

# HODGE CENTER COOLING TOWER REPLACEMENT PROJECT H34-9544

## UNIVERSITY OF SOUTH CAROLINA UPSTATE

Spartanburg, South Carolina

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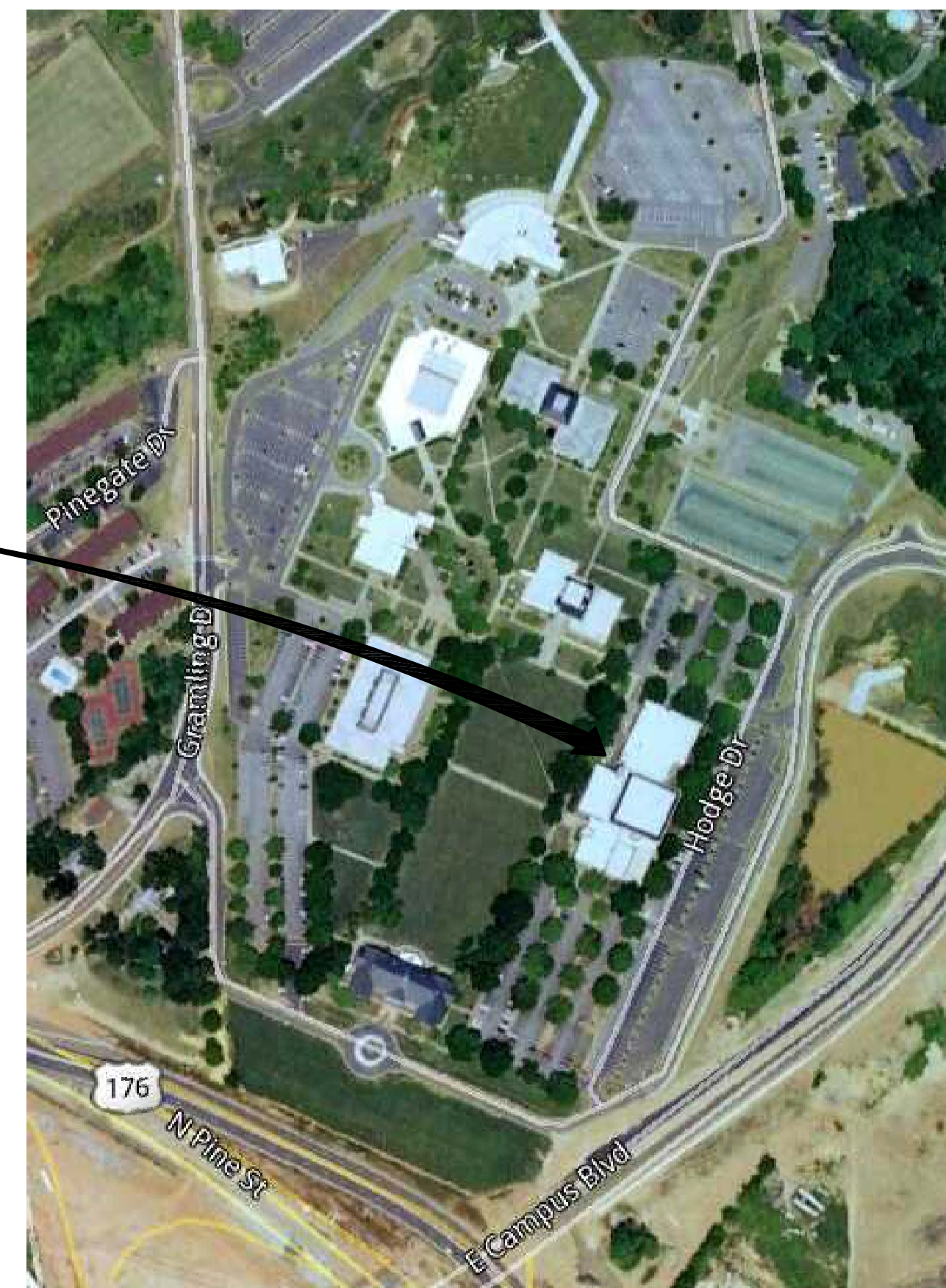
#### ELECTRICAL ENGINEER

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HODGE CENTER  
COOLING TOWER SITE



VICINITY MAP

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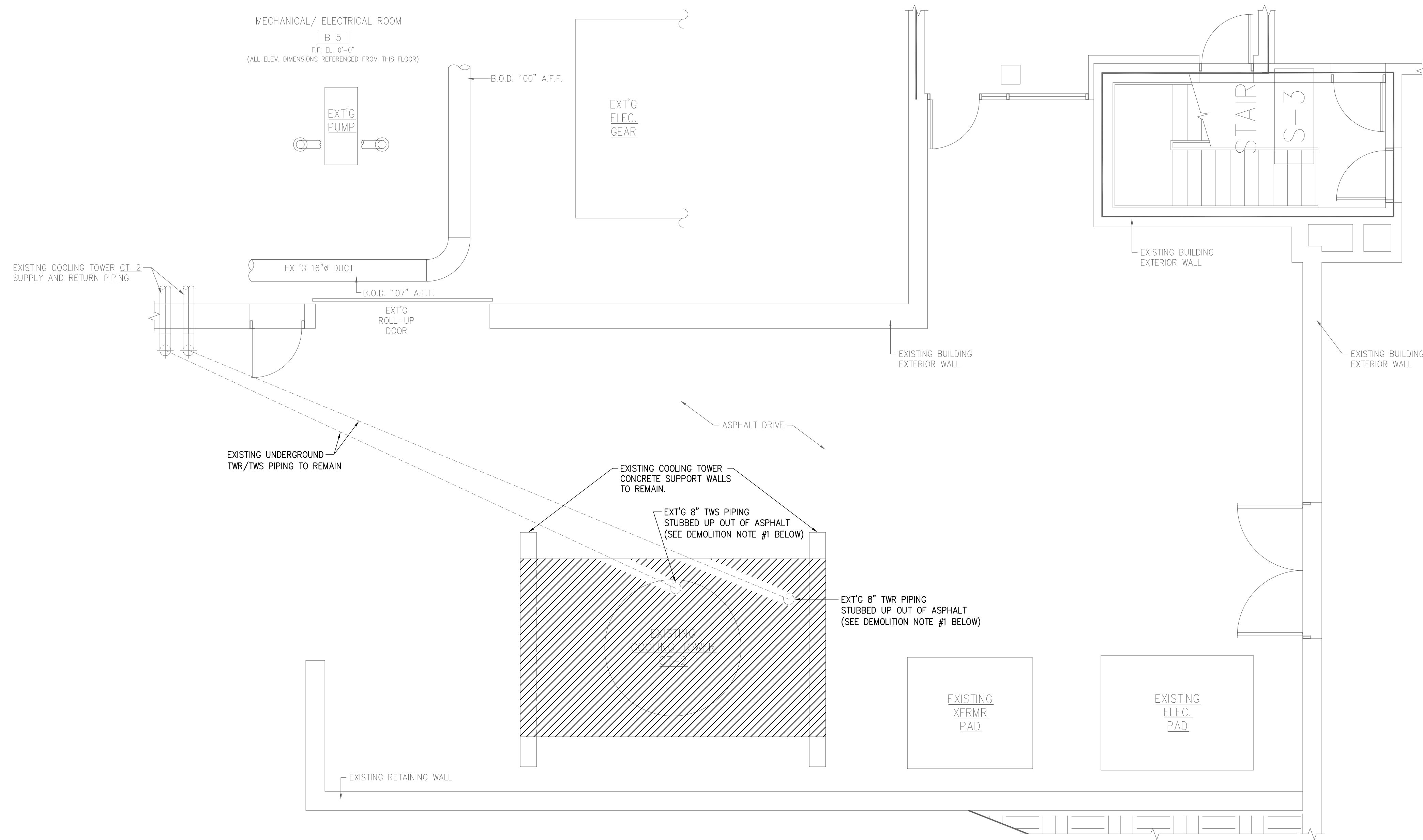
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T-1					
1 OF 1 SHEETS					

HODGE CENTER		COOLING TOWER REPLACEMENT		PROJECT #H34-9544		SPARTANBURG, SOUTH CAROLINA	
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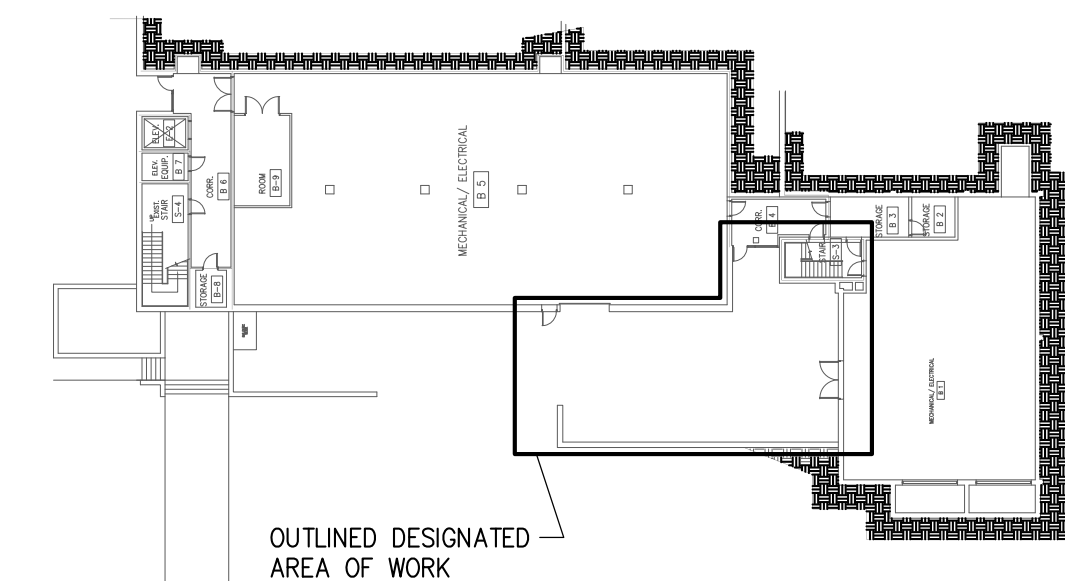
**PARTIAL HVAC DEMOLITION PLAN**

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

////// HATCHED AREA INDICATES ITEMS TO BE REMOVED

**DEMOLITION WORK NOTES:**

1. REMOVE AND DISPOSE OF EXISTING COOLING TOWER CT-2 INCLUDING EXISTING TOWER WATER SUPPLY AND RETURN PIPING UP TO MECHANICAL ROOM EXTERIOR WALL. REMAINING PIPING STUBBED UP OUT OF ASPHALT (BELOW TOWER) SHALL BE MADE SUITABLE FOR NEW PIPING CONNECTIONS.

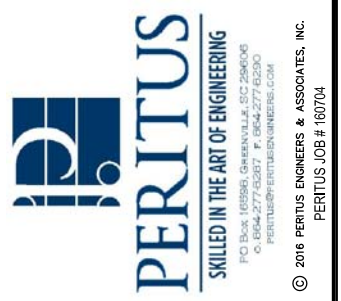


**KEY PLAN**  
NO SCALE

**HODGE CENTER  
COOLING TOWER REPLACEMENT  
PROJECT #H34-9544  
SPARTANBURG, SOUTH CAROLINA**

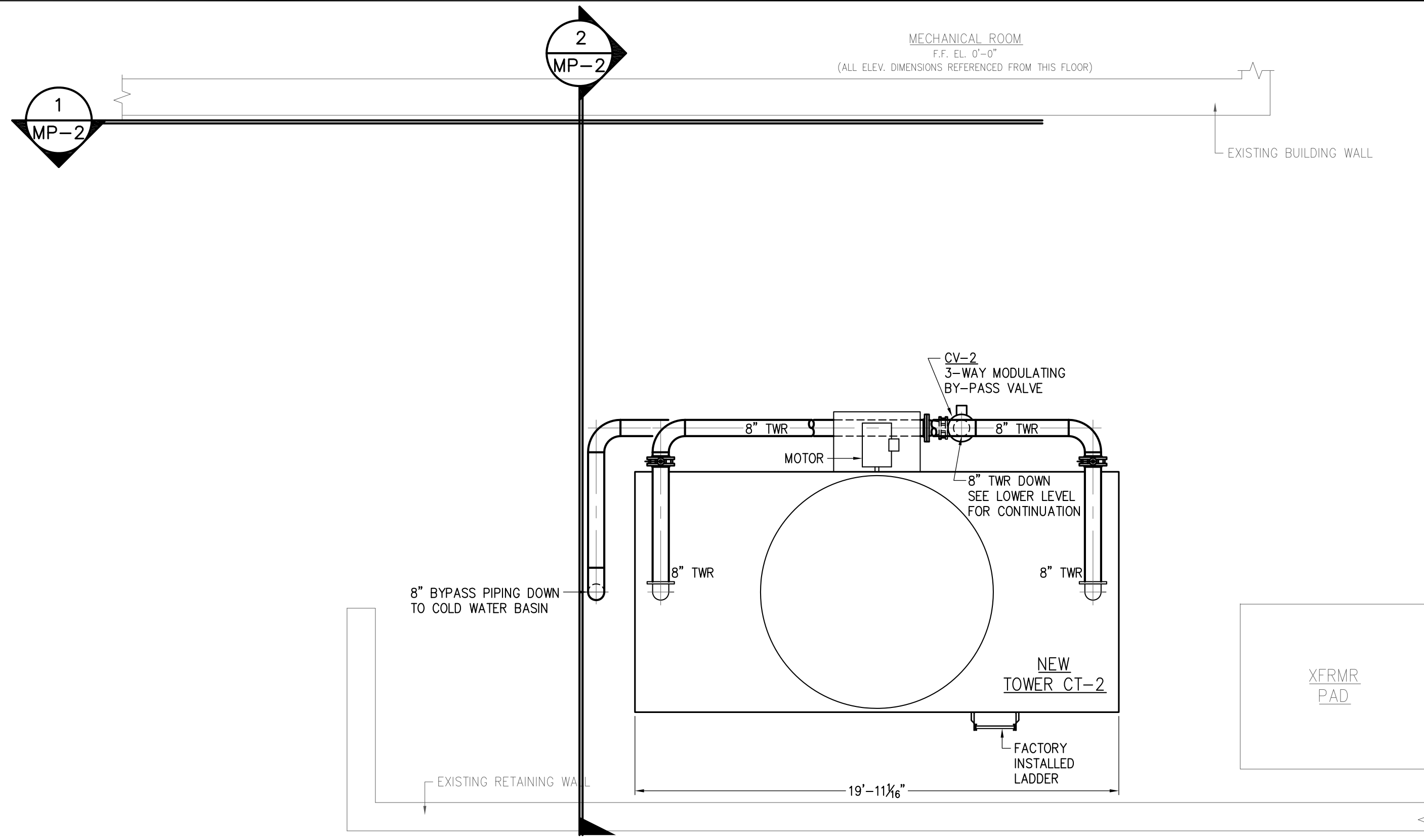
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**DMP-1**  
1 OF 4 SHEETS



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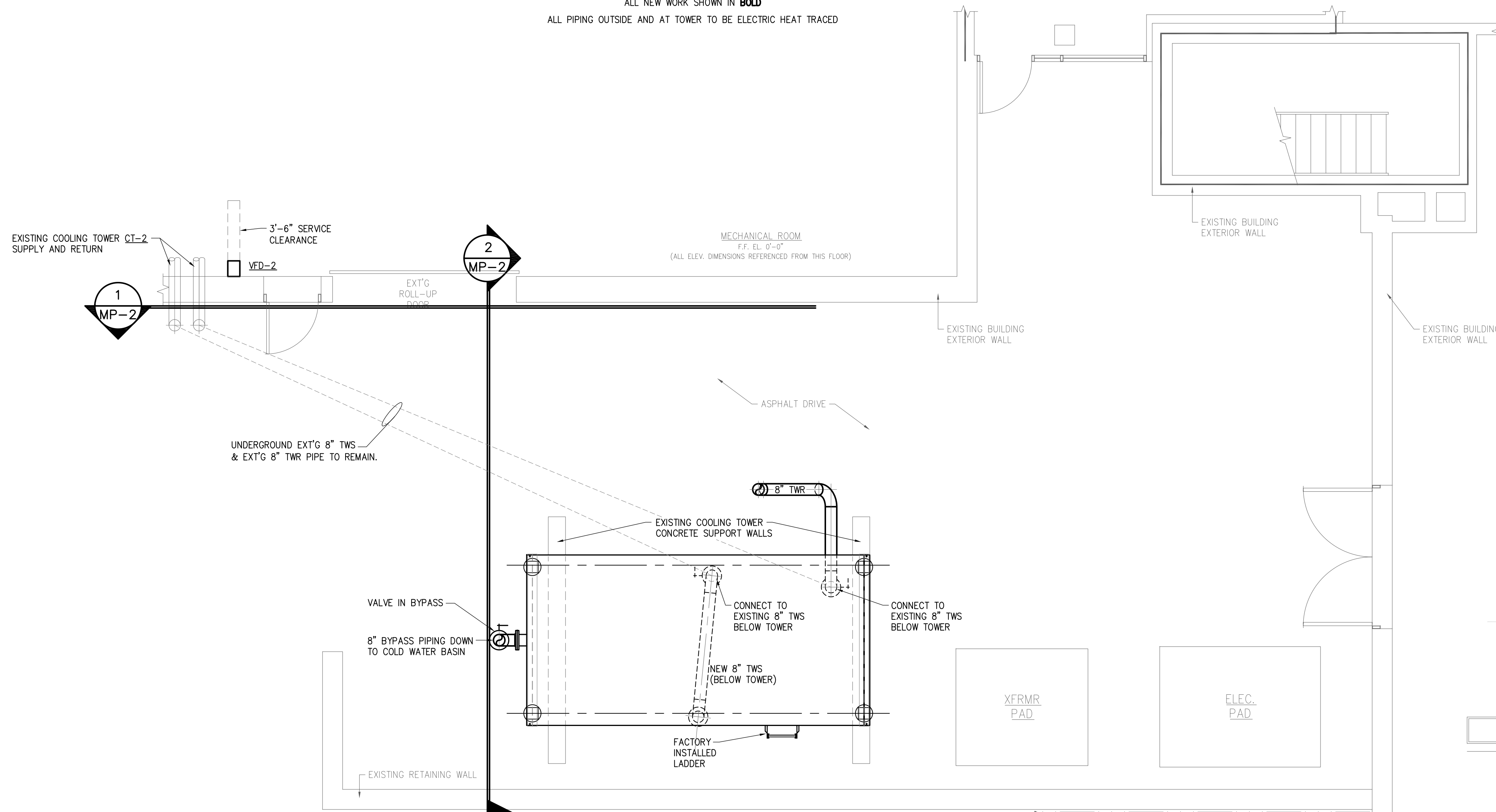


**HVAC PIPING PARTIAL NEW WORK PLAN - UPPER LEVEL**

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

ALL NEW WORK SHOWN IN **BOLD**

ALL PIPING OUTSIDE AND AT TOWER TO BE ELECTRIC HEAT TRACED

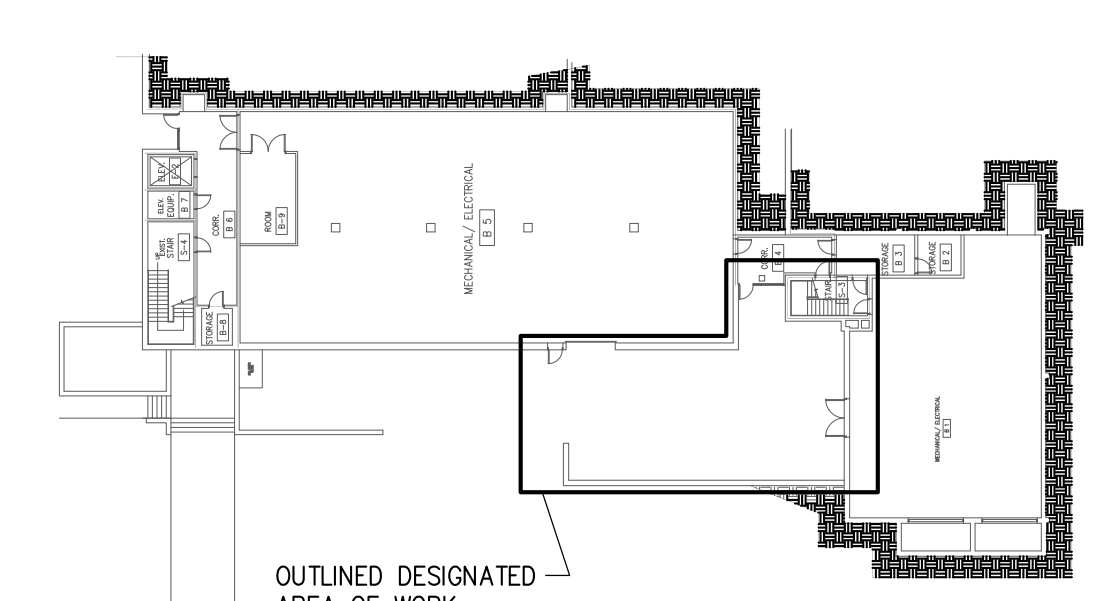


**HVAC PIPING PARTIAL NEW WORK PLAN - LOWER LEVEL**

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

ALL NEW WORK SHOWN IN **BOLD**

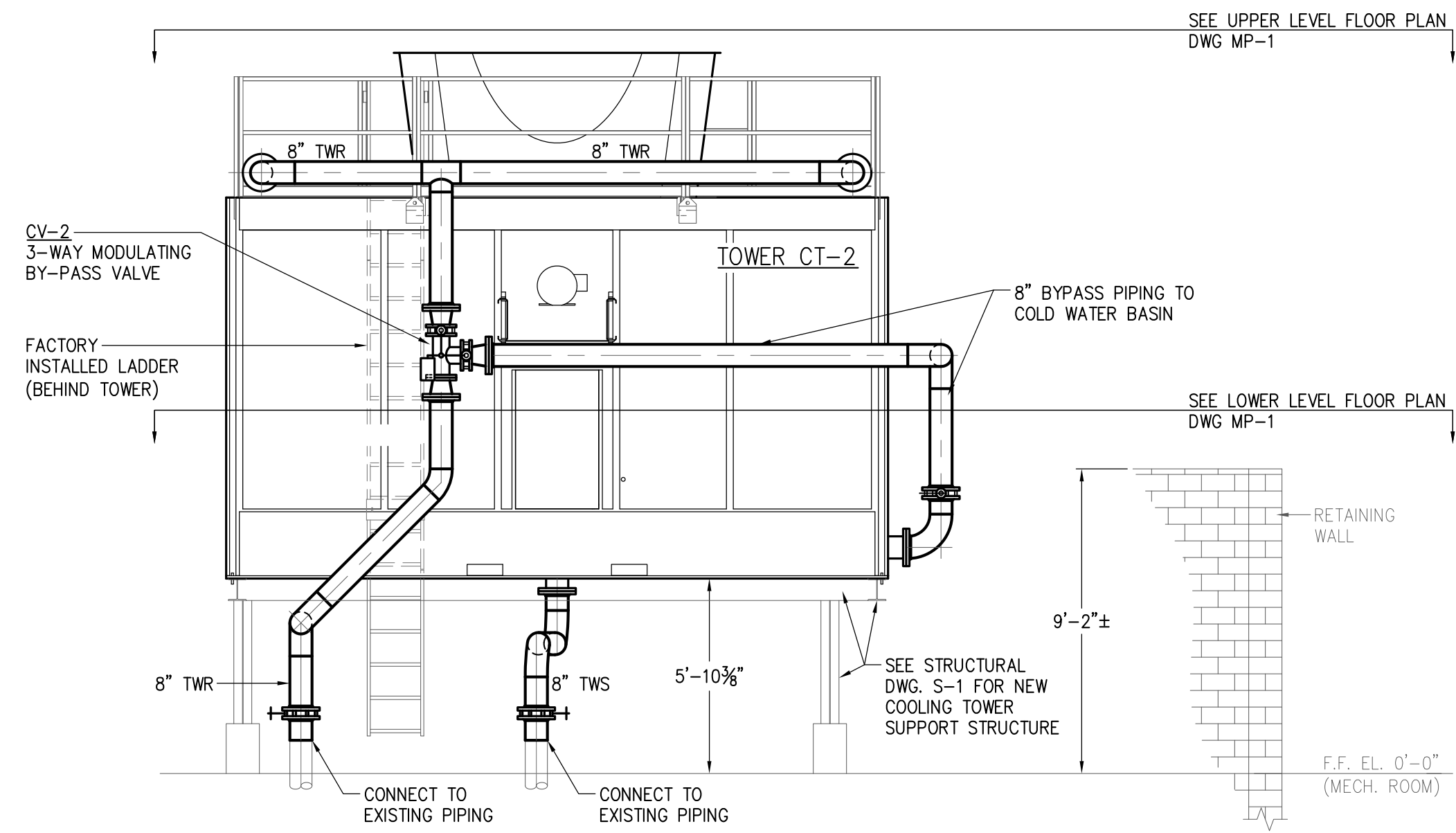
ALL PIPING OUTSIDE AND AT TOWER TO BE ELECTRIC HEAT TRACED



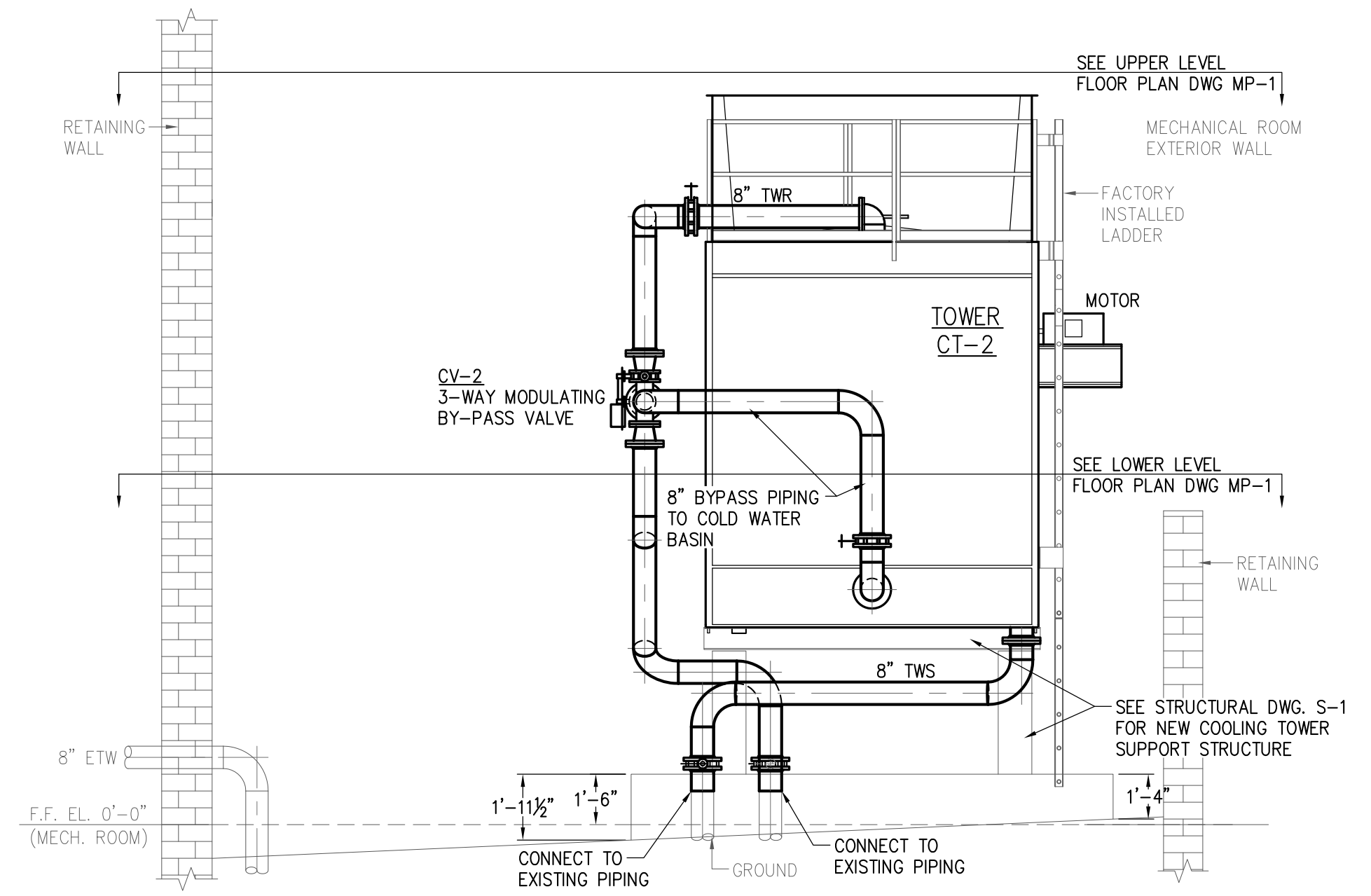
**KEY PLAN**  
NO SCALE

<p><b>HODGE CENTER COOLING TOWER REPLACEMENT PROJECT #H34-9544 SPARTANBURG, SOUTH CAROLINA</b></p>	
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<p>MP-1</p>	
<p>2 OF 4 SHEETS</p>	

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**2** COOLING TOWER PIPING ELEVATION  
 MP-1 SCALE: 1/4" = 1'-0"  
 ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR

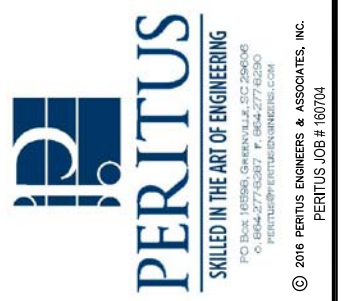


**3** COOLING TOWER PIPING ELEVATION  
 MP-1 SCALE: 1/4" = 1'-0"  
 ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR  
 EXISTING PIPING PENETRATIONS THROUGH BUILDING EXTERIOR WALL SHALL BE RESEALED  
 WATERTIGHT AFTER NEW CONNECTIONS ARE MADE. INSULATION SHALL EXTEND THROUGH WALL.

HODGE CENTER  
 COOLING TOWER REPLACEMENT  
 PROJECT #H34-9544  
 SPARTANBURG, SOUTH CAROLINA

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SHEET  
**MP-2**  
 3 OF 4 SHEETS



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COOLING TOWER SCHEDULE – INDUCED DRAFT CROSSFLOW TYPE												
ITEM	MARLEY No.	OPERATING CONDITIONS	HEAT TRANSFER PERFORMANCE			G.P.M.	TOTAL HEAT REJECTION (Btu/h)	VOLTAGE	TOTAL FAN AIRFLOW (CFM)	FAN H.P.(QTY)	OPERATING WEIGHT	REMARKS
			AMBIENT TEMP.		WATER TEMP.							
			W.B.	°F IN	°F OUT							
CT-2	NC84050AS1	SUMMER	78.3	95.0	85.0	1350	6,750,000	460/3/60	118,800	20(1)	20,318	SEE NOTES #1-#20

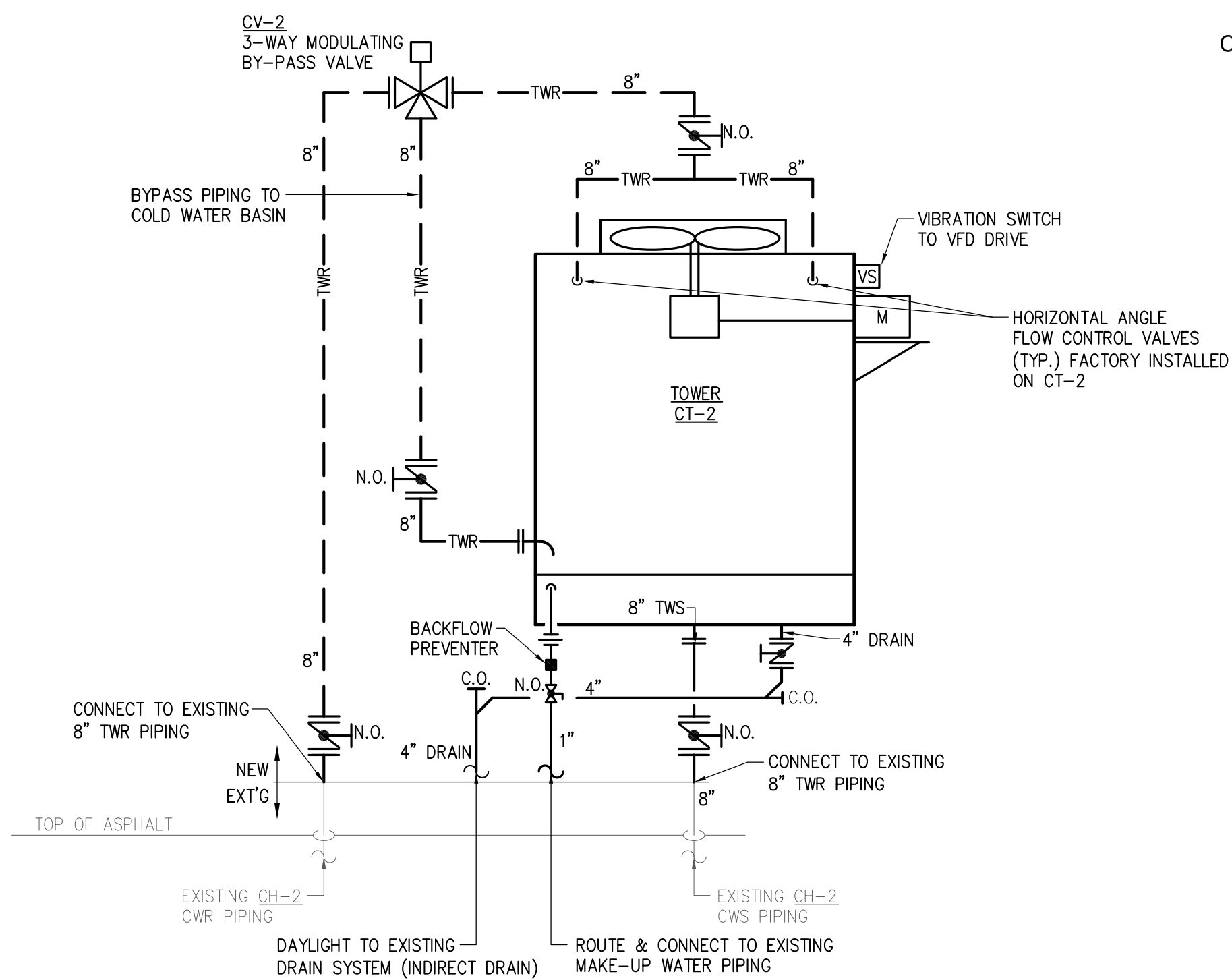
**NOTES:**

- SUMP HEATER-15KW, 480/3/60, INCLUDING HEATER ELEMENT, WATER TEMP. SENSOR PROBE AND NEMA4X CONTROL PANEL WITH CONTACTOR, TRANSFORMER, TEMP. CONTROLLER, AND LOW WATER CUTOFF.
- GALVANIZED STEEL CASING, GALVANIZED STEEL STRUCTURE.
- STAINLESS STEEL FULLY WELDED, WATER TIGHT COLD WATER COLLECTION BASIN.
- STAINLESS STEEL HOT WATER DISTRIBUTION BASIN.
- LOW SOUND FAN WITH ALUMINUM FAN BLADES.
- FIVE (5) YEAR "GEAREDUCE" WARRANTY.
- MOTOR MOUNT OUTSIDE AIRSTREAM (FIELD MOUNTED AND ALIGNED DRIVESHAFT).
- 15 MIL PVC FILM FILL WITH INTEGRAL LOUVERS AND DRIFT ELIMINATORS.
- HDG STEEL FAN GUARD.
- 4" DIA. COMBINATION DRAIN AND OVERFLOW.
- 1" WATER MAKE-UP FLOAT VALVE.
- QTY (2) 8" HORIZONTAL FLOW CONTROL VALVES.
- VARIABLE FLOW HOT WATER DISTRIBUTION NOZZLES.
- EXTERNAL LUBE LINE WITH DIPSTICK.
- COLLECTION BASIN AND PLENUM AREA ACCESS DOOR, LOCATED ON END WALLS.
- STAINLESS STEEL PLENUM WALKWAY IN EACH CELL.
- PERIMETER GUARDRAIL, KNEE RAIL, AND TOEBOARD AT TOP OF TOWER WITH (1) CAGED FACE LADDER WITH 60" EXTENSION.
- MANUAL RESET VIBRATION CUTOFF SWITCH.
- NOMINAL OVERALL SIZE: 19'-11"W x 9'-10 1/2"L x 16'-5 1/2"H.
- PREMIUM EFFICIENCY, INVERTER DUTY NAMEPLATED MOTOR, 1.15 SF, TEFC, 1800 RPM NOMINAL.

CONTROL VALVE SCHEDULE							
SYMBOL	SERVICE	SIZE	CV	G.P.M.	DP FEET	TYPE	NOTES
CV-2	CT-2 BY-PASS	6"	1025	1350	4	3-WAY	1

**NOTES:**

- VALVE SELECTION BASED UPON "JCI" MODEL # VFD-060 WITH MODULATING PNEUMATIC ACTUATOR.



**COOLING TOWER PIPING FLOW DIAGRAM**

NO SCALE  
ALL PIPING OUTSIDE AND AT TOWER TO BE ELECTRIC TAPE TRACED

VARIABLE FREQUENCY DRIVE SCHEDULE						
TAG	SERVICE	ABB MODEL No.	H.P.	OUTPUT AMPS	VOLTAGE	REMARKS
VFD-2	CT-2	ACH550-VCR-031A-4	20	31	460/3/60	SEE NOTE #1

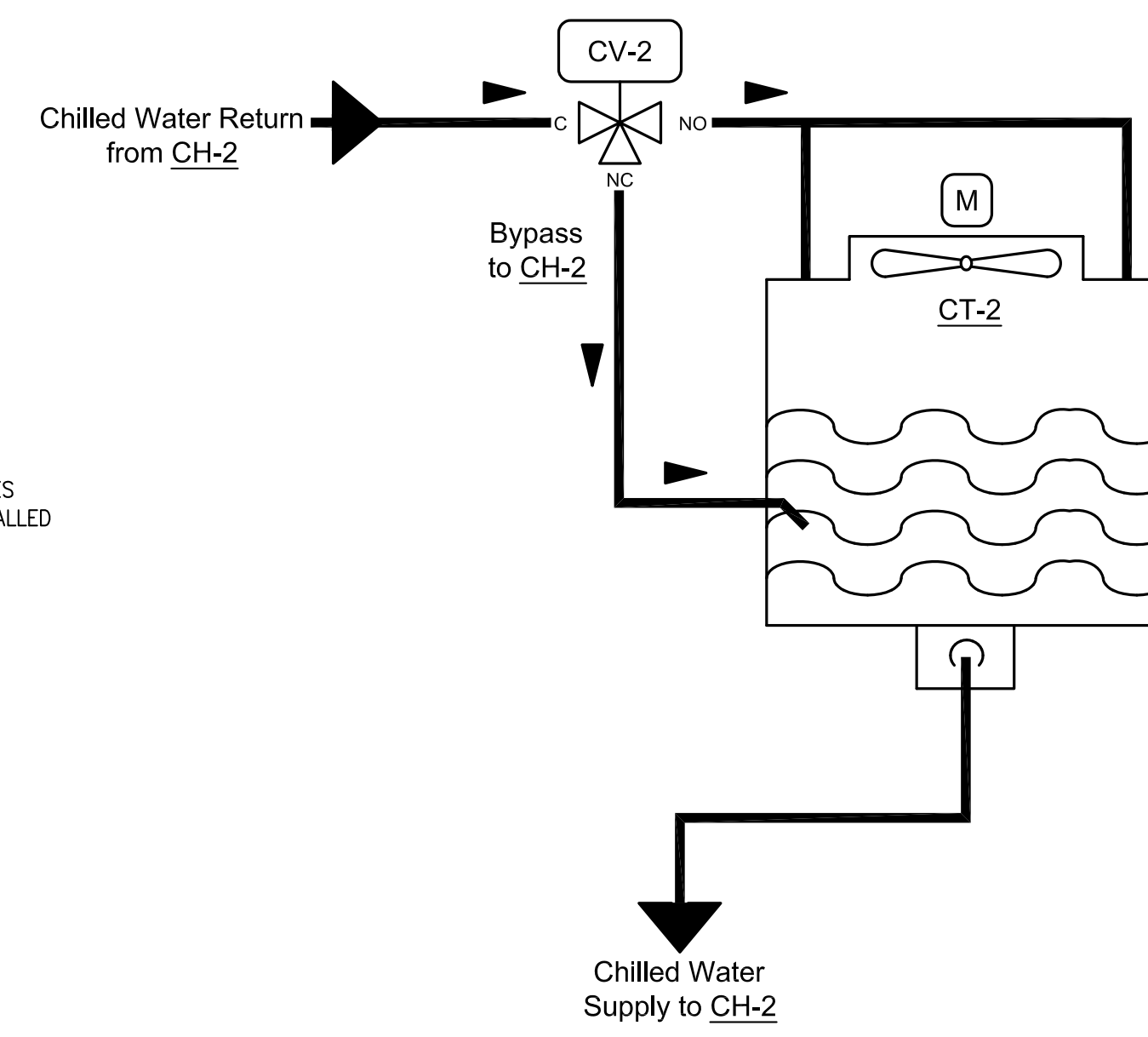
**NOTES:**

- VERTICAL ARRANGEMENT WITH MECHANICAL BYPASS (NO ELECTRICAL BYPASS). "E-CLIPSE-BYPASS", CIRCUIT BREAKER DISCONNECT, NEMA 1 UL TYPE 1 ENCLOSURE, N2 COMMUNICATIONS BUS, WITH INPUT/OUTPUT CARDS FOR START/STOP, SPEED CONTROL INPUT AND GENERAL ALARM/FAULT OUTPUT.

**MECHANICAL GENERAL NOTES**

- ALL SCHEDULES SHOWN ARE THE PURPOSE OF AIDING THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CORRECT TOTALS.
- CO-ORDINATE HVAC INSTALLATION WITH ALL OTHER TRADES, INCLUDING ELECTRICAL.
- REFER TO ELECTRICAL DRAWINGS FOR POWER CONNECTION POINTS.
- ALL PIPING INSULATION SHALL COMPLY WITH SECTION 503 OF THE INTERNATIONAL ENERGY CONSERVATION CODE, 2009 EDITION.
- ALL ELECTRICALLY POWERED EQUIPMENT SHALL BE LISTED AND LABELED PER NATIONAL ELECTRICAL CODE, AND INTERNATIONAL MECHANICAL CODE, 2015 EDITION, CHAPTER 3.
- ALL EQUIPMENT SHALL BE ACCESSIBLE PER INTERNATIONAL MECHANICAL CODE 2015 EDITION, CHAPTER 3.
- ALL PIPING ARRANGEMENT AND ROUTING AS SHOWN IS DIAGRAMMATIC AND MAY REQUIRE ALTERATIONS DIFFERENT FROM THAT SHOWN IN ORDER TO ACCOMMODATE STRUCTURAL FEATURES. CONTRACTOR SHALL FIELD VERIFY AND MAKE ALTERATIONS OR REVISIONS AS REQUIRED.

MECHANICAL LEGEND	
SYMBOL	DESCRIPTION
ETWS	EXISTING TOWER WATER SUPPLY PIPING
ETWR	EXISTING TOWER WATER RETURN PIPING
—D—	DRAIN PIPING
—DCW—	DOMESTIC COLD WATER PIPING
—TWS—	TOWER WATER SUPPLY (TWS) PIPING
—TWR—	TOWER WATER RETURN (TWR) PIPING
—C.O.—	CLEAN OUT (C.O.)
	BALL VALVE
	CHECK VALVE
	STRAINER ASSEMBLY
	CIRCUIT BALANCER
	BUTTERFLY VALVE (LUG BODY)
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	PRESSURE REDUCING VALVE
	REDUCER
	UNION
	TRIPLE DUTY VALVE
	PRESSURE GAUGE
	THERMOMETER
N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
— — —	EXISTING PIPE TO REMAIN



**COOLING TOWER CONTROL SCHEMATIC**

NO SCALE

**SEQUENCE OF OPERATION**

EXISTING "JCI" CONTROLS SHALL BE UTILIZED AND MODIFIED AS REQUIRED FOR NEW COOLING TOWER OPERATION. WHEN CONDENSER PUMP STATUS IS "ON", THE COOLING TOWER WATER BYPASS VALVE SHALL MODULATE OPEN AND COOLING TOWER FANS SHALL MODULATE (THROUGH VFD CONTROL) TO MAINTAIN COOLING TOWER SUPPLY WATER SETPOINT. THE COOLING TOWER FAN SHALL AUTOMATICALLY START WHEN THE COOLING TOWER BYPASS VALVE IS INDEXED FOR FLOW OVER THE TOWER AND MORE COOLING IS REQUIRED. THE VARIABLE SPEED DRIVE WILL MODULATE TO MAINTAIN THE CONDENSER WATER AT SETPOINT. IF FOR ANY REASON THE FAN STATUS DOES NOT MATCH ITS COMMANDED VALUE AN ALARM WILL BE GENERATED.

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SHEET MP-3	
4 OF 4 SHEETS	

**HODGE CENTER  
COOLING TOWER REPLACEMENT  
PROJECT #H34-9544  
SPARTANBURG, SOUTH CAROLINA**

REVISIONS

NO.	DATE	BY	DESCRIPTION

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### GENERAL CONSTRUCTION NOTES

- PROVIDE ALL WORK IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:  
 INTERNATIONAL BUILDING CODE 2015 EDITION  
 NFPA 70 - NATIONAL ELECTRICAL CODE 2014 EDITION
- RACEWAYS SHALL BE GALVANIZED RMC WITH THREADED FITTINGS UNLESS NOTED OR DETAILED OTHERWISE. ALL WIRING SHALL BE COPPER WITH THWN INSULATION AND SHALL BE INSTALLED IN METAL RACEWAY.
- INSTALL ELECTRICAL SYSTEMS WITHOUT INTERFERING WITH DUCTS, PIPES, STRUCTURAL MEMBERS, OR OTHER SYSTEMS.
- THOROUGHLY CLEAN ALL EQUIPMENT AND SYSTEMS BEFORE PLACING IN OPERATION. RESTORE FINISHED SURFACES IF DAMAGED AND DELIVER THE ENTIRE INSTALLATION IN AN APPROVED CONDITION. THE CONTRACTOR SHALL INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF ALL SYSTEMS. FURNISH 3 SETS OF OPERATION AND MAINTENANCE MANUALS TO THE OWNER FOR EACH SYSTEM.
- THE CONTRACTOR SHALL GUARANTEE THE WORK INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE. DEFECTS WHICH APPEAR AS A RESULT OF NORMAL USAGE SHALL BE REMEDIED BY THE CONTRACTOR TO THE COMPLETE SATISFACTION OF THE OWNER WITHOUT COST TO THE OWNER.
- WHERE MATERIALS AND EQUIPMENT ARE INDICATED TO BE REMOVED, THE CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF MATERIALS AND EQUIPMENT, UNLESS NOTED OTHERWISE ON PLAN.
- COORDINATE AND SCHEDULE WITH THE OWNER ELECTRICAL OUTAGES THAT WILL BE REQUIRED TO PERFORM THE WORK OF THIS CONTRACT. OUTAGES SHALL ONLY OCCUR ON WEEKENDS (SATURDAYS & SUNDAYS). MAXIMUM TIME DURATION FOR EACH REQUIRED OUTAGE SHALL BE 4 HOURS.
- CUTTING, DRILLING, AND PATCHING: PROVIDE CHASES, SLOTS, AND OPENINGS IN EXISTING BUILDING COMPONENTS TO ALLOW FOR ELECTRICAL INSTALLATIONS. PERFORM CUTTING, DRILLING, FITTING, AND PATCHING REQUIRED TO:
  - INSTALL EQUIPMENT, MATERIALS, AND RACEWAYS IN EXISTING STRUCTURES.
  - REMOVE AND REPLACE DEFECTIVE WORK THAT DOES NOT CONFORM TO REQUIREMENTS OF THE CONTRACT DOCUMENTS.
  - UPON WRITTEN INSTRUCTIONS FROM THE ARCHITECT/ENGINEER, UNCOVER AND RESTORE WORK TO PROVIDE FOR ARCHITECT/ENGINEER OBSERVATION OF CONCEALED WORK.

PROTECT EXISTING STRUCTURES, FURNISHINGS, FINISHES, MECHANICAL/PLUMBING SYSTEMS, AND ELECTRICAL SYSTEMS WHILE PERFORMING CUTTING, DRILLING, FITTING, AND PATCHING.

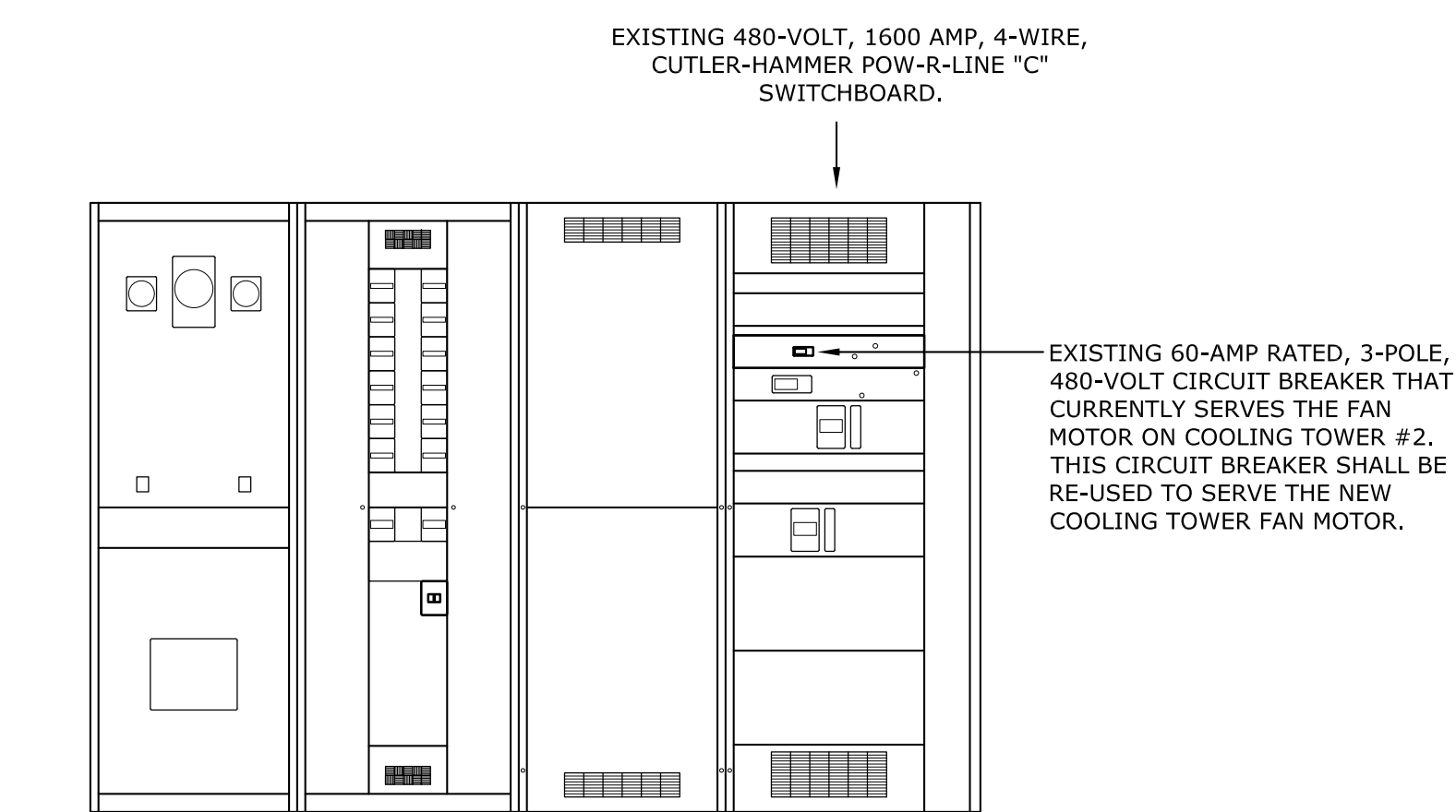
PATCH EXISTING SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS THAT MATCH EXISTING MATERIALS. PATCHING SHALL BE PERFORMED BY EXPERIENCED INSTALLERS.

### ELECTRICAL LEGEND

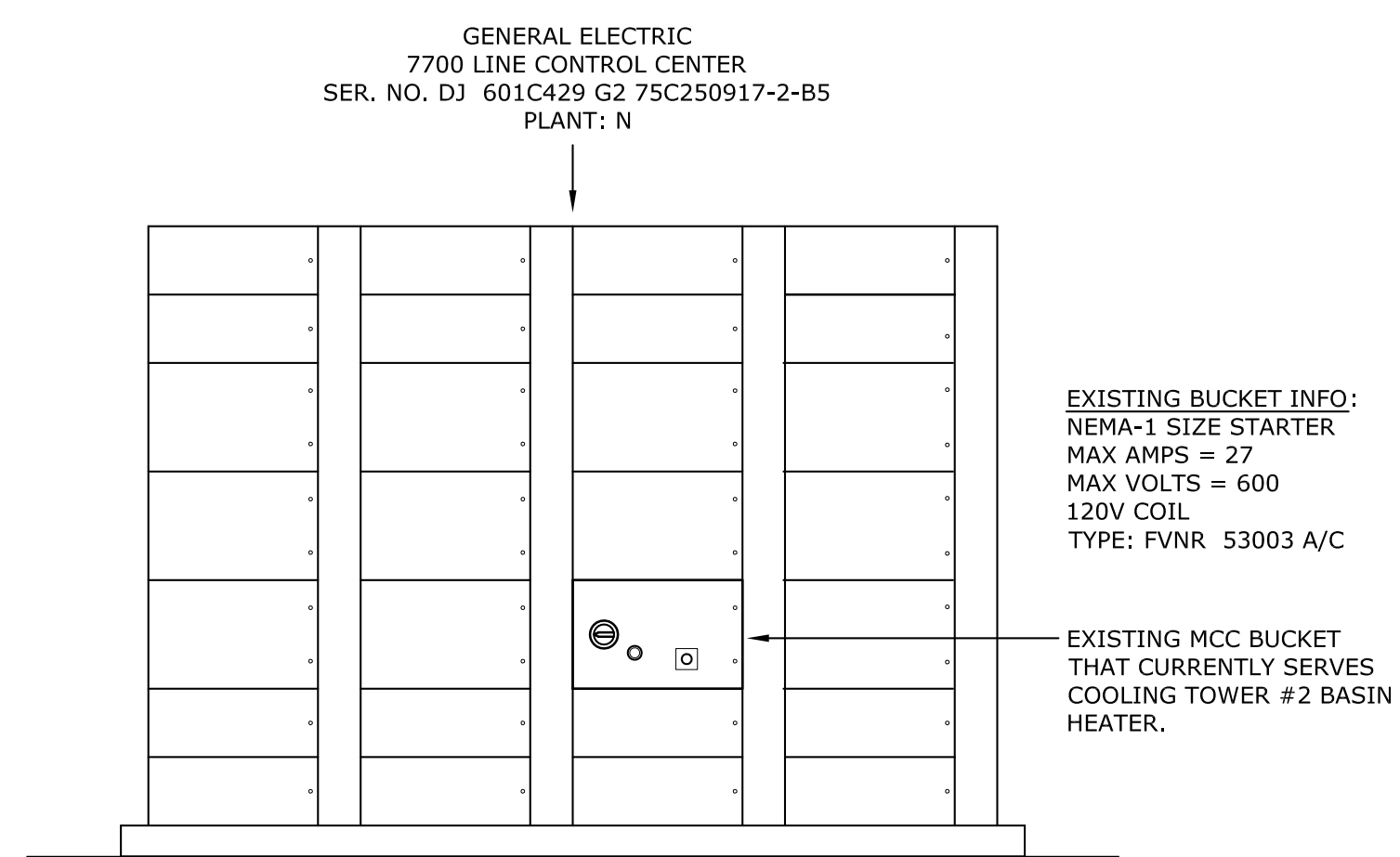
SYMBOL	DESCRIPTION
	ELECTRICAL CONNECTION TO A MOTOR OR TO MOTOR-DRIVEN EQUIPMENT. PROVIDE RACEWAY AND WIRING AS NOTED ON PLAN.
	SAFETY DISCONNECT SWITCH WITH FEATURES AND RATINGS SHOWN ON PLAN - CUTLER-HAMMER, GENERAL ELECTRIC, SQUARE-D, OR SIEMENS. MOUNT SWITCH TO EQUIPMENT WITH TOP AT 60 INCHES ABOVE GRADE.
	UNIT MOUNTED JUNCTION BOX - PROVIDE ELECTRICAL CONNECTION TO UNIT EQUIPEMNT.
	CAST-METAL JUNCTION BOX WITH GASKETED COVER. SIZE AND SUPPORT BOX IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
	VARIABLE FREQUENCY DRIVE - FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
	EXISTING 120/208 VOLT PANELBOARD - TO REMAIN IN PLACE.
	EXISTING CONTROL PANEL, TYPE AS NOTED ON PLAN - TO REMAIN IN PLACE.
	EXISTING ELECTRICAL CONNECTION TO A MOTOR OR TO MOTOR DRIVEN EQUIPMENT. REMOVE MOTOR AND ALL ASSOCIATED RACEWAY AND WIRING. NUMBER INDICATES HORSEPOWER RATING.
	EXISTING NON-FUSED SAFETY DISCONNECT SWITCH - TO BE RE-USED.
	EXISTING MOTOR STARTER - REMOVE STARTER AND ALL ASSOCIATED SUPPLY-SIDE RACEWAY AND WIRING.
	EXISTING JUNCTION BOX - TO REMAIN IN PLACE.
	EXISTING WALL MOUNTED JUNCTION BOX - TO REMAIN IN PLACE.
	EXISTING UNIT MOUNTED JUNCTION BOX - REMOVE ALL ASSOCIATED RACEWAY AND WIRING.
	EXISTING 120-VOLT HEAT TRACE RECEPTACLE OUTLET - TO BE RE-USED.

### ELECTRICAL DRAWING INDEX

E-1	GENERAL NOTES, LEGEND, AND DETAILS
E-2	ELECTRICAL DEMOLITION PLAN (POWER)
E-3	ELECTRICAL RENOVATION PLAN (POWER)
E-4	ELECTRICAL DEMOLITION PLAN (CONTROLS & HEAT TRACE)
E-5	ELECTRICAL RENOVATION PLAN (CONTROLS & HEAT TRACE)



**1** EXISTING SWITCHBOARD  
E-1 NOT TO SCALE



**2** EXISTING MOTOR CONTROL CENTER  
E-1 NOT TO SCALE

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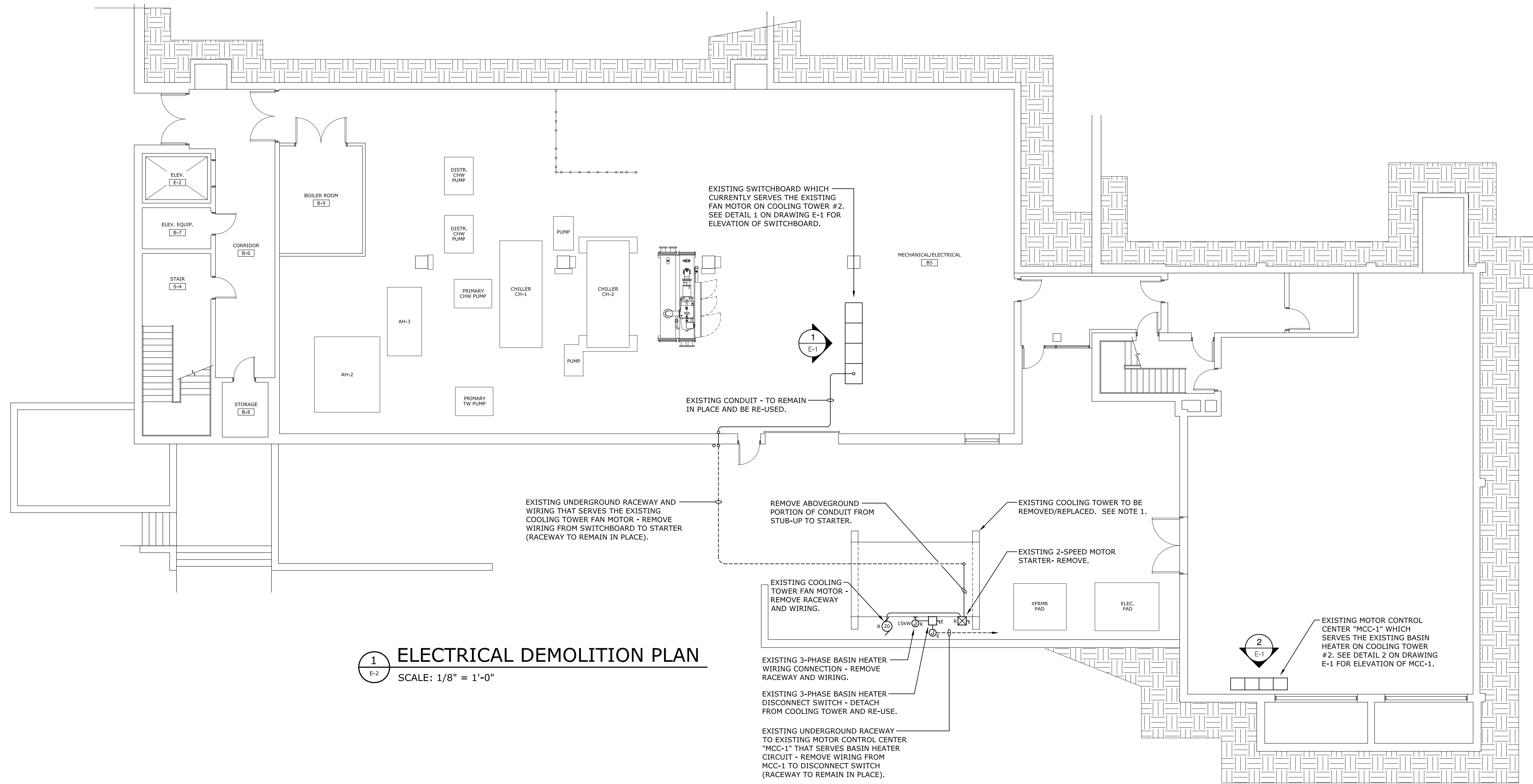
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**E-1**

1 OF 5 SHEETS



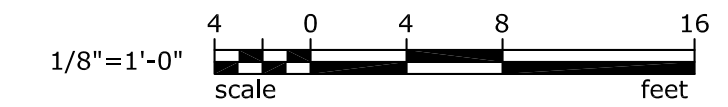
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**1**  
E-2  
**ELECTRICAL DEMOLITION PLAN**  
SCALE: 1/8" = 1'-0"

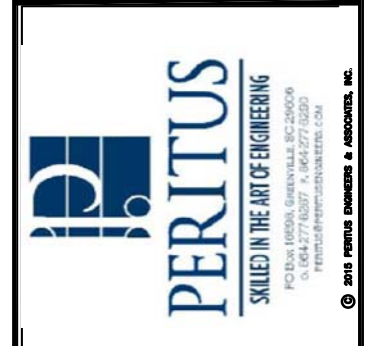
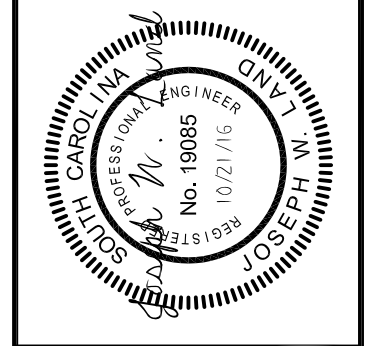
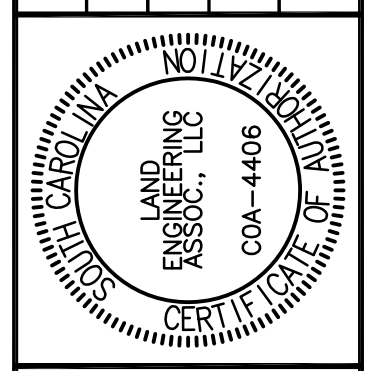
**DEMOLITION NOTES**

1. EXISTING COOLING TOWER #2: THE COOLING TOWER WILL BE REMOVED BY THE MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL DISCONNECT AND REMOVE ALL EXISTING 480-VOLT WIRING AND RACEWAYS THAT SERVE THE COOLING TOWER, EXCEPT THAT ALL UNDERGROUND RACEWAYS & ASSOCIATED STUB-UPS SHALL BE RE-USED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE/BUILDING TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO BID AND SHALL INCLUDE ALL WORK REQUIRED FOR COMPLETE DEMOLITION IN HIS BID.



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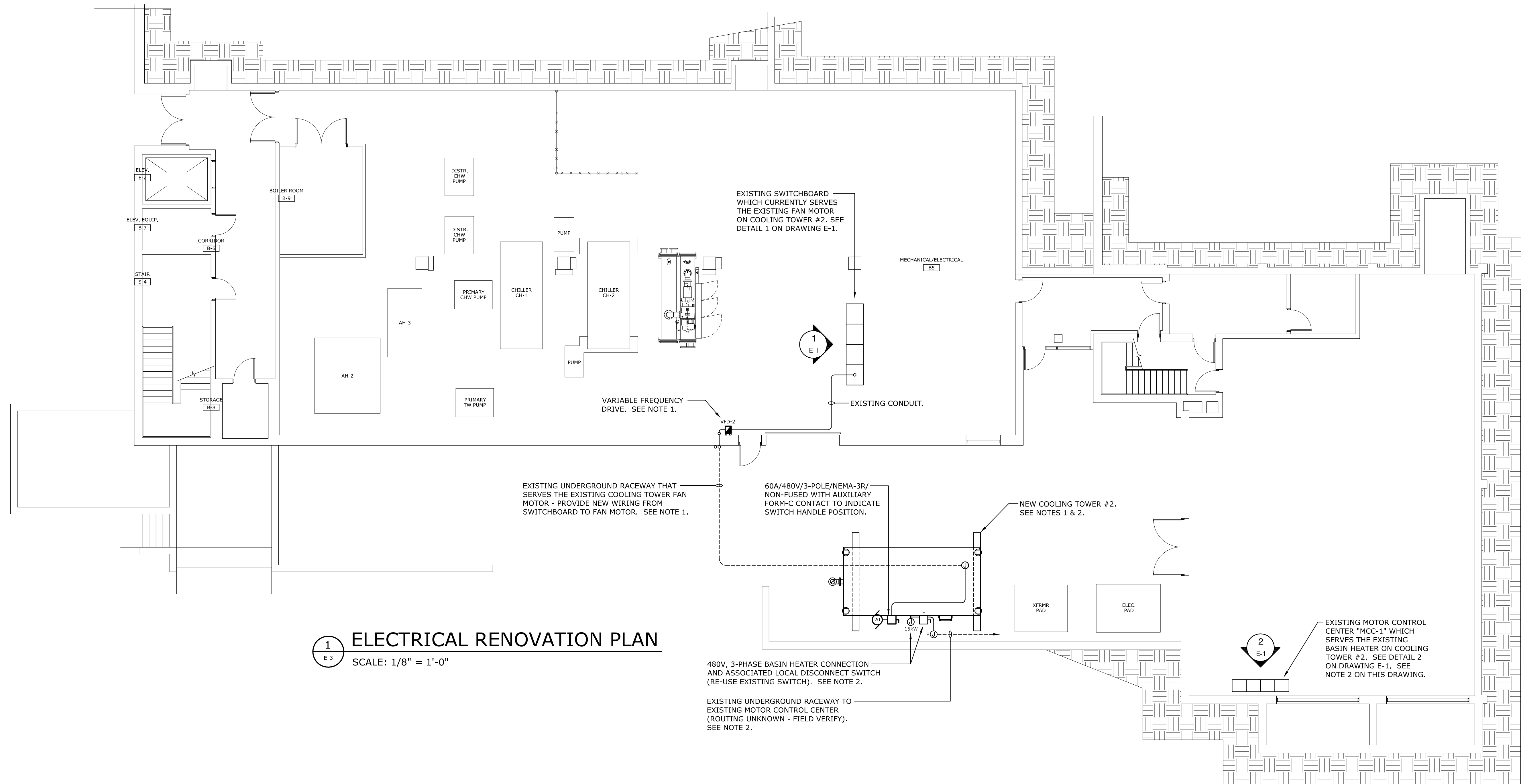
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PROJECT #H34-9544  
SPARTANBURG, SOUTH CAROLINA**

DESIGN JWL	DRAWN JSJ
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<b>E-2</b>	
2 OF 5 SHEETS	

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**1**  
E-3  
**ELECTRICAL RENOVATION PLAN**  
SCALE: 1/8" = 1'-0"

**RENOVATION NOTES**

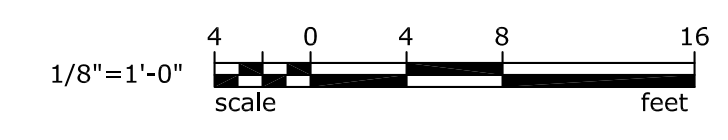
1. **NEW COOLING TOWER #2 FAN MOTOR:** THE NEW FAN MOTOR SHALL BE FIELD INSTALLED ON THE COOLING TOWER BY THE ELECTRICAL CONTRACTOR. THE SERVICES OF A MILLWRIGHT WILL BE REQUIRED TO ALIGN THE MOTOR SHAFT AND TIGHTEN-DOWN THE MOUNTING BOLTS - THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE MILLWRIGHT AS REQUIRED TO COMPLETE FIELD INSTALLATION OF THE MOTOR.

**INTERIOR WORK:** A NEW VARIABLE FREQUENCY DRIVE UNIT WILL BE FURNISHED BY THE MECHANICAL CONTRACTOR TO SERVE THE FAN MOTOR FOR THE NEW COOLING TOWER. THE ELECTRICAL CONTRACTOR SHALL WALL MOUNT THE DRIVE IN A CODE COMPLIANT LOCATION - PROVIDE UNISTRUT FRAMING MEMBERS AS REQUIRED TO OFFSET DRIVE FROM WALL. PROVIDE THREE #8 AWG THWN COPPER CONDUCTORS WITH ONE #10 AWG GREEN INSULATED COPPER GROUND WIRE FROM THE EXISTING SWITCHBOARD, TO AND THROUGH THE NEW VARIABLE SPEED DRIVE, THEN OUT TO THE NEW MOTOR DISCONNECT SWITCH AT THE COOLING TOWER. MODIFY AND EXTEND THE EXISTING WALL MOUNTED RACEWAY NEAR THE DRIVE UNIT AS REQUIRED TO ROUTE RACEWAY THROUGH (IN AND OUT OF) THE DRIVE UNIT.

**EXTERIOR WORK:** MOUNT NEW MOTOR DISCONNECT SWITCH ON NEW COOLING TOWER. PROVIDE 3/4" (MINIMUM) RIGID METALLIC CONDUIT (RMC) FROM THE EXISTING CONDUIT STUB-UP AT THE COOLING TOWER TO THE NEW DISCONNECT SWITCH. PROVIDE NEW RACEWAY AND CONDUCTORS FROM THE DISCONNECT SWITCH

TO SERVE THE NEW FAN MOTOR - COORDINATE WITH COOLING TOWER SHOP DRAWINGS TO DETERMINE FAN MOTOR LOCATION. ROUTE FAN-SUPPLY RACEWAY AND CONDUCTORS THROUGH THE VIBRATION CUT-OFF CONTACTOR (NOT SHOWN - CONTACTOR FURNISHED WITH COOLING TOWER). ALL WIRING SHALL BE THREE #8 AWG THWN COPPER CONDUCTORS WITH ONE #10 AWG GREEN INSULATED COPPER GROUND WIRE. RACEWAYS SHALL BE 3/4" (MINIMUM) RIGID METALLIC CONDUIT EXCEPT THAT FINAL RACEWAY CONNECTION TO MOTOR SHALL BE MADE WITH 3/4" (MINIMUM) LIQUID-TIGHT FLEXIBLE METAL CONDUIT. SUPPORT RACEWAYS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

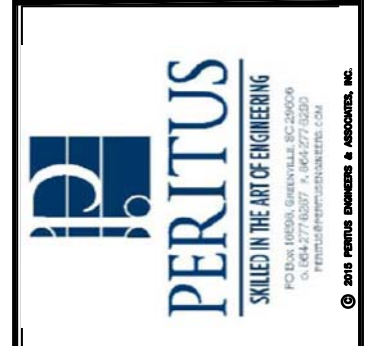
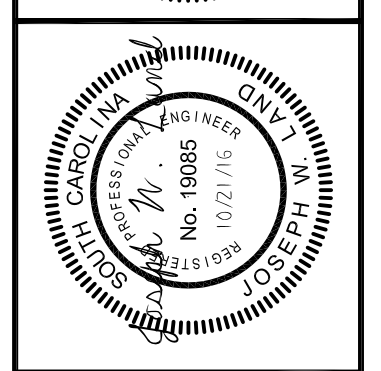
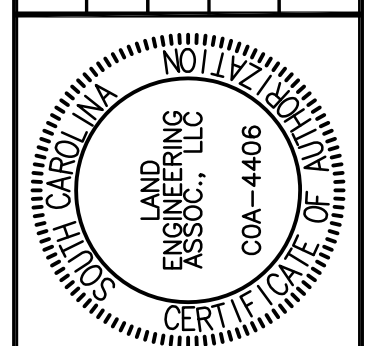
2. **NEW BASIN HEATER CIRCUIT:** MOUNT EXISTING DISCONNECT SWITCH TO NEW COOLING TOWER. PROVIDE THREE #8 AWG THWN COPPER CONDUCTORS WITH ONE #10 AWG THWN COPPER GROUND WIRE FROM EXISTING MOTOR CONTROL CENTER TO LINE-SIDE OF DISCONNECT SWITCH USING EXISTING RACEWAYS. PROVIDE NEW RACEWAY AND CONDUCTORS FROM LOAD-SIDE OF DISCONNECT SWITCH TO BASIN HEATER JUNCTION BOX - COORDINATE WITH COOLING TOWER SHOP DRAWINGS TO DETERMINE BASIN HEATER LOCATION. ALL WIRING SHALL BE THREE #8 AWG THWN COPPER CONDUCTORS WITH ONE #10 AWG GREEN INSULATED COPPER GROUND WIRE. RACEWAYS SHALL BE 3/4" (MINIMUM) RIGID METALLIC CONDUIT EXCEPT THAT FINAL RACEWAY CONNECTION TO HEATER JUNCTION BOX SHALL BE MADE WITH 3/4" (MINIMUM) LIQUID-TIGHT FLEXIBLE METAL CONDUIT. SUPPORT NEW AND EXISTING RACEWAYS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.



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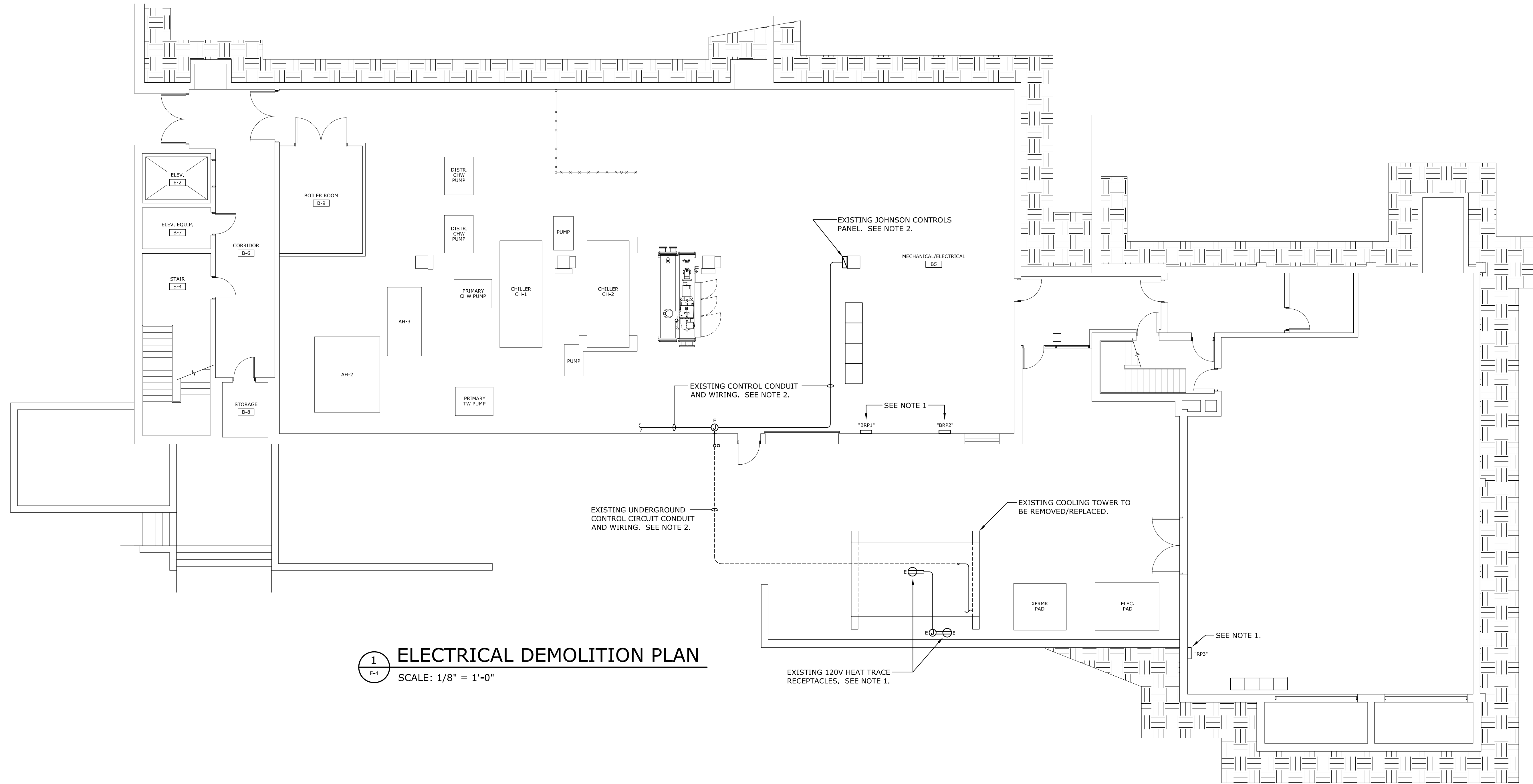


**HODGE CENTER**  
**COOLING TOWER REPLACEMENT**  
**PROJECT #H34-9544**  
**SPARTANBURG, SOUTH CAROLINA**

DESIGN JWL	DRAWN JSJ
CHECKED JWL	DATE 10/21/16
SHEET NO. LAND #USC-2016-14	
<b>E-3</b>	
3 OF 5 SHEETS	

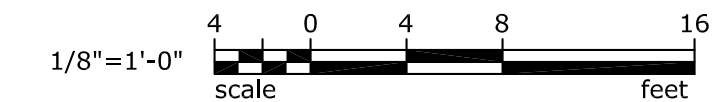


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**1** ELECTRICAL DEMOLITION PLAN  
E-4 SCALE: 1/8" = 1'-0"

- DEMOLITION NOTES**
- HEAT TRACE:** EXISTING HEAT TRACE RECEPTACLES AND ASSOCIATED RACEWAYS SHALL BE DETACHED FROM THE EXISTING COOLING TOWER AND THEN RE-ATTACHED TO THE NEW COOLING TOWER. MAINTAIN INTEGRITY OF EXISTING CIRCUITS. IT IS NOT KNOWN WHICH PANELBOARD THE EXISTING HEAT TRACE CIRCUIT(S) ARE SERVED FROM. CONTRACTOR SHALL FIELD VERIFY EXISTING CIRCUIT ORIGINS PRIOR TO WORKING ON CIRCUITS (IF NECESSARY) BY USING ELECTRONIC CIRCUIT TRACING EQUIPMENT. THREE PANELBOARDS ARE SHOWN ON PLAN THAT ARE POSSIBLE ORIGINS OF THE CIRCUIT(S).
  - CONTROLS CONDUIT:** DEMOLISH EXISTING ABOVEGROUND RACEWAYS ON THE EXISTING COOLING TOWER FROM THE EXISTING TWO-SPEED STARTER BACK TO THE EXISTING STUB-UP AT GRADE. THE EXISTING UNDERGROUND CONTROL WIRING SHALL BE REMOVED TO WHERE IT ORIGINATES IN THE BASEMENT MECHANICAL/ELECTRICAL ROOM AT THE EXISTING JOHNSON CONTROLS PANEL. NOTE THAT THERE ARE OTHER CONTROL WIRES IN THE INDOOR PORTION OF THE RACEWAY THAT SERVE OTHER EQUIPMENT AND MUST REMAIN IN PLACE - PROVIDE LABOR TO PULL OUT EXISTING CONTROL WIRES/CABLES THAT MUST REMAIN WHEN PULLING OUT THE OBSOLETE CONDUCTORS, AND THEN RE-PULL AND TERMINATE THE EXISTING CONTROL WIRES/CABLES THAT SERVE OTHER EQUIPMENT. ALSO, PULL IN NEW CONTROL WIRES THAT WILL SERVE THE NEW VARIABLE FREQUENCY DRIVE (CABLES WILL BE FURNISHED BY THE MECHANICAL CONTRACTOR).



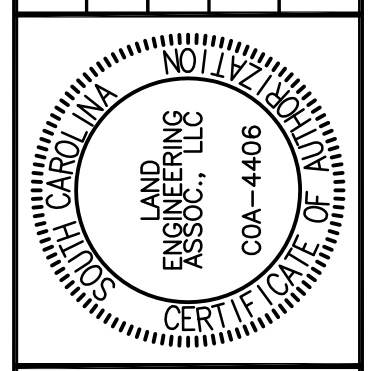
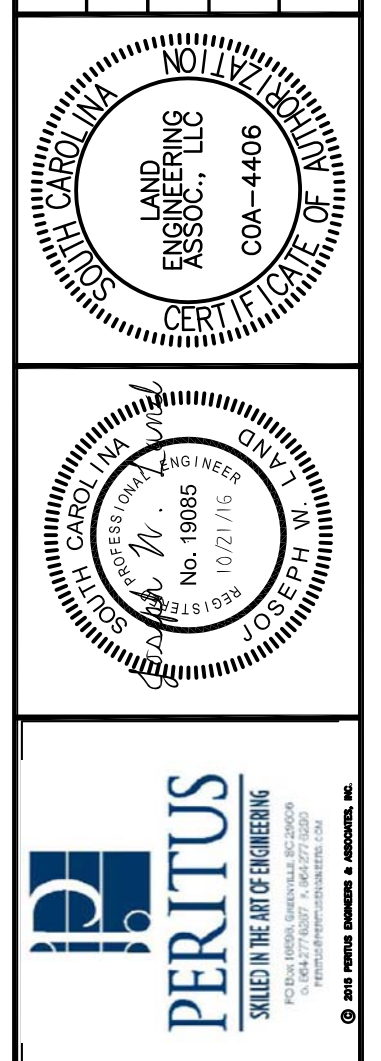
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NO.	DATE	BY	DESCRIPTION

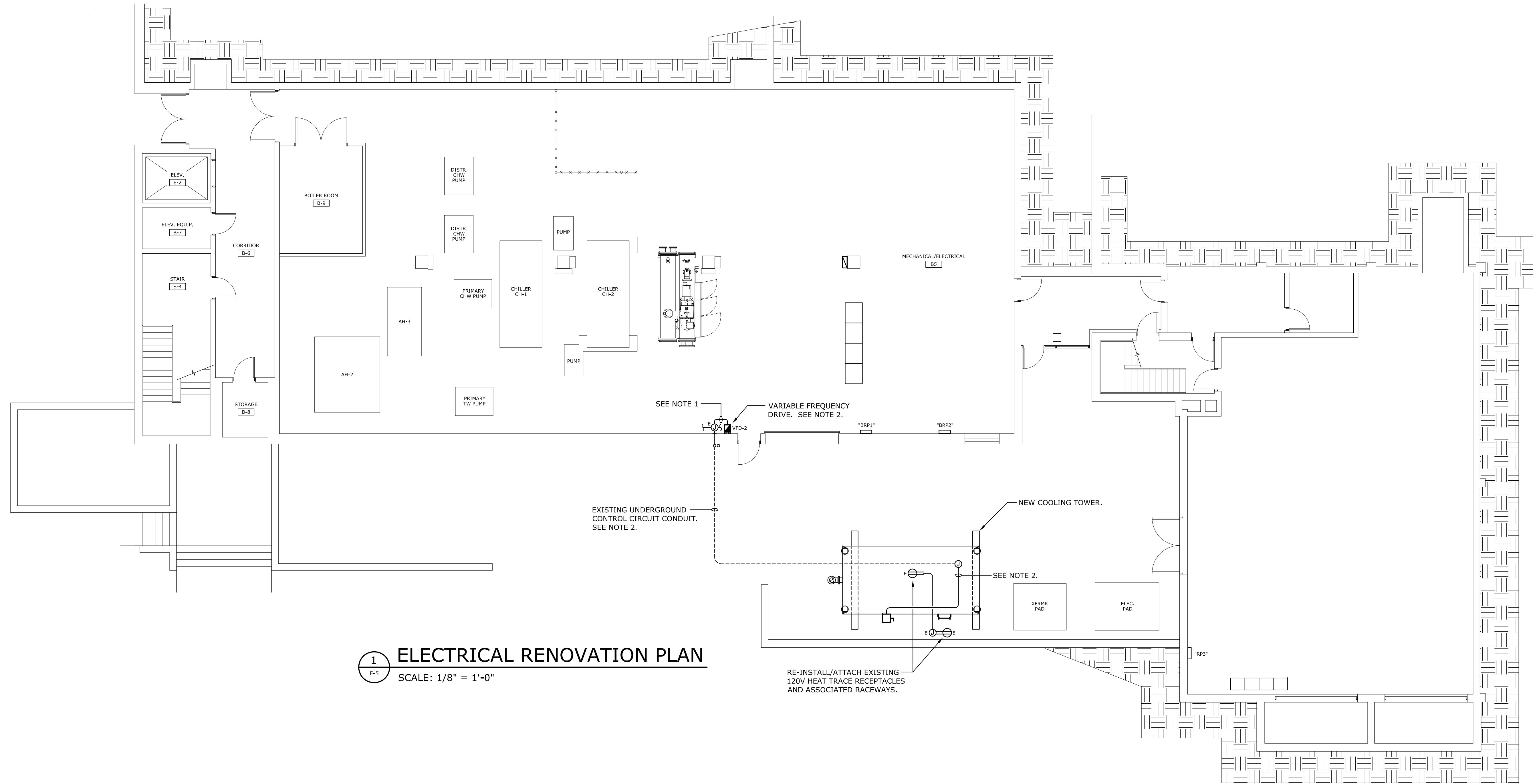
  

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CHECKED	JWL	DATE	10/21/16
PROJECT NO.	LAND #USC-2016-14		
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4 OF 5 SHEETS			

HODGE CENTER  
COOLING TOWER REPLACEMENT  
PROJECT #H34-9544  
SPARTANBURG, SOUTH CAROLINA

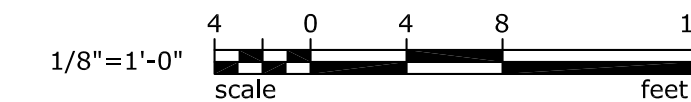


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**1**  
E-5  
**ELECTRICAL RENOVATION PLAN**  
SCALE: 1/8" = 1'-0"

- RENOVATION NOTES**
1. CONTROL CIRCUIT RACEWAY: PROVIDE A RACEWAY FROM THE EXISTING INDOOR CONTROLS JUNCTION BOX TO THE VARIABLE SPEED DRIVE UNIT FOR NEW CONTROL WIRING. RACEWAY SHALL BE 1/2" (MINIMUM) EMT WITH COMPRESSION TYPE FITTINGS. SEE NOTE 2 ON DRAWING E-4.
  2. CONTROL WIRING: PROVIDE ONE 3-CONDUCTOR #16 AWG SHIELDED CABLE WITH 600 VOLT RATED INSULATION FROM THE NEW VARIABLE SPEED DRIVE TO THE AUXILIARY CONTACTS OF THE NEW FAN MOTOR DISCONNECT SWITCH CALLED FOR ON DRAWING E-3 (THIS CIRCUIT IS TO BE USED TO SIGNAL THE VFD THAT THE DISCONNECT SWITCH HAS BEEN TURNED OFF, SO THAT THE VFD KNOWS TO RAMP-DOWN BEFORE THE DISCONNECT SWITCH IS TURNED BACK ON). PROVIDE WIRING TERMINATIONS AS DIRECTED BY THE HVAC CONTROLS CONTRACTOR. PROVIDE RMC TYPE RACEWAY FROM THE EXISTING STUB-UP AT GRADE TO THE NEW DISCONNECT SWITCH. COORDINATE WITH THE HVAC CONTROLS CONTRACTOR TO SEE IF ADDITIONAL CONTROL WIRES/CABLES NEED TO BE PULLED ALONG WITH THE 3-CONDUCTOR CABLE AND PROVIDE LABOR TO PULL ANY ADDITIONAL WIRES AND/OR CABLES.



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CERTIFIED PROFESSIONAL ENGINEER

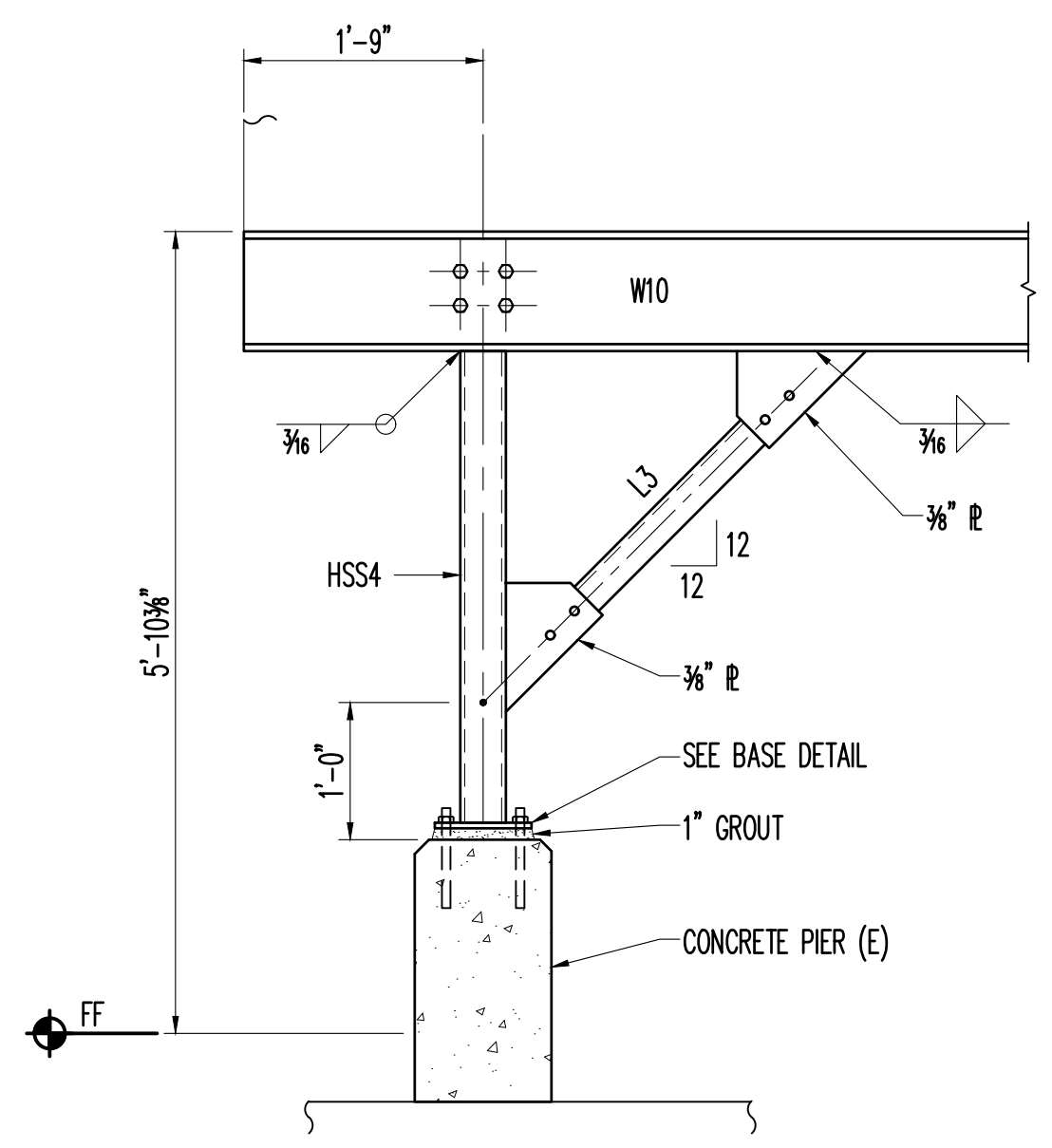
**HODGE CENTER  
COOLING TOWER REPLACEMENT  
PROJECT #H34-9544  
SPARTANBURG, SOUTH CAROLINA**

DESIGN: JWJ / DRAWN: JSJ  
CHECKED: JWJ  
DATE: 10/21/16  
JOB NO: LAND #USC-2016-14  
SHEET: **E-5**  
5 OF 5 SHEETS

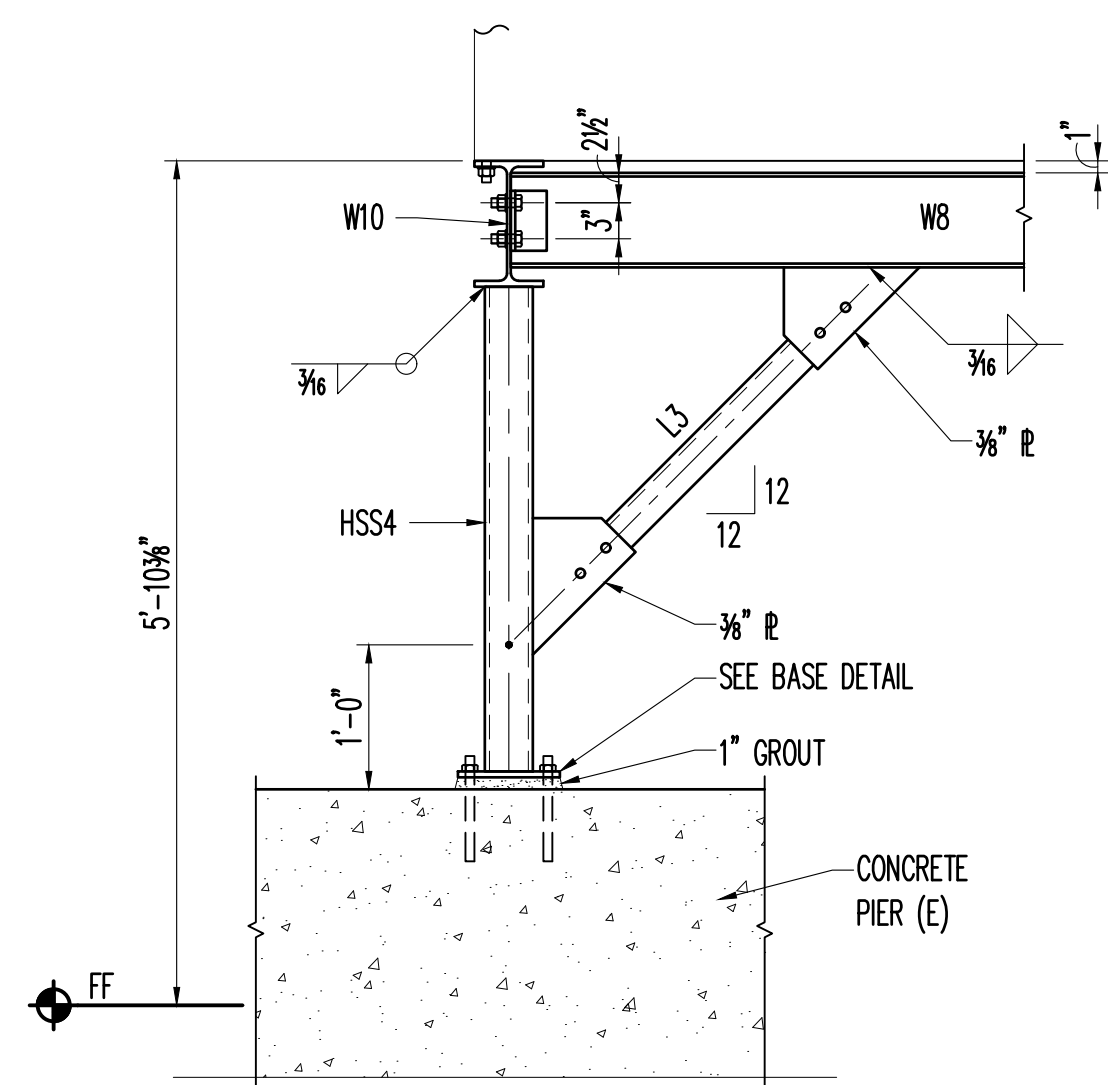


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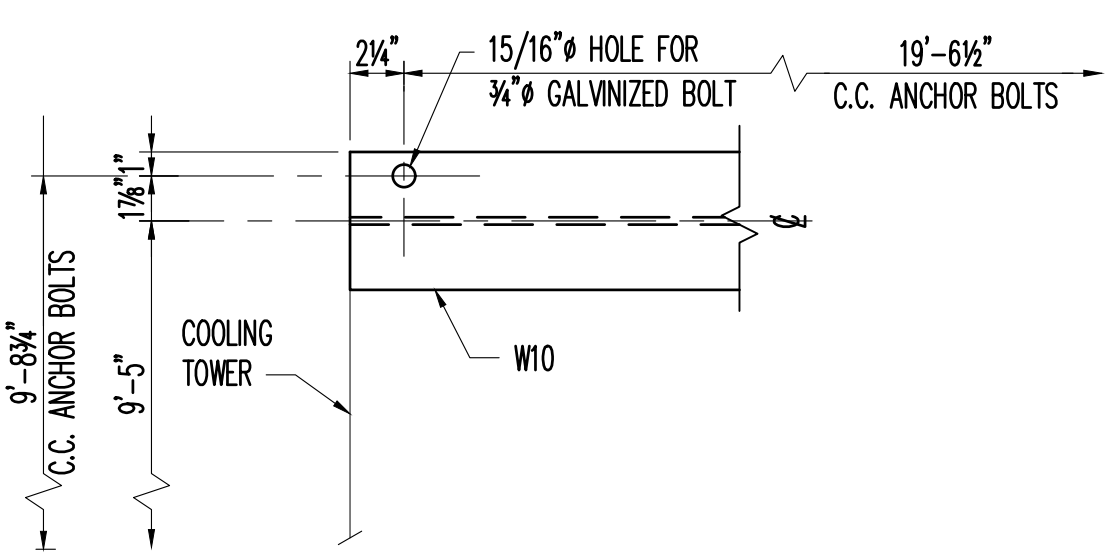
**REI**  
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 16-173



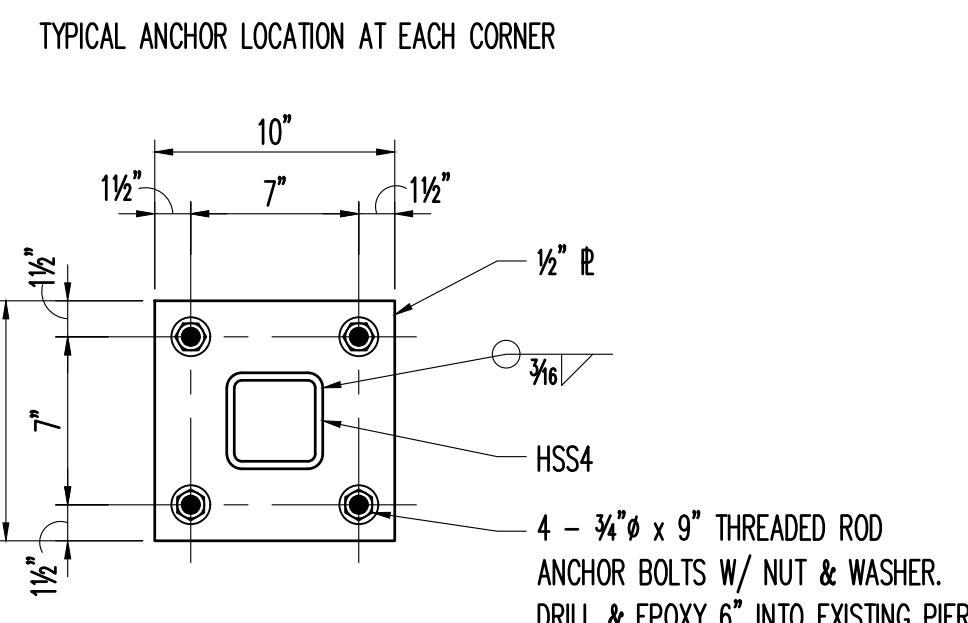
**DETAIL C**  
 SCALE: 3/4" = 1'-0"  
 S1



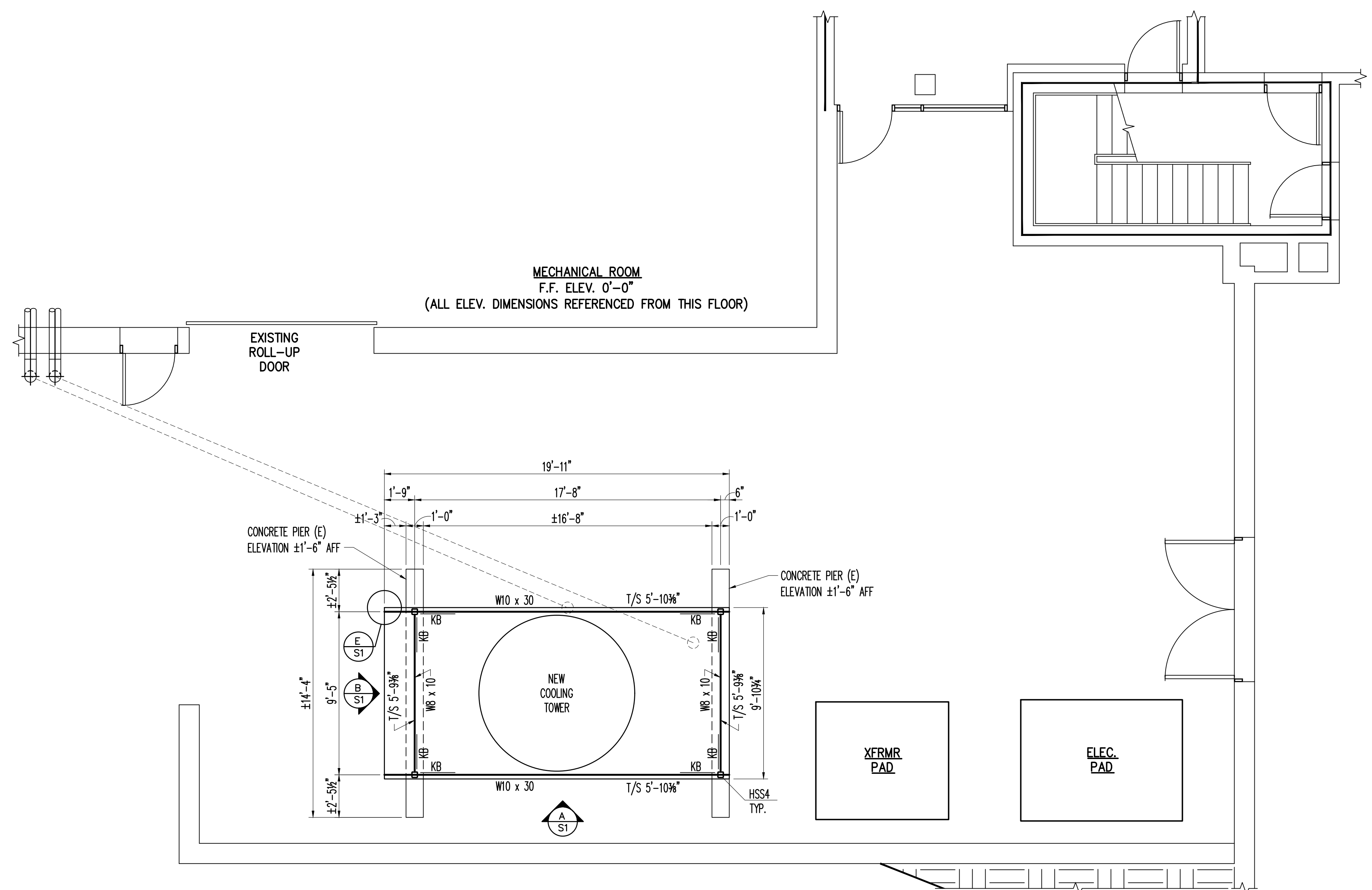
**DETAIL D**  
 SCALE: 3/4" = 1'-0"  
 S1



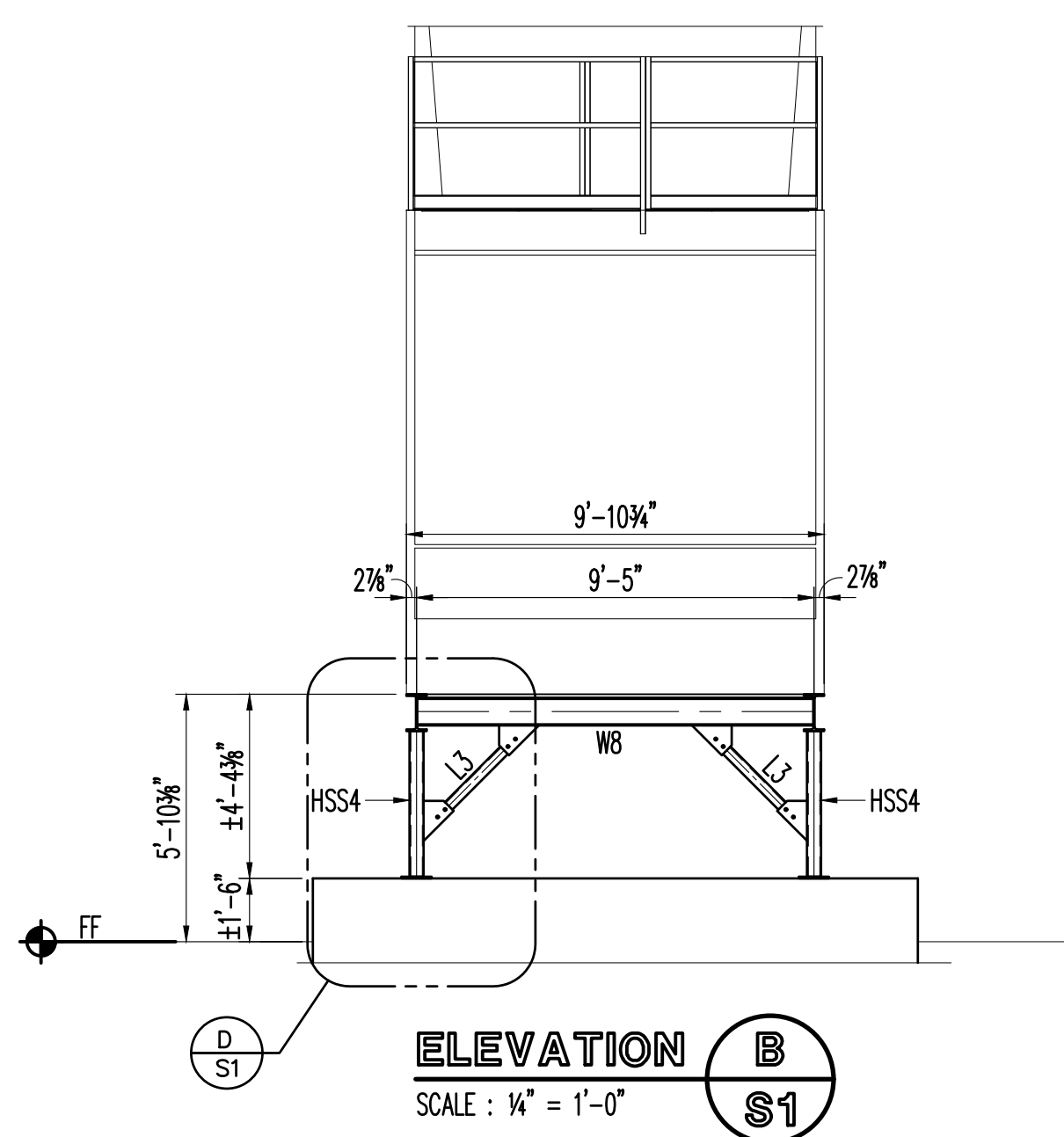
**DETAIL E**  
 SCALE: 1 1/2" = 1'-0"  
 S1



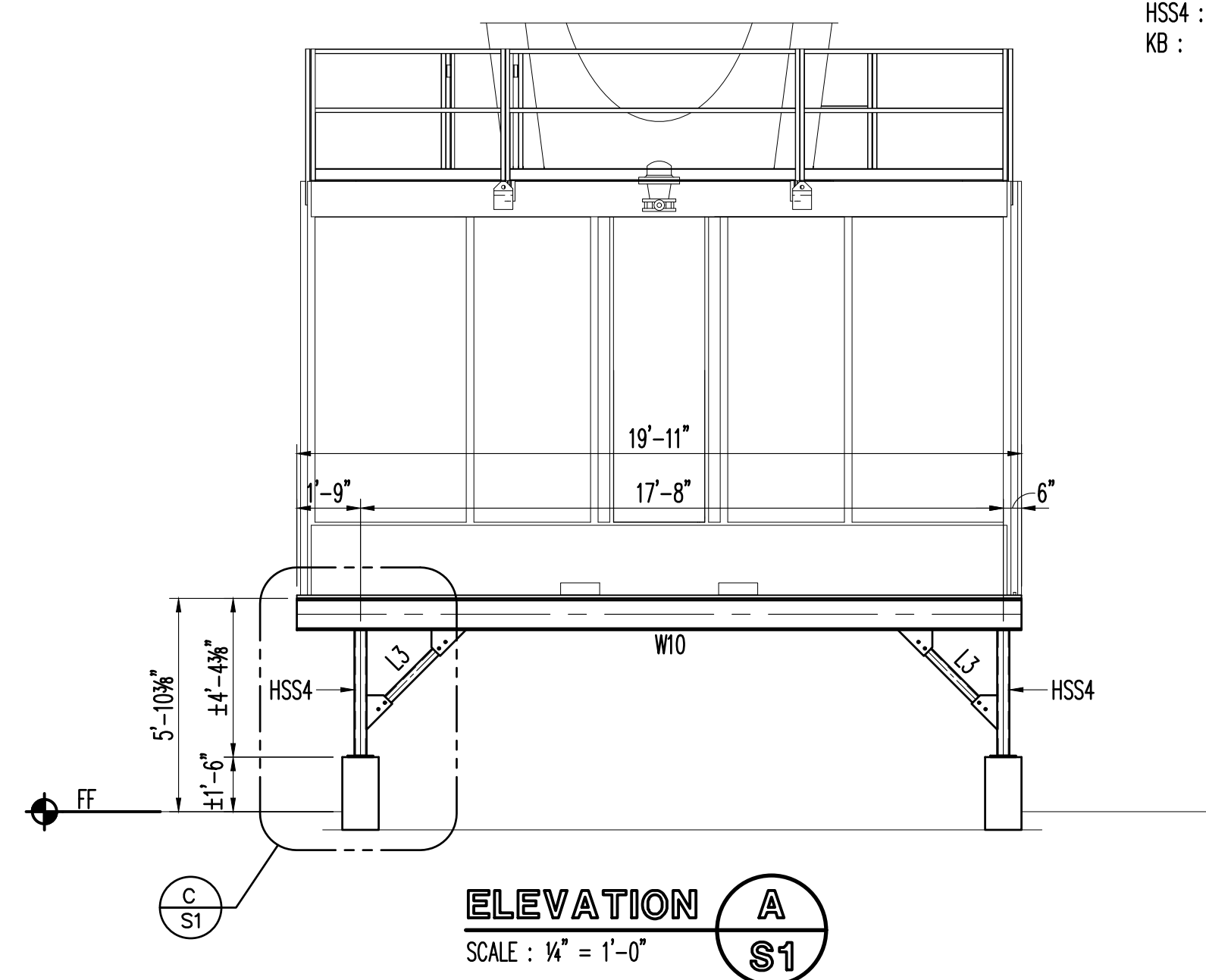
**BASE PLATE DETAIL**  
 SCALE: 1 1/2" = 1'-0"



**SUPPORTING STEEL PLAN**  
 SCALE: 1/4" = 1'-0"



**ELEVATION B**  
 SCALE: 1/4" = 1'-0"  
 S1



**ELEVATION A**  
 SCALE: 1/4" = 1'-0"  
 S1

**LEGEND**

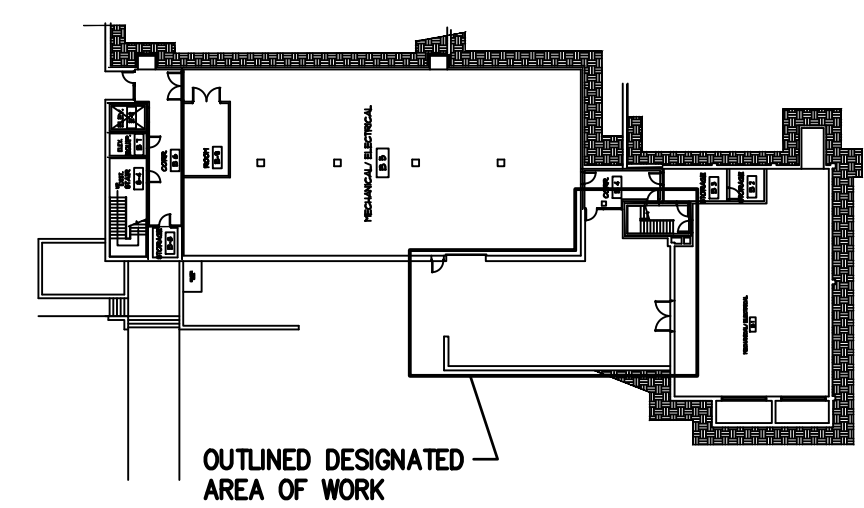
- (E) : EXISTING
- T/S : TOP OF STEEL ABOVE FINISHED FLOOR
- HSS4 : HSS4 x 4 x 3/4
- KB : L3 x 3 x 1/4 KNEE BRACE

**MATERIAL SPECIFICATIONS**

- STEEL BEAMS : A992
- STEEL TUBES : A500 GR. B
- STEEL SHAPES & PLATES : A36
- WELDS : E70XX
- BOLTS : 3/4" A325N
- SHOP FINISH : HOT DIP GALVANIZED
- EPOXY : HILTI HIT HY150 ADHESIVE SYSTEM, OR EQUAL

**DESIGN CRITERIA**

- OPERATING WEIGHT : 20,318 LBS.
- WIND : 120 MPH
- EXPOSURE B
- SEISMIC : DESIGN CATEGORY C
- S<sub>SI</sub> = 0.35 S<sub>SS</sub> = 0.17
- R = 3.0 I = 1.25
- V = 1,422 LBF



**KEY PLAN**  
 NO SCALE

<p><b>HODGE CENTER                  COOLING TOWER REPLACEMENT                  PROJECT #H34-9544                  SPARTANBURG, SOUTH CAROLINA</b></p>	
DESIGN BR	DRAWN DS
CHECKED BR	
DATE 10/21/16	
JOB NO. PERITUS #06704	
SHEET S-1	
1 OF 1 SHEETS	