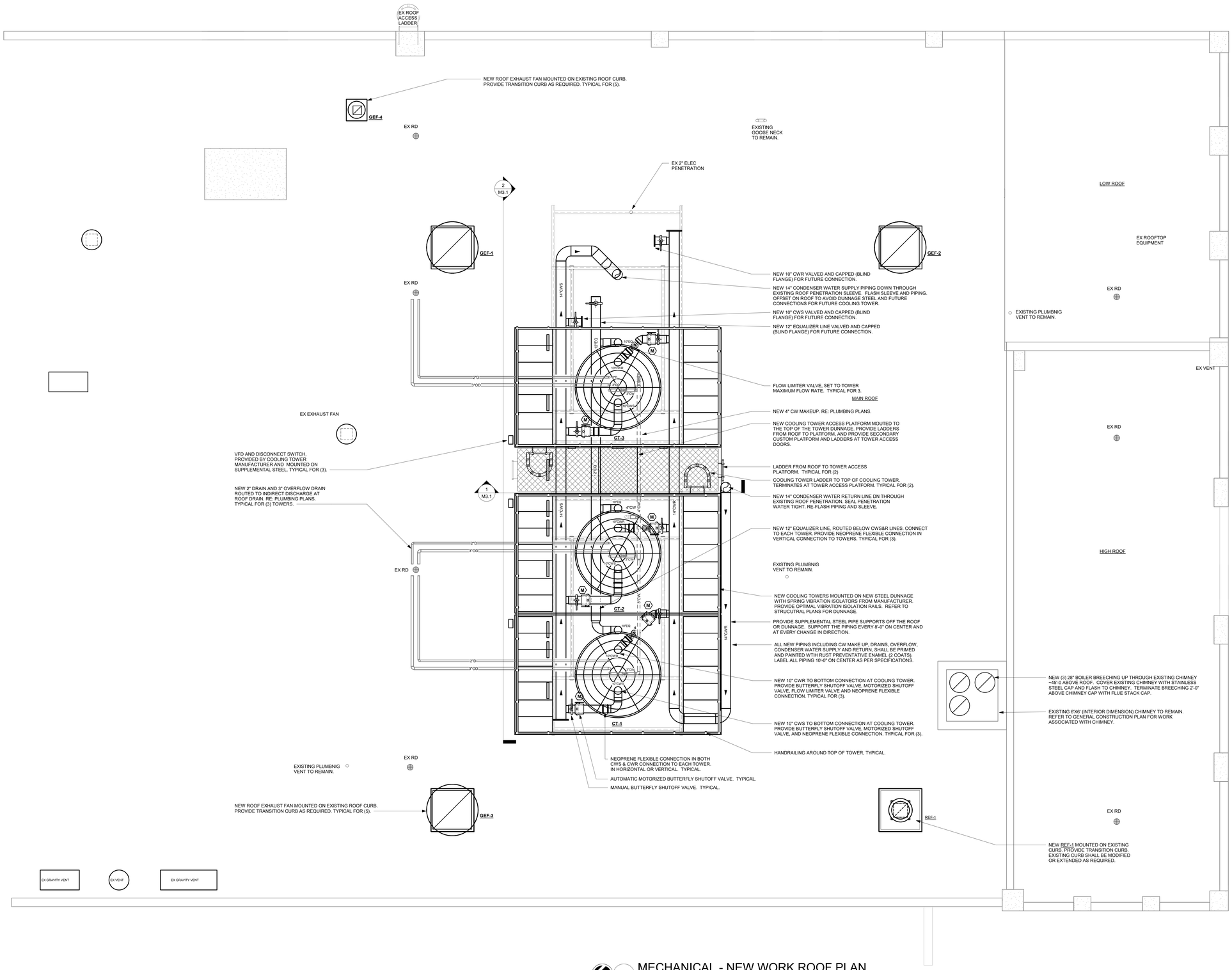
	1/4" = 1'-0"	NRCK0016.00
	DRAWN BY: JRT	DRAWING NO.
	CHECKED BY: RS	M2.1
	DATE: 04-28-2020	



NORTH

1 MECHANICAL - NEW WORK ROOF PLAN

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

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KEYPLAN

BULDING E AREA OF WORK

CAMPUS - KEYPLAN

NORTH

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MECHANICAL NEW WORK ROOF PLAN

SEAL

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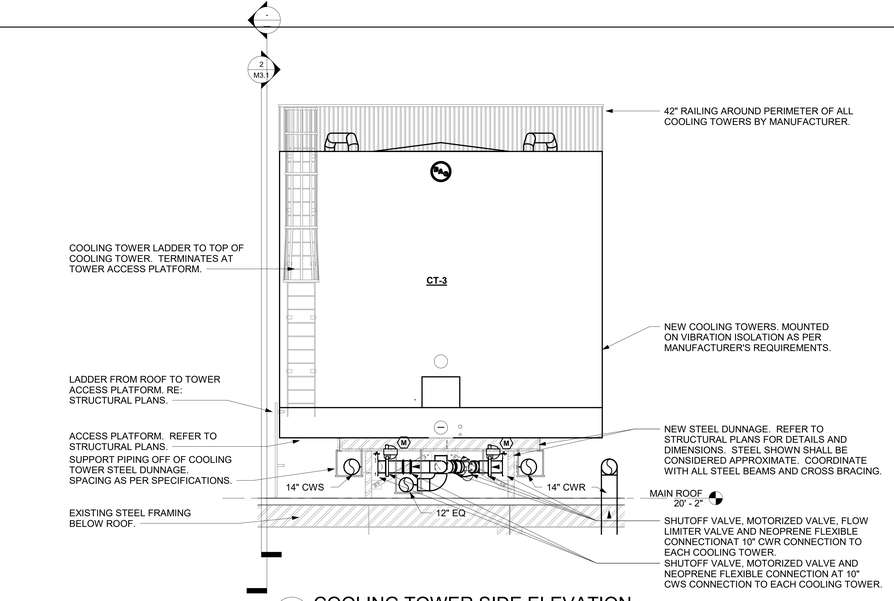
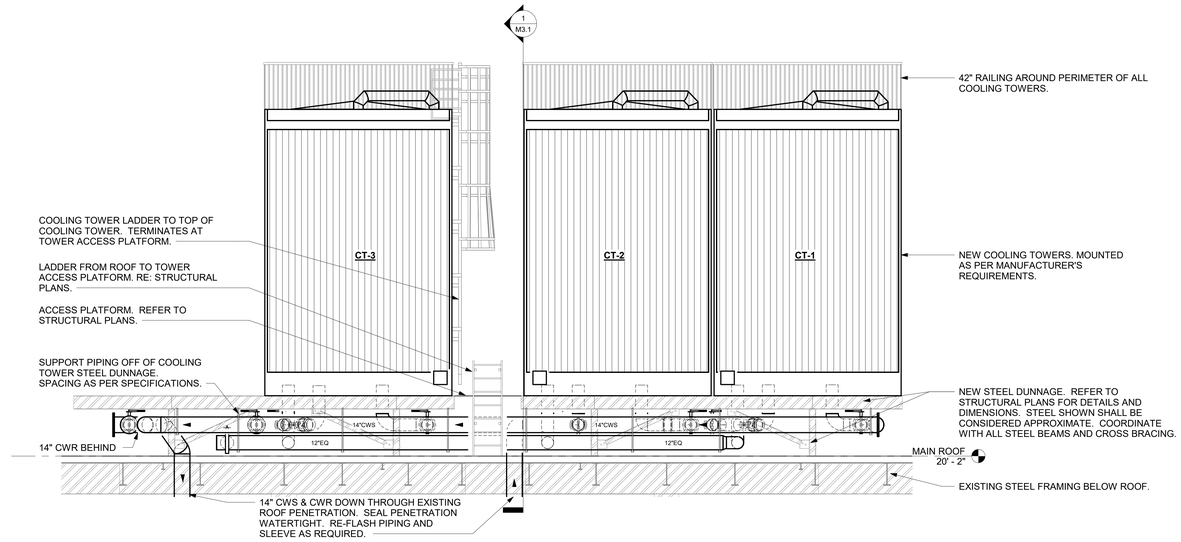
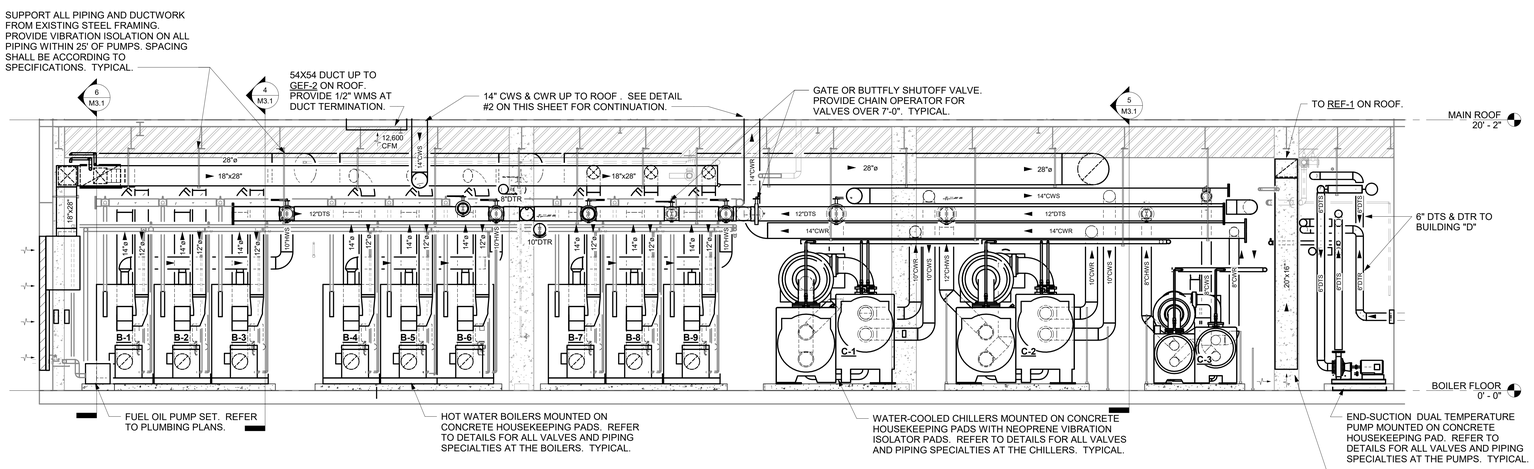


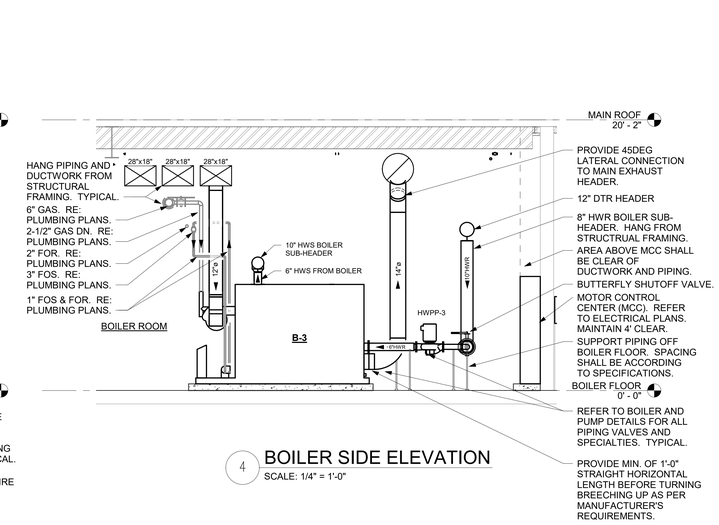
1 COOLING TOWER SIDE ELEVATION
SCALE: 1/4" = 1'-0"



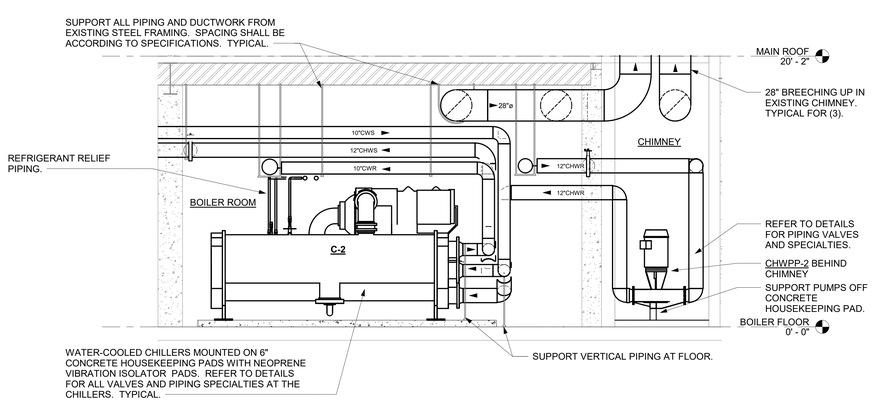
2 COOLING TOWERS FRONT ELEVATION
SCALE: 1/4" = 1'-0"



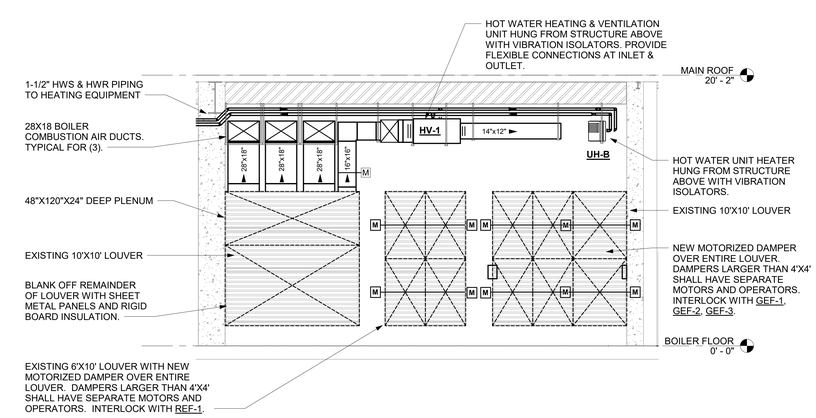
3 BOILER & CHILLER FRONT ELEVATION
SCALE: 1/4" = 1'-0"



4 BOILER SIDE ELEVATION
SCALE: 1/4" = 1'-0"



5 CHILLER SIDE ELEVATION
SCALE: 1/4" = 1'-0"



6 ELEVATION OF OAI INTAKE LOUVER
SCALE: 1/4" = 1'-0"

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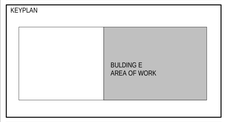

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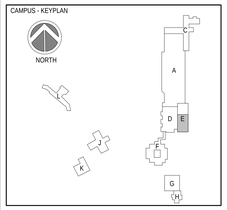

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MECHANICAL ELEVATIONS

SEAL

SCALE 1/4" = 1'-0"	PROJECT NO. NRCK0016.00
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CHECKED BY Checker	M3.1
DATE 04-28-2020	

HOT WATER UNIT HEATER SCHEDULE

DESIGNATION	UH-A	UH-B	UH-C
LOCATION	BOILER ROOM	BOILER ROOM	BOILER ROOM
MODEL	HV-84	HV-120	HV-36
CFM	1400 / 1100	1900 / 1600	550 / 480
HP	1/12	1/12	25 WATT
CAPACITY (MBH)	52.5 / 47.2	74.9 / 67.4	22.4/20.2
GPM	6.1	8.8	2.7
E.W.T. / L.W.T.	180°F/160°F	180°F/160°F	180°F/160°F
AMPS	2.2	2.2	1.2
VOLTS/Ø/Hz	115/1/60	115/1/60	115/1/60

NOTES:
1. UNIT HEATERS BASED ON VULCAN.
2. PROVIDE THE FOLLOWING FOR EACH UNIT:
   DISCONNECT SWITCH
   WALL THERMOSTAT
   ADJUSTABLE AIR DEFLECTION LOUVER
   WALL MOUNTED SPEED CONTROLLER
   STRAP ON AQUASTAT HOT WATER SENSOR
3. HANG UNIT FROM BUILDING STRUCTURE WITH VIBRATION ISOLATORS.

COOLING TOWER SCHEDULE

DESIGNATION	CT-1, CT-2, CT-3
LOCATION	UTILITY PLANT ROOF
MANUFACTURER	BALTIMORE AIRCOIL
MODEL	XES3E-1424-13N
INTERLOCKED	CHILLER OPERATION
SHIPPING WEIGHT (LBS)	21,780
OPERATING WEIGHT (LBS)	45,610 (EACH)
NOMINAL UNIT SIZE (TONS) (EACH)	838
AMBIENT DB/WB (°F)	-/78
GPM (EACH)	2400
W.P.D. (FT H_2O)	19.5
APPROACH (°F):	7
EWT/LWT (°F)	95/85
FANS	
No. OF FANS	1
FAN MOTOR HP (EACH)	25
TOTAL FAN CFM	198,630
VOLTS/Ø/Hz	480/3/60
STARTER TYPE	VFD
STARTER LOCATION	MCC
CONNECTION SIZES	
INLET (IN)	12
OUTLET (IN)	12
COLD WATER MAKE-UP (IN)	3
DRAIN (IN)	2
EQUALIZER (IN)	12

PROVIDE THE FOLLOWING FEATURES & OPTIONS:
1. UNITARY CONTROLLER BY AUTOMATIC TEMPERATURE CONTROLS MANUFACTURER, COMPATIBLE WITH BUILDING AUTOMATION SYN SYSTEM.
2. VIBRATION CUTOUT SENSOR WIRED TO FAN MOTOR STARTER.
3. STAINLESS STEEL BASIN.
4. LOCAL WEATHERPROOF DISCONNECT SWITCH AT UNIT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
5. MOTOR STARTERS AND DISCONNECT SWITCHES NOT LOCATED IN THE MOTOR CONTROL CENTER (MCC) SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL MOTOR STARTERS LOCATED IN THE MOTOR CONTROL CENTER (MCC) SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
6. ALL MOTORS FURNISHED WITH VARIABLE FREQUENCY DRIVES SHALL BE INVERTER DUTY RATED & APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS.
7. SERVICE PLATFORM WITH 42" HANDRAILS AROUND TOP OF TOWER, SAFETY GATES AND ACCESS LADDER BY MANUFACTURER. ALL COMPONENTS SHALL BE GALVANIZED STEEL.
8. AIR INLET SCREENS.
9. ELECTRIC WATER LEVEL CONTROL PACKAGE.
10. PREMIUM EFFICIENCY MOTORS WITH VARIABLE SPEED DRIVE.
11. EXTENDED LUBRICATION LINES.
12. LOW AND HIGH LEVEL ALARM FLOAT SWITCHES.
13. LOW SOUND FAN.
14. MOTORIZED VALVES ON TOWER INLET AND OUTLET CONNECTIONS.
15. PROVIDE VIBRATION ISOLATION AS PER SPECIFICATIONS.
16. VFD STARTER SHALL BE PROVIDED BY THE MANUFACTURER.
17. SINGLE POINT POWER CONNECTION.

WATER COOLED ELECTRIC CHILLER SCHEDULE

DESIGNATION	C-1, C-2	C-3
LOCATION	BOILER ROOM	BOILER ROOM
AREA SERVED	YEAGER CAMPUS	YEAGER CAMPUS
MANUFACTURER	CARRIER	CARRIER
MODEL	19XRV6567C49VEG64	19XRV454634HUDT64
INTERLOCKED	COOLING TOWER OPERATION	COOLING TOWER OPERATION
OPERATING WEIGHT (LBS)	37,907 (EACH)	23,705
NOMINAL SIZE (TONS)	800	400
FULL LOAD EFF. (KW/TON)	0.5763	0.6144
NPLV (KW/TON)	0.3618	0.3688
EVAPORATOR:		
GPM	1600	800
E.W.T./L.W.T. (°F)	54/42	54/42
W.P.D. (FT H_2O)	19	14.3
No. PASSES	2	2
CONDENSER:		
GPM	2400	1200
E.W.T./L.W.T. (°F)	85/95	85/95
W.P.D. (FT H_2O)	21	16.9
No. PASSES	2	2
ELECTRICAL DATA:		
VOLTS/Ø/Hz	460/3/60	460/3/60
MCA	757	401
FLA	605	353
MOCP	1200	700

PROVIDE THE FOLLOWING FEATURES & OPTIONS:
1. PROVIDE CHILLER WITH SINGLE POINT EXTERNAL POWER CONNECTION & FACTORY FURNISHED VFD WITH LOCAL DISCONNECT SWITCH.
2. SHIPPED FACTORY CHARGED WITH REFRIGERANT.
3. HOT GAS BYPASS / ENVELOPE STABILITY CONTROL.
4. THERMAL INSULATION.
5. CUSTOMER FACTORY PERFORMANCE TESTING.
6. EXTENDED WARRANTY.
7. REFRIGERANT ISOLATION VALVES.
8. SOLEPLATE PACKAGE.
9. BACNET COMPATIBLE - SHALL BE INTEGRATED WITH THE BUILDING AUTOMATION INTERFACE.
10. ACOUSTICAL SOUND INSULATION KIT.
11. FURNISH VIBRATION ISOLATORS FOR CHILLER AS PER THE SPECIFICATIONS.

CHILLERS SHALL BE EQUIPPED WITH THE FOLLOWING:
1. MICROPROCESSOR CONTROLS.
2. LOSS OF CHILLED WATER FLOW SENSOR.
3. TEMPERATURE AND PRESSURE GAUGES.
4. LOSS OF CONDENSER WATER FLOW SENSOR.
5. SAFETY CUTOUTS.

PUMP SCHEDULE

DESIGNATION	HWPP-1, HWPP-2, HWPP-3, HWPP-4, HWPP-5, HWPP-6, HWPP-7, HWPP-8, HWPP-9	CHWPP-1, CHWPP-2	CHWPP-3	CWP-1, CWP-2	CWP-3	P-AH-1, P-FC-1, P-FC-2	P-C-1, P-C-2	P-L-1, P-L-2	P-D-1, P-D-2	P-F-1, P-F-2	P-JKR-1, P-JKR-2	P-G-1, P-G-2	P-UH-1, P-UH-2
LOCATION	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM
SYSTEM SERVED	BOILERS	CHILLERS	CHILLERS	CONDENSER WATER	CONDENSER WATER	"AH" UNITS	BUILDING "C"	BUILDING "L"	BUILDING "D"	BUILDING "F"	BUILDINGS "J&K"	BUILDINGS "G&H"	UNIT HEATERS
PRIMARY OR SECONDARY	PRIMARY	PRIMARY	PRIMARY	-	-	SECONDARY	SECONDARY	SECONDARY	SECONDARY	SECONDARY	SECONDARY	SECONDARY	SECONDARY
MANUFACTURER	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG
MODEL	4380 6X6X8	4300 10X10X13	4300 8X8X10	4030 10X8X15	4030 10X8X15	4030 8X6X13	4030 4X3X13	4030 4X3X13	4030 4X3X13	4030 3X2X6	4030 4X3X10	4030 3X2X10	4030 3X2X10
TYPE	INLINE	INLINE	INLINE	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION
NOMINAL DESIGN FLOW RATE (GPM)	560	1600	800	2400	2400	1400	400	450	355	260	325	160	165
MINIMUM FLOW RATE (GPM)	-	-	-	-	-	490	140	160	125	90	115	55	55
COOLING SEASON FLOW RATE (GPM)	-	1600	800	2400	1200	943	383	302	355	260	173	160	-
HEATING SEASON FLOW RATE (GPM)	560	-	-	-	-	981	354	279	328	238	160	149	130
TOTAL DYNAMIC HEAD (FT H_2O)	20	30	25	80	80	135	135	140	140	100	85	80	33
RPM	1200	1200	1200	1200	1200	1800	1800	1800	1800	3600	1800	1800	1586
NPSH (FT. H_2O)	5	10	7	9	9	10	5	5	5	10	7	5	7.81
MOTOR BHP	3.5	16	7	58	58	58	20	23	18	8	8	4.5	1.85
MOTOR HP	5	20	7.5	75	75	75	30	30	30	15	15	7.5	3
VOLTAGE/Ø/Hz	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60
STARTER TYPE	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD	VFD
STARTER LOCATION	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM	BOILER ROOM
INTERLOCK	BOILERS	CHILLERS	CHILLERS	COOLING TOWERS / CHILLERS	COOLING TOWERS / CHILLERS	BMS	BMS	BMS	BMS	BMS	BMS	BMS	BMS

NOTES:
1. ALL PUMPS SHALL BE CAST IRON BODY, BRONZE FITTED, BRONZE IMPELLER. REFER TO SPECIFICATION FOR PUMP CONSTRUCTION.
2. ALL MOTORS 1 HP OR GREATER SHALL BE PREMIUM EFFICIENCY.
3. ALL MOTORS FURNISHED WITH VARIABLE FREQUENCY DRIVES SHALL BE INVERTER DUTY RATED & APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS.
4. MOTOR STARTERS AND DISCONNECT SWITCHES NOT LOCATED IN THE MOTOR CONTROL CENTER (MCC) SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL MOTOR STARTERS LOCATED IN THE MOTOR CONTROL CENTER (MCC) SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
5. REFER TO THE SPECIFICATIONS FOR VIBRATION ISOLATION REQUIREMENTS.
6. PROVIDE GROUNDING FOR EACH PUMP FOR LIGHTNING PROTECTION.

HEATING AND VENTILATING UNIT SCHEDULE

DESIGNATION:	HV-1	
LOCATION	BOILER ROOM	
MANUFACTURER	CARRIER	
MODEL	39SHK05	
UNIT DIMENSIONS - WIDTH x HEIGHT x DEPTH (IN)	45x42x22	
FILTERS:		
TYPE	MERV 8	
QUANTITY/SIZE	2 / 20x20	
HOT WATER COIL:		
FACE AREA (SQ. FT.)	5	
E.W.T./L.W.T. (°F)	180/160	
E.A.T./L.A.T. (°F)	42.7/85	
CAPACITY (MBH)	100.1	
GPM	6.7	
SUPPLY FAN:		
CFM	2200	
OAI CFM	1000	
FAN MOTOR HP	0.5	
FAN MOTOR TYPE	VFD	
ESP (IN H_2O)	.25	
VOLTS/Ø/Hz	460/3/60	

NOTES:
1. PROVIDE THE FOLLOWING FEATURES & OPTIONS FOR EACH UNIT:
• UNITARY CONTROLLER BY AUTOMATIC TEMPERATURE CONTROLS MANUFACTURER, COMPATIBLE WITH THE BUILDING AUTOMATION SYSTEM.
• COORDINATE RIGHT-HAND/LEFT-HAND COIL CONNECTIONS IN THE FIELD.
• FURNISH 2-WAY MODULATING CONTROL VALVE FOR EACH COIL. 5 PSI MAX AT CONTROL VALVE.
• WALL MOUNTED THERMOSTAT.
• FACTORY FURNISHED LOCAL DISCONNECT SWITCH.
• COIL AIR VENT.
• (2) SETS OF SPARE FILTERS FOR EACH UNIT.
• FINISH SHALL BE CUSTOM ENAMEL - SUBMIT COLOR CHART FOR APPROVAL.
• VFD STARTER SHALL BE PROVIDED BY MANUFACTURER.
• ALL MOTORS FURNISHED WITH VFD'S SHALL BE INVERTER DUTY RATED AND APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS.

FAN SCHEDULE

DESIGNATION	GEF-1, GEF-2, GEF-3	GEF-4	REF-1
LOCATION	ROOF	ROOF	ROOF
AREA SERVED	BOILER ROOM	ELECTRICAL ROOM	BOILER ROOM - CHILLERS
MANUFACTURER	COOK	COOK	COOK
MODEL	490C8B	120C17DEC	195C8B
WEIGHT (LBS)	700	55	150
FAN TYPE	MUSHROOM	MUSHROOM	MUSHROOM
DRIVE TYPE	BELT	DIRECT - EC MOTOR	BELT
CFM	12,600	1,000	4,500
BHP	1.5	0.15	1.22
HP	1.5	0.166	1.5
RPM	263	1316	1145
SP (IN H_2O)	0.375	0.5	0.5
VOLTS/Ø/Hz	480/3/60	120/1/60	480/3/60
STARTER LOCATION	MCC	ELECTRICAL ROOM WALL	MCC
STARTER TYPE	VFD	VFD	VFD
INTERLOCK	BMS/THERMOSTAT	BMS/THERMOSTAT	BMS

NOTES:
1. ALL MOTORS 1 HP OR GREATER SHALL BE PREMIUM EFFICIENCY.
2. FURNISH RUBBER IN SHEAR OR SPRING VIBRATION ISOLATORS AS PER THE SPECIFICATION.
3. FURNISH WALL MOUNTED SPEED CONTROLLER OR THERMOSTAT AS INDICATED ON PLAN.
4. TRANSITION CURB ADAPTER TO FIT ON EXISTING ROOF CURB.
5. FURNISH BAROMETRIC BACKDRAFT DAMPER IN ROOF CURB FOR ROOFTOP FAN.
6. WHERE REQUIRED, MOTOR STARTER AND DISCONNECT SWITCH FOR EACH FAN SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR. EACH ROOFTOP FAN SHALL BE FURNISHED WITH WEATHERPROOF UNIT-MOUNTED LOCAL DISCONNECT SWITCH.
7. PROVIDE BIRDSCREEN FOR ALL FANS.
8. REF-1 SHALL BE PROVIDED WITH REMOTE WALL-MOUNT AIR BALANCE KIT (VFABK).
9. PROVIDE GROUNDING FOR EACH FAN FOR LIGHTNING PROTECTION.

EQUIPMENT NOTES

ADD#5-2

1. EXPANSION TANKS: SHALL BE WESSELS / ARMSTRONG NLA-SERIES VERTICAL EXPANSION TANK MODEL NLA-800L WITH PRE-CHARGED STEEL TANK WITH HEAVY-DUTY BUTYL BLADDER, SYSTEM CONNECTIONS, CHARGING VALVE, DRAIN PLUG, PRESSURE GAUGE AND BLADDER INTEGRITY MONITOR. TANKS SHALL BE 211 GAL WITH 189 GAL ACCEPTANCE. 240°F MAX OPERATING TEMPERATURE, 125 PSI MAX WORKING PRESSURE, FACTORY PRE-CHARGED TO 40 PSIG AND FIELD ADJUSTABLE. UNIT SHALL BE MANUFACTURED IN ACCORDANCE WITH ASME SECTION VIII.

2. VORTEX AIR SEPARATOR: SHALL BE ARMSTRONG VAS SERIES, 375°F MAXIMUM WORKING TEMPERATURE, 165 PSIG MAXIMUM WORKING PRESSURE, INLET AND OUTLET CONNECTIONS WITH 150# ANSI FLANGES, BLIND FLANGE FOR STRAINER PULL, AIR OUTLET, AND DRAIN. SIZE SHALL BE VAS-8 OR VAS-10 TO MATCH THE PIPE SIZE SHOWN ON PLAN. UNIT SHALL BE MANUFACTURED IN ACCORDANCE WITH ASME CODE.

3. AUTOMATIC AIR ELIMINATOR: SHALL BE ARMSTRONG MODEL AAE-750, WITH 250°F MAXIMUM OPERATING TEMPERATURE, 2-133 PSIG AIR PRESSURE OPERATING RANGE, 100% SPRING ACTION POSITIVE SHUTOFF, 3/4" NPT SYSTEM CONNECTION.

4. CONDENSER WATER SIDE STREAM SEPARATOR: SHALL BE LAKOS MODEL TBI-0400-SRV, 69½" HIGH, 30" WIDE, 48" LONG, 150 PSIG MAXIMUM WORKING PRESSURE, 6" INLET & 4" OUTLET CONNECTIONS WITH 150# ANSI FLANGES, 1/4" NPT PRESSURE GAUGES AT INLET & OUTLET, 1½" PURGE OUTLET WITH MANUAL ISOLATION VALVE, 7.5 HP END SUCTION PUMP WITH PREMIUM EFFICIENCY MOTOR, 460/3/60, 11AMPS AND NEMA4X CONTROL ENCLOSURE WITH DISCONNECT SWITCH. PROVIDE A 1½" AUTOMATIC BALL VALVE MODEL #ABV2-15 WITH ASSOCIATED WALL MOUNTED LAKOS CONTROL PANEL. LAKOS CONTROL PANEL AND VALVE SHALL BE 120V HARDWIRED. PROVIDE INLET AND OUTLET VALVE KIT. UNIT SHALL BE MANUFACTURED IN ACCORDANCE WITH ASME CODE.

5. PIPE LABELS: SHALL BE SETON ULTRA-MARK WEATHER RESISTANT FOR OUTDOOR APPLICATION AND OPTI-CODE FOR INDOOR APPLICATION. LETTERS AND ARROWS SHALL BE 2 1/2" HIGH AND SHALL BE WHITE ON A GREEN BACKGROUND AND SHALL CONFORM TO ANSI AND OSHA STANDARDS. APPLY OVER INSULATION ONLY.

6. PIPE INSULATION JACKETING: SHALL BE WHITE ZESTON 2000 PVC COVERS FOR PIPING AND FITTINGS. JACKET ALL PIPING AND FITTINGS THAT ARE EXPOSED IN ANY ROOM. NEW AND EXISTING FROM FLOOR UP TO 10'-0" ABOVE FINISHED FLOOR.

7. HEAVY DUTY SIDEWALL RETURN AIR REGISTERS: SHALL BE TITUS MODEL 33RL, STEEL CONSTRUCTION, WITH 1/2" SPACING, 38° FIXED DEFLECTION, 16-GAUGE BORDER, 14-GAUGE BLADES, SUPPORT BARS 6" ON CENTER, OPPOSED BLADE VOLUME DAMPER IN NECK, SIZE AND CFM AS NOTED ON PLANS. FINISH SHALL BE BAKED ON ENAMEL. SUBMIT COLOR CHART FOR APPROVAL. FRAME SHALL BE SUITABLE FOR DUCT MOUNTING.

8. SIDEWALL SUPPLY AIR REGISTERS: SHALL BE TITUS MODEL 300FL, ALUMINUM CONSTRUCTION, WITH 3/4" SPACING, DOUBLE DEFLECTION AIRFOIL BLADES, OPPOSED BLADE VOLUME DAMPER IN NECK, SIZE AND CFM AS NOTED ON PLANS. FINISH SHALL BE BAKED ON ENAMEL. SUBMIT COLOR CHART FOR APPROVAL. FRAME SHALL BE SUITABLE FOR LAY-IN OR SURFACE MOUNTING AS REQUIRED. COORDINATE WITH ARCH PLANS.

9. CHEMICAL SHOT FEEDER: SHALL BE NEPTUNE VERTICAL 10-GALLON MODEL DBF-10HP. THE FEEDER SHELL SHALL BE CONSTRUCTED OF 10 GAUGE STEEL AND SHALL BE PRIMED. INCLUDE OPTIONAL FILTER BAG KIT WITH BAG, BAG FRAME, TUBING AND CONNECTORS. THE BYPASS FEEDER SHALL BE RATED AT 300 PSI. TANK & SUPPORT STANDS SHALL BE EPOXY COATED.

10. DUAL-FUEL HOT WATER BOILERS (B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9): SHALL BE FULTON VANTAGE-6000DF, DUAL-FUEL, CONDENSING HOT WATER BOILER, RATED AS FOLLOWS:
    - 42.8 GPH LIGHT OIL CONSUMPTION (5,736 MBH OUTPUT).
    - 6,000 MBH GAS INPUT - GAS PRESSURE 18 MIN / 42 MAX W.C.
    - 5,640 MBH GROSS OUTPUT.
    - 460V/3Ph/60Hz, 15 FLA.
    - 7.5 HP BLOWER MOTOR.
    - 1 HP OIL PUMP MOTOR.
    - 14,900 LBS OPERATING WEIGHT.
    - 480 GAL WATER CONTENT.
    - 12.7 FT HEAD PRESSURE DROP AT 20°F ΔT.
    - THE BOILER SHALL BE IN COMPLIANCE WITH CSD-1.

    STANDARD CONTROLS AND FEATURES:
    - 160 PSIG MAXIMUM ALLOWABLE WORKING PRESSURE.
    - 210°F MAXIMUM ALLOWABLE WORKING TEMPERATURE
    - MINIMUM RETURN WATER TEMPERATURE OF 140°F (#2 FUEL OIL); NO MINIMUM RETURN WATER TEMPERATURE ON NATURAL GAS.
    - FACTORY RECOMMENDED MAXIMUM SETPOINT 190°F.
    - DUAL FUEL (GAS/OIL) BURNER.
    - LMV3 LINKAGELESS BURNER MANAGEMENT SYSTEM.
    - SKP25 COMBINATION GAS VALVE & REGULATOR.
    - TEMPERATURE LOAD CONTROLLER WITH MODBUS.
    - LOW WATER CUT OFF PROBE WITH MANUAL RESET.
    - HIGH AND LOW GAS PRESSURE SWITCHES.
    - AUTOMATIC RESET HIGH LIMIT AQUASTAT.
    - MANUAL RESET HIGH LIMIT AQUASTAT (200°F MAX).
    - OUTLET WATER TEMPERATURE SENSOR.
    - VENTLESS GAS TRAIN UTILIZING VENT LIMITERS.
    - ALARM CONTACT AND ALARM HORN.
    - STATUS (GAS VALVE ENABLED) CONTACT.
    - REMOTE ENABLE/DISABLE CONTACT.
    - LOCAL/OFF/REMOTE 3-POSITION SWITCH.
    - TIME DELAY RELAY FOR PRIMARY (BOILER) PUMP.
    - TIME DELAY RELAY FOR MOTORIZED ISOLATION VALVE.
    - TWO (2) INTERLOCK CONTACTS.
    - EMERGENCY STOP (E-STOP) CONTACTS BACNET INTEGRATION.
    - ASME SAFETY RELIEF VALVE (60 PSIG).
    - PRESSURE & TEMPERATURE GAUGES.
    - INSTALLATION AND OPERATION MANUAL.
    - RUBBER COMBUSTION AIR INTAKE COUPLING.

    FURNISH THE FOLLOWING FEATURES & OPTIONS FOR EACH BOILER:
    - BACNET INTEGRATION.
    - SINGLE BOILER CONDENSATE DRAIN TRAP.
    - CONDENSATE PH NEUTRALIZATION KIT.
    - SECONDARY LOW-WATER CUTOFF
    - 120V MOTORIZED ISOLATION VALVE.
    - DISCONNECT SWITCH

    BOILER SEQUENCING CONTROLLER:
    - FULTON MOD SYNC SE CONTROL PANEL.

13. REFRIGERANT LEAK DETECTION SYSTEM: SHALL BE THERMAL GAS SYSTEMS INC MODEL# HALOGUARD II WITH LCD DISPLAY, AUDIBLE ALARM, RELAYS AND OUTPUTS FOR INTERFACE WITH BUILDING MANAGEMENT SYSTEM AND 2 REMOTE IR SENSOR MODULES. REFER TO SPECIFICATION FOR DETAILS. PROVIDE THE FOLLOWING OPTIONS: STROBE LIGHT ALARM, GAS TEST KIT, BATTERY BACK-UP. AUTOMATIC CALIBRATION. PROVIDE REMOTE HORN STROBE ALARMS AT EACH ENTRANCE TO THE BOILER ROOM.

14. MOTORIZED DAMPERS: SHALL BE RUSKIN MODEL CD40, 4" DEEP EXTRUDED ALUMINUM AIRFOIL DAMPER. DAMPER SHALL HAVE OPPOSED BLADES, MOTOR AND LINKAGE. DAMPERS SHALL BE 120V/1Ø/60Hz, 3 AMPS MAX. FURNISH DISCONNECT SWITCH.

15. BOILER DRAFT CONTROL SYSTEM: SHALL BE US DRAFT CO. WITH CDS2 DRAFT CONTROLLERS FOR EACH BOILER. CDS2 SHALL BE 120V/1PH/60HZ AND SHALL INCLUDE OPTIONAL GAS FLOW SWITCHES. THE SYSTEM SHALL RECEIVE (2) REMOTE TERMINAL UNITS MODEL #RTU1 WHICH WILL COMMUNICATE WITH THE BOILER CDS2 CONTROLLERS AND THE BMS SYSTEM. SEE FLOOR PLAN FOR LOCATION, DETAIL FOR SEQUENCE OF OPERATION AND SPECIFICATIONS FOR MORE INFORMATION.

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KEYPLAN

CAMPUS - KEYPLAN

NO.	DESCRIPTION	DATE
2	RE-ISSUED FOR BID	07/24/2022
1	ISSUED FOR BID	11/01/2021

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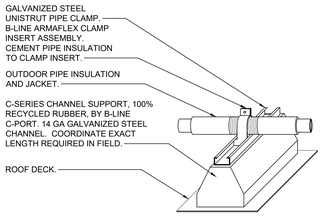
PROJECT
CAPITAL PROJECT 4466
BUILDING E UTILITY PLANT
RENOVATION & IMPROVEMENTS
DR. ROBERT L. YEAGER HEALTH CENTER
50 SANATORIUM ROAD,
POMONA, NY 10970

DRAWING TITLE
MECHANICAL SCHEDULES AND EQUIPMENT NOTES

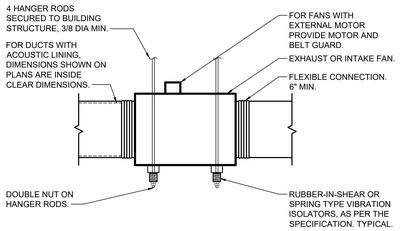
SEAL

SCALE	NONE
PROJECT NO.	NRCK0016.00
DRAWN BY	NW
CHECKED BY	RS
DATE	04-28-2020
DRAWING NO.	M6.1

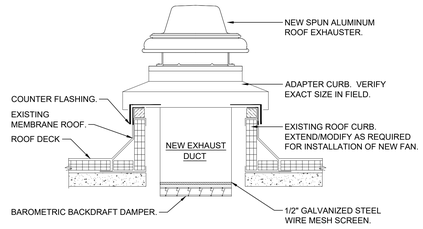


NOTES:
1. ALL BRACKETS, HANGERS, AND FASTENERS SHALL BE GALVANIZED STEEL.
2. CLAMP INSERT ASSEMBLY SHALL INCLUDE GALVANIZED STEEL PIPE CLAMP, ARMAFLEX INSULATION WITH PAINTED ALUMINUM JACKET, AND INTERIOR SUPPORTS.
3. SECURE RUBBER SUPPORT BLOCKS TO ROOF DECK WITH MASTIC COMPATIBLE WITH ROOF.

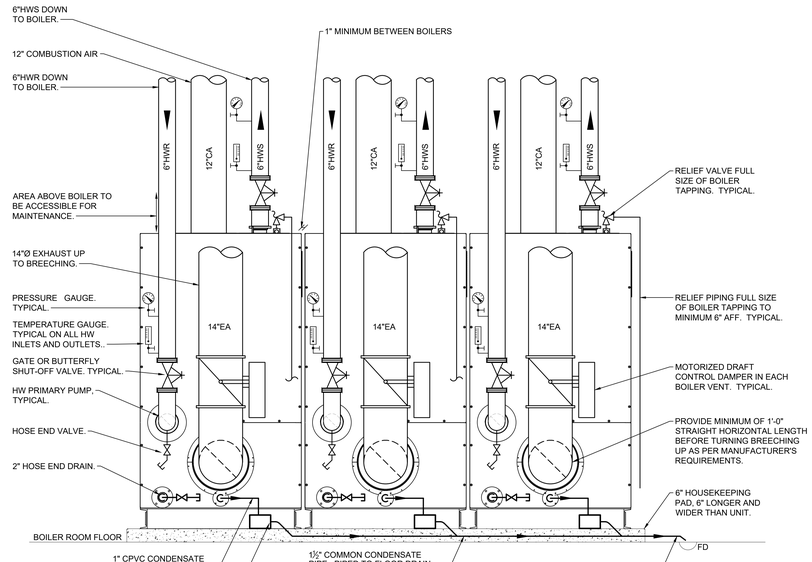
17 ROOF PIPE SUPPORT DETAIL
SCALE: NONE



13 INLINE FAN SCHEMATIC
SCALE: NONE

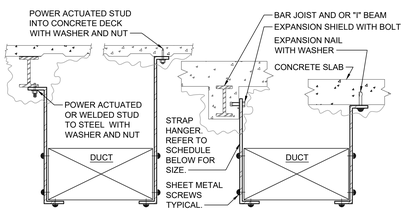


8 ROOFTOP EXHAUST FAN DETAIL
SCALE: NONE



NOTES:
1. ARRANGEMENT IS TYPICAL FOR (3) SETS OF (3) BOILERS.

4 BOILER PIPING SCHEMATIC
SCALE: NONE

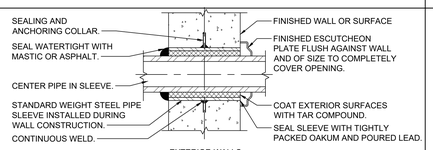


NOTES:
1.) FOR DUCTS OVER 49" WIDE, THE STRAP HANGER SHALL BE TURNED UNDER THE BOTTOM OF THE DUCT.
2.) WHERE EXISTING BUILDING STRUCTURAL COMPONENTS HAVE FIREPROOF MATERIAL, ANY AREA THAT IS DISTURBED OR DAMAGED AS A RESULT OF HANGER INSTALLATION SHALL BE PATCHED WITH UL AND FM APPROVED FIREPROOFING TO MATCH EXISTING.

HANGER STRAP SCHEDULE

DUCT SIZE	HANGER SIZE	MAXIMUM SPACING
UP TO 2 SQ.FT.	1" X 1/16"	8'-0"
2 SQ.FT. TO 4 SQ.FT.	1" X 1/8"	8'-0"
4 SQ.FT. TO 10 SQ.FT.	1" X 1/8"	6'-0"
OVER 10 SQ.FT.	1" X 1/8"	4'-0"

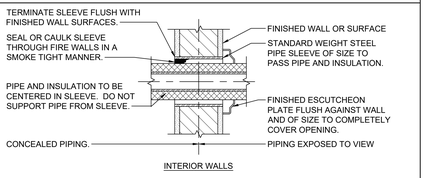
16 DUCT HANGER DETAIL
SCALE: NONE



EXTERIOR WALLS

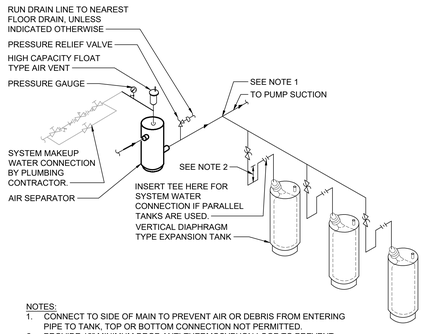
NOTES:
1. PIPE SLEEVE FOR EXTERIOR WALL ABOVE GRADE.
2. FOR GAS SERVICE EXTEND SLEEVE 1" PAST INSIDE FACE OF WALL & 4" PAST OUTSIDE FACE OF WALL.

12 PIPE WALL SLEEVE DETAILS FOR EXTERIOR WALLS
SCALE: NONE



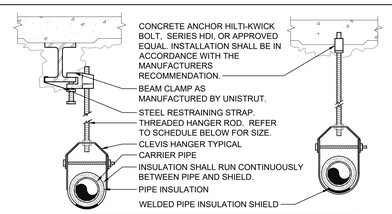
INTERIOR WALLS

11 PIPE WALL SLEEVE DETAIL FOR INTERIOR WALLS
SCALE: NONE



NOTES:
1. CONNECT TO SIDE OF MAIN TO PREVENT AIR OR DEBRIS FROM ENTERING PIPE TO TANK, TOP OR BOTTOM CONNECTION NOT PERMITTED.
2. PROVIDE 12" MINIMUM DROP ANTI-THERMOSYPHON LOOP TO PREVENT GRAVITY HEATING OF TANK.
3. PROVIDE STRAINER IN AIR SEPARATOR WHEN INDICATED IN THE EQUIPMENT NOTE.
4. SET THE PRESSURE REDUCING VALVE SO THAT THE PRESSURE AT HIGHEST POINT IN THE SYSTEM IS 4 PSIG.
5. CHARGE EXPANSION TANKS TO SYSTEM OPERATING PRESSURE.

7 EXPANSION TANK PIPING SCHEMATIC
SCALE: NONE

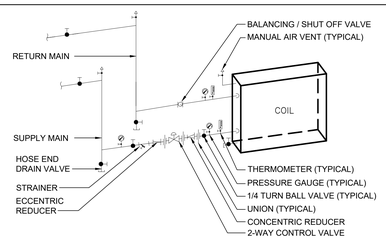


PIPE HANGER SCHEDULE

PIPE DIA.	3/4"-2"	2 1/2"-3"	4"-5"	6"	8"-12"
HANGER DIA.	3/8"	1/2"	5/8"	3/4"	7/8"

NOTES:
1.) CLEVIS HANGERS WITH WELDED INSULATION SHIELDS SIMILAR TO RAUCH FIG. 100SH ON ALL PIPES LARGER THAN 1".
2.) FOR PIPES 1" OR SMALLER, A BAND HANGER WITH INSULATION SHIELD MAY BE USED SIMILAR TO RAUCH FIG. NO. 1ASH.
3.) FOR NON-INSULATED PIPE, INSULATION SHIELDS MAY BE OMITTED.
4.) ALL PIPE HANGERS SHALL BE GALVANIZED STEEL OR FACTORY PAINTED BLACK WITH ENAMEL.
5.) FOR NON FERROUS PIPING WITHOUT INSULATION, ALL HANGERS SHALL BE COPPER PLATED OR FURNISHED WITH A DI-ELECTRIC BETWEEN PIPE AND HANGERS.
6.) WHERE EXISTING BUILDING STRUCTURAL COMPONENTS HAVE FIREPROOF MATERIAL, ANY AREA THAT IS DISTURBED OR DAMAGED AS A RESULT OF HANGER INSTALLATION SHALL BE PATCHED WITH UL AND FM APPROVED FIREPROOFING TO MATCH EXISTING.
7.) ANY AREA WITH A CEILING WHICH IS DISTURBED OR DAMAGED AS A RESULT OF HANGER INSTALLATION SHALL BE PATCHED. REPLACE WIRE LATH AND RE-CEMENT IF REQUIRED.

15 PIPE HANGER DETAIL
SCALE: NONE

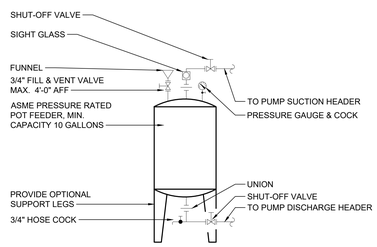


NOTES:
1. LOCATE ALL COIL UNIONS CLOSE TO, AND CLEAR OF, COIL. ARRANGE PIPING SO AS NOT TO NOT INTERFERE WITH COIL REMOVAL.
2. PROVIDE FLEXIBLE CONNECTION FOR THOSE COILS MOUNTED IN UNITS ON VIBRATION ISOLATORS.

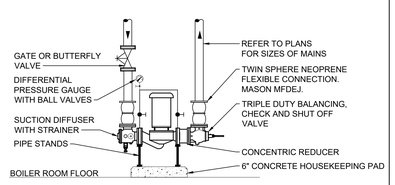
PIPE SIZE SCHEDULE

PIPE SIZE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6
MAX. GPM	2	3.5	7	13	22	45	70	130	260	480	750

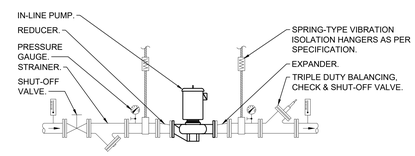
10 HYDRONIC COIL PIPING SCHEMATIC
SCALE: NONE



6 CHEMICAL POT FEEDER PIPING SCHEMATIC
SCALE: NONE

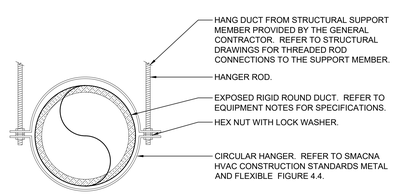


3 IN-LINE CHILLER PRIMARY PUMP SCHEMATIC
SCALE: NONE



NOTES:
1.) HANG IN-LINE PUMP FROM BUILDING STRUCTURE WITH VIBRATION ISOLATORS.
2.) REFER TO PLANS FOR PIPE SIZES.

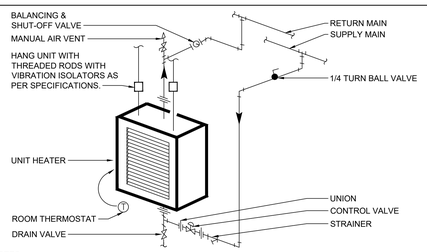
2 IN-LINE BOILER PRIMARY PUMP SCHEMATIC
SCALE: NONE



HANGER ROD SCHEDULE

DUCT SIZE	HANGER DIA	MAXIMUM SPACING
UP TO 2 SQ. FT.	16 GAUGE - $\frac{3}{16}$"	8'-0"
2 SQ FT TO 4 SQ FT	11 GAUGE - $\frac{1}{4}$"	8'-0"
4 SQ FT TO 10 SQ FT	11 GAUGE - $\frac{1}{4}$"	6'-0"
OVER 10 SQ FT.	11 GAUGE - $\frac{1}{4}$"	4'-0"

14 ROUND DUCT HANGER DETAIL
SCALE: NONE

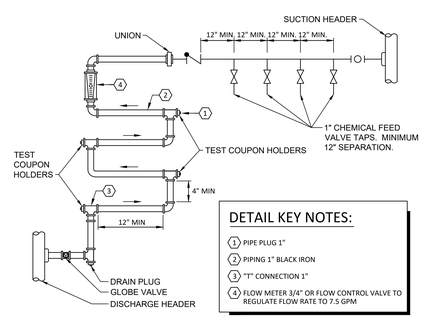


NOTES:
1.) HANG UNIT WITH THREADED RODS CONTAINING SPRING TYPE VIBRATION ISOLATORS FROM BUILDING STRUCTURAL MEMBERS. UNITS SHALL BE SECURE. COORDINATE EXACT LOCATION IN FIELD.
2.) INSTALL UNITS SO THAT THEY HANG LEVEL AND PLUMB.
3.) PROVIDE FOR EXPANSION IN SUPPLY PIPING, SWING JOINT IS SUGGESTED PIPING ARRANGEMENT.
4.) PROVIDE UNIONS AND ISOLATION VALVES ADJACENT TO UNIT HEATER IN BOTH THE SUPPLY AND RETURN LATERALS.
5.) USE 45 DEGREE ANGLE RUN OUTS FROM ALL SUPPLY AND RETURN MAINS.
6.) PROVIDE A ROOM THERMOSTAT ARRANGED TO OPEN CONTROL VALVE AND CYCLE THE FAN ON A CALL FOR HEAT. FURNISH AN AQUASTAT ARRANGED TO PREVENT FAN START UP IF HWS IS NOT ENABLED AND RUNNING.

PIPE SIZE SCHEDULE

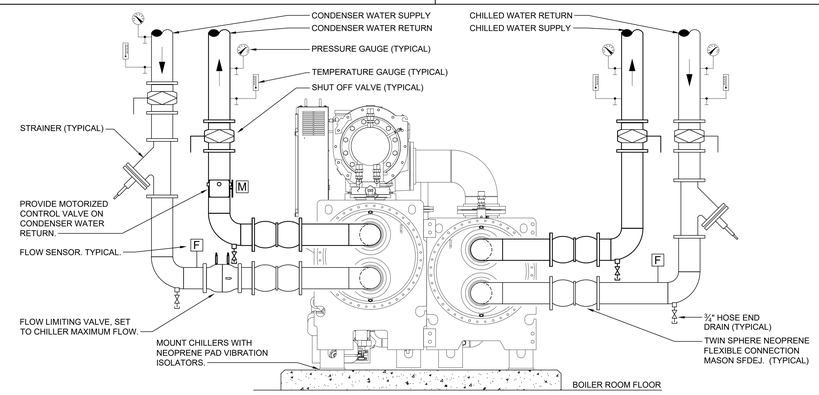
PIPE SIZE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6
MAX. GPM	2	3.5	7	13	22	45	70	130	260	480	750

9 VERTICAL UNIT HEATER PIPING SCHEMATIC
SCALE: NONE



DETAIL KEY NOTES:
1. PIPE PLUG 1"
2. PIPING 1" BLACK IRON
3. "T" CONNECTION 1"
4. FLOW METER 3/4" OR FLOW CONTROL VALVE TO REGULATE FLOW RATE TO 7.5 GPM

5 CONDENSER WATER CHEMICAL FEED TRAPS
SCALE: NONE



NOTE - PIPE ALL CONNECTIONS TO CHILLER IN SUCH A WAY THAT ACCESS TO THE CHILLER IS NOT BLOCKED. COORDINATE IN FIELD.

1 CHILLER PIPING SCHEMATIC
SCALE: NONE

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KEYPLAN

CAMPUS - KEYPLAN

NO.	DESCRIPTION	DATE
2	RE-ISSUED FOR BID	07/24/2022
1	ISSUED FOR BID	11/01/2021

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PROJECT
CAPITAL PROJECT 4466
BUILDING E UTILITY PLANT
RENOVATION & IMPROVEMENTS
DR. ROBERT L. YEAGER HEALTH CENTER
50 SANATORIUM ROAD,
POMONA, NY 10970

DRAWING TITLE
MECHANICAL DETAILS

SEAL

SCALE: NONE	PROJECT NO. NRCK00016.00
DRAWN BY: NW	DRAWING NO.
CHECKED BY: RS	M7.1
DATE: 04-28-2020	

NOTES:
1. FLOOR OR WALL ASSEMBLY - MIN 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 26 IN.
   - SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. STEEL SLEEVE (OPTIONAL) - NOM 14 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY.

3. THROUGH PENETRANTS - ONE METALLIC PIPE, CONDUIT OR TUBING INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PIPE, CONDUIT OR TUBING AND PERIPHERY OF OPENING OR SLEEVE SHALL BE MIN 0 IN. (POINT CONTACT) TO MAX 2 IN. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:

   A. STEEL PIPE - NOM 24 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE - NOM 24 IN. DIAM (OR SMALLER) SERVICE WEIGHT (OR HEAVIER) CAST IRON SOIL PIPE, NOM 24 IN DIAM (OR SMALLER) CLASS 50 (OR HEAVIER) DUCTILE IRON PRESSURE PIPE.
   C. CONDUIT - NOM 6 IN. DIAM (OR SMALLER) STEEL CONDUIT OR NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.
   D. COPPER TUBING - NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   E. COPPER PIPE - NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

4. FIRESTOP SYSTEM - THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:

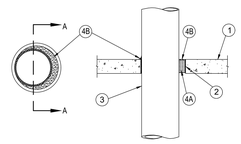
   A. PACKING MATERIAL - MIN 4 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

   B. FILL,VOID OR CAVITY MATERIALS* - CAULK OR SEALANT - MIN 1/4 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL. MIN 1/4 IN. DIAM BEAD OF CAULK APPLIED TO THE PENETRANT/CONCRETE OR PENETRANT/SLEEVE INTERFACE AT THE POINT CONTACT LOCATION ON THE TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL.

3M COMPANY - CP 25WB+ CAULK OR FB-3000 WT SEALANT.
(THE W RATING APPLIES ONLY WHEN FB-3000 WT IS USED.)

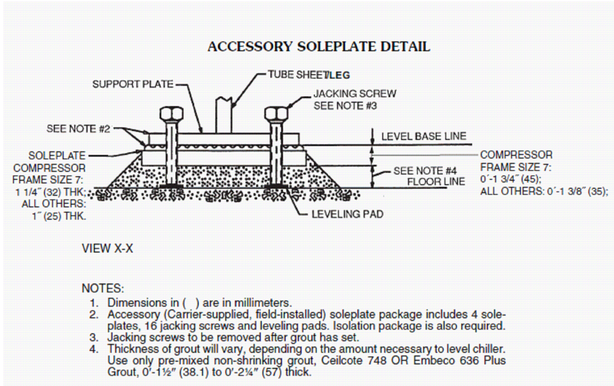
*BEARING THE UL CLASSIFICATION MARKING

SYSTEM NO. C-AJ-1274
AUGUST 23, 2004
F RATING - 3 HR
T RATING - 0 HR
W RATING - CLASS I (SEE ITEM 4)

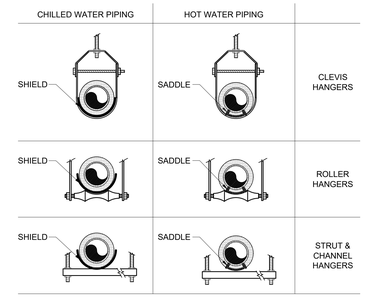


SECTION A-A

10 UNINSULATED PIPE AND CONDUIT FIRE STOPPING DETAIL
SCALE: NONE



7 ACCESSORY SOLEPLATE DETAIL
SCALE: NONE



NOTES:
1. INSULATION ON ALL COLD SURFACES SHALL BE APPLIED WITH A CONTINUOUS, UNBROKEN VAPOR SEAL. HANGERS, SUPPORTS, ANCHORS, ETC., THAT ARE SECURED DIRECTLY TO COLD SURFACES SHALL BE ADEQUATELY INSULATED AND VAPOR SEALED TO PREVENT CONDENSATION.
2. GALVANIZED METAL SHIELDS SHALL BE APPLIED BETWEEN HANGERS OR SUPPORTS AND THE PIPE INSULATION AS SHOWN ABOVE. SHIELDS SHALL BE FORMED TO FIT THE INSULATION AND SHALL EXTEND UP TO THE CENTERLINE OF THE PIPE.
3. RIGID INSULATION INSERTS SHALL BE INSTALLED ON PIPE SIZES 1½" (38 MM) OR LARGER AS SHOWN ABOVE. INSERTS SHALL BE OF EQUAL THICKNESS TO THE ADJOINING INSULATION AND SHALL BE PROVIDED WITH VAPOR RETARDER SEALS.

4 PIPE INSULATION SADDLE/SHIELD SCHEDULE
SCALE: NONE

1. FLOOR OR WALL ASSEMBLY - MIN 4-1/2 IN. (114 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M³) CONCRETE. FLOOR ASSEMBLY MAY ALSO BE CONSTRUCTED OF ANY MIN 6 IN. (152 MM) THICK UL CLASSIFIED HOLLOW-CORE PRECAST CONCRETE UNITS*. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. DIAM OF OPENING TO BE NOM 2 IN. (51 MM) LARGER THAN OUTSIDE DIAM OF PIPE COVERING MATERIAL (ITEM 3). MAX DIAM OF OPENING 12 IN. (305 MM). MAX DIAM OF OPENING IN FLOORS CONSTRUCTED OF HOLLOW-CORE CONCRETE IS 7 IN. (178 MM).

SEE CONCRETE BLOCKS (CAZT) AND PRECAST CONCRETE UNITS (CFTV) CATEGORIES IN FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. THROUGH PENETRANTS - ONE METALLIC PIPE OR TUBING TO BE INSTALLED CONCENTRICALLY OR ECCENTRICALLY WITHIN OPENING. PENETRANT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR TUBES MAY BE USED:

A. STEEL PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.

B. IRON PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.

C. COPPER TUBING - NOM 4 IN. (102 MM) DIAM (OR SMALLER) TYPE M (OR HEAVIER) COPPER TUBE.

D. COPPER PIPE - NOM 4 IN. (102 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. PIPE COVERING - NOM 3 IN. (76 MM) THICK (OR LESS) HOLLOW CYLINDRICAL HEAVY DENSITY GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY-APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH PRODUCT. ANNULAR SPACE BETWEEN THE PIPE COVERING AND PERIPHERY OF OPENING OR SLEEVE SHALL BE MIN 3/8 IN. (10 MM) TO MAX 1-1/2 IN. (38 MM). WHEN PIPE COVERING MATERIAL THICKNESS IS LESS THAN 3 IN. (76 MM), T RATING IS 0 HR.

SEE PIPE AND EQUIPMENT COVERING - MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.

4. FIRESTOP SYSTEM - THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:

A. PACKING MATERIAL - (OPTIONAL, NOT SHOWN) - POLYETHYLENE BACKER ROD OR NOM 1 IN. (25 MM) THICKNESS OF TIGHTLY-PACKED MINERAL WOOL BATT OR GLASS FIBER INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL. IN FLOORS CONSTRUCTED OF HOLLOW-CORE CONCRETE, PACKING MATERIAL TO BE RECESSED FROM TOP AND BOTTOM SURFACES OF FLOOR OR SLEEVE AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

A1. FORMING MATERIAL* - AS AN ALTERNATE TO THE PACKING MATERIAL IN ITEM 5A, NOM 4 IN. (102 MM) WIDE STRIPS OF MIN 1/2 IN (13 MM) THICK COMPRESSIBLE MAT FOLDED IN HALF LENGTHWISE AND STACKED TO A THICKNESS GREATER THAN THE WIDTH OF THE ANNULAR SPACE AND COMPRESSIONFITTED, EDGE-FIRST, TO FILL THE ANNULAR SPACE TO A MIN 2 IN. (51 MM) DEPTH. TOP OF FORMING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS NECESSARY TO ACCOMMODATE THE REQUIRED THICKNESS OF CAULK FILL MATERIAL. IN FLOORS CONSTRUCTED OF HOLLOW-CORE CONCRETE, FORMING MATERIAL TO BE RECESSED FROM TOP AND BOTTOM SURFACES OF FLOOR OR SLEEVE AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

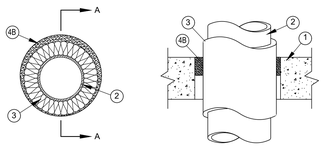
3M COMPANY - FIRE BARRIER PACKING MATERIAL

B. FILL, VOID OR CAVITY MATERIALS* - SEALANT - MIN 2 IN. (51 MM) THICKNESS OF SEALANT APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL. IN FLOORS CONSTRUCTED OF HOLLOW-CORE CONCRETE, MIN 2 IN. (51 MM) THICKNESS OF SEALANT APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP AND BOTTOM SURFACES OF FLOOR OR SLEEVE.

3M COMPANY - FB-3000 WT

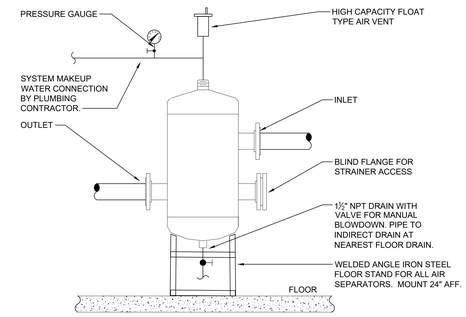
*BEARING THE UL CLASSIFICATION MARK

SYSTEM NO. C-AJ-5310
JUNE 14, 2007
T RATING - 0 AND 1 HR (SEE ITEM 3)
F RATING - 2 HR

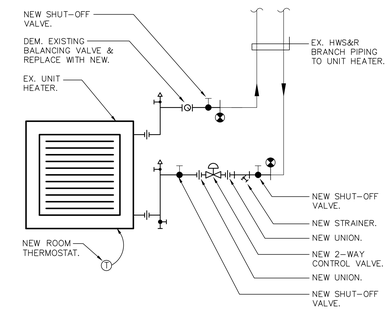


SECTION A–A

9 INSULATED PIPE FIRE STOPPING DETAIL
SCALE: NONE

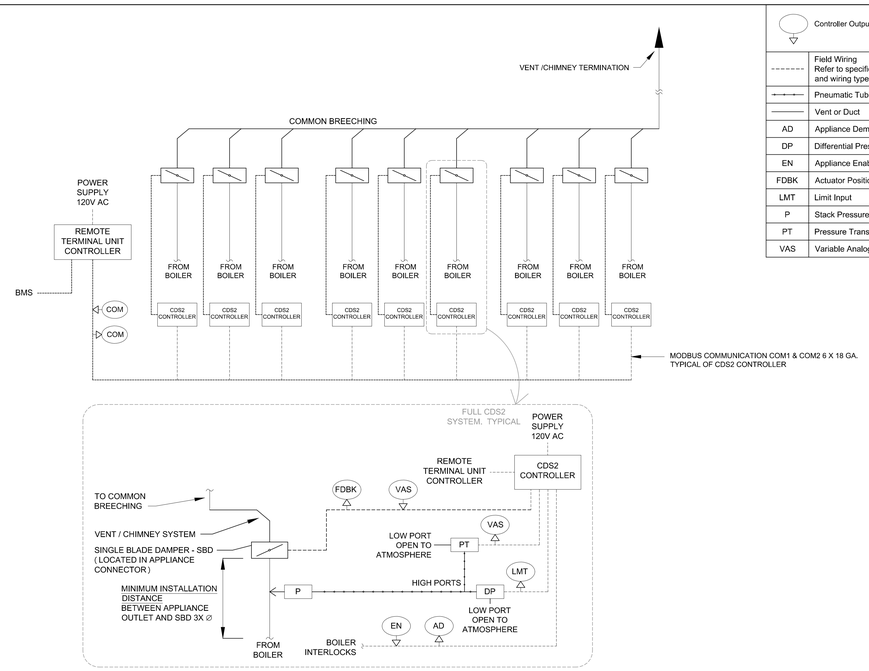


6 VORTEX AIR SEPARATOR PIPING SCHEMATIC
SCALE: NONE



NOTES:
1.) DEMOLISH EXISTING BALANCING VALVE, SHUT-OFF VALVES, & SPECIALTIES.
2.) PROVIDE NEW 2-WAY CONTROL VALVE IN EXISTING HWS BRANCH PIPING TO HEATER.
3.) PROVIDE NEW BALANCING VALVE IN EXISTING HWR BRANCH PIPING TO HEATER.
4.) COORDINATE EXACT LOCATION OF NEW VALVES IN THE FIELD.
5.) VERIFY SIZES OF EXISTING HWS&R BRANCHES IN FIELD. NEW VALVES SHALL BE LINE-SIZE.
6.) EACH EXISTING HEATER SHALL BE RE-BALANCED TO 4.0 GPM.

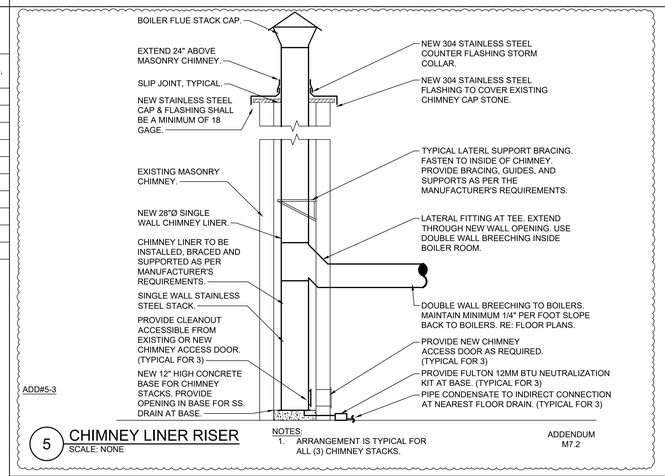
3 PIPING SCHEMATIC FOR EXISTING UNIT HEATERS
SCALE: NONE



Controller Output	Controller Input
Field Wiring Refer to specifications for voltage, amperage, and wiring type	
Pneumatic Tubing for pressure reference	
Vent or Duct	
AD	Appliance Demand
DP	Differential Pressure Switch
EN	Appliance Enable
FDBK	Actuator Position Feedback Signal 0-10VDC
LMT	Limit Input
P	Stack Pressure Probe
PT	Pressure Transducer -1 to 1 in. WC
VAS	Variable Analog Signal 0-10VDC

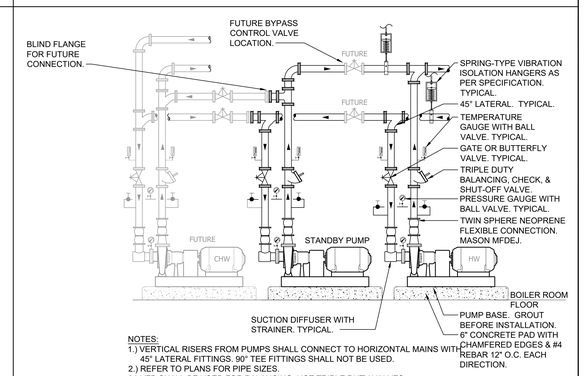
SYSTEM CONTROL SEQUENCE
1. THE HEATING APPLIANCE SHALL BE INTERLOCKED WITH THE CDS CONTROLLER. UPON A CALL FOR HEAT, THE CDS CONTROLLER SHALL TEST THE SINGLE BLADE DAMPER (SBD) OPERATION BY STOKING FULL OPEN. AFTER THE DAMPER HAS PASSED THE FUNCTION TEST THE PRESSURE SWITCH LIMIT IS MONITORED FOR STATUS. ONCE THESE CONDITIONS ARE MET THE THE CDS CONTROLLER ENTERS TRIAL MODE FOR A SET MINIMUM TIME.
2. IN TRIAL MODE THE CDS CONTROLLER RELEASES THE BURNER CONTROL OF THE APPLIANCE FOR OPERATION AND STARTS MAINTAINING APPLIANCE OUTLET PRESSURE BY MODULATING THE SBD TO THE SELECTED SET POINT PRESSURE.
3. ONCE THE TRIAL PRESSURE SETTINGS HAVE BEEN ACHIEVED THE CDS CONTROLLER ENTERS RUN MODE AND ALL OPERATION PRESSURE LIMITS BECOME ACTIVE.
4. WHEN THE APPLIANCE SHUTS DOWN THE DAMPER WILL CONTINUE TO OPERATE IN PURGE MODE FOR A SET PERIOD OF TIME TO ALLOW REMOVAL OF RESIDUAL FLUE GASES.
5. ONCE THE PURGE CYCLE IS COMPLETED THE SYSTEM SECURES, SBD CLOSES AND THE CDS CONTROLLER ENTERS STAND-BY MODE.
6. IF PROPER PRESSURE CANNOT BE MAINTAINED BECAUSE OF MECHANICAL OR ELECTRICAL FAILURE, THE CDS CONTROLLER WILL ENTER ALARM MODE AND THE INTEGRATED LIMIT FUNCTION WILL SHUT DOWN AND LOCKOUT THE APPLIANCE WITHIN THE ADJUSTABLE LIMIT TIME PERIOD.
7. IF THE DAMPER TEST FAILS THE SYSTEM WILL LOCKOUT AND ANNUNCIATE THE CONDITION LOCALLY AND AS A SPECIFIC ALARM ON THE BMS SYSTEM.
8. IF THE TRIAL PRESSURE SETTINGS CAN NOT BE REACHED WITHIN THE MAXIMUM TRIAL TIME ALLOWANCE THE CDS CONTROLLER WILL SECURE SYSTEM, LOCKOUT AND ANNUNCIATE THE CONDITION.
9. ALL ALARMS ARE MANUAL RESET LOCKOUTS AND MUST BE PHYSICALLY ACKNOWLEDGED BY PRESSING THE RESET BUTTON ON THE CDS CONTROLLER.
10. IF THE SBD ACTUATOR LOSES POWER OR CONTROL SIGNAL IT SHALL STOKE TO THE SELECTED FAILSAFE POSITION.

8 BOILER DRAFT CONTROL SYSTEM DIAGRAM
SCALE: NONE



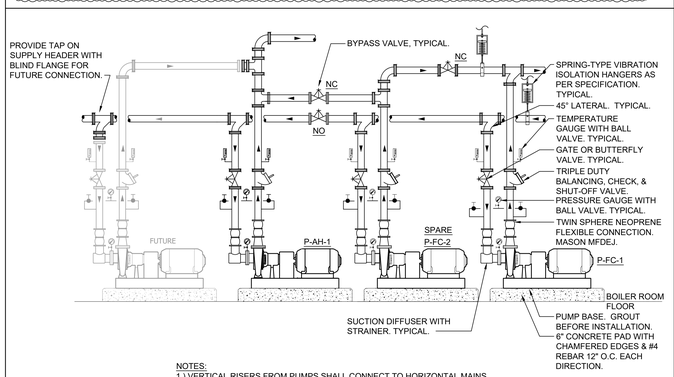
NOTES:
1. ARRANGEMENT IS TYPICAL FOR ALL (3) CHIMNEY STACKS.

5 CHIMNEY LINER RISER
SCALE: NONE



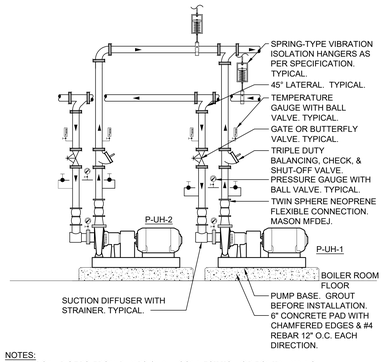
NOTES:
1.) VERTICAL RISERS FROM PUMPS SHALL CONNECT TO HORIZONTAL MAINS WITH 45° LATERAL FITTINGS. 90° TEE FITTINGS SHALL NOT BE USED.
2.) REFER TO PLANS FOR PIPE SIZES.
3.) VFD SHALL BE USED FOR BALANCING, NOT TRIPLE DUTY VALVES.
4.) REFER TO SPECIFICATIONS FOR VIBRATION ISOLATION REQUIREMENTS.
5.) TYPICAL FOR PUMP SETS P-L-1&2, P-D-1&2, P-F-1&2, P-JK-1&2, P-GH-1&2, AND P-C-1&2.

2 PUMP SCHEMATIC
SCALE: NONE



NOTES:
1.) VERTICAL RISERS FROM PUMPS SHALL CONNECT TO HORIZONTAL MAINS WITH 45° LATERAL FITTINGS. 90° TEE FITTINGS SHALL NOT BE USED.
2.) REFER TO PLANS FOR PIPE SIZES.
3.) VFD SHALL BE USED FOR BALANCING, NOT TRIPLE DUTY VALVES.
4.) REFER TO SPECIFICATIONS FOR VIBRATION ISOLATION REQUIREMENTS.

4 P-AH-1 AND P-FC-1&2 PUMP SCHEMATIC
SCALE: NONE



NOTES:
1.) VERTICAL RISERS FROM PUMPS SHALL CONNECT TO HORIZONTAL MAINS WITH 45° LATERAL FITTINGS. 90° TEE FITTINGS SHALL NOT BE USED.
2.) REFER TO PLANS FOR PIPE SIZES.
3.) VFD SHALL BE USED FOR BALANCING, NOT TRIPLE DUTY VALVES.
4.) REFER TO SPECIFICATIONS FOR VIBRATION ISOLATION REQUIREMENTS.

1 P-UH-1&2 PUMP SCHEMATIC
SCALE: NONE

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KEYPLAN

CAMPUS - KEYPLAN

NO.	DESCRIPTION	DATE
2	RE-ISSUED FOR BID	07/24/2022
1	ISSUED FOR BID	11/01/2021

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PROJECT
CAPITAL PROJECT 4466
BUILDING E UTILITY PLANT
RENOVATION & IMPROVEMENTS
DR. ROBERT L. YEAGER HEALTH CENTER
50 SANATORIUM ROAD,
POMONA, NY 10970

DRAWING TITLE
MECHANICAL DETAILS

SEAL	SCALE NONE	PROJECT NO. NRCK00016.00
	DRAWN BY NW	DRAWING NO.
	CHECKED BY RS	M7.2
	DATE 04-28-2020	