HCA Healthcare℠

LEE'S SUMMIT MEDICAL CENTER

CHILLER PLANT REVISIONS

2100 BLUE PKWY.

LEE'S SUMMIT, MO 64063

ISSUE PURPOSE: ISSUE FOR BID

HENDERSON BUILDING SOLUTIONS PROJECT NO.: 2250001567 DATE: 09-27-2022 REVISIONS:
HCA DIVISIONAL DIRECTOR OF FACILITIES MANAGEMENT: AARON SMITH

PROJECT MANAGER

HENDERSON BUILDING SOLUTIONS
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STRUCTURAL ENGINEER

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CODES & STANDARDS

2018 INTERNATIONAL BUILDING CODE
2018 INTERNATIONAL PLUMBING CODE
2018 INTERNATIONAL MECHANICAL CODE
2017 NATIONAL ELECTRICAL CODE

CODE OF ORDINANCES OF THE CITY OF LEE'S SUMMIT, MO (2009)

2018 NFPA 99 - HEALTH CARE FACILITIES CODE
2018 NFPA 101 - LIFE SAFETY CODE
2019 NFPA 110 - STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS
FGI 2018 - GUIDELINES FOR DESIGN AND CONSTRUCTION OF HEALTHCARE FACILITIES

DRAWING LIST:

MECHANICAL

ELECTRICAL

STRUCTURAL

GENERAL MECHANICAL DEMOLITION NOTES:

1. ALL PIPING REMOVAL SHOWN ON THE DRAWINGS TO INCLUDE REMOVAL OF ALL HANGERS AND SUPPORTS. REPAIR ALL HOLES IN WALLS TO MATCH EXISTING CONSTRUCTION AND RATINGS. PROVIDE NEW SUPPORTS TO BUILDING STRUCTURE FOR ANY DEVICES TO REMAIN THAT WERE SUPPORTED FROM PIPES REMOVED.
2. IT SHALL BE THE RESPONSIBILITY OF THE INDIVIDUAL CONTRACTORS TO PERFORM ALL DEMOLITION NECESSARY TO PERFORM THE WORK SHOWN ON THE DRAWINGS, EXCEPT WHERE SAID DEMOLITION IS SHOWN ON THE DRAWINGS TO BE PERFORMED BY THE PRIME CONTRACTOR.
3. OWNER SHALL HAVE THE RIGHT TO SALVAGE ANY MATERIALS AND EQUIPMENT SHOWN TO BE REMOVED. ALL EQUIPMENT AND MATERIALS REMOVED AND NOT RETAINED BY THE OWNER SHALL BE CONSIDERED PROPERTY OF THE CONTRACTOR, AND SHALL BE PROMPTLY REMOVED FROM THE OWNERS PROPERTY AND SHALL BE LEGALLY DISPOSED OF. OWNER ASSUMES NO RESPONSIBILITY FOR CONDITION OF EQUIPMENT OR MATERIAL TO BE REMOVED.
4. CONTRACTOR SHALL CEASE WORK AND NOTIFY HENDERSON BUILDING SOLUTIONS AND OWNER IMMEDIATELY SHOULD ANY HAZARDOUS MATERIALS BE ENCOUNTERED DURING THE PERFORMANCE OF THE DEMOLITION WORK.
5. ALL PIPING, CONDUIT, TUBING, SUPPORTS, CONTROLS, ETC., MADE OBSOLETE BY WORK PERFORMED UNDER THIS CONTRACT, ARE TO BE REMOVED. REPAIR ALL HOLES IN WALLS TO MATCH EXISTING CONSTRUCTION AND RATINGS.
6. WHERE PIPING IS REMOVED AND NOT TO BE REUSED, CAP PIPE AND INSULATE TO MATCH EXISTING.

GENERAL MECHANICAL NOTES:

1. IT IS THE RESPONSIBILITY OF THE PRIME CONTRACTOR AND EACH OF THEIR SUBCONTRACTORS TO REVIEW ALL DRAWINGS TO FULLY IDENTIFY SCOPE OF WORK ASSOCIATED WITH EACH TRADE AND TO ASSURE COORDINATION OF ALL WORK AFFECTING EACH TRADE.
2. CONTRACTOR SHALL INSPECT THE SITE PRIOR TO THE SUBMISSION OF A BID. CONTRACTOR SHALL INFORM THEMSELF OF THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED CONCERNING THE SITE OF THE WORK, THE OBSTACLES WHICH MAY BE ENCOUNTERED, THE DEMOLITION AND TEMPORARY REMOVAL AND REINSTALLATION REQUIRED TO PROVIDE ACCESS TO THE WORK, AND ALL OTHER RELEVANT MATTERS CONCERNING THE WORK TO BE PERFORMED. CONTRACTOR SHALL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER WHICH CONTRACTOR SHOULD HAVE INFORMED THEMSELVES OF PRIOR TO THE SUBMISSION OF A BID.
3. THE DRAWINGS REPRESENT THE BEST INFORMATION AVAILABLE TO THE ENGINEER AND HENDERSON BUILDING SOLUTIONS. ALL DIMENSIONS AND SIZES SHALL BE FIELD VERIFIED. DO NOT SCALE FROM DRAWINGS. SMALL DEVIATIONS BETWEEN THE DRAWINGS AND ACTUAL CONDITIONS ENCOUNTERED SHALL BE RECONCILED DURING THE PERFORMANCE OF THE WORK AND SHALL NOT CONSTITUTE REASON FOR ADDITIONAL COMPENSATION TO THE CONTRACTOR.
4. CONTRACTOR SHALL NOTIFY HENDERSON BUILDING SOLUTIONS AND REQUEST INSTRUCTIONS, SHOULD ACTUAL CONDITIONS DEVIATE SUBSTANTIALLY FROM THOSE INDICATED ON THE DRAWING.
5. THE PRIME CONTRACTOR AND ALL SUBCONTRACTORS SHALL CLOSELY COORDINATE WITH ALL OTHER TRADES, AND SHALL MAKE ADJUSTMENTS AND OFFSETS WHERE NEEDED FOR CLEARANCE REQUIREMENTS. REFER TO STRUCTURAL AND ELECTRICAL DRAWINGS FOR COORDINATION.
6. CONTRACTOR SHALL REPAIR ALL DAMAGE TO EXISTING BUILDING, FIXTURES AND FINISHES CAUSED BY CONTRACTOR DURING THE PERFORMANCE OF THE WORK. REPAIRS SHALL BE PERFORMED BY QUALIFIED TRADES AND SHALL BE COMPLETED IN A MANNER ACCEPTABLE TO THE OWNER AND HENDERSON BUILDING SOLUTIONS.
7. COORDINATE ALL OPENINGS IN WALLS, AND ROOFS WITH OTHER CONTRACTORS.
8. WHERE SPECIFIC PIPE ELEVATIONS ARE SHOWN, CONTRACTOR SHALL FIELD VERIFY ELEVATIONS AND NOTIFY HENDERSON BUILDING SOLUTIONS OF ANY CONFLICTS PRIOR TO INSTALLATION.
9. PROVIDE UL RATED FIRE STOPPING ASSEMBLIES AT ALL PENETRATIONS OF FIRE RATED AND OR SMOKE RATED CONSTRUCTION. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
10. PIPING CONNECTIONS TO EQUIPMENT SHALL BE VERIFIED WITH APPROVED MANUFACTURERS CERTIFIED SHOP DRAWINGS OR SUBMITTALS. PROVIDE TRANSITIONS AS INDICATED OR REQUIRED FROM EQUIPMENT TO PIPING SYSTEMS. REFER TO PIPING DIAGRAMS FOR VALVES AND SPECIALS TO BE INSTALLED.
11. SEE SPECIFICATIONS FOR ALLOWABLE METHODS OF PIPE AND DUCT SUPPORT FROM BUILDING STRUCTURE.
12. CONTRACTOR SHALL DRAIN, FLUSH AND REFILL ALL PIPING SYSTEMS NECESSARY TO PERFORM THE WORK. PROVIDE CHEMICAL TREATMENT FOR ALL PIPING SYSTEMS AT COMPLETION OF THE WORK.
13. CONTRACTOR SHALL OBTAIN INSTALLATION DRAWINGS FOR ALL HENDERSON BUILDING SOLUTIONS-SUPPLIED EQUIPMENT FROM MANUFACTURERS THAT REQUIRE CONNECTIONS TO MECHANICAL SYSTEMS. PRIOR TO INSTALLATION, COORDINATE ROUGH-IN AND CONNECTIONS TO EQUIPMENT TO MEET MANUFACTURERS REQUIREMENTS, TO PROVIDE CODE REQUIRED CLEARANCES AND TO MAINTAIN ACCESS TO EQUIPMENT FOR SERVICING.
14. CONTRACTOR SHALL PROVIDE TEMPORARY REMOVAL AND REINSTALLATION OF ALL BUILDING COMPONENTS REQUIRED TO PERFORM THE WORK. THIS INCLUDES PIPES, LIGHT FIXTURES, CONDUITS, ETC. REINSTALLATION SHALL BE PERFORMED BY QUALIFIED TRADES, AND SHALL BE COMPLETED IN A MANNER ACCEPTABLE TO THE OWNER AND HENDERSON BUILDING SOLUTIONS.
15. REFER TO CONTRACT DOCUMENTS FOR ALLOWABLE WORKING HOURS, PROJECT PHASING AND PROJECT SCHEDULE.
16. ALL SHUT-DOWNS AND INTERRUPTIONS SHALL BE CLOSELY COORDINATED WITH THE OWNER AND HENDERSON BUILDING SOLUTIONS A MINIMUM OF 96 HOURS IN ADVANCE.
17. CONTRACTOR SHALL NOTIFY HENDERSON BUILDING SOLUTIONS OF THE NEED TO REPAIR ANY EXISTING DUCTWORK, PIPING, ETC., DISCOVERED DURING THE PERFORMANCE OF THE WORK.
18. CONTRACTOR SHALL PROVIDE TEMPORARY BARRIERS TO CONTAIN DUST AND DEBRIS RESULTING FROM THE PERFORMANCE OF THE WORK TO THE AREA WHERE WORK IS BEING PERFORMED, AND TO PREVENT DUST AND DEBRIS FROM ENTERING ANY AIR HANDLING SYSTEMS. ALL SPACES WHERE CONSTRUCTION IS OCCURRING SHALL BE MAINTAINED AT A NEGATIVE PRESSURE RELATIVE TO THE SURROUNDING SPACES DURING THE ENTIRE LENGTH OF THE CONSTRUCTION PERIOD WITH THE EXCEPTION OF THE CENTRAL PLANT, UNLESS NOTED OTHERWISE. REFER TO SPECIFICATIONS FOR OTHER FACILITY SPECIFIC REQUIREMENTS.
19. CONTRACTOR SHALL OBTAIN AND BEAR THE COST OF ALL PERMITS, FEES AND ANY OTHER COSTS TO UTILITY COMPANIES, MUNICIPALITIES, INSPECTORS, REVIEWING AGENCIES, ETC., AS PART OF THIS CONTRACT.
20. FEDERAL, STATE, LOCAL, MUNICIPALITY AND UTILITY COMPANY CODES, RULES, REGULATIONS AND REQUIREMENTS APPLY, UNLESS EXCEEDED BY THIS DESIGN.
21. CONTRACTOR SHALL USE THE MECHANICAL DRAWINGS AS THE BASIS OF COORDINATION AND SHOP DRAWINGS. ANY SIGNIFICANT DEVIATION FROM THE MECHANICAL DRAWINGS SHALL BE APPROVED BY THE HENDERSON BUILDING SOLUTIONS.
22. NO WORK SHALL BE PERFORMED PRIOR TO HENDERSON BUILDING SOLUTIONS REVIEW AND APPROVAL OF ALL REQUIRED SHOP DRAWINGS, AND PRODUCT, MATERIAL AND EQUIPMENT SUBMITTALS. ANY WORK INSTALLED PRIOR TO MEETING THESE REQUIREMENTS SHALL BE REMOVED WHERE DIRECTED BY THE HENDERSON BUILDING SOLUTIONS.

MECHANICAL SYMBOLS

V2.03

ANNOTATION

- 1 — MECHANICAL PLAN NOTE CALLOUT
- CU 1 — MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR PROVIDED UNO)
- 1 / M1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 / M1 — SECTION CUT DESIGNATION

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
AI	ANALOG INPUT
AO	ANALOG OUTPUT
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BFW	BOILER FEED WATER
BI	BINARY INPUT
BO	BINARY OUTPUT
BS	BLOWDOWN SEPARATOR
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHWS/R	CHILLED WATER SUPPLY/RETURN
CP	CONDENSATE PUMP
CV	CONTROL VALVE
CWP	CONDENSER WATER PUMP
CWS/R	CONDENSER WATER SUPPLY/ RETURN
CHWP	CHILLED WATER PUMP
DA	DEAERATOR
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DI	DIGITAL INPUT
DN	DOWN
DWH	DOMESTIC WATER HEATER
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EFF	EFFICIENCY
EMS	ENERGY MANAGEMENT SYSTEM
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
FF	FINISHED FLOOR
FPM	FEET PER MINUTE
FWP	FEEDWATER PUMP
GPM	GALLONS PER MINUTE
HE	HEAT EXCHANGER
HP	HORSEPOWER
HWP	HEATING HOT WATER PUMP
HWS/R	HEATING HOT WATER SUPPLY/ RETURN
LAT	LEAVING AIR TEMPERATURE
LPC(P)	LOW PRESSURE CONDENSATE (PUMPED)
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MFR	MANUFACTURER
MIN	MINIMUM
N/A	NOT APPLICABLE
N/C	NORMALLY CLOSED
N/O	NORMALLY OPEN
NOM	NOMINAL
OA	OUTSIDE AIR
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
ST	STEAM TRAP
STM	STEAM
TOS	TOP OF STEEL
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB
WPD	WATER PRESSURE DROP
WS	WATER SOFTENER

PIPING SYMBOLS

- DIRECTION OF FLOW
- CONTROL VALVE
- SHUTOFF VALVE
- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- O, S & Y VALVE
- CHECK VALVE
- BALANCING VALVE WITH PRESSURE PORTS
- STRAINER
- STRAINER WITH BLOWOFF
- RELIEF/SAFETY VALVE
- SOLENOID VALVE
- PRV — PRESSURE REDUCING VALVE (PRV)
- BACKFLOW PREVENTER
- PRESSURE AND TEMPERATURE TEST PLUG
- UNION
- FLANGE CONNECTION
- MV — MANUAL AIR VENT
- CAP
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- ELBOW UP WITH SHUT-OFF VALVE
- ELBOW DOWN WITH SHUT-OFF VALVE
- TEE UP WITH SHUT-OFF VALVE
- TEE DOWN WITH SHUT-OFF VALVE
- REDUCER
- RECIRCULATION PUMP
- THERMOMETER
- PRESSURE GAUGE WITH SHUTOFF VALVE

PIPING LINE TYPES

- EXISTING PIPING TO BE REMOVED
- EXISTING PIPING TO REMAIN
- NEW PIPE
- CD — CONDENSATE DRAIN (CD)
- HWS — HEATING HOT WATER SUPPLY (HWS)
- HWR — HEATING HOT WATER RETURN (HWR)
- CHWS — CHILLED WATER SUPPLY (CHWS)
- CHWR — CHILLED WATER RETURN (CHWR)
- CWS — CONDENSER WATER SUPPLY (CWS)
- CWR — CONDENSER WATER RETURN (CWR)
- HRS — HEAT RECOVERY SUPPLY (HRS)
- HRR — HEAT RECOVERY RETURN (HRR)

LINE TYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINE-TYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING
DEMOLISH
NEW

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MO. CORPORATE NUMBER: E-556D
12/31/22

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STATE OF MISSOURI — BART W. WALKUP — NUMBER PE-2008020990 — PROFESSIONAL ENGINEER

BARTON W. WALKUP
LICENSE # PE-2008020990
PROFESSIONAL SEAL 12/19/2022

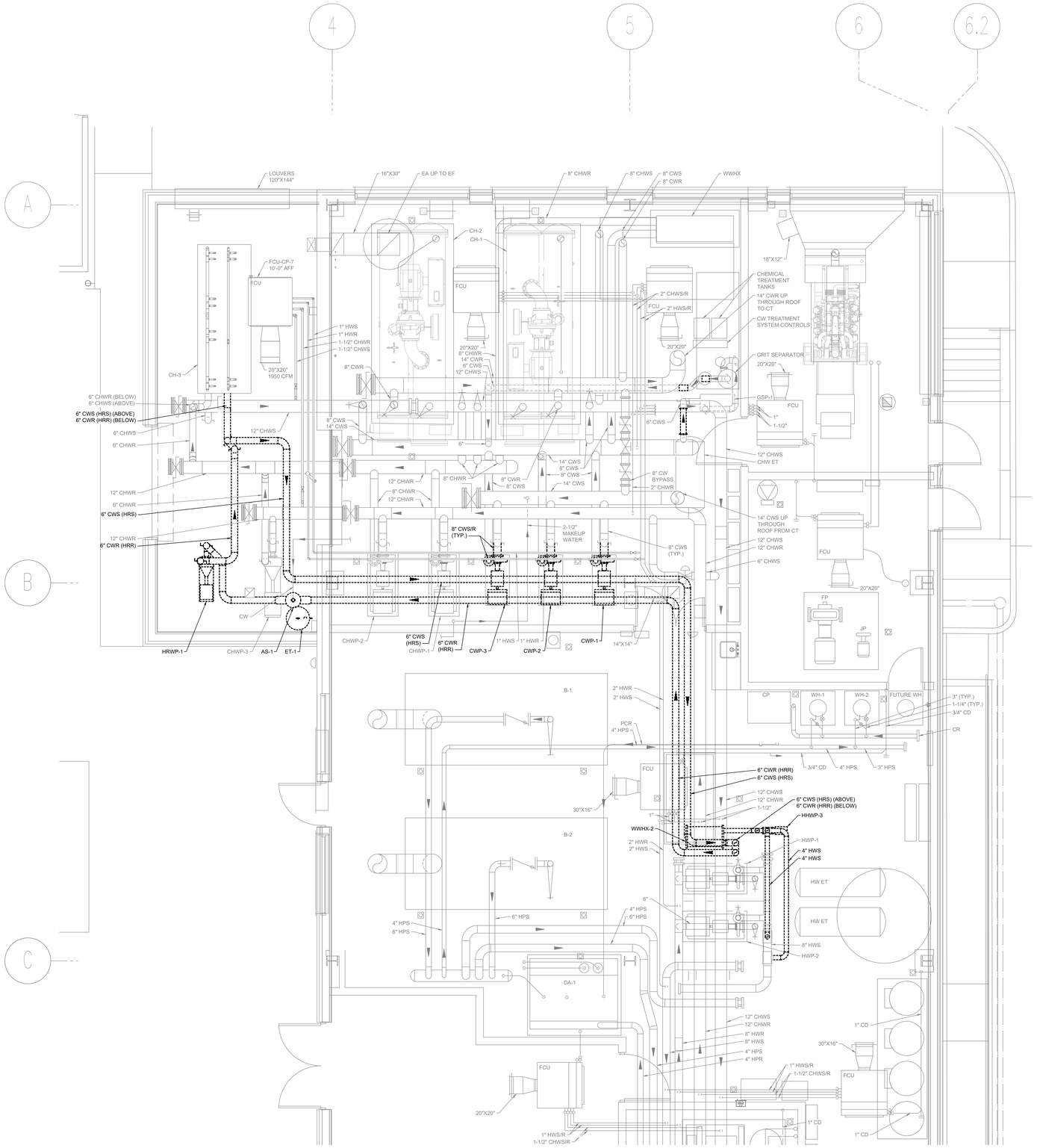
REVISIONS

JOB NO:	2250001567
DATE:	09/27/2022
CHECKED BY:	HBS
DRAWN BY:	HEI

MECHANICAL AND FIRE PROTECTION GENERAL NOTES, LEGENDS AND ABBREVIATIONS

M000

BARTON W. WALKUP



1 MECHANICAL FLOOR PLAN - CENTRAL PLANT PIPING - DEMOLITION
SCALE: 1/4"=1'-0"

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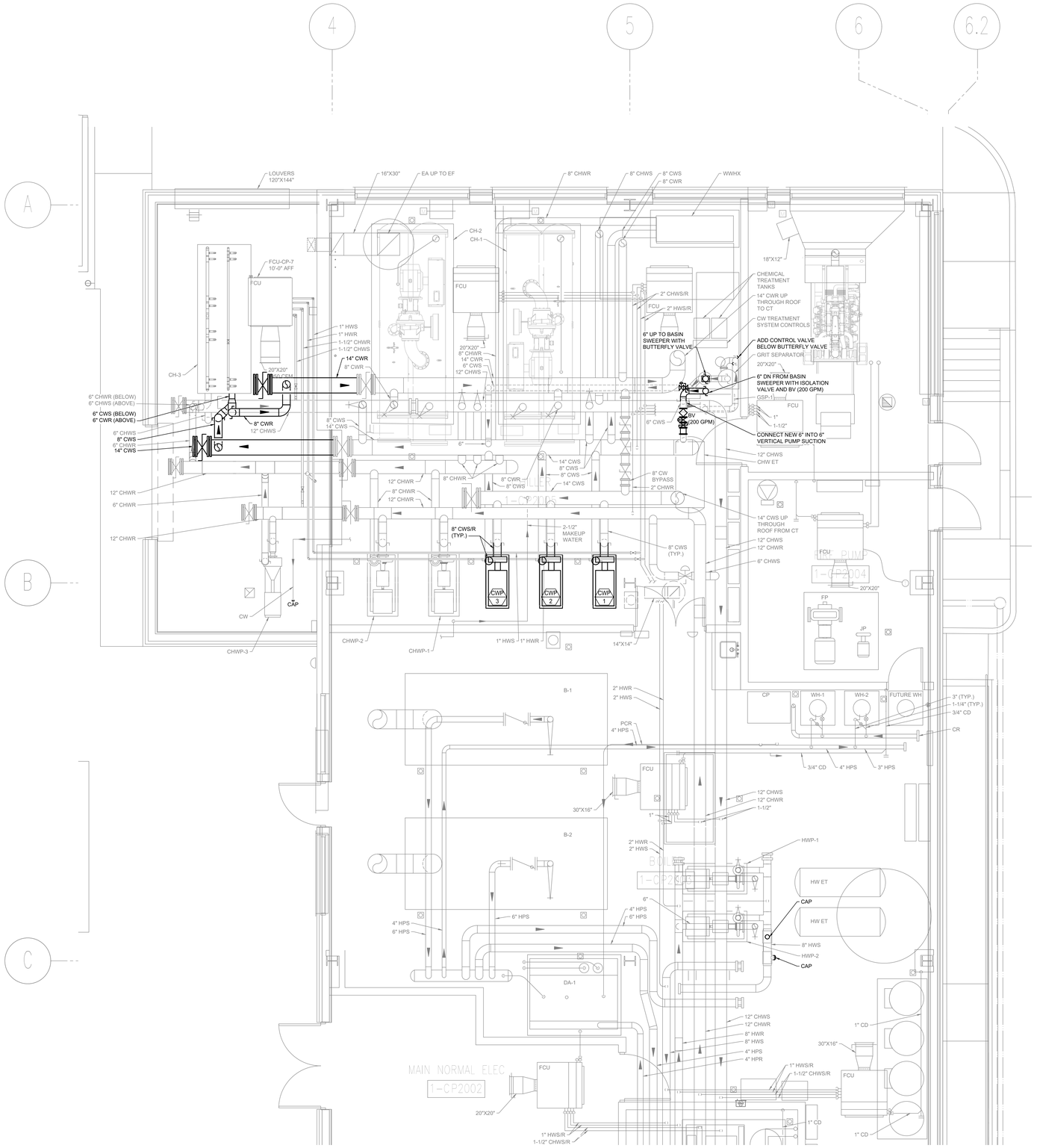
MECHANICAL
FLOOR PLAN
CENTRAL PLANT PIPING
DEMOLITION

M100



1 MECHANICAL FLOOR PLAN - CENTRAL PLANT PIPING - NEW
SCALE: 1/4"=1'-0"

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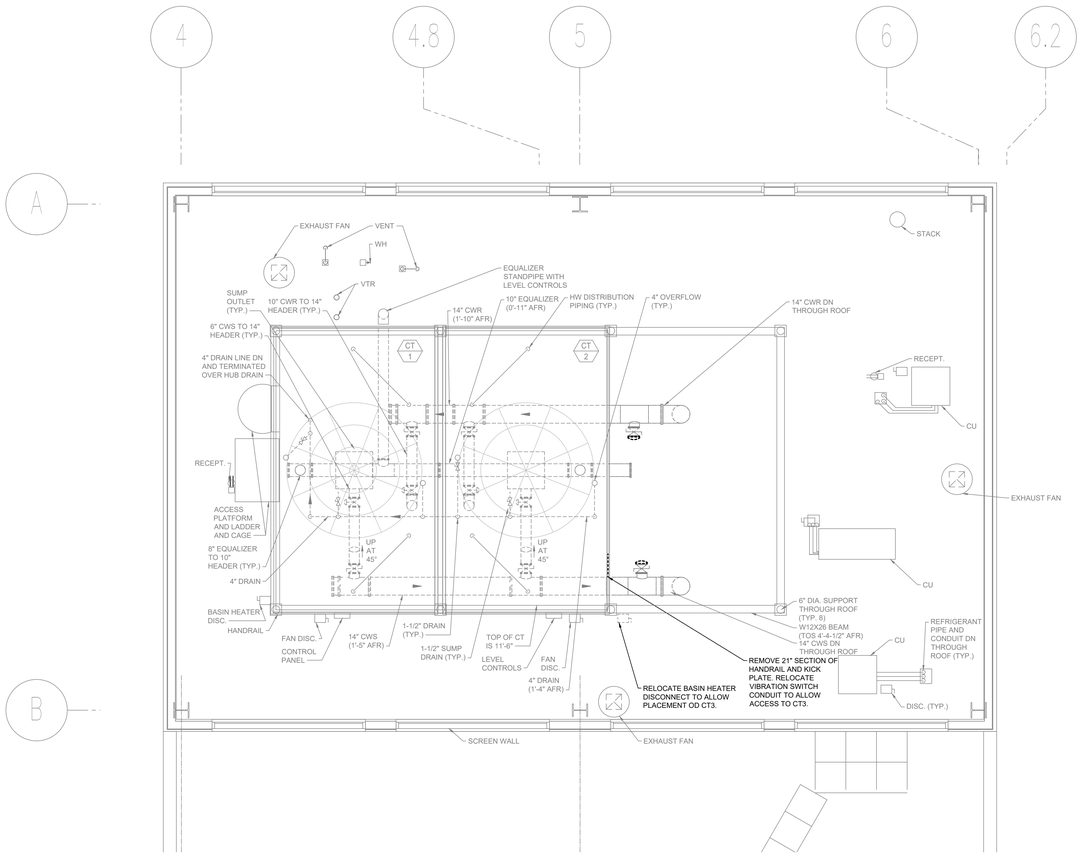
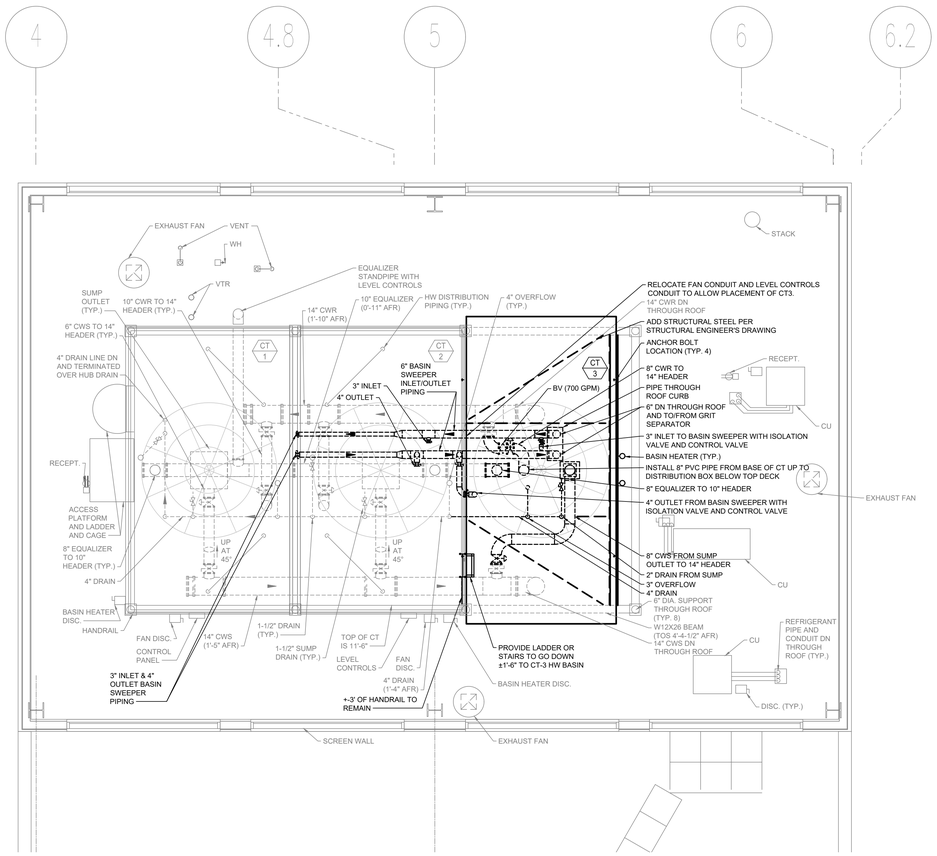
MECHANICAL
FLOOR PLAN
CENTRAL PLANT PIPING
NEW

M101



1 MECHANICAL ROOF PLAN -COOLING TOWER PIPING - DEMOLITION
SCALE: 1/4"=1'-0"



2 MECHANICAL ROOF PLAN -COOLING TOWER PIPING - NEW
SCALE: 1/4"=1'-0"

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MECHANICAL
ROOF PLAN
COOLING TOWER PIPING
DEMOLITION & NEW

M102

COOLING TOWER SCHEDULE (HENDERSON BUILDING SOLUTIONS FURNISHED)

MARK	MANUFACTURER	MODEL	NO. OF CELLS	CAP (MBH)	DESIGN FLOW (GPM)	TAB FLOW (GPM)	EAT (°F WB)	EWT (°F)	LWT (°F)	FAN HP	V/PH	DISC TYPE	VFD (Y/N)	SHIPPING WEIGHT (LBS)	OPERATING WEIGHT (LBS)	DIMENSIONS (LxWxH) W/O ITEMS SHIPPED LOOSE
CT-3	BAC	S3E-1020-060	1	6450	1,290	700	78	95	85	30	480/3	FUSED	Y	10,300	20,570	20'-0 1/2" X 9'-9 1/4" X 10'-0"

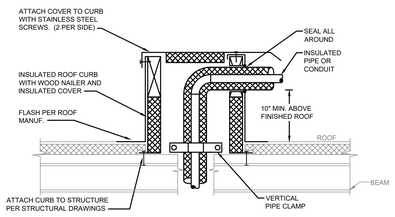
NOTES:

A. VARIABLE FREQUENCY DRIVE FURNISHED AND INSTALLED BY DIVISION 26 CONTRACTOR.
B. DISCONNECT PROVIDED BY MANUFACTURER
C. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

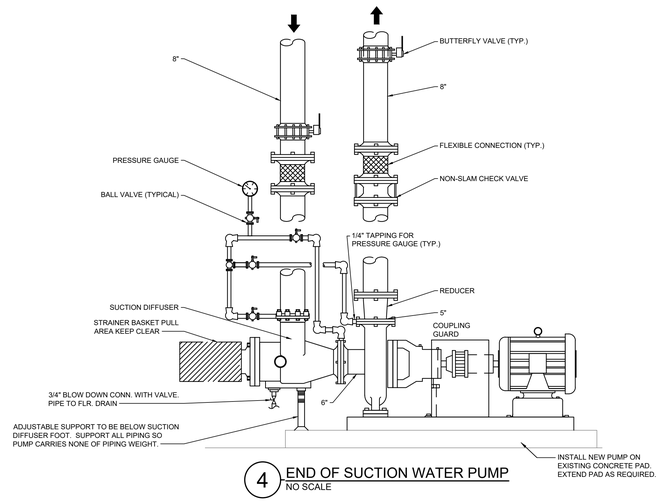
PUMP SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	MOUNTING	MIN. FLOW (GPM)	DESIGN FLOW (GPM)	TAB FLOW (GPM)	FTHD	IMPELLER DIA	MAX BHP	NOM HP	RPM	VFD (Y/N)	V/PH	WEIGHT (LBS)	NOTES
CWP-1	CONDENSER WATER	B&G	E-1510-5GB	BASE	268	1,290	700	120	12.375"	48.5	60	1,800	Y	480/3	1444	A-C
CWP-2	CONDENSER WATER	B&G	E-1510-5GB	BASE	268	1,290	700	120	12.375"	48.5	60	1,800	Y	480/3	1444	A-C
CWP-3	CONDENSER WATER	B&G	E-1510-5GB	BASE	268	1,290	700	120	12.375"	48.5	60	1,800	Y	480/3	1444	A-C

NOTES:
A. SEE SPCIFICATIONS FOR ADDITIONAL INFORMATION
B. VFD FURNISHED BY DIVISION 26 CONTRACTOR.
C. PUMP SHALL BE SELECTED FOR NON-OVERLOADING OVER THE FULL RANGE OF THE PUMP CURVE.



3 PIPE/CONDIUT THROUGH ROOF DETAIL
NO SCALE



4 END OF SUCTION WATER PUMP
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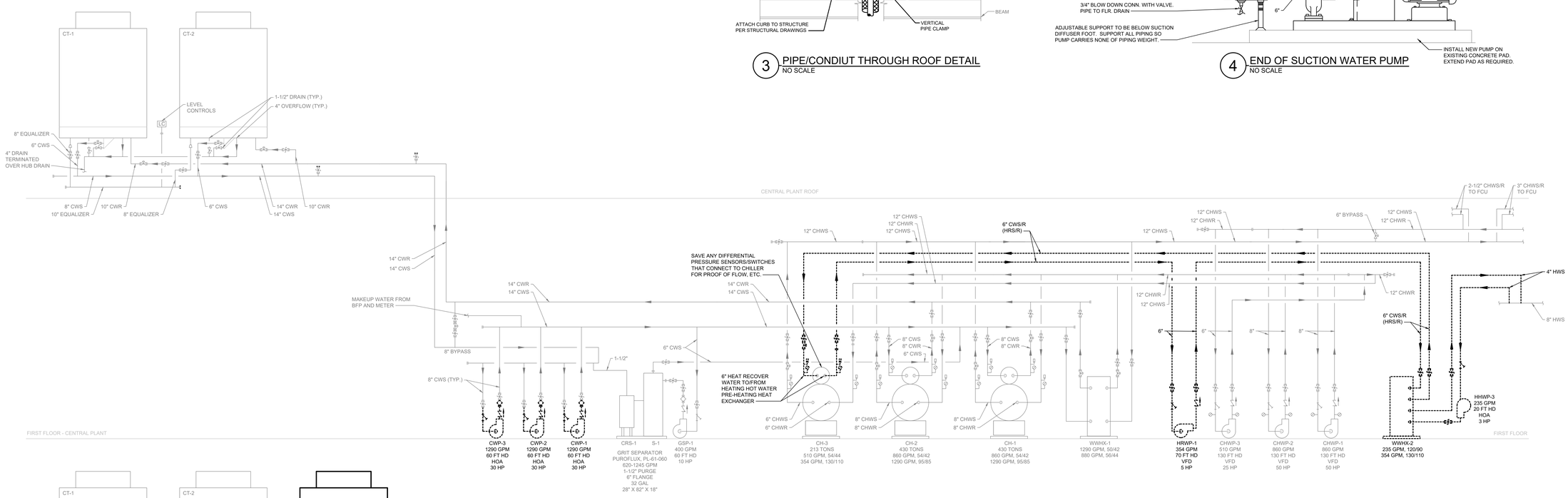
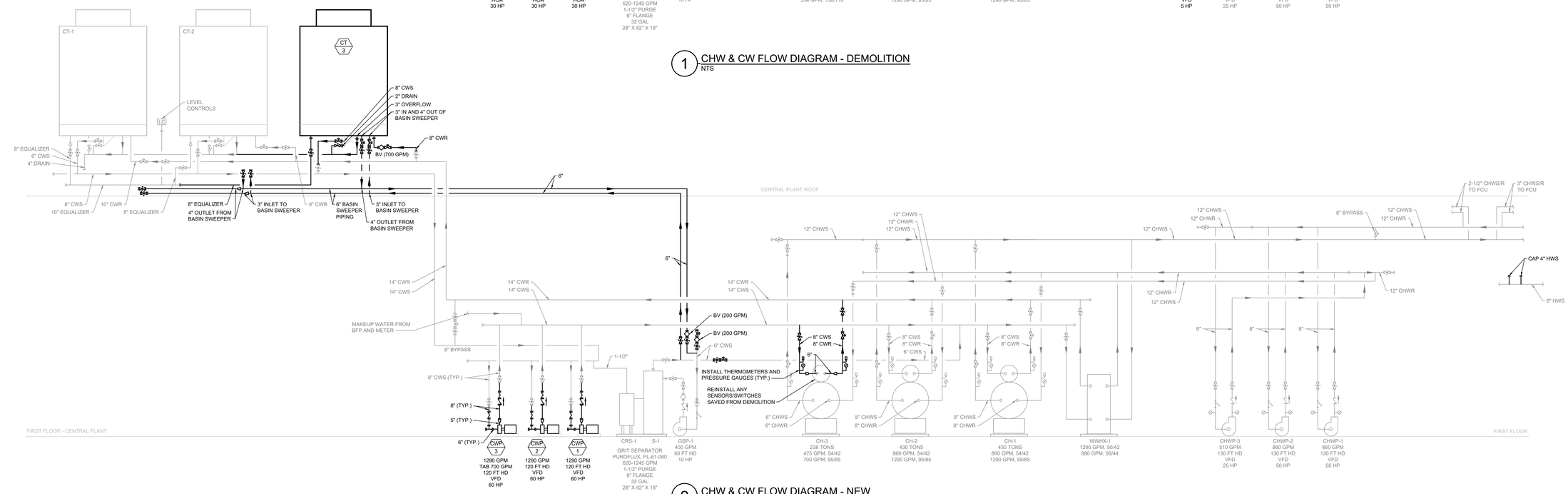


1 CHW & CW FLOW DIAGRAM - DEMOLITION
NTS



2 CHW & CW FLOW DIAGRAM - NEW
NTS

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LICENSE # PE-2008020990
PROFESSIONAL SEAL 12/19/2022

REVISIONS

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CHECKED BY:	HBS
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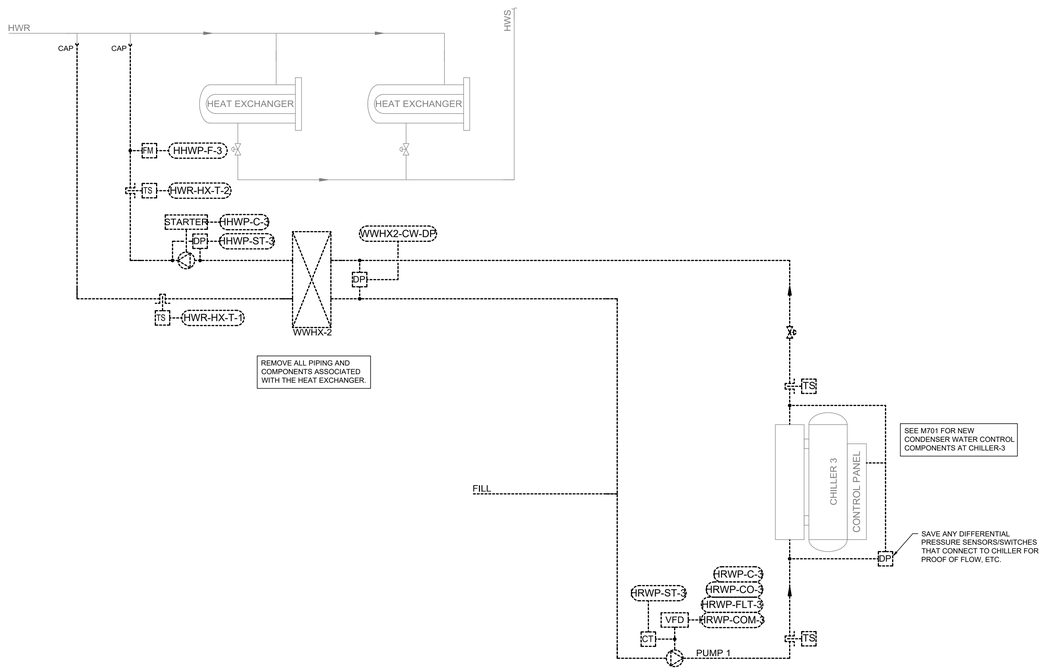
MECHANICAL DETAILS & SCHEDULES

M500

BARTON W. WALKUP



DEMOLITION - POINTS LIST - CONDENSER WATER PLANT

REMOVE EXISTING POINTS

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SETPOINT	SET POINT RESET RANGE	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
HEATING HOT WATER LOOP								
HWR-HX-T-1	HEATING HOT WATER RETURN TEMPERATURE AT HX INLET	AI						
HWR-HX-T-2	HEATING HOT WATER RETURN TEMPERATURE AT HX OUTLET	AI						
HHWP-C-3	CONDENSER PUMP COMMAND	BO						
HHWP-ST-3	CONDENSER PUMP STATUS	BI						
HHWP-F-3	CHILLER CONDENSER WATER FLOW RATE	AI						
WWHX2-CW-DP	LOOP DIFFERENTIAL PRESSURE SENSOR	AI						
CONDENSER WATER PUMP (TYPICAL ALL CWP)								
HRWP-C-3	CONDENSER PUMP COMMAND	BO						
HRWP-CO-3	CONDENSER PUMP CONTROL OUTPUT	AO						
HRWP-COM-3	CONDENSER PUMP VFD COMMUNICATION	COM						
HRWP-FLT-3	CONDENSER PUMP VFD FAULT	BI						
HRWP-ST-3	CONDENSER PUMP STATUS	BI						

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LEE'S SUMMIT MEDICAL CENTER
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2100 BLUE PKWY, LEE'S SUMMIT, MO 64063

BARTON W. WALKUP
LICENSE # PE-2008020990
PROFESSIONAL SEAL 12/19/2022

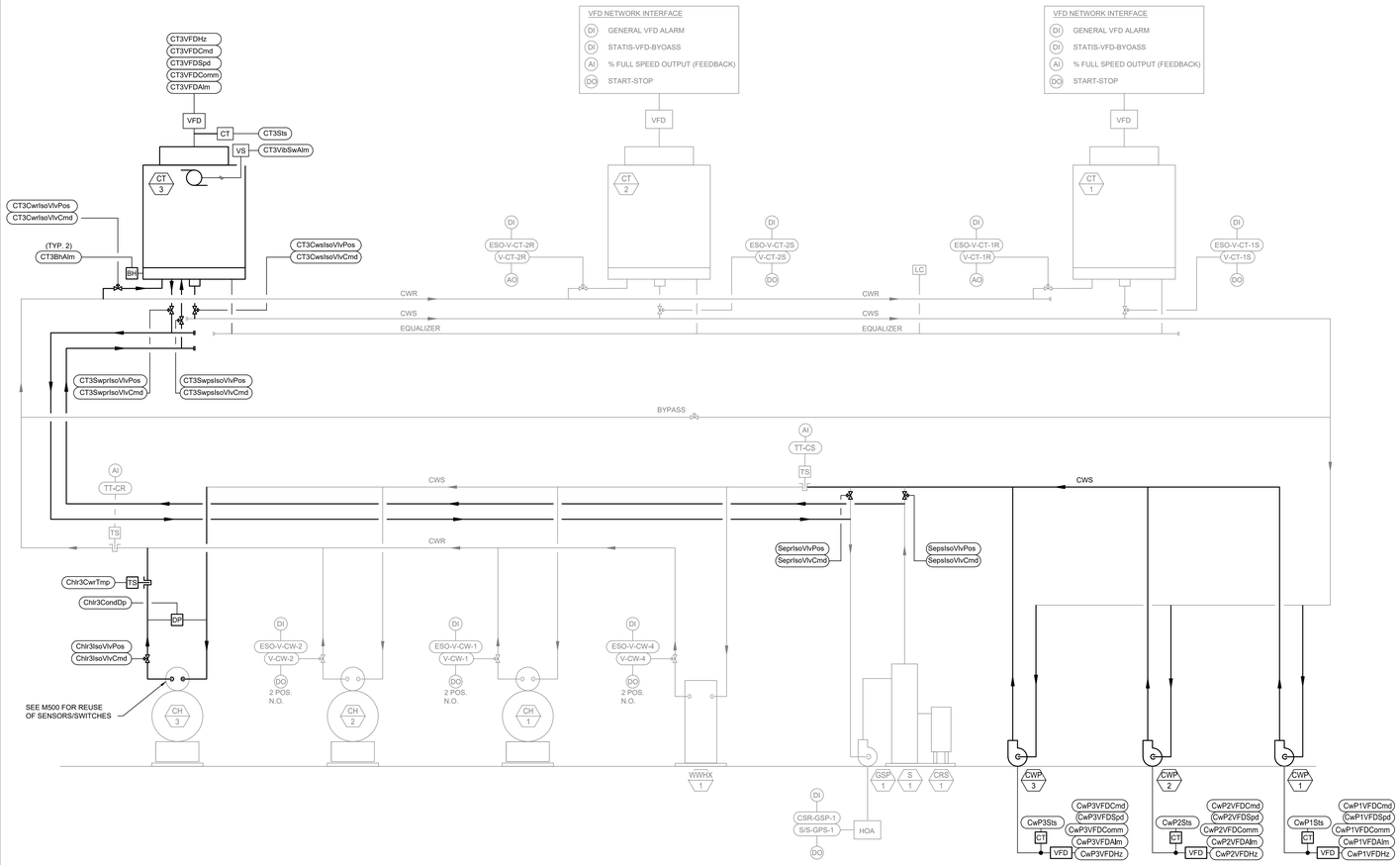
REVISIONS

JOB NO:	2250001567
DATE:	09/27/2022
CHECKED BY:	HBS
DRAWN BY:	HEI

MECHANICAL CONTROLS

M700

BARTON W. WALKUP



1 CONDENSER WATER CONTROL DIAGRAM
NTS

POINTS LIST - CONDENSER WATER PLANT (CT-3 & CWPS 1-3)

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SETPOINT	SET POINT RESET RANGE	FAIL POSITION	TRENDING INTERVAL	TRENDING STORAGE	GRAPHIC DISPLAY	STATUS ALARM	ALARM RANGE	NOTES
CHILLER SENSORS AND VALVES											
Chlr3CondDp	CHILLER 3 CONDENSER DIFFERENTIAL PRESSURE	AI	TBD					X			A, B
Chlr3CwIsoVlvCmd	CHILLER 3 CONDENSER ISOLATION VALVE COMMAND (OPEN/CLOSE)	BO			NO			X			A
Chlr3CwIsoVlvPos	CHILLER 3 CONDENSER ISOLATION VALVE POSITION	BI						X	X	ChlrXCwIsoVlvpOS <> ChlrXCwIsoVlvCmd	
Chlr3CwrTmp	CHILLER 3 CONDENSER WATER RETURN TEMPERATURE	AI						X			A
COOLING TOWER SENSORS AND VALVES											
CT3BhAlm	COOLING TOWER 3 BASIN HEATER ALARM (TYP. 2)	BI				15 MIN.	X	X	X	ON ACTIVATION	C
CT3CwrIsoVlvCmd	COOLING TOWER 3 CONDENSER WATER RETURN VALVE COMMAND (OPEN/CLOSED)	BO			NO			X			A
CT3CwrIsoVlvPos	COOLING TOWER 3 CONDENSER WATER RETURN VALVE POSITION	BI						X	X	CT3CwrVlvPos <> CT3CwrVlvCmd	
CT3CwsIsoVlvCmd	COOLING TOWER 3 CONDENSER WATER SUPPLY ISOLATION VALVE COMMAND (OPEN/CLOSED)	BO			NO			X			A
CT3CwsIsoVlvPos	COOLING TOWER 3 CONDENSER WATER SUPPLY ISOLATION VALVE POSTION	BI						X	X	CT3CwsVlvPos <> CT3CwsVlvCmd	
CT3SwpsIsoVlvCmd	COOLING TOWER 3 SWEEPER SUPPLY ISOLATION VALVE COMMAND (OPEN/CLOSED)	BO						X			A
CT3SwpsIsoVlvPos	COOLING TOWER 3 SWEEPER SUPPLY ISOLATION VALVE POSTION	BI						X	X	CT3SwpsIsoVlvPos <> CT3SwpsIsoVlvCmd	
CT3SwprIsoVlvCmd	COOLING TOWER 3 SWEEPER RETURN ISOLATION VALVE COMMAND (OPEN/CLOSED)	BO						X			A
CT3SwprIsoVlvPos	COOLING TOWER 3 SWEEPER RETURN ISOLATION VALVE POSTION	BI						X	X	CT3SwprIsoVlvPos <> CT3SwprIsoVlvCmd	
COOLING TOWER FAN											
CT3VFDCmd	COOLING TOWER 3 FAN VFD COMMAND (START/STOP)	BO						X			
CT3VFDHz	COOLING TOWER 3 FAN VFD OUTPUT FREQUENCY	AI						X			
CT3VFDSpd	COOLING TOWER 3 FAN VFD CONTROL SPEED OUTPUT	AO		MIN - 60 Hz				X	X	CT3VFDHz< MINIMUM	B
CT3VFDComm	COOLING TOWER 3 FAN VFD COMMUNICATION	COM						X			
CT3VFDAlm	COOLING TOWER 3 FAN VFD ALARM	BI				15 MIN.	X	X	X	COMMON ALARM	
CT3Sts	COOLING TOWER 3 FAN STATUS	BI				15 MIN.	X	X	X	CT3Sts <> CT3Cmd	
CT3VIBSwAlm	COOLING TOWER 3 FAN VIBRATION SWITCH ALARM	BI									
CONDENSER WATER SEPARATOR											
SeprIsoVlvCmd	SEPARATOR RETURN ISOLATION VALVE COMMAND (OPEN/CLOSED)	BO						X			A
SeprIsoVlvPos	SEPARATOR RETURN ISOLATION VALVE POSITION	BI					X	X	X	SeprIsoVlvPos <> SeprIsoVlvCmd	
SepsIsoVlvCmd	SEPARATOR SUPPLY ISOLATION VALVE COMMAND (OPEN/CLOSED)	BO						X			A
SepsIsoVlvPos	SEPARATOR SUPPLY ISOLATION VALVE POSITION	BI						X	X	SepsIsoVlvPos <> SepsIsoVlvCmd	
CONDENSER WATER PUMPS											
CwP1VFDCmd	CONDENSER PUMP 1 VFD COMMAND	BO						X			
CwP1VFDSpd	CONDENSER PUMP 1 VFD CONTROL SPEED OUTPUT	AO	TBD	MIN. - 60 Hz				X	X		B
CwP1Sts	CONDENSER PUMP 1 STATUS	BI				15 MIN.	X	X	X	CwP1Sts <> CwP1Cmd	
CwP1VFDComm	CONDENSER PUMP 1 VFD COMMUNICATION	COM						X			
CwP1VFDAlm	CONDENSER PUMP 1 VFD FAULT ALARM	BI				15 MIN.	X	X	X	COMMON ALARM	
CwP1VFDHz	CONDENSER PUMP 1 VFD OUTPUT FREQUENCY	AI						X			
CwP2VFDCmd	CONDENSER PUMP 2 VFD COMMAND	BO						X			
CwP2VFDSpd	CONDENSER PUMP 2 VFD CONTROL SPEED OUTPUT	AO	TBD	MIN. - 60 Hz				X	X		B
CwP2Sts	CONDENSER PUMP 2 STATUS	BI				15 MIN.	X	X	X	CwP2Sts <> CwP2Cmd	
CwP2VFDComm	CONDENSER PUMP 2 VFD COMMUNICATION	COM						X			
CwP2VFDAlm	CONDENSER PUMP 2 VFD FAULT ALARM	BI				15 MIN.	X	X	X	COMMON ALARM	
CwP2VFDHz	CONDENSER PUMP 2 VFD OUTPUT FREQUENCY	AI						X			
CwP3VFDCmd	CONDENSER PUMP 3 VFD COMMAND	BO						X			
CwP3VFDSpd	CONDENSER PUMP 3 VFD CONTROL SPEED OUTPUT	AO	TBD	MIN. - 60 Hz				X	X		B
CwP3Sts	CONDENSER PUMP 3 STATUS	BI				15 MIN.	X	X	X	CwP3Sts <> CwP3Cmd	
CwP3VFDComm	CONDENSER PUMP 3 VFD COMMUNICATION	COM						X			
CwP3VFDAlm	CONDENSER PUMP 3 VFD FAULT ALARM	BI				15 MIN.	X	X	X	COMMON ALARM	
CwP3VFDHz	CONDENSER PUMP 3 VFD OUTPUT FREQUENCY	AI						X			

ALL POINTS SHOWN SHALL BE PROVIDED BY BAS CONTRACTOR UNLESS NOTED OTHERWISE.

NOTES:
A. BAS CONTRACTOR SHALL PROVIDE DEVICE.
B. DETERMINE SETPOINT IN FIELD.
C. BASIN HEATER CONTROLS ARE PROVIDED BY COOLING TOWER MANUFACTURER AND ARE STAND ALONE CONTROLS.

SEQUENCE OF OPERATIONS
CENTRAL CONDENSER WATER PLANT - CT-3

This sequence of operations is organized into the following main categories: operating modes, control setpoint resets, safeties, overrides and interlocks, and component control loops. The operating modes describe the criteria that either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties, overrides, and interlocks section outlines the hardwired interlocks that will be required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram. The controls contractor shall be responsible for coordinating any necessary time delay setpoints to establish stable system operation.

GENERAL DESCRIPTION
The chilled water plant sequence of operation is existing and shall remain the same, unless noted otherwise.
The condenser water plant described by this sequence of operations is existing and shall remain the same except the addition of Cooling Tower-3 and constant volume water pumps and consist(s) of cooling towers, variable speed cooling tower fans and separator.

OPERATING MODES

CHILLED WATER PLANT DISABLED MODE:
The condenser water plant shall be in disabled mode as defined within the Central Chilled Water Plant control sequence.

CHILLED WATER PLANT ENABLED MODE:
The condenser water plant shall be in enabled mode as defined within the Central Chilled Water Plant control sequence.

CHILLER HEAD PRESSURE CONTROL MODE:
Chiller head pressure control shall be provided with chiller and activated by the onboard factory controller to maintain the minimum head pressure differential pressure between the evaporator and condenser. The building automation system (BAS) shall provide visibility when a chiller is in head pressure control mode.

LOSS OF POWER RESTART DELAY MODE:
The plant shall be in loss of power mode upon restoration of power after an unexpected loss of power. The plant shall remain in this mode for the duration as defined by the plant start delay (PSD) setpoint. Once the plant start delay duration has elapsed, the plant shall return to its previous mode prior to loss of power.

CHILLER FAILURE MODE:
A chiller shall be in failure mode as defined by the chiller failure mode within the Central Chilled Water Plant control sequence.

CHILLER MANUAL START MODE:
The BAS shall indicate manual start mode as defined by the chiller manual start mode within the Central Chilled Water Plant control sequence.

PUMP FAILURE MODE:
A pump shall be in failure mode when:
The pump is given a start signal,
And- The pump status indicates it is off.

SAFETIES, OVERRIDES AND INTERLOCKS

EMERGENCY STOP SWITCH (CHSTP):
Reference the Central Chilled Water Plant control sequence for shutdown information.

REFRIGERANT MONITORING SYSTEM INTERLOCK (RLS):
Reference the Central Chilled Water Plant control sequence for shutdown information.

SMOKE CONTROL FIRE ALARM INTERLOCK:
The condenser plant shall shut down when commanded by the BAS during smoke control mode. All equipment and accessories shall be in disabled mode during smoke control mode.

CONTROL LOOPS

Cooling Tower Control

COOLING TOWER CONTROL (CT-3)

ISOLATION VALVES, PUMPS AND FANS CONTROL
IF COMMON CWS TEMPERATURE RISES ABOVE SETPOINT, CH-3 AND CT-3 ISOLATION VALVES SHALL OPEN, ASSOCIATED CWP SHALL START AND CT-3 FAN SHALL START. CT FAN VFD SHALL MODULATE TO MAINTAIN CWS TEMPERATURE.

IF COMMON CWS TEMPERATURE DROPS BELOW SETPOINT, ASSOCIATED CHWP AND CWP SHALL STOP, CT-3 FAN SHALL STOP AND CH-3 AND CT-3 ISOLATION VALVES SHALL CLOSE.

CONDENSER WATER BYPASS VALVE CONTROL
CONDENSER WATER BYPASS VALVE CONTROL SHALL REMAIN THE SAME.

CONDENSER WATER MAKEUP AND BLOWDOWN CONTROL
CONDENSER WATER MAKEUP AND BLOWDOWN CONTROL SHALL REMAIN THE SAME.

BASIN HEATER CONTROL
CT-3 BASIN HEATERS SHALL OPERATE SUBJECT TO THE MANUFACTURER'S PROVIDED CONTROLLER.

SEPARATOR AND PUMP CONTROL
SEPARATOR AND PUMP CONTROL SHALL REMAIN THE SAME, WITH THE EXCEPTION OF THE ADDED CONTROL VALVES FOR THE SEPARATOR AND CT-3.

PUMP SHALL RUN WHENEVER COOLING TOWERS ARE ON. CONTROL VALVES SHALL REMAIN OPEN TO CONDENSER WATER SUPPLY HEADER AND OPEN TO CT-3 BASIN SWEEPER PIPING. IN THE FUTURE, THE CONTROL VALVES CAN ALTERNATE BETWEEN CT-1, 2 OR 3 SWEEPER PIPING.

VIBRATION SWITCH CONTROL
THE MANUFACTURER PROVIDED CT-3 FAN VIBRATION SWITCH SHALL BE WIRED TO THE FAN MOTOR CONTROLLER TO STOP FAN IF EXCESSIVE VIBRATION IS SENSED.

FAN VFD CONTROL
FANS VFD SHALL BE SET TO LOCK OUT ANY CRITICAL FREQUENCIES OR MINIMUM SPEED BASED ON THE MANUFACTURER'S RECOMMENDATION. FAN'S VFD SHALL MODULATE TO CONTROL FOR COMMON CONDENSER WATER SUPPLY TEMPERATURE SETPOINT.

Condenser Water Pump Control

CONDENSER WATER- PUMP CONTROL (CwP-1-3)

The pump(s) shall be controlled by the BAS. The pump(s) shall be provided with variable frequency drive (VFD) operating at fixed speed based on number of pumps running.

When in chilled water plant disabled mode:
The pump shall be off.

When in chilled water plant enabled mode:
The pump(s) shall be on or off with respective chiller.

A pump that is on shall start on low speed and ramp up to design gpm for the corresponding chiller. Speed setpoints shall be determined during system startup.

When staging on a lag pump:

1. Ramp the operating pumps down to minimum speed.
2. Turn the lag pump on.
3. Ramp the operating pumps together to meet setpoint.

When staging off a lag pump:

1. Ramp the operating pumps down to minimum speed.
2. Turn the lag pump off.
3. Ramp the remaining operating pumps together to meet setpoint.

When in pump failure mode:
The next lag pump shall start.

RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
Dec 19, 2022

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PROFESSIONAL SEAL 12/19/2022

REVISIONS

JOB NO:	2250001567
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CHECKED BY:	HBS
DRAWN BY:	HEI

MECHANICAL CONTROLS

M701

BARTON W. WALKUP

GENERAL ELECTRICAL DEMOLITION NOTES:

1. ALL CONDUIT AND ELECTRICAL COMPONENTS REMOVAL SHOWN ON THE DRAWINGS TO INCLUDE REMOVAL OF ALL HANGERS AND SUPPORTS. REPAIR ALL HOLES IN FLOORS, CEILINGS, ROOFS AND WALLS TO MATCH EXISTING CONSTRUCTION AND RATINGS. PROVIDE NEW SUPPORTS TO BUILDING STRUCTURE FOR ANY DEVICES TO REMAIN THAT WERE SUPPORTED FROM CONDUIT AND ELECTRICAL COMPONENTS REMOVED.

2. IT SHALL BE THE RESPONSIBILITY OF THE INDIVIDUAL CONTRACTORS TO PERFORM ALL DEMOLITION NECESSARY TO PERFORM THE WORK SHOWN ON THE DRAWINGS, EXCEPT WHERE SAID DEMOLITION IS SHOWN ON THE DRAWINGS TO BE PERFORMED BY THE PRIME CONTRACTOR.

3. CONTRACTOR SHALL REPAIR ALL DAMAGE TO EXISTING BUILDINGS, FIXTURES AND FINISHES CAUSED BY CONTRACTOR DURING THE PERFORMANCE OF THE WORK. REPAIRS SHALL BE PERFORMED BY QUALIFIED TRADES AND SHALL BE COMPLETED IN A MANNER ACCEPTABLE TO THE OWNER AND HBS.

4. OWNER SHALL HAVE THE RIGHT TO SALVAGE ANY AND ALL MATERIALS AND EQUIPMENT OR PORTION THEREOF. ALL REMOVED EQUIPMENT AND MATERIALS NOT RETAINED BY THE OWNER SHALL BE CONSIDERED PROPERTY OF THE CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM THE OWNERS PROPERTY AND LEGALLY DISPOSED OF. OWNER ASSUMES NO RESPONSIBILITY FOR CONDITION OF EQUIPMENT OR MATERIAL TO BE DEMOLISHED.

5. CONTRACTOR SHALL CEASE WORK AND NOTIFY OWNER AND HBS IMMEDIATELY SHOULD ANY HAZARDOUS MATERIALS BE ENCOUNTERED DURING THE PERFORMANCE OF THE DEMOLITION WORK.

6. ALL CONDUIT, TUBING, WIRING, CABLE, PANELS, ETC. MADE OBSOLETE BY WORK PERFORMED UNDER THIS CONTRACT, ARE TO BE REMOVED.

7. ALL EXISTING CIRCUIT DIRECTORIES SHALL BE UPDATED WITH NEW TYPEWRITTEN DIRECTORIES TO REFLECT ALL DEMOLITION AND NEW WORK PERFORMED UNDER THIS CONTRACT.

GENERAL ELECTRICAL NOTES:

1. THESE NOTES APPLY TO ALL ELECTRICAL TRADES.

2. PROVIDE ALL OPENINGS IN WALLS, FLOORS, ROOFS AND CEILINGS AND FIRE STOP AS REQUIRED. COORDINATE WITH OTHER CONTRACTORS.

3. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO PROVIDE TEMPORARY REMOVAL AND REINSTALLATION OF ALL BUILDING FINISHES INCLUDING CEILINGS, CASEWORK, FLOOR COVERINGS, WALLS, ETC. AND PROVIDE REMOVAL AND REINSTALLATION OF ALL BUILDING CONSTRUCTION NECESSARY TO PERFORM THE WORK SHOWN ON THE DRAWINGS. REINSTALLATION SHALL BE PERFORMED BY QUALIFIED TRADES AND SHALL BE COMPLETED IN A MANNER ACCEPTABLE TO THE OWNER AND HBS.

4. CONTRACTOR SHALL REPAIR ALL DAMAGE TO EXISTING BUILDING, FIXTURES AND FINISHES, AND TO SITE CAUSED BY CONTRACTOR DURING THE PERFORMANCE OF THE WORK. REPAIRS SHALL BE PERFORMED BY QUALIFIED TRADESMEN AND SHALL BE COMPLETED IN A MANNER ACCEPTABLE TO THE OWNER AND HBS.

5. CONTRACTOR SHALL INSPECT THE SITE PRIOR TO THE SUBMISSION OF A BID. CONTRACTOR SHALL INFORM THEMSELVES OF THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED CONCERNING THE SITE OF THE WORK, THE OBSTACLES WHICH MAY BE ENCOUNTERED, THE DEMOLITION AND TEMPORARY REMOVAL AND REINSTALLATION REQUIRED TO PROVIDE ACCESS TO THE WORK, AND ALL OTHER RELEVANT MATTERS CONCERNING THE WORK TO BE PERFORMED. CONTRACTOR SHALL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER WHICH CONTRACTOR SHOULD HAVE INFORMED THEMSELVES PRIOR TO THE SUBMISSION OF A BID.

6. REMOVAL OR RELOCATION OF ANY CONDUITS 1-INCH OR SMALLER OR CABLES, WIRES, ETC. NOT INSTALLED IN CONDUIT REQUIRED TO ALLOW INSTALLATION OF NEW WORK SHALL BE CONSIDERED WORK REQUIRED BY THIS CONTRACT WHETHER OR NOT SUCH WORK IS SHOWN ON THE DRAWINGS. EXTRA PAYMENTS WILL NOT BE ALLOWED FOR WORK REQUIRED BY THIS NOTE.

7. THE DRAWINGS REPRESENT THE BEST INFORMATION AVAILABLE TO THE ENGINEER AND HBS. ALL DIMENSIONS AND SIZES SHALL BE FIELD VERIFIED. DO NOT SCALE FROM DRAWINGS. SMALL DEVIATIONS BETWEEN THE DRAWINGS AND ACTUAL CONDITIONS ENCOUNTERED SHALL BE RECONCILED DURING THE PERFORMANCE OF THE WORK AND SHALL NOT CONSTITUTE REASON FOR ADDITIONAL COMPENSATION TO THE CONTRACTOR.

8. CONTRACTOR SHALL NOTIFY HBS AND REQUEST INSTRUCTIONS, SHOULD ACTUAL CONDITIONS DEVIATE SUBSTANTIALLY FROM THOSE INDICATED ON THE DRAWING.

9. THE ELECTRICAL CONTRACTOR SHALL CLOSELY COORDINATE WITH ALL OTHER TRADES AND SHALL MAKE ADJUSTMENTS AND OFFSETS WHERE NEEDED FOR CLEARANCE REQUIREMENTS. REFER TO MECHANICAL DRAWINGS FOR COORDINATION.

10. CONNECTIONS TO EQUIPMENT SHALL BE VERIFIED WITH APPROVED MANUFACTURERS CERTIFIED DRAWINGS. PROVIDE ALL COMPONENTS FOR A COMPLETE ELECTRICAL CONNECTION.

11. PROVIDE UL RATED FIRE STOPPING ASSEMBLIES AT ALL PENETRATIONS OF FIRE OR SMOKE RATED CONSTRUCTION. SEAL ALL PENETRATIONS OF SMOKE WALLS SMOKE TIGHT.

12. ALL FEES AND ANY OTHER COSTS TO UTILITY COMPANIES, MUNICIPALITIES, INSPECTORS, REVIEWING AGENCIES, ETC. ARE TO BE INCLUDED AS A PART OF THIS CONTRACT.

13. UPDATE ALL PANEL DIRECTORIES WITH A TYPED DIRECTORY TO REFLECT ALL WORK PERFORMED UNDER THIS CONTRACT.

14. SEE SPECIFICATIONS AND DRAWINGS FOR PROJECT PHASING, ALLOWABLE WORKING HOURS AND PROJECT SCHEDULE.

15. REFER TO SPECIFICATIONS FOR ALLOWABLE HOURS AND DATES FOR EQUIPMENT SHUTDOWNS OR INTERUPTIONS IN ELECTRICAL SERVICE. COORDINATE SHUTDOWNS WITH OWNER AND HBS A MINIMUM OF 96 HOURS IN ADVANCE.

16. NEW AND EXISTING PANELS ALTERED UNDER THIS PROJECT SHALL BE VACUUM CLEANED OF ANY DEBRIS. ALL OPENINGS REMAINING SHALL BE SEALED WITH THE PROPER DEVICE (IE. KNOCKOUT BLANKS, BREAKER BLANKS, ETC.) LISTED AND APPROVED FOR SUCH USE.

17. CONTRACTOR SHALL CLEAN ALL DEVICE BACKBOXES AND JUNCTION BOXES AND SHALL INSTALL A BLANK PLATE ON ANY BOX DESIGNATED AS FUTURE USE FOR A DEVICE TO BE INSTALLED BY OTHERS.

18. SEE SPECIFICATIONS FOR ALLOWABLE METHODS OF CONDUIT SUPPORT FROM BUILDING STRUCTURE.

19. FEDERAL, STATE, LOCAL, MUNICIPAL AND UTILITY COMPANY CODES, RULES AND REGULATIONS APPLY UNLESS EXCEEDED BY THIS DESIGN.

20. NO WORK SHALL BE PERFORMED PRIOR TO HBS REVIEW AND APPROVAL OF ALL REQUIRED SHOP DRAWINGS AND PRODUCT MATERIAL AND EQUIPMENT SUBMITTALS. ANY WORK INSTALLED PRIOR TO MEETING THESE REQUIREMENTS SHALL BE REMOVED BY CONTRACTOR WHERE DIRECTED BY HBS.

ELECTRICAL ABBREVIATIONS:

A	AMP, AMPERE
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CH	CHILLER
CB	CIRCUIT BREAKER
CU	COPPER
CWP	CONDENSER WATER PUMP
CHWP	CHILLED WATER PUMP
CT	COOLING TOWER
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EMT	ELECTRICAL METALLIC TUBING
F	FUSED
G	GROUND
GC	GENERAL CONTRACTOR
GFI	GROUND FAULT INTERRUPTING
GND	GROUND
HHWP	HEATING HOT WATER PUMP
HRWP	HEATING RETURN WATER PUMP
HP	HORSEPOWER
HZ	HERTZ
K	1000 (KILO)
KVA	KILOVOLT AMPERES
KW	KILOWATT
LED	LIGHT EMITTING DIODES
MC	MECHANICAL CONTRACTOR
MCC	MOTOR CONTROL CENTER
MCB	MAIN CIRCUIT BREAKER
MCM	1000 CIRCULAR MILS (Kcmil)
MLO	MAIN LUG ONLY
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NORMALLY OPEN
NTS	NOT TO SCALE
RMC	RIGID METAL CONDUIT
RTU	ROOFTOP UNIT
RF	RETURN FAN
SF	SUPPLY FAN
SPD	SURGE PROTECTIVE DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORY
V	VOLTS
VA	VOLT AMPS
VAC	VOLTS ALTERNATING CURRENT
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
WP	WEATHERPROOF

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	EXISTING TO REMAIN
	EXISTING TO BE REMOVED/REUSED
	NEW
GFI WP/GFI	GROUND FAULT INTERRUPTING DUPLEX RECEPTACLE WITH WEATHERPROOF COVER
T	THERMOSTAT CONTROL FOR HEAT TRACE
	CIRCUIT BREAKER
J	JUNCTION BOX
	PANELBOARD
1HEQ	PANELBOARD (1-LINE)
	DISTRIBUTION PANEL/CABINET/EQUIPMENT
30A,DGAF	DISCONNECT SWITCH (AMPS/FUSE AMPS)
40A 2	STARTER/CONTACTOR (NEMA STARTER/CONTACTOR SIZE)
VFD	VARIABLE FREQUENCY DRIVE
	TRANSFORMER
T-1LEQ 75KVA	TRANSFORMER (1-LINE)
ATS-1 260A	TRANSFER SWITCH
750KW GENERATOR 480Y/277V GEN 1200A	GENERATOR
10	MOTOR LOAD (HORSEPOWER)
	HOMERUN ARROW
A, B, C Z	HOMERUNS A, B, C, TO PANEL Z
	CURVED TIC = GROUND LONG TIC = NEUTRAL SHORT TIC = PHASE
	NO TICS = 3#12, PHASE, NEUTRAL, AND GROUND FOR STANDARD WIRING
	3#12, PHASE, SWITCHED PHASE, AND GROUND FOR STANDARD LIGHT SWITCH WIRING

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STATE OF MISSOURI
SCOTT C. SAIA
NUMBER PE-2020028047
PROFESSIONAL ENGINEER

12/19/2022
SCOTT C. SAIA
LICENSE # PE-2020028047
PROFESSIONAL SEAL

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JOB NO:	2250001567
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DRAWN BY:	HEI

ELECTRICAL GENERAL NOTES, ABBREVIATIONS AND LEGENDS

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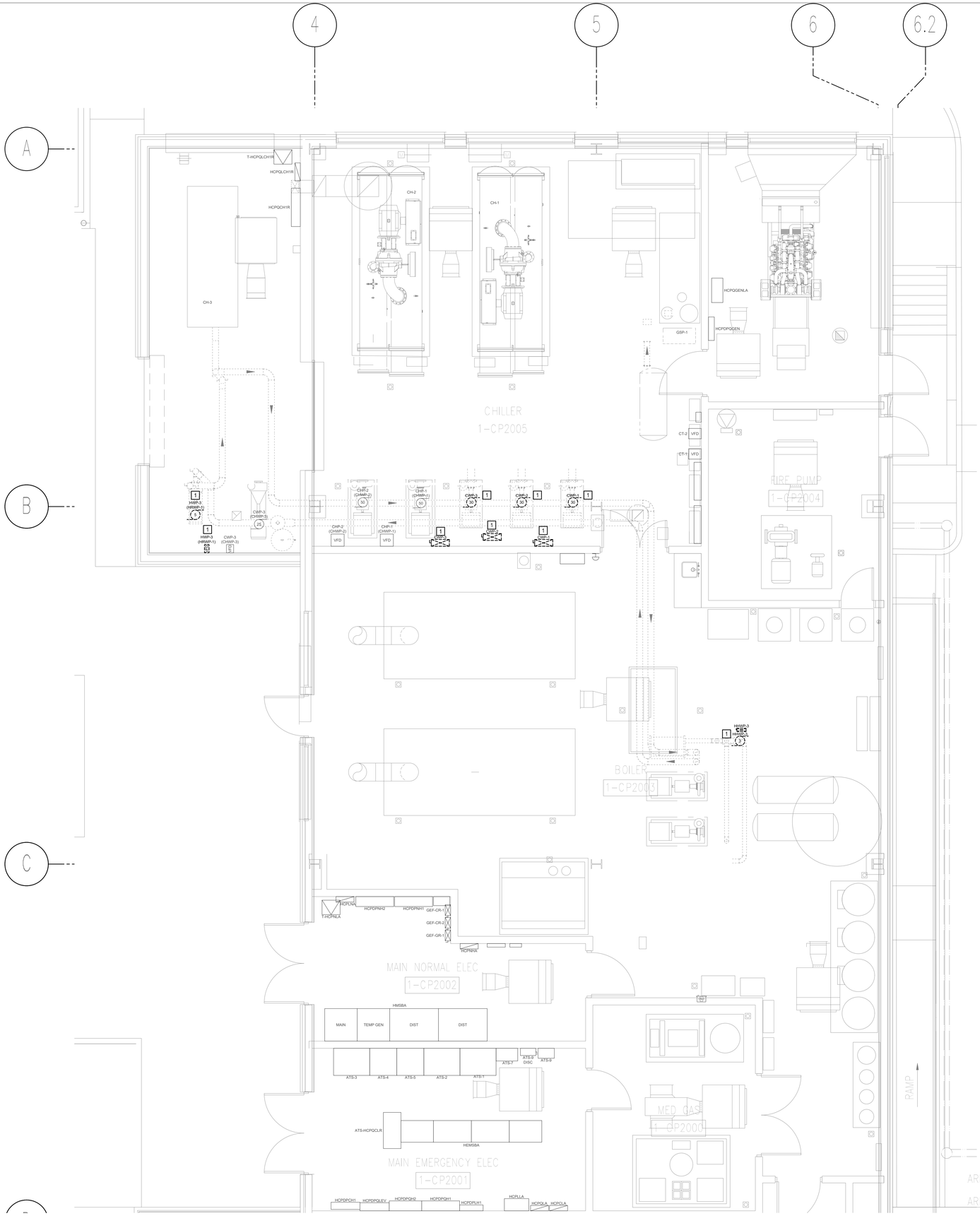
SCOTT C. SAIA

NOTES:

1 DISCONNECT PUMP AND REMOVE ALL ASSOCIATED STARTERS OR VFDS, CONDUIT AND WIRING.



1 ELECTRICAL DEMOLITION PLAN - CENTRAL PLANT
SCALE: 1/4" = 1'-0"

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2250005580

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2250001567
MO. CORPORATE NUMBER: E-556D
12/31/22

LEE'S SUMMIT MEDICAL CENTER
CHILLER PLANT REVISIONS
2100 BLUE PKWY, LEE'S SUMMIT, MO 64063

STATE OF MISSOURI
SCOTT C. SAIA
NUMBER PE-2020028047
PROFESSIONAL ENGINEER

12/19/2022
SCOTT C. SAIA
LICENSE # PE-2020028047
PROFESSIONAL SEAL

REVISIONS

JOB NO:	2250001567
DATE:	09/27/2022
CHECKED BY:	HBS
DRAWN BY:	HEI

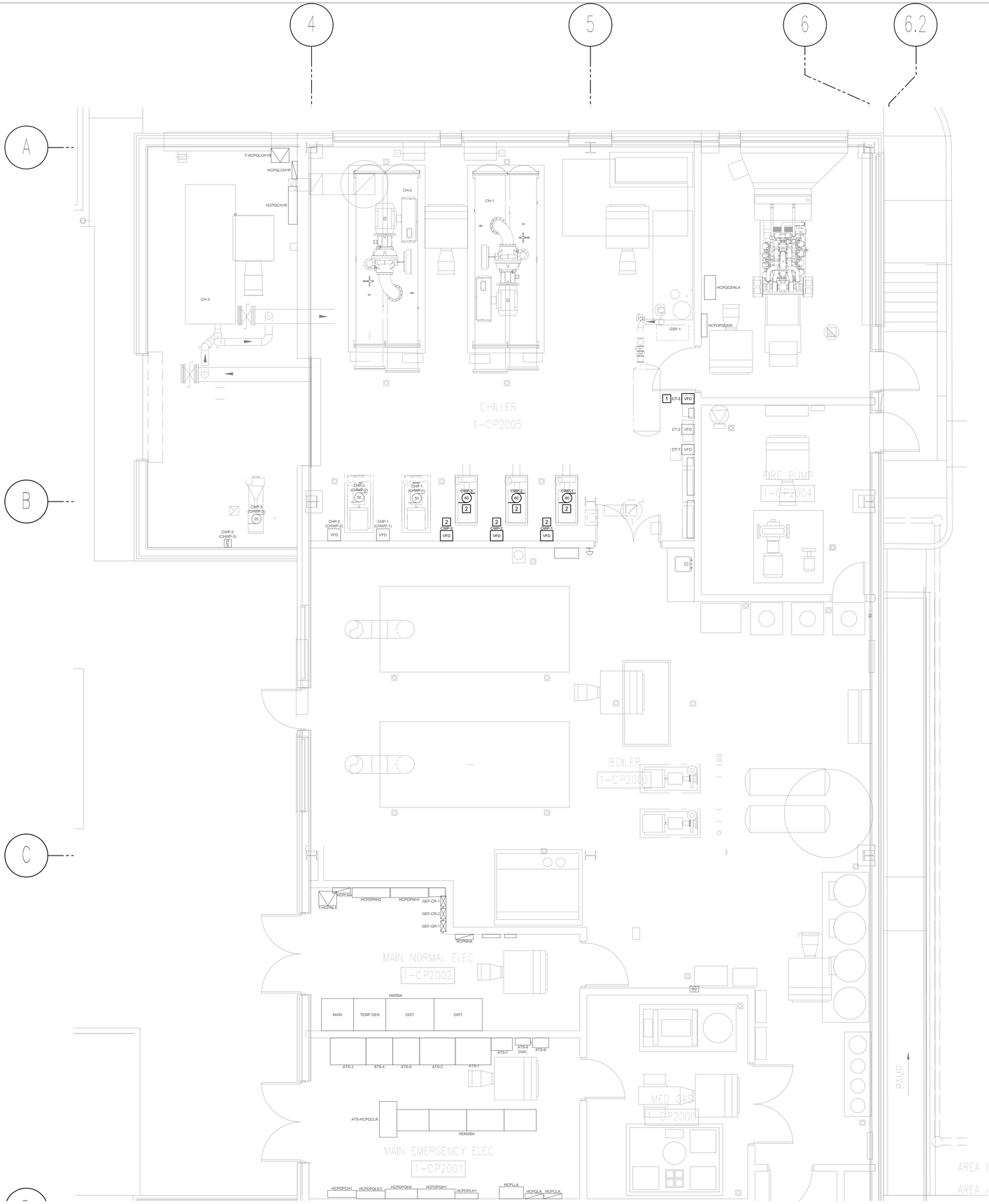
ELECTRICAL DEMOLITION PLAN
CENTRAL PLANT

E100

SCOTT C. SAIA

NOTES:

1. PROVIDE VFD FOR CT-3. SEE VFD SCHEDULE ON SHEET E500. PROVIDE VFD. SEE VFD SCHEDULE ON SHEET E500. PROVIDE CONTROL FROM AUXILIARY CONTACTS IN DISCONNECT SWITCH PER DETAIL 4 ON SHEET E500. REWORK COPPER TUBING AIR LINES CONNECTED TO REFRIGERANT MONITOR TO MAKE ROOM FOR VFD.
2. PROVIDE COMPLETE ELECTRICAL CONNECTION TO NEW PUMP. PROVIDE VFD. SEE VFD SCHEDULE ON SHEET E500.



1 ELECTRICAL PLAN - CENTRAL PLANT
SCALE: 1/4" = 1'-0"

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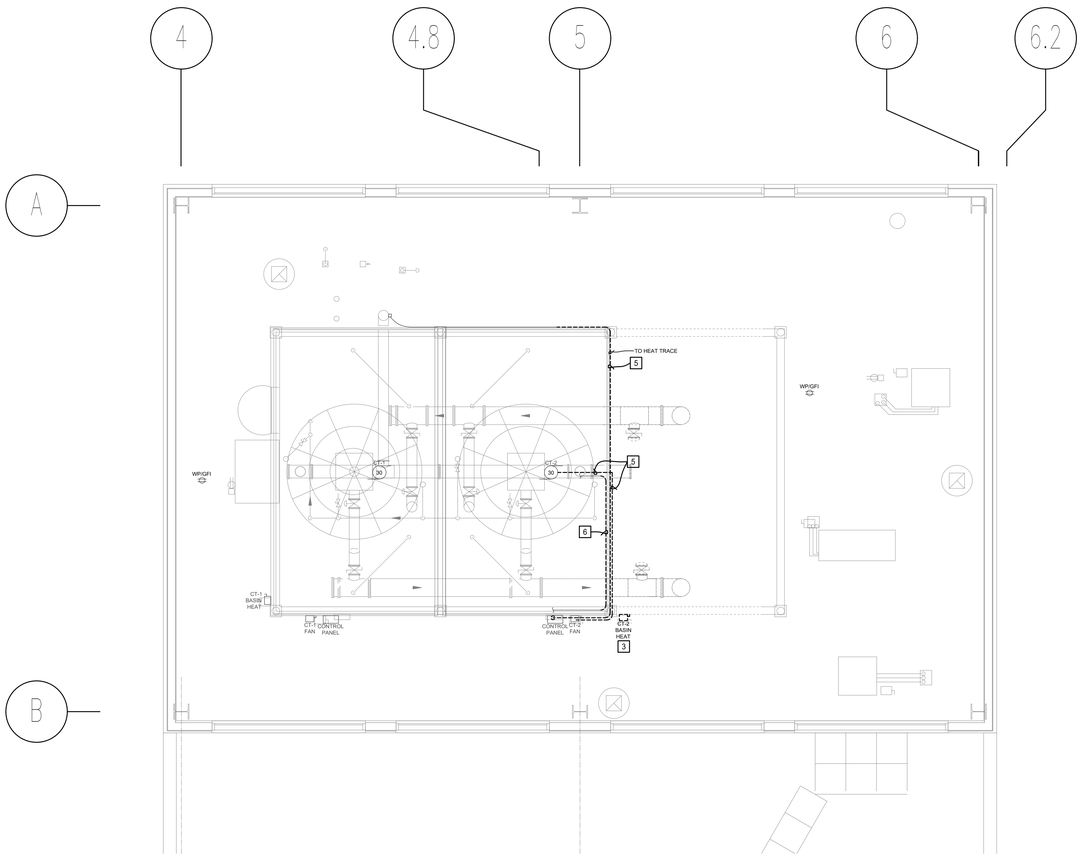
ELECTRICAL PLAN
CENTRAL PLANT

E101

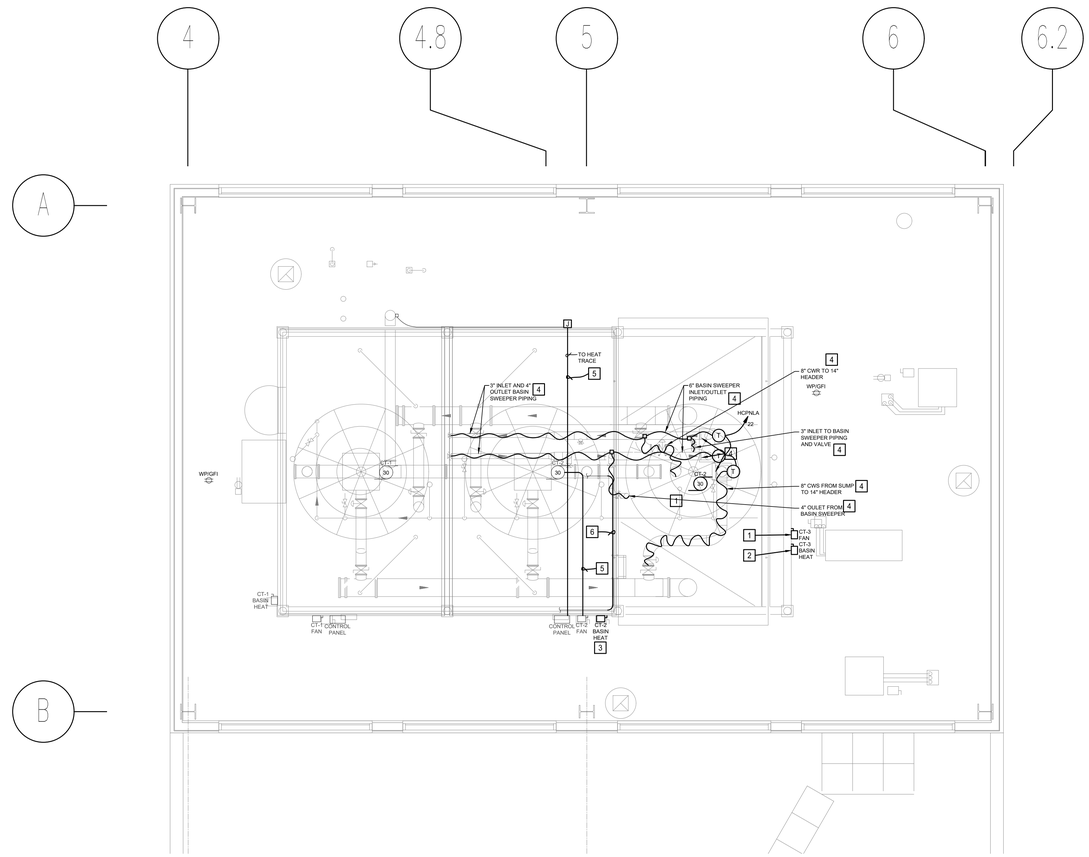
SCOTT C. SAIA

NOTES:

1. PROVIDE COMPLETE ELECTRICAL CONNECTION TO NEW COOLING TOWER. PROVIDE NON-FUSED NEMA 3R DISCONNECT SWITCH
2. PROVIDE COMPLETE ELECTRICAL CONNECTION TO NEW BASIN HEATER. PROVIDE NON-FUSED NEMA 3R DISCONNECT SWITCH.
3. RELOCATE DISCONNECT SWITCH FOR CT-2 BASIN HEATERS. REWORK CONDUIT AND WIRING AS REQUIRED.
4. PROVIDE HEAT TRACE ON ALL NEW BASIN SWEEPER, CWS AND CWR PIPING PER DETAILS 1, 2 AND 3 ON SHEET E500.
5. REMOVE CONDUIT AND WIRING FROM SIDE OF COOLING TOWER CT-2 TO ALLOW INSTALLATION OF NEW COOLING TOWER CT-3. INSTALL NEW CONDUIT AND WIRING BENEATH COOLING TOWER AND REWORK AS REQUIRED.
6. REMOVE CONDUIT AND WIRING ATTACHED TO COOLING TOWER RAILING CONNECTING TO COOLING TOWER CT-2 VIBRATION SWITCH TO ALLOW REMOVAL OF RAILING. INSTALL NEW CONDUIT AND WIRING ON TOP OF COOLING TOWER AND REWORK CONNECTION TO VIBRATION SWITCH AS REQUIRED.



1 ELECTRICAL DEMOLITION PLAN - ROOF
SCALE: 1/4" = 1'-0"



2 ELECTRICAL PLAN - ROOF
SCALE: 1/4" = 1'-0"

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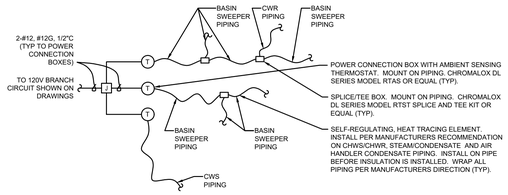
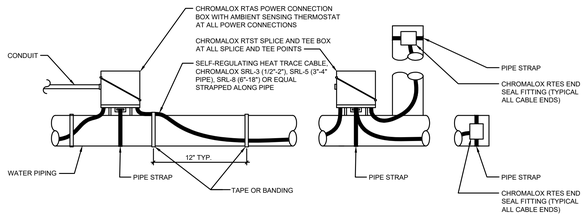
ELECTRICAL PLANS
ROOF

E102

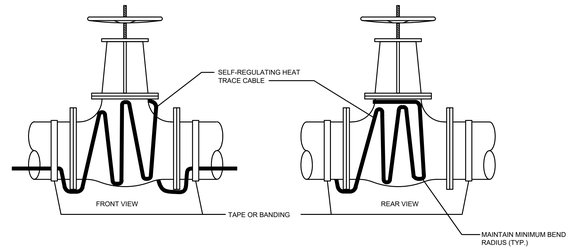
SCOTT C. SAIA



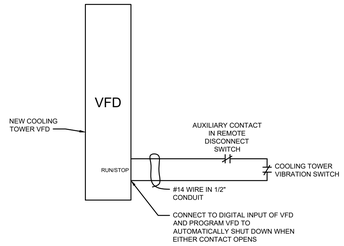
1 HEAT TRACE WIRING DETAIL
NTS



2 HEAT TRACE DETAIL
NTS



3 HEAT TRACE MOUNTING DETAIL - LARGE VALVES
NTS



4 COOLING TOWER VFD CONTROL DETAIL
NTS

PANELBOARD: HCPNLA
BUS AMPS: 100A
MAIN SIZE/TYPE: 100A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1

FED FROM:
A/C RATING:
MOUNTING: SURFACE
SERVES:
LOCATION:

LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

CKT NO.	DESCRIPTION	VOLTAMPS/PHASE A	B	C	BKR AMP	P	P	BKR AMP	VOLTAMPS/PHASE A	B	C	DESCRIPTION	CKT NO.
1	FCU CP-1				20	1							
3	FCU CP-2				20	1	3	100				MAIN	
5	FCU CP-3				20	1							
7	FCU CP-4				20	1	1	20				SPARE	2
9	DEF GR1				20	1	1	20				LTG RM 1-CP2004 1-CP2005	4
11	DEF CR-1				20	1	1	20				LTG RM 1-CP2003	6
13	DEF CR-2				20	1	1	20				LTG RM 1-CP2001 1-CP2002	8
15	RCPTS ROOF				20	1	1	20				RCPT CENTRAL PLANT	10
17	RCPT POLE				20	1	1	20				RCPT CENTRAL PLANT	12
19	RCPT POLE				20	1	1	20				RCPT CENTRAL PLANT	14
21	HEAT TRACE				20	1	1	20				IRRIGATION CONTROL	16
23					SPE	1	1	20				CT LEVEL CONTROL	18
25	HEAT TRACE				20	1	1	20				LTG RM 1-CP2006	20
27					SPE	1	1	20GFE				**HEAT TRACE CT-3**	22
29	HEAT TRACE				20	1	1	20				SPARE	24
31					SPE	1	1	20				SPARE	26
33	RCPT POLE				20	1	1	20				SPARE	28
35	SPARE				20	1	1	20				SPARE	30
37					20	1	1	20				SPARE	32
39	SPARE				20	1	1	20				SPARE	34
41	SPARE				20	1	1	20				SPARE	36
							1	20				SPARE	38
							1	20				SPARE	40
							1	20				SPARE	42
SUBTOTAL												SUBTOTAL	

PROVIDE NEW BREAKER WITH GROUND FAULT EQUIPMENT PROTECTION (30mA)

TOTAL PHASE A - VA		LOAD		CONN. VA	DF	LOAD		CONN. VA	DF	
AMPS		COOLING	[C]		1.00	REFRIG	[F]		1.00	
TOTAL PHASE B - VA		HEATING	[H]		0	SIGNAGE	[S]		1.25	
AMPS		LIGHTING	[L]		1.25	KITCHEN	[K]		1.00	
TOTAL PHASE C - VA		RECEPTACLES	[R]		1.0/.5	EXISTING	[E]		1.00	
AMPS		MOTORS	[M]		1.00	LRG MOTOR			1.25	TOTAL DEMAND
TOTAL PNLBD - VA		SUPP HEAT	[U]		1.00	SHOW WND	[W]		1.25	
AMPS		MISC EQUIP	[Z]		1.00	LTG TRACK			1.00	

VFD SCHEDULE

MARK	VFD HORSEPOWER	MANUFACTURER	MODEL	VOLTAGE/ PHASE	ENCLOSURE	INTEGRAL INPUT DISCONNECTING MEANS	MAXIMUM OUTPUT FREQUENCY	BYPASS	MINIMUM SHORT-CIRCUIT RATING (SCCR)
CWP-1	60	DANFOSS GRAHAM	VLT HVAC FC102	480V - 3 PH	NEMA 1	CIRCUIT BREAKER	60	NONE	100,000
CWP-2	60	DANFOSS GRAHAM	VLT HVAC FC102	480V - 3 PH	NEMA 1	CIRCUIT BREAKER	60	NONE	100,000
CWP-3	60	DANFOSS GRAHAM	VLT HVAC FC102	480V - 3 PH	NEMA 1	CIRCUIT BREAKER	60	NONE	100,000
CT-3	30	DANFOSS GRAHAM	VLT HVAC FC102	480V - 3 PH	NEMA 1	CIRCUIT BREAKER	60	NONE	100,000

VFD SCHEDULE NOTES:
1. MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY.
2. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURER LISTED IS THE BASIS FOR THE DESIGN.
3. PROVIDE VFDS WITH CARD TO COMMUNICATE WITH BUILDING MANAGEMENT SYSTEM (COORDINATE WITH CONTROLS CONTRACTOR):
   BACnet MS/TP = JOHNSON CONTROLS
   BACnet IP = SIEMENS

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DRAWN BY:	HEI

ELECTRICAL DETAILS AND SCHEDULES

E500

SCOTT C. SAIA

RELEASED FOR CONSTRUCTION
As Noted on Plans Review
Development Services Department
Lee's Summit, Missouri
Date: 10/06/2023

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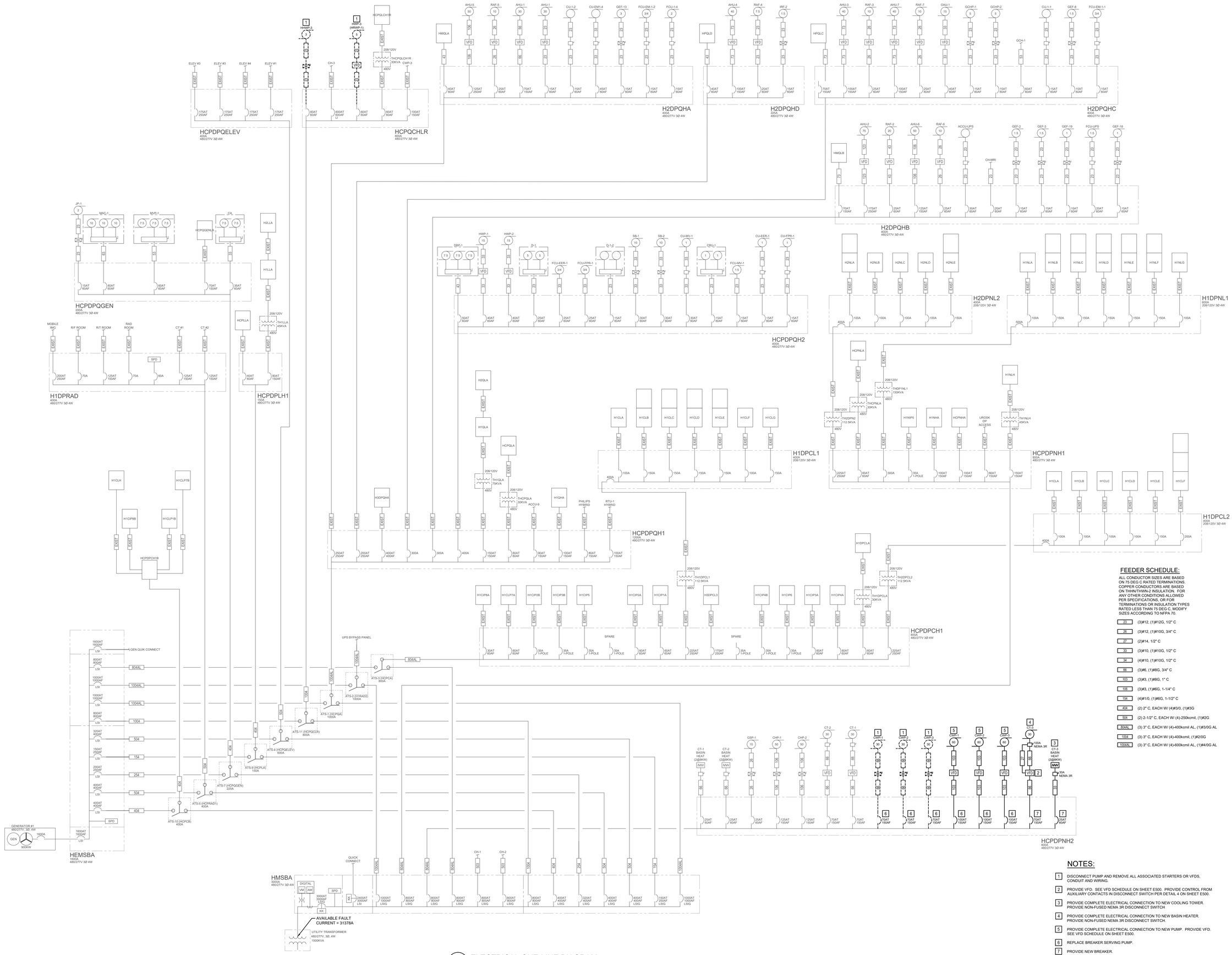

FEEDER SCHEDULE:

ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS. COPPER CONDUCTORS ARE BASED ON THWN/THWN-2 INSULATION. FOR ANY OTHER CONDITIONS ALLOWED PER SPECIFICATIONS, OR FOR TERMINATIONS OR INSULATION TYPES RATED LESS THAN 75 DEG C, MODIFY SIZES ACCORDING TO NFPA 70.

23	(3)#12, (1)#12G, 1/2" C
26	(3)#12, (1)#10G, 3/4" C
27	(2)#14, 1/2" C
33	(3)#10, (1)#10G, 1/2" C
34	(4)#10, (1)#10G, 1/2" C
66	(3)#6, (1)#8G, 3/4" C
103	(3)#3, (1)#8G, 1" C
106	(3)#3, (1)#6G, 1-1/4" C
154	(4)#1/0, (1)#6G, 1-1/2" C
404	(2) 2" C, EACH W/ (4)#3/0, (1)#3G
504	(2) 2-1/2" C, EACH W/ (4)-250kcmil, (1)#2G
804AL	(3) 3" C, EACH W/ (4)-400kcmil AL, (1)#3/0G AL
1004	(3) 3" C, EACH W/ (4)-600kcmil, (1)#2/0G
1004AL	(3) 3" C, EACH W/ (4)-600kcmil AL, (1)#4/0G AL

NOTES:

1. DISCONNECT PUMP AND REMOVE ALL ASSOCIATED STARTERS OR VFDS, CONDUIT AND WIRING.
2. PROVIDE VFD. SEE VFD SCHEDULE ON SHEET E500. PROVIDE CONTROL FROM AUXILIARY CONTACTS IN DISCONNECT SWITCH PER DETAIL 4 ON SHEET E500.
3. PROVIDE COMPLETE ELECTRICAL CONNECTION TO NEW COOLING TOWER. PROVIDE NON-FUSED NEMA 3R DISCONNECT SWITCH
4. PROVIDE COMPLETE ELECTRICAL CONNECTION TO NEW BASIN HEATER. PROVIDE NON-FUSED NEMA 3R DISCONNECT SWITCH.
5. PROVIDE COMPLETE ELECTRICAL CONNECTION TO NEW PUMP. PROVIDE VFD. SEE VFD SCHEDULE ON SHEET E500.
6. REPLACE BREAKER SERVING PUMP.
7. PROVIDE NEW BREAKER.

1 ELECTRICAL ONE-LINE DIAGRAM
NTS

SCOTT C. SAIA

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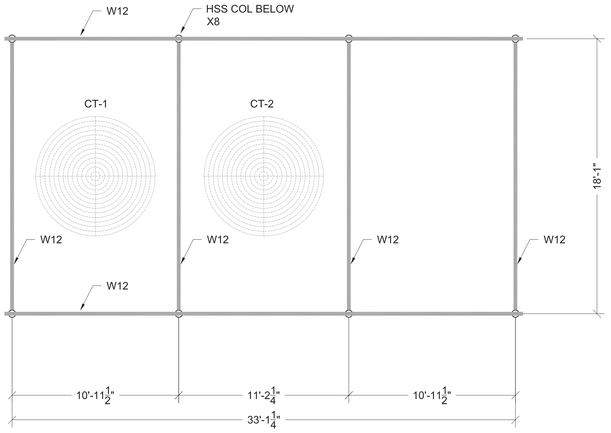
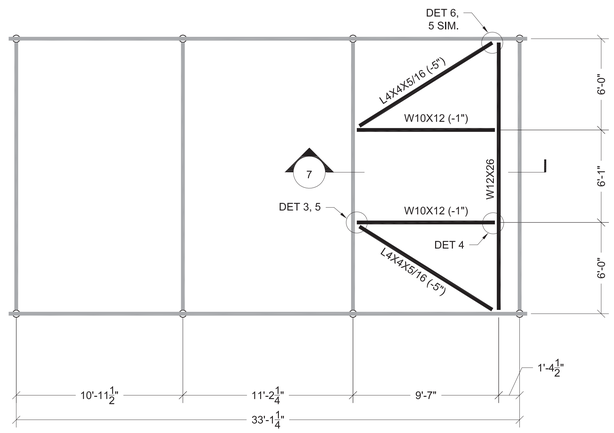
ELECTRICAL 1-LINE DIAGRAM

E700



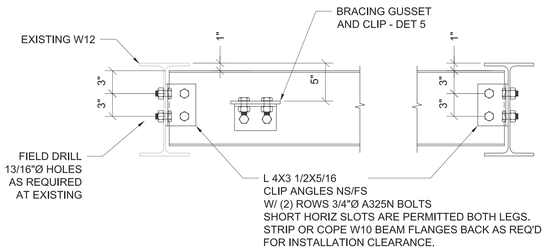
FIELD VERIFY ALL DIMENSIONS
REF GENERAL NOTE #4

1 EXISTING TOWER SUPPORT PLAN
NTS



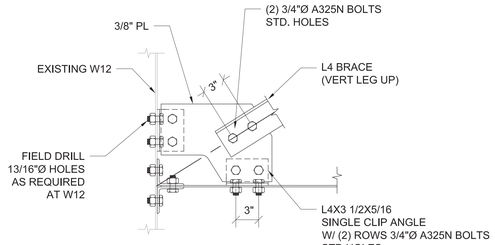
2 FRAMING AT CT-3
NTS

CT-3
20,600# OPERATING WEIGHT

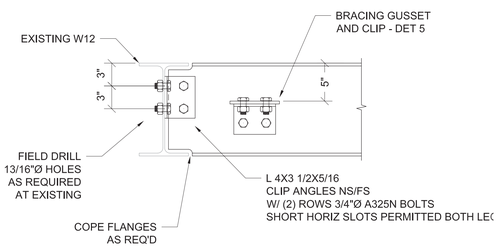


3 W10 TO EXISTING W12
SCALE: 1 1/2"=1'-0"

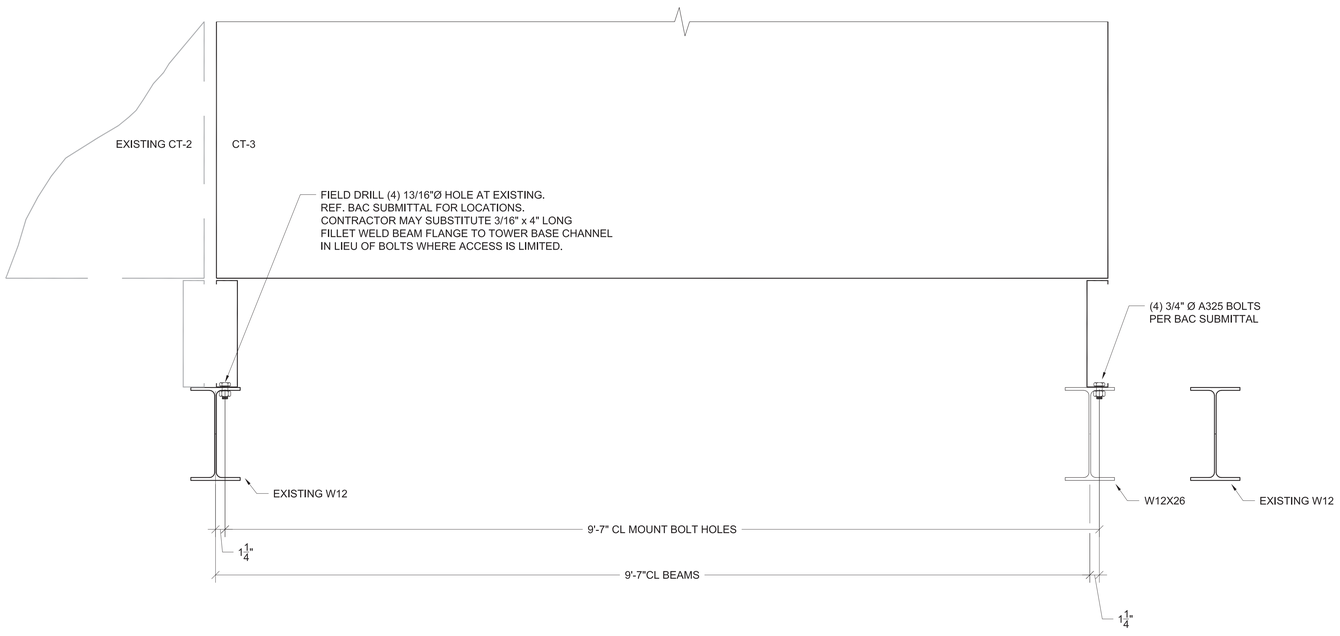
4 W10 TO W12
SCALE: 1 1/2"=1'-0"



5 BRACING CONNNECTION
SCALE: 1 1/2"=1'-0"



6 W12 TO EXISTING W12
SCALE: 1 1/2"=1'-0"



7 SECTION AT TOWER MOUNTS
SCALE: 1 1/2"=1'-0"

GENERAL REQUIREMENTS

1. FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK SHOWN OR INFERRED BY THESE DRAWINGS.
2. THE GENERAL CONTRACTOR SHALL REVIEW AND COMPARE THE STRUCTURAL DRAWINGS WITH ALL OTHER CONTRACT DOCUMENTS VERIFYING ALL DIMENSIONS AND ELEVATIONS, AND REPORT ANY DISCREPANCIES, ERRORS OR OMISSIONS TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
3. THE GENERAL CONTRACTOR SHALL REVIEW THE SITE CONDITIONS BEFORE MOBILIZING AND BEGINNING THE WORK. REPORT ANY CONDITIONS TO THE ENGINEER THAT MAY HAMPER OR PREVENT THE WORK FROM PROGRESSING AS INTENDED BY THESE DRAWINGS.
4. DIMENSIONS OF EXISTING STRUCTURE SHOWN ON THIS DRAWING ARE APPROXIMATE. CONTRACTOR MUST TAKE FIELD MEASUREMENTS PRIOR TO STEEL DETAILING AND FABRICATION TO ENSURE FIT-UP OF NEW CONSTRUCTION WITH EXISTING STEEL STRUCTURE.
5. CONTRACTOR SHALL INSPECT ALL EXISTING BOLTED CONNECTIONS OF EXISTING TOWER SUPPORT STRUCTURE AND ENSURE ALL BOLTS ARE SNUG TIGHT MINIMUM TENSIONING.

STRUCTURAL STEEL AND MISCELLANEOUS STEEL:

1. STEEL MATERIALS, U.N.O. ON THE DRAWINGS:

WIDE FLANGE STEEL SHAPES	ASTM A572-50 OR A992-50
ANGLE AND CHANNEL SHAPES	ASTM A36 OR A572-50
PLATES AND BARS	ASTM A572-50
ROUND HSS SHAPES	ASTM A500, GR B

2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL AND MISCELLANEOUS STEEL MEMBERS SHALL BE SUPPLIED HOT DIPPED GALVANIZED MEETING ASTM A123 STANDARD SPECIFICATION FOR ZINC (HOT DIP GALVANIZED) COATINGS OF IRON AND STEEL.
REPAIR ALL DAMAGED GALVANIZED SURFACES AND FIELD WELDED AREAS WITH GALVANIZING REPAIR PAINT ACCORDING TO ASTM A780 AND MANUFACTURERS WRITTEN INSTRUCTIONS.
3. ALL BOLTS SHALL BE ASTM F3125 GRADE A325 HIGH STRENGTH BOLTS, SIZE AS SHOWN AND SHALL BE INSTALLED TO SNUG TIGHT CONDITION.
ALL BOLTS AND CONNECTING HARDWARE SHALL BE SUPPLIED GALVANIZED IN ACCORDANCE WITH ASTM A153. AT CONTRACTORS OPTION, GALVANIZED TWIST OFF TENSION CONTROL BOLTS ASTM F1852 MAY BE SUBSTITUTED FOR STANDARD BOLTS. TENSION CONTROL BOLTS SHALL HAVE ENDS TOUCHED UP PER NOTE 2 AFTER TENSIONING AND SPLINE REMOVAL.
4. ALL STRUCTURAL CONNECTIONS SHALL BE BOLTED OR WELDED AS NOTED ON THE DRAWINGS.
5. ALL WELDING SHALL CONFIRM TO THE CURRENT AMERICAN WELDING SOCIETY SPECIFICATIONS (AWS) AND BE PERFORMED BY AWS CERTIFIED WELDERS.
6. ALL STEEL ITEMS MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO STEEL FABRICATION. SUBMIT SHOP DRAWINGS SHOWING LAYOUT, ALL MATERIAL SIZES AND DIMENSIONS, ALL WELDS USING STANDARD AWS SYMBOLS, APPROPRIATE DETAILS AND ERECTION INFORMATION.
ALLOW (3) WORKING DAYS FOR REVIEW AND RETURN OF SHOP DRAWINGS PRIOR TO FABRICATION.

SPECIAL INSPECTIONS STATEMENT:

UNLESS SPECIFICALLY WAIVED BY THE BUILDING OFFICIAL DUE TO THE MINOR NATURE OF THIS CONSTRUCTION, SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE (IBC). ALL SPECIAL INSPECTORS SHALL BE QUALIFIED FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION, AND MUST BE APPROVED BY THE BUILDING OFFICIAL. REPORTS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL AS REQUIRED BY THE LOCAL JURISDICTION AUTHORITY.

1. STRUCTURAL STEEL:
PERIODIC INSPECTION FOR MATERIAL VERIFICATIONS OF HIGH STRENGTH BOLTS, NUTS AND WASHERS.
PERIODIC INSPECTION OF BEARING-TYPE BOLTED CONNECTIONS. BOLTS SHALL BE TIGHTENED TO A SNUG TIGHT CONDITION AND OBSERVED ONLY TO ENSURE THAT ALL PLIES OF THE CONNECTED ELEMENT HAVE BEEN BROUGHT INTO SNUG CONTACT.
QUALIFICATIONS OF WELDING PROCEDURES AND WELDERS SHALL BE VERIFIED PRIOR TO THE START OF WORK. PERIODIC INSPECTIONS SHALL BE MADE OF ALL SINGLE PASS FIELD WELDS.
SPECIAL INSPECTION IS REQUIRED FOR SHOP FABRICATED MEMBERS UNLESS THE FABRICATOR IS REGISTERED AND APPROVED TO PERFORM WORK WITHOUT SPECIAL INSPECTIONS PER 1704.2.5.2.

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CHECKED BY:	ASB
DRAWN BY:	DAS

S1