

# Rockford Public Schools #205

4145 Samuelson Rd, Rockford, IL 61109

IFB# 24-04 PROJECT NUMBER: 2403

## ESSER HVAC Improvements - Jefferson High School Chiller Replacement



623 26TH AVENUE  
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ESSER HVAC  
Improvements - Jefferson  
High School Chiller  
Replacement

4145 Samuelson Rd, Rockford, IL 61109

Rockford Public Schools  
#205

CONSULTANT



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VICINITY MAP	APPLICABLE CODES
	2015 International Energy Conservation Code (IECC) 2015 International Existing Building Code (IEBC) 2015 International Fire Code (IFC), excluding Chapter 4 2015 International Fuel Gas Code (IFGC) 2015 International Mechanical Code (IMC) 2014 Illinois Plumbing Code 2014 National Electrical Code
SCOPE OF WORK	PROJECT DIRECTORY
Heating, ventilation and air conditioning revisions to school as well as electrical revisions to support the HVAC work.	PROJECT MANAGER: BRANDON PIERSON IMEG CORP 623 26TH AVENUE QUAD CITIES, IL 61201 PHONE: 13097933200 CONTACT: BRANDON.W.PIERSON@IMEG.CORP.COM  MECHANICAL ENGINEER: CRIS WASHBURN IMEG CORP 623 26TH AVENUE QUAD CITIES, IL 61201 PHONE: 13097865039 CONTACT: CRIS.A.WASHBURN@IMEG.CORP.COM  ELECTRICAL ENGINEER: GAURAV SHARMA IMEG CORP 623 26TH AVENUE QUAD CITIES, IL 61201 PHONE: 13097933578 CONTACT: GAURAV.D.SHARMA@IMEG.CORP.COM

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REVISIONS

No.	Date	Revision / Issue

SHEET INFORMATION

Issue: **BID DOCUMENTS**

Date: **AUGUST 15, 2023**

Job Number: **21002885.15**

SHEET TITLE

**PROJECT COVERSHEET**

SCALE

Scale: \_\_\_\_\_

SHEET NUMBER

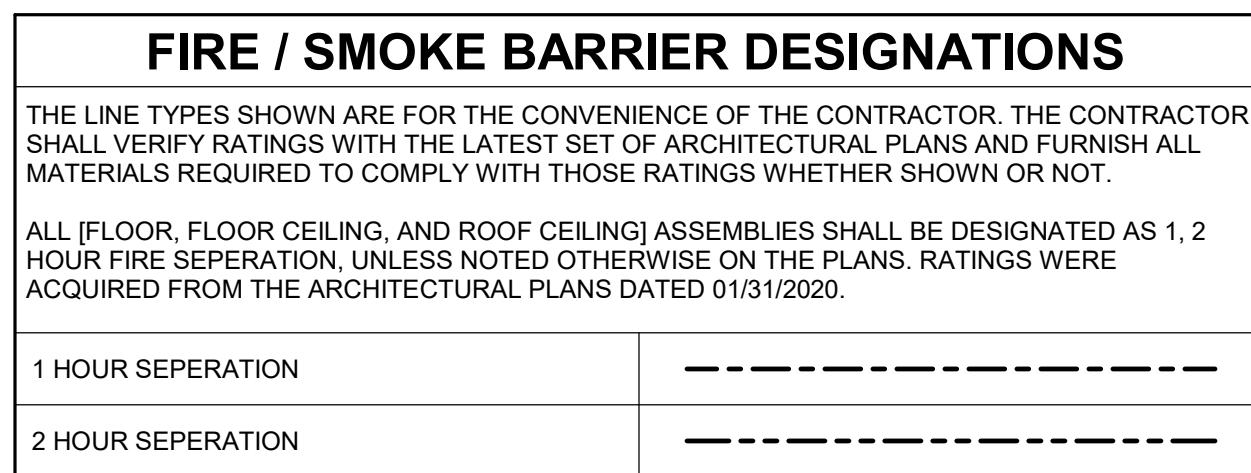
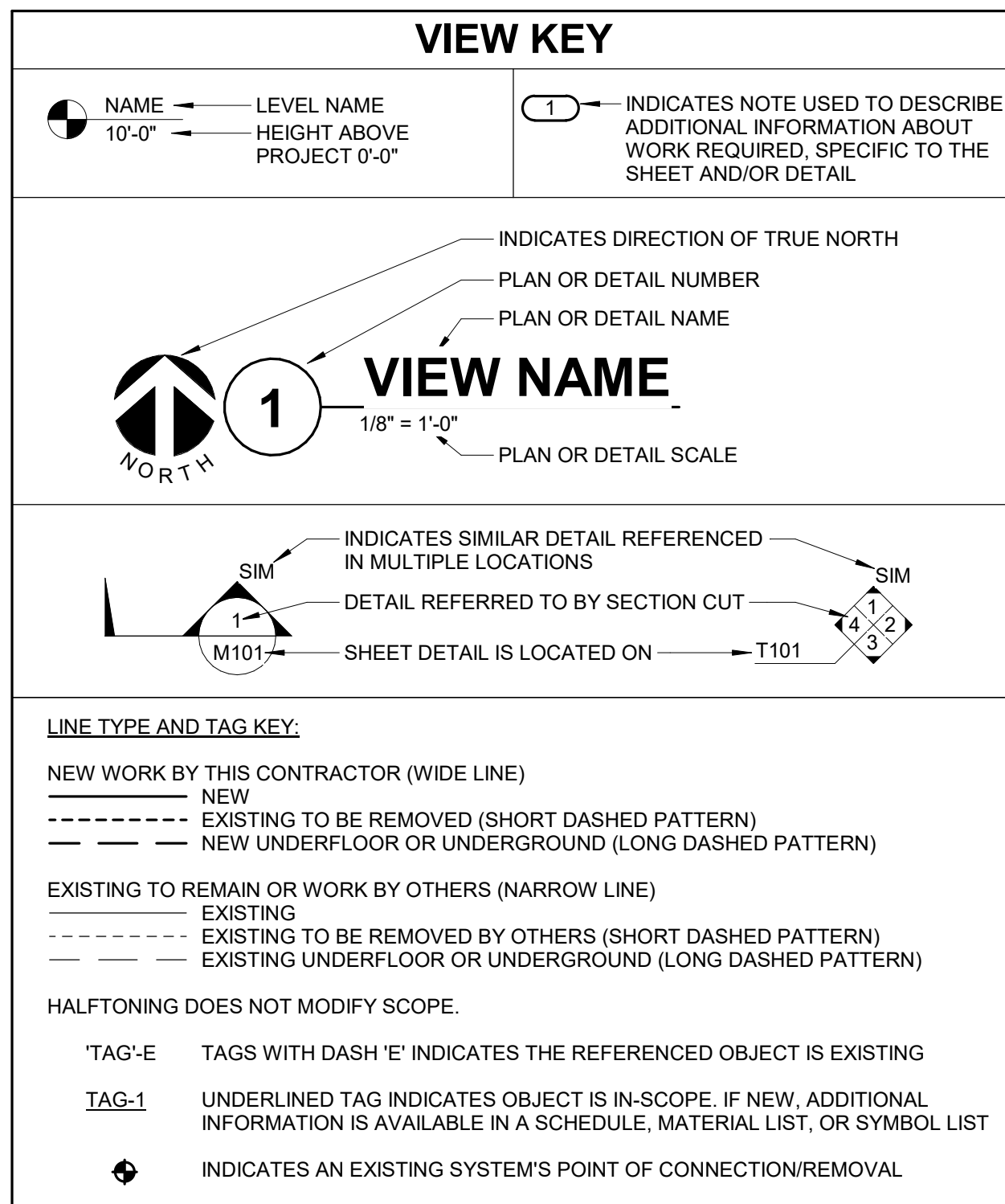
**C000**

M/P Engineer:  
**IMEG Corp.**  
623 26th Avenue  
Rock Island, IL 61201

EXP. DATE:

E Engineer:  
**IMEG Corp.**  
623 26th Avenue  
Rock Island, IL 61201

EXP. DATE:



### APPLICABLE CODES

CONTRACTOR SHALL COMPLY WITH APPLICABLE CODES AND LOCAL AMENDMENTS INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

BUILDING CODE:	IBC 2015 EDITION
FIRE CODE:	IFC 2015 EDITION, EXCLUDING CHAPTER 4
PLUMBING CODE:	IPC 2014 EDITION
MECHANICAL CODE:	IMC 2015 EDITION
ELECTRICAL CODE:	NFPA 70 (NEC) 2014 EDITION
ENERGY CONSERVATION CODE:	IECC 2015
LOCAL BUILDING CODE:	CURRENT EDITION

### CONTRACTOR ABBREVIATION KEY

ABBR:	DESCRIPTION:
C.C.	CIVIL CONTRACTOR
C.M.	CONSTRUCTION MANAGER
E.C.	ELECTRICAL CONTRACTOR
G.C.	GENERAL CONTRACTOR
H.C.	HEATING CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
T.C.C.	TEMPERATURE CONTROLS CONTRACTOR
V.C.	VENTILATION CONTRACTOR

### CONTACT PERSONS:

DESCRIPTION:	PERSON:
PROJECT MANAGER	BRANDON PIERSON
MECHANICAL	CRIS WASHBURN
ELECTRICAL	GAURAV SHARMA

### MECHANICAL SYMBOL LIST

NOT ALL SYMBOLS MAY APPLY.

SYMBOL:	DESCRIPTION:
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
DPP	DRAIN
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
PCAP	PIPE CAP
PD	PIPE DOWN
PU	PIPE UP OR UP/DOWN
PPD	PITCH PIPE IN DIRECTION
DF	DIRECTION OF FLOW IN PIPE
EC	ELECTRIC CONNECTION
UF	UNION/FLANGE
SVNO	SHUT OFF VALVE NORMALLY OPEN
SVNC	SHUT OFF VALVE NORMALLY CLOSED
TV	THROTTLING VALVE
BV	BALANCING VALVE (NUMBER INDICATES GPM)
MV	MIXING VALVE
CV	CONTROL VALVE (THREE-WAY)
CV2	CONTROL VALVE (TWO-WAY)
SV	SOLENOID VALVE
CV	CHECK VALVE
BPP	BACKFLOW PREVENTER
SRV	SAFETY/RELIEF VALVE
PRV	PRESSURE REDUCING VALVE (LIQUID/GAS)
P	PUMP
V	VACUUM BREAKER
W	"WYE" - STRAINER
WV	"WYE" - STRAINER W/SHUTOFF VALVE AND HOSE CONNECTION WITH CAP
B	BASKET STRAINER
F	FLEXIBLE CONNECTION
PT	PRESSURE/TEMPERATURE TEST PLUG
R	REDUCER - REFERENCE SPECIFICATION FOR CONCENTRIC/ECCENTRIC AND FOT/FOB
S	SUCTION DIFFUSER WITH SUPPORT FOOT
AV	AUTOMATIC AIR VENT
MAV	MANUAL AIR VENT
D	DRAIN VALVE WITH HOSE CONNECTION AND CAP
P	PRESSURE SENSOR (FURNISHED WITH BALL VALVE)
G	PRESSURE GAUGE (FURNISHED WITH BALL VALVE)
SP	STATIC SWITCH
FM	FLOW METER
F	FLOW SWITCH
FS	FLOW SENSOR
F	FLEXIBLE CONNECTION

### PIPE INSULATION SCHEDULE

GENERAL NOTES:  
 1. REFER TO THE SPECIFICATIONS FOR TYPE DESCRIPTIONS AND JACKETING REQUIREMENTS. VALUES LISTED BELOW ARE BASED ON <ASHRAE / IECC> <CALIFORNIA TITLE 24> REQUIREMENTS.  
 2. TYPE A INSULATION IS NOT ALLOWED IN NON-AIR CONDITIONED SPACES, SUCH AS MECHANICAL ROOMS, EXTERIOR, ATTICS, ETC.  
 3. TYPE B INSULATION GREATER THAN 1" THICK SHALL BE INSTALLED USING MULTIPLE LAYERS OF 3/4" OR 1" WITH STAGGERED SEAMS.  
 4. TYPE E IS NOT ALLOWED IN RETURN AIR PLENUMS, UNLESS LISTED AND LABELED AS 25/50 RATED PER ASTM E84UL723  
 5. TYPE G 4" SHALL BE INSTALLED IN TWO (2)" LAYERS WITH STAGGERED SEAMS.  
 6. PROVIDE RIGID INSERT AT HANGERS, EITHER PRE-MANUFACTURED COUPLINGS (REFER TO PIPE HANGER AND SUPPORTS SPECIFICATIONS) OR TYPE C, D, OR E INSULATION. SEE SPEC. FOR MORE DETAILS.  
 7. DIRECT BURIED PIPING SHALL ONLY USE TYPE C OR TYPE E. REDUCTION IN THICKNESS FOR DIRECT BURIED PIPING IS ALLOWED PER ASHRAE / IECC AS APPLICABLE.

PIPE SYSTEM	INSULATION TYPE	INSULATION THICKNESS PER NOMINAL PIPE OR TUBE SIZE					NOTES
		< 1"	1" TO < 1.5"	1.5" TO < 4"	4" TO < 8"	≥ 8"	
23 PIPING - COOLING							
CR - CONDENSER WATER RETURN	A (GlsFbr), B (Elasto), E (Plyiso)	0.5"	0.5"	1"	1"	1"	
CS - CONDENSER WATER SUPPLY	A (GlsFbr), B (Elasto), E (Plyiso)	0.5"	0.5"	1"	1"	1"	
CWR - CHILLED WATER RETURN	A (GlsFbr), B (Elasto), E (Plyiso)	0.5"	0.5"	1"	1"	1"	
CWS - CHILLED WATER SUPPLY	A (GlsFbr), B (Elasto), E (Plyiso)	0.5"	0.5"	1"	1"	1"	
DPP - DRAIN - PIPING	A (GlsFbr), B (Elasto), E (Plyiso)	0.5"	0.5"	1"	1"	1"	APPLY INSULATION ONLY TO LOW TEMP DRAINS (55 DEG AND LOWER IE: COOLING COIL CONDENSATE, ICE MACHINE DRAINS, ETC.)
Grand total:							

### MECHANICAL SYMBOL LIST

NOT ALL SYMBOLS MAY APPLY.

SYMBOL:	DESCRIPTION:
TS	TEMPERATURE SENSOR WITH WELL
TM	THERMOMETER WITH WELL (DIAL TYPE)
TF	THERMOMETER WITH WELL (FILLED TYPE)

### MECHANICAL ABBREVIATION KEY

ABBR:	DESCRIPTION:
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
DPG (0-2")	DIFFERENTIAL PRESSURE GAUGE (RANGE)
DPS	DIFFERENTIAL PRESSURE SWITCH
FD	FIRE DAMPER
FSD	FIRE/SMOKE DAMPER
MV	MIXING VALVE
N.C.	NORMALLY CLOSED
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
PS	PRESSURE SWITCH
SCCR	SHORT CIRCUIT CURRENT RATING
SD	SMOKE DAMPER
TYP	TYPICAL

### MECHANICAL RENOVATION NOTES:

THESE NOTES APPLY TO ALL MECHANICAL SHEETS AND TRADES, INCLUDING BUT NOT LIMITED TO VENTILATION, PIPING AND TEMPERATURE CONTROL.

- EXISTING CONDITIONS ARE SHOWN BASED ON INFORMATION OBTAINED FROM FIELD SURVEYS, EXISTING BUILDING DOCUMENTS, AND STAFF. VERIFY EXISTING CONDITIONS AND REPORT ANY CONFLICTS BEFORE PROCEEDING.
- NOT ALL EXISTING DUCTWORK AND PIPING IS SHOWN. VERIFY EXISTING CONDITIONS BEFORE STARTING WORK. NOTIFY ENGINEER OF ANY CONFLICTS WITH NEW WORK.
- FIELD VERIFY THE AVAILABLE CLEARANCES FOR DUCTWORK AND PIPING BEFORE FABRICATION. RISERS AND DROPS MAY BE NECESSARY BECAUSE OF EXISTING FIELD CONDITIONS.
- EACH CONTRACTOR OR SHALL FIELD VERIFY ACCESSIBILITY TO THE AREA OF THEIR WORK AND SHALL NOTIFY THE GENERAL CONTRACTOR PRIOR TO BIDDING IF OTHER UTILITIES ARE REQUIRED TO BE REMOVED OR RELOCATED TO ALLOW ACCESS TO THEIR AREA OF WORK.
- THE GENERAL CONTRACTOR IS RESPONSIBLE FOR CUTTING, REMOVAL, AND PATCHING OF ROOFS, WALLS, AND FLOORS ASSOCIATED WITH WORK BY ALL CONTRACTORS.
- CONTRACTORS SHALL NOTIFY THE GC OF AFFECTED AREAS PRIOR TO BIDDING WHERE EXISTING MECHANICAL SYSTEMS ARE LOCATED IN AREAS THAT CONFLICT WITH NEW EQUIPMENT, PIPING, OR DUCTWORK TO BE INSTALLED. EACH CONTRACTOR SHALL EITHER ARRANGE NEW EQUIPMENT, PIPING, OR DUCTWORK IN SUCH A FASHION THAT IT DOES NOT CONFLICT WITH EXISTING SYSTEMS, OR REWORK EXISTING MECHANICAL SYSTEMS TO ALLOW FOR INSTALLATION OF NEW EQUIPMENT, PIPING, OR DUCTWORK.
- PROVIDE TEMPORARY CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. MAINTAIN ACCESS TO EXISTING MECHANICAL INSTALLATIONS THAT REMAIN ACTIVE.
- OBTAIN PERMISSION FROM OWNER BEFORE SHUTTING DOWN ANY SYSTEM FOR ANY REASON. MAINTAIN SERVICE TO ALL COMPONENTS THAT ARE TO REMAIN UNTIL NEW SYSTEMS ARE INSTALLED.
- MAINTAIN EXISTING SYSTEM IN SERVICE UNTIL NEW SYSTEM IS COMPLETE AND READY FOR TIE IN AND SWITCHOVER. DRAIN SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. OBTAIN PERMISSION FROM OWNER BEFORE PARTIALLY OR COMPLETELY DRAINING SYSTEM. MAKE CHANGEOVER TO NEW SYSTEMS WITH MINIMUM OUTAGE.
- DISCONNECT AND REMOVE MECHANICAL DEVICES AND EQUIPMENT SERVING EQUIPMENT THAT HAS BEEN REMOVED.

### TAB PRE-DEMOLITION NOTES:

- BEFORE ANY DEMOLITION WORK IS BEGUN A COMPLETE BALANCE TEST PER 23 05 93 SHALL BE PERFORMED BY THE TESTING, ADJUSTING AND BALANCING (TAB) CONTRACTOR ON PUMPS AS SHOWN ON PLAN.
- TAB CONTRACTOR SHALL COMPLETE AND SUBMIT FOUR COPIES OF THE FINAL PRE-DEMOLITION REPORT WITHIN 10 WORKING DAYS AFTER THE FIELD MEASUREMENTS ARE COMPLETED. FINAL TAB REPORT SHALL BE SUBMITTED FOR REVIEW TO THE ARCHITECT/ENGINEER. TESTING SHALL INCLUDE ALL ITEMS REQUIRED IN THE SPECIFICATIONS.

### TAB POST-CONSTRUCTION NOTES:

- AFTER CONSTRUCTION ACTIVITIES ARE COMPLETE, TESTING, ADJUSTING (TAB) AND BALANCING CONTRACTOR SHALL REBALANCE PUMPS AS REQUIRED TO ACHIEVE PRE-CONSTRUCTION VALUES.
- TAB CONTRACTOR SHALL COMPLETE AND SUBMIT COPIES OF THE FINAL POST-CONSTRUCTION TAB REPORT AS REQUIRED BY SECTION 23 05 93.
- THE FINAL POST CONSTRUCTION REPORT SHALL INCLUDE ALL ITEMS REQUIRED IN THE SPECIFICATIONS.

### PIPING GENERAL NOTES:

1. PIPE DRAIN LINES FROM EQUIPMENT TO NEAREST FLOOR DRAIN.

### MECHANICAL GENERAL NOTES:

THESE NOTES APPLY TO ALL MECHANICAL SHEETS AND TRADES, INCLUDING BUT NOT LIMITED TO VENTILATION, PIPING AND TEMPERATURE CONTROL.

- SCOPE OF PROJECT IS REPLACEMENT OF EXISTING EQUIPMENT AND MINOR TEMPERATURE CONTROLS WORK AS REQUIRED FOR PROPER OPERATION. CONTRACTOR SHALL PERFORM PRE-BALANCE MEASUREMENTS ON ALL EQUIPMENT BEING REMOVED AND REPORT FINDINGS TO ENGINEER PRIOR TO REMOVAL OF ANY EQUIPMENT.
- DRAWINGS SHOWING LOCATIONS OF EQUIPMENT, DUCTWORK, PIPING, ETC. ARE DIAGRAMMATIC AND MAY NOT ALWAYS REFLECT EXACT INSTALLATION CONDITIONS. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF DUCTWORK, PIPING, EQUIPMENT, ETC., AND MAY NOT INCLUDE ALL OFFSETS AND FITTINGS REQUIRED FOR COMPLETE INSTALLATION. THE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONSTRUCTION AND THE WORK OF OTHERS WILL PERMIT.
- DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS AND CLEARANCES FROM ARCHITECTURAL, STRUCTURAL, SUBMITTALS, AND OTHER APPROPRIATE DRAWINGS OR PHYSICALLY AT SITE. REVIEW ALL DRAWINGS, INCLUDING THOSE OF OTHER TRADES.
- COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO INSTALLATION TO PROVIDE CLEARANCES REQUIRED FOR OPERATION, MAINTENANCE, CODE COMPLIANCE, AND TO VERIFY NON-INTERFERENCE WITH OTHER WORK. DO NOT FABRICATE PRIOR TO VERIFICATION OF NECESSARY CLEARANCES FOR ALL TRADES. BRING ANY INTERFERENCES OR CONFLICTS TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH FABRICATION OR EQUIPMENT ORDERS.
- REVIEW SPACE REQUIREMENTS OF EQUIPMENT SPECIFIED OR SUBSTITUTED AND MAKE REASONABLE ACCOMMODATIONS IN LAYOUT AND POSITIONING TO PROVIDE PROPER ACCESS.
- ANY CHANGES REQUIRED TO ELIMINATE CONFLICTS OR THAT RESULT FROM A FAILURE TO COORDINATE SHALL BE MADE BY THE CONTRACTOR WITHOUT ADDITIONAL COST OR EXPENSE TO OTHERS.
- EACH CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ELECTRICAL CHANGES REQUIRED FOR EQUIPMENT PROPOSED THAT DIFFERS FROM THE BASIS OF DESIGN.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLAN, ELECTRICAL TECHNOLOGY AUDIO/VISUAL, AND OTHER MECHANICAL PLANS FOR EXACT LOCATIONS OF ALL CEILING MOUNTED DEVICES, OTHER THAN SPRINKLERS.
- EACH CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED BY THEIR ACTIONS TO WALLS, FLOORS, CEILINGS, AND ROOFS. THE CONTRACTOR WHOSE WORK CAUSES DAMAGE IS RESPONSIBLE FOR PATCHING TO MATCH ORIGINAL CONSTRUCTION, FIRE RATING, AND FINISH.
- SEAL ALL FLOOR, WALL, AND ROOF PENETRATIONS AIRTIGHT WHERE CONDUITS, PIPING, AND DUCTS PENETRATE.
- CAULK ALL PIPE AND DUCT PENETRATIONS OF FULL HEIGHT NON-FIRE RATED WALL, PARTITION, FLOOR, AND ROOF ASSEMBLIES. THIS IS ESSENTIAL TO PREVENT NOISE TRANSMISSION FROM ONE ROOM TO ANOTHER AND TO PROVIDE THE DESIRED NC LEVELS WITHIN ROOMS.
- WHERE PIPES AND DUCTS ARE REQUIRED TO PENETRATE FLOORS, PROVIDE DESIRED OPENINGS WITH THE TOP EDGE RAISED ABOVE FLOOR SURFACE IN ACCORDANCE WITH ALL RELEVANT SPEC SECTIONS. SEAL SLEEVE PERIMETER TO BE WATERTIGHT.
- EQUIPMENT SIZES AND SERVICE CLEARANCE REQUIREMENTS VARY AMONG DIFFERENT MANUFACTURERS. CONSULT APPROVED SHOP DRAWINGS FOR EQUIPMENT SIZES AND REQUIRED SERVICE CLEARANCES. COORDINATE WITH LAYOUT OF EQUIPMENT PADS, PIPING, DUCTWORK, ETC.
- DO NOT BLOCK TUBE PULL OR EQUIPMENT SERVICE CLEARANCES.
- MAINTAIN A MINIMUM WORKING CLEARANCE OF 3'-6" IN FRONT OF ALL ELECTRICAL EQUIPMENT REQUIRING MAINTENANCE, INSPECTION, AND TESTING INCLUDING BUT NOT LIMITED TO PANELS, DISTRIBUTION PANELS, SWITCHBOARDS, MOTOR CONTROL CENTERS, TRANSFORMERS, EQUIPMENT DISCONNECTS AND STARTERS.
- MAINTAIN THE DEDICATED ELECTRICAL EQUIPMENT SPACE DEFINED BY THE WIDTH / DEPTH OF ELECTRICAL EQUIPMENT MEASURED FROM THE FLOOR TO A HEIGHT 6'-0" ABOVE THE EQUIPMENT OR THE STRUCTURAL CEILING, WHICHEVER IS LOWER. SYSTEMS FOREIGN TO THE ELECTRICAL DISTRIBUTION SYSTEM ARE NOT ALLOWED IN THE DEDICATED ELECTRICAL SPACE INCLUDING: DUCTWORK, PIPING, ETC.
- PROVIDE CONCRETE EQUIPMENT PAD FOR ALL FLOOR MOUNTED EQUIPMENT. PAD SHALL EXTEND MINIMUM 6" BEYOND ALL SIDES OF EQUIPMENT.
- DO NOT EXCEED 25 LBS PER HANGER AND A MINIMUM SPACING OF 2'-0" ON CENTER WHEN ATTACHING TO METAL ROOF DECKING (LIMITATION NOT REQUIRED WITH CONCRETE ON METAL DECK). THIS 25 LBS. LOAD AND 2'-0" SPACING INCLUDE ADJACENT ELECTRICAL AND ARCHITECTURAL ITEMS HANGING FROM DECK. IF THE HANGER RESTRICTIONS CANNOT BE ACHIEVED, SUPPLEMENTAL FRAMING OFF STEEL FRAMING SHALL BE ADDED. ANCHORS EMBEDDED IN CONCRETE SHALL BE CRACKED CONCRETE APPROVED IN ACCORDANCE WITH SPECIFICATIONS.

### MECHANICAL SHEET INDEX

M000	MECHANICAL COVERSHEET
M100	BASEMENT DEMOLITION PLAN - PIPING
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M700	MECHANICAL CONTROLS
GRAND TOTAL:	8



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4145 Samuelson Rd, Rockford, IL 61109

### Rockford Public Schools #205

PROFESSIONAL SEAL

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REFERENCE SCALE IN INCHES

REVISIONS

No. Date Revision / Issue

SHEET INFORMATION

Issue **BID DOCUMENTS**

Date **AUGUST 15, 2023**

Job Number **21002885.15**

Drawn **Author**

Checked **Checker**

Approved **Approver**

SHEET TITLE

**MECHANICAL COVERSHEET**

SCALE

Scale: **As Indicated**

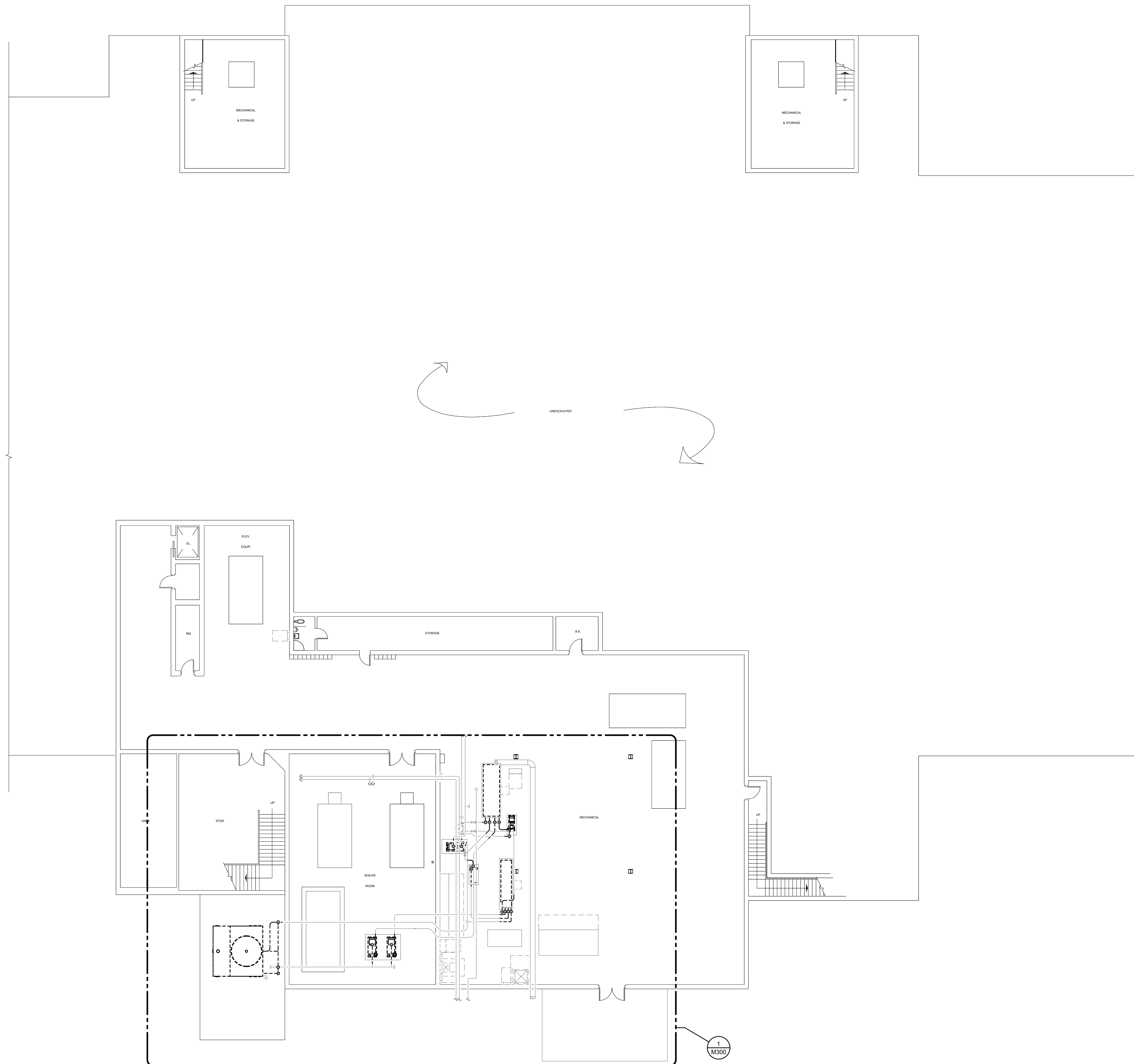
SHEET NUMBER

**M000**

**ESSER HVAC  
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4145 Samuelson Rd, Rockford, IL 61109

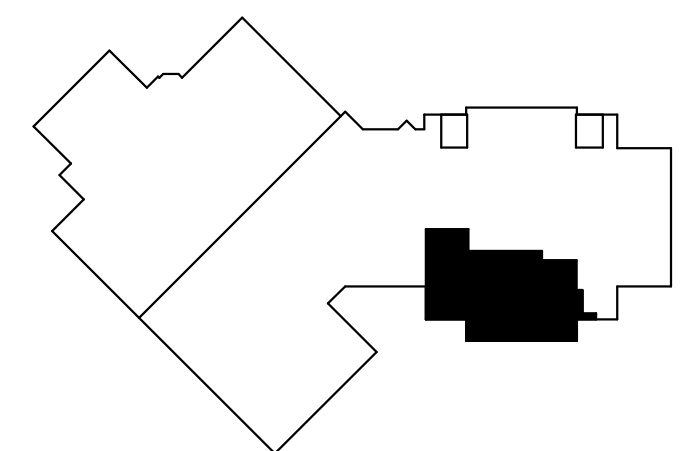
**Rockford Public Schools  
#205**



PROFESSIONAL SEAL

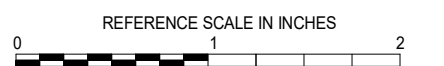
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KEY PLAN



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Approved	<b>Approver</b>

**SHEET TITLE  
BASEMENT  
DEMOLITION  
PLAN -  
PIPING**

SCALE

Scale: **3/32" = 1'-0"**

SHEET NUMBER

**M100**

21002885.15 8/15/2023 1:08:49 PM ESSER HVAC Improvements - Jefferson High School Chiller Replacement



**1**

**BASEMENT DEMOLITION PLAN - HVAC**

3/32" = 1'-0"

21002885.15 8/15/2023 1:06:50 PM ESSER HVAC Improvements - Jefferson High School Chiller Replacement



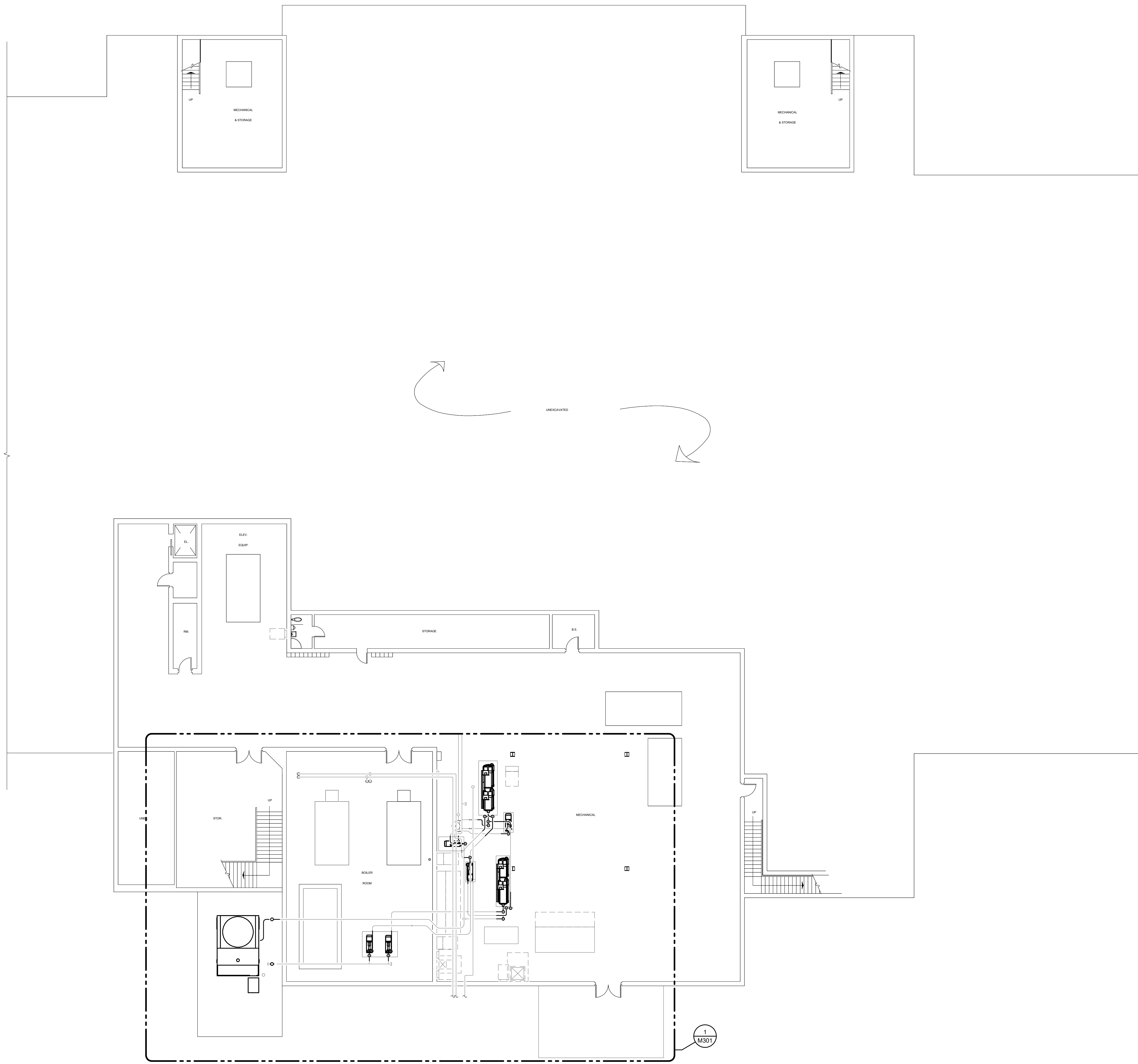
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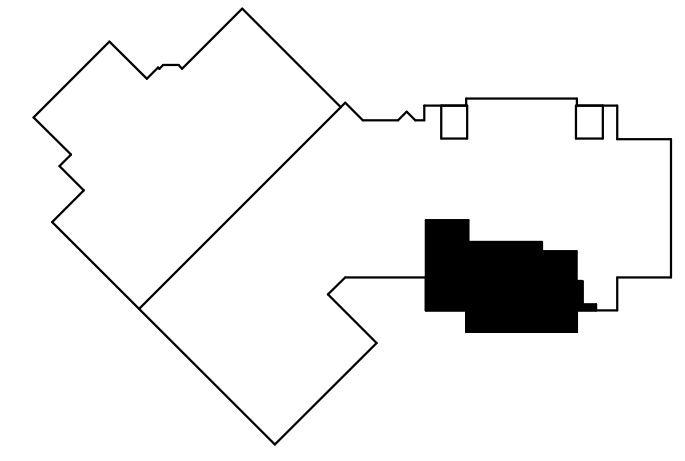


**1** **BASEMENT PLAN - PIPING**  
3/32" = 1'-0"

PROFESSIONAL SEAL

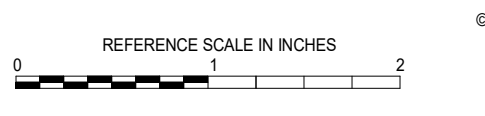
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KEY PLAN



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Checked		Checker	
Approved		Approver	

SHEET TITLE

**BASEMENT PLAN - PIPING**

SCALE

Scale: **3/32" = 1'-0"**

SHEET NUMBER

**M200**

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**Rockford Public Schools  
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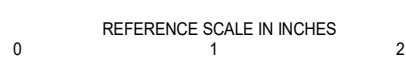
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KEY PLAN

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SHEET TITLE

**MECHANICAL  
ENLARGED  
PLANS**

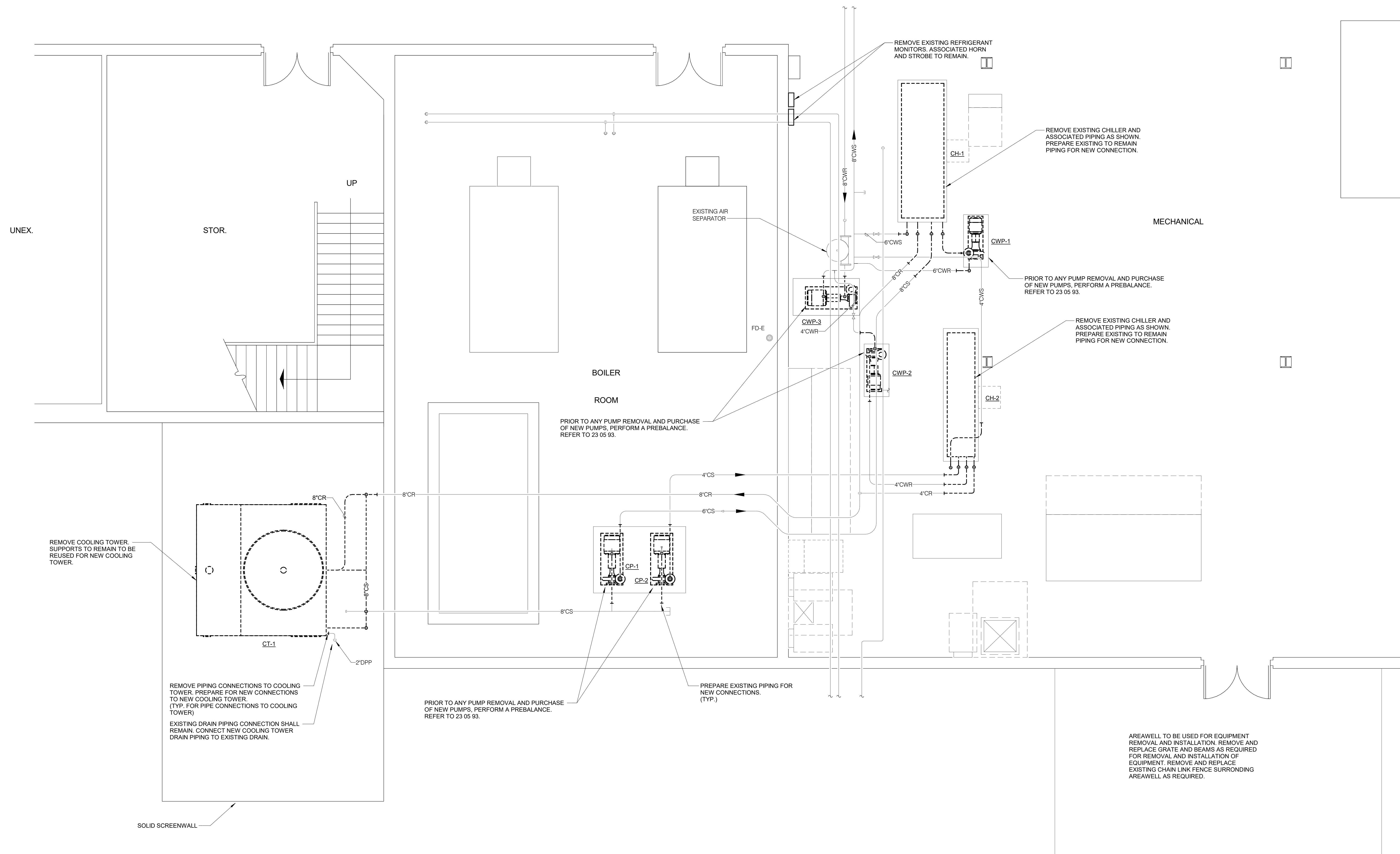
SCALE

Scale: **1/4" = 1'-0"**

SHEET NUMBER

**M300**

21002885.15 8/15/2023 1:06:51 PM ESSER HVAC Improvements - Jefferson High School Chiller Replacement



UNEX.      STOR.

UP

BOILER ROOM

MECHANICAL

REMOVE COOLING TOWER SUPPORTS TO REMAIN TO BE REUSED FOR NEW COOLING TOWER.

REMOVE PIPING CONNECTIONS TO COOLING TOWER. PREPARE FOR NEW CONNECTIONS TO NEW COOLING TOWER. (TYP. FOR PIPE CONNECTIONS TO COOLING TOWER)  
EXISTING DRAIN PIPING CONNECTION SHALL REMAIN. CONNECT NEW COOLING TOWER DRAIN PIPING TO EXISTING DRAIN.

SOLID SCREENWALL

PRIOR TO ANY PUMP REMOVAL AND PURCHASE OF NEW PUMPS, PERFORM A PREBALANCE. REFER TO 23 05 93.

PRIOR TO ANY PUMP REMOVAL AND PURCHASE OF NEW PUMPS, PERFORM A PREBALANCE. REFER TO 23 05 93.

PREPARE EXISTING PIPING FOR NEW CONNECTIONS. (TYP.)

REMOVE EXISTING REFRIGERANT MONITORS. ASSOCIATED HORN AND STROBE TO REMAIN.

REMOVE EXISTING CHILLER AND ASSOCIATED PIPING AS SHOWN. PREPARE EXISTING TO REMAIN PIPING FOR NEW CONNECTION.

PRIOR TO ANY PUMP REMOVAL AND PURCHASE OF NEW PUMPS, PERFORM A PREBALANCE. REFER TO 23 05 93.

REMOVE EXISTING CHILLER AND ASSOCIATED PIPING AS SHOWN. PREPARE EXISTING TO REMAIN PIPING FOR NEW CONNECTION.

AREAWELL TO BE USED FOR EQUIPMENT REMOVAL AND INSTALLATION. REMOVE AND REPLACE GRATE AND BEAMS AS REQUIRED FOR REMOVAL AND INSTALLATION OF EQUIPMENT. REMOVE AND REPLACE EXISTING CHAIN LINK FENCE SURROUNDING AREAWELL AS REQUIRED.

**1 BASEMENT DEMOLITION PLAN - PIPING - ENLARGED**  
1/4" = 1'-0"

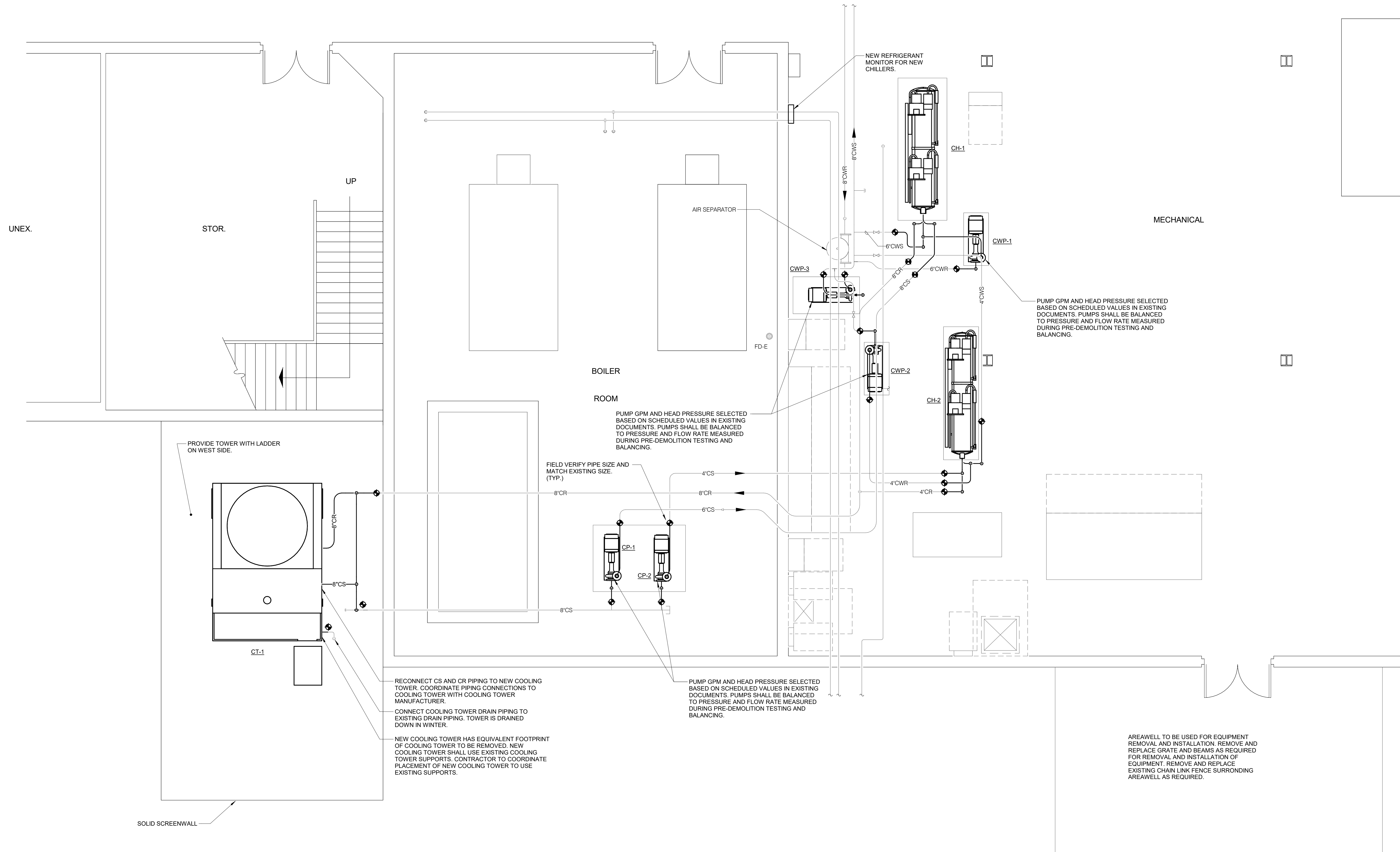




**ESSER HVAC Improvements - Jefferson High School Chiller Replacement**

4145 Samuelson Rd, Rockford, IL 61109

**Rockford Public Schools #205**



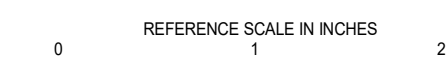
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REVISIONS

No.	Date	Revision / Issue

SHEET INFORMATION

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Date: **AUGUST 15, 2023**

Job Number: **21002885.15**

Drawn: **Author**

Checked: **Checker**

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SHEET TITLE

**MECHANICAL ENLARGED PLANS**

SCALE

Scale: **1/4" = 1'-0"**

SHEET NUMBER

**M301**

21002885.15 8/15/2023 1:06:51 PM ESSER HVAC Improvements - Jefferson High School Chiller Replacement

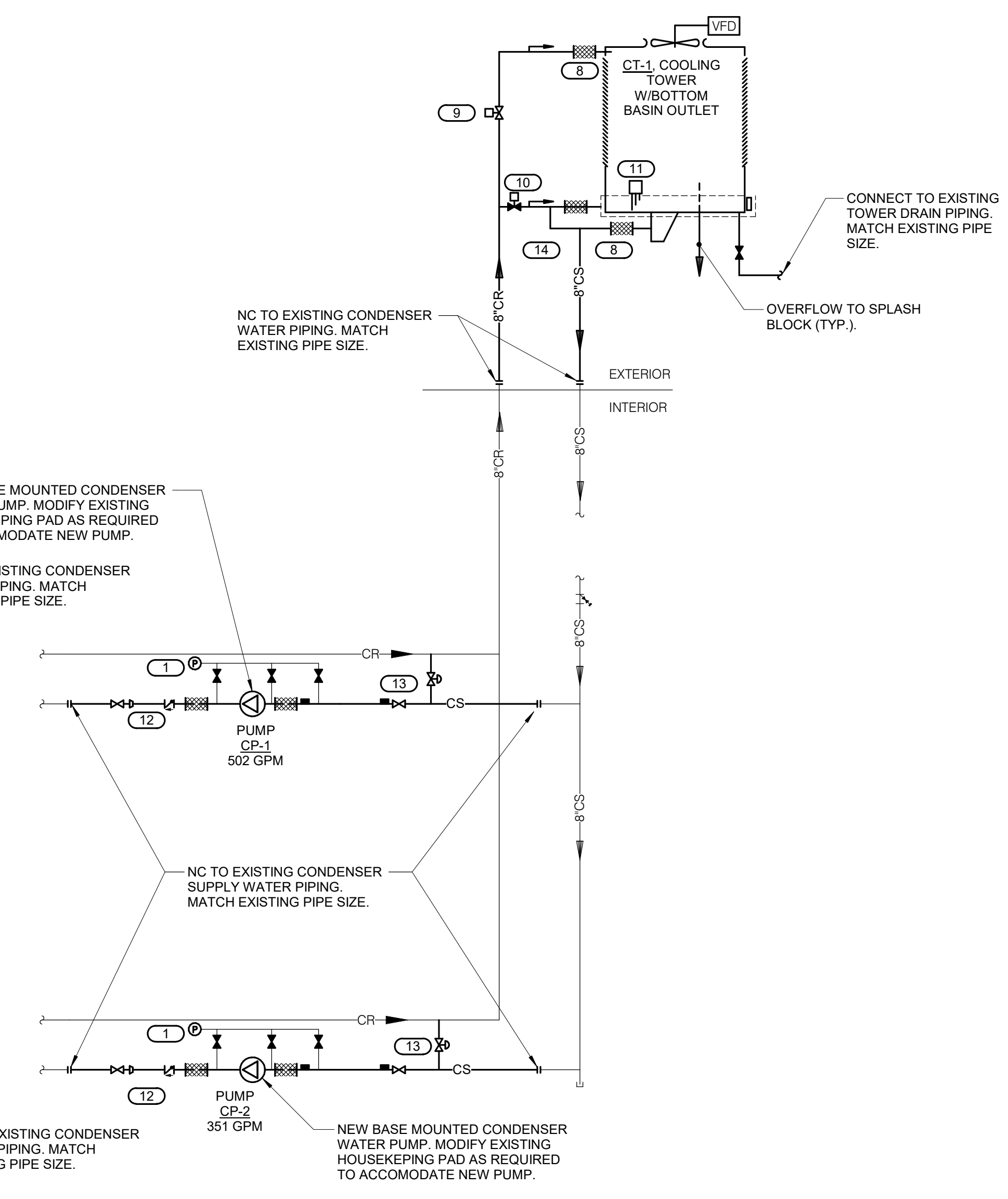
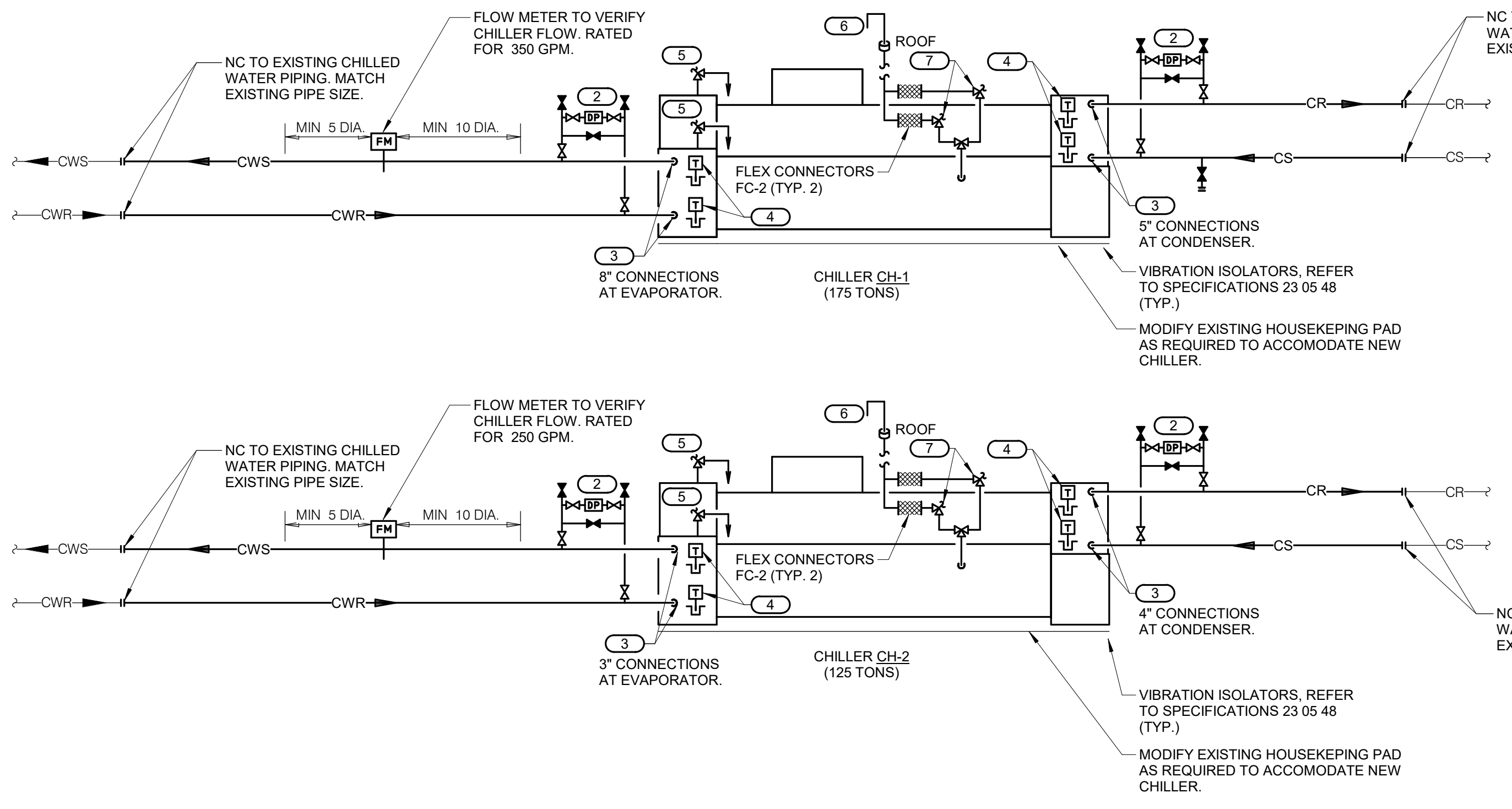
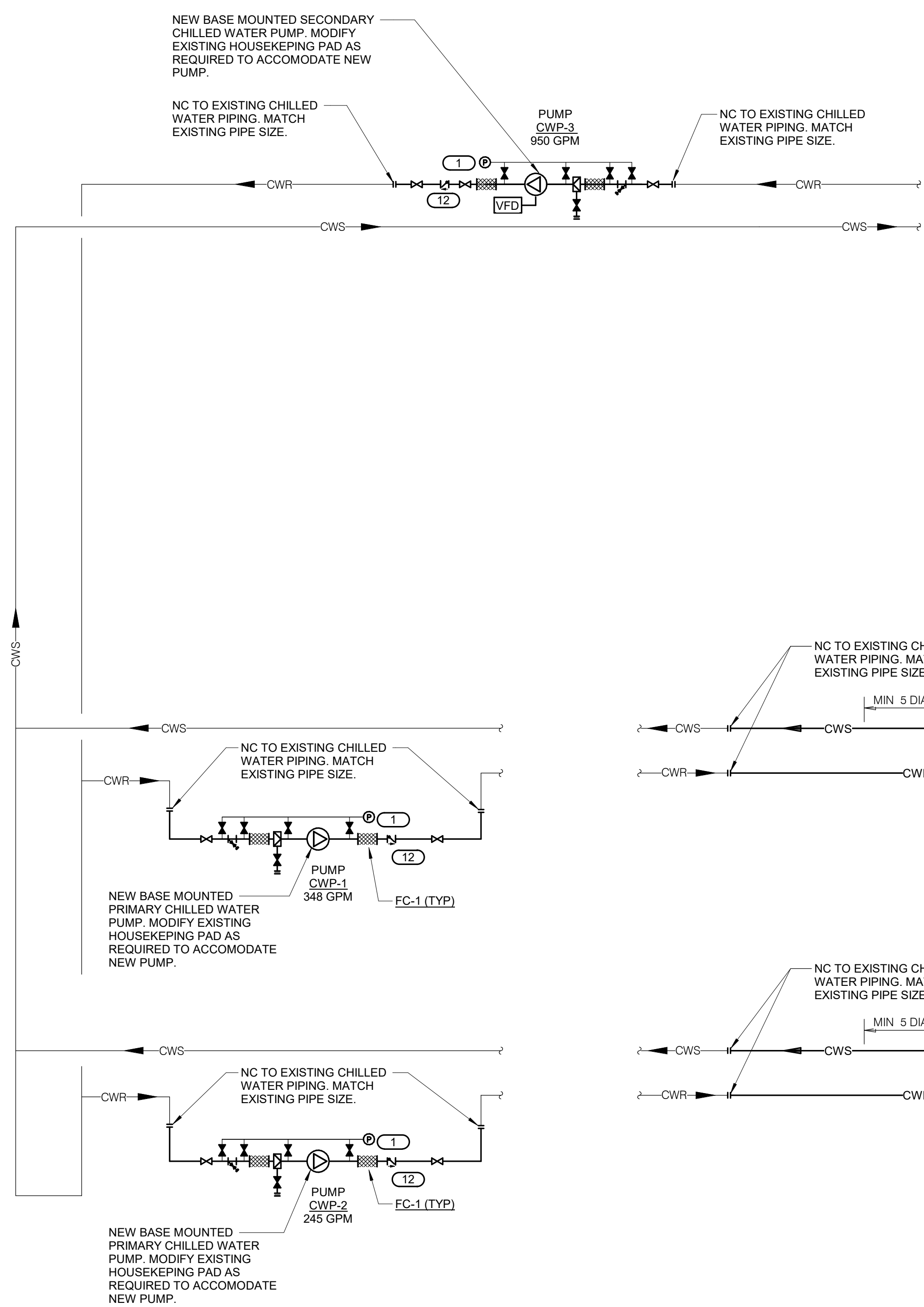
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**ESSER HVAC  
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 #205**

- KEYNOTES**
- PRESSURE GAUGE WITH SNUBBER PER SPECIFICATIONS. MOUNT ON WALL, STAND, OR VIBRATION-FREE PIPE BRACKET ABOVE PUMP. INSTALL FLEXIBLE COPPER TUBING TO PIPING CONNECTIONS TO AVOID VIBRATION DAMAGE TO THE GAUGE. GAUGE SHALL BE GLYCERIN FILLED. PREFERRED CONNECTION LOCATIONS ARE: (a) JUST UPSTREAM OF STRAINER, (b) GAUGE PORT ON SUCTION DIFFUSER OR BETWEEN STRAINER & PUMP INLET, (c) GAUGE TAPPING ON PUMP INLET FLANGE, (d) GAUGE TAPPING ON PUMP OUTLET FLANGE.
  - FLOW SWITCH FURNISHED BY CHILLER MANUFACTURER. FIELD INSTALLED.
  - GROOVED COUPLING/FLANGED CONNECTIONS ARRANGED TO PERMIT PULLING OF TUBES WITH REMOVAL OF MINIMUM AMOUNT OF PIPE. MINIMUM OF THREE FLEXIBLE GROOVED COUPLINGS OR FC-1 FOR VIBRATION ISOLATION. REFER TO SPECIFICATIONS.
  - TEMPERATURE SENSORS INTERNAL TO CHILLER. MONITOR THRU DDC OR PROVIDE SEPARATE SENSORS. PROVIDE SENSOR ON CS LINE TO CONTROL COOLING TOWER VFD.
  - CHILLED WATER SIDE SAFETY RELIEF VALVES PER ASME 34" SRV-1. REFER TO SPECIFICATIONS.
  - PIPE REFRIGERANT RELIEF VENT THROUGH ROOF. DO NOT COMBINE INDIVIDUAL CHILLER VENTS TOGETHER. ELBOW DOWN FOR RAIN PROTECTION. PITCH 1/8" PER FOOT AWAY FROM CHILLER. SIZE PER MANUFACTURER'S RECOMMENDATIONS. PIPING SHALL BE SCHEDULE 40 STEEL.
  - RUPTURE DISK OR REFRIGERANT RELIEF VALVES WITH BYPASS MAINTENANCE SHUTTLE VALVE. VERIFY SIZE AND REQUIREMENTS WITH MANUFACTURER.
  - FLEXIBLE CONNECTOR FC-1 WITH UV RESISTANT EPDM OR HYPALON CONSTRUCTION.
  - COOLING TOWER CONTROL VALVE - NORMALLY OPEN. USE IN CONJUNCTION WITH COOLING TOWER BYPASS VALVE. CONTROLLED BY BUILDING AUTOMATION SYSTEM.
  - COOLING TOWER BYPASS VALVE - NORMALLY CLOSED. FULL SIZE TWO POSITION CONTROL VALVE CONTROLLED BY BUILDING AUTOMATION SYSTEM. USED FOR CHILLER START UP AND WINTER OPERATION OF TOWER.
  - ELECTRONIC LEVEL SENSOR BY COOLING TOWER MFR. PROVIDE NON-CORRODING BAFFLE PLATES AROUND SENSOR TO MINIMIZE LEVEL SURGE AND INSULATE SENSOR HOUSING TO PREVENT FREEZING (TYP. 2).
  - TRIPLE DUTY OR BALANCING VALVES ARE NOT PERMITTED ON VARIABLE FLOW SYSTEMS. USE FLOW METER FOR PUMP FLOW TESTING.
  - CONDENSER WATER 2-WAY MODULATING WARM-UP/START VALVE.
  - PIPING FROM BASIN SHALL PITCH DOWNWARD FROM COOLING TOWER TO PUMP (APRX. 1/4" PER FOOT)



**1 CHILLED WATER FLOW DIAGRAM - PRIMARY / SECONDARY SYSTEM**  
 NO SCALE

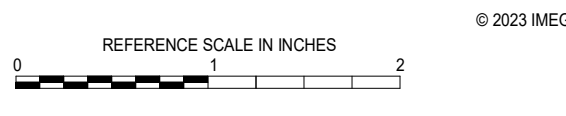
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Approved	<b>Approver</b>

**MECHANICAL DIAGRAMS**

SCALE  
 12" = 1'-0"

SHEET NUMBER

**CHILLER SCHEDULE - WATER COOLED (OWNER PROVIDED)**

NOTES:  
 1. PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.  
 2. REFER TO SPECIFICATION SECTION 23 64 16 FOR ADDITIONAL REQUIREMENTS.

TAG NAME	AREA SERVED	CAPACITY/PERFORMANCE						EVAPORATOR PERFORMANCE						CONDENSER PERFORMANCE						ELECTRICAL (NOTE 1)						MANUFACTURER	MODEL (NOTE 2)	NOTES						
		TON AT % LOAD						GPM						GPM						DISCONNECT									CONTROLLER/STARTER					
		DESIGN TONS	100	75	50	IFLV	EWTF	LWTF	MINIMUM	DESIGN	PRESS. DROP FT. HEAD	FOULING FACTOR	EWTF	LWTF	DESIGN	PRESS. DROP FT. HEAD	FOULING FACTOR	VOLTAGE	PHASES	MCA	MOCF	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)				SCCR	BY (NOTE A)	TYPE (NOTE C)			
CH-1	CHILLED WATER SYSTEM	175	188	141	94	0.57	56	44	111	244.0	10.00	0.0001	85	95	495	5.00	0.000250	460	3	196.0	350	MFR	F	MFR	VFD	6500	DAIKIN	WWWJNN	SCREW CHILLER - WATER COOLED					
CH-2	CHILLED WATER SYSTEM	123	123	90	61	0.41	56	44	111	244.0	10.00	0.0001	85	95	348	6.50	0.000250	460	3	140.0	250	MFR	F	MFR	VFD	6500	DAIKIN	WWWJNN	SCREW CHILLER - WATER COOLED					

**COOLING TOWER SCHEDULE**

NOTES:  
 1. PROVIDE SHAFT GROUNDING AS REQUIRED IN SPECS.  
 2. E.C. TO PROVIDE POWER FOR ELECTRIC LEVEL CONTROLLER AND MAKE UP WATER SOLENOID.  
 3. NEW COOLING TOWER SHALL REUSE EXISTING COOLING TOWER SUPPORTS.

TAG NAME	AREA SERVED	CONDENSING WATER				AMBIENT CONDITIONS		FAN DATA		ELECTRICAL (NOTE 1)						MAX. DIMENSIONS (FT)			MANUFACTURER	MODEL	NOTES
		GPM	EWTF	LWTF	DB °F	WB °F	NUMBER OF FANS	HP EACH	VOLTAGE	PHASES	DISCONNECT		CONTROLLER/STARTER		LENGTH	WIDTH	HEIGHT				
		95.0	85.0	80.0	75.0	2	3	460	3	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	12	12	15					
CT-1	CONDENSER SYSTEM	850	95.0	85.0	80.0	75.0	2	3	460	3	E.C.	F	E.C.	VFD	12	12	15	BAC	SERIES 1500 XE15E	NOTE 2, 3	

**PUMP SCHEDULE**

NOTES:  
 1. PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.

TAG NAME	AREA SERVED	GPM	PUMP FT. HEAD AT DESIGN	MINIMUM PUMP EFFICIENCY %	IMPELLER SIZE (IN)	INLET SIZE (IN)	ELECTRICAL						MANUFACTURER	MODEL	NOTES			
							BHP	HP (NOTE E)	RPM	VOLTAGE	PHASES	DISCONNECT				CONTROLLER/STARTER		
							10.6	15	1770	460	3	BY (NOTE A)				TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)
CP-1	CONDENSER SYSTEM	522.0	66.00	80	9.000	4	5.98	7.5	1770	460	3	E.C.	F	E.C.	FV	B & G	e-1510 3BD	NOTE 1
CP-2	CONDENSER SYSTEM	351.0	52.00	75	7.750	4	5.98	7.5	1770	460	3	E.C.	F	E.C.	FV	B & G	e-1510 3BD	NOTE 1
CWP-1	CHILLED WATER SYSTEM	348.0	16.00	75	6.875	6	1.92	3	1150	460	3	E.C.	F	E.C.	FV	B & G	e-1510 5A	NOTE 1
CWP-2	CHILLED WATER SYSTEM	245.0	18.00	75	7.250	6	1.5	2	1170	460	3	E.C.	F	E.C.	FV	B & G	e-1510 3BD	NOTE 1
CWP-3	CHILLED WATER SYSTEM	950.0	86.00	80	10.375	6	25	30	1770	460	3	E.C.	F	E.C.	VFD	B & G	e-1510 5EB	NOTE 1

**SCHEDULE GENERAL NOTES:**

A. DISCONNECT AND CONTROLLER STARTER FURNISHED AND INSTALLED BY:  
 MFR = MANUFACTURER  
 EC = ELECTRICAL CONTRACTOR  
 MC = FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR  
 MFR/EC = FURNISHED LOOSE BY MANUFACTURER INSTALLED BY ELECTRICAL CONTRACTOR  
 ATC = AUTOMATIC TEMPERATURE CONTROL CONTRACTOR

B. DISCONNECT TYPE:  
 CB = CIRCUIT BREAKER  
 F = FUSED  
 NF = NON-FUSED

C. CONTROLLER STARTER TYPE:  
 FV = FULL VOLTAGE  
 WYE = WYE-DELTA  
 SS = SOLID STATE (SOFT START)  
 MS = MANUAL STARTER  
 VFD = VARIABLE FREQUENCY DRIVE  
 VFD/B = VARIABLE FREQUENCY DRIVE WITH BYPASS  
 YD = WYE - DELTA

D. FAN RPM SHALL NOT EXCEED 110% OF SCHEDULED VALUE, WITH THE SCHEDULED WHEEL TYPE. SUBSTITUTION OF B1 OR B1A FANS FOR F0 IS ACCEPTABLE IF EFFICIENCY IS NOT LOWER.

E. NO EQUIPMENT SHALL BE SELECTED ABOVE 90% OF MOTOR NAME PLATE RATING.

F. MUST BE WITHIN +/- 10% OF SCHEDULED RPM.

G. CURB TYPE:  
 MFR = STANDARD CURB BY MANUFACTURER  
 GC = BY GENERAL CONTRACTOR  
 SAC = SOUND ATTENUATOR CURB



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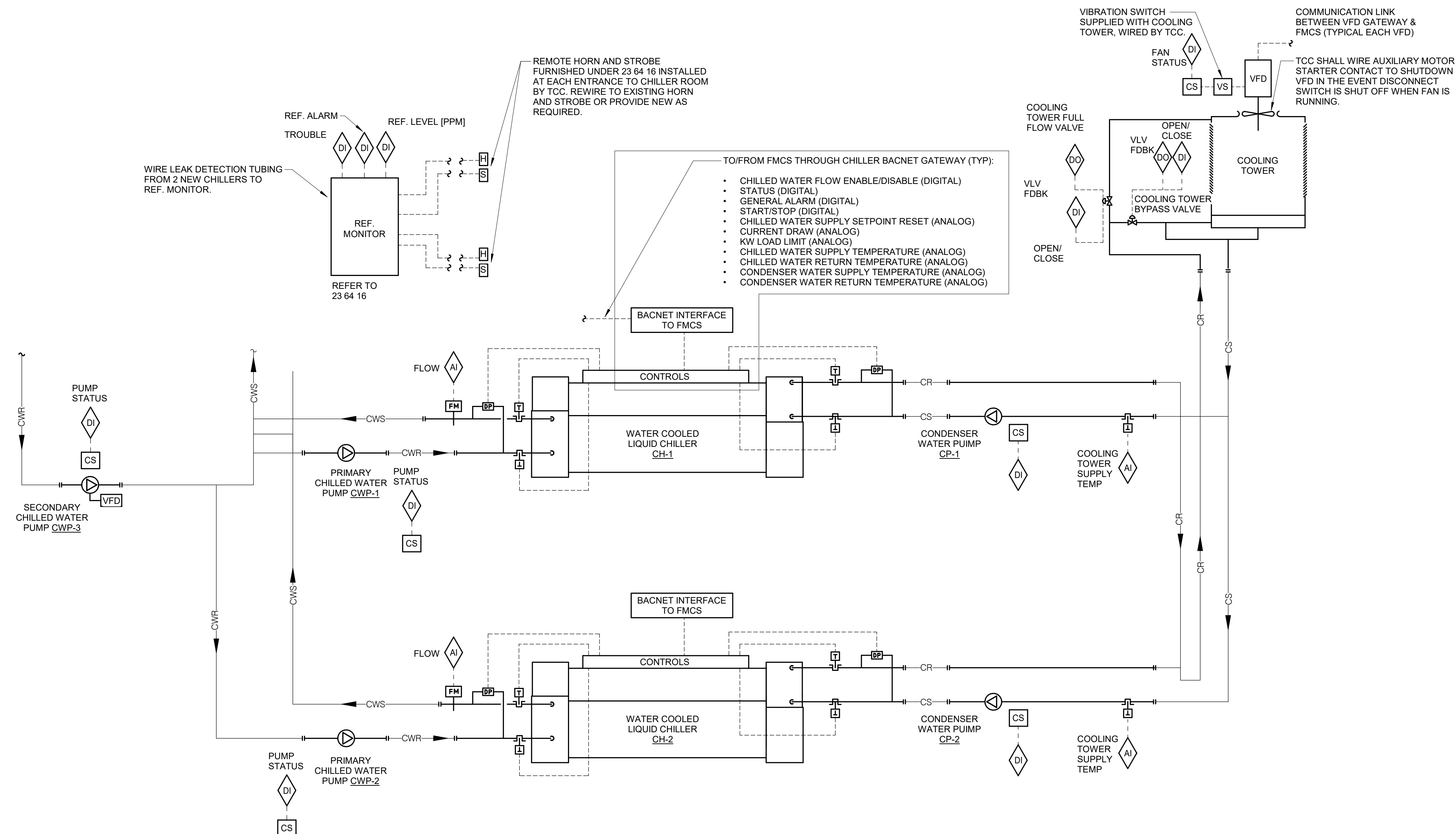
SCALE

Scale:

SHEET NUMBER

**M600**





REMOTE HORN AND STROBE FURNISHED UNDER 23 64 16 INSTALLED AT EACH ENTRANCE TO CHILLER ROOM BY TCC. REWIRE TO EXISTING HORN AND STROBE OR PROVIDE NEW AS REQUIRED.

WIRE LEAK DETECTION TUBING FROM 2 NEW CHILLERS TO REF. MONITOR.

REF. ALARM TROUBLE (DI)

REF. LEVEL (PPM)

REF. MONITOR 23 64 16

TO/FROM FMCS THROUGH CHILLER BACNET GATEWAY (TYP):

- CHILLED WATER FLOW ENABLE/DISABLE (DIGITAL)
- STATUS (DIGITAL)
- GENERAL ALARM (DIGITAL)
- START/STOP (DIGITAL)
- CHILLED WATER SUPPLY SETPOINT RESET (ANALOG)
- CURRENT DRAW (ANALOG)
- KW LOAD LIMIT (ANALOG)
- CHILLED WATER SUPPLY TEMPERATURE (ANALOG)
- CHILLED WATER RETURN TEMPERATURE (ANALOG)
- CONDENSER WATER SUPPLY TEMPERATURE (ANALOG)
- CONDENSER WATER RETURN TEMPERATURE (ANALOG)

BACNET INTERFACE TO FMCS

CONTROLS

WATER COOLED LIQUID CHILLER CH-1

CONDENSER WATER PUMP CP-1

COOLING TOWER FULL FLOW VALVE

VLV FDBK (DI)

OPEN/ CLOSE

COOLING TOWER BYPASS VALVE

COOLING TOWER

VIBRATION SWITCH SUPPLIED WITH COOLING TOWER, WIRED BY TCC

FAN STATUS (DI)

VFD

COMMUNICATION LINK BETWEEN VFD GATEWAY & FMCS (TYPICAL EACH VFD)

TCC SHALL WIRE AUXILIARY MOTOR STARTER CONTACT TO SHUTDOWN VFD IN THE EVENT DISCONNECT SWITCH IS SHUT OFF WHEN FAN IS RUNNING.

**TEMPERATURE CONTROL GENERAL NOTES:**

1. REFER TO EQUIPMENT SCHEDULES TO CROSS REFERENCE WHICH CONTROL DIAGRAMS APPLY TO WHICH ITEMS OF EQUIPMENT. REFER TO TERMINAL AIR BOX (TAB) SCHEDULES FOR TEMP SENSOR REQUIREMENTS FOR EACH TAB.
2. EACH D.I., D.O., A.I. AND A.O. POINT SHOWN FOR ALL CONTROL DIAGRAMS SHALL BE DISCRETE FROM ALL OTHER POINTS EXCEPT AS SPECIFICALLY NOTED.
3. ALL WIRING, CONTROL COMPONENTS, DEVICES AND PROGRAMMING SHOWN ON THESE CONTROL DRAWINGS SHALL BE PROVIDED BY THE TCC UNLESS SPECIFICALLY NOTED OTHERWISE.
4. ALL ACTUATORS SHALL BE OF THE ELECTRICAL TYPE FOR THIS PROJECT UNLESS AN ACTUATOR IS SPECIFICALLY INDICATED ON THE DRAWINGS OR SPECIFICATIONS TO BE PNEUMATIC.
5. ALL MODULATING DAMPER AND VALVE ACTUATORS SHOWN WITH POSITION FEEDBACK SHALL HAVE THE VALVE POSITION DISPLAYED ON GRAPHICAL SCREEN ADJACENT TO THE DAMPER/VALVE COMMAND SIGNAL. DISPLAYED VALVE POSITION SHALL BE FROM THE FEEDBACK DEVICE/CIRCUIT (OUTPUT SIGNAL FROM THE FMCS TO THE ACTUATOR IS NOT ACCEPTABLE).
6. MODULATING SIGNALS SHALL BE DISPLAYED AS % OPEN (SIGNALS DISPLAYED AS % CLOSED ARE NOT ACCEPTABLE).
7. PRESSURE TRANSMITTERS WHOSE SIGNAL IS UTILIZED FOR MAINTAINING DUCT STATIC PRESSURE SHALL BE WIRED DIRECTLY TO THE CONTROLLER THAT MODULATES FAN SPEED. SIGNAL SHALL BE COMPLETELY INDEPENDENT OF THE FMCS NETWORK.
8. PRESSURE TRANSMITTERS WHOSE SIGNAL IS UTILIZED FOR MAINTAINING DIFFERENTIAL PRESSURE OF ANY PUMPED WATER SYSTEM (E.G. HEATING HOT WATER, CHILLED WATER AND THE LIKE) SHALL BE WIRED DIRECTLY TO THE CONTROLLER THAT MODULATES PUMP SPEED. SIGNAL SHALL BE COMPLETELY INDEPENDENT OF THE FMCS NETWORK.
9. ALL CONTROL COMPONENTS SUCH AS RELAYS, SWITCHES, DDC CONTROLLERS, ETC. SHALL BE MOUNTED IN STEEL ENCLOSURES WITH STEEL MOUNTING BACKPLATES PER SPECIFICATION 23 09 00.
10. EACH CONTROL PANEL SHALL HAVE A LAMINATED COPY OF THE APPLICABLE SEQUENCE OF OPERATION AND CONTROL DIAGRAM INDICATING THE POINTS, COMPONENTS AND OPERATION OF EQUIPMENT ASSOCIATED WITH EACH PANEL. REFER TO SECTION 23 09 00 FOR ADDITIONAL REQUIREMENTS.
11. TCC SHALL EXTEND CONTROL SIGNAL FROM ADDRESSABLE RELAY DEVICE SERVING EACH AIR HANDLING UNIT. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS. TCC SHALL EXTEND AND TERMINATE WIRING AS REQUIRED FOR EQUIPMENT SHUTDOWN.
12. TCC SHALL PROVIDE POWER SUPPLIES FOR ALL 24VAC POWER REQUIREMENTS TO INCLUDE, BUT NOT LIMITED TO, CONTROLLERS, VALVE ACTUATORS, BUILDING PRESSURE SENSORS, AND OTHER CONTROL COMPONENTS AND DEVICES. REFER TO CONTROLS SPECIFICATIONS FOR POWER SUPPLY REQUIREMENTS. PROVIDE LOW VOLTAGE WIRING FROM POWER SUPPLIES TO ALL CONTROLLERS, MONITORS, COMPONENTS AND DEVICES REQUIRING 24 VAC POWER. ADDITIONAL POWER SUPPLIES NOT SHOWN AND REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM SHALL BE PROVIDED BY THE TEMPERATURE CONTROL CONTRACTOR. THE TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE FINANCIAL PROVISIONS WITHIN THEIR BID FOR THE ELECTRICAL CONTRACTOR TO PROVIDE BRANCH POWER TO THE ADDITIONAL POWER SUPPLIES. COORDINATE THE LOCATION OF ADDITIONAL POWER SUPPLY CABINET WITH THE ELECTRICAL CONTRACTOR.
13. TO PREVENT GENERATOR OVERLOADING, TCC SHALL PROGRAM A STAGGERED START TIME FOR ALL MECHANICAL EQUIPMENT THAT IS CONTROLLED BY FMCS TO INCLUDE, BUT NOT LIMITED TO PUMPS, AND CHILLERS. THE FIRST EQUIPMENT SHALL START 2 MINUTES (ADJ.) FROM THE TIME THE FMCS RECEIVES THE SIGNAL THAT THE TRANSFER SWITCH CHANGED TO EMERGENCY POWER SOURCE WITH ALL EQUIPMENT BEING ENERGIZED WITHIN A 20 MINUTE (ADJ.) TIME SPAN. COORDINATE ORDER OF EQUIPMENT STAGING WITH OWNER'S REPRESENTATIVE.
14. CONTROL DIAGRAMS ARE SCHEMATIC IN NATURE AND DO NOT SHOW ALL REQUIRED CONTROL DEVICES AND COMPONENTS. REFER TO FLOOR PLANS, FLOW DIAGRAMS AND DETAILS FOR ADDITIONAL CONTROL DEVICES, COMPONENTS AND REQUIREMENTS NOT SHOWN ON THESE CONTROL DRAWINGS.
15. TCC SHALL PROVIDE ALL CONTROL COMPONENTS AND ACCESSORIES AS REQUIRED FOR EQUIPMENT TO BE CONTROLLED AS DESCRIBED IN THE SEQUENCE OF OPERATION REGARDLESS OF WHETHER ALL CONTROL COMPONENTS OR POINTS ARE SHOWN IN THE ASSOCIATED CONTROL DIAGRAM.
16. COORDINATE DDC CONTROL PANEL EMERGENCY POWER SUPPLY REQUIREMENT WITH ELECTRICAL CONTRACTOR. ALL CONTROLS ASSOCIATED WITH MECHANICAL SYSTEM REQUIRING EMERGENCY POWER SHALL BE CONNECTED TO THE EMERGENCY POWER SYSTEM.

**SEQUENCE OF OPERATION**  
A FACTORY MOUNTED CHILLER CONTROL PANEL SHALL BE PROVIDED BY THE CHILLER MANUFACTURER. ALL AVAILABLE DATA PROVIDED/MONITORED BY THE CHILLER CONTROL PANEL SHALL BE AVAILABLE TO AND MONITORED BY THE FMCS SYSTEM.

CHILLER OPERATION SHALL BE CONTROLLED BY THE FMCS AND SHALL BE ENABLED TO OPERATE WHEN THE OUTSIDE AIR TEMP RISES ABOVE 42°F (ADJ.) FOR 15 MINUTES (ADJ.). WHEN OUTSIDE AIR TEMP DROPS BELOW 40°F (ADJ.) FOR 15 MINUTES (ADJ.) CHILLER OPERATION SHALL BE DISABLED.

WHEN THE FMCS INDEXES A CHILLER TO RUN THE FOLLOWING SHALL OCCUR:

- THE FMCS SYSTEM SHALL OPERATE THE CONDENSER FILL VALVE BASED ON WATER LEVELS ESTABLISHED BY THE SENSORS LOCATED IN THE COOLING TOWER SUMP (REFER TO LEVEL CONTROL IN THE COOLING TOWER CONTROL SECTION). ONCE THE REQUIRED COOLING TOWER SUMP WATER LEVEL IS ESTABLISHED, THE FMCS SYSTEM SHALL START THE CONDENSER WATER PUMP.
- COND ISOLATION VALVES SHALL OPEN. CONDENSER WATER PUMP SHALL TURN ON AND THE ASSOCIATED PRIMARY AND SECONDARY CHILLED WATER PUMP SHALL TURN ON.
- UPON PROOF OF FLOW IN THE EVAPORATOR AND CONDENSER BARREL THE FMCS SHALL INDEX CHILLER TO START
- CHILLER SHALL START AFTER ALL INTERNAL SAFETIES ARE SATISFIED

**CHILLER STOPPING:**  
WHEN THE FMCS INDEXES THE CHILLER TO STOP THE FOLLOWING SHALL OCCUR:

- FMCS SHALL INDEX CHILLER TO STOP
- AFTER A TIME DELAY OF 5 MIN. (ADJ.) FMCS SHALL SHUTDOWN CONDENSER AND CHILLED WATER PUMP.
- COND ISOLATION VALVES SHALL CLOSE

**FREEZE PROTECTION OF OUTDOOR PIPING:**  
PER OWNER'S MAINTENANCE PLAN, TOWER IS DRAINED AT END OF COOLING SEASON.

**CHILLER SAFETIES:**  
CONTRACTOR PROVIDING FMCS SHALL COORDINATE ALL SAFETY AND INTERLOCK REQUIREMENTS WITH CHILLER MANUFACTURER. CONTRACTOR SHALL PROVIDE THE INSTALLATION AND WIRING OF CHILLED WATER FLOW SWITCHES, AND OTHER COMPONENTS PROVIDED WITH CHILLER AS REQUIRED FOR PROPER OPERATION.

**COOLING TOWER CONTROL:**  
WHEN THE WATER LEVEL IS AT THE 'OPERATING LEVEL', THE MAKE-UP WATER CONTROL VALVE SHALL BE CLOSED. AS THE WATER LEVEL DROPS TO 'LOW LEVEL', THE LEVEL SENSOR SHALL SEND A SIGNAL TO THE FMCS SYSTEM TO OPEN THE MAKE-UP WATER CONTROL VALVE. IF THE WATER LEVEL DROPS TO THE 'ALARM LEVEL', THE FMCS SYSTEM SHALL SEND AN ALARM TO THE OPERATOR INTERFACE.

THE TCC SHALL PROVIDE NECESSARY RELAYS, WIRING AND COMPONENTS REQUIRED TO CONNECT THE FMCS SYSTEM TO THE EXISTING BLOWDOWN WATER METER (FURNISHED AND INSTALLED BY CHEMICAL TREATMENT SUPPLIER) TO PROVIDE BLOWDOWN CONSUMPTION INFORMATION.

**CONDENSER WATER START-UP:**  
UPON INITIAL SYSTEM START-UP THE CHILLER CONTROL PANEL SHALL SEQUENCE THE COND WARM-UP VALVE(S) AND COOLING TOWER FULL FLOW VALVE(S) AND BYPASS VALVE(S) TO WARM UP CONDENSER WATER SYSTEM FOR PROPER CHILLER OPERATION. FIRST THE CONTROL PANEL SHALL WARM UP THE CONDENSER LOOP TO 55°F (ADJ.). CONFIRM TEMP WITH CHILLER MANUFACTURER), THEN CONDENSER WATER SHALL BE PERMITTED TO FLOW THROUGH THE COOLING TOWERS.

WHEN THE CONDENSER WATER SUPPLY TEMPERATURE IS ABOVE 55°F (ADJ.) (REFER TO CONDENSER WATER TEMPERATURE RESET) THE FMCS SYSTEM SHALL CALL FOR COOLING TOWER OPERATION.

**COOLING TOWER FAN OPERATION:**  
ONCE CONDENSER WATER FLOW IS PROVEN, THE FMCS SYSTEM SHALL START THE COOLING TOWER FAN VIA THE VFD. THE FMCS SYSTEM SHALL STOP THE COOLING TOWER FAN WHEN THE VFD IS OPERATING AT MINIMUM SPEED AND CONDENSER WATER SUPPLY TEMPERATURE IS 5°F BELOW SETPOINT FOR 10 MINUTES (ADJ.) OR IF CONDENSER WATER FLOW IS NOT PROVEN.

THE PURPOSE OF THE COOLING TOWER FAN SPEED CONTROL IS TO MAINTAIN THE OPTIMAL CONDENSER WATER SUPPLY TEMPERATURE SETPOINT. THE FMCS SYSTEM SHALL CONTROL THE COOLING TOWER FAN VFD USING A 4-20MA OUTPUT.

THE CONDENSER WATER SUPPLY TEMPERATURE SHALL BE RESET BASED ON ENERGY USAGE/EFFICIENCY OF THE CHILLER, TOWER, CONDENSER WATER PUMP AND CHILLED WATER PUMP ENERGY WILL BE CALCULATED BASED ON CURRENT (AMP) USAGE OF THE SYSTEM EQUIPMENT. TEMPERATURE RESET BASED SOLELY ON OUTDOOR AIR WET BULB TEMPERATURE OFFSET IS NOT ADEQUATE. THE FMCS SYSTEM SHALL INCORPORATE CHILLER AND COOLING TOWER EFFICIENCIES TO DETERMINE THE CONDENSER WATER TEMPERATURE THAT RESULTS IN THE LOWEST SYSTEM ENERGY CONSUMPTION.

INSTALL A VIBRATION SWITCH TO STOP OPERATION OF THE COOLING TOWER FAN IF THE SWITCH IS ACTIVATED AND SEND AN ALARM TO THE FMCS.

**CONDENSER SUMP CLEANING SYSTEM:**  
CHILLER PLANT GRAPHICAL SCREEN SHALL INTERFACE WITH EXISTING SAND FILTER SYSTEM. SYSTEM SHALL ALLOW FOR OPERATOR TO MANUALLY ENTER THE NUMBER OF HOURS (DURATION) THE SAND FILTER WILL RUN. GRAPHICAL SCREEN SHALL ALSO ALLOW FOR OPERATOR TO MANUALLY SELECT EITHER A 'DAILY', 'WEEKLY' OR 'MONTHLY' MODE (FREQUENCY) OF OPERATION. IF THE FREQUENCY IS SET TO 'DAILY' (ADJ.) AND THE DURATION IS SET TO 2 HOURS (ADJ.), THEN THE SAND FILTER SHALL RUN FOR THE SET DURATION EACH DAY STARTING AT 8 AM (ADJ.). IF THE FREQUENCY IS SET TO 'WEEKLY' (ADJ.) AND THE DURATION IS SET TO 2 HOURS (ADJ.), THEN THE SAND FILTER SHALL RUN FOR THE SET DURATION EACH TUESDAY (ADJ.) STARTING AT 8 AM (ADJ.). IF THE FREQUENCY IS SET TO 'MONTHLY' (ADJ.) AND THE DURATION IS SET TO 2 HOURS (ADJ.), THEN THE SAND FILTER SHALL RUN FOR THE SET DURATION ON THE FIRST TUESDAY (ADJ.) OF EACH MONTH STARTING AT 8 AM (ADJ.).

**CONDENSER WATER PUMP CONTROL:**  
THE FMCS SYSTEM SHALL START THE PUMP WHENEVER THE CHILLER CONTROL PANEL IS ENABLED AND THE CHILLER CONTROL PANEL IS CALLING COOLING.

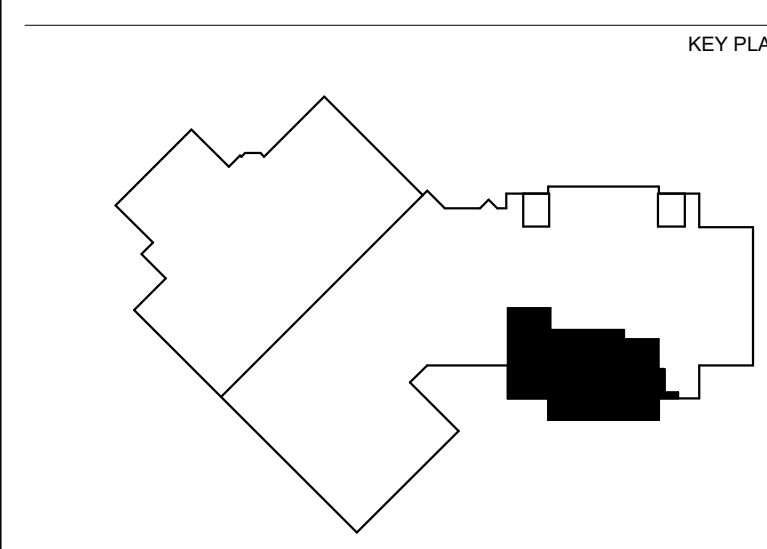
**WATER LOOP LOAD CALCULATION & DISPLAY:**  
CALCULATE AND DISPLAY THE CHILLED WATER LOOP TONNAGE ON THE FMCS COMPUTER CHILLER PLANT GRAPHICAL SCREEN UTILIZING THE ENTERING AND LEAVING CHILLED WATER TEMPS AND THE FLOW RATE AS DETERMINED BY THE FLOW METER.

**ALARMS, INTERLOCKS AND SAFETIES:**  
AN ALARM SHALL BE INDICATED AT THE FMCS WHEN THE FOLLOWING OCCUR:

- AN ALARM IS INDICATED AT THE CHILLER CONTROL PANEL
- IF CHILLED WATER SUPPLY TEMPERATURE IS MORE THAN 5°F (ADJ.) ABOVE OR BELOW SETPOINT FOR MORE THAN 10 MINUTES (ADJ.)
- SHOULD THE FMCS COMMAND A PRIMARY OR CONDENSER WATER TO OPERATE AND THE PUMP FAILS TO DO SO AS DETERMINED BY THE ASSOCIATED CURRENT SENSOR STATUS, AN ALARM SHALL BE INDICATED AT THE FMCS OPERATOR WORKSTATION.
- AN ALARM CONDITION OCCUR AT ANY VFD.
- IF SYSTEM DIFFERENTIAL PRESSURE IS NOT MAINTAINED FOR MORE THAN 15 MINUTES (ADJ.)

**1 WATER COOLED CHILLERS CONTROL DIAGRAM**  
NO SCALE

PROFESSIONAL SEAL  
CONSULTANT



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REVISIONS

No.	Date	Revision / Issue

SHEET INFORMATION  
Issue: **BID DOCUMENTS**  
Date: **AUGUST 15, 2023**  
Job Number: **21002885.15**  
Drawn: **Author**  
Checked: **Checker**  
Approved: **Approver**

SHEET TITLE  
**MECHANICAL CONTROLS**

SCALE  
Scale: **12" = 1'-0"**

SHEET NUMBER

### VIEW KEY

NAME: LEVEL NAME, HEIGHT ABOVE PROJECT 0'-0"

INDICATES DIRECTION OF TRUE NORTH

PLAN OR DETAIL NUMBER, PLAN OR DETAIL NAME, PLAN OR DETAIL SCALE

INDICATES SIMILAR DETAIL REFERENCED IN MULTIPLE LOCATIONS

DETAIL REFERRED TO BY SECTION CUT, SHEET DETAIL IS LOCATED ON

LINE TYPE AND TAG KEY:

NEW WORK BY THIS CONTRACTOR (WIDE LINE)

EXISTING TO BE REMOVED (SHORT DASHED PATTERN)

EXISTING TO REMAIN OR WORK BY OTHERS (NARROW LINE)

EXISTING TO BE REMOVED BY OTHERS (SHORT DASHED PATTERN)

EXISTING UNDERFLOOR OR UNDERGROUND (LONG DASHED PATTERN)

HALFTONING DOES NOT MODIFY SCOPE.

TAG-E TAGS WITH DASH 'E' INDICATES THE REFERENCED OBJECT IS EXISTING

TAG-1 UNDERLINED TAG INDICATES OBJECT IS IN-SCOPE. IF NEW, ADDITIONAL INFORMATION IS AVAILABLE IN A SCHEDULE, MATERIAL LIST, OR SYMBOL LIST

INDICATES AN EXISTING SYSTEM'S POINT OF CONNECTION/REMOVAL

### FIRE / SMOKE BARRIER DESIGNATIONS

THE LINE TYPES SHOWN ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL VERIFY RATINGS WITH THE LATEST SET OF ARCHITECTURAL PLANS AND FURNISH ALL MATERIALS REQUIRED TO COMPLY WITH THOSE RATINGS WHETHER SHOWN OR NOT.

ALL FLOOR, FLOOR CEILING, AND ROOF CEILING ASSEMBLIES SHALL BE DESIGNATED AS 1, 2 HOUR FIRE SEPERATION, UNLESS NOTED OTHERWISE ON THE PLANS. RATINGS WERE ACQUIRED FROM THE ARCHITECTURAL PLANS DATED 01/31/2020.

1 HOUR SEPERATION	---
2 HOUR SEPERATION	----

### APPLICABLE CODES

CONTRACTOR SHALL COMPLY WITH APPLICABLE CODES AND LOCAL AMENDMENTS INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

BUILDING CODE: IBC 2015 EDITION

FIRE CODE: IFC 2015 EDITION, EXCLUDING CHAPTER 4

PLUMBING CODE: IPC 2014 EDITION

MECHANICAL CODE: IMC 2015 EDITION

ELECTRICAL CODE: NFPA 70 (NEC) 2014 EDITION

ENERGY CONSERVATION CODE: IECC 2015

LOCAL BUILDING CODE: CURRENT EDITION

### CONTRACTOR ABBREVIATION KEY

ABBR:	DESCRIPTION:
C.C.	CIVIL CONTRACTOR
C.M.	CONSTRUCTION MANAGER
E.C.	ELECTRICAL CONTRACTOR
G.C.	GENERAL CONTRACTOR
H.C.	HEATING CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
T.C.C.	TEMPERATURE CONTROLS CONTRACTOR
V.C.	VENTILATION CONTRACTOR

### CONTACT PERSONS:

DESCRIPTION:	PERSON:
PROJECT MANAGER	BRANDON PIERSON
MECHANICAL	CRIS WASHBURN
ELECTRICAL	GAURAV SHARMA

### ELECTRICAL ABBREVIATION KEY

ABBR:	DESCRIPTION:
AFF	ABOVE FINISHED FLOOR
C	CONDUIT
C.O.	CONDUIT AND BOX ROUGH-IN ONLY (ROUGH-IN ONLY)
GFI	GROUND FAULT INTERRUPTER
N.C.	NORMALLY CLOSED
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
TYP	TYPICAL
UCN	UNLESS OTHERWISE NOTED

### ELECTRICAL SYMBOL LIST

SYMBOL:	TAG:	SPEC SECTION:	DESCRIPTION:
	ECO#N	26 05 33	ELECTRICAL CONNECTION
	JB	26 05 33	JUNCTION BOX
	MX-#/CS-#	26 24 19	MANUAL SWITCH/COMBINATION STARTER. REFER TO DISC/STA SCHEDULE
	DS-#/FDS-#	26 28 16	DISCONNECT. REFER TO DISC/STA SCHEDULE
	REC-DUP-WP	26 27 26	DUPLEX GFI WEATHERPROOF RECEPTACLE 125V

### ELECTRICAL EXISTING/DEMOLITION SYMBOL LIST

SYMBOL:	DESCRIPTION:
	ELECTRICAL CONNECTION
	JUNCTION BOX
	PANELBOARD - SURFACE MOUNT
	DISCONNECT SWITCH
	TRANSFORMER
	VFD (VARIABLE FREQUENCY DRIVE)

### ELECTRICAL EQUIPMENT TAGS

TAG:	DESCRIPTION:	RELATED SPECIFICATION
MX-#	MANUAL SWITCH, REFER TO DISCONNECT AND STARTER SCHEDULE	26 24 19
VFD-#	VARIABLE FREQUENCY DRIVE - REFER TO VFD SCHEDULE	26 29 23

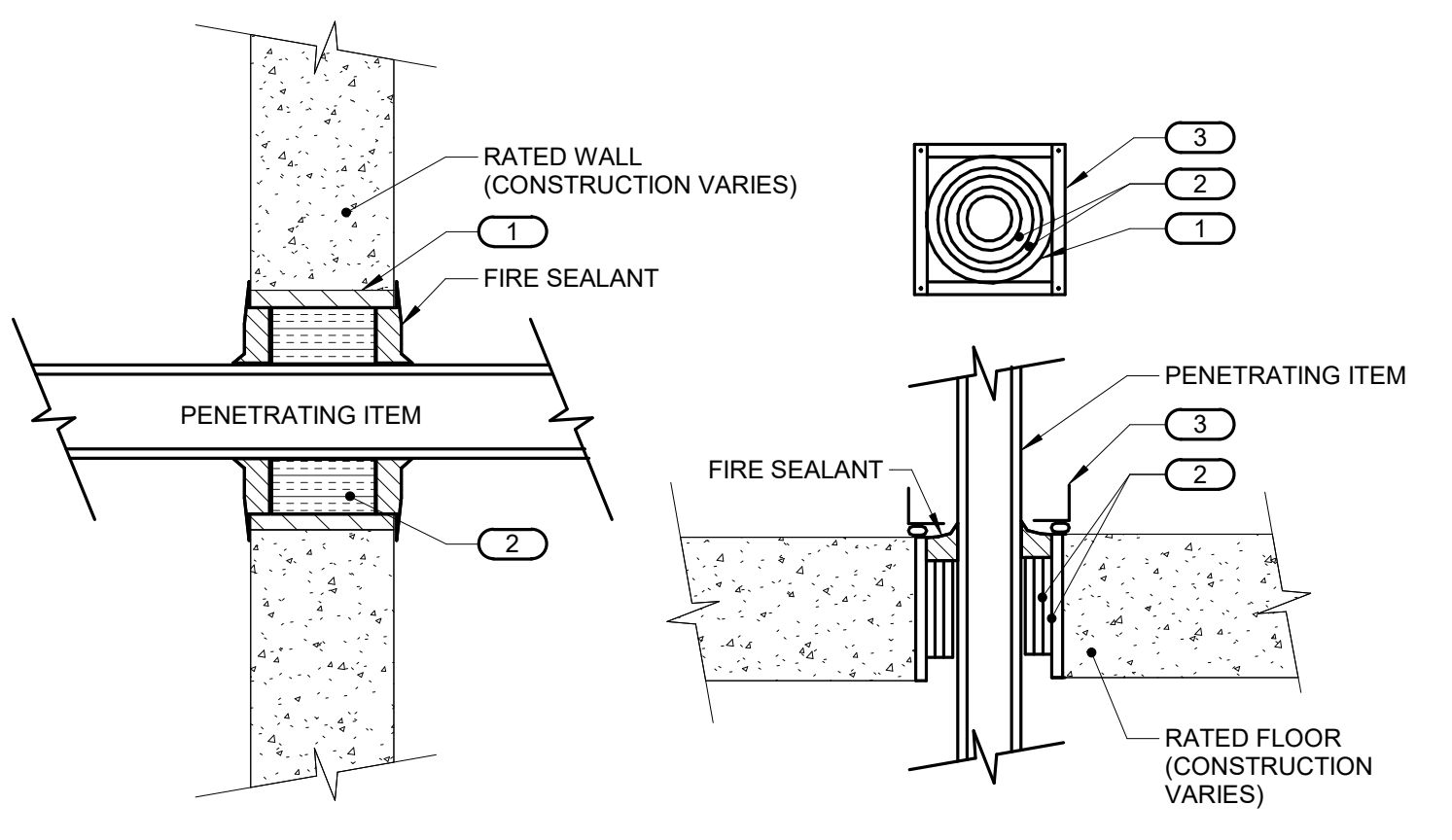
### ELECTRICAL SHEET INDEX

E000	ELECTRICAL COVERSHEET
E200	BASEMENT PLAN - ELECTRICAL
E300	ELECTRICAL ENLARGED PLANS
E500	ELECTRICAL DIAGRAMS
GRAND TOTAL: 4	

### CONDUIT INSTALLATION SCHEDULE

THE FOLLOWING SCHEDULE SHALL BE ADHERED TO UNLESS THEY CONSTITUTE A VIOLATION OF APPLICABLE CODES OR ARE NOTED OTHERWISE ON THE DRAWINGS. THE INSTALLATION OF RMC CONDUIT WILL BE PERMITTED IN PLACE OF ALL CONDUIT SPECIFIED IN THIS SCHEDULE. REFER TO CONDUIT AND BOXES SPECIFICATION 26 05 33 FOR ADDITIONAL INFORMATION.

INSTALLATION TYPE	RMC	EMT
FEEDERS: SWITCHBOARDS, DISTRIBUTION PANELS, PANELBOARDS, MOTOR CONTROL CENTERS, ETC.		X
BRANCH CIRCUITS: LIGHTING, RECEPTACLES, CONTROLS, ETC.		X
MECHANICAL EQUIPMENT FEEDERS: PUMPS, CHILLERS, AIR HANDLING UNITS, ETC.		X
FLOOR MOUNTED EQUIPMENT FEEDERS: PUMPS, ETC. (INCLUDE NO MORE THAN 8 FEET OF LFMC TO PUMP)		X
CONTROLS (LIGHTING, POWER, BUILDING AUTOMATION, ETC.)		X
WET AND DAMP LOCATIONS: (CONDUIT, BOXES, FITTINGS, INSTALLED AND EQUIPPED TO PREVENT WATER ENTRY)	X	
INTERIOR LOCATIONS WITH FINISHED CEILING AND WALLS: CONCEALED IN WALLS AND ABOVE FINISHED CEILINGS		X
INTERIOR LOCATIONS WITHOUT FINISHED CEILINGS: CONCEALED IN WALL, EXPOSED ABOVE CEILINGS		X
EXISTING INTERIOR LOCATIONS WITH FINISHED CEILINGS AND WALLS: CONCEALED IN WALLS AND ABOVE FINISHED CEILING UNLESS OTHERWISE NOTED		X



**NOTES:**

1. THIS GENERAL DETAIL APPLIES TO ALL ITEMS PENETRATING FIRE RATED WALLS OR FLOORS. THE INTENT IS TO MAINTAIN THE FIRE RATING AND TO ALLOW LONGITUDINAL MOVEMENT. REFER TO SPECIFICATION FOR ADDITIONAL INFORMATION.

**KEYNOTES: (#)**

1. SCHEDULE 5 PIPE SLEEVE EMBEDDED IN WALL OR FLOOR, OR SMOOTH CORE DRILL. EACH CONTRACTOR FURNISHES SLEEVE TO G.C. COORDINATES SLEEVE LOCATIONS AND DEBURS SLEEVE. G.C. BUILDS SLEEVE INTO WALL OR FLOOR ALLOWING NO GAP AROUND SLEEVE. IF SLEEVE IS NOT PROVIDED WHEN WALL OR FLOOR IS BUILT, CONTRACTOR SHALL INSTALL SLEEVE. SLEEVE SIZE SHALL ALLOW ANNUAL SPACE REQUIRED BY THE SELECTED FIRE STOP SYSTEM.

2. INSTALL BACKING MATERIAL, SUCH AS MINERAL WOOL SAVING, AS REQUIRED FOR FIRE STOP SYSTEM. INSTALL IN ACCORDANCE WITH FIRE STOP SYSTEM APPLICATION LISTING. SECURE TO WALL OR FLOOR TO ALLOW LONGITUDINAL MOVEMENT OF PENETRATING ITEM WITHOUT MOVEMENT OF FIRE BARRIER.

3. WATER-TIGHT WELDED 1"x1/2" GAUGE MINIMUM GALVANIZED SHEET METAL ANGLE FRAME. BY CONTRACTOR IN EQUIPMENT ROOMS FOR WATER STOP. PLACE A BEAD OF WATERPROOF SEALANT BETWEEN FLOOR AND BOTTOM OF ANGLE FRAME. SECURE TO FLOOR WITH MASONRY ANCHORS IN CORNERS AND ON 12" MAXIMUM CENTERS. MULTIPLE PENETRATING ITEMS MAY BE ENCLOSED IN ONE FRAME.

### 1 FIRE BARRIER PENETRATION

NO SCALE

### ELECTRICAL RENOVATION NOTES:

- THESE NOTES APPLY TO ALL ELECTRICAL SHEETS AND TRADES, INCLUDING BUT NOT LIMITED TO LIGHTING, POWER, AND SYSTEMS.
- EXISTING CONDITIONS ARE SHOWN BASED ON INFORMATION OBTAINED FROM FIELD SURVEYS, EXISTING BUILDING DOCUMENTS, AND STAFF. VERIFY EXISTING CONDITIONS AND REPORT ANY CONFLICTS BEFORE PROCEEDING.
  - NOT ALL EXISTING EQUIPMENT, LUMINAIRES, AND CONDUIT ARE SHOWN. VERIFY EXISTING CONDITIONS AND REPORT ANY CONFLICTS WITH NEW WORK BEFORE STARTING WORK.
  - FIELD VERIFY THE AVAILABLE CLEARANCES FOR CABLE TRAY, BUSWAY AND CONDUITS BEFORE FABRICATION. RISERS AND DROPS MAY BE NECESSARY BECAUSE OF EXISTING FIELD CONDITIONS.
  - EACH CONTRACTOR SHALL FIELD VERIFY ACCESSIBILITY TO THE AREA OF THEIR WORK AND SHALL NOTIFY THE GENERAL CONTRACTOR PRIOR TO BIDDING IF OTHER UTILITIES ARE REQUIRED TO BE REMOVED OR RELOCATED TO ALLOW ACCESS TO THEIR AREA OF WORK.
  - THE CONTRACTOR SHALL CUT AND PATCH ROOFS, WALLS, AND FLOORS ASSOCIATED WITH THEIR WORK.
  - THE GENERAL CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF CEILINGS, CEILING TILES, AND CEILING GRIDS ASSOCIATED WITH AREAS OF WORK BY ALL CONTRACTORS. NOTIFY THE GENERAL CONTRACTOR OF AFFECTED AREAS PRIOR TO BIDDING.
  - WHERE EXISTING ELECTRICAL SYSTEMS ARE LOCATED IN AREAS THAT CONFLICT WITH NEW EQUIPMENT, PIPING, OR DUCTWORK TO BE INSTALLED, EACH CONTRACTOR SHALL EITHER ARRANGE NEW EQUIPMENT, CONDUIT, OR DUCTWORK IN SUCH A FASHION THAT IT DOES NOT CONFLICT WITH EXISTING SYSTEMS, OR REWORK EXISTING ELECTRICAL SYSTEMS TO ALLOW FOR INSTALLATION OF NEW EQUIPMENT, PIPING, OR DUCTWORK.

### ELECTRICAL INSTALLATION NOTES:

- THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE ADA STANDARDS FOR ACCESSIBLE DESIGN. REFER TO THE ADA GUIDELINES FOR ALL CONFIGURATION DETAILS ON THIS PAGE FOR ADDITIONAL INFORMATION.
- CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH NUMBERING COMMON NEUTRALS MAY NOT BE USED FOR BRANCH CIRCUITS. BALANCE THE LOAD ON PANEL AS EVENLY AS POSSIBLE BETWEEN EACH PHASE.
- ALL MATERIALS USED TO SEAL PENETRATIONS OF FIRE RATED WALLS AND FLOORS SHALL BE TESTED AND CERTIFIED AS A SYSTEM PER ASTM E814 STANDARDS FOR FIRE TESTS OF THROUGH-PENETRATION FIRESTOPS. REFER TO 26 05 03 FOR ADDITIONAL INFORMATION AND REQUIREMENTS SPECIFIC TO FIRESTOPPING.
- CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL CEILING MOUNTED DEVICES AND EQUIPMENT WITH LUMINAIRES, SPRINKLER, AND CEILING DIFFUSERS. CENTER ALL DEVICES IN CEILING TILE PATTERN. SMOKE DETECTORS AND OCCUPANCY/VACANCY SENSORS SHALL BE LOCATED NO CLOSER THAN 3 FEET TO AN AIR SUPPLY DIFFUSER OR RETURN GRILLE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS. ALL OPENINGS SHALL BE REPAIRED TO MATCH EXISTING BY A QUALIFIED CONTRACTOR AT THE EXPENSE OF THIS CONTRACTOR. ALL CONDUITS THROUGH WALLS SHALL BE GROUTED OR SEALED INTO OPENINGS.
- ALL WELDING SHALL BE ACCORDING TO AMERICAN WELDING SOCIETY STANDARDS. CONTRACTOR SHALL FURNISH TO THE ARCHITECT/ENGINEER CERTIFICATES QUALIFYING EACH WELDER. PRIOR TO START OF WORK. THE ARCHITECT/ENGINEER RESERVES THE RIGHT TO REQUIRE QUALIFYING DEMONSTRATION, AT THE CONTRACTOR'S EXPENSE, OF ANY WELDERS ASSIGNED TO THE JOB.
- EACH CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED BY THEIR ACTIONS TO THE WALLS, FLOORS, CEILINGS, AND ROOFS. THE CONTRACTOR WHOSE WORK CAUSES DAMAGE IS RESPONSIBLE FOR PATCHING TO MATCH ORIGINAL CONSTRUCTION, FIRE RATING, AND FINISH.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLAN, ELECTRICAL, TECHNOLOGY AUDIOVISUAL, AND OTHER ELECTRICAL PLANS FOR EXACT LOCATIONS OF ALL CEILING MOUNTED DEVICES, OTHER THAN SPRINKLERS.
- ELECTRICAL IDENTIFICATION. REFER TO SPECIFICATION SECTION 26 05 53 FOR COLOR/LABEL REQUIREMENTS FOR CONDUIT, BOX, CABLEWIRE, AND EQUIPMENT.

### EXISTING DP-1

ENCLOSURE: NEMA 1  
FED FROM: EXISTING SWITCHBOARD  
LOCATION: EXISTING MECHANICAL

MAIN: 800 A MLO  
VOLTS: 480/277 Wye  
PHASE: 3  
WIRE: 4  
SCCR: EXISTING

NOTES: OLD CONNECTED (ESTIMATED) LOAD = 324.4A (269.5 KVA); EXISTING LOAD BEING REMOVED = 324.4A (269.5 KVA); NEWLY ADDED LOAD = 273A (227 KVA); TOTAL NEW CONNECTED LOAD = 273A (227 KVA).

CKT	LOAD DESCRIPTION	Load	POLES	FRAME	TRIP	TYPE	ACC.	WIRE AND RACEWAY	CIRCUIT KEY
DP-1-1	HVAC Cooling Only, CH-1	128.8 kVA	3	350 A	350 A			3#3/0 & 1#3 EGC IN 2" C.	*NB
DP-1-2	HVAC Cooling Only, CH-2	91.41 kVA	3	250 A	250 A			EXISTING WIRE AND CONDUIT	*RB
DP-1-3	Motor, CWP-1	3.6 kVA	3	15 A	15 A			EXISTING WIRE AND CONDUIT	*EB
DP-1-4	Motor, CWP-2	2.7 kVA	3	15 A	15 A			EXISTING WIRE AND CONDUIT	*EB
DP-1-5									
DP-1-6									

LOAD CLASSIFICATION

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	TOTALS*
HVAC Cooling Only	220.21 kVA	100.00%	220.21 kVA	
Motor	6.5 kVA	100.00%	6.5 kVA	
				TOTAL CONNECTED LOAD: 226.71 kVA
				TOTAL ESTIMATED DEMAND LOAD: 226.71 kVA
				TOTAL CONNECTED AMPS: 272.69 A
				TOTAL ESTIMATED DEMAND AMPS: 272.7 A

\*TOTAL DEMAND CALCS SUBTRACT ANY REDUNDANT LOAD AND THE SMALLER OF ANY NONCOINCIDENT HVAC LOADS. THIS CALC IS DONE AT EACH PANEL.

CIRCUIT KEY NOTES: \*EB = NEW LOAD IN EXISTING BREAKER AND EXISTING WIRING; \*RB = REPLACE EXISTING BREAKER WITH CUSTOM FIT NEW BREAKER AND EXISTING WIRING. FIELD VERIFY THE EXACT REQUIREMENTS. \*NB = REPLACE EXISTING BREAKER WITH CUSTOM FIT NEW BREAKER AND NEW WIRING. FIELD VERIFY THE EXACT REQUIREMENTS.

### VARIABLE FREQUENCY DRIVE SCHEDULE

STARTER TYPE:	ACCESSORIES & OPTIONS (REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION):
PWM - PULSE WIDTH MODULATED (6.12, 18 PULSE PWM REQUIRED)	SC - SHIELDED VFD CABLE LPF - LEADING POWER FACTOR MANAGEMENT DB - DYNAMIC BRAKING LH - LOW HARMONIC (REQUIRED)
AFE - ACTIVE FRONT END / ULTRA	RSS - REMOTE START-STOP, DRIVE RUN, FAULT TRIP
LINE DISCONNECT:	SA - STANDARD ACCESSORIES FOR ALL DRIVES (INCLUDES 1 ITEM) * MANUAL SPEED ADJUSTMENT * ELECTRONIC THERMAL OVERLOADS * CONTROL TRANSFORMER, FUSED, 120V * HAND-OFF-AUTO DOOR SWITCH * SKIP FREQUENCY CAPABILITY * HARMONIC DISTORTION PERFORMANCE CRITERIA REFER TO SPECIFICATIONS
DS - DISCONNECT SWITCH	AHF - ACTIVE HARMONIC FILTER
FDS - FUSED DISCONNECT SWITCH	CA - TWO CONVERTIBLE AUXILIARY CONTACTS
CB - CIRCUIT BREAKER	TO - MELTING THERMAL OVERLOADS MMO - MULTIPLE MOTOR OVERLOADS FCH - FORCED COOLING / HEATING

ITEM	LINE DISC.	DRIVE BYPASS	SCCR	CIRCUIT VOLTAGE	POLES	HP RATING	TORQUE TYPE	ENCLOSURE	REQUIRED ACCESSORIES & OPTIONS	COMMENTS
VFD-CT-1	FDS	NONE	65 kA	480 V	3	7.5	PWM	NEMA 1	SA, PROVIDE MMO FOR (2) 3HP MOTORS	
VFD-CWP-3	FDS	NONE	65 kA	480 V	3	30	PWM	NEMA 1	SA	

### DISCONNECT AND STARTER SCHEDULE

NOTE: ALL DISCONNECTS (EXCEPT MANUAL STARTERS) SHALL BE HEAVY DUTY TYPE.

DISCONNECT TYPE:	ACCESSORIES & OPTIONS
FU - FUSED	SA - STANDARD ACCESSORIES (INCLUDES 1 ITEM)
NF - NON-FUSED	*CT - CONTROL TRANSFORMER, FUSED 120V
CB - CIRCUIT BREAKER	*EO - ELECTRONIC OVERLOAD (3 PHASE MOTORS) *HA - HAND-OFF-AUTO IN DOOR *RP - (RED) PILOT LIGHT IN DOOR *TA - TWO CONVERTIBLE AUXILIARY CONTACTS *S/N - INSULATED NEUTRAL ASSEMBLY
STARTER TYPE:	
FV - FULL VOLTAGE	
DS-CP-1	NF
DS-CP-2	NF
DS-CT-1-1	NF
DS-CP-1	NF
DS-CP-2	NF
DS-CT-1-2	NF
RE - REVERSING	
TW - 2 SPEED, 2 WINDING	
SW - 2 SPEED, 1 WINDING	
RV - REDUCED VOLTAGE AUTOXFMR	
SS - SOLID STATE	
MS - MANUAL STARTER	
MX - MANUAL SWITCH	
FS - FUSED SWITCH	
AMS-ASSEMBLED MOTOR STARTER	

ITEM	DISCONNECT TYPE & RATING	VOLTAGE	POLES	STARTER NEMA SIZE	STARTER TYPE	ENCLOSURE	REQUIRED ACCESSORIES & OPTIONS	COMMENTS
MX-CT-1 CP	FU 30 A	120 V	1	0	MX	NEMA 4	RP, 115 VOLT PILOT LIGHT CIRCUIT	
FCS-CWP-1	FU 30 A	480 V	3	1	FV	NEMA 1	SA, FUSED AT 6 AMPS WITH NEUTRAL	
FCS-CWP-2	FU 30 A	480 V	3	1	FV	NEMA 1	SA, FUSED AT 4.5 AMPS WITH NEUTRAL	
DS-CT-1-1	NF 30 A	480 V	3			NEMA 3R	WITH NEUTRAL, EI	
DS-CP-1	NF 30 A	480 V	3			NEMA 1	WITH NEUTRAL	
DS-CP-2	NF 30 A	480 V	3			NEMA 1	WITH NEUTRAL	
DS-CT-1-2	NF 30 A	480 V	3			NEMA 3R	WITH NEUTRAL, EI	

### ESSER HVAC Improvements - Jefferson High School Chiller Replacement

4145 Samuelson Rd, Rockford, IL 61109

### Rockford Public Schools #205

PROFESSIONAL SEAL

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KEY PLAN

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REVISIONS

No.	Date	Revision / Issue
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SHEET INFORMATION

Issue: **BID DOCUMENTS**

Date: **AUGUST 15, 2023**

Job Number: **21002885.15**

Drawn: **RAJMAK**

Checked: **JERJET**

Approved: **GAUSHA**

SHEET TITLE  
**ELECTRICAL COVERSHEET**

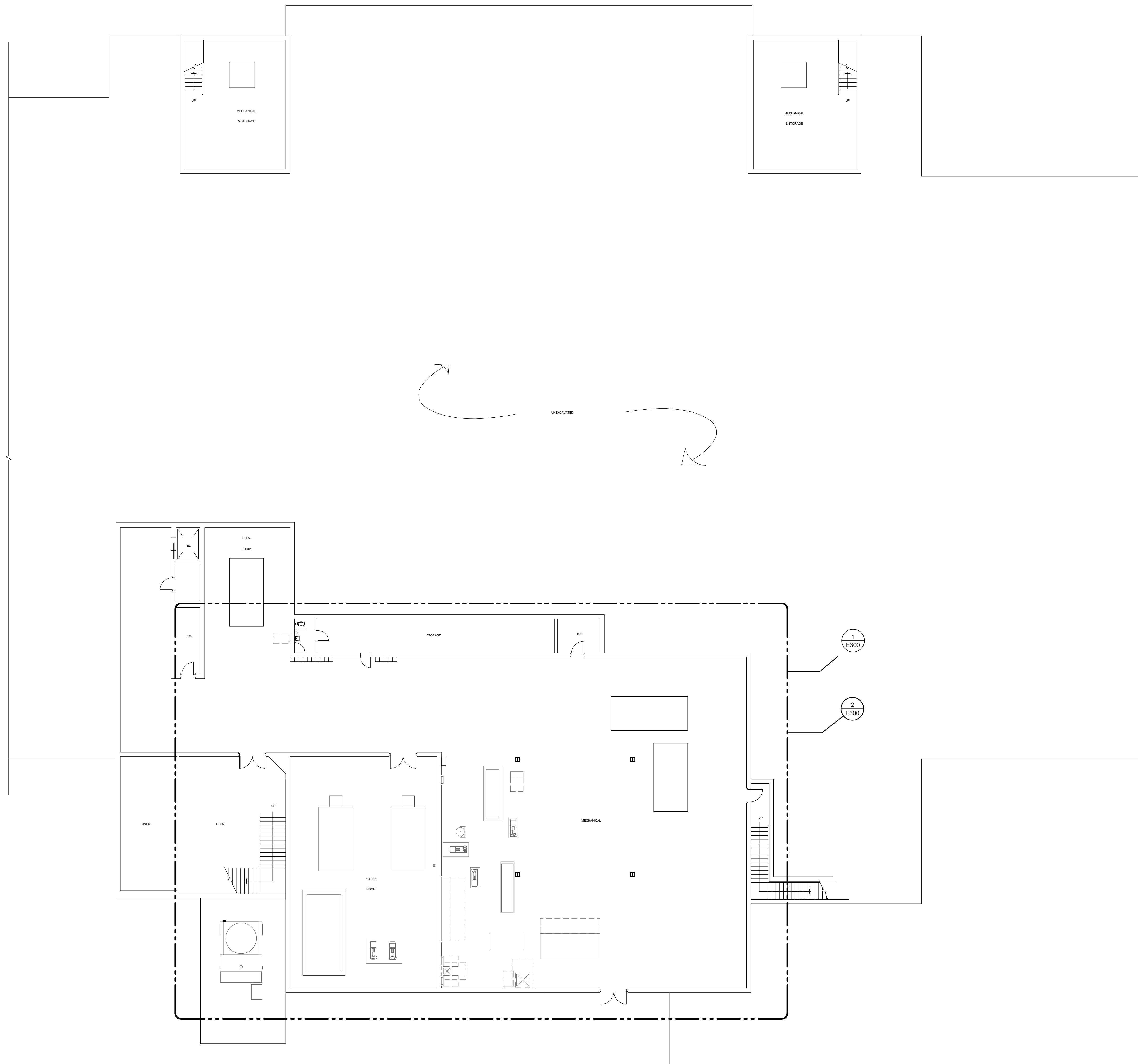
SCALE  
As Indicated

SHEET NUMBER

**ESSER HVAC Improvements -  
Jefferson High School Chiller Replacement**

4145 Samuelson Rd, Rockford, IL 61109

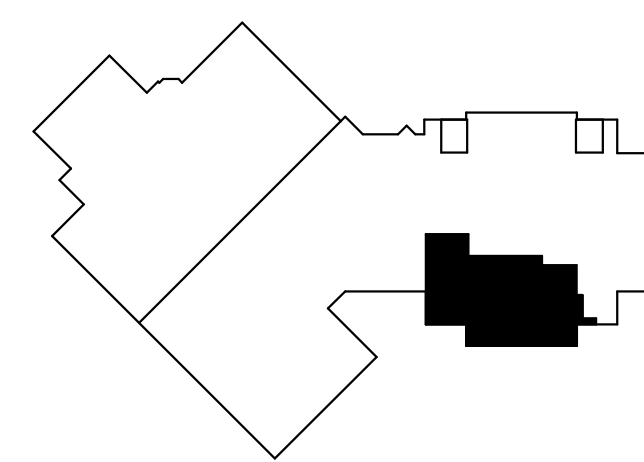
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#205**



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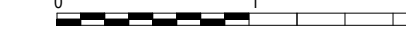
KEY PLAN



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REFERENCE SCALE IN INCHES



REVISIONS

No.	Date	Revision / Issue

SHEET INFORMATION

ISSUE	
Issue	BID DOCUMENTS
Date	AUGUST 15, 2023
Job Number	21002885.15
Drawn	RAJMAK
Checked	JERVET
Approved	GAUSHA

SHEET TITLE

**BASEMENT  
PLAN -  
ELECTRICAL**

SCALE

Scale: **3/32" = 1'-0"**

SHEET NUMBER

**E200**

21002885.15 8/15/2023 12:19:22 PM ESSER HVAC Improvements - Jefferson High School Chiller Replacement



**1**

**BASEMENT OVERALL PLAN - ELECTRICAL**

3/32" = 1'-0"



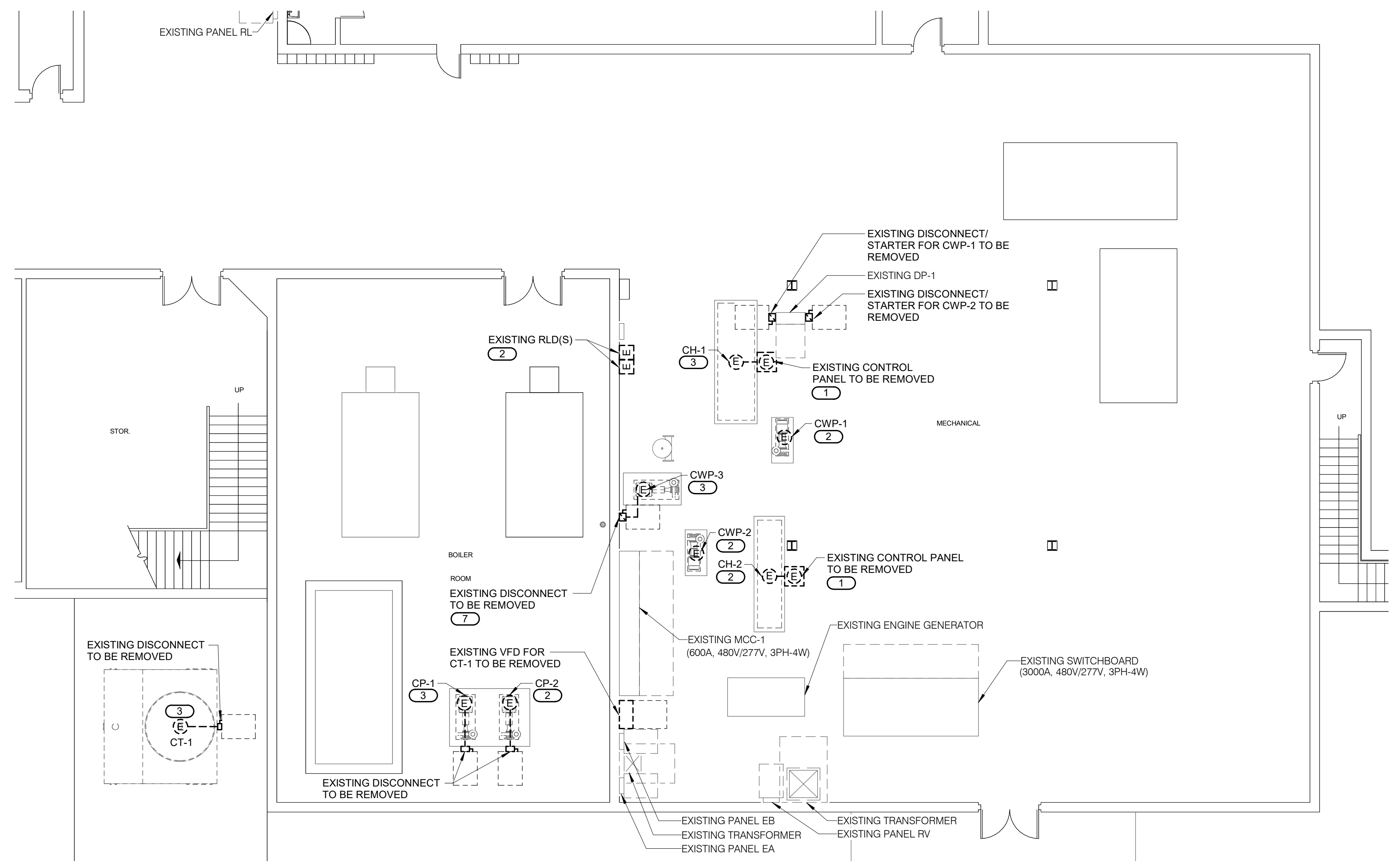
**ESSER HVAC Improvements - Jefferson High School Chiller Replacement**

4145 Samuelson Rd, Rockford, IL 61109

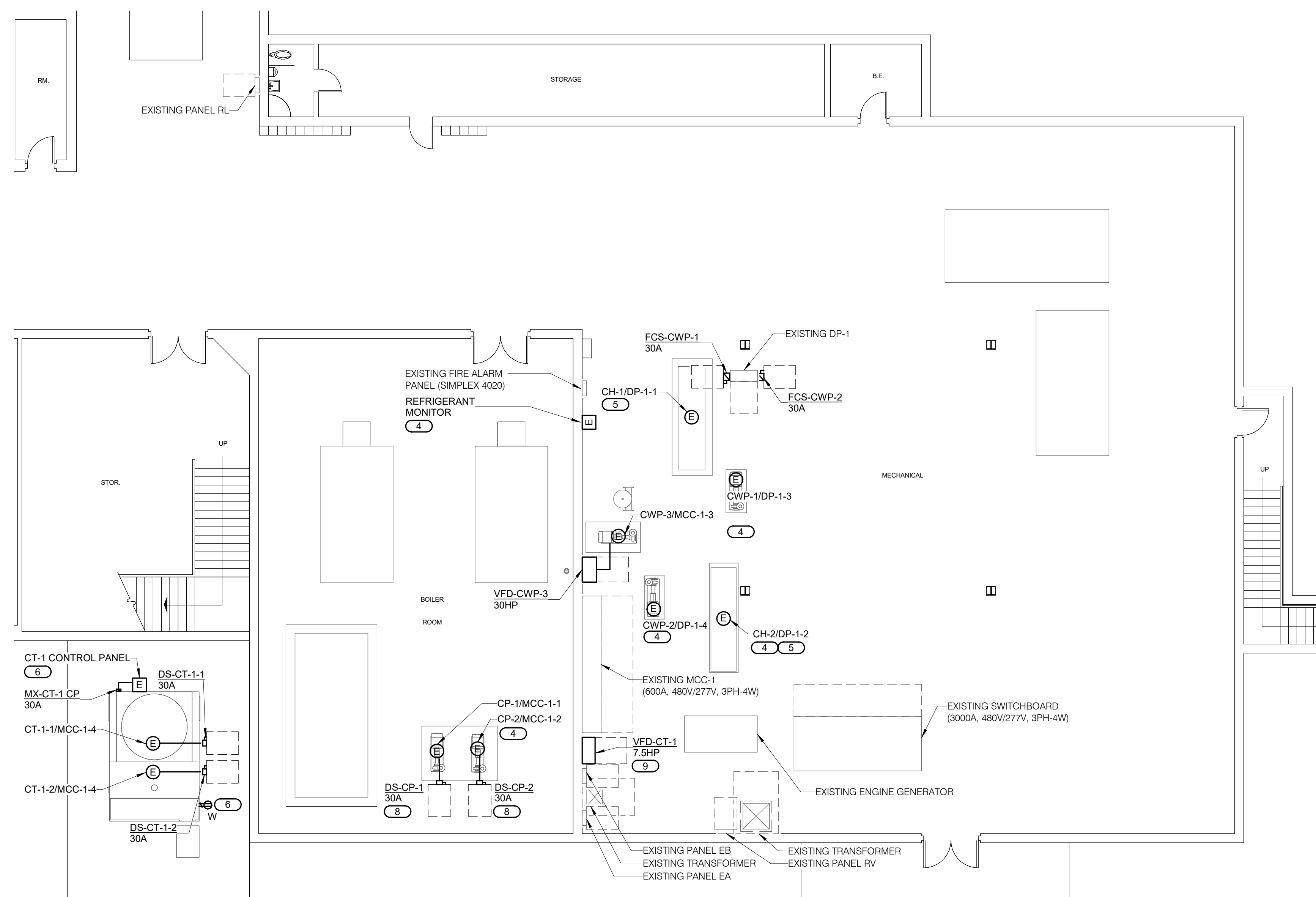
**Rockford Public Schools #205**

- SHEET NOTES:**
- REFER TO SHEET E000 FOR GENERAL ELECTRICAL NOTES, ELECTRICAL INSTALLATION NOTES, ELECTRICAL SYMBOL LIST, VIEW KEY AND ELECTRICAL PANEL SCHEDULES.
  - REFER TO SHEET E500 FOR ELECTRICAL RISER DIAGRAM.
  - THE SHOWN CIRCUIT NUMBERS, FED FROM EXISTING MCC-1, ARE FOR REFERENCE ONLY. FIELD VERIFY THE EXACT EXISTING CIRCUIT NUMBERS FROM PROVIDED LABELS ON EXISTING MCC-1.

- KEYNOTES: (B)**
- DISCONNECT EXISTING POWER CIRCUIT FROM EXISTING CONTROL PANEL. REMOVE ASSOCIATED WIRING & CONDUIT BACK TO SERVING PANEL AND MARK THE BREAKER AS "SPARE". MAINTAIN CONTINUITY OF POWER TO ALL EXISTING REMAIN DEVICES FOUND CONNECTED TO THIS CIRCUIT. FIELD VERIFY THE REQUIREMENTS PRIOR TO REMOVAL OF CIRCUIT.
  - DISCONNECT POWER FROM EXISTING MECHANICAL UNIT AND ASSOCIATED ELECTRICAL INFRASTRUCTURE (DISCONNECT, STARTER, BACKBOXES ETC.). RETAIN EXISTING BRANCH CIRCUIT AND PREPARE IT TO SERVE THE NEW EQUIPMENT AT NEW LOCATION. FIELD VERIFY THE REQUIREMENTS.
  - DISCONNECT POWER FROM EXISTING MECHANICAL UNIT AND ASSOCIATED ELECTRICAL INFRASTRUCTURE (DISCONNECT, STARTER, BACKBOXES ETC.). REMOVE ASSOCIATED WIRING & CONDUIT BACK TO SERVING PANEL AND MARK THE BREAKER AS "SPARE". MAINTAIN CONTINUITY OF POWER TO ALL EXISTING REMAIN DEVICES FOUND CONNECTED TO THIS CIRCUIT. FIELD VERIFY THE REQUIREMENTS PRIOR TO REMOVAL OF CIRCUIT.
  - EXTEND EXISTING MECHANICAL UNIT CIRCUIT, RETAINED DURING DEMOLITION WORK IN THIS AREA. PROVIDE NEW WIRING IN NEW CONDUIT (MATCH WITH EXISTING SIZE AND TYPE) AS REQUIRED.
  - DISCONNECT AND/OR CONTROLLER/STARTER PROVIDED BY OTHERS AND WIRED BY E.C.
  - UTILIZE EXISTING 20A-1P, 120V RATED SPARE CIRCUIT BREAKER(S) IN THE NEAREST AVAILABLE EXISTING PANEL OR PROVIDE NEW 20A-1P, 120V RATED CUSTOM FIT CIRCUIT BREAKER(S) IN THE EXISTING AVAILABLE SPACE OF EXISTING PANEL "RL" OR "RV" TO SERVE THE SHOWN NEW LOAD(S) WITH DEDICATED CIRCUIT. PROVIDE NEW WIRING AND CONDUIT (2#12 & 1#12 EGC IN 1/2" C.) AS REQUIRED. FIELD VERIFY THE EXACT AVAILABLE SPACES AND SPACES.
  - FIELD VERIFY THE EXACT LOCATION.
  - MODIFY EXISTING UNISTRUT TO ACCOMMODATE AND INSTALL THE NEW SHOWN DISCONNECT(S).
  - EC TO INTERFACE THE COOLING TOWER HARDWARE WITH THE VFD.



**1 BASEMENT DEMOLITION PLAN - ELECTRICAL - MECHANICAL/BOILER**  
 1/8" = 1'-0"



**2 BASEMENT PLAN - ELECTRICAL - MECHANICAL/BOILER**  
 1/8" = 1'-0"

8/15/2023 12:19:23 PM ESSER HVAC Improvements - Jefferson High School Chiller Replacement

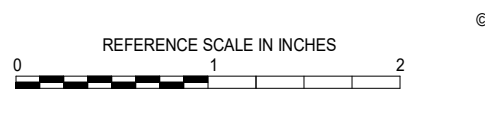
PROFESSIONAL SEAL

CONSULTANT

KEY PLAN

AGENCY APPROVAL

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REVISIONS

No.	Date	Revision / Issue

**SHEET INFORMATION**

Issue	BID DOCUMENTS
Date	AUGUST 15, 2023
Job Number	21002885.15
Drawn	RAJMAK
Checked	JERVET
Approved	GAUSHIA

**SHEET TITLE**

**ELECTRICAL ENLARGED PLANS**

SCALE  
 1/8" = 1'-0"

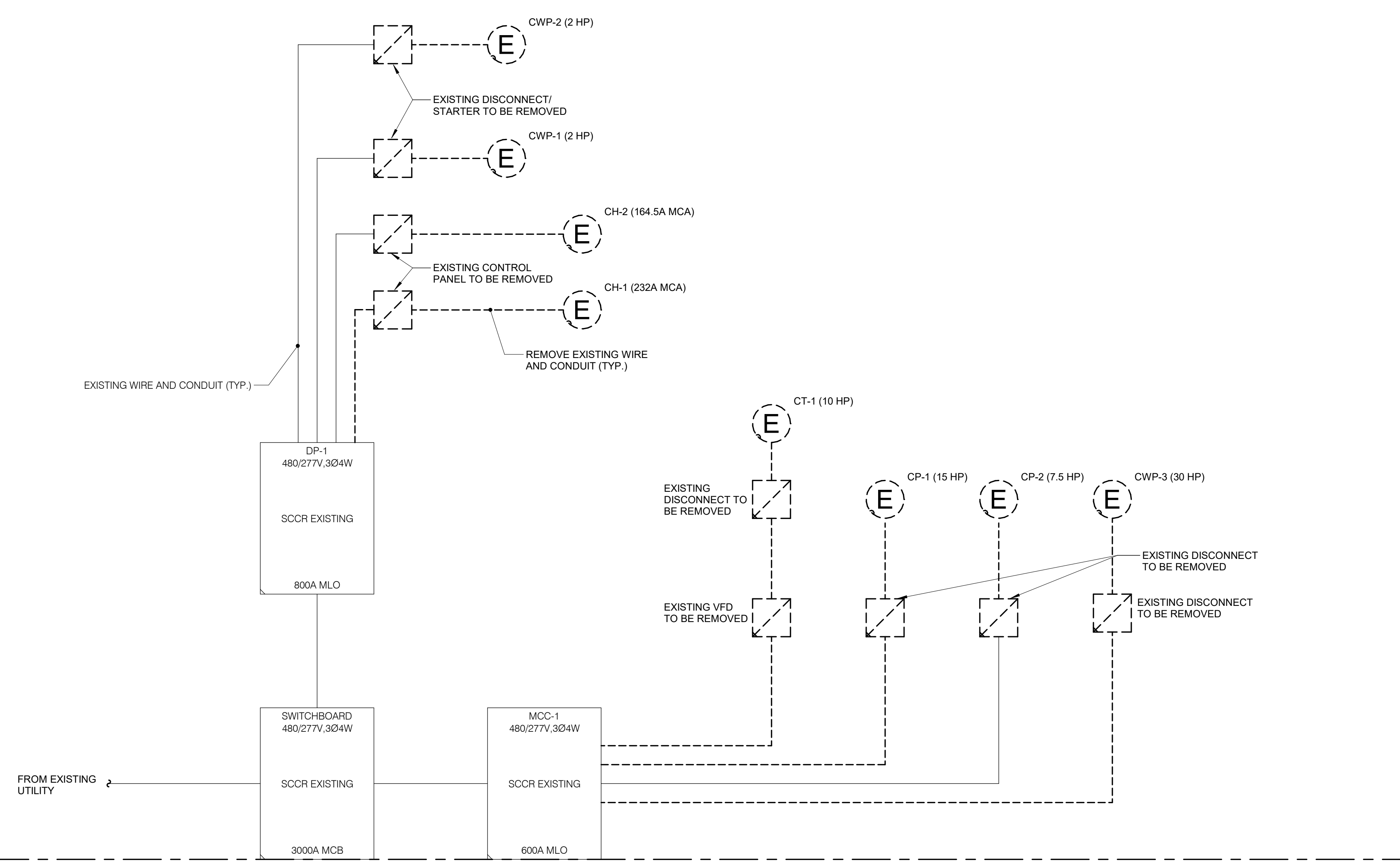
SHEET NUMBER

**E300**

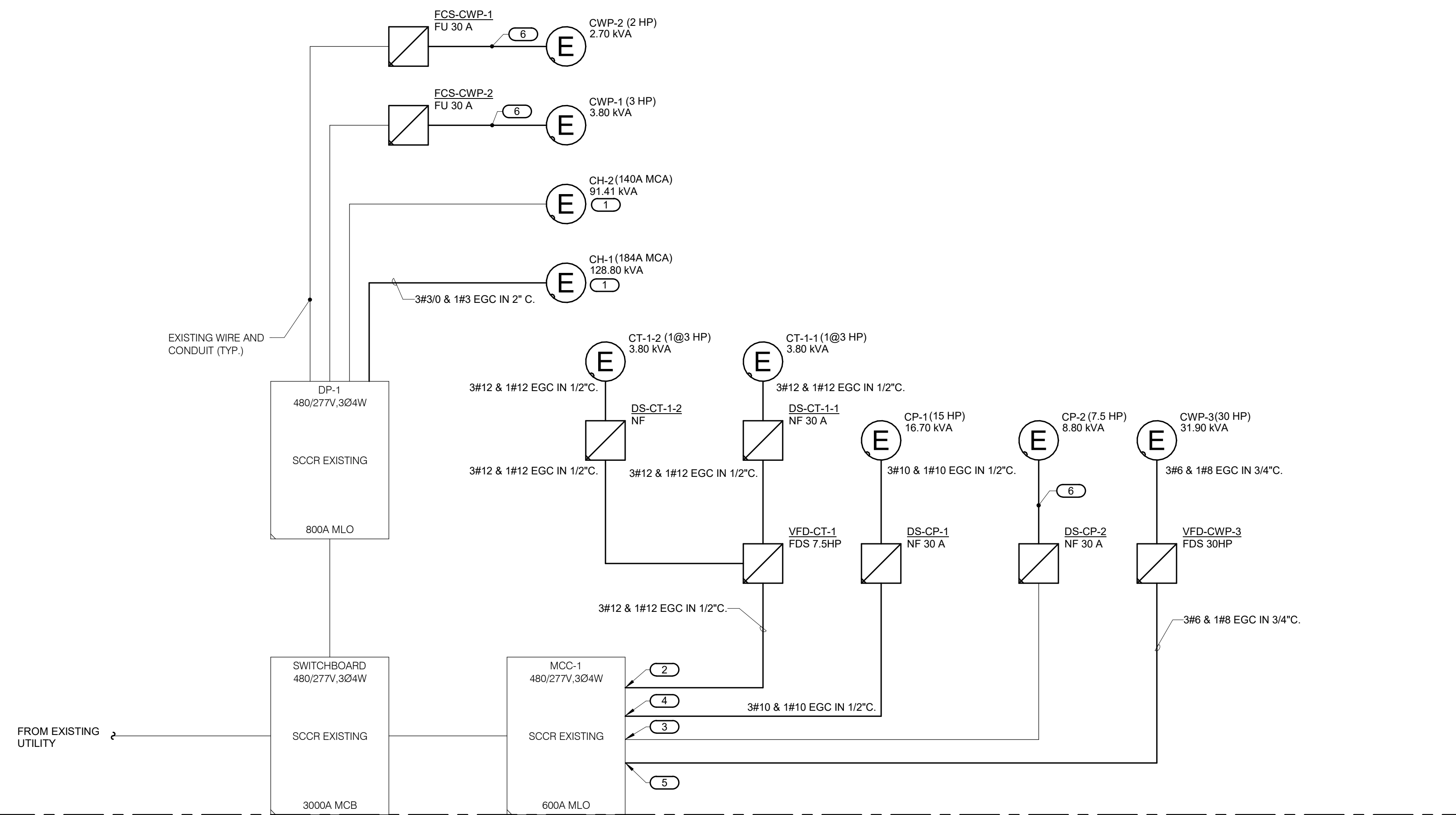
**ELECTRICAL - RISER DIAGRAM NOTES:**

- THE RISER DIAGRAM IS INTENDED TO CONVEY THE COMPONENTS OF THE ELECTRICAL DISTRIBUTION SYSTEM. REFER TO ELECTRICAL DRAWINGS, DETAILS, DISTRIBUTION / PANEL / EQUIPMENT / EQUIPMENT CONNECTION SCHEDULES, AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- SHORT CIRCUIT CURRENT RATINGS (SCCR) FOR EQUIPMENT ARE MINIMUM REQUIREMENTS FOR BUSS BRACING AND DEVICE RATING. ALL EQUIPMENT SHALL BE FULLY RATED UNLESS SPECIFICALLY NOTED AS SERIES RATED.
- THE BASIS OF DESIGN: THE CONTRACTOR SHALL BE RESPONSIBLE FOR DERATING AND SIZING CONDUCTORS AND CONDUITS TO EQUAL OR EXCEED AMPACITY OF THE BASIS OF DESIGN CIRCUITS WHEN ALTERNATIVE METHODS OR MATERIALS OTHER THAN THE BASIS OF DESIGN ARE APPLIED.
  - FEEDER CHARACTERISTICS: ALL CURRENT CARRYING CONDUCTORS SHALL BE COPPER UNLESS NOTED OTHERWISE. CONDUCTOR SIZES ARE BASED ON AMERICAN WIRE GAUGE AWG AND KCMIL THOUSANDS OF CIRCULAR MIL. REFER TO SPECIFICATION SECTION 25 05 13 WIRE AND CABLE FOR ADDITIONAL INFORMATION.
  - GROUNDING AND BONDING CONDUCTORS SHALL BE COPPER.
  - CONDUCTORS (MOTORS): COPPER.
  - CONDUCTOR LENGTHS LISTED IN RISER DIAGRAMS AND SCHEDULES ARE FOR ENGINEERING CALCULATIONS AND SHALL NOT BE USED FOR BIDDING PURPOSES. [BLANK] OR [CU] INDICATES COPPER CONDUCTOR.
- CONDUCTORS AND GROUND SIZES ON THE LINE AND LOAD SIDES OF ALL DISCONNECT SWITCHES SHALL BE IDENTICAL UNLESS NOTED OTHERWISE.
- REFER TO GROUNDING ELECTRODE SYSTEM AND BONDING DETAILS.
- CONDUCTORS AND GROUND SIZES ON THE LINE AND LOAD SIDES OF ALL DISCONNECT SWITCHES SHALL BE IDENTICAL UNLESS NOTED OTHERWISE.
- REFER TO GROUNDING ELECTRODE SYSTEM AND BONDING DETAILS.
- CIRCUIT BREAKER CHARACTERISTICS AND ACCESSORIES:
  - [CB] INDICATES CIRCUIT BREAKER
  - [FU] INDICATES FUSED SWITCH
  - [NF] INDICATES NON-FUSED SWITCH
  - [MLO] INDICATES MAIN LUG ONLY
  - [MCB] INDICATES MAIN CIRCUIT BREAKER

- KEYNOTES: #**
- DISCONNECT AND/OR CONTROLLER/STARTER PROVIDED BY OTHERS AND WIRED BY E.C.
  - REPLACE EXISTING 60A FUSE(S) WITH NEW 20A FUSE(S) IN EXISTING FUSIBLE DISCONNECT SWITCH LOCATED IN EXISTING MCC-1.
  - REPLACE EXISTING 30A FUSE(S) WITH NEW 20A FUSE(S) IN EXISTING FUSIBLE DISCONNECT SWITCH. REPLACE EXISTING MOTOR STARTER WITH NEW MOTOR STARTER SIZE OF "1" AND PROVIDE NEW OVERLOADS LOCATED IN EXISTING MCC-1.
  - REPLACE EXISTING 50A FUSE(S) WITH NEW 40A FUSE(S) IN EXISTING FUSIBLE DISCONNECT SWITCH. REPLACE EXISTING MOTOR STARTER WITH NEW MOTOR STARTER SIZE OF "2" AND PROVIDE NEW OVERLOADS LOCATED IN EXISTING MCC-1.
  - REMOVE EXISTING MOTOR STARTER AND OVERLOADS. RETAIN EXISTING FUSIBLE SWITCH AND REPLACE EXISTING FUSE(S) WITH NEW 70A FUSE(S) IN EXISTING FUSIBLE DISCONNECT SWITCH LOCATED IN EXISTING MCC-1.
  - PROVIDE NEW WIRING IN NEW CONDUIT (MATCH WITH EXISTING SIZE AND TYPE) AS REQUIRED.



**1 RISER DIAGRAM - EXISTING**  
 NO SCALE



**2 RISER DIAGRAM - NEW**  
 NO SCALE

PROFESSIONAL SEAL

CONSULTANT

KEY PLAN

AGENCY APPROVAL

REFERENCE SCALE IN INCHES  
 0 1 2

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SHEET TITLE  
**ELECTRICAL DIAGRAMS**

SCALE  
 As Indicated

SHEET NUMBER