

# ENERGY PLANT REPAIRS AND MODIFICATIONS

## STATE PROJECT NUMBER H27-Z215 COLUMBIA, SC

### CONSTRUCTION DOCUMENTS

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CAMPUS PLANNING  
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COLUMBIA, SC 29208

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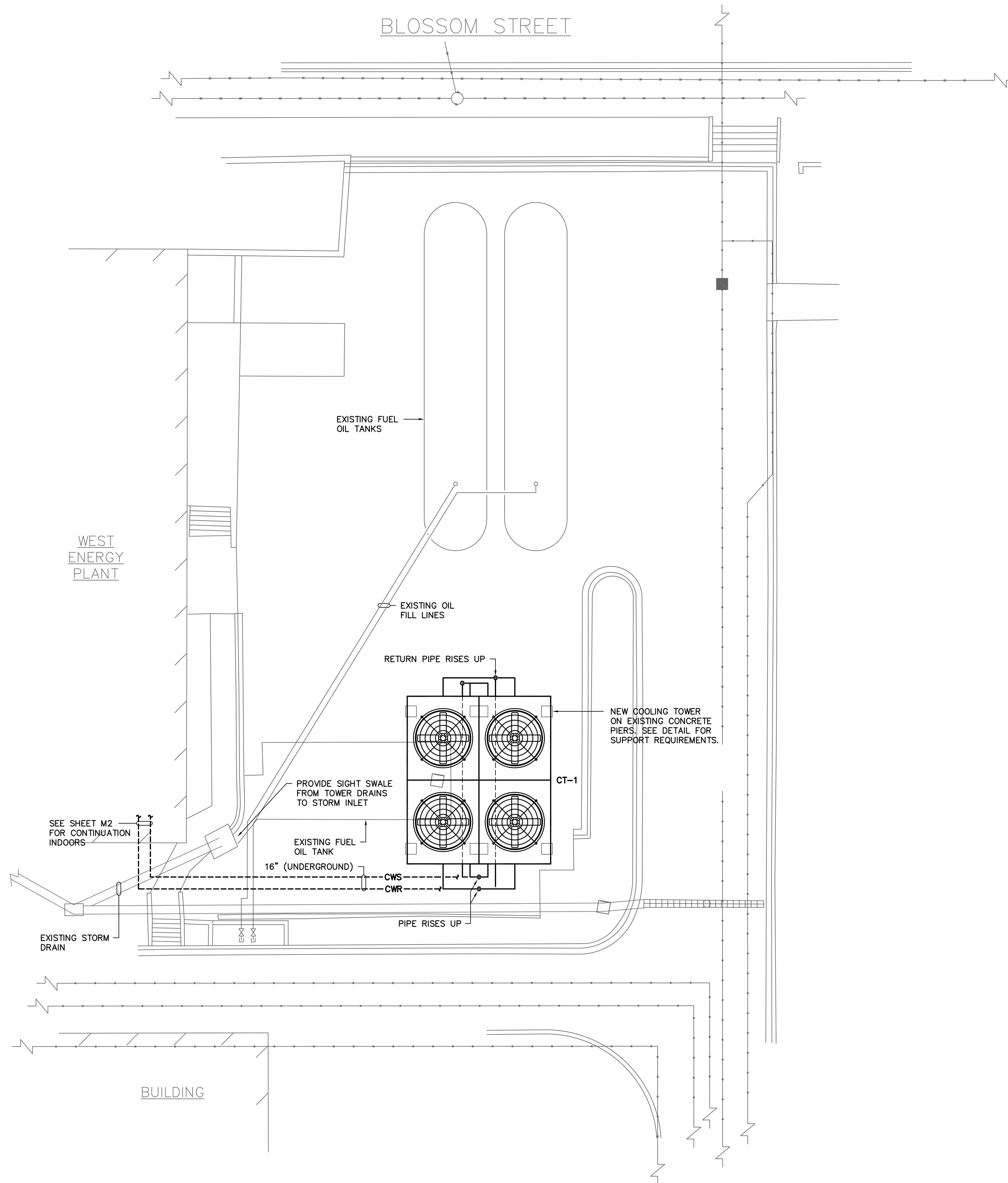
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PROJECT TITLE: ENERGY PLANT REPAIRS AND MODIFICATIONS  
STATE PROJECT NUMBER: H27-Z215  
University of South Carolina

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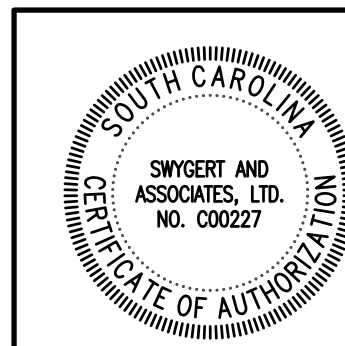
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Post Office Box 11686 Fax: (803) 791-9830  
Columbia, S.C. 29211 mail@swygert-associates.com



1  
M1

**SITE PLAN @ BLOSSOM STREET**

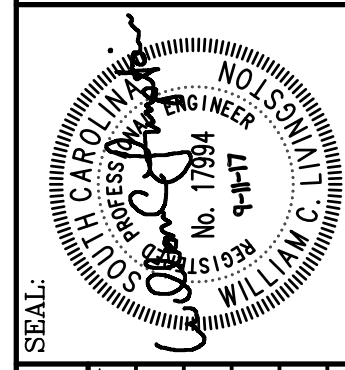
SCALE: 1" = 10'



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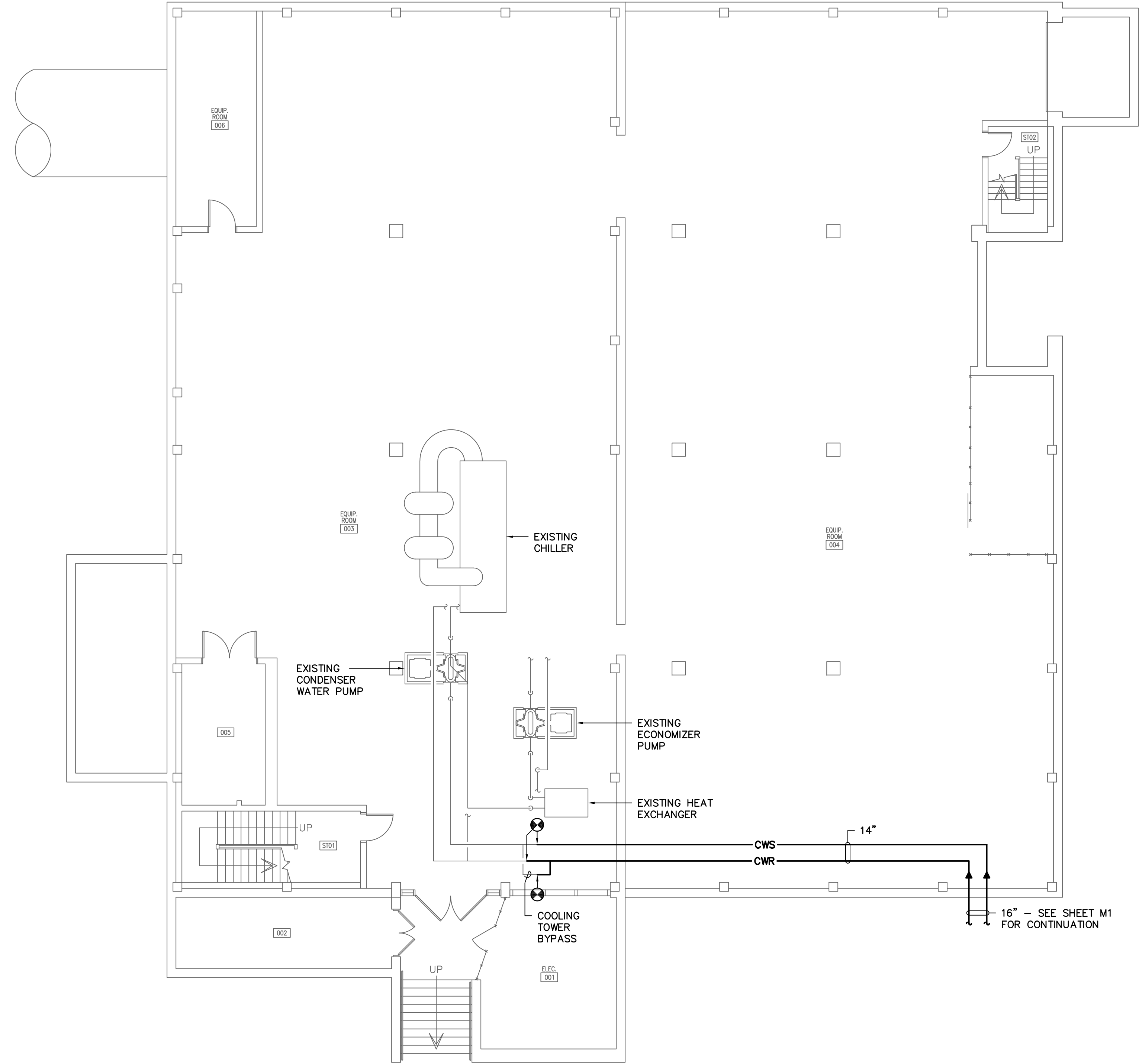
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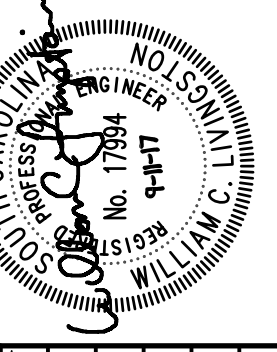


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M2

### WEST ENERGY FACILITY BASEMENT FLOOR PLAN

SCALE: 1/8" = 1'-0"

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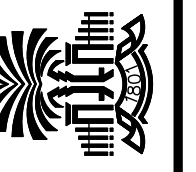


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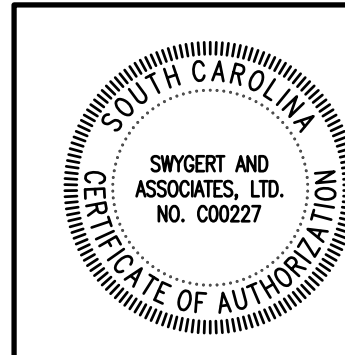
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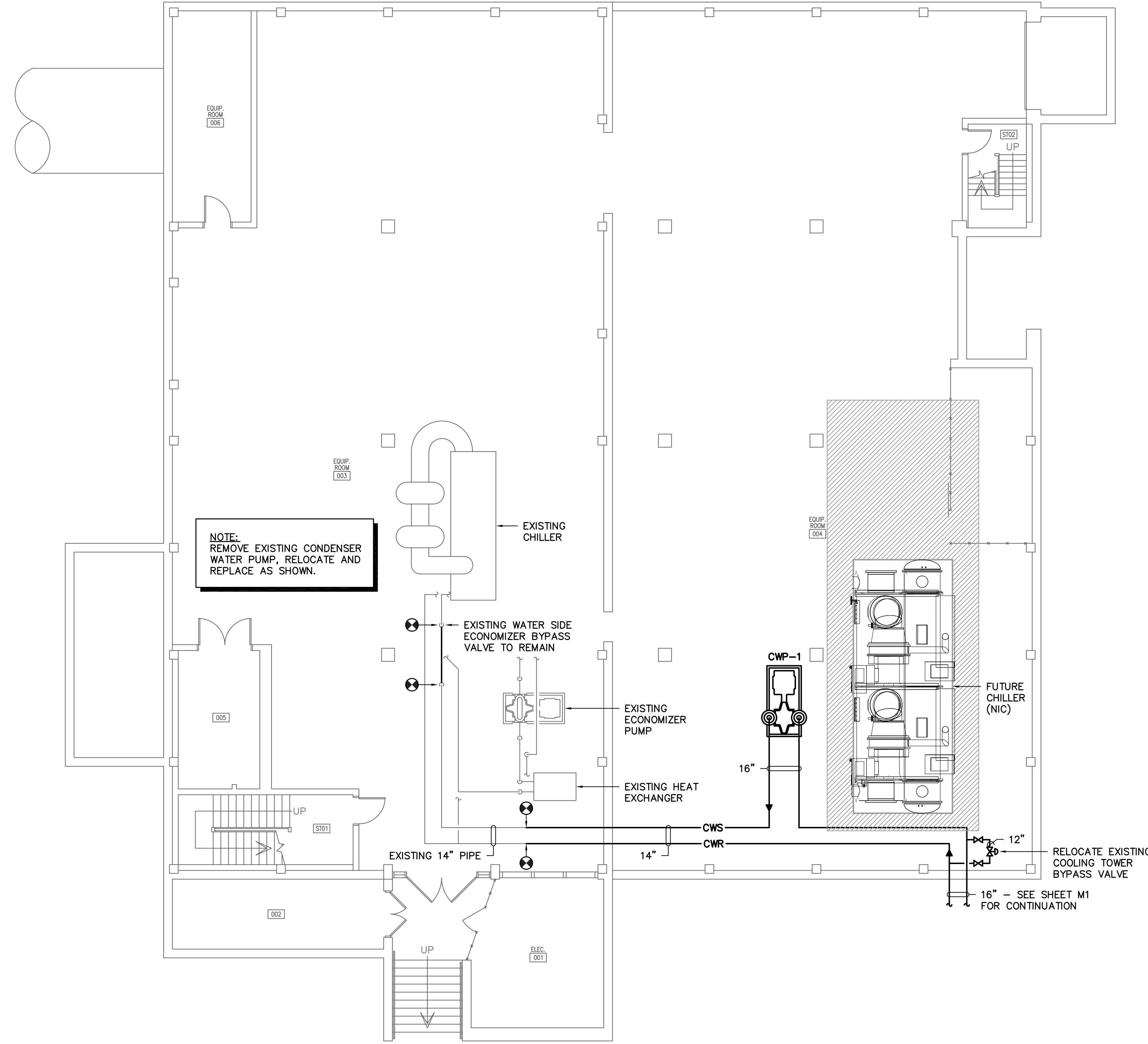
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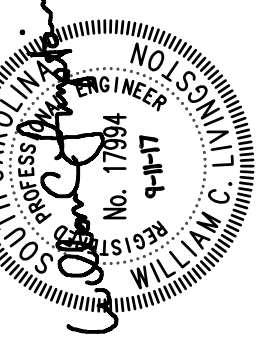


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M2A

**WEST ENERGY PIPE FACILITY BASEMENT FLOOR PLAN - ALTERNATE 1**

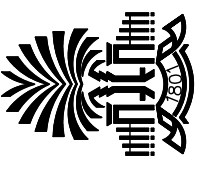
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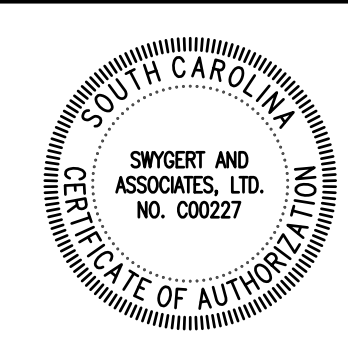
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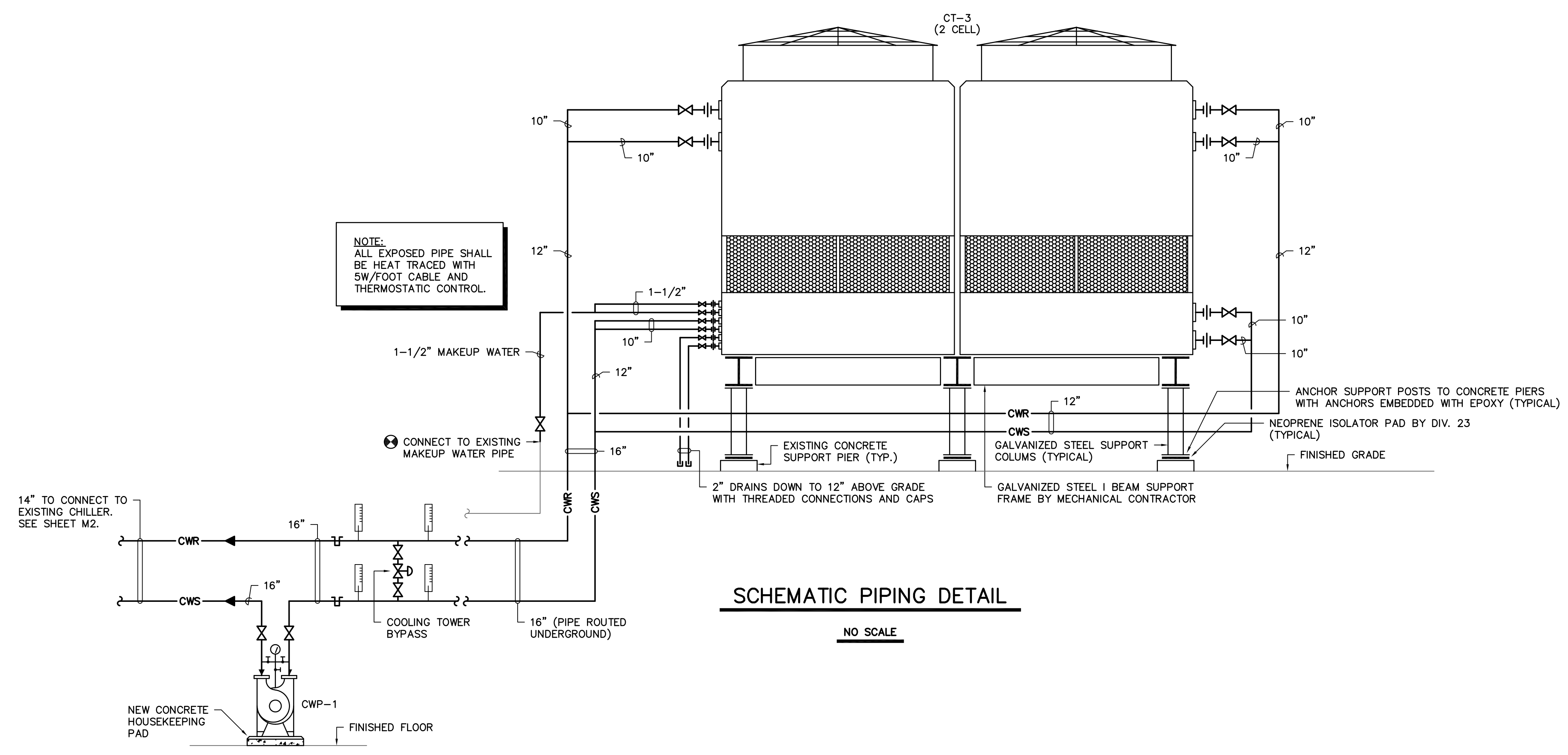
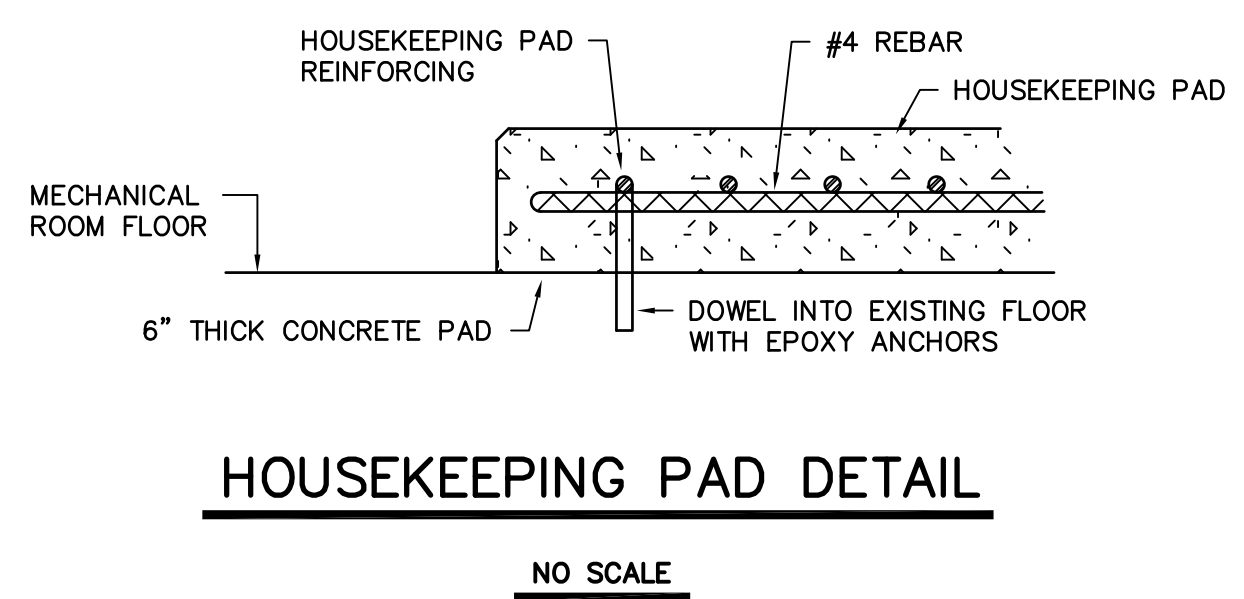
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COOLING TOWER SCHEDULE							
TAG	EVAPCO MODEL NO.	ENT. WTR.	LVG. WTR.	GPM	ENT. AIR WB	MOTOR H.P.	REMARKS
CT-3	USS424-3N28	95	85	6500	78	40 (4)	1, 2
1. PROVIDE TWO CELL STAINLESS STEEL CONSTRUCTION COUNTERFLOW COOLING TOWER WITH DIRECT DRIVE PREMIUM EFFICIENCY FAN MOTORS. 2. PROVIDE WITH CONTROL PANELS (2), FLOAT TYPE WATER LEVEL CONTROL, BASIN HEATERS (FOUR AT 15KW EACH), AND EQUALIZER FOR TWO SEPARATE SUMPS.							

PUMP SCHEDULE (ALTERNATE 1)								
TAG	B&G MODEL NO.	TYPE	GPM	HEAD FT-WTR	HP (MIN)	BRAKE HP	RPM	REMARKS
CWP-1	VX-VSCS 14x16x15A	BASE	6500	60	150	132	1180	1
1. PROVIDE BASE MOUNTED VERTICAL SPLIT CASE PUMP, BROZNE FITTED WITH ODP PREMIUM EFFICIENCY PUMP MOTOR WITH VFD.								

ISOLATION AND SEISMIC SCHEDULE				
RISK CATEGORY = II		SEISMIC DESIGN CATEGORY = D		
EQUIPMENT TAG	COMPONENT I <sub>p</sub>	ISOLATION SPECIFICATION	SEISMIC REST. SPECIFICATION	ISOLATION DEFLECTION
PUMPS (ON GRADE) ≥ 7.5 HP	1.0	NONE	NOTE 1	0"
COOLING TOWER (ON GRADE)	1.0	SPEC W	NOTE 1	0.15"
1. ANCHOR BOLTS FOR NON-ISOLATED AND INTERNALLY ISOLATED EQUIPMENT SHALL BE SIZED BY THE SEISMIC RESTRAINT SUPPLIER.				

- ### GENERAL NOTES
- VISIT SITE PRIOR TO BIDDING. THIS CONTRACTOR SHALL DETERMINE DIFFICULTY OF INSTALLATION AND REFLECT THIS IN HIS BIDDING.
  - DO NOT SCALE DRAWINGS. THIS CONTRACTOR SHALL VERIFY ALL EXISTING ITEMS AND LOCATIONS IN THE FIELD.
  - SEE SITE PLAN FOR CONTINUATION OF UTILITIES.
  - WATER SYSTEMS SHALL BE DRAINED AS REQUIRED FOR INSTALLATION OF WORK. UPON COMPLETION, SYSTEM SHALL BE FILLED WITH WATER AND VENTED OF ALL AIR.
  - ALL PIPING IS SHOWN DIAGRAMMATIC. HOWEVER, THIS CONTRACTOR SHALL PROVIDE ALL REQUIRED FITTINGS, PIPING AND INSULATION FOR ALL OFFSETS AND/OR CHANGES IN ELEVATION.
  - EXTEND ALL DRAIN LINES TO NEAREST FLOOR DRAIN OR AS INDICATED - SO ROUTED AS TO AVOID INTERFERENCE WITH PASSAGEWAYS AND MAINTENANCE.
  - ALL WATER PIPING SHALL PITCH DOWN IN DIRECTION OF FLOW ONE-INCH PER FIFTY FEET WITH MANUAL AIR VENTS AT ALL HIGH POINTS AND 3/4-INCH DRAIN VALVES WITH STANDARD HOSE CONNECTION AT ALL LOW POINTS.
  - ALL VALVES AND SPECIALTIES SHALL BE LINE SIZE UNLESS NOTED OTHERWISE, USING ECCENTRIC REDUCERS ON PUMP SUCTION AND CONCENTRIC REDUCERS ON PUMP DISCHARGE. USE ECCENTRIC REDUCERS ON AUTOMATIC VALVES AS REQUIRED.
  - ALL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE SPECIFICATIONS AND FURTHER SUPPORTS OR HANGERS SHALL BE PROVIDED TO PREVENT WEIGHT OF PIPING BEING PLACED ON EQUIPMENT.
  - BASES FOR PUMPS SHALL:
    - EXTEND 4-INCHES IN ALL DIRECTIONS BEYOND PUMPS AND BASES.
    - BE SECURELY BOLTED AND GROUTED TO PUMPS.
    - BE LOCATED A MINIMUM OF ONE PUMP BASE WIDTH APART.
  - PROVIDE AND INSTALL HEAT TRACE TAPE ON ALL EXTERIOR HOT AND CHILLED WATER PIPING.
  - COOLING TOWER SUCTION CENTER LINE SHALL BE LOCATED A MINIMUM OF TWO FEET ABOVE CONDENSER WATER PUMP SUCTION CENTER LINE.
  - ALL ITEMS OF EQUIPMENT ON GRADE SHALL BE LOCATED ON REINFORCED CONCRETE FOUNDATIONS, MINIMUM 6-INCH THICK OR AS DETAILED ON THESE PLANS AND SPECIFICATIONS AND 6 INCHES LARGER THAN EQUIPMENT IN EACH DIRECTION. PADS SHALL BE REINFORCED PER THE HOUSEKEEPING PAD SECTION OF THE ASHRAE PRACTICAL GUIDE FOR SEISMIC RESTRAINT. ALL UNITS SHALL BE SECURED TO THE HOUSEKEEPING PAD WITH SEISMIC RESTRAINTS. PROVIDE 1-INCH CHAMFERS ON ALL SIDES.
  - PROVIDE FOR ACCESS TO ALL EQUIPMENT REQUIRING CLEANING OR ADJUSTMENT.
  - THIS CONTRACTOR SHALL PROVIDE ALL ITEMS OF MISCELLANEOUS STEEL AS REQUIRED FOR INSTALLATION OF ALL MECHANICAL ITEMS.
  - THIS CONTRACTOR SHALL DO ALL CONTROL WIRING. DIVISION 16 WILL DO ALL POWER WIRING. ALL WIRING SHALL BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE.
  - THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY DISMANTLING OF EQUIPMENT TO BE REMOVED.
  - ITEMS REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF PROPERLY.



### LEGEND

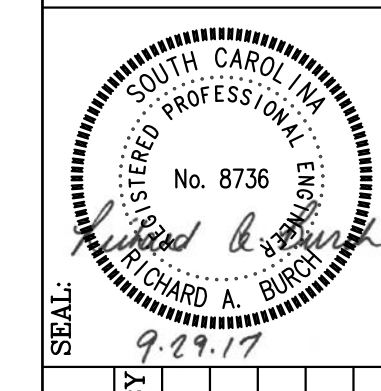
SYMBOL	DESCRIPTION
	CONDENSER WATER SUPPLY LINE
	CONDENSER WATER RETURN LINE
	CONTROL VALVE 2-WAY
	PIPE TURNS TO AWAY
	CONNECTION POINT OF NEW TO EXISTING

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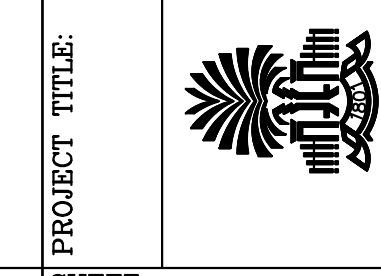
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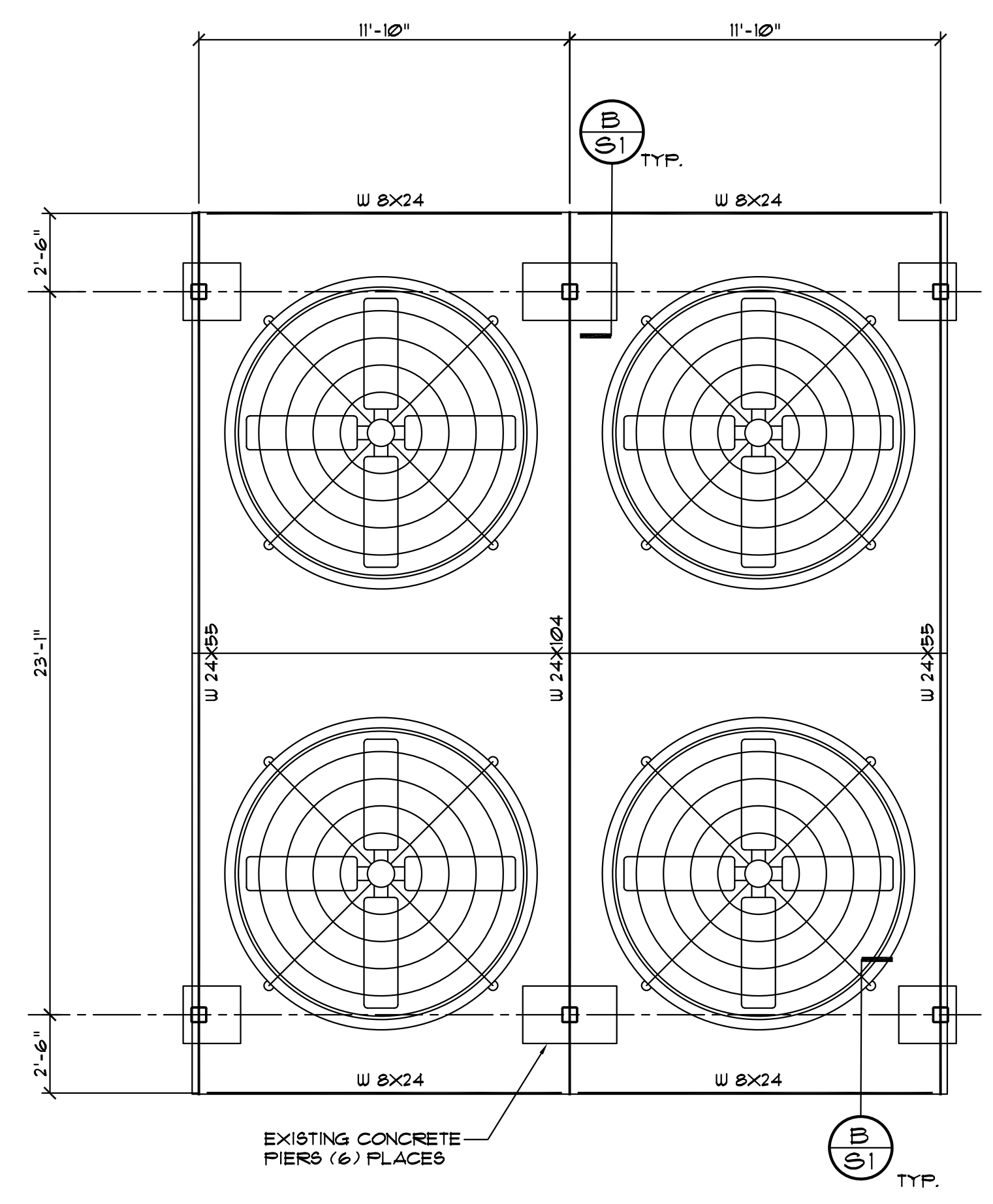


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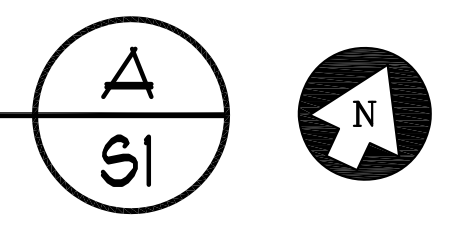


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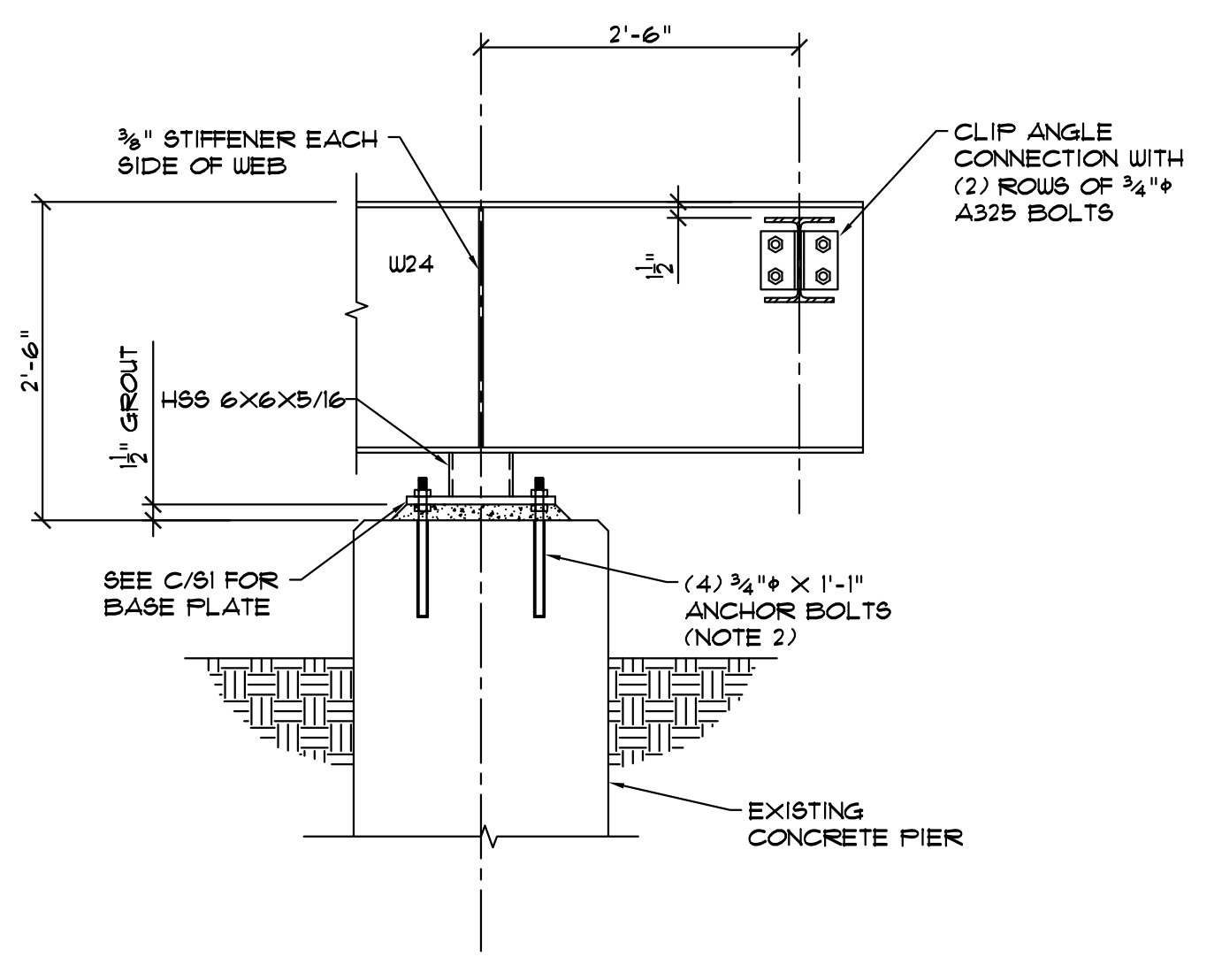


**FRAMING PLAN**

SCALE 1/4" = 1'-0"

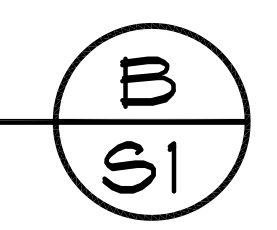


- PLAN NOTES:
- SEE B/S1 FOR TOP OF STEEL ELEVATIONS RELATIVE TO TOPS OF EXISTING CONCRETE PIERS.
  - ALL STEEL AND BOLTS SHALL BE HOT-DIPPED GALVANIZED.
  - PROVIDE HOLES IN BEAM FLANGES FOR COOLING TOWER BASED ON COOLING TOWER SHOP DRAWINGS. CONTRACTOR SHALL COORDINATE BEAM HOLE LOCATIONS WITH THE STEEL FABRICATOR. DO NOT BURN HOLES IN FIELD. USE A MAG DRILL IF HOLES ARE DRILLED IN THE FIELD.

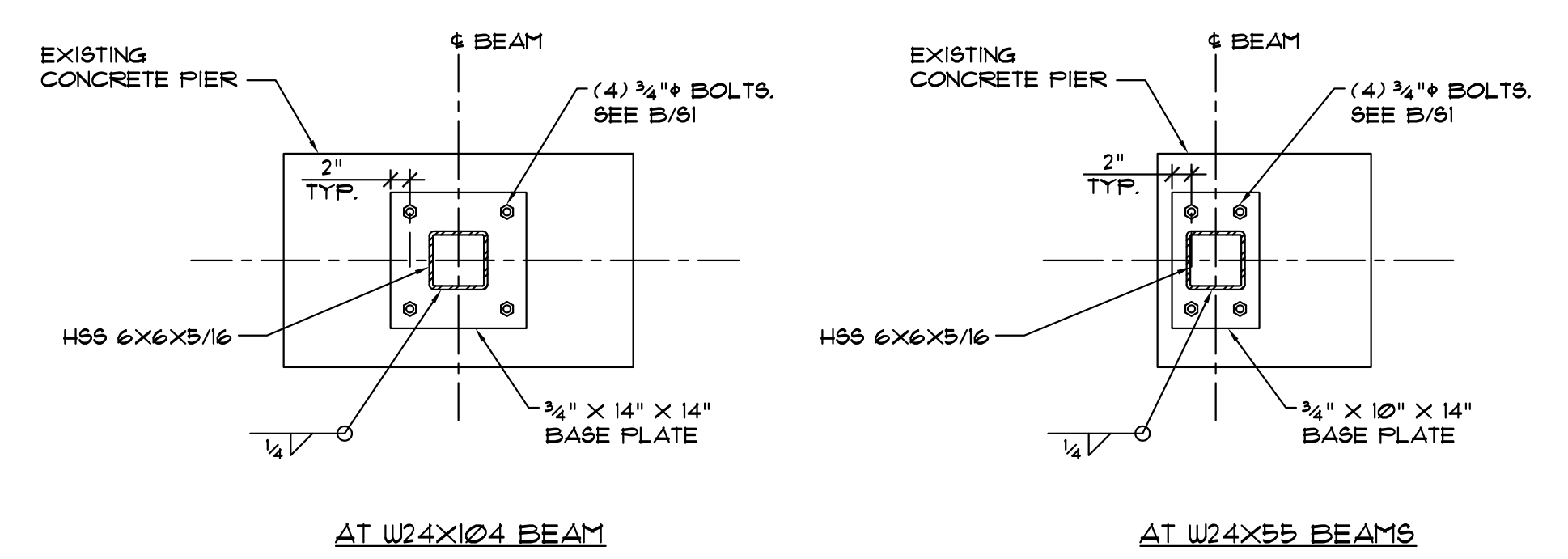


**SECTION**

SCALE 3/4" = 1'-0"

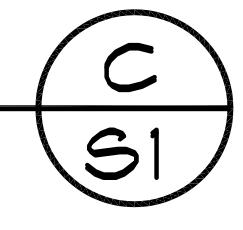


- NOTES:
- REMOVE EXISTING ANCHOR BOLTS FLUSH WITH TOP OF PIERS.
  - DRILL AND GROUT 3/4" GALVANIZED THREADED ROD ANCHOR BOLTS 9" INTO EXISTING PIERS USING ONE OF THE FOLLOWING ADHESIVES: HILTI HIT HY-200, FOWERS P1000, SIMPSON SET-XP.
  - ALL STEEL AND BOLTS SHALL BE HOT-DIPPED GALVANIZED.
  - PROVIDE 2" VENT HOLE FOR GALVANIZING IN BOTTOM OF BASE PLATE. IF POSSIBLE, USE ONLY THIS ONE VENT HOLE. IF ANY OTHER VENT HOLES ARE NECESSARY, THEY SHALL BE PLUG WELDED AFTER GALVANIZING AND THEN PAINTED WITH GALVANIZING REPAIR PAINT.



**BASE PLATE DETAILS**

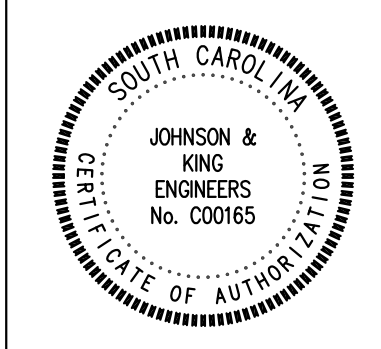
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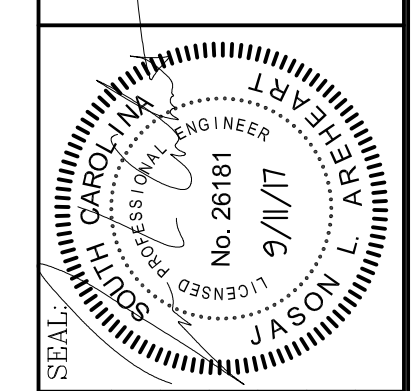
- NOTES:
- SEE STRUCTURAL PLAN FOR RELATIONSHIP OF W24X55 BEAMS TO CONCRETE PIERS.

**GENERAL NOTES**

- IN CASE OF A DISCREPANCY BETWEEN THE MECHANICAL AND STRUCTURAL DRAWINGS, CONSULT WITH THE MECHANICAL ENGINEER. FIELD VERIFY ALL DIMENSIONS AND CONDITIONS RELATED TO EXISTING CONSTRUCTION AND VERIFY ALL DIMENSIONS WITH SHOP DRAWINGS FOR THE COOLING TOWER.
- DESIGN CRITERIA
  - BUILDING CODE: 2015 INTERNATIONAL BUILDING CODE
  - RISK CATEGORY II
  - SEISMIC DESIGN DATA
    - IMPORTANCE FACTOR 1.00
    - $S_{DS} = 0.409$   $S_{D1} = 0.213$
    - SITE CLASS D (ASSUMED) SEISMIC DESIGN CATEGORY D
  - WIND DESIGN DATA
    - WIND VELOCITY 115 MPH, EXPOSURE B
    - OPERATING WEIGHT OF COOLING TOWER = 69,000 LBS.
- STRUCTURAL STEEL
  - WIDE FLANGES: ASTM A992, GRADE 50
  - TUBE: ASTM A500, GRADE B OR C
  - OTHER: ASTM A36
  - ALL STEEL AND BOLTS SHALL BE HOT-DIPPED GALVANIZED.
  - WELDING ELECTRODES: E10XX
  - BOLTS: ASTM A325, 3/4" DIAMETER, SNUG-TIGHTENED, WITH THREADS IN SHEAR PLANE.
  - GROUT: NON-SHRINK, NON-METALLIC FACTOR-PACKAGED GROUT.
  - PROVIDE SHOP DRAWINGS FOR REVIEW BEFORE FABRICATION.
- SPECIAL INSPECTOR SHALL INSPECT COMPLETED STEEL MEMBERS IN ACCORDANCE WITH IBC 1105.2.1.



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Columbia, SC 29201 | 803.779.8831 F



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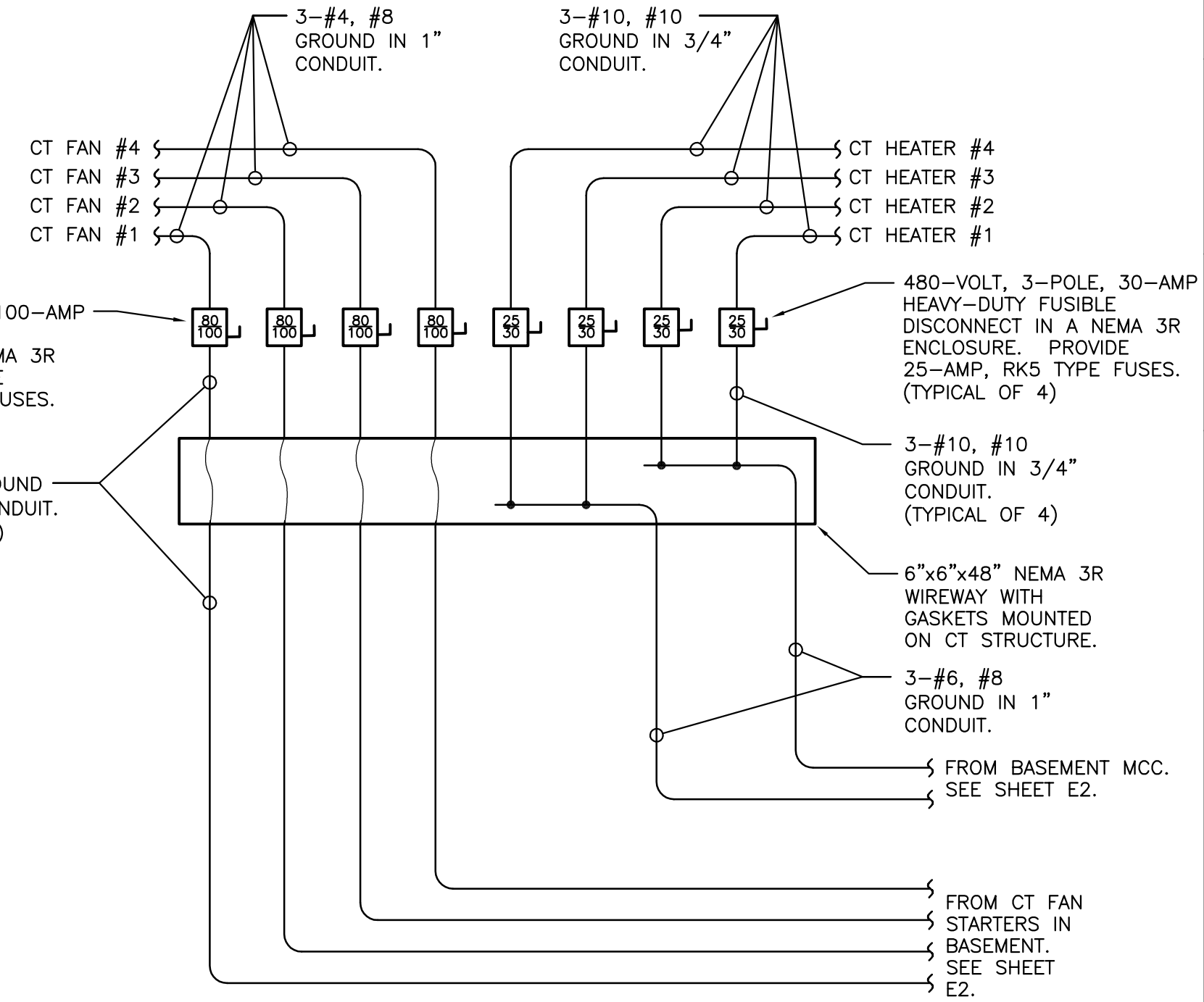
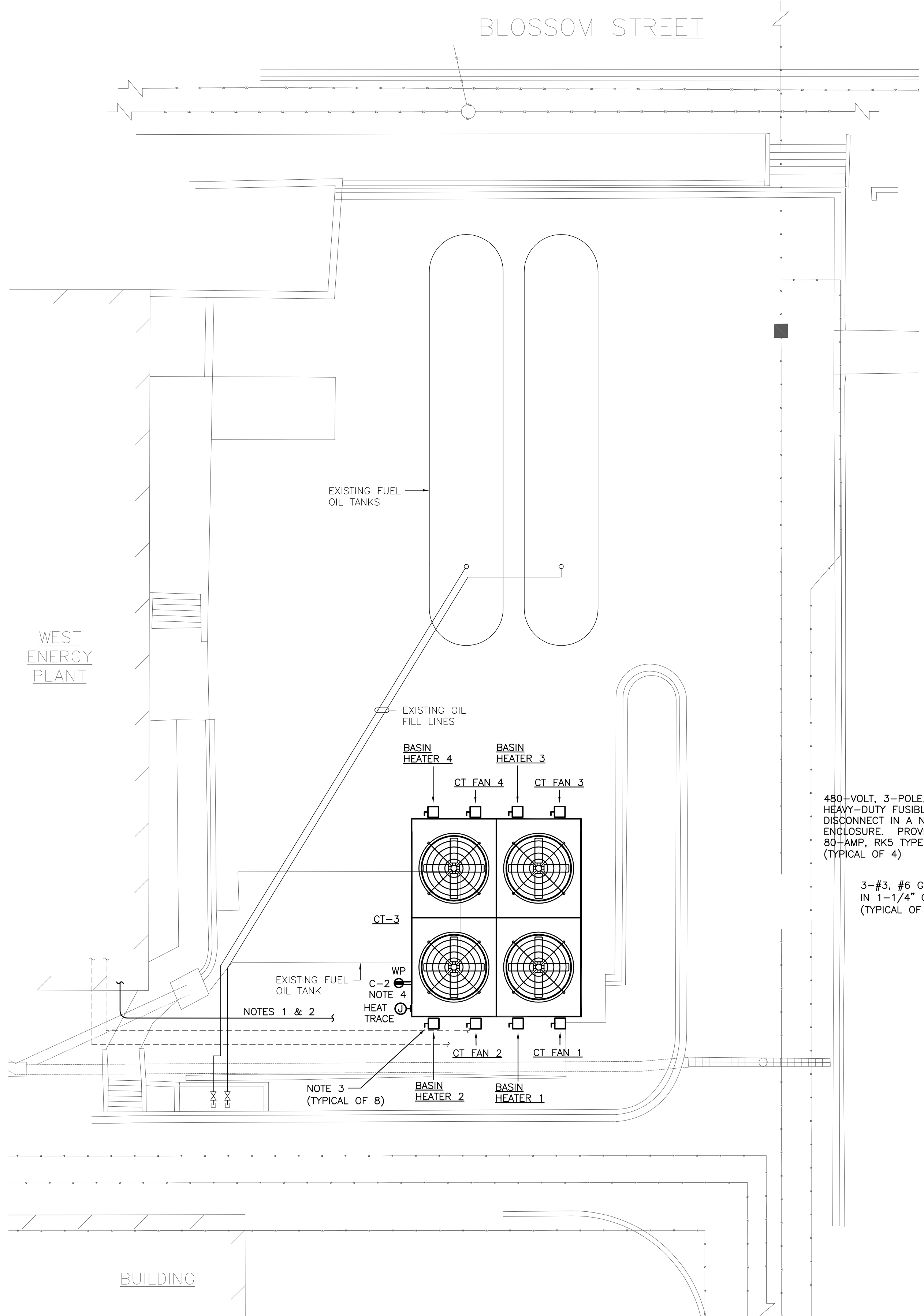
- PLAN NOTES
- DISCONNECT EXISTING BRANCH CIRCUITS FROM COOLING TOWER FANS AND BASIN HEATERS FOR REMOVAL BY DIVISION 23 CONTRACTOR. REMOVE CONDUCTORS AND EXPOSED RACEWAYS COMPLETELY BACK TO SOURCE. RACEWAYS BELOW GRADE SHALL BE ABANDONED IN PLACE.
  - EXTEND CONDUITS FROM BASEMENT (SHOWN ON SHEET E2) BELOW GRADE TO THE COOLING TOWER. CUTTING, PATCHING, AND TRENCHING THE EXISTING PARKING LOT AND SIDEWALKS SHALL BE BY DIVISION 23 CONTRACTOR. COORDINATE TRENCHING REQUIREMENTS WITH DIVISION 23 PRIOR TO START OF WORK. ROUTE CONDUITS UP TO WIREWAY MOUNTED TO COOLING TOWER STRUCTURE AND EXTEND TO THE DESIGNATED EQUIPMENT. SEE DETAIL 2/E1 ON THIS SHEET FOR MORE INFORMATION.
  - COORDINATE WITH MECHANICAL INSTALLER AND OWNER ON EXACT MOUNTING LOCATIONS OF WIREWAYS, PULL BOXES, JUNCTION BOXES, DISCONNECT SWITCHES, AND OTHER ELECTRICAL COMPONENTS ON STRUCTURAL SUPPORTS PRIOR TO INSTALL.
  - PROVIDE A 120-VOLT, 20-AMP, DUPLEX, GFCI TYPE RECEPTACLE IN A METALLIC "IN-USE" STYLE WEATHERPROOF BOX MOUNTED ON COOLING TOWER. EXTEND BRANCH CIRCUIT TO HEAT TRACE THROUGH A GFEP DEVICE.

- ELECTRICAL LEGEND
- DUPLEX RECEPTACLE (GFCI TYPE) MOUNTED AT 18" ABOVE FINISHED GRADE UNLESS NOTED OTHERWISE. "WP" INDICATES A METALLIC WEATHERPROOF "IN-USE" TYPE COVER.
  - SAFETY DISCONNECT SWITCH (FUSIBLE UNLESS SPECIFICALLY NOTED OTHERWISE). SWITCH SHALL BE AS DEFINED ON PLAN FOR EACH PIECE OF EQUIPMENT.
  - JUNCTION BOX AND/OR CONNECTION TO EQUIPMENT AS DEFINED ON PLANS.

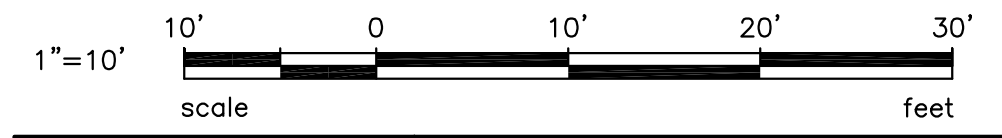
- GENERAL NOTES
- ALL ELECTRICAL EQUIPMENT TO BE REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER. THE CONTRACTOR SHALL NOT DISPOSE OF ANY MATERIALS UNTIL RELEASED BY OWNER'S PROJECT MANAGER. MATERIALS THAT OWNER'S PROJECT MANAGER CHOOSES TO RETAIN SHALL BE DELIVERED BY THE CONTRACTOR TO A LOCATION DESIGNATED BY THE PROJECT MANAGER. ALL OTHER MATERIALS SHALL BE PROPERLY DISPOSED OF BY THE CONTRACTOR.
  - REFER TO MECHANICAL PLANS FOR PHASING OF CONSTRUCTION.
  - WHERE INFORMATION SHOWN ON THESE DRAWINGS CONFLICTS WITH VERIFIED FIELD CONDITIONS, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
  - PROVIDE FLEXIBLE CONDUIT FOR ALL CONDUITS CROSSING EXPANSION JOINTS.
  - FEEDER CONDUITS, BRANCH CIRCUITS AND CABLE TRAY ROUTING SHALL COMPLY WITH DETAILS ON DRAWINGS AND SHALL BE COORDINATED WITH THE WORK OF OTHER TRADES BEFORE AND DURING CONSTRUCTION.
  - THE ARRANGEMENT, GROUPING, AND ROUTING OF BRANCH CIRCUITS SHALL BE PROVIDED AT THE CONTRACTOR'S DISCRETION IN ACCORDANCE WITH GENERALLY ACCEPTED PRACTICE FOR ELECTRICAL WORK, THE NATIONAL ELECTRICAL CODE REQUIREMENTS, LOCAL ORDINANCES, AND THE FOLLOWING:
    - A COMMON NEUTRAL SHALL NOT BE INSTALLED IN A HOMERUN FOR 2 OR 3 BRANCH CIRCUITS UNLESS DIRECTION IS PROVIDED BY THE ENGINEER IN WRITING FOR A SPECIFIC APPLICATION.
    - MULTIPLE SINGLE-POLE BRANCH CIRCUITS (UP TO 3 HOTS, 3 NEUTRALS, 1 GROUND) RATED FOR 30-AMPS OR LESS MAY BE PULLED INTO A SINGLE RACEWAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING THE RACEWAYS AND DERATING CONDUCTORS PER NEC ARTICLE 310.15.
    - A GROUND CONDUCTOR SHALL BE PROVIDED IN ALL RACEWAYS UNLESS NOTED OTHERWISE.
  - COORDINATE THE ROUTING OF UNDERGROUND CONDUCTORS/CONDUIT WITH STRUCTURAL FOOTINGS AND NEW AND EXISTING UNDERGROUND UTILITIES.
  - WHEREVER ON THE ELECTRICAL DRAWINGS THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL".
  - PROVIDE AND INSTALL AN ENGRAVED LAMINATED PLASTIC NAMEPLATE ON EACH ITEM OF ELECTRICAL EQUIPMENT SERVING MECHANICAL EQUIPMENT MATCH MECHANICAL DESCRIPTIONS TO INDICATE THE DESIGNATION OF THE UNIT ON THE PLANS & THE BRANCH CIRCUIT SERVING THE EQUIPMENT.
  - ALL BRANCH CIRCUITS ROUTED BELOW GRADE SHALL BE A MINIMUM OF 30" BELOW TOP OF FINISHED GRADE.
  - ALL CONNECTIONS TO MECHANICAL EQUIPMENT SHALL BE MADE WITH FLEXIBLE CONDUIT (WET-LISTED IN OUTDOOR LOCATIONS).

ELECTRICAL DRAWING INDEX

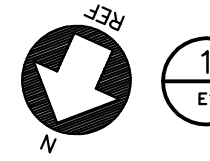
E1	ELECTRICAL SITE PLAN
E2	ELECTRICAL BASEMENT PLAN



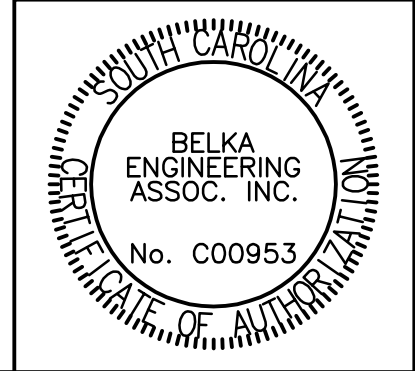
2 PARTIAL POWER SINGLE-LINE  
NOT TO SCALE



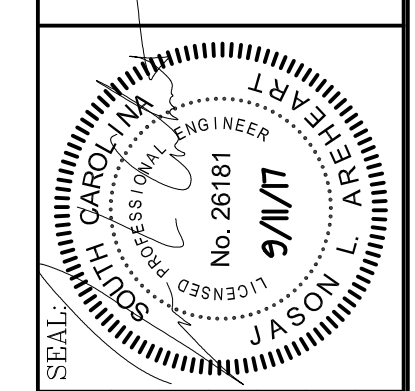
CONSIDERABLE EFFORT HAS BEEN MADE TO DETERMINE THE EXTENT OF UNDERGROUND UTILITIES. SOME LOCATIONS ARE ACTUAL FIELD MEASUREMENTS AND SOME ARE TAKEN FROM UTILITY RECORDS. THIS PLAN DOES NOT WARRANT THAT UTILITIES ARE SHOWN ACCURATELY NOR THAT ALL UTILITIES ARE SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES PRIOR TO BEGINNING DIGGING OPERATIONS. CALL PALMETTO UTILITIES LOCATION SERVICE AT 811 A MINIMUM OF 3 WORKING DAYS BEFORE DIGGING. ANY UTILITIES DAMAGED OR DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. ADDITIONALLY, THE CONTRACTOR SHALL CONFIRM THE CONNECTION POINTS OF NEW UTILITIES TO EXISTING UTILITIES PRIOR TO BEGINNING NEW CONSTRUCTION.



1 ELECTRICAL SITE PLAN @ BLOSSOM STREET  
SCALE: 1" = 10'



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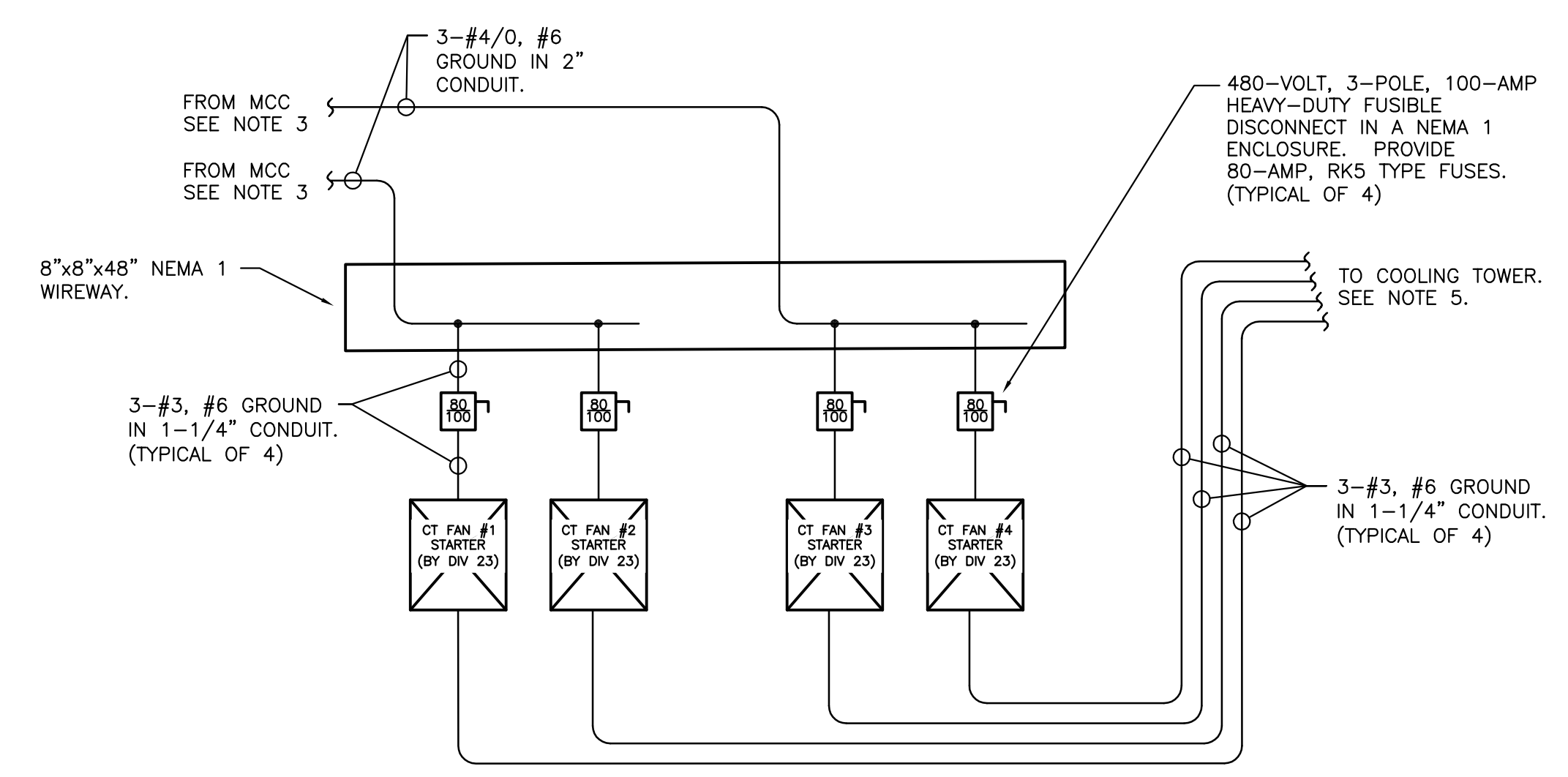
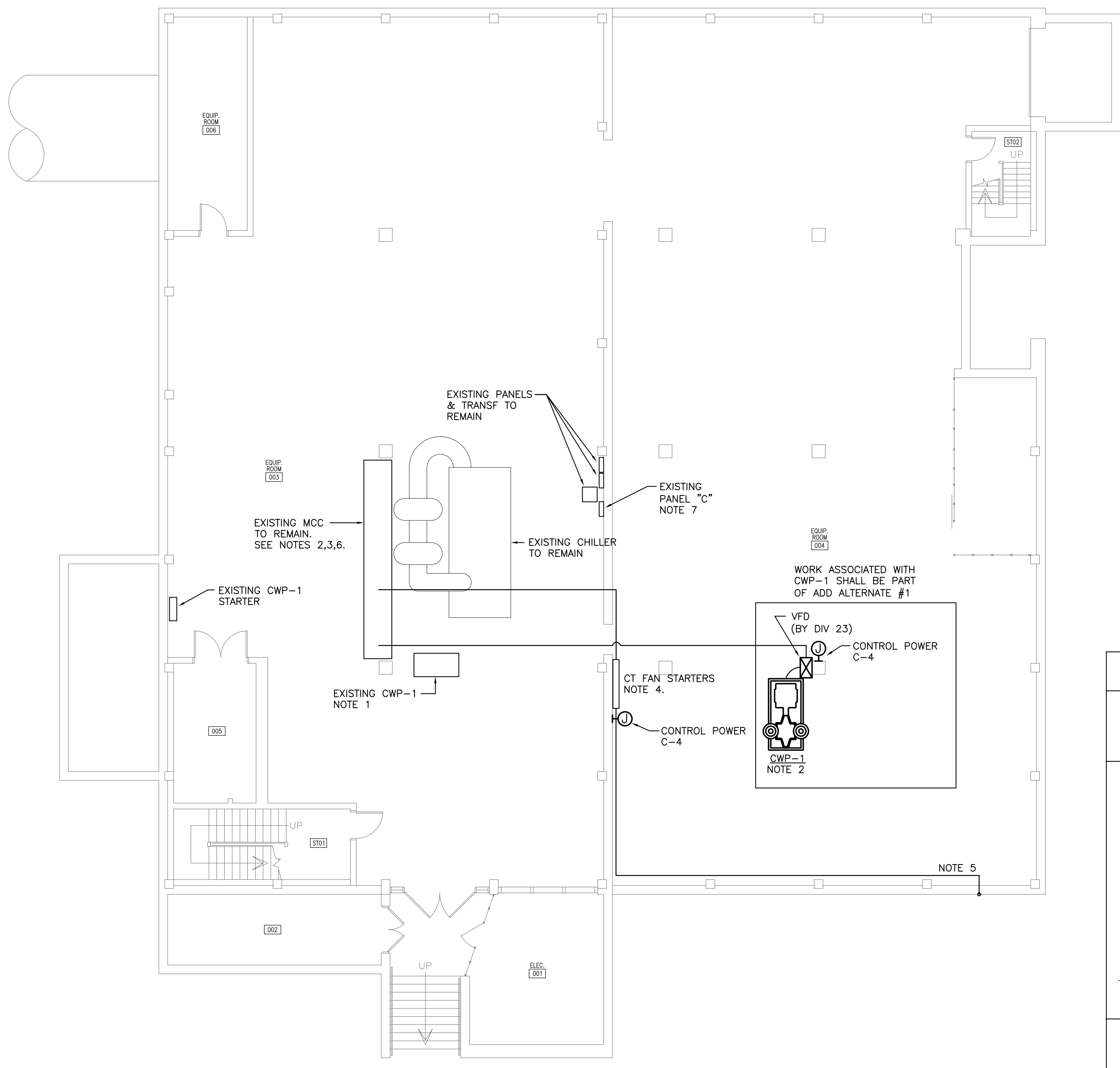


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ORIG. BY:	BY
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DRAWN BY:	11SEPT17
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DRAWING:	
BUILDING:	
REV:	

ENERGY PLANT REPAIRS AND  
MODIFICATIONS  
STATE PROJECT NUMBER: H27-Z215  
University of South Carolina

NOTES

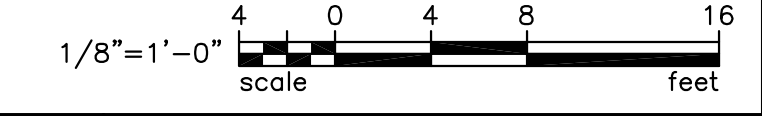
- AS PART OF ADD ALTERNATE #1: EXISTING CWP-1 TO BE REMOVED BY MECHANICAL CONTRACTOR. DISCONNECT EXISTING BRANCH CIRCUIT AND REMOVE ALL ASSOCIATED CONDUCTORS AND RACEWAYS FROM MCC, THROUGH STARTER, TO PUMP. A NEW CWP SHALL BE PROVIDED BY MECHANICAL CONTRACTOR IN A DIFFERENT LOCATION. SEE NOTE 2 BELOW FOR ADDITIONAL INFORMATION.
- AS PART OF ADD ALTERNATE #1: REPLACE THE EXISTING CIRCUIT BREAKER IN THE EXISTING CWP-1 BUCKET OF THE MCC WITH A 250-A CIRCUIT BREAKER. PROVIDE 3-250cmil, #4 GROUND IN 2" CONDUIT FROM MCC THROUGH VFD (WITH INTEGRAL FUSIBLE DISCONNECT) FURNISHED BY MECHANICAL CONTRACTOR TO PUMP.
- REMOVE EXISTING CIRCUIT BREAKER AND CONTROLS IN THE TWO EXISTING COOLING TOWER BUCKETS IN THE EXISTING MCC. PROVIDE A 200-A CIRCUIT BREAKER IN EACH BUCKET TO FEED TWO COOLING TOWER FANS EACH. THE FEEDERS SHALL BE ROUTED TO A WIRING TROUGH ADJACENT TO COOLING TOWER FAN STARTER LOCATIONS SHOWN.
- PROVIDE WIREWAY AND FUSED DISCONNECTS AT LOCATION OF COOLING TOWER FAN STARTERS. SEE DETAIL 3 / E2 FOR ADDITIONAL INFORMATION.
- ROUTE RACEWAYS FROM STARTERS (FANS) AND MCC (HEATERS) TO COOLING TOWER. ROUTE OVERHEAD IN BASEMENT AS MUCH AS PRACTICAL AND PENETRATE EXTERIOR WALL BELOW GRADE AND EXTEND TO COOLING TOWER. SEE ELECTRICAL SITE PLAN ON SHEET E1 FOR ADDITIONAL INFORMATION.
- REMOVE EXISTING CIRCUIT BREAKER AND CONTROLS IN THE TWO EXISTING COOLING TOWER HEATER BUCKETS IN THE EXISTING MCC. PROVIDE A 50-A CIRCUIT BREAKER IN EACH BUCKET TO FEED THE BASIN HEATERS AT THE COOLING TOWER. PROVIDE 3-#6, #8 GROUND IN 1" CONDUIT ROUTED TO COOLING TOWER ADJACENT TO COOLING TOWER FAN BRANCH CIRCUITS. SEE SHEET E1 FOR ADDITIONAL INFORMATION.
- EXISTING PANEL "C" IS A 120/208-VOLT PANELBOARD. THERE IS AN EXISTING SPARE 70-AMP, 2-POLE CIRCUIT BREAKER IN SPACE 2,4 OF THE PANEL. REMOVE EXISTING BREAKER AND REPLACE WITH TWO 20-AMP, 1-POLE CIRCUIT BREAKERS IN THESE SPACES FOR CONTROL POWER.



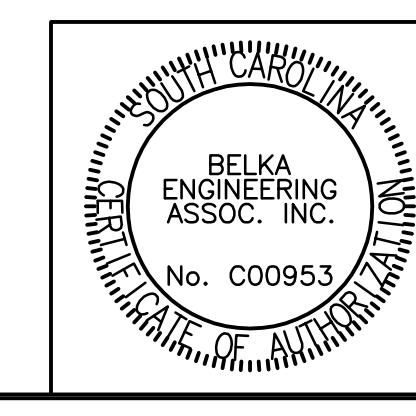
3 PARTIAL POWER SINGLE-LINE  
NOT TO SCALE

CHILLED WATER PUMP #1	CHILLED WATER PUMP #2	CHILLED WATER PUMP #3	HEATER #1 NOTE 6	HEATER #2 NOTE 6	OUTSIDE COOLING TOWER #1 NOTE 3	OUTSIDE COOLING TOWER #2 NOTE 3	NO LABEL	"C" SECONDARY CHILLED WATER PUMP TO REMAIN IN PLACE	CONDENSER WATER PUMP #3 TO REMAIN IN PLACE	CWP-1 NOTE 2 250A	MAIN CIRCUIT BREAKER 1200-AMP TO REMAIN IN PLACE
TO REMAIN IN PLACE	TO REMAIN IN PLACE	TO REMAIN IN PLACE	50A	50A	200A	200A					

2 EXISTING MCC ELEVATION  
NOT TO SCALE



1 WEST ENERGY FACILITY BASEMENT ELECTRICAL PLAN  
SCALE: 1/8" = 1'-0"



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