

RICHMOND COMMUNITY SCHOOL
Richmond High School: Mechanical Modernization Project
LWC Commission No. 20104.02

ADDENDUM #01
September 16, 2021

LWC, Inc.
712 EAST MAIN ST
RICHMOND, IN 47374

To Prospective Bidders:

This addendum is a modification of the Contract Documents for the above referenced project and is hereby incorporated into and becomes a part of said Contract Documents. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification. It is to be considered in the Proposals and covers additions to or changes in the Contract Documents as indicated below.

This addendum consists of (2) pages.

Attachments:

- Drawings: M002, M105, M105.1, M202, M601, M602, M604
- Specifications: None.

GENERAL NOTES

- The original Prebid Meeting schedule for September 7, 2021, was canceled and did not occur.
- The Bid period for the project has been extended. **The new Bid Date and time will be October 8, 2021, at 3:00 pm** at the School Administration Building, 300 Hub Etchison Parkway.
- A new Prebid Meeting has been schedule for September 22, 2021, at 2:00 pm.
- The date for the final Addendum has been changed based on the new Bid Date. The last Addendum will be issued Tuesday, October 5, 2021.
- The date for final Bidder Question has been changed based on the new Bid Date. The last day for Bidder Questions is Friday, October 1, 2021. Any questions after that date will not be answered.

DRAWINGS

ITEM NO.1 Drawing M002

- A. Added differential pressure locations to overall floor plans for areas not in current phase.
- B. Updated area tags to match key plan.

ITEM NO.2 Drawing M105

- A. Added demolition notes.

ITEM NO.3 Drawing M105.1

- A. Added sheet for temporary heating and cooling requirements and connections.

ITEM NO.4 Drawing M202

- A. Fire dampers on classroom side of east corridor.

ITEM NO.5 Drawing M601

- A. Added general notes and setpoints to sheet.

ITEM NO.6 Drawing M602

- A. Area name changed to match key plan.

ITEM NO.7 Drawing M604

- A. Additional Differential Pressure sensor added for 2nd floor on hot water loop.

SPECIFICATIONS

ITEM NO. 1 230200 – HVAC Equipment

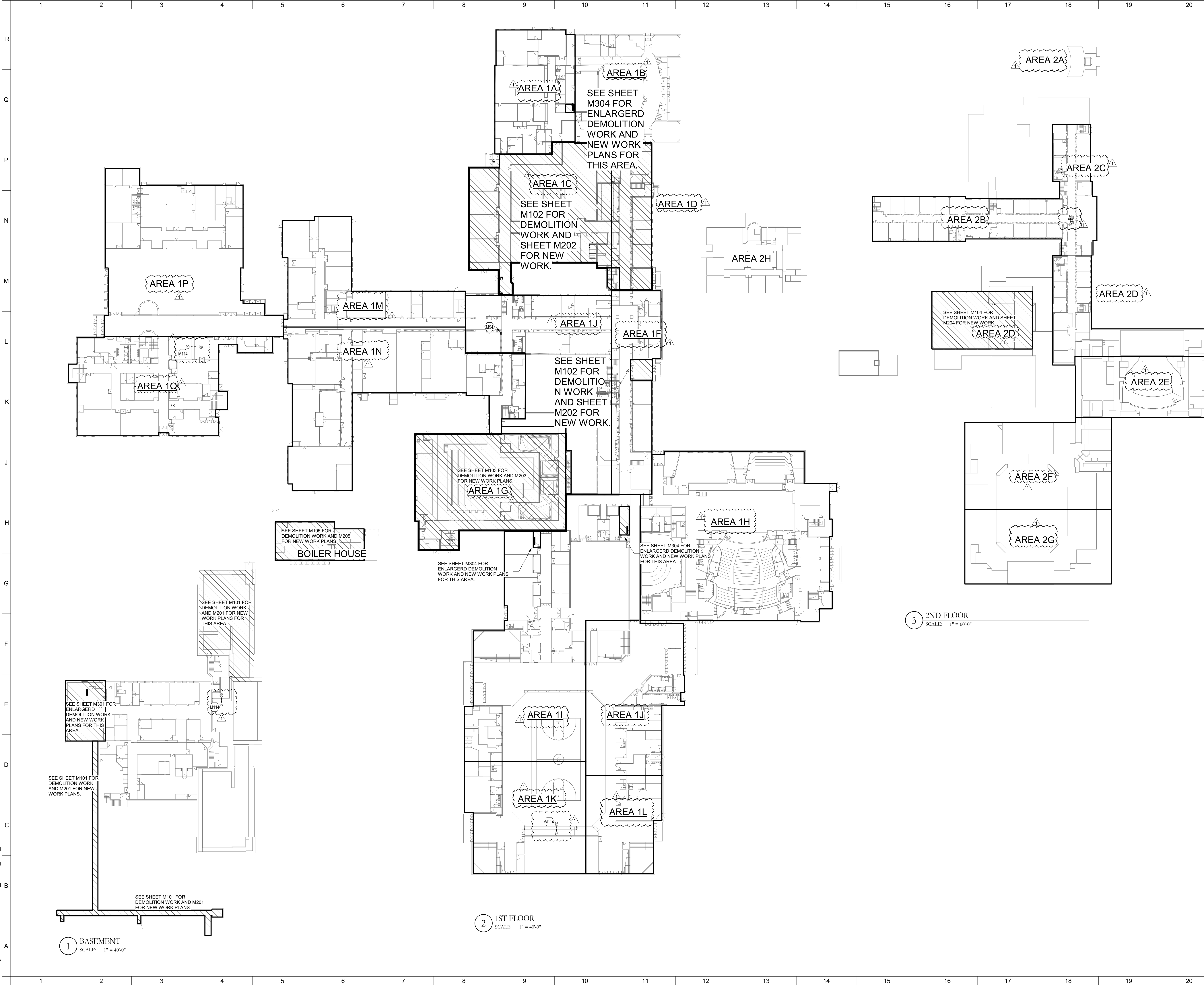
A. Part 7.2.1

- a. Remove bullet point 3 – “Base bid shall be Trane Agility chiller with approved alternate being Daikin. Job awarded on basis of specified machine. Alternate will be considered after the job is awarded.”
- b. Add the following: Acceptable Manufacturers: Daikin, Trane, Carrier, York

END OF ADDENDUM #01

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1 BASEMENT
SCALE: 1" = 40'-0"

2 1ST FLOOR
SCALE: 1" = 40'-0"

3 2ND FLOOR
SCALE: 1" = 60'-0"

SHEET NOTES:

- M04 EXISTING 2 1/2" HWS/HWR RISER SERVING AREA C. SEE SHEET M201 FOR CONTINUATION TO AREA C.
- M114 DIFFERENTIAL PRESSURE SENSORS FOR HOT AND CHILLED WATER LOOP. REFER TO SHEET M402 FOR MORE DETAIL. FIELD VERIFY LOCATION.

GENERAL NOTES:

KEY PLAN:

No.	Revisions / Submissions	Date
1	Addendum 1	09.10.2021

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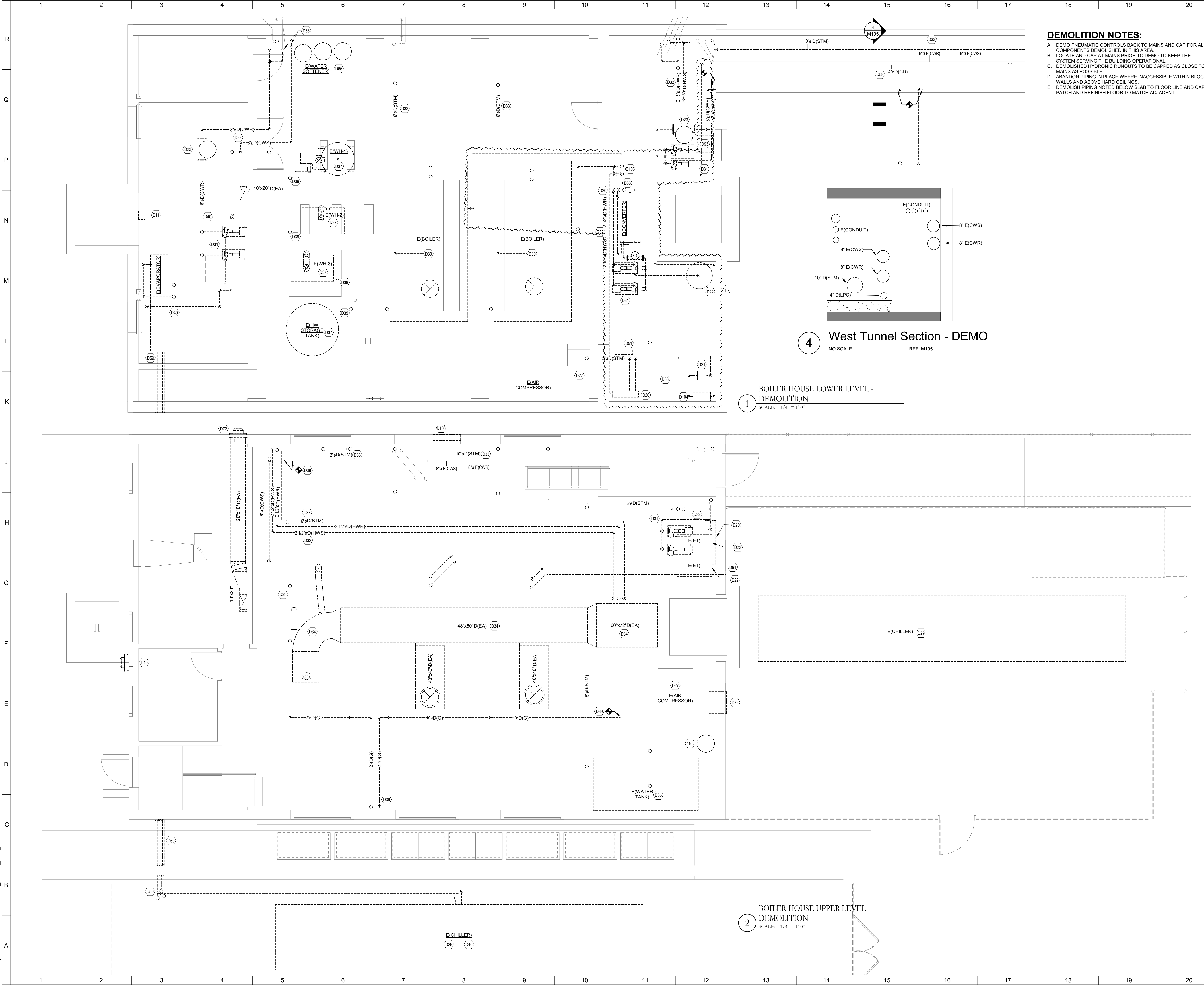
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MECHANICAL MODERNIZATION PROJECT

OVERALL FLOOR PLANS

Comm. No.	Date
20104.02	9.10.2021
Drawn	Drawing No.
JLK	M002
Checked	
NPR	

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1 BOILER HOUSE LOWER LEVEL - DEMOLITION
SCALE: 1/4" = 1'-0"

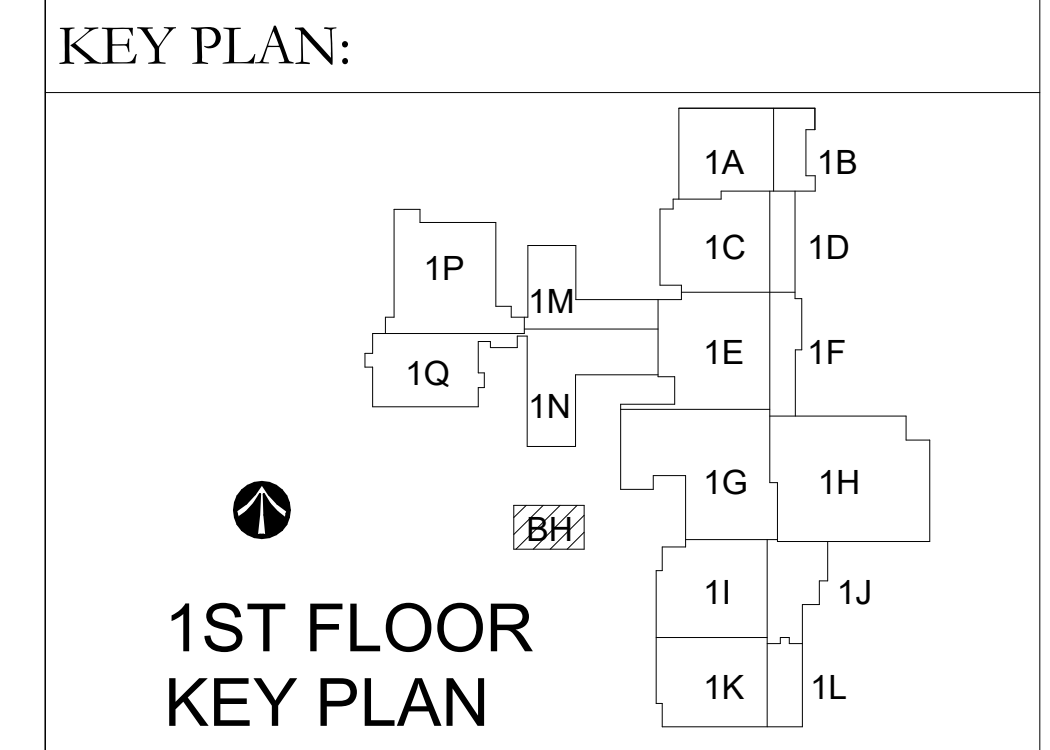
2 BOILER HOUSE UPPER LEVEL - DEMOLITION
SCALE: 1/4" = 1'-0"

4 West Tunnel Section - DEMO
NO SCALE REF: M105

- DEMOLITION NOTES:**
- DEMO PNEUMATIC CONTROLS BACK TO MAINS AND CAP FOR ALL COMPONENTS DEMOLISHED IN THIS AREA.
 - LOCATE AND CAP AT MAINS PRIOR TO DEMO TO KEEP THE SYSTEM SERVING THE BUILDING OPERATIONAL.
 - DEMOLISHED HYDRONIC RUNOUTS TO BE CAPPED AS CLOSE TO MAINS AS POSSIBLE.
 - ABANDON PIPING IN PLACE WHERE INACCESSIBLE WITHIN BLOCK WALLS AND ABOVE HARD CEILINGS.
 - DEMOLISH PIPING NOTED BELOW SLAB TO FLOOR LINE AND CAP. PATCH AND REFINISH FLOOR TO MATCH ADJACENT.

- SHEET NOTES:**
- EXISTING EXHAUST FAN TO BE REMOVED COMPLETELY, INCLUDING ALL DUCTWORK AND CONTROLS CONNECTIONS. CAP CURB ON ROOF. SEE CURB CAP DETAIL ON THIS SHEET. REFER TO ELECTRICAL DRAWINGS FOR MORE INFORMATION ON DEMOLITION OF ELECTRICAL.
 - EXISTING UNIT HEATER TO BE REMOVED COMPLETELY, INCLUDING ALL PIPING, CONTROLS, AND ELECTRICAL CONNECTIONS. CONDENSATE RUN BELOW SLAB TO TUNNEL SHALL BE ABANDONED AND CAPPED BELOW FLOOR LINE. REFER TO ARCHITECTURAL PLANS FOR FINISH DETAILS.
 - EXISTING STEAM TO WATER HEAT EXCHANGER TO BE REMOVED COMPLETELY, INCLUDING ALL PIPING AND ACCESSORIES.
 - EXISTING LOW PRESSURE CONDENSATE PUMP TO BE REMOVED COMPLETELY, INCLUDING ALL PIPING, ELECTRICAL AND CONTROLS CONNECTIONS.
 - EXISTING EXPANSION TANK TO BE REMOVED COMPLETELY.
 - EXISTING AIR SEPARATOR TO BE REMOVED COMPLETELY.
 - EXISTING PNEUMATIC AIR COMPRESSOR TO REMAIN.
 - REMOVE EXISTING AIR-COOLED CHILLER AND ALL ASSOCIATED MECHANICAL, ELECTRICAL, AND CONTROLS CONNECTIONS. COORDINATE REMOVAL WITH ELECTRICAL CONTRACTOR.
 - EXISTING BOILERS TO BE COMPLETELY REMOVED INCLUDING ALL EXISTING MECHANICAL, ELECTRICAL, EMERGENCY SHUT DOWN BUTTONS, AND CONTROL CONNECTIONS. COMPLETELY DEMOLISH CONCRETE PAD BENEATH BOILERS. REFER TO NEW WORK PLAN FOR MORE DETAIL.
 - EXISTING HOT/CHILLED WATER PUMPS TO BE COMPLETELY REMOVED INCLUDING ALL EXISTING MECHANICAL, ELECTRICAL AND CONTROLS CONNECTIONS. COORDINATE REMOVAL WITH ELECTRICAL CONTRACTOR. COMPLETELY DEMOLISH EXISTING CONCRETE PADS BENEATH PUMPS AND REPAVE.
 - EXISTING HOT/CHILLED WATER PIPING AND ALL ASSOCIATED VALVES, HANGERS, AND SUPPORTS TO BE COMPLETELY REMOVED TO POINT INDICATED ON DRAWINGS.
 - EXISTING STEAM PIPING AND ALL ASSOCIATED VALVES, HANGERS, AND SUPPORTS TO BE COMPLETELY REMOVED.
 - BOILER FLUE DUCTWORK TO BE COMPLETELY REMOVED BACK TO PENETRATION AT BOILER FLUE STACK AND PATCH OPENING. REFER TO ARCHITECTURAL DRAWINGS FOR PATCH DETAILS.
 - EXISTING BOILER WATER STORAGE TANK TO BE REMOVED COMPLETELY.
 - EXISTING DOMESTIC WATER HEATING EQUIPMENT AND STORAGE TO BE DEMOLISHED. DEMOLISH CONCRETE PAD UNDER EXISTING EQUIPMENT. REFER TO PLUMBING DRAWINGS FOR MORE DETAIL.
 - CWS/CWR RISERS TO BE DEMOLISHED UP TO EXISTING VALVES. REFER TO NORTH SECTION VIEW ON SHEET M401 AND NEW WORK FOR MORE DETAIL.
 - EXISTING NATURAL GAS LINE TO EQUIPMENT TO BE REMOVED COMPLETELY INCLUDING ALL ASSOCIATED VALVES, HANGERS AND SUPPORTS TO POINT INDICATED. SEE PLUMBING DRAWINGS FOR MORE INFORMATION.
 - REFER TO PHASING PLAN TO COORDINATE REMOVAL OF EQUIPMENT AND HYDRONIC PIPING REQUIRED FOR TEMPORARY OPERATION OF CHILLERS.
 - EXISTING BACKFLOW PREVENTER AND MAKEUP WATER TO MECHANICAL EQUIPMENT TO BE DEMOLISHED.
 - SEE TUNNEL SECTIONS ON THIS SHEET FOR MORE DETAIL OF PIPE LAYOUT.
 - EXISTING RS/RL PIPING TO BE REMOVED COMPLETELY.
 - BELOW GRADE RS/RL PIPING TO BE REMOVED COMPLETELY. SEE SHEET M105 FOR CONTINUATION TO LOWER LEVEL OF BOILER HOUSE.
 - EXISTING WATER SOFTENER SYSTEM TO BE DEMOLISHED. SEE PLUMBING PLANS FOR MORE DETAIL.
 - EXISTING EXHAUST FAN TO BE REMOVED COMPLETELY, INCLUDING ALL DUCTWORK AND CONTROLS CONNECTIONS. WALL TO BE PATCHED. REFER TO ARCHITECTURAL PLANS FOR MORE INFORMATION.
 - EXISTING BOILER VENTS TO BE REMOVED COMPLETELY. WALL PENETRATIONS TO BE PATCHED. SEE ARCHITECTURAL DRAWINGS FOR MORE DETAIL.
 - EXISTING LOUVER AND MOTORIZED DAMPER IN ROOM BELOW TO REMAIN.
 - EXISTING EXHAUST FAN TO BE REMOVED COMPLETELY, INCLUDING ALL ELECTRICAL AND CONTROLS CONNECTIONS. LOUVER TO REMAIN AND BE USED FOR INTAKE AIR.
 - DEMOLISH EXISTING CHEMICAL FEED TANK, ASSOCIATED PIPING, CONTROLS, AND ELECTRICAL CONNECTIONS.
 - DEMOLISH EXISTING PLENUM AND DAMPER ON BACK OF EXISTING LOUVER TO REMAIN.
 - EXISTING FLASH TANK TO BE REMOVED COMPLETELY, INCLUDING ALL ASSOCIATED PIPING AND ACCESSORIES.
 - EXISTING FEED WATER PUMPS TO BE REMOVED COMPLETELY, INCLUDING ALL MECHANICAL, ELECTRICAL AND CONTROLS CONNECTIONS. COORDINATE REMOVAL WITH ELECTRICAL CONTRACTOR.

GENERAL NOTES:



2	Bid Documents	08.27.2021
	Addendum 1	09.10.2021
No.	Revisions / Submissions	Date

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MECHANICAL MODERNIZATION PROJECT

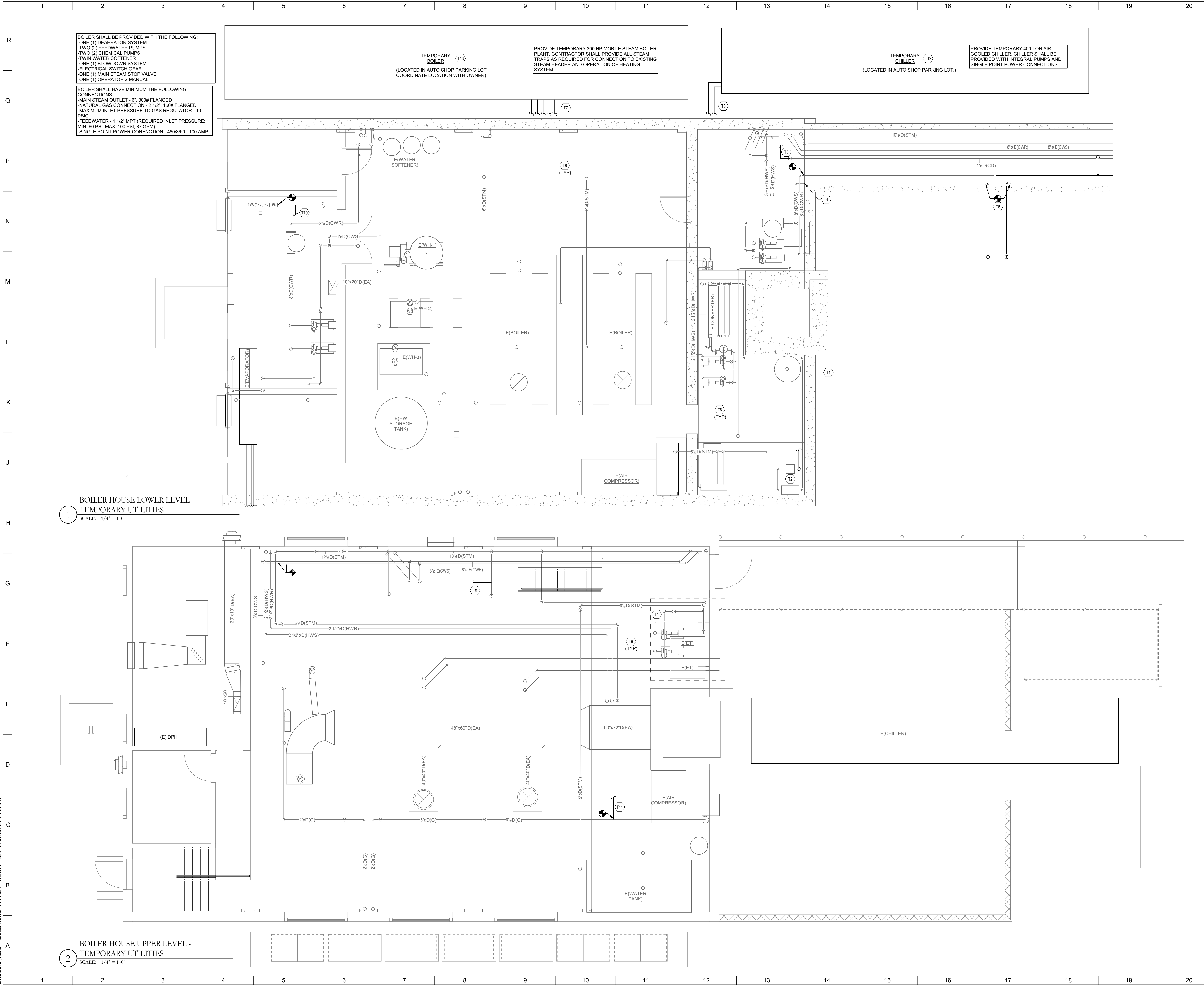
BOILER HOUSE MECHANICAL DEMOLITION PLAN

Comm. No.	Date
20104.02	9.10.2021
Drawn	Drawing No.
JLK	M105
Checked	
NPR	

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1 BOILER HOUSE LOWER LEVEL -
TEMPORARY UTILITIES
SCALE: 1/4" = 1'-0"

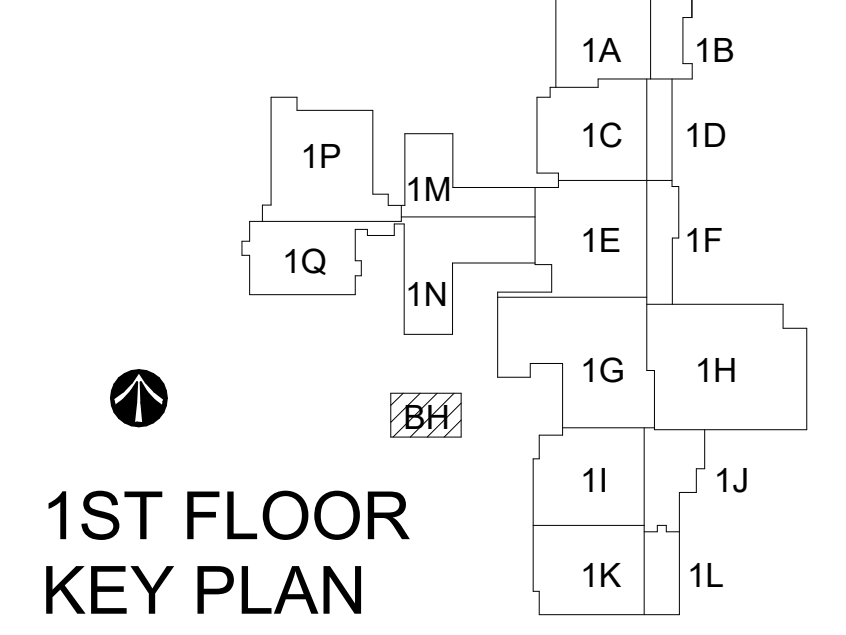
2 BOILER HOUSE UPPER LEVEL -
TEMPORARY UTILITIES
SCALE: 1/4" = 1'-0"

SHEET NOTES:

- T1 STEAM HX, PIPING, CONTROLS, AND TRAPS AND HW PUMPS, EXPANSION TANK, AND FILL SHALL REMAIN FOR OPERATION OF HOT WATER SYSTEM UNTIL END OF HEATING SEASON. APPROVAL FROM OWNER SHALL BE PROVIDED PRIOR TO DEMOLITION/SHUTDOWN OF SYSTEM.
- T2 STEAM FLASH TANK AND CONDENSATE PUMP SHALL REMAIN IN OPERATION UNTIL END OF HEATING SEASON. APPROVAL FROM OWNER SHALL BE PROVIDED PRIOR TO DEMOLITION/SHUTDOWN OF SYSTEM. ROUTE PUMPED CONDENSATE TO TEMPORARY BOILER. ROUTE PUMPED RETURN TO TEMPORARY BOILER. COMBINE WITH PUMPED RETURN FROM BUILDING PRIOR TO EXISTING BUILDING TO TEMPORARY BOILER.
- T3 ROUTE PUMPED CONDENSATE RETURN FROM BUILDING TO TEMPORARY BOILER. COMBINE WITH PUMPED RETURN FROM BOILER HOUSE PRIOR TO EXISTING BUILDING TO TEMPORARY BOILER.
- T4 ROUTE CWS/CWR TO TEMPORARY CHILLER.
- T5 ROUTE TO CWS/CWR CONNECTIONS NOTED AT UTILITY TUNNEL ENTRANCE.
- T6 INSTALL CWR PIPING IN TUNNEL AS INDICATED ON M205 AFTER REMOVAL OF EXISTING CHILLER.
- T7 ROUTE 6" STEAM FROM TEMPORARY BOILER TO 10" STEAM HEADER TO REMAIN. ROUTE CONDENSATE RETURN TO RETURN FROM BUILDING CONDENSATE PUMPED LOCATED IN BOILER HOUSE. ROUTE 1-1/2" DOMESTIC WATER TO BOILER HOUSE WHERE INDICATED ON PLANS. ROUTE 2-1/2" GAS LINE TO BOILER HOUSE WHERE INDICATED ON PLANS.
- T8 STEAM PIPING, TRAPS, AND CONTROLS SHALL REMAIN AS REQUIRED TO PROVIDE HEATING TO CAMPUS THROUGHOUT THE ENTIRE HEATING SEASON. TYPICAL.
- T9 ROUTE 6" STEAM TO TEMPORARY BOILER.
- T10 ROUTE 1 1/2" FEED WATER LINE FROM EXISTING DOMESTIC WATER MAIN TO TEMPORARY BOILER.
- T11 ROUTE 2 1/2" GAS LINE TO TEMPORARY BOILER.
- T12 E.C. SHALL PROVIDE ELECTRICAL CONNECTION TO TEMPORARY CHILLER. COORDINATE PHASING OF MECHANICAL WORK WITH REPLACEMENT OF ELECTRICAL EQUIPMENT. PROVIDE NEW FUSES IN EXISTING EQUIPMENT AND ADDITIONAL BREAKERS IN NEW EQUIPMENT AS REQUIRED TO SUPPORT TEMPORARY CHILLER FOR THE WHOLE PROJECT. PROVIDE NEW 600A FUSES IN EXISTING 600A BUCKETS IN EXISTING SWITCHBOARD DPH PREVIOUSLY SERVING EXISTING CHILLER. PROVIDE NEW 480V-3P-600A BREAKERS IN NEW SWITCHBOARD DPH. INCLUDE COST FOR TRANSITIONING ELECTRICAL CONNECTION TO TEMPORARY CHILLER FROM EXISTING ELECTRICAL EQUIPMENT TO NEW ELECTRICAL EQUIPMENT IN ALTERNATE PRICING. TEMPORARY CHILLER SHALL BE PROVIDED WITH LOCAL DISCONNECTING MEANS AS REQUIRED PER NEC.
- T13 E.C. SHALL PROVIDE ELECTRICAL CONNECTION TO TEMPORARY BOILER. COORDINATE PHASING OF MECHANICAL WORK WITH REPLACEMENT OF ELECTRICAL EQUIPMENT. PROVIDE NEW FUSES IN EXISTING SWITCHBOARD DPH AND ADDITIONAL BREAKERS IN NEW EQUIPMENT AS REQUIRED TO SUPPORT TEMPORARY BOILER FOR THE WHOLE PROJECT. PROVIDE NEW 100A FUSE IN EXISTING SPARE 400A BUCKET IN EXISTING EQUIPMENT. PROVIDE NEW 480V-3P-100A BREAKER IN NEW SWITCHBOARD DPH. INCLUDE COST FOR TRANSITIONING ELECTRICAL CONNECTION TO TEMPORARY BOILER FROM EXISTING ELECTRICAL EQUIPMENT TO NEW ELECTRICAL EQUIPMENT IN ALTERNATE PRICING.

GENERAL NOTES:

KEY PLAN:



1ST FLOOR KEY PLAN

1	Addendum 1	Revisions / Submissions	09.10.2021
No.			Date

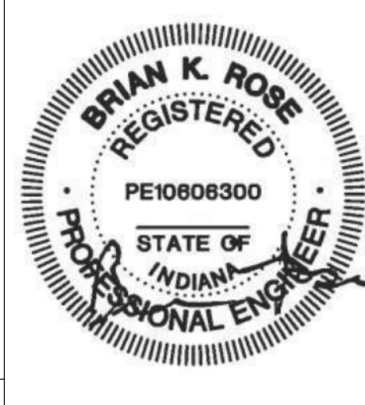
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TEMPORARY UTILITIES

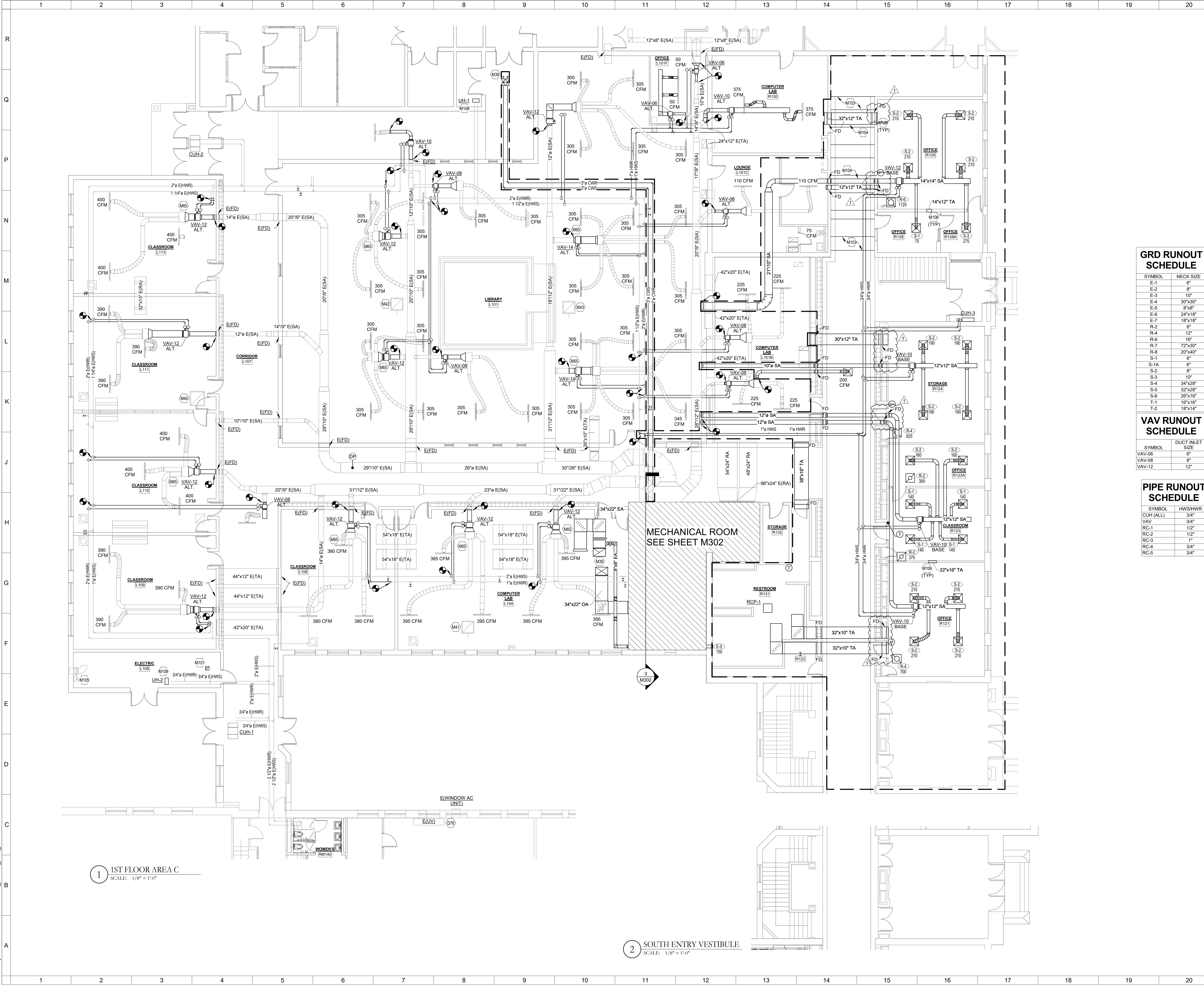
Comm. No.	Date
20104.02	9.10.2021
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SHEET NOTES:

- D78 EXISTING EQUIPMENT TO REMAIN.
- M38 PIPES TO BE CAPPED FOR FUTURE CONNECTION.
- M39 34"x22" OAVE DUCT UP TO ERV-1 ON ROOF.
- M40 EXISTING 36"x36" DUCT WITH MOTORIZED DAMPER UP TO EXISTING RELIEF VENT #1 TO REMAIN. REPLACE ACTUATOR ON EXISTING DAMPER FOR CONNECTION TO NEW CONTROL SYSTEM.
- M41 EXISTING 30"x30" DUCT WITH MOTORIZED DAMPER UP TO EXISTING RELIEF VENT #2 TO REMAIN. REPLACE ACTUATOR ON EXISTING DAMPER FOR CONNECTION TO NEW CONTROL SYSTEM.
- M42 EXISTING 30"x30" DUCT WITH MOTORIZED DAMPER UP TO EXISTING RELIEF VENT #3 TO REMAIN. REPLACE ACTUATOR ON EXISTING DAMPER FOR CONNECTION TO NEW CONTROL SYSTEM.
- M43 EXISTING 30"x30" DUCT WITH MOTORIZED DAMPER UP TO EXISTING RELIEF VENT #4 TO REMAIN. REPLACE ACTUATOR ON EXISTING DAMPER FOR CONNECTION TO NEW CONTROL SYSTEM.
- M65 SHIFT PLENUM BOX AS REQUIRED TO INSTALL NEW VAV BOX. SHIFT AS REQUIRED TO PROVIDE ADEQUATE STRAIGHT DUCT RUN TO VAV INLET PER MANUFACTURERS RECOMMENDATION.
- M101 10"x10" EA DUCT UP TO EF-7.
- M103 COORDINATE DUCT CROSSING WITH STRUCTURAL JOISTS. REFER TO STRUCTURAL DRAWINGS FOR MORE DETAIL.
- M104 REFER TO STRUCTURAL DRAWINGS FOR MORE DETAIL ON REMOVAL OF BRIDGING BETWEEN JOISTS.
- M105 REPLACE ACTUATOR ON EXISTING MOTORIZED DAMPER FOR CONNECTION TO NEW CONTROL SYSTEM.
- M106 INSTALL TRANSFER DUCT ABOVE CEILING.
- M108 REFER TO DETAIL ON SHEET M403 FOR CONNECTION DETAILS.

GRD RUNOUT SCHEDULE

SYMBOL	NECK SIZE
E-1	6"
E-2	8"
E-3	10"
E-4	30"x30"
E-5	8"x8"
E-6	24"x18"
E-7	18"x18"
R-2	6"
R-4	12"
R-6	16"
R-7	72"x30"
R-8	20"x40"
S-1	6"
S-1A	6"
S-2	8"
S-3	10"
S-4	34"x28"
S-5	32"x28"
S-6	28"x18"
T-1	16"x16"
T-2	18"x14"

VAV RUNOUT SCHEDULE

SYMBOL	DUCT INLET SIZE
VAV-06	6"
VAV-08	8"
VAV-12	12"

PIPE RUNOUT SCHEDULE

SYMBOL	HWS/HWR
CUH (ALL)	3/4"
VAV	3/4"
RC-1	1/2"
RC-2	1/2"
RC-3	1"
RC-4	3/4"
RC-5	3/4"

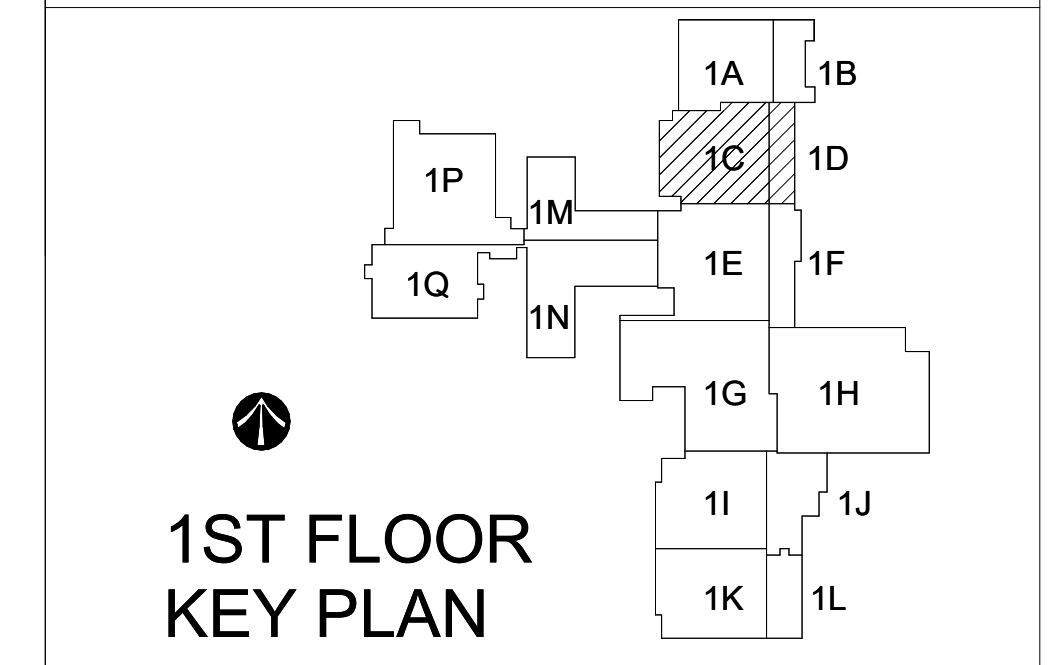
GENERAL NOTES:

- A. FIELD VERIFY DUCT/PIPE LAYOUTS WITH EXISTING CONDITIONS PRIOR TO ORDERING ANY EQUIPMENT OR MATERIALS.
- B. COORDINATE NEW WORK WITH ALL EXISTING AND NEW WORK OF OTHER TRADES.

ALTERNATE NOTES (AREA C):

- A. NEW WORK WITHIN OUTLINE SHALL BE BASE BID SCOPE. ALL OTHER NEW WORK ON PLAN SHALL BE INCLUDED AS A PART OF ALTERNATE #3 AND ALTERNATE #4.
- B. BASE BID WORK SHALL INCLUDE THE FOLLOWING:
 - a. INSTALLATION OF NEW VAV BOXES LABELED "BASE" AND ASSOCIATED DUCTWORK SUPPLY DUCTWORK TO GRILLE AND BACK TO EXISTING SUPPLY DUCT MAINS.
 - b. INSTALLATION OF NEW HOT WATER PIPING SERVING VAV BOXES LABELED "BASE".
 - c. INSTALLATION OF TRANSFER DUCTS SERVING CLASSROOMS ALONG FRONT OF BUILDING LOCATED WITHIN OUTLINE ON SHEET M202.
 - d. INSTALLATION OF 3" CWS/CWR PIPING FROM LIBRARY MECHANICAL ROOM THROUGH LIBRARY FOR FUTURE CONNECTION TO UNITS SERVING AREA B.
- C. ALTERNATE #3 BID WORK SHALL INCLUDE THE FOLLOWING:
 - a. INSTALLATION OF VAV BOXES LABELED "ALT" AND DUCTWORK AS REQUIRED FOR REPLACEMENT AS INDICATED ON SHEET M202.
 - b. INSTALLATION OF HWS/HWR PIPING TO REPLACEMENT VAV BOXES LABELED "ALT".
- D. ALTERNATE #4 BID WORK SHALL INCLUDE THE FOLLOWING:
 - a. INSTALLATION OF NEW AIR HANDLER (AHU-1C) SERVING LIBRARY AND SURROUNDING CLASSROOMS AS INDICATED ON SHEET M302.
 - b. INSTALLATION OF ENERGY RECOVERY VENTILATOR FOR MINIMUM OUTSIDE AIR TO AHU-1C LOCATED ON ROOF AS INDICATED ON SHEET M206.

KEY PLAN:



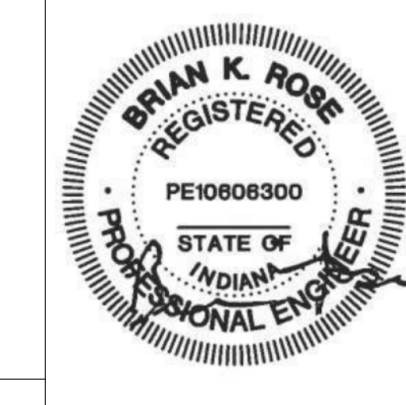
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FIRST FLOOR AREA C & D MECHANICAL PLAN

Comm. No.	Date
20104.02	9.10.2021
Drawn	Drawing No.
JLK	M202
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1 1ST FLOOR AREA C
SCALE: 1/8" = 1'-0"

2 SOUTH ENTRY VESTIBULE
SCALE: 1/8" = 1'-0"

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MECHANICAL CONTROL LEGEND			
AFF	ABOVE FINISHED FLOOR		AVERAGING TEMPERATURE SENSOR
AI	ANALOG INPUT		INSERTION TEMPERATURE SENSOR
AO	ANALOG OUTPUT		HUMIDITY SENSOR
BAS	BUILDING AUTOMATION SYSTEM		LOW LIMIT TEMPERATURE SENSOR
BP	BOOSTER PUMP		PRESSURE SENSOR
CCF	100 CUBIC FEET NATURAL GAS		DUCT STATIC PRESSURE SENSOR
CMD	COMMAND		DIFFERENTIAL PRESSURE SWITCH
CO2	CARBON DIOXIDE		DAMPER END SWITCH
CR	CONDENSER RETURN		DIFFERENTIAL PRESSURE SENSOR
CS	CONDENSER SUPPLY		START/STOP COMMAND
CSR	CURRENT SENSOR RELAY		MOTORIZED DAMPER
CWR	CHILLED WATER RETURN		FLOW METER
CWS	CHILLED WATER SUPPLY		CURRENT SENSOR
DAT	DISCHARGE AIR TEMPERATURE		DUCT MOUNTED SMOKE DETECTOR
DI	DIGITAL INPUT		CONDENSATE OVERFLOW SWITCH
DO	DIGITAL OUTPUT		DUCT STATIC PRESSURE HIGH LIMIT
DP	DEWPOINT		DUCT STATIC PRESSURE LOW LIMIT
DPR	DAMPER		ZONE DEW POINT
EA	EXHAUST AIR PATH		ZONE OCCUPANCY SENSOR
FBD	FACE AND BYPASS DAMPER		ZONE TEMPERATURE - 48° AFF
HL	HIGH LIMIT		HEATING COIL
HP	HEAT PUMP		CHILLED WATER COIL
HR	HEAT PUMP RETURN		ENERGY RECOVERY COIL
HS	HEAT PUMP SUPPLY		ENERGY RECOVERY COIL
HWR	HOT WATER RETURN		ENERGY RECOVERY COIL
HWS	HOT WATER SUPPLY		HUMIDIFIER
LL	LOW LIMIT		DISCHARGE AIR SENSOR
LPC	LOW PRESSURE CONDENSATE		VARIABLE FREQUENCY DRIVE
LPS	LOW PRESSURE STEAM		AIR FLOW MONITORING STATION
MAT	MIXED AIR TEMPERATURE		
MAU	MAKE UP AIR UNIT		
MIN	MINIMUM		
NSW	NON-SOFTENED WATER		
NC	NORMALLY CLOSED		
OCC	OCCUPANCY		
PRESS	PRESSURE		
RA	RETURN AIR PATH		
RF	RETURN FAN		
RH	RELATIVE HUMIDITY		
SA	SUPPLY AIR PATH		
SETP	SETP		
SF	SUPPLY FAN		
SFA	SUPPLY FAN ARRAY		
STS	STATUS		
SW	SOFT WATER		
TCC	TEMPERATURE CONTROL CONTRACTOR		
TEMP	TEMPERATURE		
UIC	UNOCCUPIED COOLING SETPOINT		
UIH	UNOCCUPIED HEATING SETPOINT		
VFD	VARIABLE FREQUENCY DRIVE		

GENERAL:

- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE TEMPERATURE CONTROL CONTRACTOR (TCC) SCHEDULES AND SCOPE OF WORK. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE SCOPE COORDINATION PRIOR WITH THE TCC PRIOR BID.
- CUTTING, PATCHING, OR PAINTING OF ANY NATURE SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. ALL BAS PANELS SHALL BE PROVIDED WITH LOCAL SURGE PROTECTION. REFER TO SPECIFICATION SECTION 264313 FOR ADDITIONAL INFORMATION.

TIME SCHEDULES (ADJ.):

- ALL EQUIPMENT OCCUPIED / UNOCCUPIED SCHEDULING SHALL BE ACCOMPLISHED VIA GRAPHICAL USER INTERFACE. THE TCC SHALL PROVIDE PROGRAMMING AND IMPLEMENT SCHEDULES.
- EQUIPMENT SCHEDULES SHALL BE COORDINATED WITH THE OWNER. THE SYSTEM SHALL ALLOW THE OPERATOR TO DESIGNATE ANY COMBINATION OF EQUIPMENT TO FORM A GROUP THAT
- CAN BE SCHEDULED WITH A SINGLE OPERATOR COMMAND THROUGH THE USER INTERFACE. ANY DESIGNATED GROUP SHALL HAVE THE CAPABILITY TO BE A MEMBER OF ANOTHER GROUP.
- THE OPERATOR SHALL BE ABLE TO MAKE ALL SCHEDULE ADDITIONS, MODIFICATIONS, AND DELETIONS USING THE MOUSE AND APPROPRIATE DIALOG BOXES. IN ADDITION, THE OPERATOR
- SHALL HAVE THE CAPABILITY TO EDIT ALL SCHEDULES AND THEN DOWNLOAD ANY OR ALL SCHEDULE CHANGES TO THE CONTROL MODULES WITH A SINGLE OPERATOR COMMAND THROUGH
- THE MOUSE INTERFACE. THE OPERATOR SHALL BE ABLE TO VIEW A FORECAST OF SCHEDULES FOR INSTANT OVERVIEW OF THE FACILITY SCHEDULES. SCHEDULE FORECAST SHALL INCLUDE INDICATION OF ALL TYPES OF SCHEDULES, I.E. NORMAL, HOLIDAY AND OVERRIDE.

DESIGN PARAMETERS:

- SUMMER DESIGN CONDITIONS: 93°F / 75°F (DB/WB)
- WINTER DESIGN CONDITIONS: 5°F (DB)

SETPPOINTS (ADJ.):

- OCCUPIED HEATING 68°F +/-2°F, UNOCCUPIED HEATING 60°F
- OCCUPIED COOLING 72°F +/-2°F, UNOCCUPIED COOLING 80°F
- RELATIVE HUMIDITY SHALL NOT EXCEED 60%

MECHANICAL AREAS AND ELECTRICAL AREAS:

- HEATING 60°F, COOLING 80°F

SHEET NOTES:

GENERAL NOTES:

KEY PLAN:

No.	Addendum / Revisions / Submissions	Date
1	Addendum 1	09.10.2021

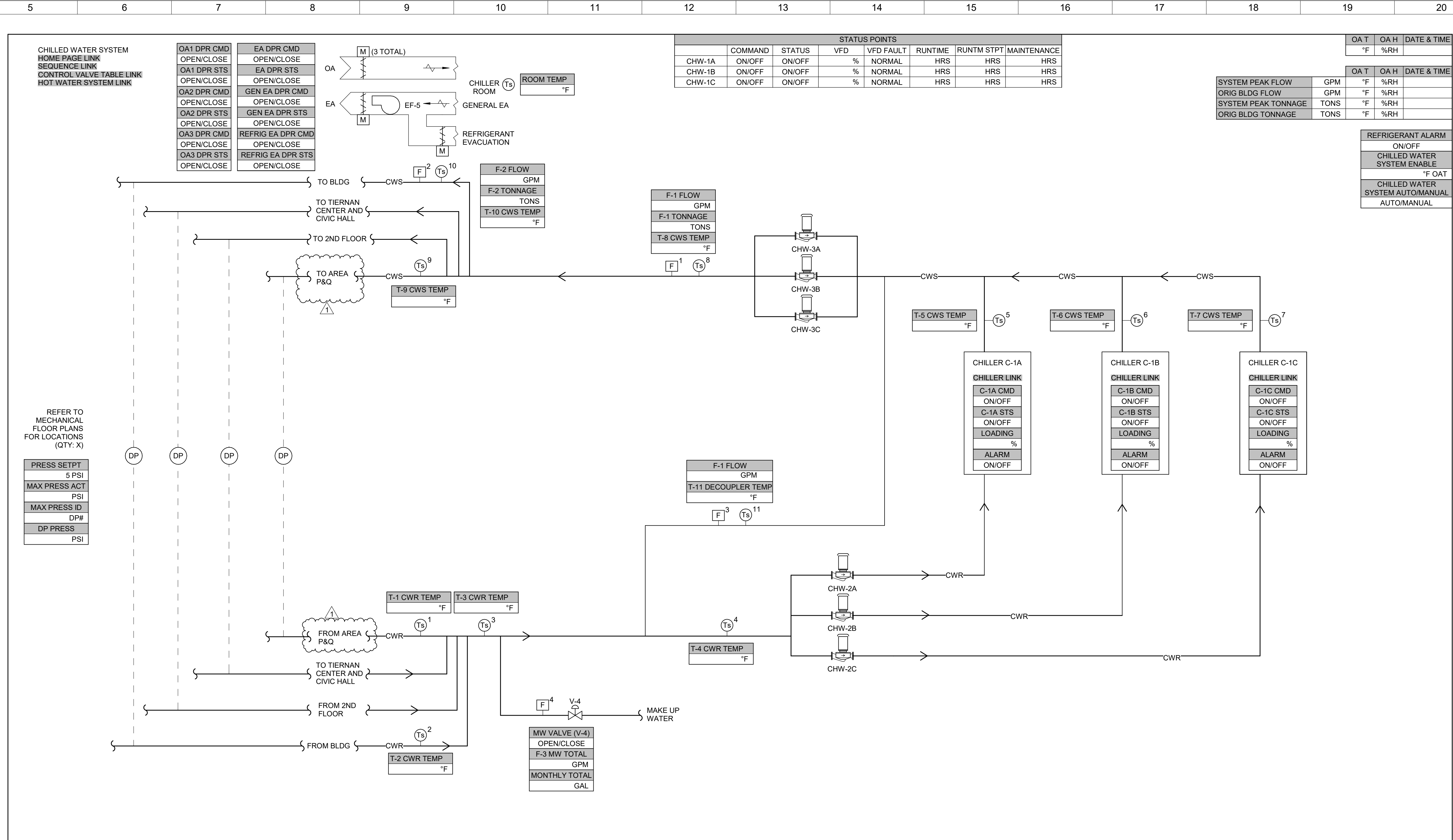
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MECHANICAL MODERNIZATION PROJECT

MECHANICAL CONTROLS LEGEND

	Comm. No.	Date
	20104.02	9.10.2021
	Drawn	JLK
Checked	NPR	M601
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CHILLED WATER SYSTEM POINTS

SORT-CHWS	POINT DESCRIPTION	DI	DO	AI	AO	CALCULATED	TREND
1	CWR TEMP (T-1)			X			X
2	CWR TEMP (T-2)			X			X
3	CWR TEMP (T-3)			X			X
4	MW FLOW (F-4)			X			X
5	MW VALVE (V-4)		X				X
6	PUMP CHW-2A START, STOP, STATUS AND RUNTIME HOURS	X	X			X	X
7	PUMP CHW-2B VFD SPEED			X			X
8	PUMP CHW-2B START, STOP, STATUS AND RUNTIME HOURS	X	X			X	X
9	PUMP CHW-2B VFD SPEED			X			X
10	PUMP CHW-2C START, STOP, STATUS AND RUNTIME HOURS	X	X			X	X
11	PUMP CHW-2C VFD SPEED			X			X
15	CWS TEMP (T-4)			X			X
16	CWS TEMP (T-5)			X			X
17	CWS TEMP (T-6)			X			X
18	CWS OVERALL FLOW (F-1)			X			X
19	CWS TEMP (T-7)			X			X
20	PUMP CHW-3A START, STOP, STATUS AND RUNTIME HOURS	X	X			X	X
21	PUMP CHW-3A VFD SPEED			X			X
22	PUMP CHW-3B START, STOP, STATUS AND RUNTIME HOURS	X	X			X	X
23	PUMP CHW-3B VFD SPEED			X			X
24	PUMP CHW-3C START, STOP, STATUS AND RUNTIME HOURS	X	X			X	X
25	PUMP CHW-3C VFD SPEED			X			X
27	CWS TEMP (T-8)			X			X
28	CWS TEMP (T-9)			X			X
29	EA DAMPER STS (3 TOTAL)			X			X
30	CWS TEMP (T-10)			X			X
31	OA DAMPER STS (3 TOTAL)			X			X
32	DECOUPLER TEMP (T-11)			X			X
33	DECOUPLER FLOW TO BUILDING (F-3)			X			X

CHILLED WATER SYSTEM CONTROL SEQUENCE:

- THE CHILLED WATER SYSTEM CONSISTS OF THREE 400 TON CHILLERS (C-1, C-2 AND C-3). A PRIMARY, SECONDARY VARIABLE-FLOW CHILLED WATER PUMPING SYSTEM WILL BE UTILIZED WITH A SYSTEM BYPASS VALVE. THREE COOLING TOWERS AND FANS SHALL PROVIDE HEAT REJECTION FOR THE CONDENSER WATER. ALL CHILLERS AND COOLING TOWERS ARE REQUIRED TO SATISFY THE BUILDING LOAD.
- ALL CHILLER SYSTEMS SHALL BE AUTOMATICALLY STARTED/STOPPED BY THE DDC CONTROL SYSTEM OR MANUALLY STARTED/STOPPED BY THE SYSTEM OPERATOR. THE SYSTEM OPERATOR SHALL PLACE THE CHILLED WATER SYSTEM IN THE "AUTOMATIC" MODE OR "MANUAL" MODE THROUGH THE FRONT-END. CHILLER WILL ENABLE AT A 60°F (ADJ.) OUTSIDE AIR TEMPERATURE. A DEWPOINT OF 57°F (ADJ.) A CALL FOR COOLING FROM THE SYSTEM.
- ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE DDC SYSTEM. REFER TO THE FOLLOWING PARAGRAPHS FOR ADDITIONAL INFORMATION/DETAIL. ALL CHILLERS SHALL ROTATE LEAD/LAG OPERATION ON A MONTHLY (ADJ.) BASIS.
- THE CHILLED WATER SYSTEM SHALL BE PLACED INTO OPERATION FROM THE DDC SYSTEM. WHEN THE SYSTEM IS ACTIVATED, THE DEDICATED CHILLER PUMP P-2A, P-2B OR P-2B SHALL BE STARTED AT DESIGN FLOW. THE LEAD CHILLER SHALL BE STARTED WITH THE ASSOCIATED LEAD CONDENSER WATER PUMP AND LEAD COOLING TOWER CELL/CONTROL VALVES. THE CHILLER WATER SYSTEM SHALL MAINTAIN 47°F CHILLED WATER SUPPLY TEMPERATURE AT A 12 DEGREE DELTA TEMPERATURE.
- THE CHILLERS SHALL BE STAGED ON AND OFF BY THE DDC SYSTEM AS DICTATED BY THE COOLING LOAD. THE LEAD CHILLER SHALL BE STARTED FIRST. THE CHILLED WATER SUPPLY TO THE BUILDING SHALL BE SET AT 47°F (ADJ.). WHEN THE CHILLED WATER TEMPERATURE CANNOT MAINTAIN CHILLED WATER SETPOINT FOR 30 MINS (ADJ.); THEN THE LAG CHILLER AND ASSOCIATED PUMP, LAG CONDENSER WATER PUMP AND THE LAG COOLING TOWER CELL/CONTROL VALVES SHALL BE STARTED AS DESCRIBED PREVIOUSLY. IF THE CHILLED WATER TEMPERATURE CANNOT MAINTAIN CHILLED WATER SETPOINT FOR 30 MINS (ADJ.); THEN THE 3RD CHILLER SHALL BE ENABLED.
- PRIOR TO STARTING THE LAG CHILLER, THE LEAD CHILLER SHALL UNLOAD TO 50% (ADJ.) AND OPERATE AT THIS CONDITION FOR 3 MINUTES (ADJ.). AFTER THIS TIME THE LAG CHILLER SHALL START. IF THE 3RD CHILLER IS REQUIRED THAN IT SHALL STAGE AFTER THE LEAD/LAG CHILLERS ARE 50% FOR 3 MINUTES.
- CHILLER PLANT SHALL STAGE OFF BASED ON TOTAL FLOW ACROSS THE DECOUPLER. IF THE SYSTEM FLOW IN THE DECOUPLER IS EQUAL TO 90% OF 1 CHILLER FOR A MINIMUM OF 30 MINUTES (ADJ.), STAGE DOWN A CHILLER.
- WHEN SEQUENCING THE CHILLERS, THE DDC SYSTEM SHALL HAVE CAPABILITY OF STAGING THE ORDER OF CHILLERS SO THAT CHILLER USAGE MAY BE EVENLY DISTRIBUTED. THE RUNTIME OF EACH CHILLER SHALL BE MONITORED BY THE DDC SYSTEM. ALL CHILLERS SHALL ROTATE LEAD/LAG OPERATION ON A MONTHLY (ADJ.) BASIS.
- WHEN STARTING CHILLERS, ALLOW THIRTY MINUTES (ADJ.) AFTER STARTING A CHILLER BEFORE ANOTHER STARTS.
- A CHILLER SHALL NOT BE ALLOWED TO START UNLESS CHILLED WATER FLOW AND CONDENSER WATER FLOW IS PROVEN. A CURRENT SENSOR SHALL PROVIDE PUMP STATUS. IF FLOW IS NOT PROVEN, PUMPS SHALL BE DEACTIVATED AND THE CHILLER SHALL NOT BE ALLOWED TO START. IN THE EVENT CHILLED WATER OR CONDENSER WATER FLOW FAILS AFTER THE CHILLER IS OPERATING, THE CHILLER, CHILLED WATER PUMP AND CONDENSER WATER PUMP SHALL ALL BE DEACTIVATED. AN AUDIOVISUAL ALARM SHALL BE ACTIVATED AT THE DDC CONTROL SYSTEM. ONCE THE CAUSE OF THE ALARM HAS BEEN INVESTIGATED AND FIXED, THE CHILLER/PUMPS SHALL BE PLACED INTO NORMAL OPERATING CONDITIONS BY RESETTING THE SYSTEM. A THIRTY SECOND TIME DELAY SHALL PREVENT FALSE ALARMS. THE AUDIO ALARM SHALL HAVE A SILENCING BUTTON. THE LAG CHILLER, CHILLED WATER PUMP AND CONDENSER WATER PUMP SHALL ALL BE AUTOMATICALLY ACTIVATED.

CHILLED WATER LOOP CONTROL:

- THE BUILDING CHILLED WATER LOOP SYSTEM CONSISTS OF CHILLED WATER DISTRIBUTION PUMPS (P-3A, P-3B AND P-3C) AND ASSOCIATED PUMP VFD'S. THE PUMPS ARE 50-50/50 AND OPERATE LEAD/LAG STANDBY.
- DISTRIBUTION PUMPS SHALL BE PROVIDED WITH A VFD BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE TCC. EACH VFD WILL REQUIRE A BACNET MS/TP CONNECTION; HARDWARE ENABLE/ DISABLE AND SHARED ANALOG INPUT (AI) FOR SPEED CONTROL. COORDINATE WITH OWNER AND ENGINEER THE POINTS TO MAP WITHIN THE BAS GRAPHICS.
- CHILLED WATER LOOP WATER DISTRIBUTION: A DIFFERENTIAL PRESSURE SENSOR LOCATED AS INDICATED ON PLANS TO MEASURE WATER DIFFERENTIAL PRESSURE. THE CHILLER CONTROLLER SHALL CONTINUOUSLY SURVEY THE DIFFERENTIAL PRESSURE SENSOR. THE DIFFERENTIAL PRESSURE SHALL INITIALLY BE SET AT 8 PSI (ADJ.). COORDINATE SETPOINT REQUIRED WITH TAB CONTRACTOR. IF THE PUMP CONTROLLER SENSES THE DIFFERENTIAL PRESSURE IS BELOW THE PRESSURE SETPOINT, THE SPEED OF THE LEAD PUMP SHALL INCREASE. IF ONE PUMP RISES ABOVE 90% FLOW OF 1 CHILLER (ADJ.), THEN THE LAG CHILLER AND LAG DISTRIBUTION PUMP IS ENABLED. THE LAG CHILLER PUMP SHALL RAMP UP AND THE LEAD PUMP SHALL RAMP DOWN TO THE SAME SPEED TO MEET THE PRESSURE SETPOINT. THE PUMPS MUST OPERATE AT THE SAME SPEED AND THEIR SPEED SHALL BE INCREASED/ DECREASED IN TANDEM TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT. IF BOTH PUMPS ARE OPERATING AT 35% FLOW OF 1 CHILLER (ADJ.) OR LESS AND DIFFERENTIAL PRESSURE SETPOINT IS SATISFIED, THEN THE LAG CHILLER AND PUMP SHALL SHUT-OFF AND THE LEAD CHILLER AND PUMP SHALL INCREASE SPEED TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT.
- THIS CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING NECESSARY FOR PROPER SYSTEM OPERATION. THE DIFFERENTIAL PRESSURE SENSOR SHALL BE WIRED TO THE CHILLER CONTROL PANEL.
- ALARMS: IF THE CURRENT SENSOR INDICATES THERE IS NO WATER FLOW AT THE PUMPS, THEN AN ALARM SIGNAL SHALL BE GENERATED AND THE LAG PUMP SHALL BE ENGAGED. A THIRTY SECOND TIME DELAY RELAY SHALL BE PROVIDED FOR THE PUMPS TO PREVENT FALSE ALARMS. AFTER THE CAUSE OF THE ALARM HAS BEEN ELIMINATED, THE SYSTEM SHALL BE CAPABLE OF RESETTING AND RE-ESTABLISHING THE LEAD PUMP.

REFRIGERANT MONITORING SYSTEM AND CHILLER ROOM VENTILATION

- PROVIDE AND INSTALL THE SPECIFIED CHILLER ROOM REFRIGERANT EVACUATION SYSTEM FOR THE CHILLER ROOM. UPON ACTIVATION, THE CHILLER ROOM'S EA ISOLATION AND REFRIGERANT DAMPER SHALL OPEN. GENERAL EA DAMPER SHALL CLOSE. ROOM EXHAUST FAN EF-5 SHALL START. OA INTAKE DAMPERS SHALL OPEN. STROBE HORN ACTIVATED AND AN ALARM ACTIVATED AT THE BAS. UPON CORRECTION OF THE PROBLEM, THE SYSTEM SHALL BE RESET AND RETURN TO NORMAL OPERATION. THE AUDIO ALARM SHALL HAVE A SILENCING BUTTON.
- PROVIDE MANUAL SWITCH AND TEMPERATURE SENSOR SO THAT EXHAUST FAN, EA ISOLATION DAMPER AND OA DAMPER CAN BE STARTED MANUALLY FROM THE CHILLER ROOM. WHEN SPACE TEMPERATURE IS 80°F OR HIGHER THE EXHAUST FAN SHALL PROVIDE VENTILATION TO THE CHILLER ROOM.
- UPON ACTIVATION, EA ISOLATION AND GEN EA DAMPER SHALL OPEN, REFRIG EA DAMPER SHALL CLOSE, ROOM EXHAUST FAN EF-5 SHALL START, OA INTAKE DAMPERS SHALL OPEN.
- THE EXHAUST FAN, EXHAUST ISOLATION, GENERAL EA DAMPER AND OA INTAKE DAMPERS SHALL BE HARDWIRED INTERLOCKED.
- PROVIDE AND INSTALL 3 GAS SENSORS, ONE AT EACH CHILLER.

STATUS POINTS

COMMAND	STATUS	VFD	VFD FAULT	RUNTIME	RUNTIME STPT	MAINTENANCE
CHW-1A	ON/OFF	ON/OFF	%	NORMAL	HRS	HRS
CHW-1B	ON/OFF	ON/OFF	%	NORMAL	HRS	HRS
CHW-1C	ON/OFF	ON/OFF	%	NORMAL	HRS	HRS

REFRIGERANT ALARM

REFRIGERANT ALARM	ON/OFF
CHILLED WATER SYSTEM ENABLE	ON/OFF
CHILLED WATER SYSTEM AUTO/MANUAL	ON/OFF

CHILLER RUNTIME

CHILLER	CHILLER RUNTIME
C-1A	HRS
C-1B	HRS
C-1C	HRS

GENERAL NOTES:

KEY PLAN:

MECHANICAL CONTROLS

Comm. No.	Date
20104.02	9.10.2021

Drawn: JLK
Checked: NPR

M602

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SHEET NOTES:

GENERAL NOTES:

KEY PLAN:

MECHANICAL CONTROLS

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MECHANICAL MODERNIZATION PROJECT

MECHANICAL CONTROLS

Comm. No. 20104.02 Date 9.10.2021
Drawn JLK Drawing No. M602
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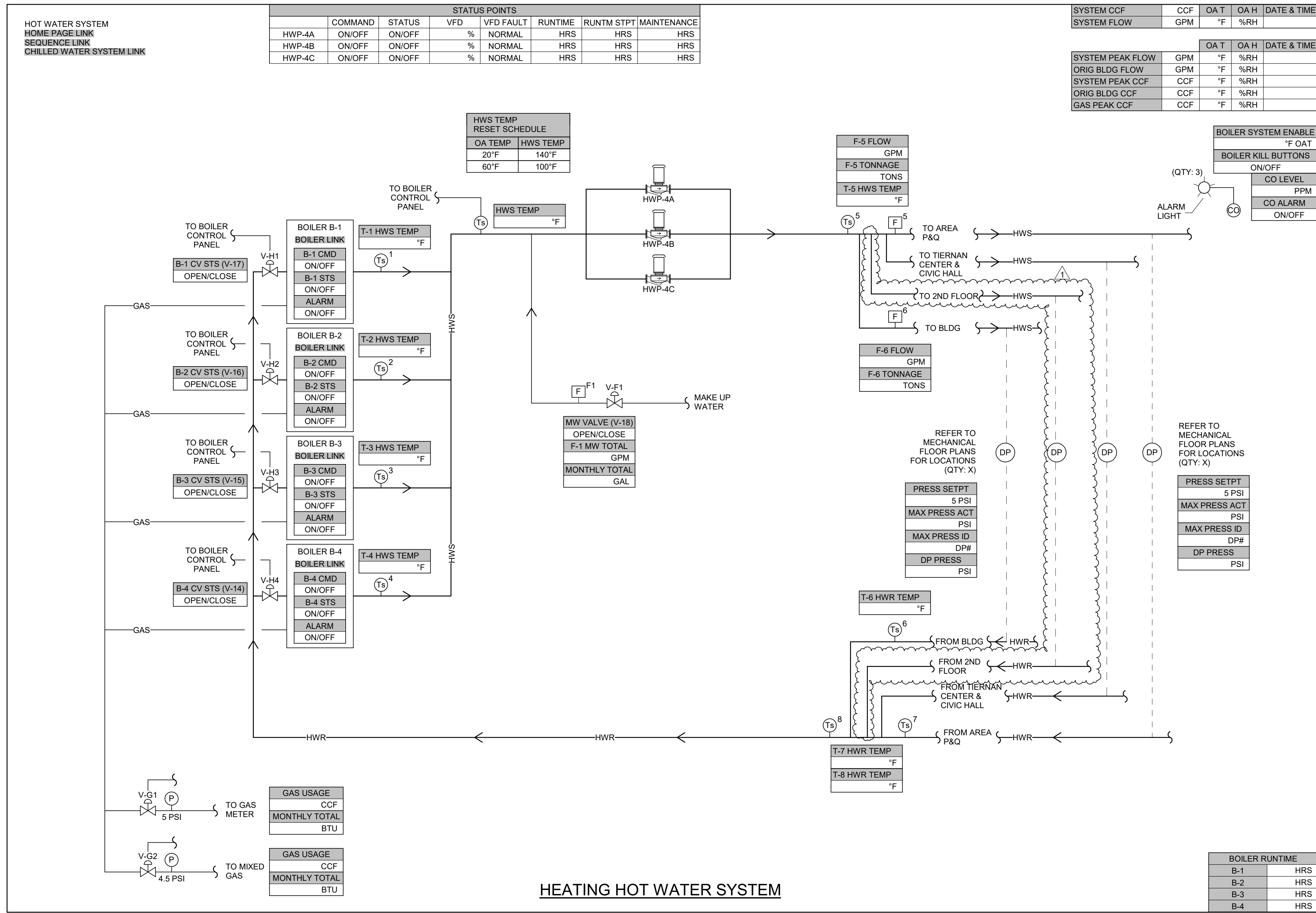
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HEATING HOT WATER SYSTEM POINTS LIST						
POINT DESCRIPTION	DI	DO	AI	AO	CALCULATED	TREND
T-6 HWR TEMP			X			X
T-7 HWR TEMP			X			X
T-8 HWR TEMP			X			X
B-4 CV STS (V-14)		X				X
B-3 CV STS (V-15)		X				X
B-2 CV STS (V-16)		X				X
B-1 CV STS (V-17)		X				X
T-4 HWS TEMP			X			X
T-3 HWS TEMP			X			X
T-2 HWS TEMP			X			X
T-1 HWS TEMP			X			X
HWS TEMP			X			X
F-1 MW FLOW			X			X
MW VALVE (V-18)		X				X
PUMP P-4A START, STOP, STATUS, AND RUNTIME HOURS	X	X		X		X
PUMP P-4A VFD SPEED			X			X
PUMP P-4B START, STOP, STATUS, AND RUNTIME HOURS	X	X		X		X
PUMP P-4B VFD SPEED			X			X
PUMP P-4C START, STOP, STATUS, AND RUNTIME HOURS	X	X		X		X
PUMP P-4C VFD SPEED			X			X
T-5 HWS TEMP			X			X
F-2 HWS FLOW TO AREA P&Q			X			X
F-3 HWS FLOW TO BLDG			X			X

- HOT WATER SYSTEM:**
- THE HOT WATER SYSTEM SHALL CONSIST OF FOLLOWING:
 - FOUR (4) HIGH EFFICIENCY, CONDENSING, HOT WATER BOILERS (B-1, B-2, B-3 AND B-4) WITH PRIMARY PUMPS (P-4A, P-4B AND P-4C).
 - THREE (3) PRIMARY DISTRIBUTION PUMPS (P-4A, P-4B AND P-4C).
 - GENERAL:
 - THE HOT WATER SYSTEM SHALL OPERATE UNDER THE CONTROL OF A LOCAL, STAND-ALONE, MICROPROCESSOR BASED DDC CONTROLLER. A DEDICATED DDC CONTROLLER SHALL BE PROVIDED.
 - BOILER STATUS AND OPERATING CONDITIONS SHALL BE MONITORED THROUGH THE DEVICE'S BACNET MS/TP COMMUNICATIONS INTERFACE PORT. PROVIDE A LINK TO THE BOILER BACNET POINTS FROM THE HOT WATER SYSTEM GRAPHIC. COMMUNICATION WIRING BETWEEN THE BOILERS SHALL BE PROVIDED AND COORDINATED WITH THE BOILER MANUFACTURER.
 - EACH BOILER SHALL BE PROVIDED WITH AN ISOLATION VALVE (V-H1, V-H2, V-H3, AND V-H4) AND IT SHALL BE CONTROLLED BY EACH RESPECTIVE BOILER. THE VALVE SHALL BE WIRED TO THE RESPECTIVE BOILER CONTROLLER BY BOILER MANUFACTURER.
 - THE BAS SHALL PROVIDE A HARDWARE ENABLE/DISABLE TO THE LEAD BOILER CONTROLLER BY BOILER MANUFACTURER.
 - THE HEADER TEMPERATURE SENSOR SHALL BE WIRED TO THE LEAD BOILER CONTROLLER BY TCC.
 - THE BAS SHALL PROVIDE THE HOT WATER SETPOINT THROUGH THE BACNET MS/TP GATEWAY PROVIDED WITH THE BOILER. THE BOILER CONTROL PANEL SHALL SEQUENCE AND STAGE THE BOILERS.
 - THE HOT WATER SYSTEM SHALL OPERATE CONTINUOUSLY WHEN OUTDOOR AIR TEMPERATURE IS 68°F OR LESS. WHEN THE OUTDOOR AIR TEMPERATURE IS GREATER THAN 68°F (ADJ.), THE HOT WATER SYSTEM SHALL BE ENABLED WHENEVER TWO HEATING HOT WATER VALVES ARE ABOVE 50%.
 - SEQUENCE RUNTIMES OF EQUIPMENT:
 - WHEN SEQUENCING THE BOILERS, THE DDC SYSTEM SHALL HAVE CAPABILITY OF STAGING THE ORDER OF BOILERS SO THAT BOILER USAGE MAY BE EVENLY DISTRIBUTED. THE RUNTIME OF EACH BOILER SHALL BE MONITORED BY THE DDC SYSTEM. ALL BOILERS SHALL ROTATE LEAD/LAG/STANDBY OPERATION ON A MONTHLY (ADJ.) BASIS.
 - WHEN SEQUENCING THE PUMPS, THE DDC SYSTEM SHALL HAVE CAPABILITY OF STAGING THE ORDER OF PUMPS SO THAT PUMPS USAGE MAY BE EVENLY DISTRIBUTED. THE RUNTIME OF EACH PUMP SHALL BE MONITORED BY THE DDC SYSTEM. ALL PUMPS SHALL ROTATE LEAD/LAG/STANDBY OPERATION ON A MONTHLY (ADJ.) BASIS.
 - HOT WATER RESET SCHEDULE: THE BOILERS SHALL BE SET TO MAINTAIN A CONSTANT HOT WATER SUPPLY TEMPERATURE BASED ON THE OUTDOOR AIR TEMPERATURE IS BELOW 40°F. SUPPLY WATER SHALL BE 180°F. WHEN OUTDOOR AIR TEMPERATURE IS ABOVE 65°F, SUPPLY WATER SHALL BE 100°F. THE WATER TEMPERATURE SHALL BE VARIED BETWEEN THESE OUTDOOR AIR CONDITIONS LINEARLY.
 - THE HOT WATER DISTRIBUTION TO THE BUILDING IS ACCOMPLISHED BY PUMPS (P-4A, P-4B AND P-4C).
 - HOT WATER LOOP WATER DISTRIBUTION: THE DIFFERENTIAL PRESSURE SENSORS LOCATED AS INDICATED ON PLANS SHALL MEASURE WATER DIFFERENTIAL PRESSURE. THE HW SYSTEM PUMP CONTROLLER SHALL CONTINUOUSLY SURVEY THE DIFFERENTIAL PRESSURE SENSOR. THE DIFFERENTIAL PRESSURE SHALL INITIALLY BE SET AT 8 PSI (ADJ.), COORDINATE SETPOINT REQUIRED WITH TAB CONTRACTOR. IF THE PUMP CONTROLLER SENSES THE DIFFERENTIAL PRESSURE IS BELOW THE PRESSURE SETPOINT, THE SPEED OF THE LEAD PUMP SHALL INCREASE. IF ONE (1) PUMP RISES ABOVE 90%, THEN THE LAG DISTRIBUTION PUMP IS ENABLED. THE LAG HOT WATER PUMP SHALL RAMP UP AND THE LEAD PUMP SHALL RAMP DOWN TO THE SAME SPEED TO MEET THE PRESSURE SETPOINT. THE PUMPS MUST OPERATE AT THE SAME SPEED AND THEIR SPEED SHALL BE INCREASED/DECREASED IN TANDEM TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT. IF BOTH PUMPS ARE OPERATING AT 35% OR LESS AND DIFFERENTIAL PRESSURE SETPOINT IS SATISFIED, THEN THE LAG PUMP SHALL SHUT-OFF AND THE LEAD PUMP SHALL INCREASE SPEED TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT.
 - TWO DIFFERENTIAL PRESSURE SENSORS ARE LOCATED ON THE DRAWINGS TO CONTROL THE PUMP SPEED. THE DIFFERENTIAL PRESSURE SENSOR SHALL BE WIRED TO THE UNITARY CONTROLLER THAT IS PROVIDED FOR PUMP SEQUENCING; AND MAY NOT BE MAPPED THROUGH THE COMMUNICATIONS BUS BETWEEN CONTROLLERS.
 - SAFETIES:
 - THE ROOM SHALL HAVE TWO BOILER EMERGENCY SHUT OFF BUTTONS LOCATED BY THE MECHANICAL ROOM EXITS AND IN ACCORDANCE WITH PARAGRAPH HG-634, ARTICLE 6, SECTION 4 OF THE ASME HEATING BOILER CODE. PROVIDE WITH COVER AND LABEL "BOILER EMERGENCY SHUT DOWN". THE ACTIVATION OF THIS SWITCH SHALL SHUT DOWN THE GAS TRAINS TO THE BOILERS. THE PUSH BUTTONS SHALL BE "RED MUSHROOM" TYPE TO AVOID ANY CONFUSSION WITH LIGHT SWITCHES.
 - THE SPACE SHALL MONITOR CARBON MONOXIDE (CO) IN THE BOILER ROOM AND SHALL PROVIDE VENTILATION TO THE MECHANICAL ROOM IF THE SPACE IS MONITORED AT 25PPM.
 - HOT WATER BTU MONITORING:
 - TOTAL HOT SYSTEM WATER BTU METER SHALL BE UTILIZED TO MONITOR, MEASURE AND CALCULATE ACTUAL BUILDING COOLING LOAD AT THE DDC SYSTEM USING A BTU PACKAGE INCLUDING FLOW METER FX AND TEMPERATURE SENSORS TT IN THE MAIN SUPPLY/RETURN PIPES.
 - PROVIDE AND INSTALL FLOW METER PER SPECIFICATIONS, THE ENTIRE SYSTEM SHALL BE FACTORY CALIBRATED AND PROGRAMMED FOR PARTICULAR SYSTEM WHERE INSTALLED (HOT WATER) AND SHALL BE RE-PROGRAMMABLE AT THE CONTROL PANEL KEYPAD. FURNISH A CERTIFICATE OF CALIBRATION FOR EACH BTU METER. INTERFACE THE CONTROL PANEL INTO THE DDC CONTROL SYSTEM TO OBTAIN ENERGY TOTALS, FLOW RATES, TEMPERATURES (SUPPLY AND RETURN) FOR TRENDDING. INSTALL FLOW METER WITH SUFFICIENT PIPE DIAMETERS AS RECOMMENDED BY MANUFACTURER.
 - FIELD ASSEMBLED COMPONENTS SHALL NOT BE UTILIZED. THE DDC SYSTEM SHALL MONITOR SUPPLY TEMPERATURE, RETURN TEMPERATURE, FLOW AND BTU'S. THE DDC SHALL RECORD STORE PEAK FLOW AND PEAK TONNAGE. THE DDC SYSTEM SHALL STORE THE COINCIDENT DATE, TIME AND OUTSIDE AIR TEMPERATURE AT PEAL DISTRIBUTION AND BTU'S.
 - FLOW METER ALARM AND EMERGENCY SHUTDOWN FOR HOT WATER SYSTEM MAKE-UP WATER: ON THE MAKE-UP WATER LINE, A TWO-WAY, TWO-POSITION, NORMALLY OPEN VALVE SHALL CLOSE IF (AFTER A TIME DELAY OF 2 MINUTES) THE MAKE-UP WATER CONTINUES FLOWING AT A RATE OF 3 GALLON PER MINUTE WHILE THE SYSTEM SWITCH IS IN THE NORMAL OPERATING POSITION. AN ALARM SHALL BE SENT TO THE BAS. AN AUDIBLE ALARM MOUNTED ON THE CONTROL PANEL (MOUNTED VERY NEAR THE MAKE-UP NETWORK) SHALL SOUND AND AN INDICATOR LIGHT WILL PROVIDE VISUAL INDICATION OF A PROBLEM. A MOMENTARY PUSH BUTTON ON THE PANEL SHALL BE USED TO SILENCE/ACKNOWLEDGE THE ALARM AND RESET SYSTEM FOR NORMAL OPERATION AFTER ANY NECESSARY REPAIRS ARE MADE. A SWITCH MOUNTED ON THE PANEL SHALL BE USED TO SHUT DOWN THE ALARM WHILE NORMAL SYSTEM FILL OPERATIONS ARE PERFORMED. THIS SWITCH AND ALL PANEL MOUNTED DEVICES ARE TO BE APPROPRIATELY LABELED. PROVIDE AND COORDINATE INSTALLATION OF THE VALVE AND FLOW METER PER SPECIFICATIONS.

SHEET NOTES:

GENERAL NOTES:

KEY PLAN:

No.	Addendum / Revisions / Submissions	Date
1	Addendum 1	09.10.2021

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MECHANICAL MODERNIZATION PROJECT

MECHANICAL CONTROLS

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Checked		NPR	M604

