

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE MEMPHIS, TN 38103



SHELBY COUNTY SUPPORT SERVICES

SSR PROJECT NO. 13650760

CONSTRUCTION DOCUMENT

MARCH 4, 2015



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CODE REFERENCE

- APPLICABLE CODES**
- MEMPHIS SHELBY COUNTY OFFICE OF CONSTRUCTION CODE
 - 2009 INTERNATIONAL BUILDING CODE*
 - 2009 INTERNATIONAL EXISTING BUILDING CODE
 - 2009 INTERNATIONAL MECHANICAL CODE*
 - 2009 INTERNATIONAL ENERGY CONSERVATION CODE*
 - 2008 NATIONAL ELECTRICAL CODE*
- *INCLUDES 2012 LOCAL AMMENDMENTS

PROJECT DATA
PROJECT NAME: DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

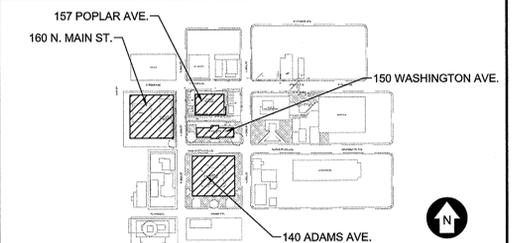
ADDRESSES:
160 N. MAIN ST. - VASCO A. SMITH, JR. ADMINISTRATION
157 POPLAR AVE. - SHELBY COUNTY OFFICE BUILDING
150 WASHINGTON AVE - OLD JAIL
140 ADAMS AVE - SHELBY COUNTY COURTHOUSE

OWNER: SHELBY COUNTY SUPPORT SERVICES

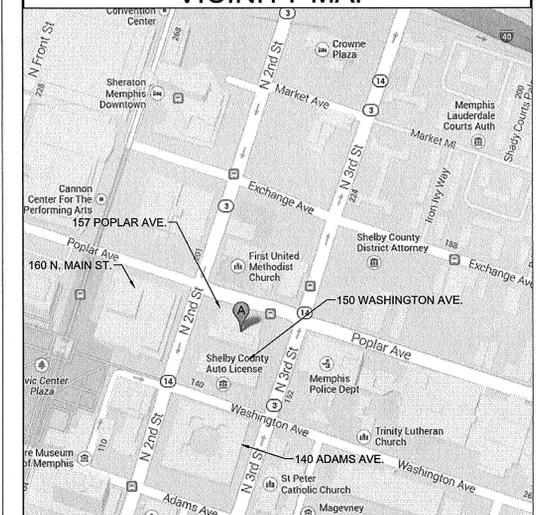
LIST OF DRAWINGS

Number	Title
	Cover
S0.1	Structural General Notes 157 Poplar Ave. Shelby County Office Building
S0.2	Structural Special Inspection Notes 157 Poplar Ave. Shelby County Office Building
S1.1	Structural Cooling Tower FDN Plan 157 Poplar Ave. Shelby County Office Building
S1.2	Structural C.T. Support Framing Plan 157 Poplar Ave. Shelby County Office Building
S1.3	Structural C.T. Sections & Details 157 Poplar Ave. Shelby County Office Building
M0.1	Mechanical General Notes and Legends
MS1.0	Mechanical Site Plan
M1.0	Mechanical Schedules
M1.1	Basement Mechanical Room 157 Poplar Ave. Shelby County Office Building
M1.2	Partial Basement Floor Plan Mechanical 150 Washington Ave. Old Jail
M1.3	12th Floor North Mechanical Plan 160 N. Main St. Administration
M1.4	Partial Basement Floor Plan Mechanical 140 Adams Ave. Shelby County Courthouse
M5.1	Mechanical Details
M5.2	Mechanical Details
M5.3	Mechanical Seismic Details
M6.1	Mechanical Chilled and Condenser Water Piping Schematic
M6.2	Mechanical Chilled and Condenser Water Control Schematic
M6.3	Mechanical Controls Sequence of Operation
M6.4	Mechanical Chilled Water Loop Controls Points List
M6.5	Mechanical Chilled Water Loop Controls Points List
E0.1	Electrical General Notes & Legend
E1.0	Electrical Site Plan
E1.1	Electrical Basement Mechanical Room 157 Poplar Ave. Shelby County Office Building
E1.2	Electrical Partial Basement Floor Plan 150 Washington Ave. Old Jail
E1.3	Electrical 12th Floor North Mechanical Plan 160 N. Main St. Administration
E1.4	Electrical Partial Basement Floor Plan 140 Adams Ave. Shelby County Courthouse
E5.1	Electrical Schedules & Details
E5.2	Electrical Seismic Details
E6.1	Electrical Single Line & Riser Diagrams

KEY PLAN



VICINITY MAP



GENERAL NOTES

DESIGN CRITERIA

DESIGN PER INTERNATIONAL BUILDING CODE (2012), UNLESS NOTED OTHERWISE

DEAD LOADS:
EQUIPMENT: (BAC COOLING TOWER), 38,000 LBS
GROUND SNOW LOAD (P_g): 10 PSF

WIND LOADS (ASCE 7-10):
BASIC WIND SPEED: 115 MPH
WIND EXPOSURE CATEGORY: C

SIMPLIFIED METHOD
C&C DESIGN VALUES IN PSF:
Z: 20'
AREA: 185 SF
P_{net}: 33 PSF

SEISMIC:
IMPORTANCE FACTOR I_e: 1.0
OCCUPANCY CATEGORY: II
SITE CLASS: D
SEISMIC DESIGN CATEGORY: D
MAPPED SPECTRAL RESPONSE ACCELERATION:
S₁: 1.008
S₂: 0.350
SPECTRAL DESIGN COEFFICIENTS:
S_{ds}: 0.737
S_{ds}: 0.397
BASIC SEISMIC FORCE RESISTING SYSTEM:
SEISMIC FORCE RESISTING SYSTEM
ORDINARY STEEL MOMENT FRAMES
SEISMIC BASE SHEAR (V): 7.5K
RESPONSE MODIFICATION FACTOR (R): 3.5
DEFLECTION AMPLIFICATION FACTOR (C_d): 1.75
SEISMIC RESPONSE COEFFICIENT (C_s): 0.212
ANALYSIS PROCEDURE: EQUIV. LATERAL FORCE PROCEDURE

CONCRETE (DESIGN PER CURRENT EDITION ACI 318)
SLAB ON GRADE: F_c=4000 PSI (MIN)
FOOTINGS: F_c=4000 PSI
COLUMNS/BEAMS: F_c=4000 PSI
ALL OTHER CONCRETE: F_c=3000 PSI

ALL REINFORCING STEEL ASTM A615 GRADE 60

ALL WELDED WIRE FABRIC ASTM A185

STRUCTURAL STEEL (DESIGN PER CURRENT EDITION AISC)
ALL WIDE FLANGE SECTIONS ASTM A992 GRADE 50
ALL PLATE AND BAR STOCK, ASTM A36
STEEL PIPE ASTM A53, GRADE B OR ASTM A501
STEEL TUBE ASTM A500, GRADE B

ASSUMED SOIL BEARING (DESIGN MAXIMUM): 2000 PSF
(SPREAD FOOTINGS)

CONTRACTOR SHALL HIRE A GEOTECHNICAL ENGINEER TO PERFORM SOIL BORINGS AND DETERMINE ACCEPTABLE SOIL BEARING CAPACITY OF THE EXCAVATED FOUNDATION PRIOR TO POURING FOUNDATIONS. REPORT ON SOIL BORINGS SHALL BE COMPLETED A MINIMUM OF 4 WEEKS PRIOR TO ANTICIPATED FOUNDATION INSTALLATION. IN ADDITION GEOTECHNICAL ENGINEER SHALL INSPECT FOUNDATION EXCAVATION PRIOR TO PLACEMENT OF CONCRETE. CONTRACTOR SHALL REINFORCE OR REPLACE UNACCEPTABLE SOIL IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.

GENERAL NOTES

CONCRETE:
UNLESS NOTED OTHERWISE (UNO) ON THE DRAWINGS, MINIMUM COVER FOR REINFORCING SHALL BE AS FOLLOWS:

FOOTINGS: 3"
SLABS AND WALLS
EXPOSED TO EARTH LIQUID OR WEATHER: 2"
NOT EXPOSED TO EARTH LIQUID OR WEATHER: 3/4"
SLABS ON GRADE: 2" FROM TOP

ALL REINFORCING SHALL BE HELD SECURELY IN POSITION WITH STANDARD ACCESSORIES IN CONFORMANCE W/ THE CRSI MANUAL OF STANDARD PRACTICE AND ACI 315 DURING THE PLACING OF THE CONCRETE.

UNLESS NOTED OTHERWISE, SPLICES IN REINFORCING, WHERE PERMITTED, SHALL BE AS FOLLOWS:

WELDED WIRE FABRIC: WIRE SPACING PLUS 6"
REINFORCING BARS:

DEVELOPMENT LENGTH SCHEDULE

	#6 and Smaller				#7 and Larger			
	Other Bars		Top Bars		Other Bars		Top Bars	
	Class A	Class B						
3000 psi	44 d _s	57 d _s	57 d _s	74 d _s	55 d _s	72 d _s	72 d _s	93 d _s
4000 psi	38 d _s	50 d _s	50 d _s	65 d _s	48 d _s	62 d _s	62 d _s	81 d _s
5000 psi	34 d _s	45 d _s	45 d _s	58 d _s	43 d _s	56 d _s	56 d _s	72 d _s

- NOTES:
1. ALL LAPS SHALL BE CLASS B UNLESS NOTED OTHERWISE.
2. LAP LENGTHS SHOWN IN CRSI'S REINFORCING BARS ANCHORAGES AND SPLICES, 5TH EDITION, MAY BE USED IN LIEU OF THIS TABLE.
3. BEAMS AND COLUMNS: INCREASE LAPS SHOWN BY 50% IF CLEAR SPACING OF BARS IS LESS THAN d_s, OR IF CLEAR COVER OF BARS IS LESS THAN d_s.
4. WALLS, SLABS AND FOOTINGS: INCREASE LAPS SHOWN BY 50% IF CLEAR SPACING OF BARS IS LESS THAN 2d_s, OR IF CLEAR COVER OF BARS IS LESS THAN d_s.
5. INCREASE LAPS BY 25% FOR GRADE 75 REINFORCEMENT.
6. INCREASE LAPS BY 33% FOR LIGHTWEIGHT CONCRETE.

ALL HOOKS IN REINFORCING BARS SHALL BE ACI STANDARD HOOKS, U.N.O.

PROVIDE 3/4" CHAMFER AT ALL EXPOSED CORNERS OF BEAMS, WALLS, SLABS, ETC.

PROVIDE 3/8" REMOLDED EXPANSION JOINT MATERIAL WHERE SLAB ON GRADE IS POURED AROUND COLUMNS AND AGAINST GRADE BEAMS OR WALLS, UNLESS OTHERWISE SHOWN OR NOTED.

CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (LATEST EDITION), EXCEPT AS MODIFIED BY THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

ALL CONCRETE MIXES SHALL BE PROPORTIONED BY THE FIELD EXPERIENCE METHOD OR THE LABORATORY TRIAL METHOD IN ACCORDANCE W/ ACI 318, MAX WATER TO CEMENT RATIO SHALL BE 0.45

PROVIDE COMPRESSIVE STRENGTH TESTS CONFORMING TO ASTM C31 AND ASTM C39.

ONE SET OF FOUR CYLINDERS FOR EACH 150 CUBIC YARDS OR FRACTION THEREOF, OF EACH STRENGTH OF CONCRETE PLACED IN ANY ONE DAY. TEST ONE SPECIMEN AT SEVEN DAYS, TEST TWO SPECIMENS AT 28 DAYS AND HOLD ONE IN RESERVE. PERFORM ONE SLUMP TEST FOR EACH SET OF COMPRESSIVE STRENGTH TEST SPECIMENS. SUBMIT RESULTS DIRECTLY TO DESIGNER.

CONCRETE EXPOSED TO EARTH AND WEATHER SHALL HAVE LIMESTONE AGGREGATE AND ENTRAINED AIR.

MASONRY:

ALL LOAD BEARING WALLS AND EXTERIOR WALLS SHALL BE COMPOSED OF ASTM C90, GRADE N-1 HOLLOW CONCRETE MASONRY UNITS WITH ASTM C270, TYPE "S" MORTAR.

ALL INTERIOR CMU WALLS SHALL BE REINFORCED FULL HEIGHT IN A GROUT FILLED CELL WITH 1 #5 AT:

- EACH CORNER, WALL ENDS, WALL INTERSECTIONS, EACH SIDE OF CONTROL JOINTS, AS INDICATED IN MASONRY WALL SCHEDULE, THIS SHEET.

LAP VERTICAL BARS 48 BAR DIAMETERS, SUPPORT WITH WIRE TIES.

GROUT ALL CELLS BELOW FINISHED GRADE.

PROVIDE HORIZONTAL JOINT REINFORCEMENT IN WALLS AT 16" o.c. VERTICALLY UNO. IN ADDITION, INSTALL JOINT REINFORCING IN THE FIRST TWO MORTAR JOINTS ABOVE AND BELOW OPENINGS, EXTENDING AT LEAST 24 INCHES BEYOND THE OPENING. PROVIDE HORIZONTAL JOINT REINFORCEMENT IN PARAPETS AND FREE STANDING WALLS AT 8" o.c. VERTICALLY. LAP JOINT REINFORCEMENT 6" MINIMUM.

SEE ARCHITECTURAL DRAWING FOR EXPANSION OR CONTROL JOINTS. LOCATE VERTICAL CONTROL JOINTS AT 24'-0" o.c. MAXIMUM, BUT NOT LESS THAN 2'-0" FROM A JOIST OR BEAM BEARING PLATE.

16" U-BLOCK OR BOND BEAM SHALL CONSIST OF AN 8" U-BLOCK UNDER A KNOCK-OUT BLOCK.

WHERE MASONRY ABUTS STEEL COLUMNS, PROVIDE 3/16" DIAMETER WIRE TIES @ 16" HOOKED AROUND 1/4" OFFSET BAR AND EXTENDED INTO MASONRY. OFFSET PART SHALL BE 1/4" DIAMETER BY 9" LONG WITH 3/8" OFFSET AND 4" ADJUSTMENT WELDED TO COLUMN.

MASONRY WORK SHALL BE INSPECTED IN ACCORDANCE WITH ACI 530.1

FOUNDATIONS:

IF FOOTING ELEVATIONS SHOWN OCCUR IN A DISTURBED, UNSUITABLE, OR UNSTABLE SOIL, THE DESIGNER SHALL BE NOTIFIED.

ALL FOUNDATION EXCAVATIONS SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO POURING FOUNDATIONS.

STRUCTURAL STEEL:

ALL BOLTS SHALL BE 3/4" DIAMETER (ASTM A325) UNLESS NOTED OTHERWISE.
ANCHOR BOLTS ASTM F1554
WELDED STUDS ASTM A108
DEFORMED BAR ANCHORS ASTM A706

MINIMUM SIZE OF ALL FILLET WELDS SHALL CONFORM TO SECTION J2 AISC SPECIFICATIONS EVEN THOUGH SHOWN OTHERWISE ON MECHANICAL, OR STRUCTURAL DRAWINGS.

ALL WELDS ALONG THE LENGTH OF MEMBERS INDICATED ON ARCHITECTURAL OR STRUCTURAL DRAWINGS, BUT NOT SIZED SHALL BE A MINIMUM OF A 2" LONG, 3/16" FILLET WELD EA. SIDE.

ALL WELDS SHALL BE MADE WITH E70XX ELECTRODES

PROVIDE MIN. 3/4" NON-SHRINK GROUT UNDER COLUMN BASE PLATES, U.N.O. WHERE MINIMUM BASE PLATE WIDTH EXCEEDS 12", ADD 1/8" TO MINIMUM GROUT THICKNESS AT A RATE OF 1/8" THICKNESS PER INCH OF WIDTH EXCEEDING 12" ARE PLACED. BEAMS WITH CONCENTRATED LOADS SHALL HAVE STUDS PLACED IN THE ZONES INDICATED IN THE SAME MANNER AS DESCRIBED ABOVE. GIRDERS WITH DECK FLUTE PARALLEL TO THE SPAN SHALL HAVE STUDS PLACED UNIFORMLY WITHIN THE ZONE INDICATED ON THE DRAWINGS.

GEOTECHNICAL:

A GEOTECHNICAL TESTING AND INSPECTION FIRM SHALL BE EMPLOYED TO PERFORM A SOIL SURVEY FOR SATISFACTORY SOIL MATERIALS, SAMPLING AND TESTING FOR QUALITY CONTROL AS PER THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT FOR THIS PROJECT. ALL EARTHWORK OPERATIONS SHALL BE PERFORMED TO THE SATISFACTION OF THE GEOTECHNICAL TESTING FIRM.

SUPPLEMENTARY NOTES:

PROVIDE ALL TEMPORARY BRACING, GUYING OR OTHER MEANS TO AVOID EXCESSIVE STRESSES AND TO HOLD STRUCTURAL ELEMENTS IN PLACE DURING CONSTRUCTION. THE STRUCTURE SHOULD NOT BE CONSIDERED STABLE UNTIL ALL STRUCTURAL ELEMENTS HAVE BEEN CONSTRUCTED.

THE STRUCTURAL ENGINEER SHALL NOT HAVE CONTROL OR BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, PROCEDURES OR SEQUENCES. FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, OR ANY OTHER PERSONS PERFORMING THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

VERIFY ALL DIMENSIONS WITH MECHANICAL DRAWINGS, SUBMITTALS & APPROVED EQUIPMENT.

CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING THE PROJECT AND NOTIFY DESIGNER OF ANY CONFLICT WITH EXISTING CONDITIONS INDICATED TO REMAIN.

SEE MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR EMBEDS, OPENINGS, SLEEVES, ETC. NOT SHOWN ON THE STRUCTURAL DRAWINGS.

ALL STRUCTURAL OPENINGS AROUND OR AFFECTED BY MECHANICAL, ELECTRICAL, AND PLUMBING EQUIPMENT SHALL BE VERIFIED WITH EQUIPMENT PURCHASED BEFORE PROCEEDING WITH STRUCTURAL WORK AFFECTED.

ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT.

GENERAL CONTRACTOR MUST REVIEW AND APPROVE SHOP DRAWINGS PRIOR TO SUBMITTAL TO DESIGNER. SUBMITTALS WHICH DO NOT CONTAIN THE CONTRACTORS SHOP DRAWING OR STAMP OR HAVE BEEN MERELY "RUBBER STAMPED" SHALL BE RETURNED WITHOUT REVIEW.

CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND UTILITIES PRIOR TO EXCAVATION. NOTIFY DESIGNER OF UNDERGROUND UTILITIES BEFORE EXCAVATION.



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NO:	DATE	DESCRIPTION
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DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

STRUCTURAL, GENERAL NOTES
157 POPLAR AVE.
SHELBY COUNTY OFFICE BUILDING

DRAWN BY: JRB
DESIGNED BY: KEM
CHECKED BY: KEM
Q.A.Q.C. BY: CB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
S0.1

STATEMENT OF SPECIAL INSPECTIONS

THIS STATEMENT OF SPECIAL INSPECTIONS IS SUBMITTED AS REQUIRED FOR BUILDING PERMIT ISSUANCE IN ACCORDANCE WITH THE SPECIAL INSPECTION AND STRUCTURAL TESTING REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE. THIS STATEMENT OF SPECIAL INSPECTIONS IS ONLY FOR THE STRUCTURAL PORTION OF THE WORK. REFER TO OTHER DISCIPLINES FOR OTHER SPECIAL INSPECTION REQUIREMENTS FOR THIS PROJECT.

THE OWNER OR REGISTERED DESIGN PROFESSIONAL IN CHARGE (ARCHITECT) ACTING AS THE OWNERS AGENT SHALL EMPLOY ONE OR MORE AGENCIES APPROVED BY THE BUILDING OFFICIAL TO PERFORM INSPECTION DURING CONSTRUCTION. THESE INSPECTIONS ARE IN ADDITION TO SECTION 110 OF THE IBC. CONTRACTOR IS RESPONSIBLE TO ENSURE THE INSPECTOR IS PRESENT WHERE WORK REQUIRES PERIODIC OR CONTINUOUS INSPECTION.

RESPONSIBILITIES OF THE SPECIAL INSPECTOR

THE INSPECTOR SHALL KEEP RECORDS OF ALL INSPECTIONS AND SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. DISCOVERED DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF SUCH DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING ALL THE REQUIRED SPECIAL INSPECTIONS AND TESTING, AND CORRECTION OF ANY DISCREPANCIES NOTED PREVIOUSLY SHALL BE SUBMITTED TO THE BUILDING OFFICIAL PRIOR TO ISSUANCE OF A CERTIFICATE OF USE AND OCCUPANCY.

FABRICATIONS

SPECIAL INSPECTIONS OF THE FABRICATION PROCESS SHALL NOT BE REQUIRED WHERE FABRICATION OF STRUCTURAL LOAD BEARING MEMBERS AND ASSEMBLIES IS BEING PERFORMED ON THE PREMISES OF A FABRICATOR WHO IS REGISTERED AND APPROVED TO PERFORM THE WORK WITHOUT SPECIAL INSPECTIONS. AT THE COMPLETION OF THE FABRICATION, THE APPROVED FABRICATOR SHALL SUBMIT A CERTIFICATE OF COMPLIANCE TO THE BUILDING OFFICIAL.

THE SPECIAL INSPECTIONS ARE IN ADDITION TO THE MATERIAL TESTING AND INSPECTIONS LISTED IN THE CONTRACT SPECIFICATIONS. CONTRACTOR IS TO COORDINATED SPECIAL INSPECTIONS, MATERIAL SPECIFIC TESTING AND INSPECTIONS WITH CONTRACTOR FURNISHED SPECIAL INSPECTOR MATERIAL TESTING LABS.

THE SPECIAL INSPECTIONS INDICATED HEREIN DO NOT RELIEVE THE CONTRACTOR FROM THEIR RESPONSIBILITIES. CONTRACTOR SHALL PAY FOR ANY ADDITIONAL TESTING OR INSPECTION REQUIRED FROM WORK OR MATERIALS NOT IN CONFORMANCE WITH THE CONTRACT DOCUMENTS.

THE STATEMENT OF SPECIAL INSPECTIONS INCLUDES REQUIRED VERIFICATION AND INSPECTION OF THE FOLLOWING SECTIONS:

- 1. CONCRETE CONSTRUCTION
- 2. MASONRY CONSTRUCTION

COMPONENTS PART OF THE MAIN WIND FORCE RESISTING SYSTEM AND SUBJECTED TO SPECIAL INSPECTIONS FOR WIND RESISTANCE:

COMPONENTS PART OF THE MAIN SEISMIC FORCE RESISTING SYSTEM AND SUBJECTED TO SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE: NOT APPLICABLE

AISC 360-10: SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS

TASK	CONTINUOUS	PERIODIC
TABLE N54-1 INSPECTION TASKS PRIOR TO WELDING		
1. WELDING PROCEDURE SPECIFICATIONS (WPSs) AVAILABLE	X	-
2. MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	X	-
3. MATERIAL IDENTIFICATION (TYPE/GRADE)	-	X
4. WELDER IDENTIFICATION SYSTEM	-	X
5. FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY) A. JOINT PREPARATION B. DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL) C. CLEANLINESS (CONDITION OF STEEL SURFACES) D. TACKING (TACK WELD QUALITY AND LOCATION) E. BACKING TYPE AND FIT (IF APPLICABLE)	-	X
6. CONFIGURATION AND FINISH OF ACCESS HOLES	-	X
7. FIT-UP OF FILLET WELDS A. DIMENSIONS (ALIGNMENT, GAPS AT ROOT) B. CLEANLINESS (CONDITION OF STEEL SURFACES) C. TACKING (TACK WELD QUALITY AND LOCATION)	-	X
8. CHECK WELDING EQUIPMENT	-	X
TABLE N54-2 INSPECTION TASKS DURING WELDING		
1. USE OF QUALIFIED WELDERS	-	X
2. CONTROL AND HANDLING OF WELDING CONSUMABLES A. PACKING B. EXPOSURE CONTROL	-	X
3. NO WELDING OVER CRACKED TACK WELDS	-	X
4. ENVIRONMENTAL CONDITIONS A. WIND SPEED WITHIN LIMITS B. PRECIPITATION AND TEMPERATURE	-	X
5. WPS FOLLOWED A. SETTINGS ON WELDING EQUIPMENT B. TRAVEL SPEED C. SELECTED WELDING MATERIALS D. SHIELDING GAS TYPE/RATE FLOW E. PREHEAT APPLIED F. INTERPASS TEMPERATURE MAINTAINED (MIN./MAX.) G. PROPER POSITION (F, V, H, OH)	-	X
6. WELDING TECHNIQUES A. INTERPASS AND FINAL CLEANING B. EACH PASS WITHIN PROFILE LIMITATIONS C. EACH PASS MEETS QUALITY REQUIREMENTS	-	X
TABLE N54-3 INSPECTION TASKS AFTER WELDING		
1. WELDS CLEANED	-	X
2. SIZE, LENGTH AND LOCATION OF WELDS	X	-
3. WELDS MEET VISUAL ACCEPTANCE CRITERIA A. CRACK PROHIBITION B. WELD/BASE-METAL FUSION C. CRATER CROSS SECTION D. WELD PROFILES E. WELD SIZE F. UNDERCUT G. POROSITY	-	X
4. ARC STRIKES	X	-
5. k-AREA	X	-
6. BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)	X	-
7. REPAIR ACTIVITIES	X	-
8. DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	X	-

**TABLE N56-1
INSPECTION TASKS PRIOR TO BOLTING**

1. MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIAL	X	-
2. FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	-	X
3. PROPER FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE)	-	X
4. PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	-	X
5. CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	-	X
6. PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHOD USED	X	X
7. PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	-	X

**TABLE N56-2
INSPECTION TASKS DURING BOLTING**

1. FASTENER ASSEMBLIES, OF SUITABLE CONDITION, PLACED IN ALL HOLES AND WASHERS (IF REQUIRED) ARE POSITIONED AS REQUIRED	-	X
2. JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	-	X
3. FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	-	X
4. FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RSCS SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	-	X

**TABLE N56-3
INSPECTION TASKS AFTER BOLTING**

1. DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	X	-
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**TABLE N61
INSPECTION OF STEEL ELEMENTS OF COMPOSITE CONSTRUCTION PRIOR TO CONCRETE PLACEMENT**

1. PLACEMENT AND INSTALLATION OF STEEL DECK	X	-
2. PLACEMENT AND INSTALLATION OF STEEL HEADED STUD ANCHORS	X	-
3. DOCUMENT ACCEPTANCE OR REJECTION OF STEEL ELEMENTS	X	-

TABLE 1705.3, REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	IBC REFERENCE
1. INSPECTION OF REINFORCING STEEL INCLUDING PRESTRESSING TENDONS, AND PLACEMENT.	---	X	ACI 318: 3.5, 7.1-7.7	1910.4
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1705.2.2, ITEM 2B.	---	---	AWS D1.4 318:3.5.2 ACI	---
3. INSPECTION OF ANCHORS CAST IN CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED OR WHERE STRENGTH DESIGN IS USED.	---	X	ACI 318:8.1.3, 21.2.8	1908.5, 1909.1
4. INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS	---	X	ACI 318: 3.8.6, 8.1.3, 21.2.8	1909.1
5. VERIFYING USE OF REQUIRED DESIGN MIX	---	X	ACI 318: CH. 4, 5.2-5.4	1904.2, 1910.2, 1910.3
6. AT THE TIME OF FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	---	ASTM C172 C31 5.6, 5.8 ASTM ACI 318:	1910.10
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	---	ACI 318: 5.9, 5.10	1910.6, 1910.7, 1910.8
8. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	---	X	ACI 318: 5.11-5.13	1910.9
9. INSPECTION OF PRESTRESSED CONCRETE: A. APPLICATION OF PRESTRESSING FORCES.	X	---	ACI 318: 18.20 318: 18.18.4 ACI	---
B. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC FORCE-RESISTING SYSTEM.	X	---		
10. ERECTION OF PRECAST CONCRETE MEMBERS.	---	X	ACI 318: CH. 16	---
11. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	---	X	ACI 318: 6.2	---
12. INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	---	X	ACI 318: 6.1.1	---

***** USE THIS FOR OCCUPANCY I, II, AND III *****

TABLE 1704.5.1, LEVEL 1 INSPECTION OF CONCRETE MASONRY CONSTRUCTION

VERIFICATION AND INSPECTION	FREQUENCY		REFERENCE FOR CRITERIA		
	CONTINUOUS	PERIODIC			
1. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE: A. PROPORTIONS OF SITE-PREPARED MORTAR. B. CONSTRUCTION OF MORTAR JOINTS. C. LOCATION OF REINFORCEMENT, CONNECTORS, PRESTRESSING TENDONS, AND ANCHORAGES. D. PRESTRESSING TECHNIQUE. E. GRADE AND SIZE OF PRESTRESSING TENDONS AND ANCHORAGES.	---	X	---	---	ART. 2.6A ART. 3.3B ART. 3.4, 3.6A ART. 3.6B ART. 2.4B, 2.4H
2. THE INSPECTION PROGRAM SHALL VERIFY: A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS. B. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION. C. SPECIFIED SIZE, GRADE, AND TYPE OF REINFORCEMENT. D. WELDING OF REINFORCING BARS.	---	X	---	---	ART. 3.3G SEC. 1.2.2(E), 2.1.4, 3.1.6 SEC. 1.13 ART. 2.4, 3.4 SEC. 2.1.10.7.2, 3.3.3.4(B)
E. PROTECTION OF MASONRY DURING COLD WEATHER (BELOW 40°) OR HOT WEATHER (ABOVE 90°).	---	X	SEC. 2104.3, 2104.4	---	ART. 1.8C, 1.8D
F. APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE.	---	X	---	---	ART. 3.6B
3. PRIOR TO GROUTING, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE: A. GROUT SPACE IS CLEAN. B. PLACEMENT OF REINFORCEMENT AND CONNECTORS AND PRESTRESSING TENDONS AND ANCHORAGES. C. PROPORTIONS OF SITE-PREPARED GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS. D. CONSTRUCTION OF MORTAR JOINTS.	---	X	---	---	ART. 3.2D SEC. 1.13 ART. 3.4 ART. 2.6B ART. 3.3B
4. GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE WITH CODE AND CONSTRUCTION DOCUMENT PROVISIONS.	X	---	---	---	ART. 3.5
A. GROUTING OF PRESTRESSING BONDED TENDONS.	X	---	---	---	ART. 3.6C
5. PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS SHALL BE OBSERVED.	X	---	SEC. 2105.2.2, 2105.3	---	ART. 1.4
6. COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED.	---	X	---	---	ART. 1.5



2650 Thousand Oaks Blvd., Suite 3200
Memphis, TN 38118
(901) 683-3900
FAX: (901) 683-3990
www.ssr-inc.com

NO.	DATE	DESCRIPTION

**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

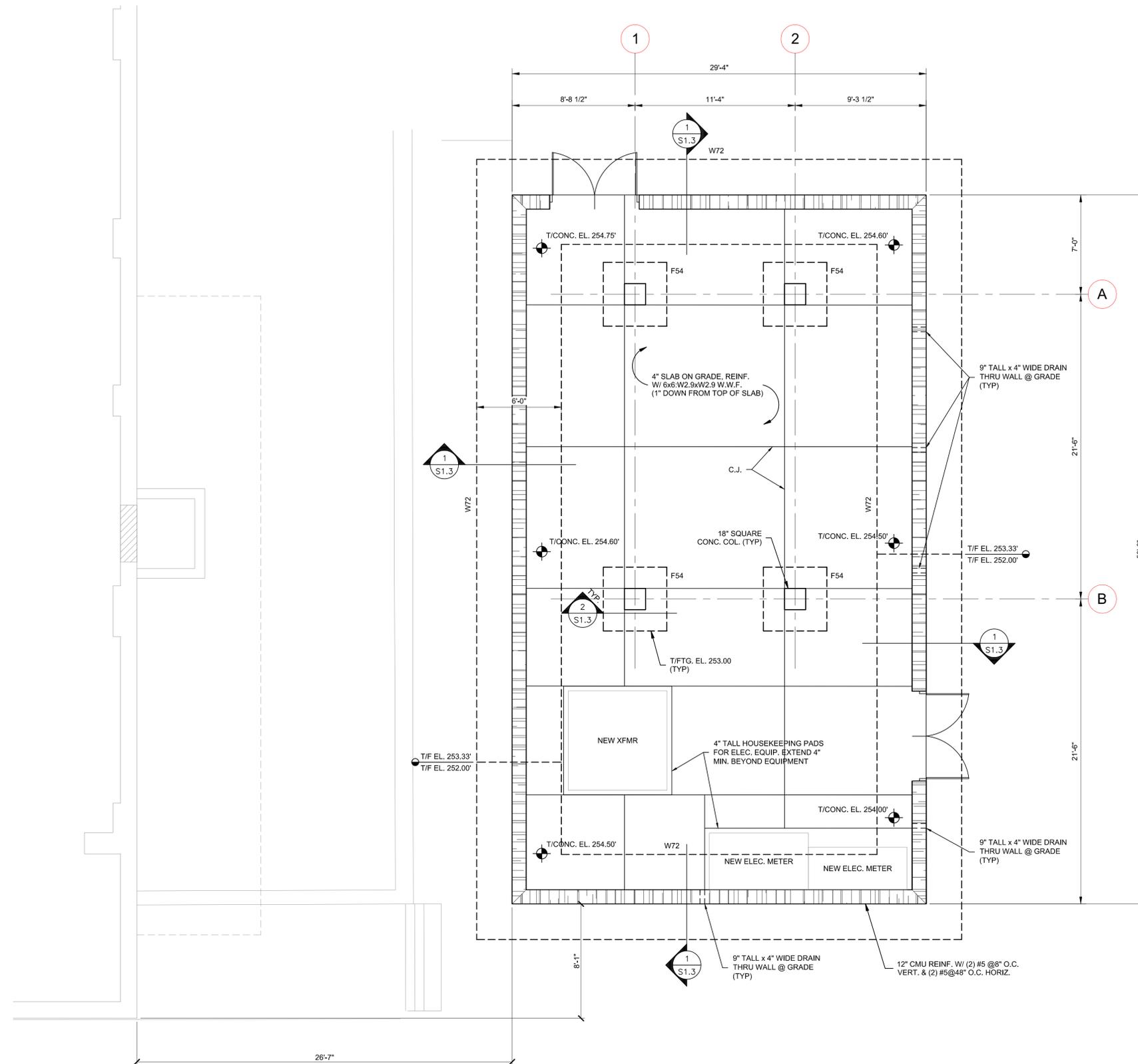
STRUCTURAL, SPECIAL
INSPECTION NOTES
157 POPLAR AVE.
SHELBY COUNTY OFFICE
BUILDING

DRAWN BY: JRB
DESIGNED BY: KEM
CHECKED BY: KEM
Q.A.Q.C. BY: CB

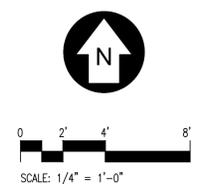


JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
S0.2



1 COOLING TOWER FOUNDATION PLAN
1/4" = 1'-0"



NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

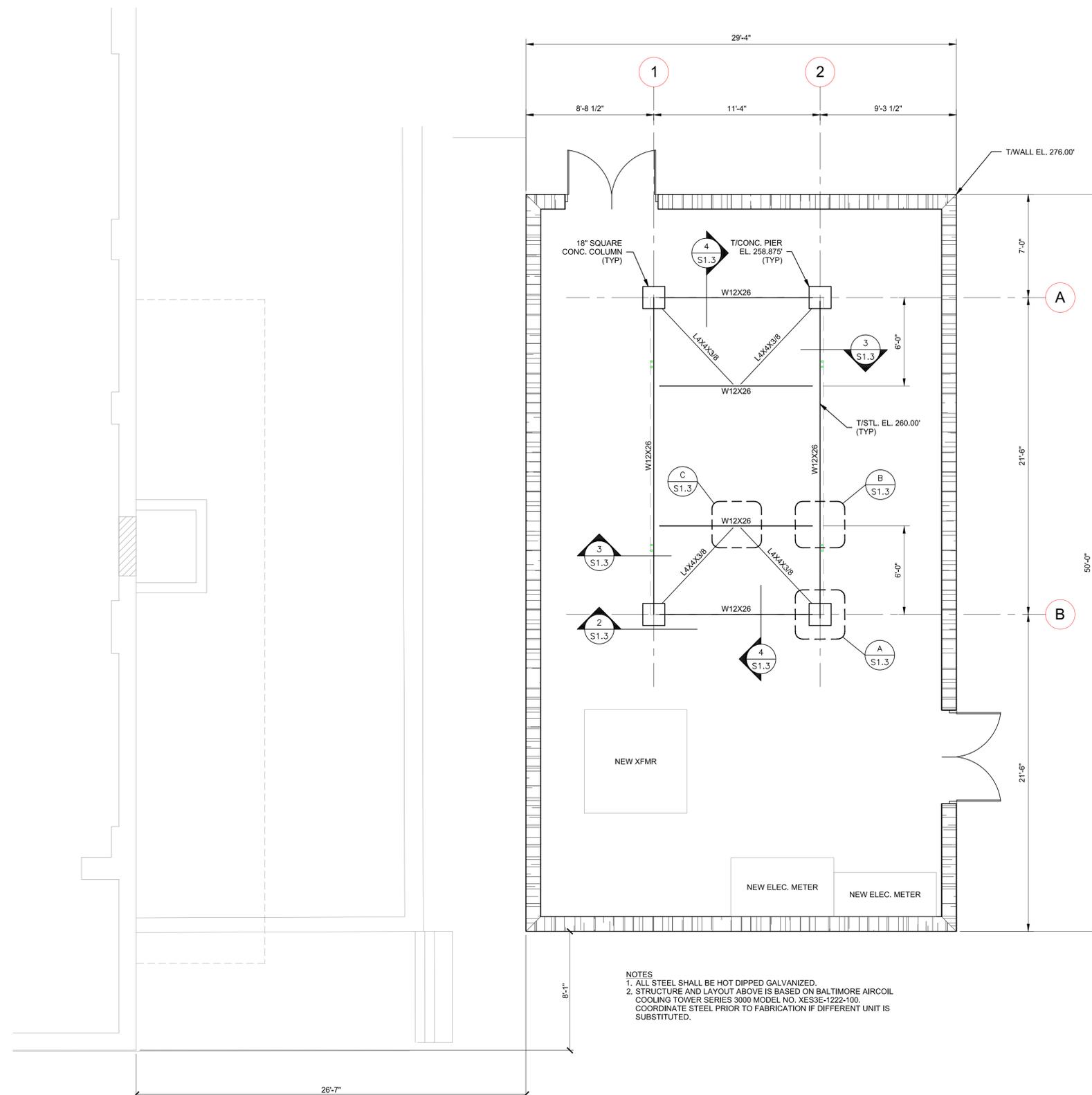
STRUCTURAL, COOLING TOWER
FOUNDATION PLAN
157 POPLAR AVE.
SHELBY COUNTY OFFICE
BUILDING

DRAWN BY: JRB
DESIGNED BY: KEM
CHECKED BY: KEM
Q.A.Q.C. BY: CB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
S1.1



NOTES
 1. ALL STEEL SHALL BE HOT DIPPED GALVANIZED.
 2. STRUCTURE AND LAYOUT ABOVE IS BASED ON BALTIMORE AIRCOIL COOLING TOWER SERIES 3000 MODEL NO. XES3E-1222-100. COORDINATE STEEL PRIOR TO FABRICATION IF DIFFERENT UNIT IS SUBSTITUTED.

1 COOLING TOWER SUPPORT FRAMING PLAN
 1/4" = 1'-0"

NO:	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

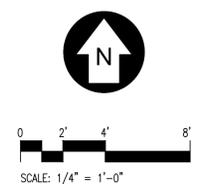
STRUCTURAL, COOLING TOWER SUPPORT FRAMING PLAN
 157 POPLAR AVE.
 SHELBY COUNTY OFFICE BUILDING

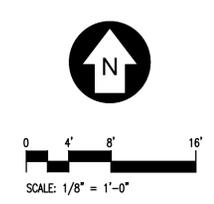
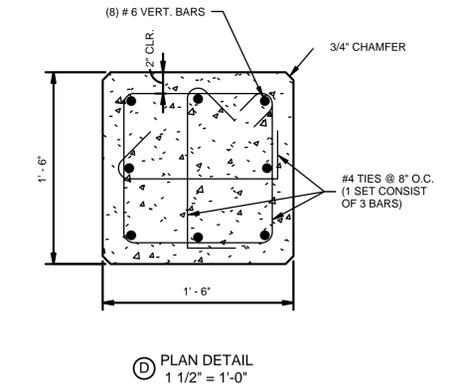
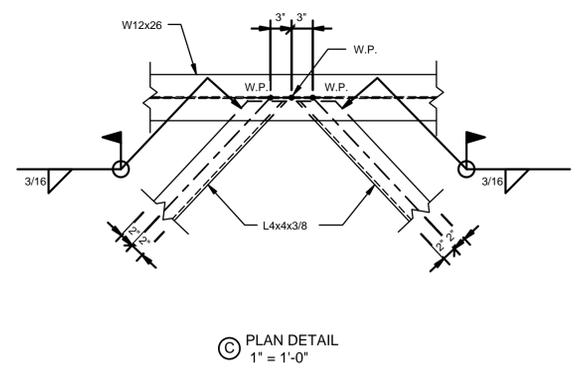
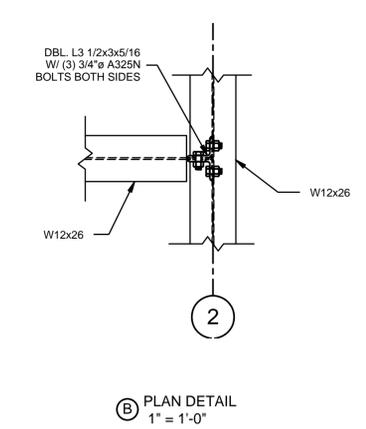
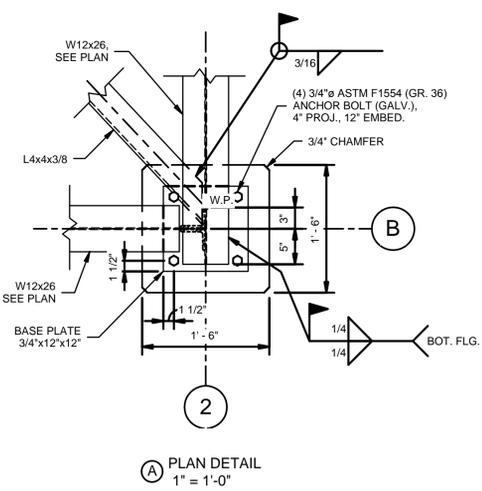
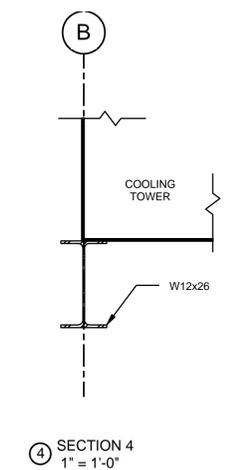
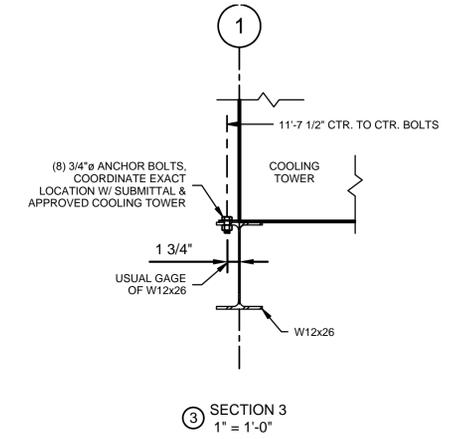
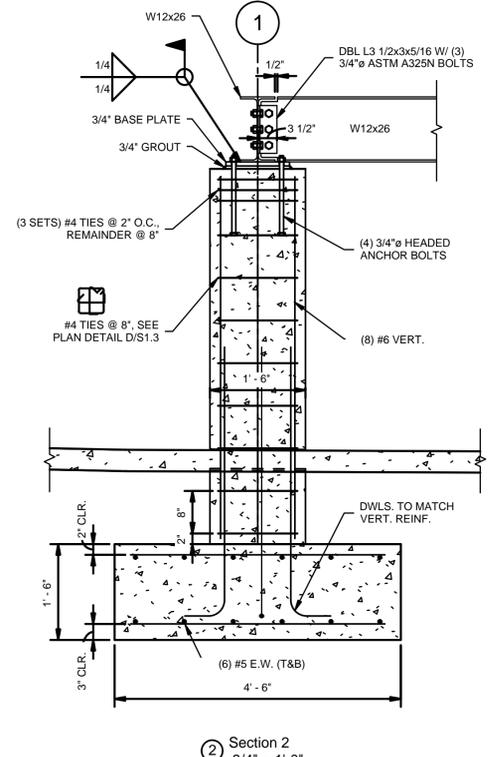
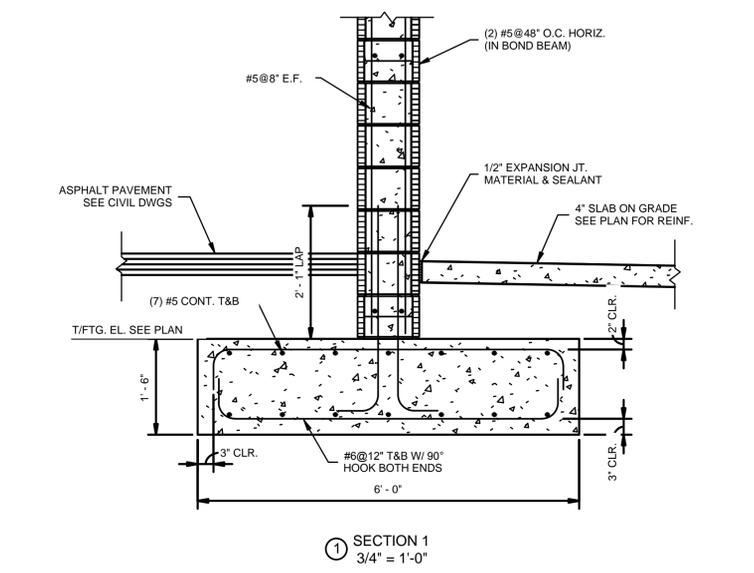
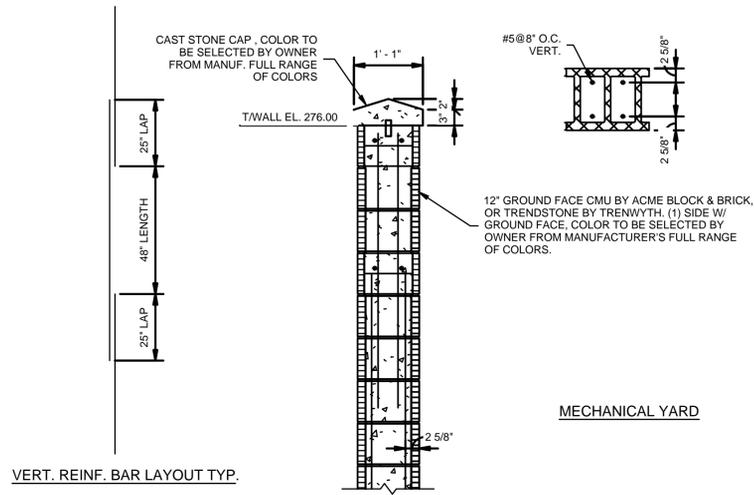
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 CHECKED BY: KEM
 Q.A.Q.C. BY: CB



JOB NO.: 13650760
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 DATE: 03-04-15

DRAWING NO.:
S1.2





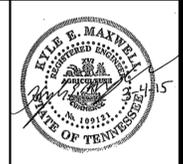
NO.	DATE	DESCRIPTION

**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

STRUCTURAL
C.T. SECTIONS & DETAILS
157 POPLAR AVE.
SHELBY COUNTY OFFICE
BUILDING

DRAWN BY: JRB
DESIGNED BY: KEM
CHECKED BY: KEM
Q.A.Q.C. BY: CB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO:
S1.3

MECHANICAL LEGEND

(NOT ALL SYMBOLS
MAY BE USED)

PIPING

—CHS— CHILLED WATER SUPPLY	—CHR— CHILLED WATER RETURN	—HWS— HOT WATER SUPPLY	—HWR— HOT WATER RETURN	—CWS— CONDENSER WATER SUPPLY	—CWR— CONDENSER WATER RETURN	—D— DRAIN LINE	→ DIRECTION OF FLOW	↘ REDUCER	↗ RISE/DROP IN PIPE ELEVATION	○ ELBOW UP	○ ELBOW DOWN	—T— BRANCH PIPE CONNECTION	—S— TEE - OUTLET DOWN	—U— TEE - OUTLET UP	PRV PRESSURE REDUCING VALVE	TDV TRIPLE DUTY VALVE	● POINT OF CONNECTION BETWEEN NEW AND EXISTING	—T— TRIPLE DUTY VALVE (TDV)	—M— MOTORIZED(DDC) CONTROL VALVE, 2 WAY	—M— MOTORIZED(DDC) CONTROL VALVE, 3 WAY	—G— GATE VALVE	—G— GLOBE VALVE	—B— BALL VALVE	—B— BUTTERFLY VALVE	—P— PNEUMATIC CONTROL VALVE, 2 WAY	—P— PNEUMATIC CONTROL VALVE, 3 WAY	—C— CHECK VALVE	—S— STRAINER	—S— STRAINER & BLOWDOWN VALVE	—P— PLUG COCK/BALANCING VALVE	—C— CIRCUIT SETTER	—P— PRESSURE REDUCING VALVE	—C— COMPANION FLANGE	—U— UNION	—G— GUIDE	—A— ANCHOR	—F— FLEXIBLE CONNECTOR	—T— THERMOMETER WELL	—P— PETE'S PLUG	—V— VALVE WITH BLIND FLANGE	—C— PIPE CAP	—S— STEAM TRAP	—G— GAUGE & GAUGE COCK	—T— THERMOMETER
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MECHANICAL GENERAL NOTES

- CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE PROJECT SCOPE, UTILITY CONNECTIONS, AND ALL BUILDING SERVICES. CONTRACTOR SHALL CONFIRM EXISTING PIPE SIZES PRIOR TO ORDERING VALVES AND EQUIPMENT. ADVISE ENGINEER/OWNER OF ANY DISCREPANCIES.
- HOUSEKEEPING PAD SIZE AND FLOOR DRAIN LOCATIONS SHALL BE COORDINATED WITH THE SIZE AND LOCATION OF EXACT EQUIPMENT TO BE INSTALLED.
- STANDARD DETAILS ILLUSTRATED ON THE DRAWINGS SHALL BE APPLIED IN ALL CASES WHERE THE FEATURE OCCURS IN THE SYSTEM DESIGN.
- MAJOR EQUIPMENT SHOWN ON THE PLANS AND ELEVATIONS ILLUSTRATE THE GENERAL ARRANGEMENT AND SPACE ALLOCATIONS. THE CONTRACTOR SHALL VERIFY THE SPACE REQUIREMENTS FOR EACH SYSTEM COMPONENT USING MANUFACTURER CERTIFIED SHOP DRAWINGS AND MAKE THE NECESSARY ADJUSTMENTS IN EQUIPMENT PLACEMENT AND CONNECTION IN ORDER TO ACCOMMODATE THE EXACT EQUIPMENT TO BE INSTALLED.
- SUPPORTS, ANCHOR BOLTS, AND HANGERS FOR ALL EQUIPMENT SPECIFIED IN DIVISION 23 SHALL CONFORM TO THE SPECIFICATIONS. MISCELLANEOUS STEEL BRACING SUPPORTS AND REINFORCING STEEL NEEDED TO SUPPORT EQUIPMENT SPECIFIED IN DIVISION 23 SHALL BE FURNISHED AS PART OF SCOPE OF WORK OF DIVISION 23.
- PIPING CONNECTIONS TO MAJOR EQUIPMENT SHALL BE FABRICATED WITH ISOLATION VALVES, FLANGES, AND/OR UNIONS POSITIONED TO ALLOW REMOVAL AND SERVICE OF THE COMPONENT PARTS.
- THERMOMETER WELLS SHALL BE INSTALLED ON TOP OR SIDE OF HORIZONTAL PIPING IN ORDER TO RETAIN GAUGE FLUID AND SO AS TO BE EASILY READ FROM THE FLOOR.
- PRESSURE GAUGES SHALL BE INSTALLED ON THE TOP OR SIDE OF HORIZONTAL PIPING SO AS TO BE EASILY READ FROM THE FLOOR.
- CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO CUTTING ANY OPENING IN THE STRUCTURE.
- DRAWINGS ARE SCHEMATIC IN NATURE AND SHALL NOT BE SCALED. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING EXACT ROUTING OF ALL SERVICES WITH EXISTING CONDITIONS AND WITH ALL OTHER TRADES. REFER TO SPECIFICATIONS FOR SERVICE PRIORITY.
- COORDINATE ANY DEVICE REQUIRING AN ACCESS PANEL WITH THE OWNER.
- WHERE WORK IN RENOVATED AREAS AFFECTS SYSTEMS IN OTHER AREAS OF THE BUILDING, THE CONTRACTOR SHALL COORDINATE THIS WORK WITH THE OWNER. THIS WORK SHALL BE DONE TO FIT BUILDING OPERATIONAL SCHEDULE AND MINIMIZE DISRUPTION/DISCOMFORT TO OCCUPIED AREAS. PROVIDE 48 HOURS WRITTEN NOTICE WITH ANTICIPATED DURATION OF OUTAGE.
- ALL PENETRATIONS THROUGH RATED WALLS, FLOORS AND PARTITIONS MUST BE INSTALLED AND FIRESAFED TO MEET UL FIRE RESISTANCE LISTING DETAILS FOR THE PENETRATION.
- COORDINATE WITH ALL TRADES FOR REQUIRED CEILING REMOVAL IN EXISTING BUILDING. NOTIFY THE OWNER PRIOR TO COMMENCING REMOVAL. REMOVE ONLY THAT PORTION OF CEILING NECESSARY TO ACCESS AND COMPLETE THE NEW WORK. UPON COMPLETION OF THE ABOVE CEILING WORK, CEILING IS TO BE REINSTALLED. REPLACE ANY DAMAGED CEILING TILES WITH NEW TILES TO MATCH EXISTING.
- IN CENTRAL PLANTS AND MECHANICAL ROOMS, MAINTAIN A MINIMUM OF 6'-6" VERTICAL CLEARANCE IN AISLE WAYS, AND WALKWAYS TO OVERHEAD EQUIPMENT, PIPING, DUCTWORK, CONDUIT, ETC., WHEN POSSIBLE.
- PROVIDE EXPANSION JOINT AT EACH PIPE CROSSING AN INTERIOR BUILDING EXPANSION JOINT.
- MAINTAIN ACCESSIBILITY OF ALL EQUIPMENT, CONTROL PANELS, VALVES, AND OTHER DEVICES. PROVIDE ACCESS PANELS AS REQUIRED. COORDINATE PLACEMENT WITH THE ENGINEER/OWNER PRIOR TO INSTALLATION.

MECHANICAL DEMOLITION NOTES

- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE CONDITION OF ALL EXISTING EQUIPMENT, EXACT SIZES OF EXISTING DUCT AND PIPING, ETC. BEFORE DEMOLITION WORK IS BEGUN. REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL FIELD CONDITIONS TO OWNER AND ENGINEER PRIOR TO THE COMMENCEMENT OF DEMOLITION WORK.
- REMOVE THE INDICATED HVAC ITEMS AS SHOWN ON PLANS. THIS INCLUDES ALL HANGERS, STRAPS AND RELATED MATERIAL. IF THE OWNER WISHES TO UTILIZE THE EXISTING EQUIPMENT, CONTRACTOR SHALL MOVE THE EQUIPMENT TO AN ON-SITE LOCATION DESIGNATED BY THE OWNER. ALL EQUIPMENT REFUSED BY OWNER SHALL BE DISPOSED OF IN A MANNER ACCEPTABLE BY LOCAL JURISDICTION. ITEMS SHOWN TO BE REMOVED SHALL NOT BE ABANDONED IN PLACE.
- CAP AND SEAL AIR TIGHT ALL POINTS AT WHICH DUCTWORK IS REMOVED FROM DUCTWORK THAT WILL REMAIN. RE-INSULATE REMAINING DUCTWORK TO MAINTAIN VAPOR BARRIER.
- CAP AND SEAL WATER TIGHT ALL POINTS WHERE PIPING IS REMOVED. RE-INSULATE REMAINING PIPING TO MAINTAIN VAPOR BARRIER.
- PATCH OPENINGS IN WALLS WITH LIKE MATERIALS TO MAINTAIN THE INTEGRITY OF THE WALL WHERE AIR DEVICES, DUCTS, PIPING, ETC. HAVE BEEN REMOVED.
- CONTRACTOR SHALL VERIFY CLEARANCE REQUIREMENTS AND INDICATE ROUTING OF NEW DUCTWORK BEFORE FABRICATION BEGINS AS RISES AND DROPS MAY BE NECESSARY DUE TO EXISTING FIELD CONDITIONS.
- CONTRACTOR SHALL VERIFY ALL EXISTING TO REMAIN FIRE, SMOKE, AND COMBINATION FIRE/SMOKE DAMPERS AND DUCT SMOKE DETECTORS IN THE PROJECT AREA ARE IN PROPER WORKING CONDITION. CONTRACTOR TO NOTIFY ENGINEER AND OWNER OF ANY EXISTING EQUIPMENT FOUND INOPERABLE.
- CONTRACTOR TO VERIFY ALL MOTORS, MANUAL AND MOTORIZED VALVES, TEMPERATURE SENSORS AND CONTROLS IN THE PROJECT AREA SHOWN AS EXISTING TO REMAIN ARE IN PROPER WORKING CONDITION. CONTRACTOR TO NOTIFY ENGINEER AND OWNER OF ANY EXISTING EQUIPMENT FOUND INOPERABLE.

MECHANICAL EQUIPMENT ROOM NOTES

- DO NOT BLOCK COIL OR TUBE PULL SERVICE SPACE WITH PIPING, DUCTWORK, CONDUIT, OR OTHER COMPONENTS. FLANGED OR REMOVABLE SECTIONS MAY BE USED IN INSTANCES WHERE TIGHT CLEARANCES EXIST. REMOVABLE COMPONENTS SHALL NOT IMPACT THE OPERATION OF ADJACENT EQUIPMENT.
- MAINTAIN MINIMUM 6'-8" HIGH CLEARANCE ABOVE AISLE WAYS AND WALKWAYS IN MECHANICAL EQUIPMENT ROOMS.
- MAINTAIN VERTICAL CLEARANCE IN AISLE WAYS AND WALKWAYS IN CENTRAL PLANTS EQUAL TO OR GREATER THAN THE HEIGHT OF THE OUTSIDE OVERHEAD DOOR. MAINTAIN A MINIMUM CLEARANCE OF 6'-8" IN THE ABSENCE OF AN OVERHEAD DOOR.
- EQUIPMENT SIZES AND SERVICE SPACE REQUIREMENTS VARY BETWEEN MANUFACTURERS. CONSULT MANUFACTURER AS SUBMITTED AND APPROVED FOR APPLICATION WITHIN CENTRAL PLANTS AND MECHANICAL EQUIPMENT ROOMS.
- SEAL ALL WALLS, ROOF, AND FLOOR PENETRATIONS AIR TIGHT WHERE DUCTWORK, PIPING, AND CONDUIT PENETRATE.
- ALL CAPPED PIPING SHALL BE IDENTIFIED WITH STENCILED SERVICE TYPE WITHIN 36" OF CAP.
- INSTALL 4" CONCRETE CURBS AROUND DUCT AND PIPING PENETRATIONS AT FLOOR.
- PIPE EQUIPMENT DRAIN LINES TO NEAREST FLOOR DRAIN. REFER TO PLUMBING DRAWINGS FOR LOCATIONS OF DRAINS.
- PROVIDE CHAIN WHEEL OPERATORS ON VALVES LOCATED MORE THAN 7'-0" ABOVE FINISHED FLOOR.
- INSTALL FLOW METERS WITH MANUFACTURER REQUIRED STRAIGHT PIPE UP AND DOWNSTREAM, UNLESS OTHERWISE NOTED.
- PIPE ALL RELIEF VALVES INDEPENDENTLY TO OUTSIDE OF BUILDING UNLESS NOTED OTHERWISE. TERMINATE A MINIMUM OF 25 FEET FROM ANY OPENING OR INTAKE.
- PIPING TO PURGE UNIT AND OIL COOLER ON REFRIGERATION MACHINES SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- MOUNT CHEMICAL FEED PUMPS ON WALL TO ALLOW 50 GALLON DRUMS TO FIT UNDERNEATH.

CONTROLS LEGEND

AI	Analog Input
AO	Analog Output
BDFM	Bi-Directional Flow Meter
DI	Digital Input
DO	Digital Output
CH	Chiller
T	Temperature
CV	Control Valve
BFIV	Butterfly Isolation Valve
BV	Balance Valve
IP	Internet Protocol
M/IV	Modulating/Isolation Control Valve
MV	Modulating Control Valve
P	Pump
VFD	Variable Frequency Drive
WCM	Water Chilling Machine
Str	Starter
HX	Heat Exchanger
DP	DP Differential Pressure

Notes:
Piping diagrams are not to scale and diagrammatic only. Refer to mechanical drawings for piping installation requirements and details.

NO.	DATE	DESCRIPTION
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**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

**MECHANICAL GENERAL
NOTES AND LEGENDS**

DRAWN BY: FN
DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO:
MO.1

ELECTRICAL KEYED NOTES

- ① PROPOSED LOCATION FOR ELECTRICAL SERVICE.

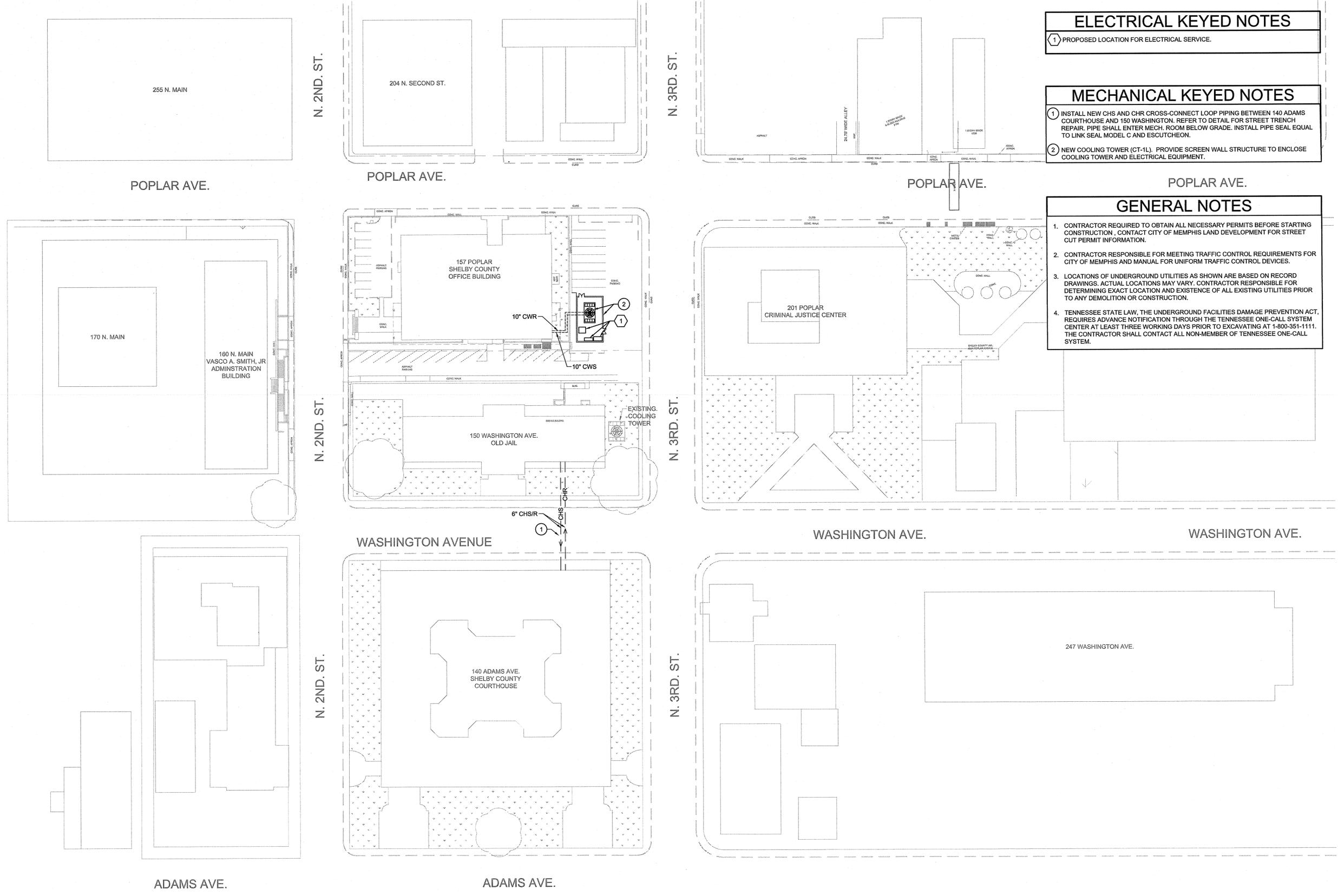
MECHANICAL KEYED NOTES

- ① INSTALL NEW CHS AND CHR CROSS-CONNECT LOOP PIPING BETWEEN 140 ADAMS COURTHOUSE AND 150 WASHINGTON. REFER TO DETAIL FOR STREET TRENCH REPAIR. PIPE SHALL ENTER MECH. ROOM BELOW GRADE. INSTALL PIPE SEAL EQUAL TO LINK SEAL MODEL C AND ESCUTCHEON.
- ② NEW COOLING TOWER (CT-1L). PROVIDE SCREEN WALL STRUCTURE TO ENCLOSE COOLING TOWER AND ELECTRICAL EQUIPMENT.

GENERAL NOTES

- 1. CONTRACTOR REQUIRED TO OBTAIN ALL NECESSARY PERMITS BEFORE STARTING CONSTRUCTION. CONTACT CITY OF MEMPHIS LAND DEVELOPMENT FOR STREET CUT PERMIT INFORMATION.
- 2. CONTRACTOR RESPONSIBLE FOR MEETING TRAFFIC CONTROL REQUIREMENTS FOR CITY OF MEMPHIS AND MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES.
- 3. LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN ARE BASED ON RECORD DRAWINGS. ACTUAL LOCATIONS MAY VARY. CONTRACTOR RESPONSIBLE FOR DETERMINING EXACT LOCATION AND EXISTENCE OF ALL EXISTING UTILITIES PRIOR TO ANY DEMOLITION OR CONSTRUCTION.
- 4. TENNESSEE STATE LAW, THE UNDERGROUND FACILITIES DAMAGE PREVENTION ACT, REQUIRES ADVANCE NOTIFICATION THROUGH THE TENNESSEE ONE-CALL SYSTEM CENTER AT LEAST THREE WORKING DAYS PRIOR TO EXCAVATING AT 1-800-351-1111. THE CONTRACTOR SHALL CONTACT ALL NON-MEMBER OF TENNESSEE ONE-CALL SYSTEM.

1 SITE PLAN
1" = 50'-0"



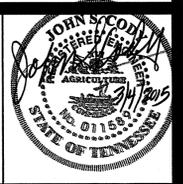
NO.	DATE	DESCRIPTION

**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

**MECHANICAL
SITE PLAN**

DRAWN BY: MW
DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
MS1.0

REFRIGERATION MACHINE SCHEDULE

NO.	TYPE	MANUFACTURER	MODEL NO.	REFRIG. CAPACITY (TONS)	COOLER					CONDENSER					COMPRESSOR TYPE			UNIT ELECTRICAL			CHILLER EFFICIENCY		CHILLER STARTER				120 VOLT CONTROLS	CHILLER OPER. WT. (EACH/LBS.)	REMARKS	
					GPM	E.W.T.	L.W.T.	PASSES	SCALE FACTOR	MAX PD. (FT)	GPM	E.W.T.	L.W.T.	PASSES	SCALE FACTOR	MAX PD. (FT)	ELEC.	R.L.A.	ELEC.	MCA	MOCP	FULL LOAD KW/TON(11)	NPLV (12)	TYPE	LOCATION	DISC. TYPE				ACCESSORIES
CH-1L	WATER COOLED CENTRIFUGAL	TRANE	CVHF0570	600	1300	53°F	42°F	2	0.0001	8.5	1,800	85°F	94.3°F	2	0.00025	17.7	460/3/60	470.3	460/3/60	564	1000A	0.565	0.356	①	ON CHILLER	⑨	③	③	28,332	⑤⑥⑦⑧⑩⑪⑫⑬⑭⑮
CH-3	WATER COOLED CENTRIFUGAL	TRANE	CVHE0400	300	600	56°F	44°F	3	0.0001	20	870	85°F	94.6°F	2	0.00025	16	460/3/60	229	460/3/60	272	450A	0.538	0.346	①	ON CHILLER	⑨	③	③	19,343	⑤⑥⑦⑧⑩⑪⑫⑬⑭⑮

(A) = CHILLED WATER THERMOSTAT (ONE PER CHILLER) **(1)** = UNIT MOUNTED ADAPTIVE FREQUENCY DRIVE **(6)** = ENSURE UNIT FITS IN THE EXISTING MECHANICAL ROOM AND ALL REQUIRED CLEARANCES ARE MAINTAINED **(13)** = PROVIDE SEISMIC SPRING ISOLATORS.
(B) = CONDENSER WATER FLOW SWITCH (ONE PER CHILLER) **(2)** = SINGLE PHASE MOTOR PROTECTION RELAY **(7)** = 10-YEAR COMPRESSOR PARTS WARRANTY **(14)** = CONTRACTOR SHALL EVALUATE SITE AND MECHANICAL ROOM CONDITIONS AND COORDINATE WITH CHILLER MANUFACTURER FOR DISASSEMBLY AND RE-ASSEMBLY OF CHILLER, AS REQUIRED, FOR MOVING CHILLER INTO MECHANICAL ROOM. CONTRACTOR SHALL ENGAGE CHILLER MANUFACTURER'S FACTORY AUTHORIZED AND TRAINED SERVICE ASSISTANCE IN THE DISASSEMBLY, RE-ASSEMBLY AND FIELD INSULATION OF THE CHILLER IN ORDER TO MEET AND MAINTAIN MANUFACTURER'S WARRANTY. CHILLER MANUFACTURER SHALL PROVIDE THEIR STANDARD FIELD DISASSEMBLY AND RE-ASSEMBLY KITS, AS REQUIRED.
(C) = CHILLED WATER FLOW SWITCH (ONE PER CHILLER) **(3)** = 120 VOLT CONTROL CIRCUIT TRANSFORMER **(8)** = FACTORY START-UP **(15)** = CHILLER SHALL BE CAPABLE OF OPERATION WITH CONDENSER WATER SUPPLY TEMPERATURE DOWN TO 70°F.
(4) = POWER FACTOR CORRECTION CAPACITORS **(9)** = FACTORY MOUNTED CIRCUIT BREAKER **(10)** = MARINE WATER BOXES ON CONDENSER AND EVAPORATOR.
(5) = ¾" FACTORY INSULATION OF ALL COLD PARTS OR FIELD INSULATION OF ALL COLD PARTS IF FIELD DISASSEMBLY/REASSEMBLY OF CHILLER IS REQUIRED. **(11)** = FULL LOAD KW/TON AT DESIGN CONDITIONS **(12)** = NPLV AS DEFINED BY ARI 550/590

NOTES:
 1. CHILLERS ARE IN PARALLEL CHILLED WATER AND CONDENSER WATER FLOW.
 2. FURNISH STARTER, COMPLETE WITH CONTROL CIRCUIT TRANSFORMER.

COOLING TOWER SCHEDULE

NO.	TYPE	NOM. CAP. TONS REFRIG. (1)	MANUFACTURER	MODEL NO.	GPM	E.W.T.	L.W.T.	E.W.B.	APPROXIMATE SIZE (L x W x H)	BASIN TYPE	APPROX. OPERATING WEIGHT (LBS.)	MOTOR				STARTER				ACCESSORIES	
												NO.	H.P.	RPM	EFFICIENCY AT 75% LOAD	ELEC.	TYPE	LOCATION	DISC. TYPE		ACCESS.
CT-1L	INDUCED DRAFT CROSS FLOW	600	BALTIMORE AIR COIL	XES3E-1222-100	1,800	95°F	85°F	80°F	11'x21'x16'	GALVANIZED	33370 (1)	1	30	1765	93.60%	460/3/60	VFD ⑨	AT COOLING TOWER	LINE OF SITE LOCKABLE	⑨	①②③④⑤⑥⑦⑧⑨⑩

(A) = COMBINATION MAG-X-LINE **(1)** = HAND RAIL **(6)** = ELECTRONIC WATER LEVEL CONTROLS **(10)** = PROVIDE SINGLE PIPE CONNECTION WITH SELF BALANCING INTERNAL PIPING TO HOT WATER BASIN BY MANUFACTURER
(B) = HAND-OFF-AUTO SWITCH, PILOT LIGHT, AND 120 VOLT CONTROL TRANSFORMER **(2)** = BASIN COVERS **(7)** = (2) 12 KW ELECTRIC BASIN HEATERS **(11)** = NEMA PREMIUM EFFICIENCY, INVERTER DUTY MOTOR FOR VFD
(3) = LADDER WITH CAGE **(8)** = AIR INLET SCREEN ON INTAKE LOUVERS **(12)** = INTERNAL WALKWAY W/ LADDER AND MOTOR ACCESS PLATFORM
(4) = FLOW CONTROL VALVES **(9)** = VFD IN NEMA 3R ENCLOSURE **(13)** = FAN SHALL BE BELT DRIVEN
(5) = SIDE OUTLET DEPRESSED SUMP BOX **(1)** = EXCLUDES STRUCTURAL STEEL SUPPORT.

PUMP SCHEDULE

QTY.	IDENT.	SYSTEM	APPLICATION	TYPE	MANUFACTURER	MODEL NO.	GPM	FEET HEAD	MOTOR				STARTER				REMARKS	
									MIN. H.P.	RPM	EFFICIENCY 100% LOAD	ELEC.	TYPE	LOCATION	DISC. TYPE	ACCESS.		
1	P-PL-1	CHILLED WATER SYSTEM	PRIMARY SYSTEM PUMP (DISTRICT LOOP)	VERTICAL IN-LINE	ARMSTRONG	SERIES 4300 0815 - 060.0	1,300	130	60	1,464	95.0%	460/3/60	VFD	157 POPLAR AVE. SHELBY COUNTY OFFICE BUILDING MECHANICAL ROOM	LINE OF SITE LOCKABLE	①②③④⑤⑥	STAND BY PUMP	
1	P-PL-2	CHILLED WATER SYSTEM	PRIMARY SYSTEM PUMP (DISTRICT LOOP)	VERTICAL IN-LINE	ARMSTRONG	SERIES 4300 0815 - 060.0	1,300	130	60	1,464	95.0%	460/3/60	VFD			①②③④⑤⑥		
1	P-CW-1	CONDENSER WATER SYSTEM	CONDENSER WATER PUMP	VERTICAL IN-LINE	ARMSTRONG	4300 0810-050.0	1,800	80	50	1,794	94.5%	460/3/60	VFD			①②③④⑤⑥		STAND BY PUMP
1	P-CW-2	CONDENSER WATER SYSTEM	CONDENSER WATER PUMP	VERTICAL IN-LINE	ARMSTRONG	4300 0810-050.0	1,800	80	50	1,794	94.5%	460/3/60	VFD			①②③④⑤⑥		
1	P-1	CHILLED WATER SYSTEM	CONDENSER WATER PUMP	VERTICAL IN-LINE	ARMSTRONG	4300 0610-060.0	1,800	130	60	1,740 @50% 2,647 @ 100%	93.6%	208/3/60	VFD	140 ADAMS SHELBY COUNTY COURT HOUSE MECHANICAL ROOM	①②③④⑤			

(1) = IF ANY POINT ON PUMP CURVE EXCEEDS THIS H.P. GO TO NEXT LARGER SIZE MOTOR AND INCLUDE IN PUMP. MOTOR MAY BE SMALLER IF IT IS NON-OVERLOADING. QUOTE ALL CHANGES TO STARTERS AND ELECTRICAL WORK. **(2)** = PROVIDE FACTORY MOUNTED CONTROL PANEL WITH STARTERS AND ACCESSORIES MOUNTED ON UNIT.
(3) = INVERTER DUTY MOTOR, NEMA PREMIUM EFFICIENCY **(4)** = VFD IN UL TYPE 12 ENCLOSURE FACTORY MOUNTED ON PUMP **(5)** = BMS PROTOCOL: BACNET
(6) = VFD USED FOR BALANCING FLOW

AIR AND DIRT ELIMINATION SYSTEM SCHEDULE

TAG	SYSTEM	LOCATION	MANUFACTURER	MODEL NO.	CONNL. SIZE	SYSTEM FLOW	MAX P.D.	DRAIN SIZE	MINIMUM DIMENSIONS	MAXIMUM VOLUME	OPER. WEIGHT	REMARKS
					INCH	GMP	FT	INCH	H x D x LF (INCH)	GALS	LBS	
ADS-1	DISTRICT COOLING LOOP	157 POPLAR AVENUE BUILDING	SPIROTHERM OR APPROVED EQUAL	VHT-800	8	1200	4.5	1	78.5 x 16 x 37.5	59	820	1,2,3,4,5,6,7,8
DS-1	CONDENSER WATER	157 POPLAR AVENUE BUILDING	SPIROTHERM OR APPROVED EQUAL	THT1000	10	1800	5.8	1	63.6 x 20 x 37.5	78.6	990	1,2,3,5,7

NOTES:
 1. PROVIDE COALESCING TYPE SEPARATORS. CENTRIFUGAL TYPE NOT ACCEPTED.
 2. VESSEL SHALL BE RATED FOR 150# WORKING PRESSURE AND BE FURNISHED WITH CLASS 150 STEEL WELD-NECK RAISED-FACE FLANGES.
 3. VESSELS WITH LOOSE OR PARTIALLY FILLED INTERNAL MEDIA NOT ACCEPTABLE.
 4. UNIT SHALL REMOVE 100% OF FREE AND ENTRAINED AIR AND 99.6% OF DISSOLVED AIR.
 5. UNIT SHALL REMOVE 80% OF THE 30 MICRON PARTICLES IN 100 CIRCULATIONS. UNIT CAPABLE OF 5 MICRON PARTICLE SIZE REMOVAL.
 6. TEMPERATURE, PRESSURE AND FLOW VELOCITY MUST BE HELD CONSTANT DURING INDEPENDENT PERFORMANCE TESTS.
 7. PROVIDE INTEGRAL FULL PORT FLOAT ACTUATED BRASS VENTING MECHANISM.
 8. PROVIDE AUTOMATIC BLOWDOWN VALVE.

SSR Smith Seckman Reid, Inc.
 2650 Thousand Oaks Blvd., Suite 3200
 Memphis, TN 38118
 (901) 683-3900
 FAX: (901) 683-3990
 www.ssr-inc.com

NO.	DATE	DESCRIPTION
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DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

MECHANICAL SCHEDULES

DRAWN BY: CH
 DESIGNED BY: JSC
 CHECKED BY: JSC
 Q.A.Q.C. BY: CBB



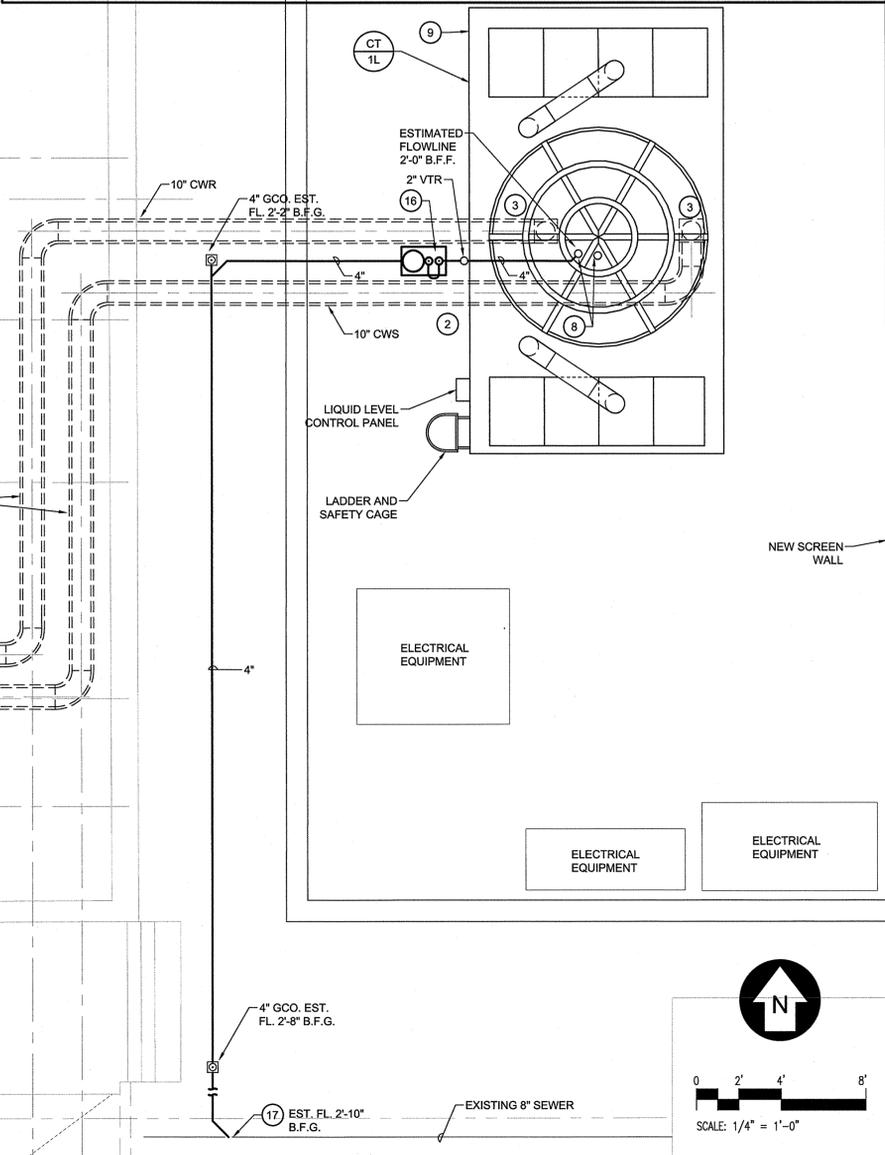
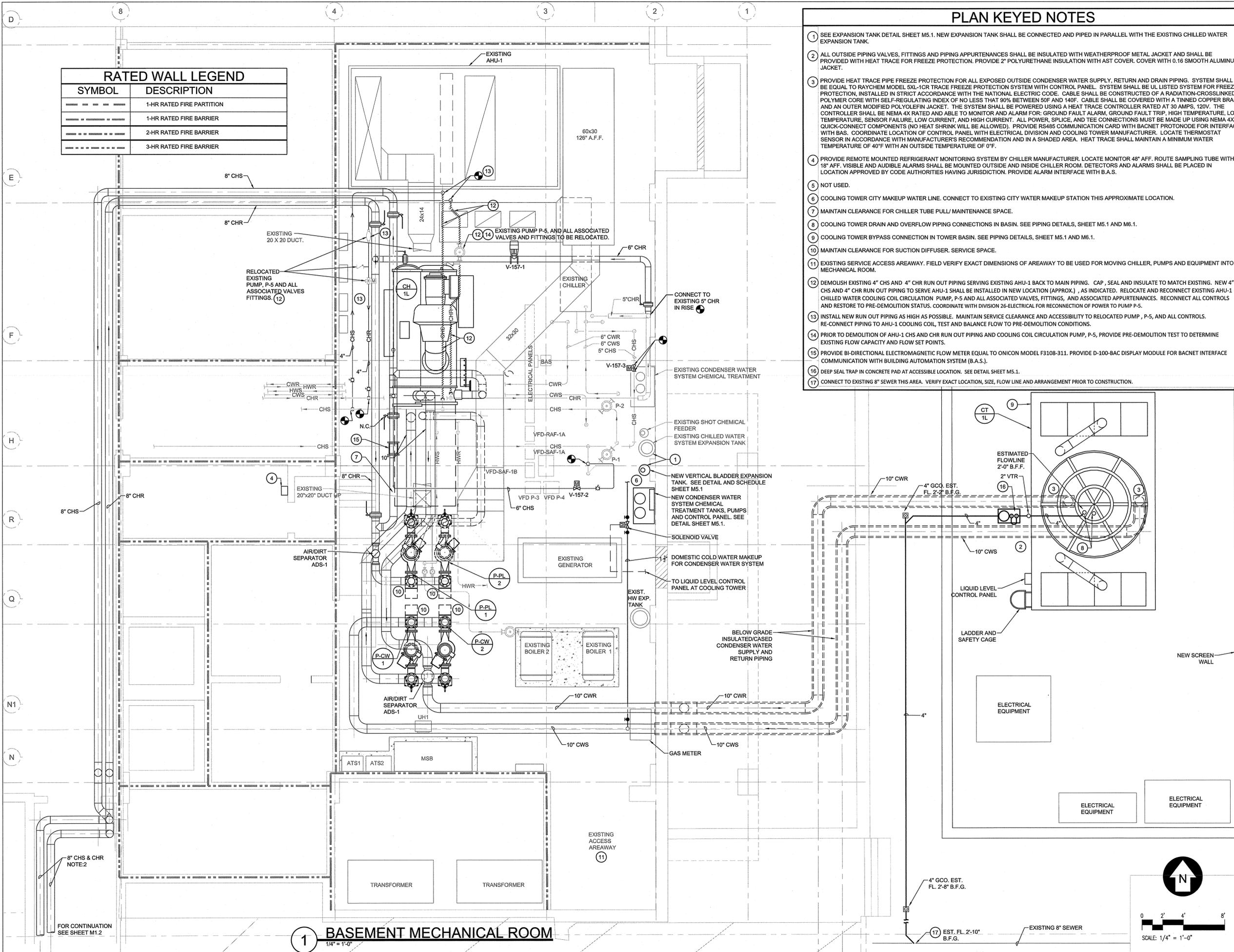
JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO.:
M1.0

RATED WALL LEGEND	
SYMBOL	DESCRIPTION
---	1-HR RATED FIRE PARTITION
---	1-HR RATED FIRE BARRIER
---	2-HR RATED FIRE BARRIER
---	3-HR RATED FIRE BARRIER

PLAN KEYED NOTES

- 1 SEE EXPANSION TANK DETAIL SHEET M5.1. NEW EXPANSION TANK SHALL BE CONNECTED AND PIPED IN PARALLEL WITH THE EXISTING CHILLED WATER EXPANSION TANK.
- 2 ALL OUTSIDE PIPING VALVES, FITTINGS AND PIPING APPURTENANCES SHALL BE INSULATED WITH WEATHERPROOF METAL JACKET AND SHALL BE PROVIDED WITH HEAT TRACE FOR FREEZE PROTECTION. PROVIDE 2" POLYURETHANE INSULATION WITH AST COVER. COVER WITH 0.16 SMOOTH ALUMINUM JACKET.
- 3 PROVIDE HEAT TRACE PIPE FREEZE PROTECTION FOR ALL EXPOSED OUTSIDE CONDENSER WATER SUPPLY, RETURN AND DRAIN PIPING. SYSTEM SHALL BE EQUAL TO RAYCHEM MODEL 5XL-1CR TRACE FREEZE PROTECTION SYSTEM WITH CONTROL PANEL. SYSTEM SHALL BE UL LISTED SYSTEM FOR FREEZE PROTECTION, INSTALLED IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRIC CODE. CABLE SHALL BE CONSTRUCTED OF A RADIATION-CROSSLINKED POLYMER CORE WITH SELF-REGULATING INDEX OF NO LESS THAN 90% BETWEEN 50F AND 140F. CABLE SHALL BE COVERED WITH A TINNED COPPER BRAID AND AN OUTER MODIFIED POLYOLEFIN JACKET. THE SYSTEM SHALL BE POWERED USING A HEAT TRACE CONTROLLER RATED AT 30 AMPS, 120V. THE CONTROLLER SHALL BE NEMA 4X RATED AND ABLE TO MONITOR AND ALARM FOR: GROUND FAULT ALARM, GROUND FAULT TRIP, HIGH TEMPERATURE, LOW TEMPERATURE, SENSOR FAILURE, LOW CURRENT, AND HIGH CURRENT. ALL POWER, SPICE, AND TEE CONNECTIONS MUST BE MADE UP USING NEMA 4X QUICK-CONNECT COMPONENTS (NO HEAT SHRINK WILL BE ALLOWED). PROVIDE RS485 COMMUNICATION CARD WITH BACNET PROTONODE FOR INTERFACE WITH BAS. COORDINATE LOCATION OF CONTROL PANEL WITH ELECTRICAL DIVISION AND COOLING TOWER MANUFACTURER. LOCATE THERMOSTAT SENSOR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND IN A SHADED AREA. HEAT TRACE SHALL MAINTAIN A MINIMUM WATER TEMPERATURE OF 40°F WITH AN OUTSIDE TEMPERATURE OF 0°F.
- 4 PROVIDE REMOTE MOUNTED REFRIGERANT MONITORING SYSTEM BY CHILLER MANUFACTURER. LOCATE MONITOR 48" AFF. ROUTE SAMPLING TUBE WITHIN 18" AFF. VISIBLE AND AUDIBLE ALARMS SHALL BE MOUNTED OUTSIDE AND INSIDE CHILLER ROOM. DETECTORS AND ALARMS SHALL BE PLACED IN LOCATION APPROVED BY CODE AUTHORITIES HAVING JURISDICTION. PROVIDE ALARM INTERFACE WITH B.A.S.
- 5 NOT USED.
- 6 COOLING TOWER CITY MAKEUP WATER LINE. CONNECT TO EXISTING CITY WATER MAKEUP STATION THIS APPROXIMATE LOCATION.
- 7 MAINTAIN CLEARANCE FOR CHILLER TUBE PULL/ MAINTENANCE SPACE.
- 8 COOLING TOWER DRAIN AND OVERFLOW PIPING CONNECTIONS IN BASIN. SEE PIPING DETAILS, SHEET M5.1 AND M6.1.
- 9 COOLING TOWER BYPASS CONNECTION IN TOWER BASIN. SEE PIPING DETAILS, SHEET M5.1 AND M6.1.
- 10 MAINTAIN CLEARANCE FOR SUCTION DIFFUSER. SERVICE SPACE.
- 11 EXISTING SERVICE ACCESS AREAWAY. FIELD VERIFY EXACT DIMENSIONS OF AREAWAY TO BE USED FOR MOVING CHILLER, PUMPS AND EQUIPMENT INTO MECHANICAL ROOM.
- 12 DEMOLISH EXISTING 4" CHS AND 4" CHR RUN OUT PIPING SERVING EXISTING AHU-1 BACK TO MAIN PIPING. CAP, SEAL AND INSULATE TO MATCH EXISTING. NEW 4" CHS AND 4" CHR RUN OUT PIPING TO SERVE AHU-1 SHALL BE INSTALLED IN NEW LOCATION (APPROX.), AS INDICATED. RELOCATE AND RECONNECT EXISTING AHU-1 CHILLED WATER COIL CIRCULATION PUMP, P-5 AND ALL ASSOCIATED VALVES, FITTINGS, AND ASSOCIATED APPURTENANCES. RECONNECT ALL CONTROLS AND RESTORE TO PRE-DEMOLITION STATUS. COORDINATE WITH DIVISION 26-ELECTRICAL FOR RECONNECTION OF POWER TO PUMP P-5.
- 13 INSTALL NEW RUN OUT PIPING AS HIGH AS POSSIBLE. MAINTAIN SERVICE CLEARANCE AND ACCESSIBILITY TO RELOCATED PUMP, P-5, AND ALL CONTROLS. RE-CONNECT PIPING TO AHU-1 COOLING COIL, TEST AND BALANCE FLOW TO PRE-DEMOLITION CONDITIONS.
- 14 PRIOR TO DEMOLITION OF AHU-1 CHS AND CHR RUN OUT PIPING AND COOLING COIL CIRCULATION PUMP, P-5, PROVIDE PRE-DEMOLITION TEST TO DETERMINE EXISTING FLOW CAPACITY AND FLOW SET POINTS.
- 15 PROVIDE BI-DIRECTIONAL ELECTROMAGNETIC FLOW METER EQUAL TO ONICON MODEL F3108-311. PROVIDE D-100-BAC DISPLAY MODULE FOR BACNET INTERFACE COMMUNICATION WITH BUILDING AUTOMATION SYSTEM (B.A.S.).
- 16 DEEP SEAL TRAP IN CONCRETE PAD AT ACCESSIBLE LOCATION. SEE DETAIL SHEET M5.1.
- 17 CONNECT TO EXISTING 8" SEWER THIS AREA. VERIFY EXACT LOCATION, SIZE, FLOW LINE AND ARRANGEMENT PRIOR TO CONSTRUCTION.



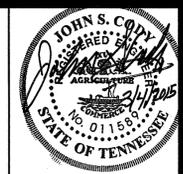
NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

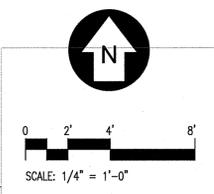
BASEMENT MECH. ROOM 157
 POPLAR AVE SHELBY COUNTY
 OFFICE BLDG

DRAWN BY: MW
 DESIGNED BY: JSC
 CHECKED BY: JSC
 Q.A.Q.C. BY: CCB



JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

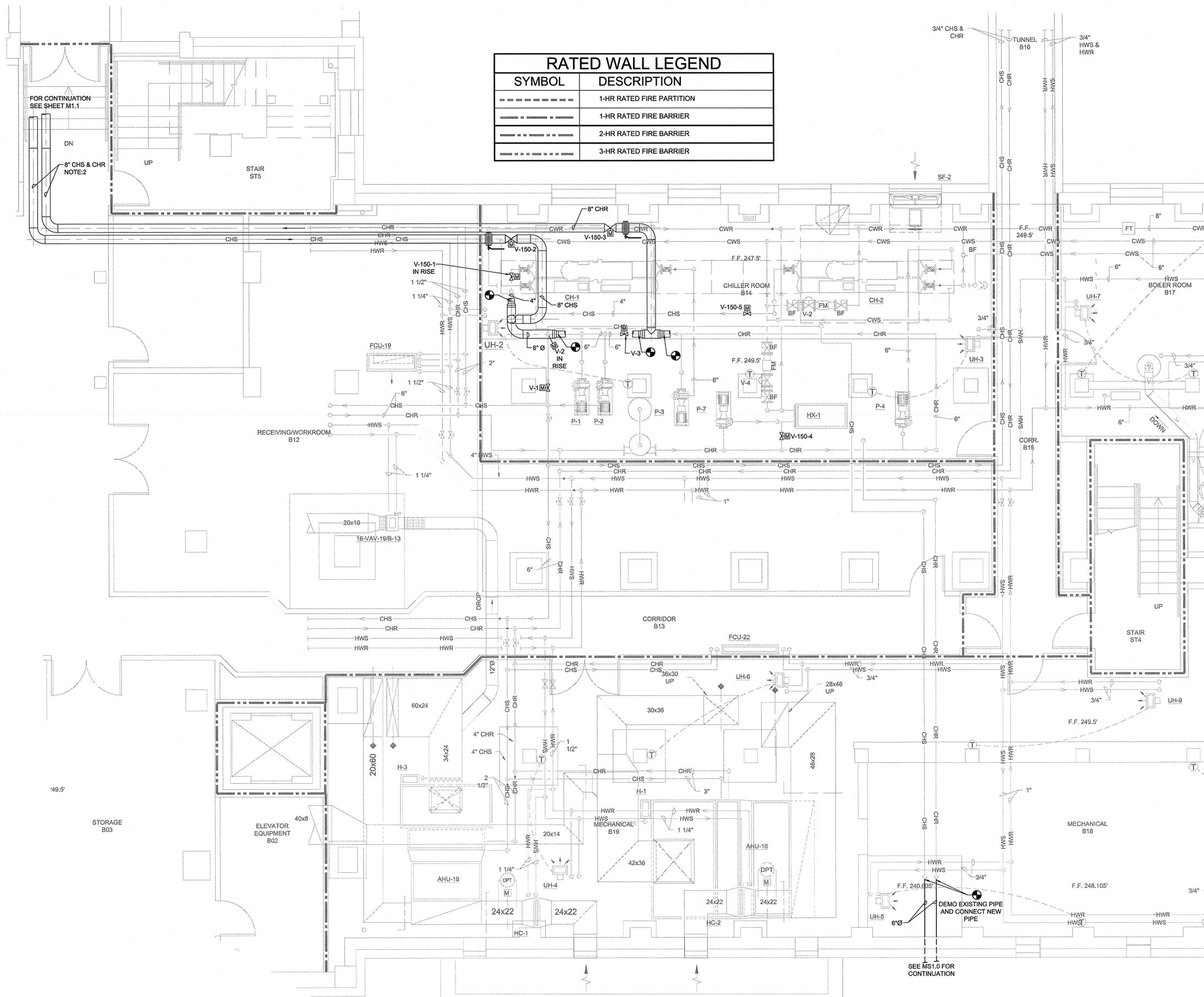
DRAWING NO:
M1.1



1 BASEMENT MECHANICAL ROOM
 1/4" = 1'-0"

FOR CONTINUATION SEE SHEET M1.2

RATED WALL LEGEND	
SYMBOL	DESCRIPTION
---	1-HR RATED FIRE PARTITION
----	1-HR RATED FIRE BARRIER
-----	2-HR RATED FIRE BARRIER
-----	3-HR RATED FIRE BARRIER



NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

PARTIAL BASEMENT FLOOR PLAN MECHANICAL
150 WASHINGTON AVE.
OLD JAIL

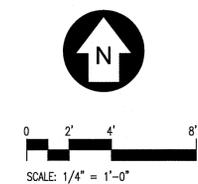
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DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB

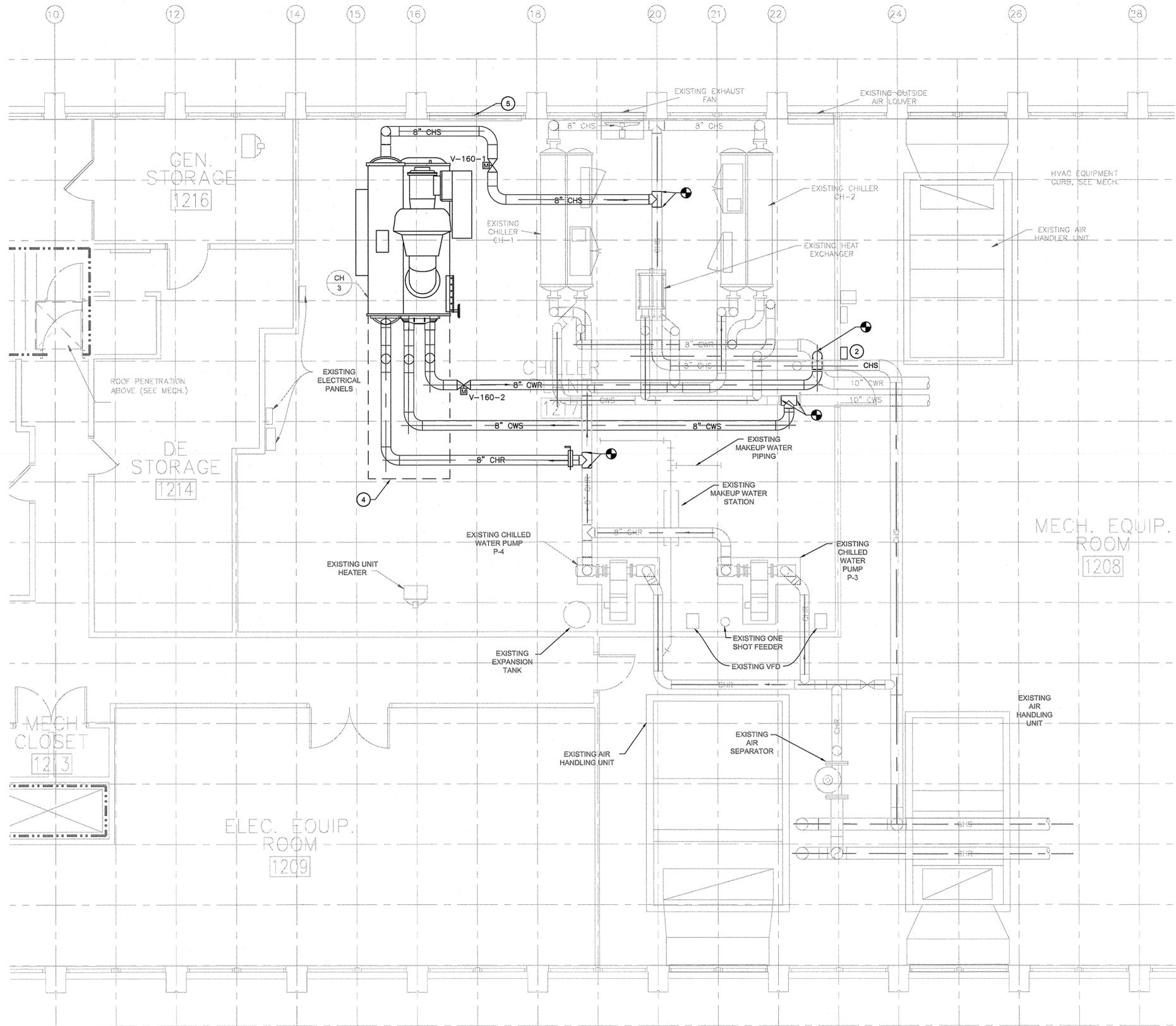


JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
M1.2

1 PARTIAL BASEMENT FLOOR PLAN MECHANICAL
1/4" = 1'-0"





- ### PLAN KEYED NOTES
- 1 FOR GENERAL NOTES SEE SHEET M0.1
 - 2 PROVIDE REMOTE MOUNTED REFRIGERANT MONITORING SYSTEM BY CHILLER MANUFACTURER. LOCATE MONITOR 48" AFF. ROUTE SAMPLING TUBE WITHIN 18" AFF. VISIBLE AND AUDIBLE ALARMS SHALL BE MOUNTED OUTSIDE AND INSIDE CHILLER ROOM. DETECTORS AND ALARMS SHALL BE PLACED IN LOCATIONS APPROVED BY CODE AUTHORITIES HAVING JURISDICTION. PROVIDE ALARM INTERFACE WITH B.A.S.
 - 3 NOT USED.
 - 4 MAINTAIN CLEARANCE FOR CHILLER TUBE PULL / MAINTENANCE SPACE.
 - 5 EXISTING REMOVABLE, OUTSIDE WALL ACCESS PANEL: 92" WIDE X 87" HIGH (APPROX.). FIELD VERIFY EXACT OPENING SIZE OF ACCESS TO BE USED FOR MOVING CHILLER INTO MECHANICAL ROOM.

RATED WALL LEGEND

SYMBOL	DESCRIPTION
-----	1-HR RATED FIRE PARTITION
-----	1-HR RATED FIRE BARRIER
-----	2-HR RATED FIRE BARRIER
-----	3-HR RATED FIRE BARRIER

SSR Smith
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www.ssr-inc.com

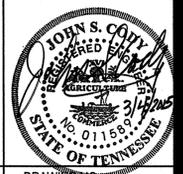
NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

12TH FLOOR NORTH MECHANICAL
PLAN 160 N. MAIN ST.
ADMINISTRATION

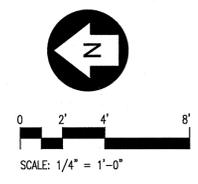
DRAWN BY: MW
DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
M1.3

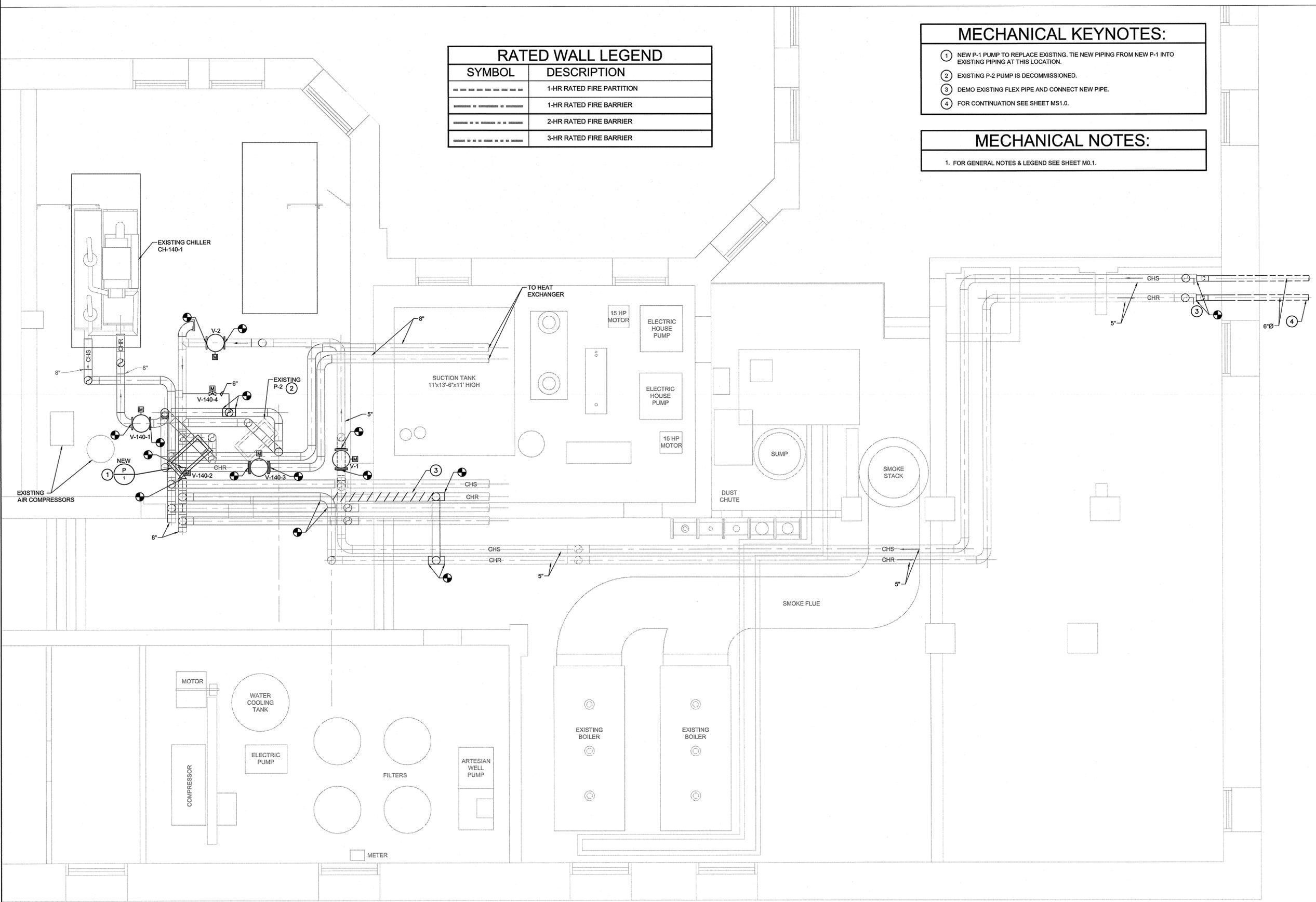
1 12TH FLOOR NORTH MECHANICAL PLAN
1/4" = 1'-0"



RATED WALL LEGEND	
SYMBOL	DESCRIPTION
---	1-HR RATED FIRE PARTITION
---	1-HR RATED FIRE BARRIER
---	2-HR RATED FIRE BARRIER
---	3-HR RATED FIRE BARRIER

- MECHANICAL KEYNOTES:**
- NEW P-1 PUMP TO REPLACE EXISTING. TIE NEW PIPING FROM NEW P-1 INTO EXISTING PIPING AT THIS LOCATION.
 - EXISTING P-2 PUMP IS DECOMMISSIONED.
 - DEMO EXISTING FLEX PIPE AND CONNECT NEW PIPE.
 - FOR CONTINUATION SEE SHEET MS1.0.

- MECHANICAL NOTES:**
- FOR GENERAL NOTES & LEGEND SEE SHEET M0.1.



NO.	DATE	DESCRIPTION

**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

PARTIAL BASEMENT FLOOR PLAN
MECHANICAL 140 ADAMS AVE.
SHELBY COUNTY

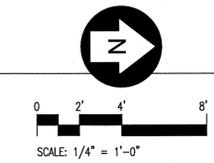
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DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB

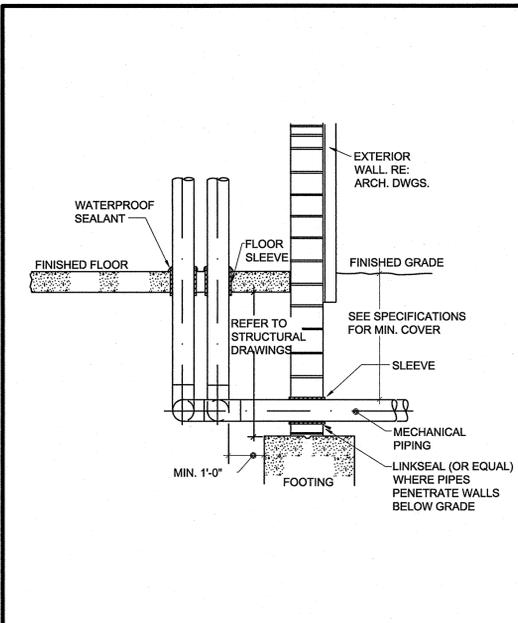


JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

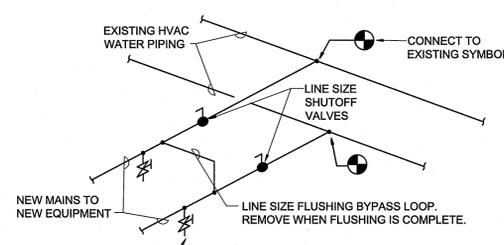
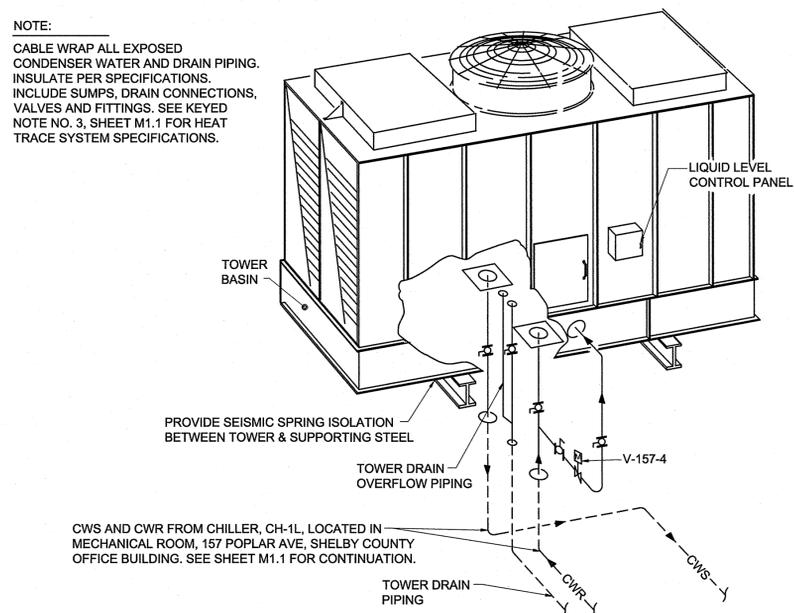
DRAWING NO:
M1.4

1 PARTIAL BASEMENT FLOOR PLAN MECHANICAL
1/4" = 1'-0"

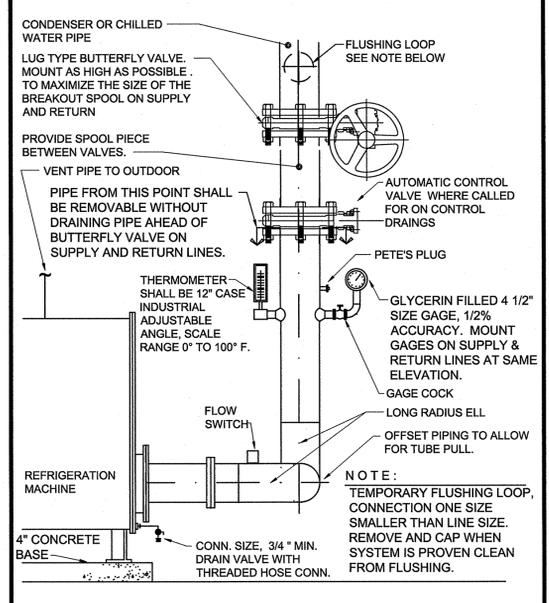




NOTE:
 CABLE WRAP ALL EXPOSED CONDENSER WATER AND DRAIN PIPING. INSULATE PER SPECIFICATIONS. INCLUDE SUMPS, DRAIN CONNECTIONS, VALVES AND FITTINGS. SEE KEYED NOTE NO. 3, SHEET M1.1 FOR HEAT TRACE SYSTEM SPECIFICATIONS.



PIPE SIZE	DRAIN VALVE SIZE
UP TO 2"	3/4"
2 1/2" TO 4"	1 1/4"
5" TO 8"	2"
OVER 8"	2 1/2"

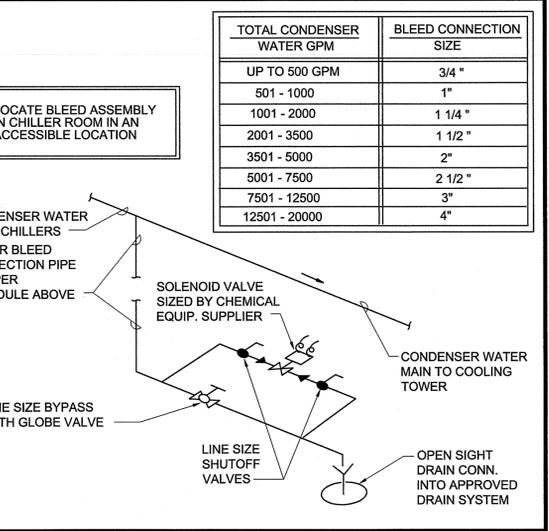
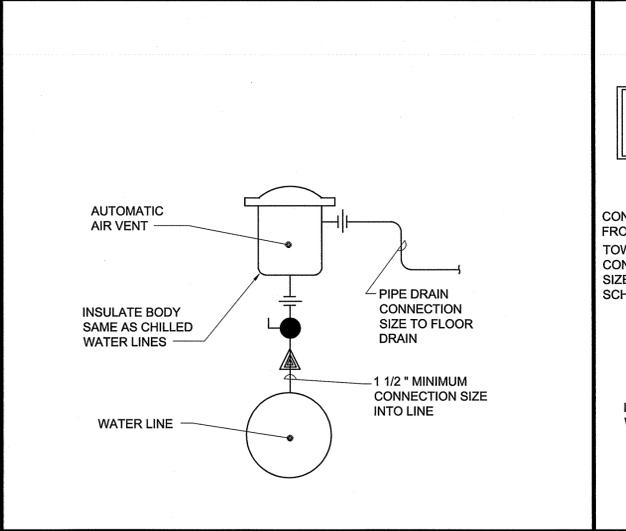
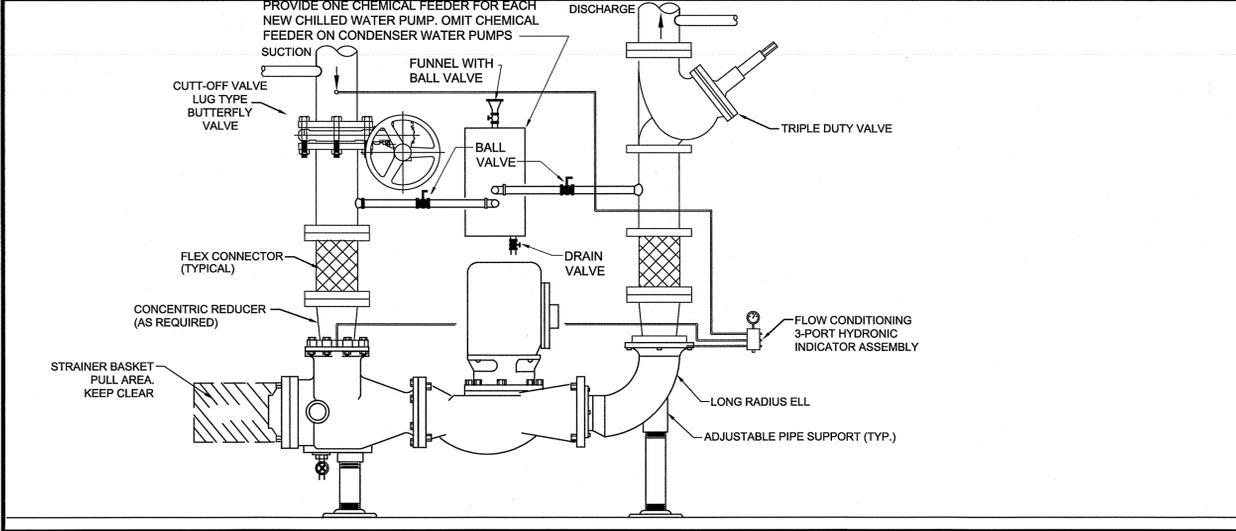


PIPING ENTRANCE

1 PIPING AT INDUCED DRAFT COOLING TOWER

2 NEW HVAC WATER PIPE CONNECTIONS TO EXISTING PIPING

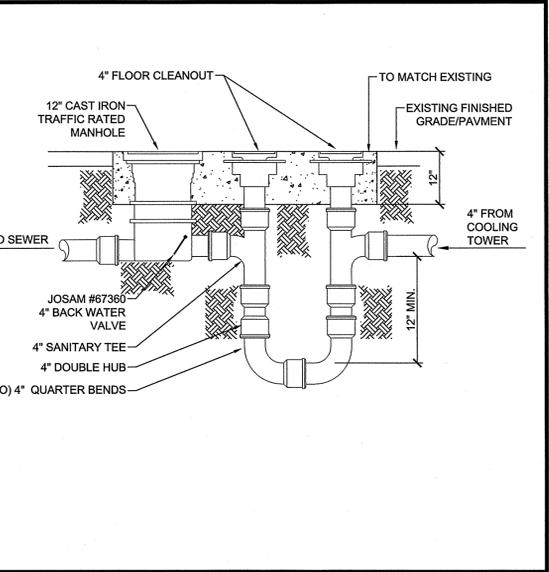
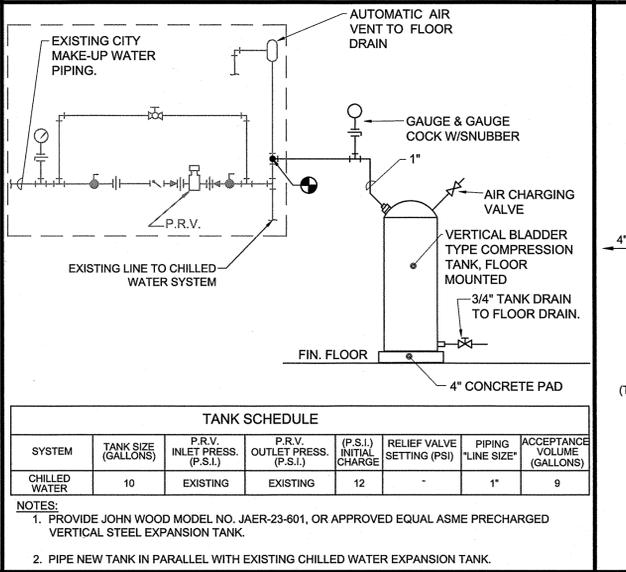
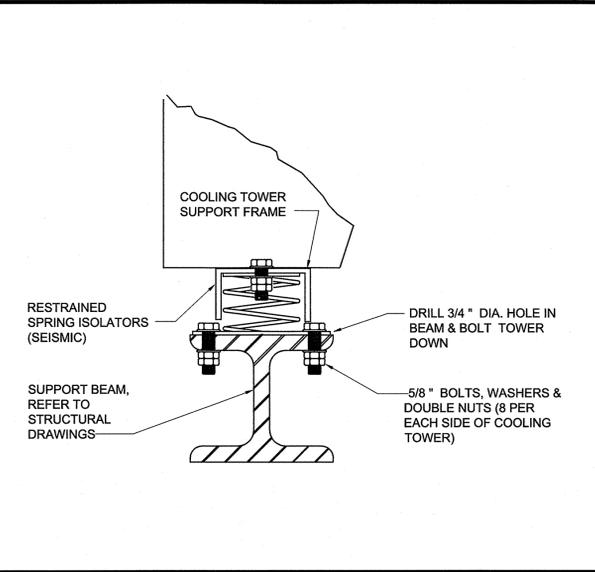
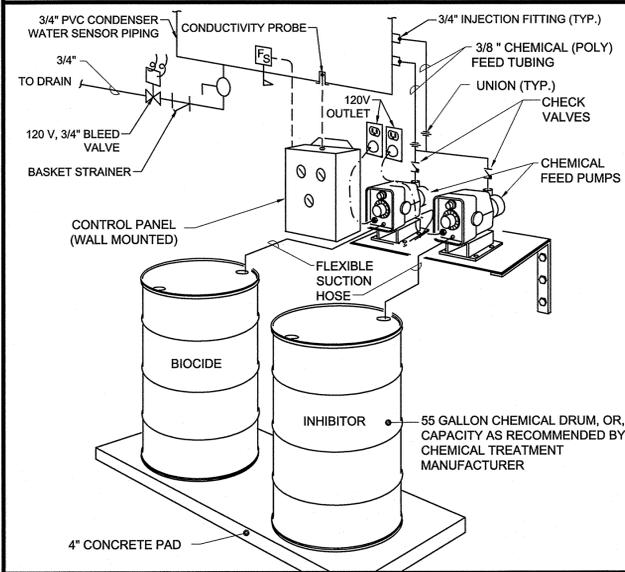
3 CHILLED AND CONDENSER WATER PIPING AT REFRIGERATION MACHINE (4 PER MACHINE)



VERTICAL IN-LINE WATER PUMP

5 AUTOMATIC AIR VENT

6 COOLING TOWER BLEED CONNECTION



COOLING TOWER CHEMICAL FEED PUMP

8 COOLING TOWER SUPPORT

9 PIPING AT FLOOR MOUNTED BLADDER EXPANSION TANK

10 DEEP SEAL TRAP DETAIL

NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

MECHANICAL DETAILS

DRAWN BY: MP
 DESIGNED BY: JSC
 CHECKED BY: JSC
 Q.A.Q.C. BY: CBB

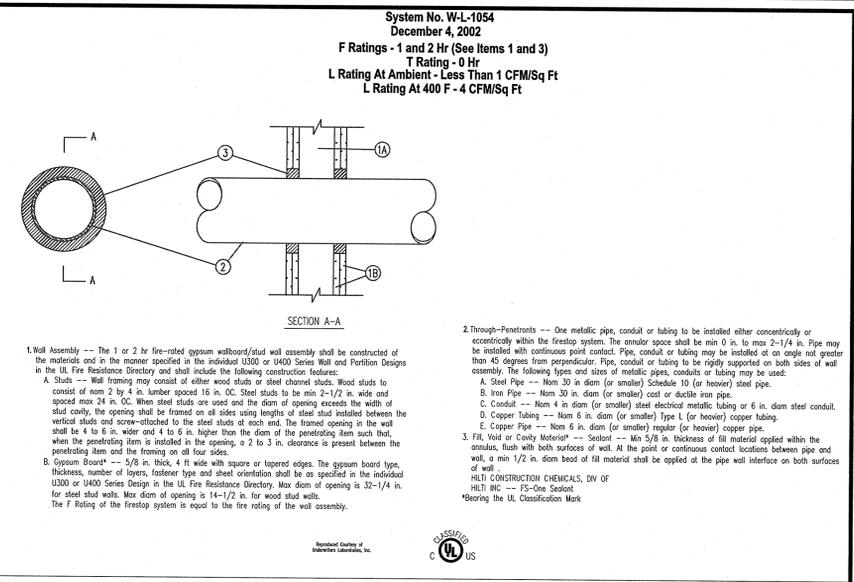


JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO.: M5.1

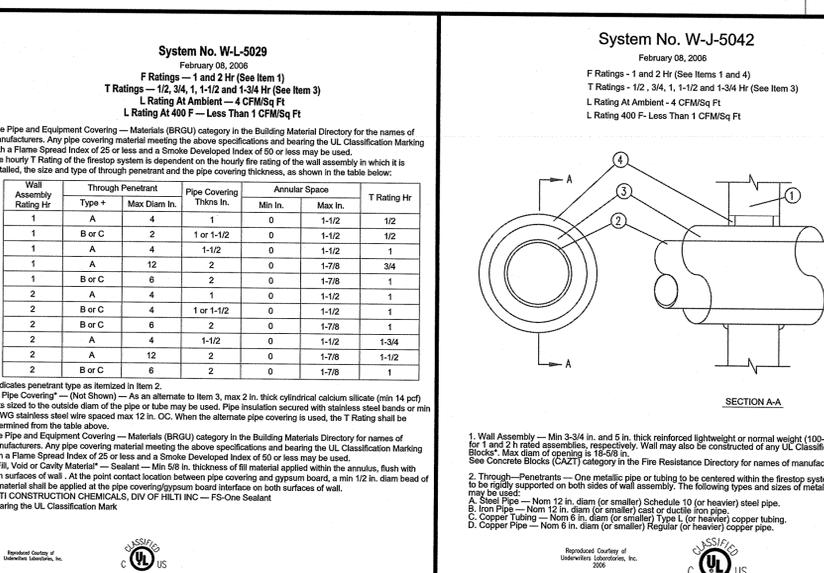
WALL PENETRATION NOTES:

1. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF FIRE STOPPING WITH THE EXISTING BUILDING FIRE RATED WALLS AND PARTITION.
2. PROVIDE EQUIPMENT AND MATERIALS BY MANUFACTURE SPECIFIED OR APPROVED EQUAL.

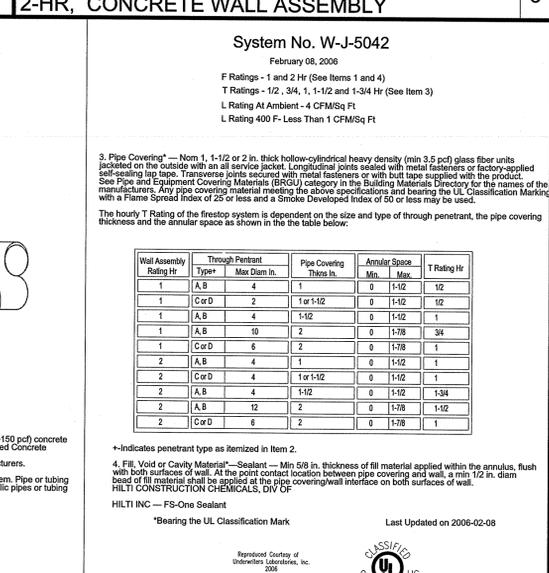


METAL PIPE THROUGH 1-HR, OR 2-HR, GYPSUM WALL ASSEMBLY

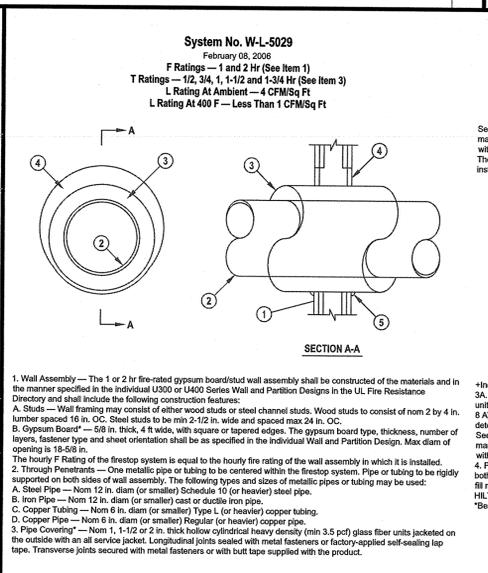
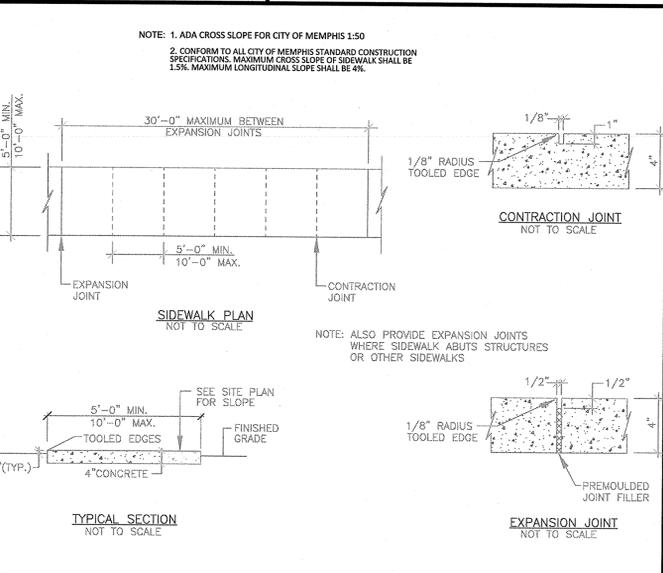
1 INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE SLAB



2 INSULATED METAL PIPE THROUGH 1-HR, OR 2-HR, CONCRETE WALL ASSEMBLY



3 METAL PIPE THROUGH 1-HR, OR 2-HR, GYPSUM WALL ASSEMBLY

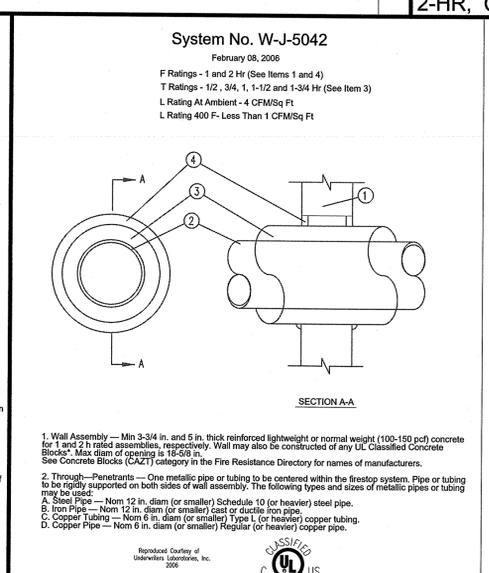


System No. W-L-5029
February 08, 2006
F Ratings --- 1 and 2 Hr (See Item 1)
T Ratings --- 1/2, 3/4, 1, 1-1/2 and 1-3/4 Hr (See Item 3)
L Rating At Ambient --- 4 CFM/Sq Ft
L Rating At 400 F --- Less Than 1 CFM/Sq Ft

See Pipe and Equipment Covering --- Materials (BRGU) category in the Building Materials Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
The hourly T Rating of the freestop system is dependent on the hourly fire rating of the wall assembly in which it is installed, the size and type of through penetrant and the pipe covering thickness, as shown in the table below:

Wall Assembly Rating Hr	Through Penetrant Type + Max Diam In.	Pipe Covering Thkns In.	Annular Space		T Rating Hr
			Min In.	Max In.	
1	A	4	1	0	1-1/2
1	B or C	2	1 or 1-1/2	0	1-1/2
1	A	4	1-1/2	0	1-1/2
1	A	12	2	0	1-7/8
1	B or C	6	2	0	1-7/8
2	A	4	1	0	1-1/2
2	B or C	4	1 or 1-1/2	0	1-1/2
2	A	4	1-1/2	0	1-3/4
2	A	12	2	0	1-7/8
2	B or C	6	2	0	1-7/8

*Indicates penetrant type as itemized in Item 2.
3A. Pipe Covering --- (Not Shown) --- As an alternate to Item 3, max 2 in. thick cylindrical calcium silicate (min 14 pcf) units sized to the outside diam of the pipe or tube may be used. Pipe insulation covered with stainless steel bands or min 8 AWG stainless steel wire spaced max 12 in. OC. When the alternate pipe covering is used, the T Rating shall be determined from the table above.
See Pipe and Equipment Covering --- Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. Fill, Void or Cavity Material --- Sealant --- Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point of continuous contact between pipe covering and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe covering/wall interface on both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC --- FS-One Sealant
*Bearing the UL Classification Mark



System No. W-J-5042
February 08, 2006
F Ratings - 1 and 2 Hr (See Items 1 and 4)
T Ratings - 1/2, 3/4, 1, 1-1/2 and 1-3/4 Hr (See Item 3)
L Rating At Ambient - 4 CFM/Sq Ft
L Rating 400 F - Less Than 1 CFM/Sq Ft

3. Pipe Covering --- Nom 1, 1-1/2 or 2 in. thick hollow-cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing top tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. See Pipe and Equipment Covering Materials (BRGU) category in the Building Materials Directory for the names of the manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
The hourly T Rating of the freestop system is dependent on the size and type of through penetrant, the pipe covering thickness and the annular space shown in the table below:

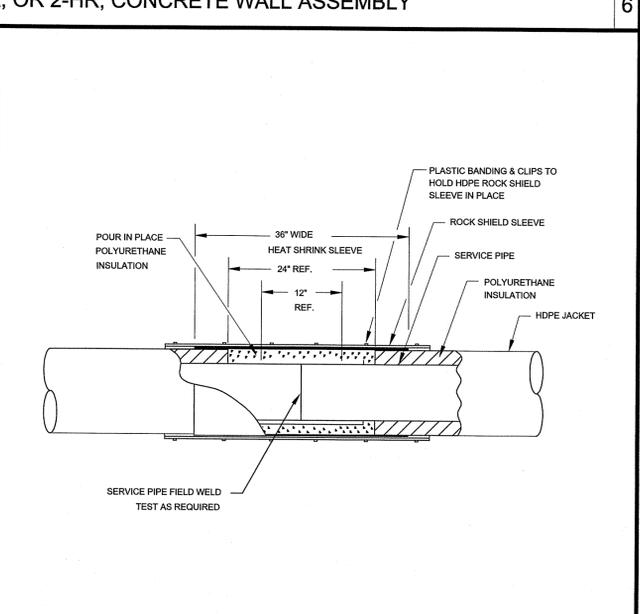
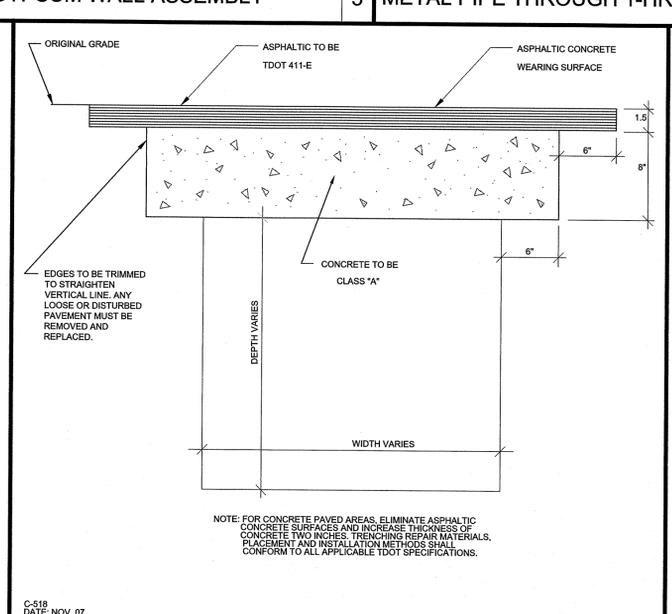
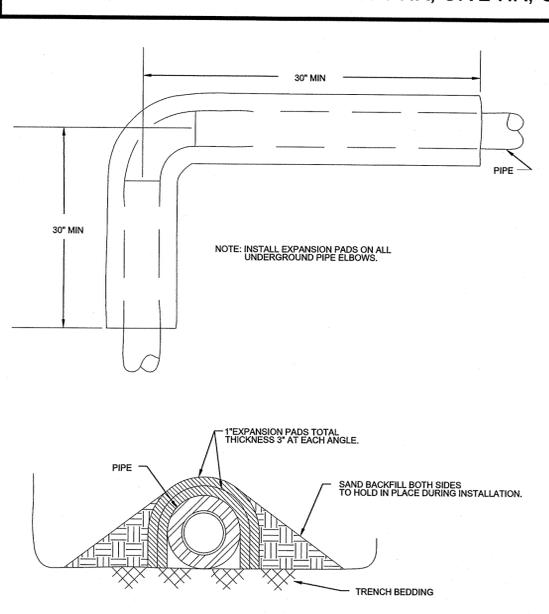
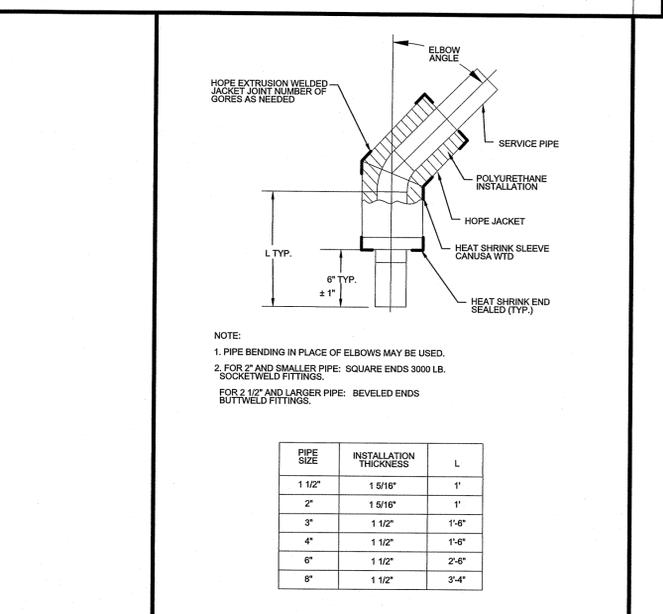
Wall Assembly Rating Hr	Through Penetrant Type + Max Diam In.	Pipe Covering Thkns In.	Annular Space		T Rating Hr
			Min In.	Max In.	
1	A,B	4	1	0	1-1/2
1	C or D	2	1 or 1-1/2	0	1-1/2
1	A,B	4	1-1/2	0	1-1/2
1	A,B	10	2	0	1-7/8
1	C or D	6	2	0	1-7/8
2	A,B	4	1	0	1-1/2
2	C or D	4	1 or 1-1/2	0	1-1/2
2	A,B	4	1-1/2	0	1-3/4
2	A,B	12	2	0	1-7/8
2	C or D	6	2	0	1-7/8

*Indicates penetrant type as itemized in Item 2.
4. Fill, Void or Cavity Material --- Sealant --- Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point of continuous contact between pipe covering and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe covering/wall interface on both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC --- FS-One Sealant
*Bearing the UL Classification Mark
Last Updated on 2006-02-08

4 SIDEWALK REPAIR

5 INSULATED METAL PIPE THROUGH 1-HR, OR 2-HR, GYPSUM WALL ASSEMBLY

6 METAL PIPE THROUGH 1-HR, OR 2-HR, CONCRETE WALL ASSEMBLY



7 ELBOW FOR UNDERGROUND PIPE

8 EXPANSION PADS FOR UNDERGROUND PIPE

9 TYPICAL TRENCHING REPAIR

10 UNDERGROUND PIPE FIELD JOINT

SSR Smith Seckman Reid, Inc.
2650 Thousand Oaks Blvd., Suite 3200
Memphis, TN 38118
(901) 683-3900
FAX: (901) 683-3990
www.ssr-inc.com

NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

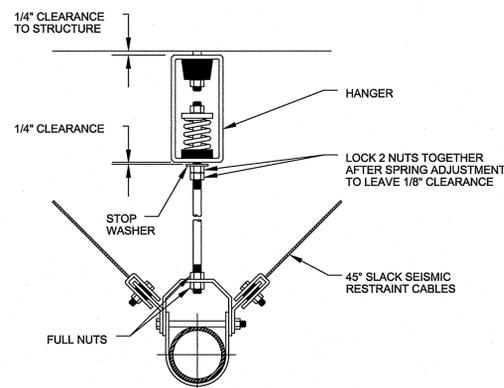
MEMPHIS TN, 38103

MECHANICAL DETAILS

DRAWN BY: MP
DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB

JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

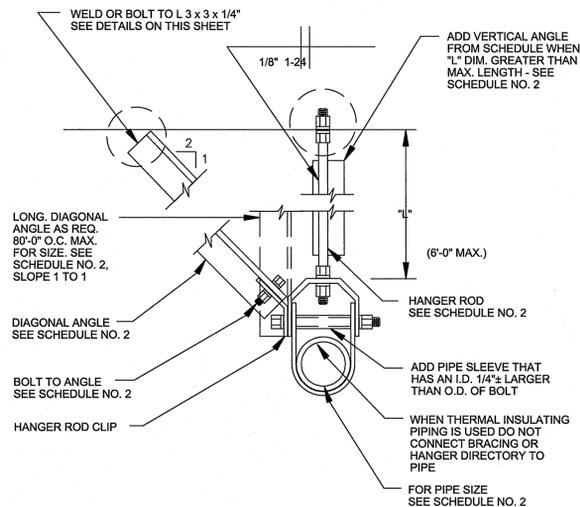
DRAWING NO.: M5.2



SEISMIC PIPE SUSPENSION DETAIL

(NOT TO SCALE)

1



TYPICAL PIPE BRACING

SCHEDULE NO. 2 BRACING FOR PIPING

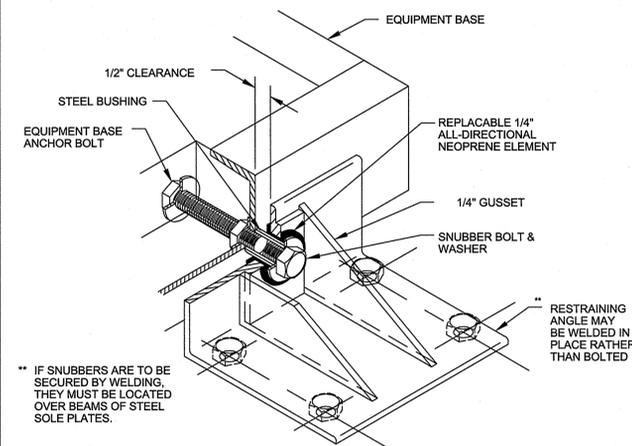
PIPE SIZE IN.	HANGER TYPE	BOLT TO ANGLE	VERTICAL ANGLE	DIAGONAL ANGLE	LONGITUDINAL ANGLE	ROD SIZE	MAX. LENGTH FOR RODS
2 1/2	CLEVIS TYPE	3/8"Ø	2x2x16GA.	2x2x16GA.	2 1/2x2 1/2x16GA.	1/2"Ø	25"
3	CLEVIS TYPE	3/8"Ø	2x2x16GA.	2x2x16GA.	2 1/2x2 1/2x16GA.	1/2"Ø	25"
4	CLEVIS TYPE	3/8"Ø	2x2x16GA.	2x2x16GA.	2 1/2x2 1/2x16GA.	5/8"Ø	31"
5	CLEVIS TYPE	1/2"Ø	2x2x16GA.	3x3x16GA.	2 1/2x2 1/2x16GA.	5/8"Ø	31"
6	CLEVIS TYPE	1/2"Ø	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	3/4"Ø	37"
8	CLEVIS TYPE	5/8"Ø	2 1/2x2 1/2x12GA.	2 1/2x2 1/2x12GA.	2 1/2x2 1/2x12GA.	7/8"Ø	43"

ALL HOLES IN ANGLES 1/16" OVERSIZE MAX. PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL ANGLES AND NUTS.

MIN. EDGE DISTANCE FOR BOLTS

1/4"Ø - 1" 5/8"Ø - 1 1/8"
 3/8"Ø - 1" 3/4"Ø - 1 1/4"
 1/2"Ø - 1" 7/8"Ø - 1 1/2"

SEISMIC REQUIREMENTS APPLY ONLY TO NEWLY-INSTALLED SYSTEMS.
 NOTE: CONTRACTOR SHALL SECURE THE SERVICES OF AN ENGINEER REGISTERED WITH THE APPLICABLE STATE TO PROVIDE SEALED AND SIGNED SHOP DRAWINGS OF ALL SUBMITTED SEISMIC SUPPORT SYSTEMS. THE DRAWINGS SHALL SHOW DETAILS OF THE SUBMITTED SYSTEM, LOCATION OF EACH SUPPORT, AND IDENTIFICATION OF SUPPORT TYPE (LONGITUDINAL AND/OR TRANSVERSE). SHOP DRAWINGS SHALL BE SUBMITTED TO THE CODE ENFORCEMENT OFFICE FOR APPROVAL. SMAGNA SEISMIC RESTRAINT MANUAL, SECOND EDITION, OR LATEST REVISION MAY BE USED AS A GUIDE FOR GENERAL SEISMIC SUPPORT DETAIL AND SUPPORT SPACING RECOMMENDATIONS.

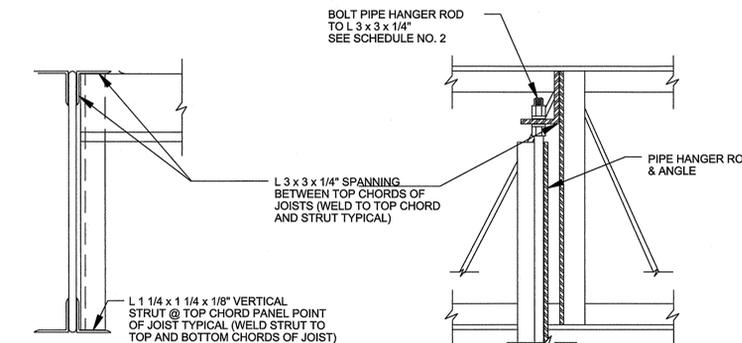


TYPICAL FOR MECHANICAL EQUIPMENT

SEISMIC EQUIPMENT SUPPORT DETAIL

(NOT TO SCALE)

2



TYP. ANGLE & JOINT CONNECTION

PIPE SUPPORT

TYPICAL NOTES FOR BRACING OF PIPES

- BRACE PIPES 2 1/2" I.D. AND LARGER.
- DETAILS SHOWN PROVIDE A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED. HOWEVER, WHERE BRACE OCCURS, THE VERTICAL ANGLE SHOWN MAY BE REPLACE A TYPICAL VERTICAL SUPPORT.
- TRANSVERSE BRACING AT 40'-0" O.C. MAXIMUM.
- LONGITUDINAL BRACINGS AT 80'-0" O.C. MAXIMUM
- TRANSVERSE BRACING FOR ONE PIPE SECTION MAY ALSO ACT AS LONGITUDINAL BRACING FOR THE PIPE SECTION CONNECTED PERPENDICULAR TO IT. IF THE BRACING IS INSTALLED WITHIN 24" OF THE ELBOW OR TEE AND SIMILAR SIZE.
- DO NOT USE BRANCH LINES TO BRACE MAIN LINES.
- PROVIDE FLEXIBILITY IN JOINTS WHERE PIPES PASS THROUGH BUILDING SEISMIC OR EXPANSION JOINTS, OR WHERE RIGIDLY SUPPORTED PIPES CONNECT TO EQUIPMENT WITH VIBRATION ISOLATORS.
- AT VERTICAL PIPE RISERS, WHEREVER POSSIBLE, SUPPORT THE WEIGHT OF THE RISER AT A POINT OR POINTS ABOVE THE CENTER OF GRAVITY OF THE RISER, PROVIDE LATERAL GUIDES AT THE TOP AND BOTTOM OF THE RISER AND AT INTERMEDIATE POINTS NOT TO EXCEED 30'-0" ON CENTER.
- PROVIDE LARGE ENOUGH PIPE SLEEVES THROUGH WALLS OR FLOORS TO ALLOW FOR ANTICIPATED DIFFERENTIAL MOVEMENTS.
- DO NOT FASTEN ONE RIGID PIPING SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE; FOR EXAMPLE, A WALL AND A ROOF.
- BRACING DETAILS, SCHEDULE, AND NOTES ARE TO BE USED WITH THE FOLLOWING TYPES OF PIPE: STEEL PIPE SCHEDULE 40, AND COPPER PIPE TYPE "L" (ONLY SILVER SOLDERED BRAZED JOINTS TO BE USED WITH COPPER PIPE).

STRUCTURAL SUPPORT FOR PIPES

(NOT TO SCALE)

3

NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

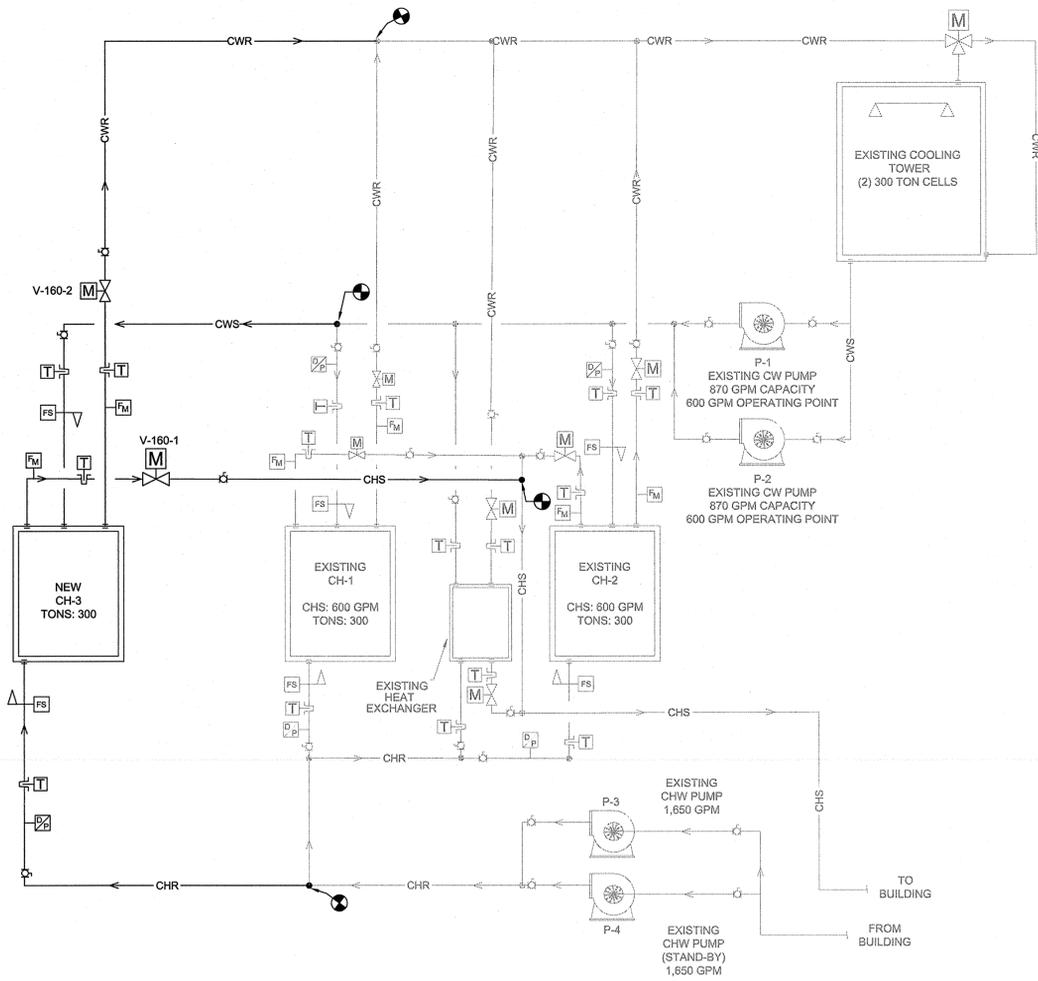
MECHANICAL SEISMIC DETAILS

DRAWN BY: FN
 DESIGNED BY: JSC
 CHECKED BY: JSC
 Q.A.Q.C. BY: CBB

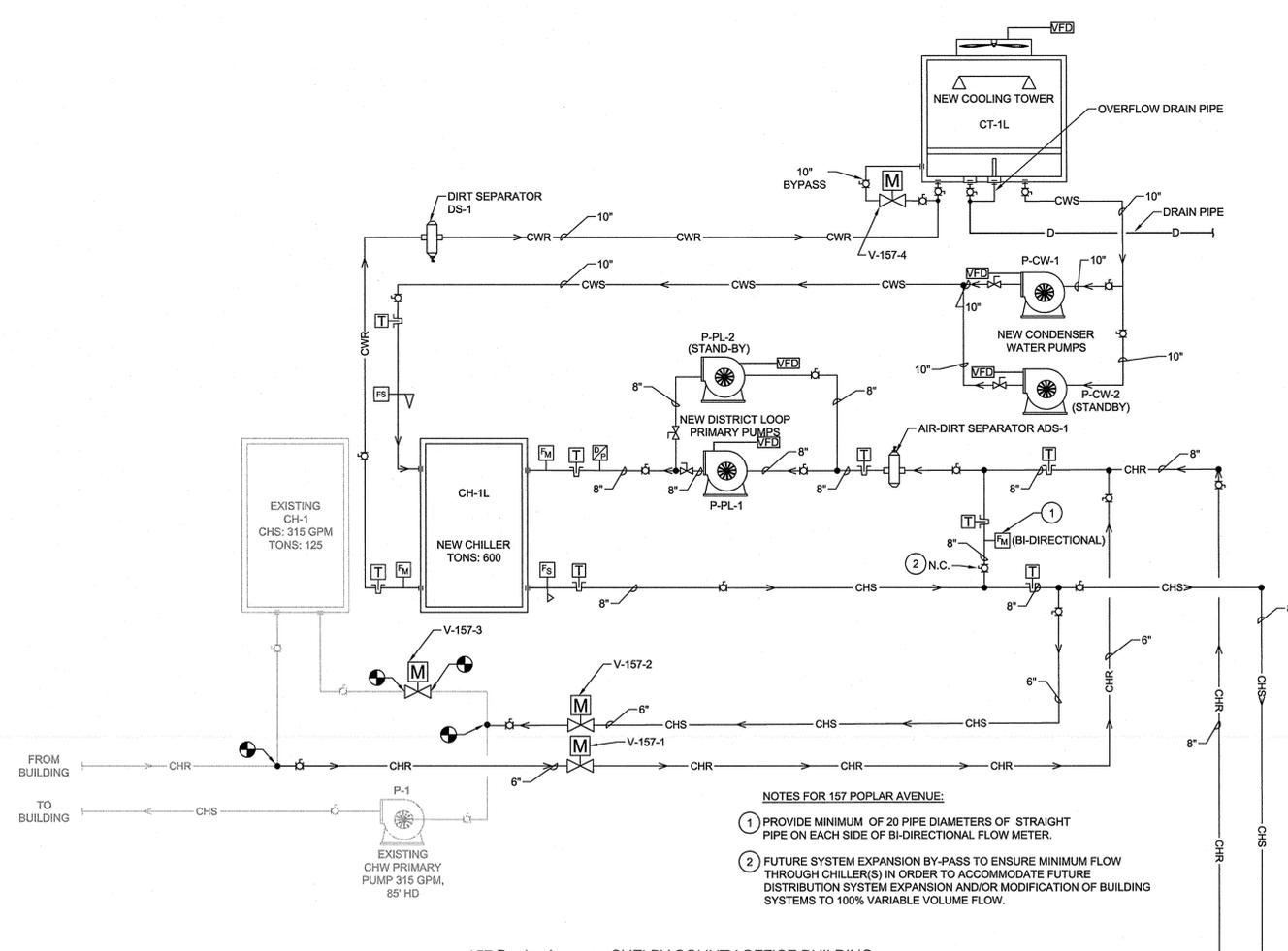


JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO:
M5.3

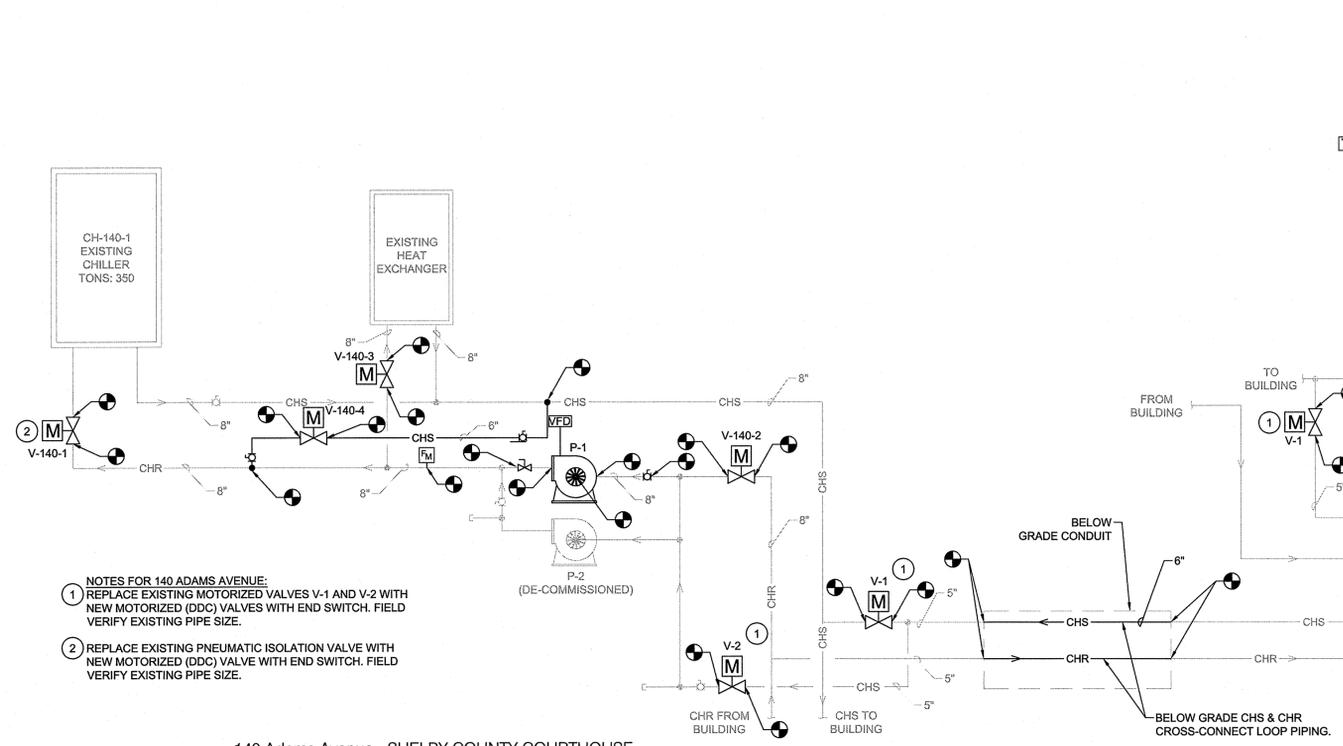


160 North Main Street - VASCO A. SMITH, JR. ADMINISTRATION BUILDING

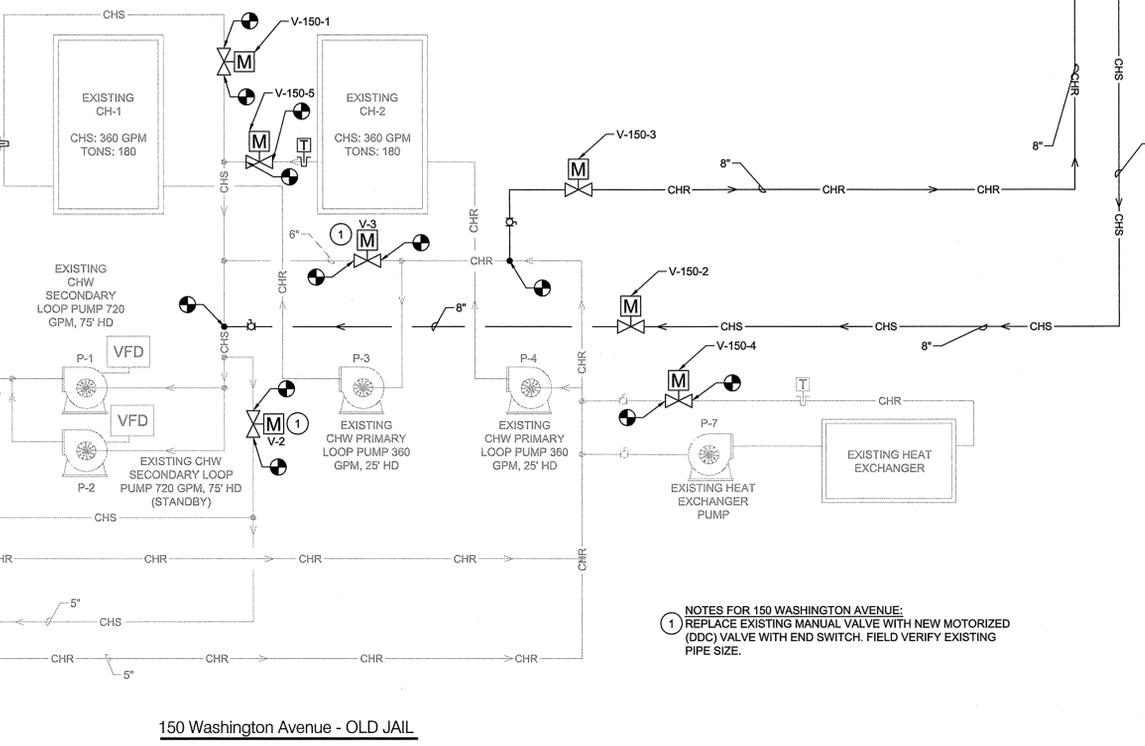


157 Poplar Avenue - SHELBY COUNTY OFFICE BUILDING

- NOTES FOR 157 POPLAR AVENUE:**
- 1 PROVIDE MINIMUM OF 20 PIPE DIAMETERS OF STRAIGHT PIPE ON EACH SIDE OF BI-DIRECTIONAL FLOW METER.
 - 2 FUTURE SYSTEM EXPANSION BY-PASS TO ENSURE MINIMUM FLOW THROUGH CHILLER(S) IN ORDER TO ACCOMMODATE FUTURE DISTRIBUTION SYSTEM EXPANSION AND/OR MODIFICATION OF BUILDING SYSTEMS TO 100% VARIABLE VOLUME FLOW.



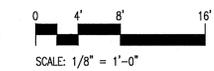
140 Adams Avenue - SHELBY COUNTY COURTHOUSE



150 Washington Avenue - OLD JAIL

- NOTES FOR 150 WASHINGTON AVENUE:**
- 1 REPLACE EXISTING MANUAL VALVE WITH NEW MOTORIZED (DDC) VALVE WITH END SWITCH. FIELD VERIFY EXISTING PIPE SIZE.

1 CHILLED AND CONDENSER WATER PIPING SCHEMATIC
 N.T.S.



NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

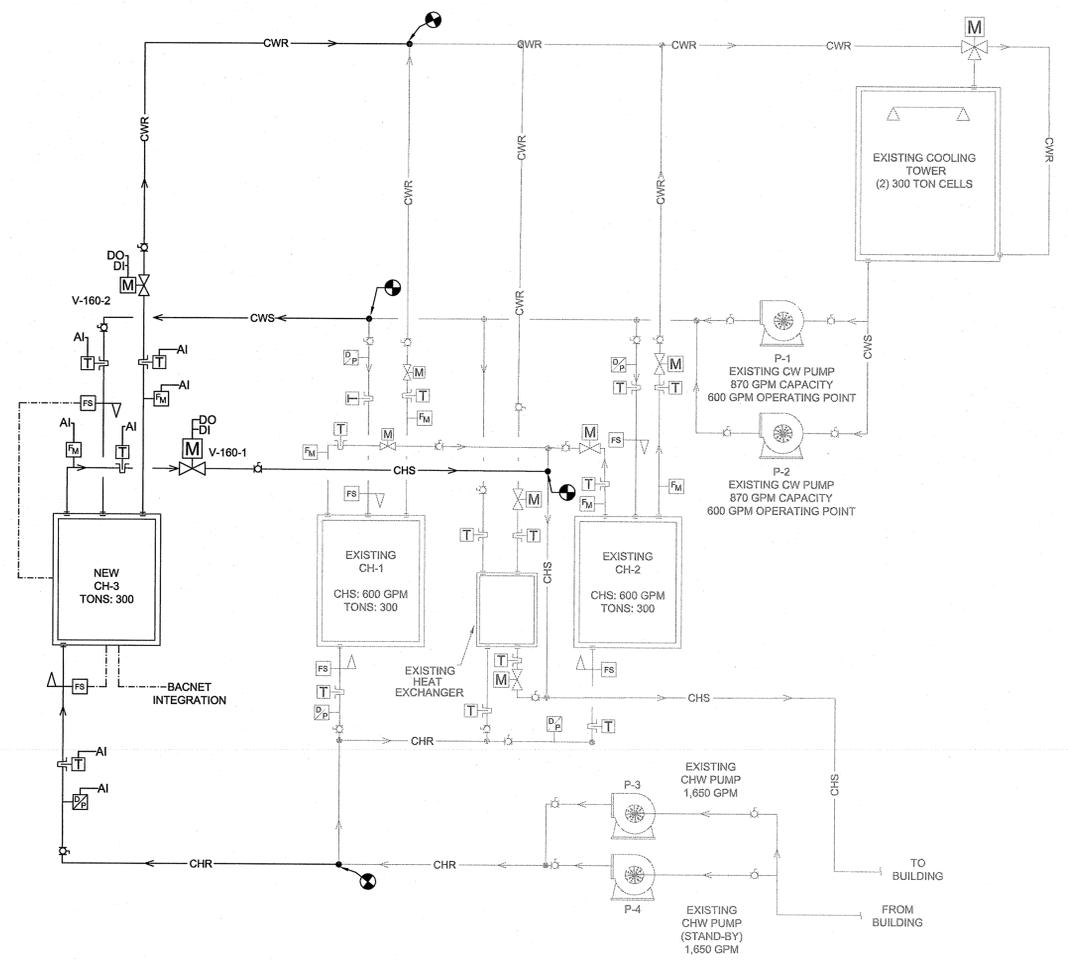
MECHANICAL CHILLED AND CONDENSER WATER PIPING SCHEMATIC

DRAWN BY: MW
 DESIGNED BY: JSC
 CHECKED BY: JSC
 Q.A.Q.C. BY: CBB

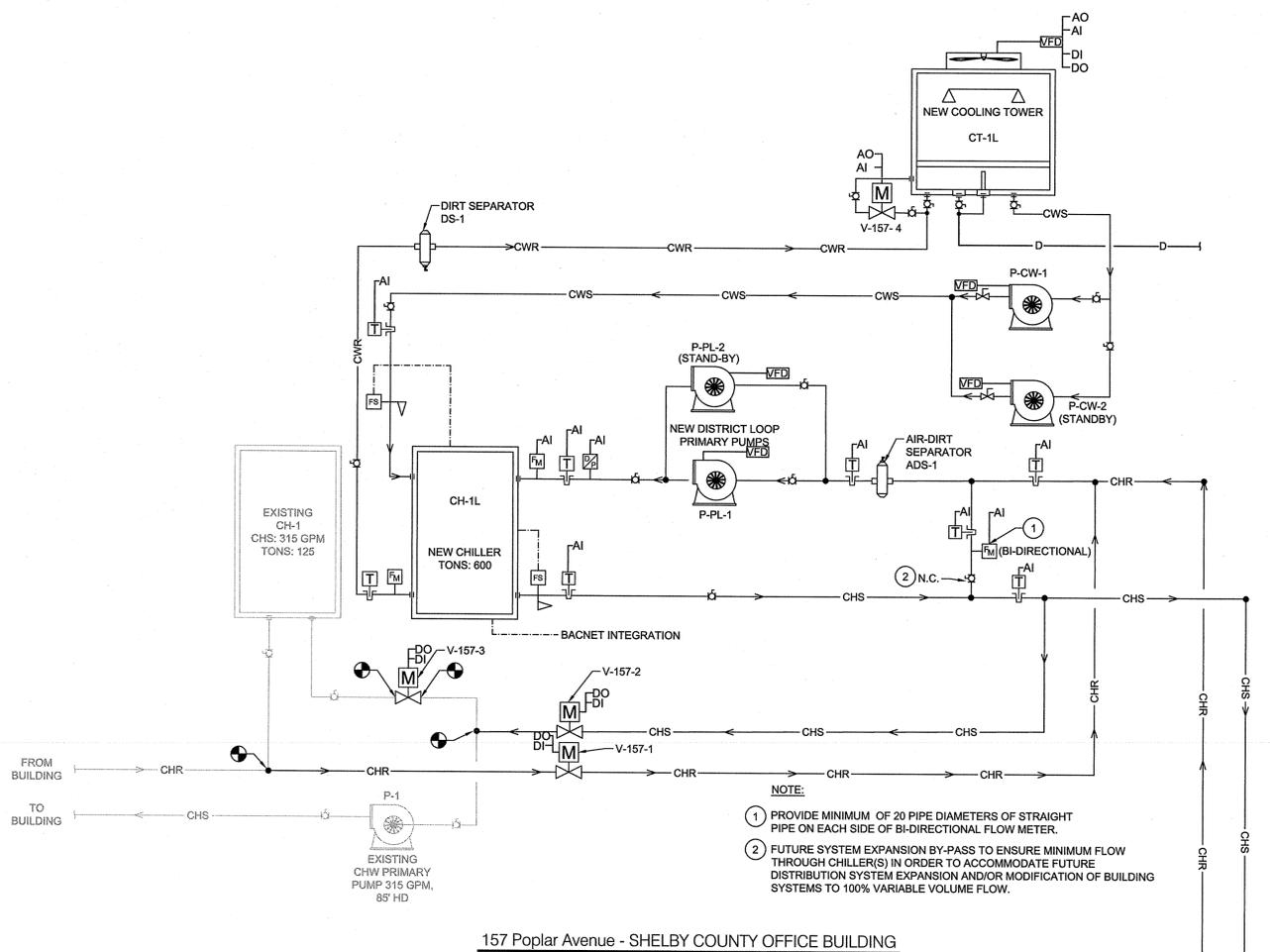


JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO:
M6.1

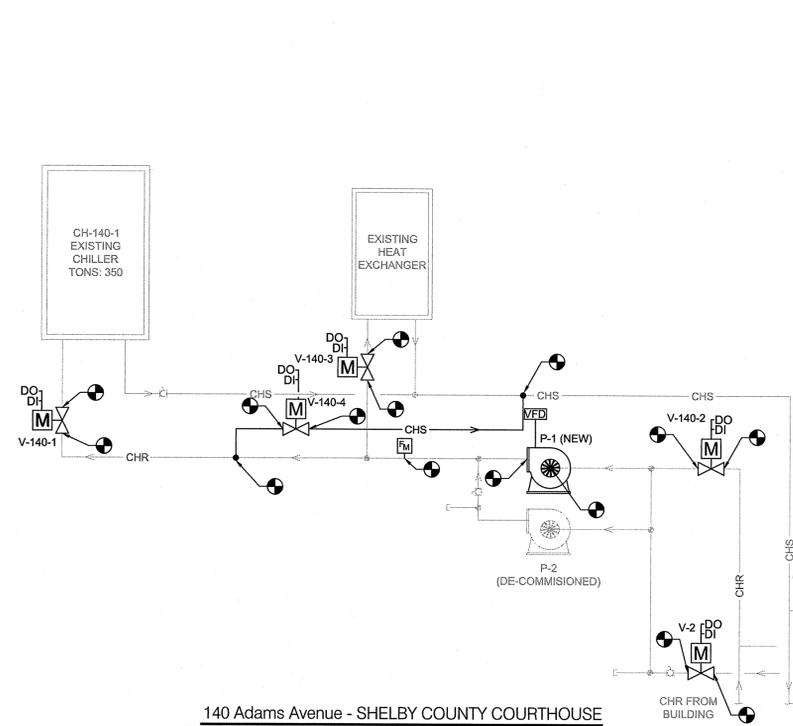


160 North Main Street - VASCO A. SMITH, JR. ADMINISTRATION BUILDING

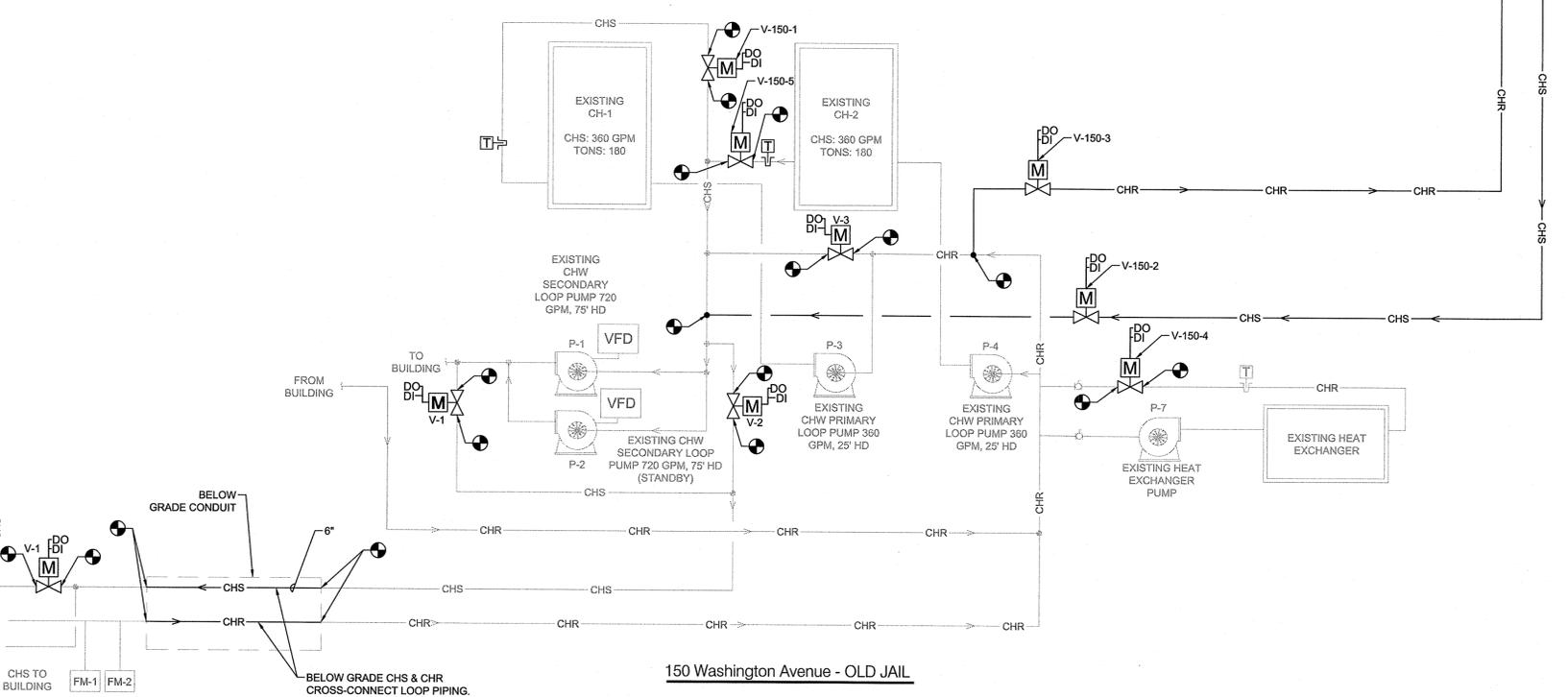


157 Poplar Avenue - SHELBY COUNTY OFFICE BUILDING

- NOTE:
- 1 PROVIDE MINIMUM OF 20 PIPE DIAMETERS OF STRAIGHT PIPE ON EACH SIDE OF BI-DIRECTIONAL FLOW METER
 - 2 FUTURE SYSTEM EXPANSION BY-PASS TO ENSURE MINIMUM FLOW THROUGH CHILLER(S) IN ORDER TO ACCOMMODATE FUTURE DISTRIBUTION SYSTEM EXPANSION AND/OR MODIFICATION OF BUILDING SYSTEMS TO 100% VARIABLE VOLUME FLOW.

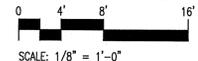


140 Adams Avenue - SHELBY COUNTY COURTHOUSE



150 Washington Avenue - OLD JAIL

1 CHILLED AND CONDENSER WATER CONTROL SCHEMATIC
N.T.S.



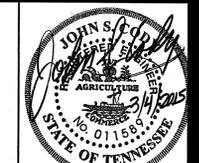
NO.	DATE	DESCRIPTION

**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

**MECHANICAL CHILLED AND
CONDENSER WATER CONTROL
SCHEMATIC**

DRAWN BY: MW
DESIGNED BY: JSC
CHECKED BY: JSC
Q.A./C.C. BY: CBB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
M6.2

SHELBY COUNTY, DOWNTOWN, DISTRICT COOLING LOOP

SEQUENCE OF OPERATION

THE ADDITION OF A NEW CENTRAL CHILLER SHALL ALLOW FOR ADDITIONAL MODES OF CONTROL BEYOND THE EXISTING SEQUENCES AS SUMMARIZED BELOW: SEQUENCE 4 SHALL BE THE PRIMARY MODE OF OPERATION EXCEPT AS NOTED BELOW DUE TO FAILURE OR MANUAL COMMAND FROM THE SYSTEM OPERATOR. SEQUENCES SHALL BE MANUALLY SELECTED BY POINT AND CLICK OPERATION FROM MAIN CENTRAL PLANT GRAPHIC SCREEN THAT WILL RESIDE ON THE EXISTING CENTRAL SERVER. ONLY A SINGLE SEQUENCE SHALL BE SELECTABLE AT ANY GIVEN TIME. INDIVIDUAL BUILDINGS SHALL BE ABLE TO BE REMOVED FROM AUTOMATIC SEQUENCE AND SHALL BE RETURNED TO LOCAL AUTOMATIC CONTROL WHEN NOT AVAILABLE FOR OPERATION IN SEQUENCES DEFINED BELOW. SEE CONTROL POINTS LIST FOR ADDITIONAL CONTROL POINTS NOT SPECIFICALLY DESCRIBED IN SEQUENCES BELOW. ALL CONTROL POINTS IN SEQUENCES AND POINTS LIST FROM NEW AND EXISTING DEVICES SHALL BE CONTROLLED, MONITORED, TRENDED, ARCHIVED AND ALARMED ON NEW CUSTOM GRAPHIC SCREENS DEPICTING THE HVAC SYSTEMS, AND RETAINED IN THE EXISTING CENTRAL SERVER. NEW AND EXISTING CONTROL POINTS SHALL BE CONNECTED TO THE EXISTING CENTRAL SERVER VIA BACNET IP.

BUILDING SHALL BE DEFINED AS FOLLOWS:

- *BUILDING 160*: 160 NORTH MAIN STREET - VASCO A. SMITH, JR. ADMINISTRATION BUILDING
- *BUILDING 157*: 157 POPLAR AVENUE - SHELBY COUNTY OFFICE BUILDING
- *BUILDING 150*: 150 WASHINGTON AVENUE - OLD JAIL
- *BUILDING 140*: 140 ADAMS AVENUE - SHELBY COUNTY COURTHOUSE

CONTRACTOR SHALL PROVIDE LABOR AND MATERIAL FOR TESTING/COMMISSIONING TO INSURE EACH SEQUENCE OF OPERATION LISTED BELOW WILL FUNCTION COMPLETELY FROM CENTRAL NETWORK SERVER. PROVIDE TEXT GRAPHIC OF POINT LIST AND INCLUDE AN OPERATIONAL MATRIX SHOWING STATUS (e.g. ON, OFF, NORMALLY OPEN, NORMALLY CLOSED, OPEN, CLOSED, ETC.) OF ALL APPLICABLE EQUIPMENT AND VALVES REPRESENTING EACH SEQUENCE (1 THROUGH 4).

SEQUENCE 1 SUMMARY- BUILDINGS 160, 157,150 AND 140 SHALL OPERATE IN STANDALONE MODE WHEREBY THE HVAC EQUIPMENT AND EXISTING CONTROLS IN EACH BUILDING ARE OPERATED WITH NO COMMON PUMPING OR COOLING PROVIDED BETWEEN BUILDINGS.

SEQUENCE 2 SUMMARY- BUILDINGS 160 AND 157 SHALL OPERATE IN STANDALONE MODE WHEREBY THE HVAC EQUIPMENT AND EXISTING CONTROLS IN EACH BUILDING ARE OPERATED WITH NO COMMON PUMPING OR COOLING PROVIDED BETWEEN BUILDINGS. BUILDING 140'S CHILL WATER SYSTEM IS OPERATED PROVIDING CHILL WATER TO BUILDING 150.

SEQUENCE 3 SUMMARY- BUILDING 160 AND 157 SHALL OPERATE IN STANDALONE MODE WHEREBY THE HVAC EQUIPMENT AND EXISTING CONTROLS IN EACH BUILDING ARE OPERATED WITH NO COMMON PUMPING OR COOLING PROVIDED BETWEEN BUILDINGS. BUILDING 150'S CHILL WATER SYSTEM IS OPERATED PROVIDING CHILL WATER TO BUILDING 140.

SEQUENCE 4 SUMMARY- BUILDING 160 SHALL OPERATE IN STANDALONE MODE WHEREBY THE HVAC EQUIPMENT AND EXISTING CONTROL IN 160 ARE OPERATED WITH NO COMMON PUMPING OR COOLING PROVIDED BETWEEN BUILDINGS. HVAC EQUIPMENT IN BUILDING 157, 150 AND 140 SHALL BE CONFIGURED FOR CENTRAL PLANT OPERATION WHEREBY THE NEW CENTRAL CHILLER PROVIDES CHILL WATER TO BUILDINGS 157, 150 AND 140.

NEW CENTRAL PLANT OPERATION THE NEW CENTRAL CHILLER, PUMPS, TOWERS, ETC. SHALL BE CONTROLLED TO PROVIDE A LEAVING CHILL WATER TEMPERATURE (ADJUSTABLE FROM THE EXISTING CENTRAL SERVER) THAT WILL SERVE BUILDINGS 157, 150 AND 140. THE CENTRAL CHILL WATER SYSTEM SHALL BE CONTROLLED AS A PRIMARY/SECONDARY (DECOUPLED) LOOP FOR BUILDING 150 AND PRIMARY WITH BOOSTER PUMP FOR BUILDINGS 140 AND 157.

WHEN NEW CENTRAL PLANT OPERATION IS INITIATED THE FOLLOWING SHALL OCCUR:

BUILDING 157: EXISTING CHILLER, PUMPS AND COOLING TOWER SHALL BE SHUT DOWN AND CONFIRMED TO BE OFF THRU MONITORING OF EXISTING CONTROL STATUS POINTS (CURRENT SWITCHES, AMPERAGE SENSOR AND/OR DP SWITCHES) FROM THE EXISTING BAS SYSTEM VIA BACNET IP INTEGRATION. COMMUNICATION OF THESE AND ANY NEW CONTROL POINTS SHALL BE VIA BACNET IP INTEGRATION TO EXISTING CENTRAL SERVER CONTROLLING NEW CENTRAL PLANT OPERATION. AFTER SHUTDOWN OF HVAC EQUIPMENT IS CONFIRMED THE NEW ISOLATION VALVE, V-157-3, TO EXISTING CHILLER SHALL BE CLOSED AND ITS POSITION CONFIRMED BY END SWITCH. CENTRAL CHILL WATER SYSTEM ISOLATION VALVES V-157-1, V-157-2 SHALL BE OPENED AND THEIR POSITION CONFIRMED BY END SWITCH.

BUILDING 150: ALL EXISTING CHILLERS, PUMPS AND COOLING TOWER SHALL BE SHUT DOWN AND CONFIRMED TO BE OFF THRU MONITORING OF EXISTING CONTROL STATUS POINTS (CURRENT SWITCHES, AMPERAGE SENSOR OR DP SWITCHES) FROM THE EXISTING BAS SYSTEM VIA BACNET IP INTEGRATION. COMMUNICATION OF THESE AND ANY NEW CONTROL POINTS SHALL BE VIA BACNET IP INTEGRATION TO EXISTING CENTRAL SERVER CONTROLLING NEW CENTRAL PLANT OPERATION. AFTER SHUTDOWN OF HVAC EQUIPMENT IS CONFIRMED ISOLATION VALVES V-150-1, V-150-4, V-150-5 TO EXISTING CHILLERS AND HEAT EXCHANGER SHALL BE CLOSED AND THEIR POSITION CONFIRMED BY END SWITCH. VALVE V-2 BETWEEN 150 POPLAR AND 140 ADAMS SHALL BE OPENED AND ITS POSITION CONFIRMED BY END SWITCH TO ALLOW FLOW FROM 150 POPLAR TO 140 ADAMS. CENTRAL CHILL WATER SYSTEM ISOLATION VALVES V-150-2 AND V-150-3 SHALL BE OPENED AND THEIR POSITION CONFIRMED BY END SWITCH. VALVES V-1 AND V-3 SHALL BE CLOSED AND THEIR POSITION CONFIRMED BY END SWITCH

BUILDING 140: EXISTING CHILLER, PUMPS AND COOLING TOWER SHALL BE SHUT DOWN AND CONFIRMED TO BE OFF THRU MONITORING OF EXISTING CONTROL STATUS POINTS (CURRENT SWITCHES, AMPERAGE SENSOR OR DP SWITCHES) VIA THE EXISTING BAS SYSTEM. COMMUNICATION OF THESE AND OTHER CONTROL POINTS SHALL BE VIA BACNET IP INTEGRATION TO THE EXISTING CENTRAL SERVER CONTROLLING NEW CENTRAL PLANT OPERATION. AFTER SHUTDOWN OF HVAC EQUIPMENT IS CONFIRMED ISOLATION VALVE V-140-2 AND ISOLATION VALVES V-140-1 AND V-140-3 TO EXISTING CHILLER AND HEAT EXCHANGER SHALL BE CLOSED AND THEIR POSITION CONFIRMED BY END SWITCH. VALVE V-140-4 AND V-2 INTERCONNECT VALVE BETWEEN 150 POPLAR AND 140 ADAMS SHALL BE OPENED AND THEIR POSITION CONFIRMED TO ALLOW FLOW FROM 150 POPLAR TO 140 ADAMS. CENTRAL CHILL WATER SYSTEM ISOLATION VALVE V-1 SHALL BE CLOSED AND ITS POSITION CONFIRMED BY END SWITCH.

ALARMS SHALL BE ANNUNCIATED TO THE EXISTING CENTRAL SERVER IF END SWITCH ON VALVES DO NOT INDICATE PROPER POSITION OR HVAC EQUIPMENT FAILS TO OPERATE AS COMMANDED.

AFTER ALL EQUIPMENT IS CONFIRMED TO BE OFF AND ALL VALVES ARE CONFIRMED TO BE IN PROPER POSITION FOR CENTRAL PLANT OPERATION THE FOLLOWING SHALL OCCUR:

BUILDING 157: PRIMARY CHILL WATER PUMP P-1 SHALL BE STARTED AND FLOW PROVEN (VIA EXISTING PUMP MONITORING DEVICE) TO THE CENTRAL SERVER. (UNDER CENTRAL PLANT MODE OF CONTROL P-1 SHALL OPERATE AS A BOOSTER PUMP FOR THE CENTRAL CHILL WATER SYSTEM).

BUILDING 150: SECONDARY CHILLED WATER PUMPS P-1 AND P-2 SHALL OPERATE AS PRIMARY AND STANDBY. THE LEAD SECONDARY CHILL WATER PUMP VFD SHALL BE STARTED AND FLOW PROVEN (VIA EXISTING PUMP MONITORING DEVICE) TO THE CENTRAL SERVER. IF THE LEAD SECONDARY CHILL WATER PUMP FAILS TO START THE LAG SECONDARY CHILL WATER PUMP SHALL BE STARTED AND AN ALARM SHALL BE ANNUNCIATED TO THE EXISTING CENTRAL SERVER. AFTER SECONDARY CHILL WATER PUMP OPERATION IS CONFIRMED THE VFD SHALL BE MODULATED TO MAINTAIN THE DIFFERENTIAL PRESSURE AT DIFFERENTIAL PRESSURE SETPOINT ADJUSTABLE VIA THE EXISTING CENTRAL SERVER. (UNDER CENTRAL PLANT MODE OF CONTROL SECONDARY CHILL WATER PUMP/S SHALL OPERATE AS THE SECONDARY IN A PRIMARY SECONDARY CHILL WATER SYSTEM).

BUILDING 140: PRIMARY CHILL WATER PUMP, P-1, VFD SHALL BE STARTED AND FLOW PROVEN (VIA EXISTING PUMP MONITORING DEVICE) TO THE CENTRAL SERVER. IF THE PRIMARY CHILL WATER PUMP FAILS TO START AN ALARM SHALL BE ANNUNCIATED TO THE CENTRAL SERVER. AFTER PRIMARY CHILL WATER PUMP OPERATION IS CONFIRMED THE VFD SHALL BE MODULATED TO MAINTAIN THE SPEED SETTING TO MAINTAIN CHILL WATER FLOW AS DETERMINED DURING TEST AND BALANCE OPERATIONS, VIA THE EXISTING CENTRAL SERVER. (PRIMARY CHILL WATER PUMP VFD SHALL OPERATE AT FULL SPEED DURING STANDALONE MODES OF CONTROL). (UNDER CENTRAL PLANT MODE OF CONTROL PRIMARY CHILL WATER PUMP SHALL OPERATE AT REDUCED SPEED AS A BOOSTER PUMP FOR THE CENTRAL CHILL WATER SYSTEM).

ALL PUMPS, TOWER, CHILLER AND VALVES SHALL BE CONTROLLED FROM EXISTING CENTRAL SERVERS NEW CUSTOM GRAPHIC SCREENS THAT WILL ALLOW AN AUTHORIZED OPERATOR TO SET LEAD/LAG SCHEDULES, ROTATION SCHEDULES, LOCKOUT AND MAINTENANCE SCHEDULES THAT WILL ALLOW AUTOMATIC OPERATION OF SECONDARY PUMP/VFD'S/BOOSTER PUMPS/PRIMARY PUMPS UNDER USER CONFIGURATION REQUIREMENTS, WITHOUT NEGATIVELY IMPACTING CHILL WATER PLANT OPERATION.

WHEN CENTRAL PLANT OPERATION IS DISABLED AND CENTRAL PLANT PUMP OPERATION IS SHUT DOWN THE CENTRAL PLANT CHILL WATER ISOLATION VALVES IN EACH BUILDING SHALL CLOSE. EACH BUILDINGS CHILLER/HX ISOLATION VALVES SHALL THEN OPEN AND LOCAL CHILLER/PUMP/TOWER OPERATION SHALL RESUME UNDER EACH BUILDINGS LOCAL DDC BAS CONTROLS. LOCAL BUILDING CONTROL OPERATION/STATUS/ALARMS ETC. OF CHILLERS/PUMPS/TOWERS/VFDS SHALL BE CONTROLLED VIA THE CENTRAL SERVER.

SYSTEM STARTUP (CHILLER CH-1)

THE CENTRAL CHILLER PROGRAM OPERATES WHEN CHILL WATER LOOP COMMAND IS ON. IF THE CHILL WATER LOOP COMMAND IS OFF THE PLANT WILL BE SHUT DOWN AND EACH BUILDING RETURNED TO LOCAL STANDALONE OPERATION.

THE FOLLOWING STEPS OCCUR DURING THE CHILLER STARTUP SEQUENCE:

- PRIMARY CHILLED WATER PUMPS P-PL-1 AND P-PL-2 SHALL OPERATE AS PRIMARY AND STANDBY. THE LEAD PRIMARY CHILLED WATER PUMP FOR THE CHILLER IS STARTED AND ITS STATUS PROVEN TO THE CHILLER AND TO THE EXISTING CENTRAL SERVER. IF PUMP FAILS TO START THE LAG PUMP SHALL START AND PROVE FLOW.
- IF CHILLED WATER FLOW STATUS HAS BEEN DEFINED, CHILLER PLANT CONTROL WAITS (UP TO) THE CONTROL FEEDBACK DELAY TIME FOR FLOW TO BE CONFIRMED. IF FLOW IS NOT CONFIRMED IN THAT TIME, THE CHILLER IS MARKED AS FAILED AND THE CHILL WATER PUMP TURNED OFF.
- AFTER FLOW/S ARE CONFIRMED, THE CHILLER IS ENABLED AND USES IT MANUFACTURERS CONTROLS FOR CONFIRMATION OF ALL SAFETIES, LOADING AND UNLOADING BASED UPON CHILL WATER SETPOINT AND CURRENT LIMIT SETPOINT ADJUSTABLE VIA THE EXISTING CENTRAL SERVER.
- IF CHILLER STATUS HAS BEEN DEFINED, THE PROGRAM WAITS (UP TO) THE CONTROL FEEDBACK DELAY TIME FOR CHILLER STATUS TO BE CONFIRMED. IF STATUS IS NOT CONFIRMED IN THAT TIME THE CHILLER IS MARKED AS FAILED AND THE CHILLER IS TURNED OFF.

SOFT START

THE SOFT START MODE (FOR THE CHILLER) PREVENTS EXCESS CAPACITY FROM BEING BROUGHT ON LINE WHEN THE SYSTEM CHILLED WATER SUPPLY TEMPERATURE IS NOT NEAR ITS SETPOINT.

THE MECHANISM FOR SOFT START IS TO CURRENT LIMIT THE CHILLERS THRU COMMAND SETPOINTS IN THE EXISTING CENTRAL SERVER. WHEN A CHILLER STARTS IN SOFT START IT STARTS UNLOADED AND BEGINS TO LOAD (AS LIMITED BY CHILLER SETUP OR CURRENT LIMIT SETPOINT FROM THE EXISTING CENTRAL SERVER) AS REQUIRED TO MAINTAIN LEAVING CHILL WATER SETPOINT.

THE CHILLER PLANT STAYS IN SOFT START MODE UNTIL THE CHILLERS SUPPLY WATER TEMPERATURE FALLS WITHIN THE ADD TEMPERATURE DEADBAND OF THE SYSTEM SUPPLY SETPOINT.

FAILURE DETECTION AND RECOVERY

WHEN THE CHILLER IS MARKED AS HAVING FAILED, THE FOLLOWING OCCURS:

- THE FAILED CHILLER IS TAKEN OFF LINE AND AN ALARM IS SENT TO THE EXISTING CENTRAL SERVER.
- THE FAILED CHILLER IS DISABLED (IF THE CHILLERS STATUS REMAINS ON, CHILLER PLANT CONTROL DOES NOT TURN ITS CHILLED WATER PUMP OFF)

THE CHILLER CAN BE MARKED AS FAILED FOR ANY OF THE FOLLOWING CONDITIONS:

- IF CHILLED WATER FLOW CANNOT BE CONFIRMED DURING THE START SEQUENCE
- IF THE CHILLERS STATUS CANNOT BE CONFIRMED AS BEING ON DURING THE START SEQUENCE
- IF CHILLED WATER FLOW IS LOST AT ANY TIME AFTER STARTUP
- IF THE CHILLERS STATUS CANNOT BE CONFIRMED AS BEING OFF DURING THE SHUTDOWN SEQUENCE

FAILURE RESET

WHEN THE CHILLERS FAILURE IS RESET, THAT CHILLER IS THEN MADE AVAILABLE FOR OPERATION. WHEN A SYSTEM FAILURE RESET IS PERFORMED, THE CHILLER MARKED AS FAILED IS MADE AVAILABLE FOR OPERATION.

FAILURE RESETS CAN BE PERFORMED IN SEVERAL WAYS:

- ALL FAILURES CAN BE RESET FROM A BUTTON ON A STATUS SCREEN
- INDIVIDUAL CHILLER FAILURES CAN BE RESET FROM A BUTTON ON A STATUS SCREEN
- ALL FAILURES CAN BE RESET VIA A BINARY POINT BEING REFERENCED BY CHILLER PLANT CONTROL

CHILLER STOP SEQUENCE

THE CHILLER PLANT CONTROL PROGRAM DISABLES A CHILLER FOR THE FOLLOWING REASON:

- CHILLER CURRENTLY ENABLED IS MADE UNAVAILABLE
- SYSTEM DISABLED
- CHILLER FAILURE
- MANUAL CHILLER COMMAND

THE FOLLOWING STEPS OUTLINE THE CHILLER STOP SEQUENCE.

- THE FIRST STEP IN THE CHILLER SHUTDOWN SEQUENCE IS TO DISABLE THE CHILLER.
- IF CHILLER STATUS HAS BEEN DEFINED, THE PROGRAM WAITS (UP TO) THE DURATION OF THE CONTROL FEEDBACK DELAY TIME FOR CHILLER STATUS TO BE CONFIRMED OFF. IF STATUS IS NOT CONFIRMED IN THAT TIME, THE CHILLER IS MARKED AS FAILED AND THE PUMP REMAINS ON.
- ONCE THE CHILLER HAS BEEN CONFIRMED OFF, THE CHILLED WATER PUMP IS TURNED OFF, ALONG WITH ASSOCIATED COOLING TOWER AND CONDENSER WATER PUMP CONTROLS.
- ISOLATION VALVES ARE CLOSED AND POSITION CONFIRMED.

LEAD/LAG PUMPING

ANY LOCATIONS THAT HAVE MULTIPLE OR STANDBY PUMP'S/VFD'S SHALL AUTOMATICALLY CONTROL PUMPS IN A LEAD/LAG MANNER FOR AUTOMATIC ROTATION OF PUMPS BASED ON RUN TIME. FAILURE OF A PUMP OR MANUAL COMMAND, STATUS OF EACH PUMP/VFD SHALL BE MONITORED BY DIFFERENTIAL PRESSURE SWITCH OR CURRENT SWITCH AS DESCRIBED ABOVE.

ALARMING

ALL CONTROL POINTS (SEE POINTS LIST) SHALL BE MONITORED, TRENDED CONTINUOUSLY IN 15 MINUTE INTERVALS AND ARCHIVED TO EXISTING CENTRAL NETWORK SERVER HARD DRIVE FOR CONTINUOUS HISTORICAL STORAGE. ALARMS SHALL ANNUNCIATE AT THE EXISTING CENTRAL SERVER VIA AUDIBLE AND VISUAL CUES FOR THE SYSTEM OPERATOR. CRITICAL ALARMS SHALL ALSO BE ROUTED VIA EMAIL AS DIRECTED BY SHELBY COUNTY MAINTENANCE OPERATIONS. LOGS OF ALL CONTROL POINTS SHALL BE AVAILABLE FOR VIEWING ON SCREEN AND AVAILABLE FOR EXPORT TO OTHER SOFTWARE SYSTEMS SUCH AS WORD, EXCEL, SQL, PDF, ETC.

GRAPHIC SCREENS

GRAPHIC SCREENS SHALL BE CREATED THAT ARE CUSTOM FOR EACH SYSTEM, APPLICATION, BUILDING, ZONE, HVAC SYSTEM AND DISTRICT LOOP CONTROL. OPERATOR COMMANDS SHALL BE ENTERED THROUGH GRAPHIC SCREEN COMMAND WINDOWS. NAVIGATION SHALL BE BY MENU TREE, HYPER-LINKS AND TABBER HEADING ON EACH GRAPHIC.

CENTRAL PLANT TOWER OPERATION (CT-1)

WHEN CENTRAL PLANT OPERATION IS ENABLED THE COOLING TOWER CONTROL PROGRAMS SHALL BE ACTIVATED. THE LEAD CONDENSER WATER PUMP SHALL BE STARTED AND ITS STATUS SHALL BE PROVEN VIA FLOW SWITCH HARDWIRED TO THE CHILLER CONTROL PANEL AND VIA DIFFERENTIAL PRESSURE SWITCH TO THE EXISTING CENTRAL SERVER. IF THE LEAD PUMP FAILS TO START AND PROVE FLOW OR STOPS FOR ANY REASON THE LAG CONDENSER WATER PUMP SHALL BE STARTED AND STATUS PROVEN AS DESCRIBED ABOVE. FAILURE OF A PUMP TO OPERATE SHALL BE ANNUNCIATED TO THE EXISTING CENTRAL SERVER.

WHEN THE CHILLER STARTS THE TOWER BYPASS VALVE SHALL BE ALLOWED TO MODULATE FROM FULL BYPASS POSITION TO FULL OVER THE TOP POSITION TO MAINTAIN ENTERING CONDENSER WATER TEMPERATURE AT THE CONDENSER WATER SETPOINT (ADJUSTABLE VIA THE EXISTING CENTRAL SERVER). IF THE TOWER BYPASS VALVE IS IN THE FULL OVER THE TOP POSITION AND CONDENSER WATER TEMPERATURE CONTINUES TO RISE ABOVE CONDENSER WATER SETPOINT THE TOWER FAN SHALL BE STARTED AND ITS STATUS PROVEN TO THE EXISTING CENTRAL SERVER. IF STATUS IS NOT PROVEN THEN AN ALARM SHALL BE SENT TO THE EXISTING CENTRAL SERVER. TOWER FAN VFD SPEED SHALL BE MODULATED TO MAINTAIN ENTERING CONDENSER WATER TEMPERATURE AT SETPOINT.

IF THE CENTRAL PLANT OPERATION IS DISABLED THE TOWER FAN SHALL BE CYCLED OFF AND THE CONDENSER WATER PUMPS SHALL BE DISABLED AFTER THE CHILLERS OPERATION IS CONFIRMED TO BE OFF.

CONTROL PROGRAMMING FUNCTIONS TO ACCOMPLISH SPECIFIED SEQUENCES OF OPERATION AS DESCRIBED AND SUMMARIZED ABOVE SHALL BE PROVIDED FOR NEW AND EXISTING BAS SYSTEMS FOR FULL AND COMPREHENSIVE AUTOMATIC CONTROL OF NEW AND EXISTING BAS CONTROL EQUIPMENT.

160 NORTH MAIN-VASCO A. SMITH, JR. ADMINISTRATION BUILDING NEW CHILLER (CH-3)

EXISTING PRIMARY CHILLED WATER PUMPS P3 AND P4 WILL OPERATE AS PRIMARY AND STANDBY. ALTERNATE PUMPS WEEKLY TO EQUALIZE RUN TIME.

PIPING DIFFERENTIAL PRESSURE SHALL BE MEASURED IN VERTICAL RISERS ON THE 3RD FLOOR. THE PUMPS SPEED IS MODULATED TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT. RESET THE DIFFERENTIAL PRESSURE SETPOINT IN RESPONSE TO CHILLER LOAD.

THE NEW CHILLER SHALL BE OPERATED AS FIRST ON/LAST OFF WHEN AVAILABLE. NEW CHILLER SHALL START AND OPERATE CONTINUOUSLY WHEN ASSIGNED AHU'S OR FCU'S ARE COMMANDED ON AND CALLING FOR COOLING OR BY MANUAL COMMAND FROM SYSTEM OPERATOR. CHILLER SHALL START ONLY AFTER HARDWIRED CONFIRMATION OF EVAPORATOR AND CONDENSER WATER PUMP OPERATION VIA FLOW SWITCHES. CHILLER IS OFF IF THE OAT IS BELOW 50F. (SEE TRANSITION FROM PLATE AND FRAME HEAT EXCHANGER).

START LEAD (NEW) CHILLER (CH-3)

1A START THE LEAD PRIMARY CHILL WATER PUMP AND OPEN MOTORIZED ISOLATION VALVE, V-160-1, ON THE LEAD CHILLER. CONFIRM OPERATION OF PUMP VIA DP SWITCH TO BAS AND VIA FS TO CHILLER.

1B START THE LEAD CONDENSER WATER PUMP AND OPEN MOTORIZED ISOLATION VALVE, V-160-2, ON THE LEAD CHILLER. CONFIRM OPERATION OF PUMP VIA DP SWITCH TO BAS AND VIA FS TO CHILLER.

1C START LEAD CHILLER. (MANUFACTURERS UNIT MOUNTED CONTROLS SHALL CONFIRM ALL SAFETIES AND CONTROL ALL LOADING/UNLOADING FUNCTIONS OF CHILLER BASED ON CHILL WATER SETPOINT THAT IS ADJUSTABLE VIA THE CENTRAL SERVER).

AS LOAD INCREASES START THE NEXT AVAILABLE CHILLER

THE LAG CHILLER WILL BE ENABLED WHEN THE LEAD CHILLERS AMPERAGE IS GREATER THAN 90% OF THE FULL LOAD AMPS FOR 20 MINUTES OR IS COMMANDED ON BY THE BAS OPERATOR VIA THE CENTRAL SERVER.

2A ACCELERATE THE CHILL WATER PUMP VFD TO 60 HZ AND OPEN MOTORIZED CHILL WATER VALVE ON THE LAG CHILLER, CONFIRM FLOW VIA THE EVAPORATOR FLOW SENSOR.

2B START THE LAG CONDENSER WATER PUMP, OPEN THE MOTORIZED CONDENSER WATER VALVE ON LAG CHILLER AND CONFIRM FLOW VIA THE CONDENSER WATER FLOW SENSOR.

2C START THE LAG CHILLER. (MANUFACTURERS UNIT MOUNTED CONTROLS SHALL CONFIRM ALL SAFETIES AND CONTROL ALL LOADING/UNLOADING FUNCTIONS OF CHILLER BASED ON CHILL WATER SETPOINT THAT IS ADJUSTABLE VIA THE CENTRAL SERVER).

2D RESTORE AUTOMATIC CONTROL TO THE CHILLED WATER PUMP VFD.

AS LOAD DECREASES

SHUT DOWN THE LAG CHILLER WHEN COMBINED AMPERAGE OF THE TWO CHILLERS FALLS BELOW 40% OF THE NAMEPLATE AMPERAGE RATING OR IS COMMANDED BY THE OPERATOR.

3A STOP THE LAG CHILLER.

3B CLOSE THE ASSOCIATED CHILL WATER AND CONDENSER WATER CHILLER ISOLATION VALVES.

3C STOP THE LAG CONDENSER WATER PUMP.

3D REDUCE SPEED OF CHILL WATER PUMP SPEED TO ONE CHILLERS REQUIREMENT.

AS THE LOAD CONTINUES TO DECREASE

ALL AHU'S AND FCU'S ARE NO LONGER CALLING FOR COOLING FOR A CONTINUOUS 30 MINUTES.

4A STOP THE LEAD CHILLER.

4B CLOSE THE CHILL WATER AND CONDENSER WATER VALVES.

4C STOP THE LEAD CHILLED WATER AND CONDENSER WATER PUMPS.

OR

OUTDOOR AIR TEMPERATURE IS BELOW 50F TRANSITION TO PLATE AND FRAME HX.

4A RESET CONDENSER WATER SUPPLY TEMPERATURE SETPOINT TO 47F, OPEN HEAT EXCHANGER CONDENSER WATER VALVE 15% AND WAIT FOR CONDENSER WATER TEMPERATURE TO DROP.

4B WHEN CONDENSER WATER SUPPLY TEMPERATURE DROPS BELOW 54F SHUT DOWN THE LEAD CHILLER.

4C CLOSE LEAD CHILLERS CHILLED WATER AND CONDENSER WATER MOTORIZED VALVES AND OPEN THE HEAT EXCHANGERS CHILLED WATER VALVES.

OTHER CONTROL SEQUENCES SHALL REMAIN AS EXISTING IN BAS SYSTEM FOR 160 NORTH MAIN.

NEW CHILLER FOR THE NEW CENTRAL PLANT AND 160 NORTH MAIN SHALL BE CONNECTED AND INTEGRATED TO THE EXISTING CENTRAL SERVER VIA BACNET MS/TP OR BACNET IP PROTOCOL.



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NO.	DATE	DESCRIPTION
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DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

MECHANICAL CONTROLS SEQUENCE OF OPERATION

DRAWN BY:	MW		
DESIGNED BY:	JSC		
CHECKED BY:	JSC		
Q.A.Q.C. BY:	CBB		
JOB NO.:	13650760	DRAWING NO.:	M6.3
PHASE:	CD		
DATE:	03-04-15		

Shelby County District Chill Water Loop Control Points List												
TAG/ID	Description	Analog Input	Analog Output	Digital Input	Digital Output	Setpoint Adjustable	Command/Override Control	Graphic	Alarm	Trend	Archive	Note
New 600 Ton Central Plant (157 Poplar Ave)												
P-PL-1	District Chill Water Loop Primary Pump											
Status	Current Transducer Switch			X				X	X	X	X	CT located in VFD
Start	Enable/Disable Command (Relay) for VFD				X		X	X	X	X	X	Low Volt Relay at VFD
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	4-20 mA Signal
Alarm	Alarm Status from VFD			X				X	X	X	X	VFD Fault Contacts
P-PL-2	District Chill Water Loop Primary Pump											
Status	Current Transducer Switch			X				X	X	X	X	CT located in VFD
Start	Enable/Disable Command (Relay) for VFD				X		X	X	X	X	X	Low Volt Relay at VFD
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	4-20 mA Signal
CHW FS	Chill Water Flow Switch			X				X	X	X	X	Bacnet Integration point from chiller
Alarm	Alarm Status from VFD			X				X	X	X	X	VFD Fault Contacts
PCHWS	Primary Chill Water Supply Temp	X						X	X	X	X	Probe type with SS immersion well
PCHWR	Primary Chill Water Return Temp	X						X	X	X	X	Probe type with SS immersion well
SCHWR	Secondary Chill Water Supply Temp	X				X		X	X	X	X	Probe type with SS immersion well
SCHWS	Secondary Chill Water Return Temp	X						X	X	X	X	Probe type with SS immersion well
Bypass	Chill Water Bypass Temp	X						X	X	X	X	Probe type with SS immersion well
BDFM	Bypass Chill Water Flow (GPM, Bi-Directional)	X						X	X	X	X	Onicon F3500
BDFM	Bypass Chill Water Flow (Direction)			X				X	X	X	X	Onicon F3500
BDFM	Bypass Chill Water Flow (Master Alarm)			X				X	X	X	X	Onicon F3500
CHW FM	Chill Water Flow Meter (GPM)	X						X	X	X	X	Onicon F1200
CW FM	Condenser Water Flow Meter (GPM)	X						X	X	X	X	Onicon F120
CT-1L	Central Plant Cooling Tower											
CWS	Condenser Water Supply Temp	X				X		X	X	X	X	Probe type with SS immersion well
CWR	Condenser Water Return Temp	X						X	X	X	X	Probe type with SS immersion well
CW FS	Condenser Water Flow Switch			X				X	X	X	X	BACnet Integration point from chiller
CW BYP Valve	Condenser Water Bypass Valve (V-157-4)	X	X			X		X	X	X	X	
CT-1L VFD	Cooling Tower Variable Frequency Drive											Hardwired I/O control points.
Amps	Motor Amperage	X						X	X	X	X	Amperage reading in VFD/Bypass
Alarm	Alarm Status from VFD			X				X	X	X	X	VFD Fault Contacts
Start	Enable/Disable Command (relay) for VFD				X		X	X	X	X	X	Low Volt Relay at VFD
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	4-20 mA Signal
P-CW-1	Central Plant Condenser Water Pump											Hardwired I/O control points.
Amps	Motor Amperage	X						X	X	X	X	Amperage reading in VFD/Bypass
Alarm	Alarm Status from VFD			X				X	X	X	X	VFD Fault Contacts
Start	Enable/Disable Command (relay) for VFD				X		X	X	X	X	X	Low Volt Relay at VFD
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	4-20 mA Signal
P-CW-2	Central Plant Condenser Water Pump											Hardwired I/O control points.
Amps	Motor Amperage	X						X	X	X	X	Amperage reading in VFD/Bypass
Alarm	Alarm Status from VFD			X				X	X	X	X	VFD Fault Contacts
Start	Enable/Disable Command (relay) for VFD				X		X	X	X	X	X	Low Volt Relay at VFD
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	4-20 mA Signal
CH-1L	New Central Plant Chiller											
CHW Setpt	Leaving Chill Water Setpoint					X		X	X	X	X	BACnet Integration point from chiller
CL Setpt	Current Limit Setpoint							X	X	X	X	BACnet Integration point from chiller
Amps A	Amperage Phase A	X						X	X	X	X	BACnet Integration point from chiller
Amps B	Amperage Phase B	X						X	X	X	X	BACnet Integration point from chiller
Amps C	Amperage Phase C	X						X	X	X	X	BACnet Integration point from chiller
Volts A	Voltage Phase A	X						X	X	X	X	BACnet Integration point from chiller
Volts B	Voltage Phase B	X						X	X	X	X	BACnet Integration point from chiller
Volts C	Voltage Phase C	X						X	X	X	X	BACnet Integration point from chiller
CHS	Chill Water Supply	X						X	X	X	X	BACnet Integration point from chiller
CHR	Chill Water Return	X						X	X	X	X	BACnet Integration point from chiller
CWS	Condenser Water Supply	X						X	X	X	X	BACnet Integration point from chiller
CWR	Condenser Water Return	X						X	X	X	X	BACnet Integration point from chiller
CH-1L SS	Chiller Enable/Disable Command					X		X	X	X	X	BACnet Integration point from chiller
CH-1L Comp	Chiller Compressor Status							X	X	X	X	BACnet Integration point from chiller
Fault	Max 20 Fault Codes based on customer preference							X	X	X	X	BACnet Integration point from chiller
Misc.	20 add'l control points based on customer preference							X	X	X	X	BACnet Integration point from chiller
157 Poplar Ave - Shelby County Office Building												
V-157-1	Chill Water Return Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-157-2	Chill Water Supply Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-157-3	Chiller Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-157-4	Cooling Tower Bypass Valve											
Open/Close	Control Command	X	X			X		X	X	X	X	
Position	Open position of valve							X	X	X	X	

Shelby County District Chill Water Loop Control Points List-Continued												
TAG/ID	Description	Analog Input	Analog Output	Digital Input	Digital Output	Setpoint Adjustable	Command/Override Control	Graphic	Alarm	Trend	Archive	Note
P-1	Existing Primary Chill Water Pump											
Status	Current Transducer Switch			X				X	X	X	X	Existing point.
Start	Enable/Disable Command				X		X	X	X	X	X	Existing point.
150 Washington Ave. - Old Jail												
V-150-3	Chill Water Return Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-150-2	Chill Water Supply Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-150-1	Chiller Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-150-5	Chiller Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-2	Interconnect Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-150-4	Heat Exchanger Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-1	Interconnect Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-3	Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
P-1	Secondary Chill Water Pump											
Amps	Motor Amperage	X						X	X	X	X	Existing point.
Start	Enable/Disable Command (relay) for VFD				X		X	X	X	X	X	Existing point.
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	Existing point.
P-2	Secondary Chill Water Pump											
Amps	Motor Amperage	X						X	X	X	X	Existing point.
Start	Enable/Disable Command (relay) for VFD				X		X	X	X	X	X	Existing point.
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	Existing point.
P-3	Primary Chill Water Pump											
Status	Current Transducer Switch			X				X	X	X	X	Existing point.
Start	Enable/Disable Command				X		X	X	X	X	X	Existing point.
P-4	Primary Chill Water Pump											
Status	Current Transducer Switch			X				X	X	X	X	Existing point.
Start	Enable/Disable Command				X		X	X	X	X	X	Existing point.
P-7	Heat Exchanger Chill Water Pump											
Status	Current Transducer Switch			X				X	X	X	X	Existing point.
Start	Enable/Disable Command				X		X	X	X	X	X	Existing point.
CH-1	Existing Chiller											
CH-1 SS	Enable/Disable Command					X		X	X	X	X	Existing point.
CH-1 Status	Current Transducer Switch						X	X	X	X	X	Existing point.
CHWS	Chill Water Supply Temp	X						X	X	X	X	Existing point.
CHWR	Chill Water Return Temp	X						X	X	X	X	Existing point.
CH-2	Existing Chiller											
CH-2 SS	Enable/Disable Command					X		X	X	X	X	Existing point.
CH-2 Status	Current Transducer Switch						X	X	X	X	X	Existing point.
CHWS	Chill Water Supply Temp	X						X	X	X	X	Existing point.
CHWR	Chill Water Return Temp	X						X	X	X	X	Existing point.



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NO.	DATE	DESCRIPTION
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DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

MECHANICAL CHILLED WATER LOOP CONTROL POINTS LIST

DRAWN BY:	MW	
DESIGNED BY:	JSC	
CHECKED BY:	JSC	
Q.A.Q.C. BY:	CBB	
JOB NO.:	13650760	

Shelby County District Chill Water Loop
Control Points List-Continued

TAG/ID	Description	Analog		Digital		Setpoint Adjustable	Command/Override Control	Graphic	Alarm	Trend	Archive	Note
		Input	Output	Input	Output							
CHW DP	Chill Water Differential Pressure Transducer	X				X		X	X	X	X	Existing point.
140 Adams Ave. - Shelby County Courthouse												
V-1	Interconnect Valve											
Control Signal	Control Command		X				X	X	X	X	X	Modulating Actuator
Position	Open position of valve	X						X	X	X	X	
V-2	Interconnect Valve											
Control Signal	Control Command		X				X	X	X	X	X	Modulating Actuator
Position	Open position of valve	X						X	X	X	X	
V-140-1	Chiller Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-140-3	HX Isolation Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-140-2	Interconnect Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
V-140-4	Interconnect Valve											
Open/Close	Control Command				X		X	X	X	X	X	
Position	Open position of valve			X				X	X	X	X	
P-1	Primary Chill Water Pump											Hardwired I/O points.
Amps	Motor Amperage	X						X	X	X	X	Amperage reading in VFD/Bypass
Alarm	Alarm Status from VFD			X				X	X	X	X	VFD Fault Contacts
Start	Enable/Disable Command (relay) for VFD				X		X	X	X	X	X	Low Volt Relay at VFD
Speed	Control Signal to VFD for speed modulation		X			X		X	X	X	X	4-20 mA Signal
FM-1	Flow meter (flow: Building 140 to Building 150)											
GPM	Flow	X				X		X	X	X	X	Existing point.
FM-2	Flow meter (flow: Building 150 to Building 140)											
GPM	Flow	X				X		X	X	X	X	Existing point.
CH-140-1	Existing Chiller				X		X	X	X	X	X	Existing point.
CH-140-1 SS	Enable/Disable Command				X		X	X	X	X	X	Existing point.
CH-140-1 Status	Current Transducer Switch			X				X	X	X	X	Existing point.
CHS	Chill Water Supply Temp	X						X	X	X	X	Existing point.
CHR	Chill Water Return Temp	X						X	X	X	X	Existing point.
160 North Main St. - Administration Building												
CH-3	New 300 Ton Chiller											
CHW Setpt	Leaving Chill Water Setpoint					X		X	X	X	X	BACnet Integration point from chiller
CL Setpt	Current Limit Setpoint					X		X	X	X	X	BACnet Integration point from chiller
Amps A	Amperage Phase A	X						X	X	X	X	BACnet Integration point from chiller
Amps B	Amperage Phase B	X						X	X	X	X	BACnet Integration point from chiller
Amps C	Amperage Phase C	X						X	X	X	X	BACnet Integration point from chiller
Volts A	Voltage Phase A	X						X	X	X	X	BACnet Integration point from chiller
Volts B	Voltage Phase B	X						X	X	X	X	BACnet Integration point from chiller
Volts C	Voltage Phase C	X						X	X	X	X	BACnet Integration point from chiller
CHS	Chill Water Supply	X						X	X	X	X	BACnet Integration point from chiller
CHR	Chill Water Return	X						X	X	X	X	BACnet Integration point from chiller
CWS	Condenser Water Supply	X						X	X	X	X	BACnet Integration point from chiller
CWR	Condenser Water Return	X						X	X	X	X	BACnet Integration point from chiller
CH-1L SS	Chiller Enable/Disable Command						X	X	X	X	X	BACnet Integration point from chiller
CH-1L Comp	Chiller Compressor Status							X	X	X	X	BACnet Integration point from chiller
Fault	Max 20 Fault Codes based on customer preference							X	X	X	X	BACnet Integration point from chiller
Misc.	20 add.l control points based on customer preference							X	X	X	X	BACnet Integration point from chiller

Graphics

System wide graphic of all chillers, primary chill water pumps, secondary chill water pumps, secondary temperature control temperature, pressure, flow.

System wide graphic of all control valves, equipment scheduling functions (lead/lag/fault/maintenance) on pumps and chillers.

Building graphic of local chiller, pump controls. (each building)

Alarm screens for each graphic page and data represented therein.

Trend screens for each graphic page and data presented therein.

Trend and archive data of all control points (hardwired, BACnet integration and setpoints) 15 minute intervals.

All control points are controlled, trended, alarmed, archived and served from Shelby County Network Server

Existing control points are required to be controlled via hardwire or integration to central server controlling new central plant and displayed on graphics, trended, alarmed and archived therein.

Automatic operation of system from central server command/control. Failure of central system will place each building HVAC and controls back into standalone operation.

Where multiple pumps/chillers/towers/etc. exist control graphic screens will be created whereby the system operator shall have the ability to setup lead/lag/alternate/out of service control by point and click on the graphic screen. Upon failure or rotation of HVAC equipment BAS controls shall automatically start/stop, enable/disable, open/close all devices in accordance with

sequence/s of operation. All sequences of control from the existing central server with modifications for new modes included.

Flow meters and installation kits to be provided by controls contractor and installed by mechanical contractor (Division 23).

Butterfly valves, actuators and linkage to be provided by control contractor and installed in piping by mechanical contractor (Division 23).



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NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

MECHANICAL CHILLED WATER LOOP CONTROL POINTS LIST

DRAWN BY: MW
DESIGNED BY: JSC
CHECKED BY: JSC
Q.A.Q.C. BY: CBB



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO:
M6.5

LEGEND		
SYMBOL	DESCRIPTION	MOUNTING HEIGHT
POWER - RECEPTACLES		
	120V. GFI RECEPTACLE - IVORY (SPECIAL MOUNTING HEIGHT)	AS NOTED OR SEE SPECS
	SURFACE METAL RACEWAY	
SWITCHES		
NORMAL	CRITICAL	
	MOTOR RATED SWITCH WITH THERMAL OVERLOAD	
	PUSH BUTTON SWITCH (MUSHROOM BUTTON)	3'-10" AFF TO CL
RACEWAY		
	CONDUIT & BRANCH CIRCUIT WIRING	
	BRANCH CIRCUIT RACEWAY CONCEALED IN OR BELOW FLOOR SLAB OR BELOW GRADE	
	FEEDER RACEWAY CONCEALED IN OR BELOW FLOOR SLAB OR BELOW GRADE	
	EXPOSED CONDUIT & BRANCH CIRCUIT WIRING	
	RACEWAY TURNING UP AS VIEWED FROM THE LOAD	
	RACEWAY TURNING DOWN AS VIEWED FROM THE LOAD	
	RACEWAY VERTICAL RISER WITH HORIZONTAL CONTINUATION AT TWO LEVELS SHOWN	
	CAPPED RACEWAY	
	CIRCUIT CONTINUATION	
	HOMERUN TO PANELBOARD - NUMBER OF ARROWHEADS INDICATES NUMBER OF #12 AWG PHASE CONDUCTORS. FOR MINIMUM CONDUIT REFER TO SPECIFICATION. NOTES: 1. #12 AWG NEUTRAL CONDUCTOR, ALTHOUGH NOT INDICATED, SHALL BE INCLUDED IN EACH RACEWAY UNLESS OTHERWISE NOTED. 2. #12 AWG GREEN GROUND CONDUCTOR, ALTHOUGH NOT INDICATED, SHALL BE INCLUDED IN EACH RACEWAY UNLESS OTHERWISE NOTED. 3. HOMERUNS TO PANELBOARDS SHALL HAVE A MAXIMUM OF THREE BRANCH CIRCUITS. PROVIDE A SEPARATE NEUTRAL CONDUCTOR WITH EACH PHASE CONDUCTOR FOR ALL BRANCH CIRCUITS.	
FIRE ALARM		
	FIRE ALARM MANUAL PULL STATION	
	FIRE ALARM HEAT DETECTOR	
	FIRE ALARM SMOKE DETECTOR	
	FIRE ALARM SMOKE DETECTOR (HVAC DUCT MOUNTED)	
	MONITOR-INDIVIDUAL ADDRESSABLE MODULE	
	RELAY-INDIVIDUAL ADDRESSABLE MODULE	
	FIRE ALARM WATERFLOW SWITCH	
	FIRE ALARM HORN	
	FIRE ALARM FLASHING LIGHT	
	FIRE ALARM COMBINATION HORN & FLASHING LIGHT	
	SPRINKLER SYSTEM PRESSURE SWITCH	
	SPRINKLER SYSTEM SOLENOID VALVE	
	FIRE ALARM TAMPERS SWITCH	
	SPRINKLER SYSTEM POST INDICATOR VALVE TAMPERS SWITCH	
	MAGNETIC DOOR HOLDER	

MISCELLANEOUS		
SYMBOL	DESCRIPTION	MOUNTING HEIGHT
	NON-FUSIBLE SAFETY SWITCH, SIZE AS NOTED (AMP RATING/POLES)	
	FUSIBLE SAFETY SWITCH, SIZE AS NOTED (AMP RATING/POLES)	
	COMBINATION MOTOR STARTER	
	FACTORY WIRED CONTROLLER OR EQUIPMENT	
	MOTOR CONNECTION	
	JUNCTION BOX	
	PANELBOARD - SURFACE MOUNTED	
	VARIABLE FREQUENCY DRIVE	
	EQUIPMENT NOT FURNISHED UNDER DIV. 16 (SPECIFIED IN OTHER THAN DIV. 16)	

ABBREVIATIONS		
AFF	ABOVE FINISHED FLOOR	
AFG	ABOVE FINISHED GRADE	
AF	AMPERES FRAME	
AT	AMPERES TRIP	
MH	UTILITY ELECTRICAL MANHOLE (MLGW)	
S	SAFETY TYPE	
TV	TRANSFORMER VAULT (MLGW)	
WP	WEATHERPROOF	

DEMOLITION GENERAL REFERENCE NOTES		
D1.	REMOVE ELECTRICAL WIRING FROM CONDUITS FOR ELECTRICAL, MECHANICAL, AND PLUMBING EQUIPMENT BACK TO RESPECTIVE PANELBOARD. CUT OFF, CAP IN JOIST AREA AND LABEL AS SPARE CONDUITS.	
D2.	NOT USED.	
D3.	EXISTING CEILING LIGHTS (IN AREAS IDENTIFIED ON DEMOLITION SHEETS) ARE TO BE REMOVED AND PRESERVED FOR REUSE. COORDINATE REMOVAL AS REQUIRED WITH MECHANICAL. EXISTING CONDUITS SHALL BE REUSED, SECURE CONDUITS AS REQUIRED AND PROTECT FROM PHYSICAL DAMAGE. DAMAGED CONDUITS SHALL BE REPLACED.	
D4.	ELECTRICAL COMMUNICATIONS EQUIPMENT, DATA CONDUCTORS, RACEWAYS AND ANCILLARY EQUIPMENT SUPPORTED FROM MECHANICAL EQUIPMENT REMOVED SHALL BE SECURED WITH TEMPORARY SUPPORTS DURING CONSTRUCTION AND RESECURED AFTER CONSTRUCTION IS COMPLETED.	
D5.	ELECTRICAL CONDUITS AND PENETRATIONS ON ROOF AND/ OR EXTERIOR MOUNTED EQUIPMENT SHALL BE CAPPED AND PROTECTED FROM WEATHER DAMAGE DUE TO LEAKAGE.	
D6.	MECHANICAL EQUIPMENT BEING REMOVED AND NOT BEING REPLACED SHALL HAVE WIRING REMOVED AND CONDUITS CAPPED AND LABELED AS SPARE WITH INFORMATION IDENTIFYING TERMINATION POINT AT OTHER END.	
D7.	COORDINATE ALL ELECTRICAL DEMOLITION WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND PLUMBING.	

CODE NOTES	
DESCRIPTION	
2009 INTERNATIONAL BUILDING CODE W/ LOCAL AMENDMENTS	
2009 INTERNATIONAL EXISTING BUILDING CODE	
2009 INTERNATIONAL FIRE CODE	
2009 INTERNATIONAL MECHANICAL CODE	
2009 U.L. FIRE RESISTANCE DIRECTORY, VOL. 1 & VOL. 2	
20137 NATIONAL FIRE ALARM CODE / NFPA 72	
2008 NATIONAL ELECTRIC CODE / NFPA 70	
ATTENTION:	
THIS CONTRACTOR SHALL BE AWARE THAT ONCE THESE PLANS HAVE BEEN SUBMITTED FOR LOCAL CODE PLAN REVIEW AND LOCAL CODE PLAN REVIEW HAS APPROVED THE DRAWINGS FOR CONSTRUCTION PERMIT ISSUE, THE DESIGN PARAMETERS AND LAYOUT OF EQUIPMENT CANNOT BE CHANGED OR MODIFIED IN THE FIELD. ALL CHANGES TO THE DESIGN PARAMETERS AND LAYOUT OF EQUIPMENT ARE REQUIRED TO BE ACCOMPLISHED UNDER THE DIRECTION OF A REGISTERED ENGINEER AND SEALED BY THE SAME. REVISED PLANS, WITH CHANGES IDENTIFIED, SHALL BE RESUBMITTED FOR LOCAL CODE PLAN REVIEW.	

GENERAL REFERENCE NOTES	
1.	ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH DIVISION 26 SPECIFICATIONS, NATIONAL ELECTRICAL CODE, AND ALL OTHER APPLICABLE STANDARDS AND REGULATIONS AS ENFORCED BY THE AUTHORITY HAVING JURISDICTION.
2.	ALL EXTERIOR ABOVE-GROUND CONDUIT SHALL BE RIGID GALVANIZED STEEL CONDUIT WITH CORROSION RESISTANT FITTINGS, CLAMPS AND SUPPORTS. USE OF OTHER THAN RIGID GALVANIZED STEEL CONDUIT SHALL BE AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE.
3.	OUTAGES AND SHUTDOWNS ARE TO BE COORDINATED AND SCHEDULED WITH THE OWNER'S REPRESENTATIVE PRIOR TO EXECUTION.
4.	IN THE EVENT OF CONFLICTS BETWEEN THE DRAWINGS, SPECIFICATIONS, CODES AND REGULATIONS, THE STRICTER REQUIREMENT SHALL BE FOLLOWED UNLESS PRIOR APPROVAL IS OBTAINED FROM THE OWNER'S REPRESENTATIVE.
5.	ALL EMPTY CONDUITS ARE TO BE CAPPED OR PLUGGED AT BOTH ENDS WITH A 200# PULL CORD IN EACH CONDUIT.
6.	3/4" CONDUIT MINIMUM WITH #12AWG MINIMUM FOR POWER UNLESS OTHERWISE NOTED.
7.	LOCATION OF UTILITIES AND UNDERGROUND STRUCTURES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL DETERMINE EXACT LOCATION AND EXISTENCE OF ALL UTILITIES AND UNDERGROUND STRUCTURES IN DEFINED CONSTRUCTION AREAS.
8.	ALL PENETRATIONS IN EXTERIOR WALLS AND ROOF SHALL BE SEALED WITH WEATHER PROOF SEALANT HAVING COLOR TO MATCH EXISTING BUILDING EXTERIOR FINISH.
9.	CONTROL WIRING AND CONDUITS SHALL BE COORDINATED WITH MECHANICAL.
10.	ALL EQUIPMENT LOCATIONS AND CONDUIT ROUTES ARE APPROXIMATE AND ARE SHOWN FOR REFERENCE AND CLARITY. EXACT LOCATIONS SHALL BE VERIFIED WITH ALL OTHER DISCIPLINES PRIOR TO ROUGH-IN.
11.	CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO PERFORMING ANY DEMOLITION OR NEW WORK.
12.	COORDINATE WITH DIVISION 23 FOR FINAL LOCATIONS OF ALL HVAC EQUIPMENT, CONTROL DEVICES, ETC. ELECTRICAL CONTRACTOR SHALL REVIEW THE PERTINENT AND APPROVED DIV. 23 SHOP DRAWINGS TO DETERMINE ALL ELECTRICAL ROUGH-IN REQUIREMENTS, POINT(S) OF CONNECTION AND EQUIPMENT VOLTAGES/AMPERAGE/PHASE. WHEN THE EQUIPMENT HAS BEEN DELIVERED TO THE PROJECT SITE, ELECTRICAL CONTRACTOR SHALL VERIFY WITH THE EQUIPMENT NAMEPLATE ALL ELECTRICAL CHARACTERISTICS AND REQUIREMENTS FOR ALL EQUIPMENT. FUSE SIZE ADJUSTMENT MAY BE REQUIRED, BUT IN ALL CASES THE FUSE TYPE SHALL BE DUAL ELEMENT-TIME DELAY, CLASS RK-5.
13.	ALL ELECTRICAL EQUIPMENT FURNISHED UNDER OTHER DIVISIONS OF THE CONTRACT THAT ARE LISTED OR LABELED TO BE FUSED, PROVIDE FUSIBLE DISCONNECT(S) WITH FUSE SIZE AND TYPE REQUIRED.
14.	ALL PENETRATIONS OF FIRE-RATED FLOORS AND WALLS SHALL BE PROTECTED BY MATERIAL AND INSTALLATION DETAILS THAT CONFORM TO UL LISTING FOR THROUGH-PENETRATION FIRE STOP SYSTEMS.
15.	ALL VFD'S AND MOTOR STARTERS SHOWN AS FURNISHED BY DIV. 23 SHALL BE CONNECTED BY DIV. 26.
16.	CONDUCTORS AND CONDUITS FOR CONTROL SYSTEMS SHALL BE COORDINATED WITH DIV. 23 AND CONSIDERED PART OF THIS CONTRACT.
17.	CONTRACTOR SHALL COORDINATE WITH LOCAL UTILITY COMPANY FOR POWER TO CONSTRUCTION TRAILER.
18.	CONTRACTOR MUST VERIFY CIRCUIT BREAKER SIZE FOR ALL NEW MECHANICAL EQUIPMENT BEING INSTALLED.

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NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

ELECTRICAL GENERAL NOTES & LEGEND

DRAWN BY: TV
 DESIGNED BY: TV
 CHECKED BY: HL
 Q.A.Q.C. BY: HL



JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO.:
E0.1

GENERAL NOTES

1. SEE SHEET E0.1 FOR GENERAL NOTES & LEGEND.
2. SEE SHEET E1.0 FOR ELECTRICAL SITE PLAN.
3. SEE SHEET E5.1 FOR PANEL SCHEDULES.
4. SEE SHEET E6.1 FOR SINGLE LINE/ RISER DIAGRAMS.

DEMO KEYED NOTES

- D1 EXISTING BOILERS TO BE TEMPORARILY DISCONNECTED AND RECONNECTED AS REQUIRED FOR THE INSTALLATION OF THE NEW CHILLER. COORDINATE WITH DIVISION 23.
- D2 EMERGENCY GENERATOR SHALL ALSO BE TEMPORARILY DISCONNECTED AND RECONNECTED AS REQUIRED FOR THE INSTALLATION OF THE NEW CHILLER. COORDINATE WITH DIVISION 23. PROVISIONS SHALL BE MADE FOR BACK-UP EMERGENCY POWER TO INSURE A MINIMUM INTERRUPTION OF EMERGENCY POWER. COORDINATE WITH DIVISION 23.
- D3 ALL EXISTING EQUIPMENT IN THE SHADED AREA EITHER BEING A PART OF OR BEING FED FROM THE ELECTRICAL SYSTEM SHALL BE TEMPORARILY DISCONNECTED AND/OR RELOCATED AS NEEDED FOR THE CHILLER INSTALLATION. EQUIPMENT NEEDING TEMPORARY SUPPORTS DURING THE INSTALLATION SHALL BE COORDINATED WITH DIVISION 23 CONTRACTOR.

KEYED NOTES

- 1 REFRIGERATION MONITORING PANEL. PROVIDE 120, 1 PHASE, 60 HZ POWER. ADD MONITORING MODULE AND INTERFACE TO EXISTING BUILDING FIRE ALARM SYSTEM. COORDINATE LOCATION WITH DIVISION 23. FIRE ALARM CONTROL PANEL AND ANCILLARY DEVICES AND WIRING, ETC. SHALL BE MODIFIED AS NECESSARY TO ACCOMMODATE ADDITIONAL EQUIPMENT.
- 2 CHEMICAL FEED CONTROL PANEL. PROVIDE 120 VOLT POWER. COORDINATE EXACT LOCATION WITH DIVISION 23.
- 3 RECEPTACLES FOR CHEMICAL FEED PUMPS. COORDINATION PLUG CONFIGURATION WITH DIVISION 23.
- 4 LABEL DISTRIBUTION PANEL AS DP-CH-1L AS 480 VOLTS, 3 PHASE, 4 WIRE FED FROM SERVICE DISCONNECT AT COOLING TOWER AREA.
- 5 INSURE ALL PUMPS AND CHILLER ARE LABELED AS 480 VOLTS FED FROM DISTRIBUTION PANEL DP-CH-1L.
- 6 EXISTING BUILDING MSB SHALL BE LABELED AS "SERVICE DISCONNECT-THIS BUILDING HAS MULTIPLE DISCONNECTS WITH ADDITIONAL SERVICE DISCONNECT ON EXTERIOR IN COOLING TOWER AREA" IN ACCORDANCE WITH NEC ARTICLE 230 WITH REGARD TO LABELING FOR MULTIPLE SERVICES. THE SERVICE DISCONNECT IN THE COOLING TOWER AREA SHALL ALSO BE LABELED IN A SIMILAR MANNER AS THE MSB.

RATED WALL LEGEND	
SYMBOL	DESCRIPTION
	1-HR RATED FIRE PARTITION
	1-HR RATED FIRE BARRIER
	2-HR RATED FIRE BARRIER
	3-HR RATED FIRE BARRIER

NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

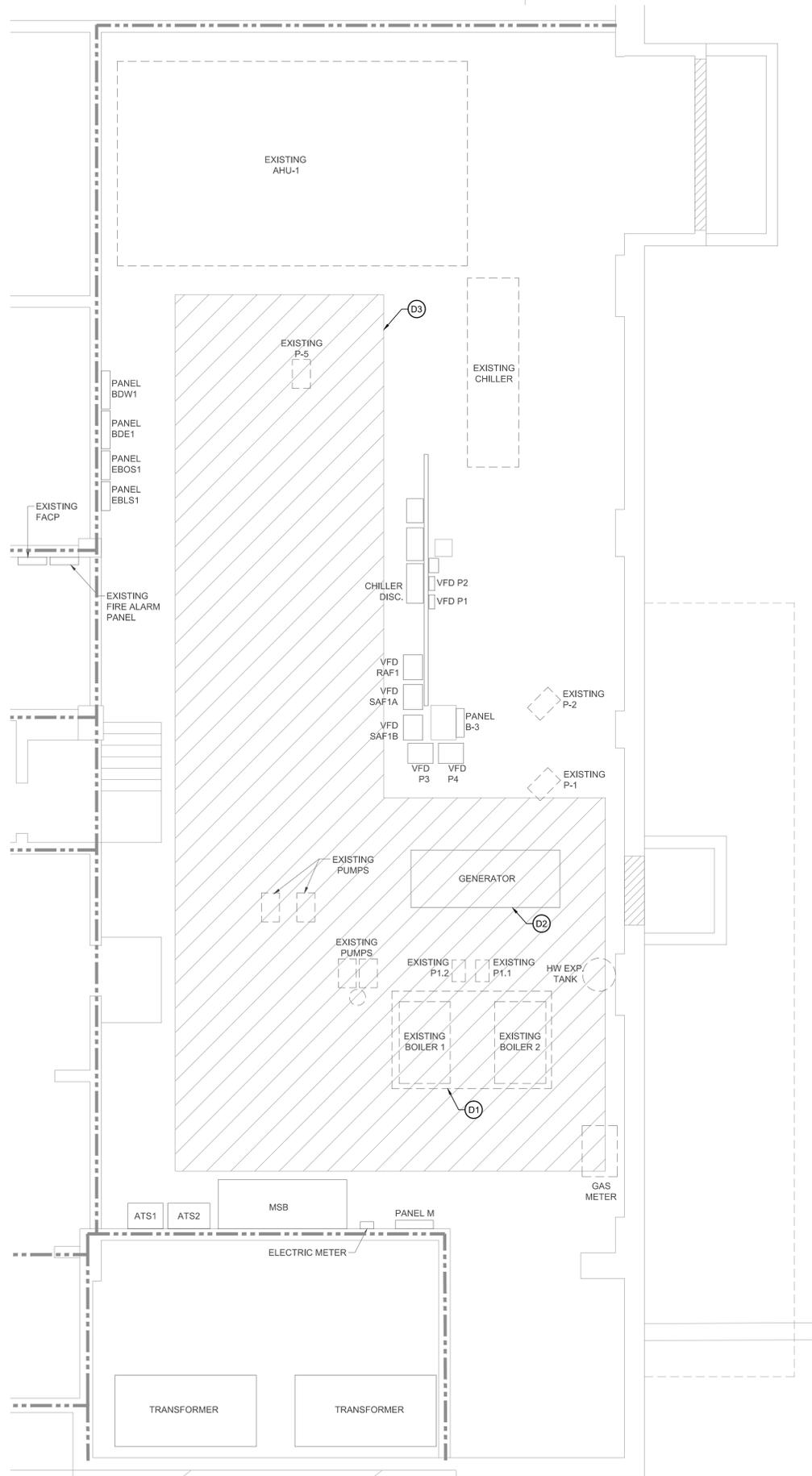
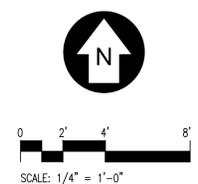
ELECTRICAL
 BASEMENT MECH. ROOM 157
 POPLAR AVE SHELBY COUNTY
 OFFICE BLDG

DRAWN BY: TV
 DESIGNED BY: HL
 CHECKED BY: HL
 Q.A.Q.C. BY: HL

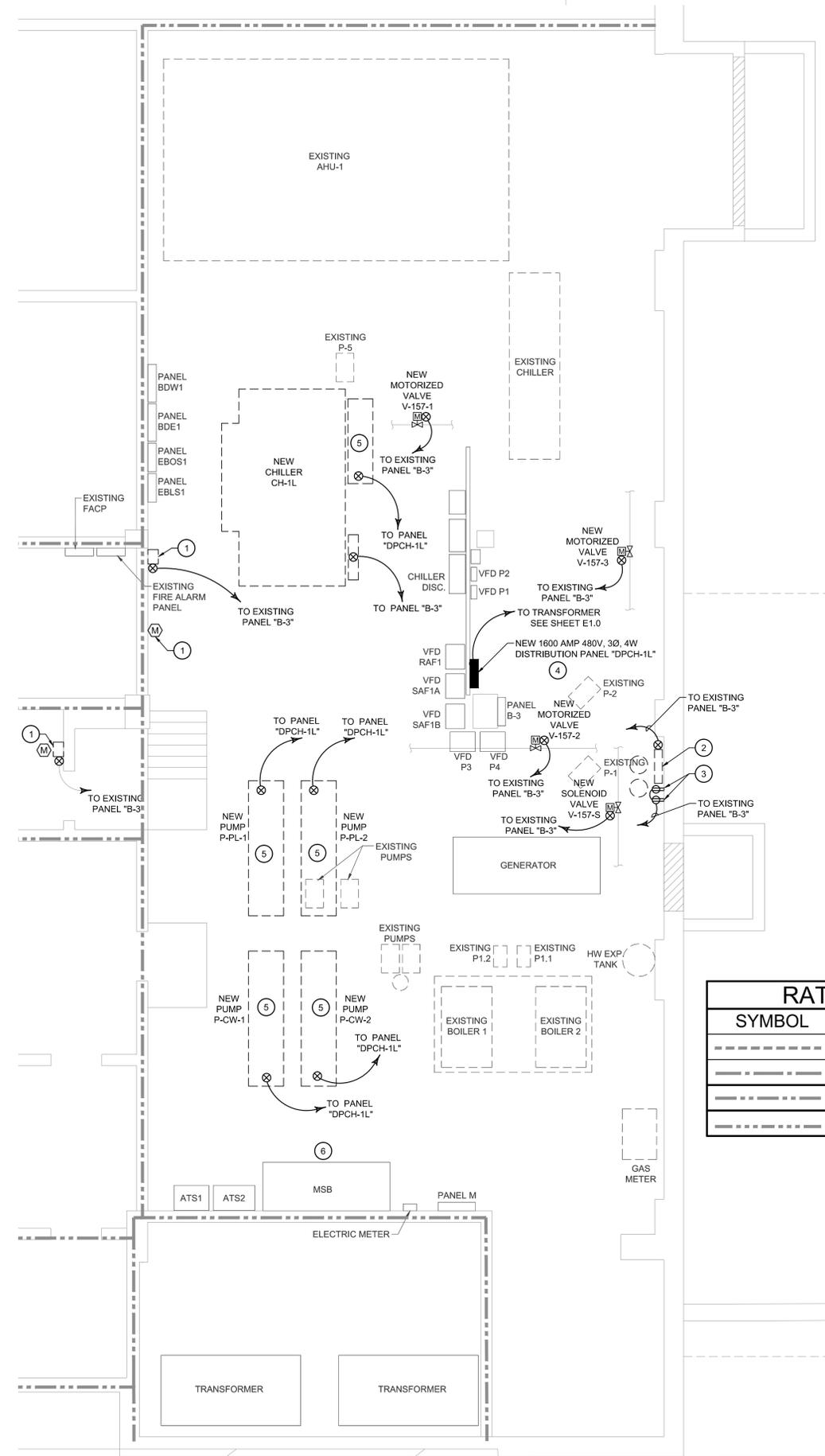


JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO.:
E1.1



1 BASEMENT POWER DEMO PLAN
 1/4" = 1'-0"



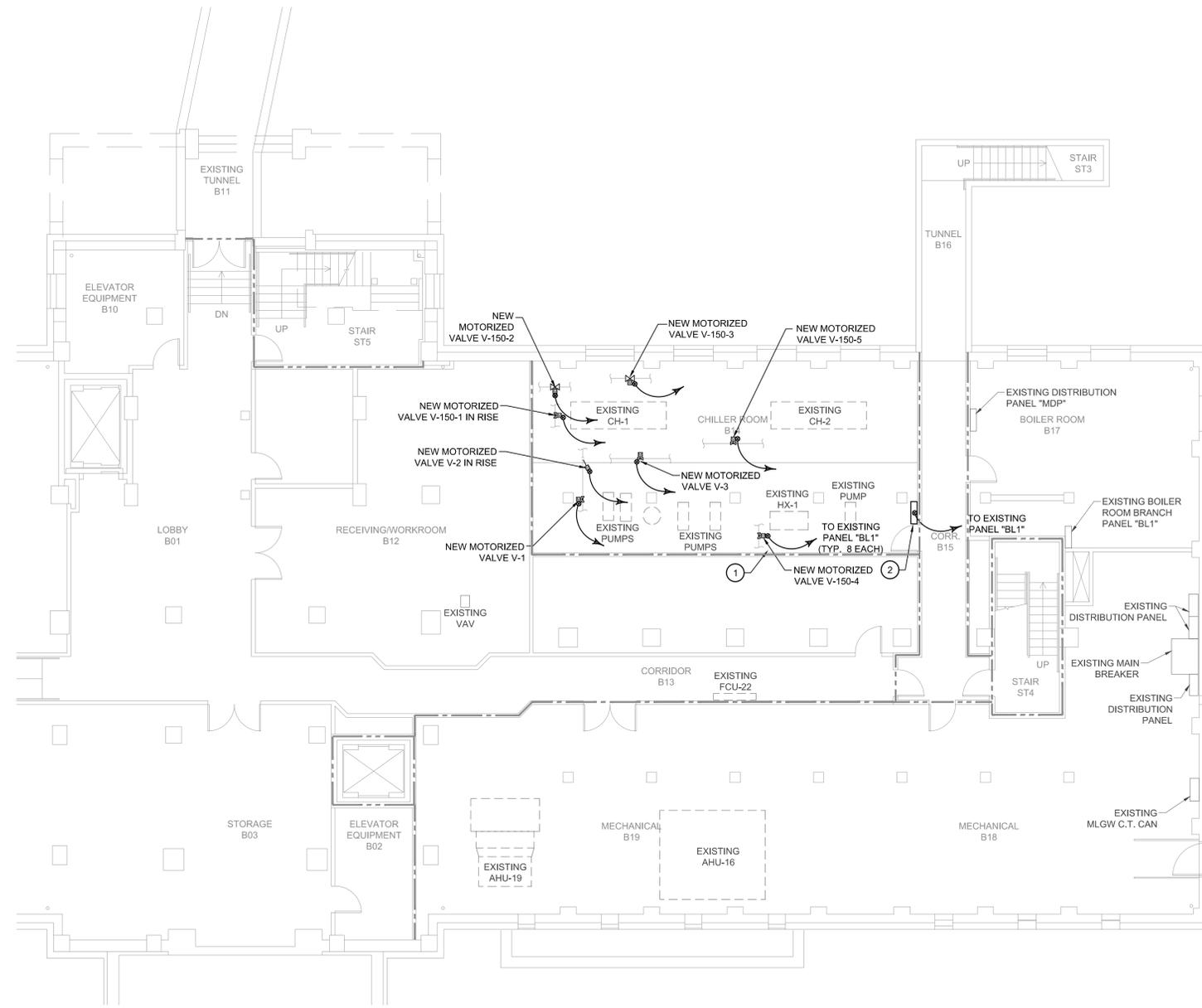
2 BASEMENT POWER PLAN
 1/4" = 1'-0"

KEYED NOTES

- ① PROVIDE 120, 1 PHASE, 60 HZ POWER (AND MOTOR RATED SINGLE PHASE DISCONNECT) FOR EACH CONTROL VALVE FROM EXISTING PANEL BOARD IDENTIFIED AS PANEL "BL-1". CONTROL SHALL BE COORDINATED WITH DIVISION 23. SEE SHEET M6.4 FOR REFERENCE.
- ② CONTROL PANEL. PROVIDE 120 VOLT POWER. COORDINATE EXACT LOCATION WITH DIVISION 23.

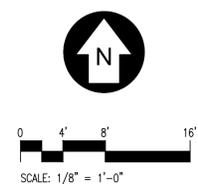
GENERAL NOTES

- 1. SEE SHEET E0.1 FOR GENERAL NOTES & LEGEND.
- 2. SEE SHEET E1.0 FOR ELECTRICAL SITE PLAN.
- 3. SEE SHEET E5.1 FOR PANEL SCHEDULES.
- 4. SEE SHEET E6.1 FOR SINGLE LINE/ RISER DIAGRAMS.



1 BASEMENT POWER PLAN
1/8" = 1'-0"

RATED WALL LEGEND	
SYMBOL	DESCRIPTION
----	1-HR RATED FIRE PARTITION
— — — —	1-HR RATED FIRE BARRIER
— — — — —	2-HR RATED FIRE BARRIER
— — — — — —	3-HR RATED FIRE BARRIER



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NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

ELECTRICAL
PARTIAL BASEMENT FLOOR PLAN
150 WASHINGTON AVE. OLD JAIL

DRAWN BY: TV
DESIGNED BY: HL
CHECKED BY: HL
Q.A.Q.C. BY: HL



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO.:
E1.2

KEYED NOTES

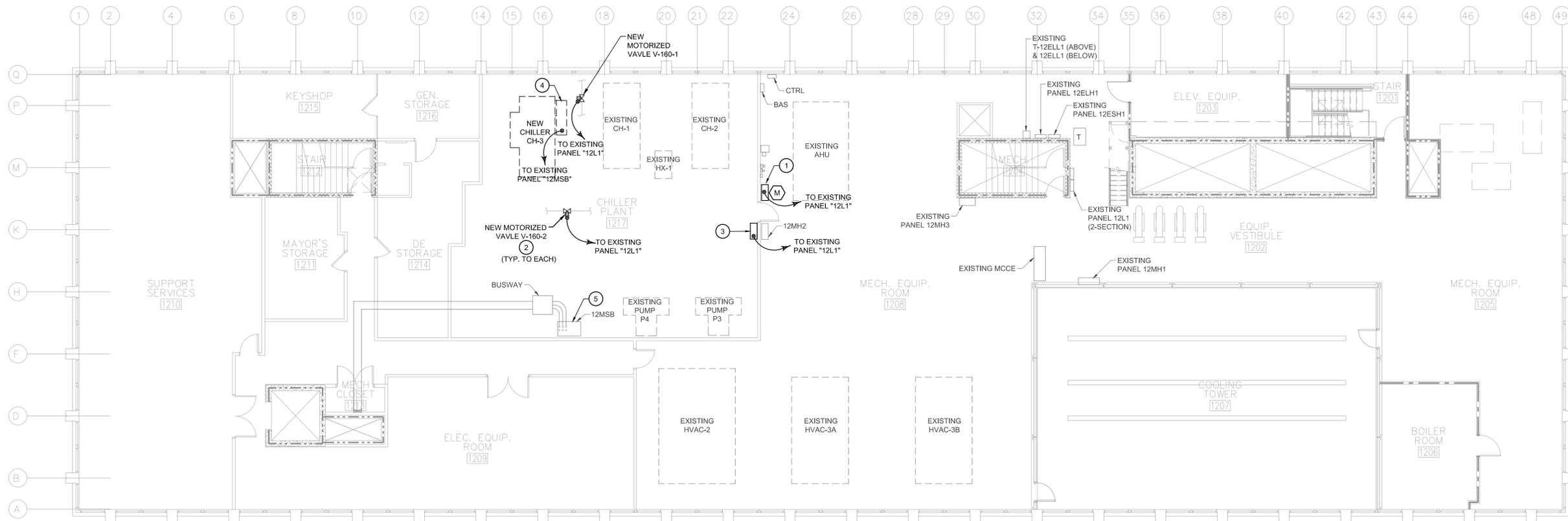
- 1 REFRIGERATION MONITORING PANEL. PROVIDE 120, 1 PHASE, 60 HZ POWER. ADD MONITORING MODULE AND INTERFACE TO EXISTING BUILDING FIRE ALARM SYSTEM. COORDINATE LOCATION WITH DIVISION 23. FIRE ALARM CONTROL PANEL AND ANCILLARY DEVICES AND WIRING, ETC. SHALL BE MODIFIED AS NECESSARY TO ACCOMMODATE ADDITIONAL EQUIPMENT.
- 2 PROVIDE 120, 1 PHASE, 60 HZ POWER (AND MOTOR RATED SINGLE PHASE DISCONNECT) FOR EACH CONTROL VALVE FROM EXISTING PANEL BOARD IDENTIFIED AS PANEL "12L1". CONTROL SHALL BE COORDINATED WITH DIVISION 23. SEE SHEET M6.4 FOR REFERENCE.
- 3 CONTROL PANEL. PROVIDE 120 VOLT POWER. COORDINATE EXACT LOCATION WITH DIVISION 23.
- 4 PROVIDE NEW CONDUIT AND WIRING FOR CHILLER "CH-3". COORDINATE VFD LOCATION WITH DIVISION 23. SEE CONDUIT AND CONDUCTOR SCHEDULES ON SHEETS E5.1 & E6.1.
- 5 PROVIDE NEW BREAKER IN EXISTING PANEL BOARD FOR CHILLER "CH-3". COORDINATE WITH DIVISION 23 AND SEE SHEET E5.1.

GENERAL NOTES

1. SEE SHEET E0.1 FOR GENERAL NOTES & LEGEND.
2. SEE SHEET E1.0 FOR ELECTRICAL SITE PLAN.
3. SEE SHEET E5.1 FOR PANEL SCHEDULES.
4. SEE SHEET E6.1 FOR SINGLE LINE/ RISER DIAGRAMS.

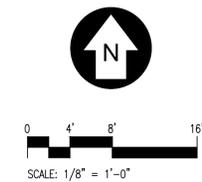


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1 12TH FLOOR CHILLER ROOM POWER PLAN
 1/8" = 1'-0"

RATED WALL LEGEND	
SYMBOL	DESCRIPTION
---	1-HR RATED FIRE PARTITION
----	1-HR RATED FIRE BARRIER
-----	2-HR RATED FIRE BARRIER
-----	3-HR RATED FIRE BARRIER



NO: DATE DESCRIPTION

BUILDING

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

ADDRESS
 MEMPHIS TN, 38103

ELECTRICAL
 12TH FLOOR NORTH MECHANICAL
 PLAN 160 N. MAIN ST.
 ADMINISTRATION

DRAWN BY: TV
 DESIGNED BY: HL
 CHECKED BY: HL
 Q.A.Q.C. BY: HL



JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO.:
E1.3

GENERAL NOTES

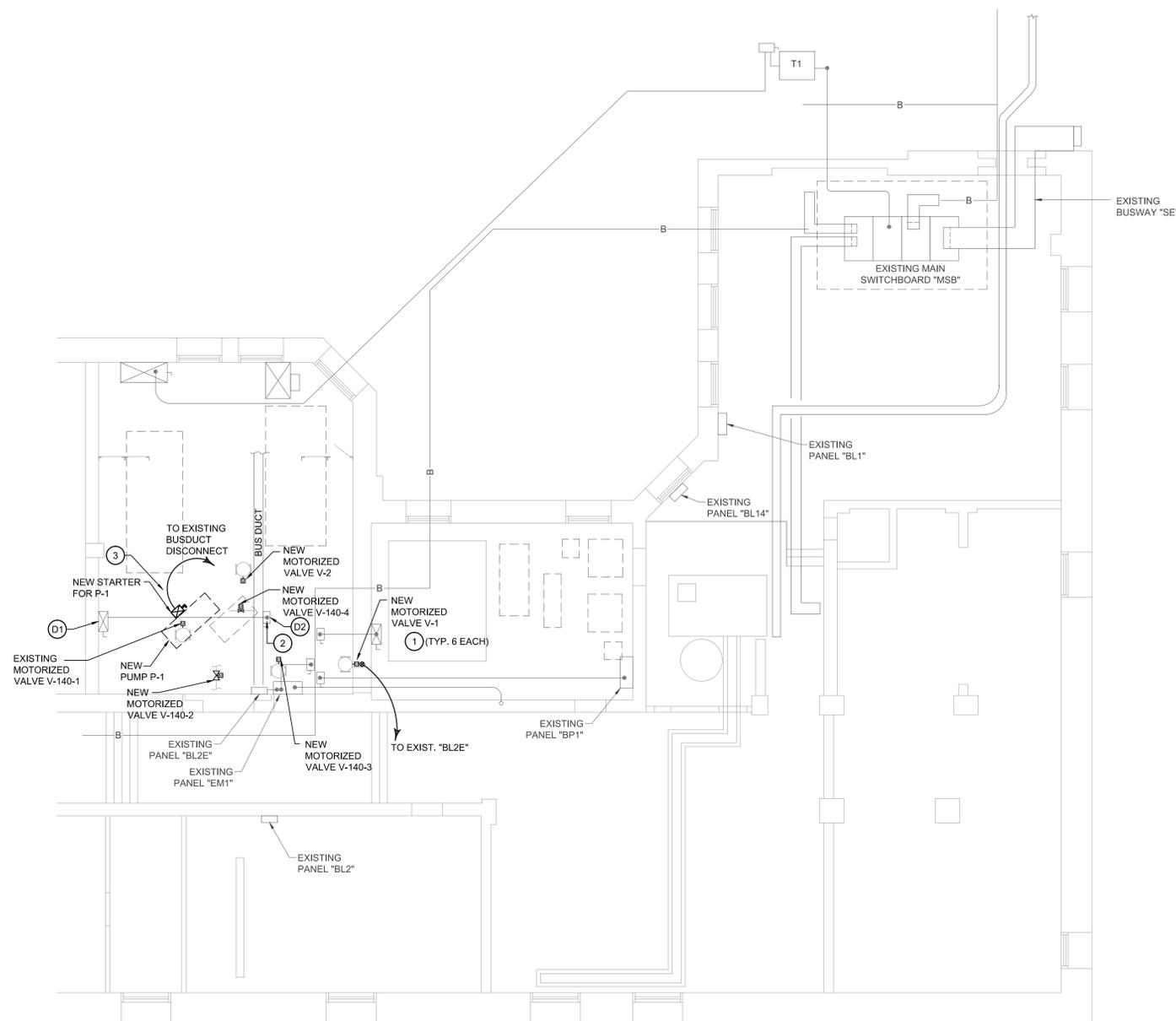
1. SEE SHEET E0.1 FOR GENERAL NOTES & LEGEND.
2. SEE SHEET E1.0 FOR ELECTRICAL SITE PLAN.
3. SEE SHEET E5.1 FOR PANEL SCHEDULES.
4. SEE SHEET E6.1 FOR SINGLE LINE/ RISER DIAGRAMS.

DEMO KEYED NOTES

- (D1) DISCONNECT CONDUCTORS, REMOVE AND DISCARD THE EXISTING PUMP "P1" MOTOR STARTER.
- (D2) DISCONNECT CONDUCTORS AND CONDUIT FROM EXISTING FUSED BUS DUCT DISCONNECT (LOCATED AT THE CEILING LEVEL). FUSED BUS DUCT SHALL BE PRESERVED FOR POSSIBLE REUSE.
- (D3) REMOVE EXISTING CONDUIT AND CONDUCTORS FROM BUS DUCT TO MOTOR STARTER.

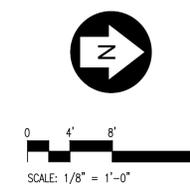
KEYED NOTES

- (1) PROVIDE 120, 1 PHASE, 60 HZ POWER (AND MOTOR RATED SINGLE PHASE DISCONNECT) FOR EACH CONTROL VALVE FROM EXISTING PANEL BOARD IDENTIFIED AS PANEL "BL2E". CONTROL SHALL BE COORDINATED WITH DIVISION 23. SEE SHEET M6.4 FOR REFERENCE.
- (2) EXAMINE EXISTING BUS DUCT DISCONNECT AND REUSE IF SUITABLY SIZED FOR THE REPLACEMENT PUMP "P1". IF SUITABLE FOR REUSE, REPLACE FUSES AND/OR BREAKER AS NOTED IN THE CONDUIT AND CABLE SCHEDULE ON SHEET E5.1 & E6.1.
- (3) PROVIDE NEW CONDUIT AND WIRING FOR THE REPLACEMENT PUMP "P1" TO THE FUSED DISCONNECT ON THE BUS DUCT. COORDINATE VFD LOCATION WITH DIVISION 23.
- (4) CONTROL PANEL. PROVIDE 120 VOLT POWER. COORDINATE EXACT LOCATION WITH DIVISION 23.



1 BASEMENT POWER PLAN
1/8" = 1'-0"

RATED WALL LEGEND	
SYMBOL	DESCRIPTION
-----	1-HR RATED FIRE PARTITION
-----	1-HR RATED FIRE BARRIER
-----	2-HR RATED FIRE BARRIER
-----	3-HR RATED FIRE BARRIER



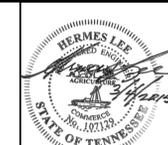
NO:	DATE	DESCRIPTION

**DOWNTOWN
DISTRICT COOLING
LOOP AND UTILITY
INFRASTRUCTURE
UPGRADE**

MEMPHIS TN, 38103

ELECTRICAL
PARTIAL BASEMENT FLOOR PLAN
140 ADAMS AVE. SHELBY COUNTY

DRAWN BY: TV
DESIGNED BY: HL
CHECKED BY: HL
Q.A.Q.C. BY: HL



JOB NO.: 13650760
PHASE: CD
DATE: 03-04-15

DRAWING NO:
E1.4

ELECTRICAL EQUIPMENT SCHEDULE											
NAME	DESCRIPTION	VOLTS	PHASE	FREQ.	WATTS(HP)	F.L.A.	MCA	MCCP	DISCONNECT	WIRING	REMARKS
CH-1L	WATER COOLED CHILLER	460	3	60		470.2	563.0	1000	DIV 23	2-(3) 350 KCMIL 1-2/0 G IN 3" C	SEE PANEL SCHEDULES (BLDG 157)
CH-3	WATER COOLED CHILLER	460	3	60		229.0	272.0	450	DIV 23	2-(3) 300 KCMIL 1-2 G IN 2-1/2" C	SEE PANEL SCHEDULES (BLDG 160)
CT-1L	COLLING TOWER HTR	460	3	60	2-12KW	29.0	36.3	40	DIV 23	3 # 8, (1) # 10 G IN 3/4" C	SEE PANEL SCHEDULES (BLDG 157)
CT-1L	COOLING TOWER FAN	460	3	60	(30)	40.0	50.0	90	DIV 23	(3)#6, (1)#8G IN 3/4" C	VFD (BLDG 157)
P-PL-1	CHILLED WATER PUMP	460	3	60	(60)	77.0	96.3	150	DIV 23	(3)#1, (1)#6G IN 1-1/4" C	VFD (BLDG 157)
P-PL-2	CHILLED WATER PUMP	460	3	60	(60)	77.0	96.3	150	DIV 23	(3)#1, (1)#6G IN 1-1/4" C	VFD (BLDG 157)
P-CW-1	CONDENSER WATER PUMP	460	3	60	(50)	65.0	81.3	125	DIV 23	(3)#3, (1)#6G IN 1-1/4" C	VFD (BLDG 157)
P-CW-2	CONDENSER WATER PUMP	460	3	60	(50)	65.0	81.3	125	DIV 23	(3)#3, (1)#6G IN 1-1/4" C	VFD (BLDG 157)
P-1	CHILLED WATER PUMP	208	3	60	(60)	177.0	221.0	300	DIV 23	(3)4/0, (1)#3G IN 2" C	(BLDG 140)
V-157-1	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 157)
V-157-2	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 157)
V-157-3	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 157)
V-157-4	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 157)
V-157-5	SOLENOID VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 157)
V-150-1	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-150-2	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-150-3	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-150-4	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-150-5	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-1	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-2	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-3	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 150)
V-160-1	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 160)
V-160-2	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 160)
V-140-1	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 140)
V-140-2	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 140)
V-140-3	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 140)
V-140-4	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 140)
V-1	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 140)
V-2	MOTORIZED VALVE	120	1	60				15	30	COORD. SIZE W/MANUFACTURER	BY DIV. 23 (BLDG 140)

EXISTING PANEL "B3"											
LOCATION:	BOILER RM.	MAIN BKR.	225	CONN. LOAD:	18.856 KVA						
VOLTAGE:	480 Y/120	S.F.L.:	YES	FEED TOP:	ENCLOSURE: NEMA 1						
CONFIGURATION:	3 @ 4 W	ENCLOSURE:	NEMA 1	GROUND BUS:	YES						
MOUNTING SURFACE:	BUS RATING: 225										
LOAD SERVED:	BKR	CKT	DMD	L1	L2	L3	DMD	CKT	BKR	LOAD SERVED	
LGST BOILER RM	201/1	1	L	1000				C	2	201/1	AHU 1 SMOKE DAMPER
LGST STAIR EAST	201/3	3	L	400	785			H	4	201/1	UNIT HEATER 1
LGST STAIR WEST	201/5	5	L	200	785			C	6	201/1	MECH. CONTROL PNL.
MOTORIZED DAMPERS	201/7	7	M	120				BD COI	8	201/1	SPARE
SPARE	201/9	9	-	0				201/10	201/1	CH-1L REFRIG. MONITOR	
CT HEAT TRACE	201/11	11	H	750				R	12	201/1	CHEMICAL FEED REC.
CH-1L REFRIG. MONITOR	201/13	13	C	0				-	14	201/1	SPARE
CHEM. FEED CNTL. PANEL	201/15	15	C	500				R	16	201/1	CT-1L REC.
MOTORIZED VALVES	201/17	17	M	120	120			L	18	201/1	CT-1L LIGHTING
MOTORIZED VALVES	201/19	19	M	0				-	20	201/1	SPARE
MOTORIZED VALVES	201/21	21	M	120				-	22	201/1	-
MOTORIZED VALVES	201/23	23	M	0				120	201/1	-	
MOTORIZED VALVES	201/25	25	M	120				-	26	201/1	-
SPARE	201/27	27	-	0				-	28	201/1	-
-	201/29	29	-	0				-	30	201/1	-
-	201/31	31	-	0				-	32	201/1	-
-	201/33	33	-	0				-	34	201/1	-
-	201/35	35	-	0				-	36	201/1	-
-	201/37	37	H	3000				-	38	201/1	-
WATER HEATER	36/S	38	H	0	3000			-	40	201/1	-
-	41	H	0	0				-	42	201/1	-

INTERRUPT RATING: 18,000 AIC 5510 5838 6258 FROM: bde1

LOADS (IN VA) CONN DMD MIN REMAINING CONTINUOUS LOADS 2400 1.25 3000

LIGHTING 5236 1.25 0 REMAINING

RECEPTS TO 10 KVA 1500 1.0 1500 NON-CONT. LOADS 0 1.0 0

RECEPTS REMAINING 0 0.5 0 PANEL XFMR LOADS 0 1.0 0

TOTAL MOTORS 720 1.0 720

LARGEST MOTOR 0 0.25 0 TOTAL CONN. LOAD 18.9 KVA 52.4 AMPS

SPACE HEATING 9200 1.0 9200 MIN. FOR PANEL CAP. 20.7 KVA 57.6 AMPS

KITCHEN EQUIPMENT 0 0.65 0 OVERALL DMD FACTOR 1.1

157 POPLAR AVE - BASEMENT
NOT TO SCALE

MAIN DISTRIBUTION PANEL											
LOCATION:	BOILER RM.	MAIN BKR.	1600	CONN. LOAD:	601.62 KVA						
VOLTAGE:	480 Y/120	S.F.L.:	YES	FEED TOP:	ENCLOSURE: NEMA 1						
CONFIGURATION:	3 @ 4 W	ENCLOSURE:	NEMA 1	GROUND BUS:	YES						
MOUNTING SURFACE:	BUS RATING: 1600										
LOAD SERVED:	BKR	CKT	DMD	L1	L2	L3	DMD	CKT	BKR	LOAD SERVED	
P-PL-1 (60 HP)	100/S	3	M	21250				M	2	100/S	P-PL-2 (60 HP)
P-CW-1 (60 HP)	100/S	8	M	18000	21250			M	10	100/S	P-CW-2 (60 HP)
600 TON CHILLER CH-1L	1000/S	15	M	120810				-	16	50/S	SPARE
SPARE	35/S	21	-	0				-	22	15/S	SPARE
SPARE	80/S	27	-	0				-	28	60/S	SPARE
SPARE	20/S	35	-	0				-	34	125/S	SPARE
SPARE	125/S	39	-	0				-	40	125/S	SPARE

INTERRUPT RATING: 42,000 AIC 200540 200540 200540 FROM: UTILITY XFMR

LOADS (IN VA) CONN DMD MIN REMAINING CONTINUOUS LOADS 0 1.25 0

LIGHTING 0 1.25 0 REMAINING

RECEPTS TO 10 KVA 0 1.0 0 NON-CONT. LOADS 0 1.0 0

RECEPTS REMAINING 0 0.5 0 PANEL XFMR LOADS 0 1.0 0

TOTAL MOTORS 60000 1.0 60000

LARGEST MOTOR 0 1.0 0 TOTAL CONN. LOAD 601.6 KVA 724.5 AMPS

SPACE HEATING 0 1.0 0 MIN. FOR PANEL CAP. 801.6 KVA 724.5 AMPS

KITCHEN EQUIPMENT 0 0.65 0 OVERALL DMD FACTOR 1.0

SSR Smith Seckman Reid, Inc.
2650 Thousand Oaks Blvd., Suite 3200
Memphis, TN 38118
(901) 683-3900
FAX: (901) 683-3990
www.ssr-inc.com

EXISTING PANEL "BL1"											
LOCATION:	BOILER RM.	MAIN BKR.	225	CONN. LOAD:	1.72 KVA						
VOLTAGE:	480 Y/120	S.F.L.:	YES	FEED TOP:	ENCLOSURE: NEMA 1						
CONFIGURATION:	3 @ 4 W	ENCLOSURE:	NEMA 1	GROUND BUS:	YES						
MOUNTING SURFACE:	BUS RATING: 225										
LOAD SERVED:	BKR	CKT	DMD	L1	L2	L3	DMD	CKT	BKR	LOAD SERVED	
STAIRWELL LIGHTS	201/1	1	L	0				L	2	201/1	STAIRWELL LIGHTS
LIGHTS	201/3	3	L	0				L	4	201/1	LIGHTS
LIGHTS	201/5	5	L	0				L	6	201/1	LIGHTS
LIGHTS	201/7	7	L	0				R	8	201/1	RECEPTACLES
RECEPTACLES	201/9	9	R	0				R	10	201/1	RECEPTACLES
RECEPTACLES	201/11	11	R	0				R	12	201/1	RECEPTACLES
RECEPTACLES	201/13	13	R	0				H	14	201/1	FAN COIL AND UNIT HTR
FAN COIL AND UNIT HTR	201/15	15	H	0				H	16	201/1	FAN COIL AND UNIT HTR
FAN COIL AND UNIT HTR	201/17	17	H	0				C	18	201/1	CHILLER CONTROL PANEL
CHILLER CONTROL PANEL	201/19	19	C	0				M	20	201/1	HOT WATER RECIRC. PMP
HEAT TRACE FOR CT.	201/21	21	-	0				-	22	201/1	HEAT TRACE CT.
HEAT TRACE FOR CT.	201/23	23	-	0				-	24	201/1	HEAT TRACE CT.
V-150-1	201/25	25	M	120				M	26	201/1	V-150-2
V-150-3	201/27	27	M	120				M	28	201/1	V-150-4
V-150-5	201/29	29	M	120				M	30	201/1	V-1
V-2	201/31	31	M	120				M	32	201/1	V-3
DIV 23 CONTROL PWR	201/33	33	C	750				-	34		SPACE
SPACE	35	-	-	0				-	36	-	-
-	37	-	-	0				-	38	-	-
-	39	-	-	0				-	40	-	-
-	41	-	-	0				-	42	-	-

INTERRUPT RATING: 18,000 AIC 480 1000 240 FROM: MAIN SWITCHBOARD

LOADS (IN VA) CONN DMD MIN REMAINING CONTINUOUS LOADS 750 1.25 950

LIGHTING 0 1.25 0 REMAINING

RECEPTS TO 10 KVA 0 1.0 0 NON-CONT. LOADS 0 1.0 0

RECEPTS REMAINING 0 0.5 0 PANEL XFMR LOADS 0 1.0 0

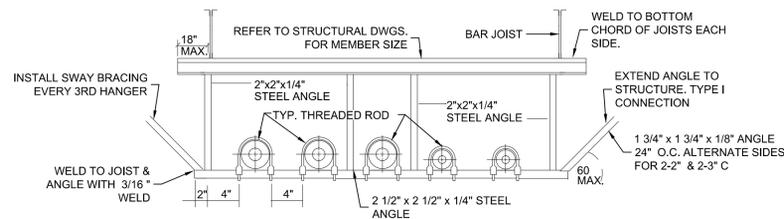
TOTAL MOTORS 960 1.0 960

LARGEST MOTOR 0 0.25 0 TOTAL CONN. LOAD 1.7 KVA 4.8 AMPS

SPACE HEATING 0 1.0 0 MIN. FOR PANEL CAP. 1.9 KVA 5.3 AMPS

KITCHEN EQUIPMENT 0 0.65 0 OVERALL DMD FACTOR 1.1

EXISTING PANEL "BL2E"											
LOCATION:	ELEC. RM.	MAIN BKR.	225	CONN. LOAD:	1.47 KVA						
VOLTAGE:	480 Y/120	S.F.L.:	YES	FEED TOP:	ENCLOSURE: NEMA 1						
CONFIGURATION:	3 @ 4 W	ENCLOSURE:	NEMA 1	GROUND BUS:	YES						
MOUNTING SURFACE:	BUS RATING: 225										
LOAD SERVED:	BKR	CKT	DMD	L1	L2	L3	DMD	CKT	BKR	LOAD SERVED	
SPARE	201/1	1	-	0				-	2	201/1	SPARE
-	201/3	3	-	0				-	4	201/1	-
-	201/5	5	-	0				-	6	201/1	-
-	201/7	7	-	0				-	8	201/1	-
-	201/9	9	-	0				-	10	201/1	-
-	201/11	11	-	0				-	12	201/1	-
-	201/13	13	-	0				-	14	201/1	-
-	201/15	15	-	0				-	16	201/1	-

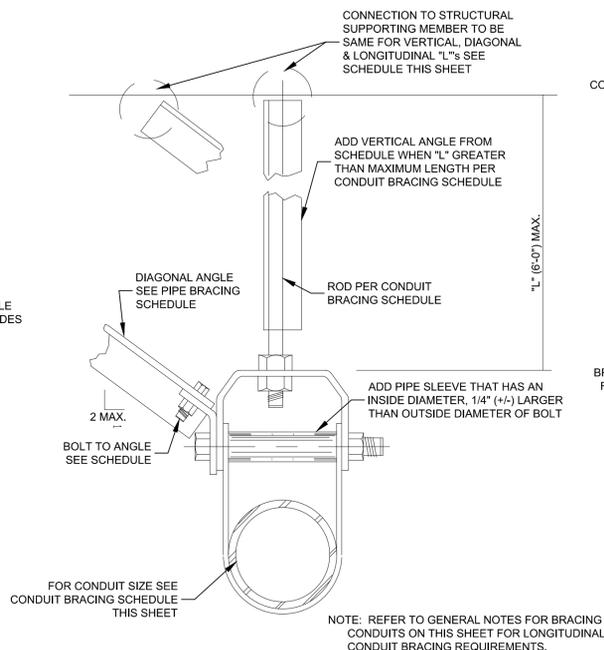


NOTES:

1. PROVIDE HANGERS EVERY 4'-0" MAX. ALSO PROVIDE SWAY BRACING EVERY 24'-0" MAX. FOR MORE THAN 4 CONDUITS - 2" DIAMETER OR EQUIVALENT
2. WHERE CONDUIT RUN PERPENDICULAR TO JOISTS, CONNECT THREADED RODS TO BOTTOM OF JOIST.

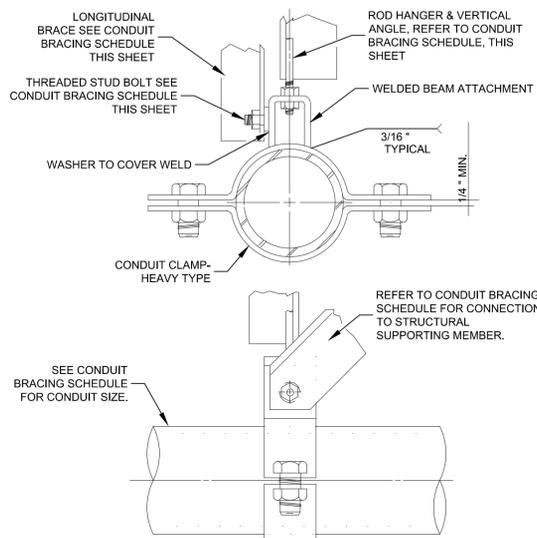
CONDUIT HANGER

SCALE: NO SCALE



TYPICAL TRANSVERSE CONDUIT BRACING

SCALE: NO SCALE

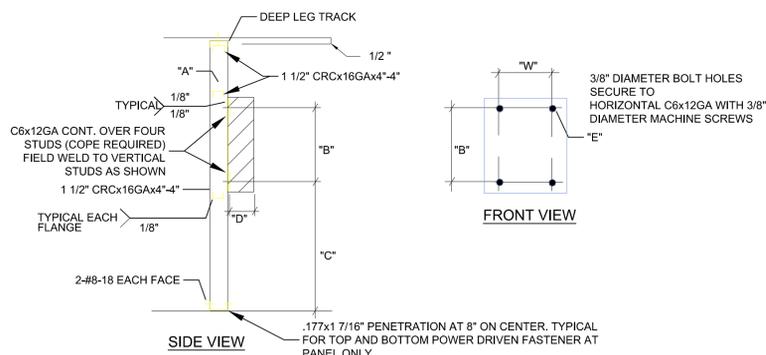


GENERAL NOTES:

1. ATTACHMENT TO STRUCTURAL MEMBERS SHALL USE DEVICES INCLUDED IN FEDERAL SPECIFICATION WW-H-171 (MSS SP-69) OR BE WELDED AS APPROVED BY THE STRUCTURAL ENGINEER. BRACES SHALL BE CONNECTED TO THE HANGERS/SUPPORTS FOR DUCTS, PIPING, AND EQUIPMENT. & NOT TO THE EQUIPMENT ITSELF.
2. REFER TO GENERAL NOTES FOR BRACING CONDUITS, THIS SHEET.

GENERAL NOTES

1. SEISMIC (IF REQUIRED BY LOCAL CODES) APPLY ONLY TO NEWLY INSTALLED SYSTEMS AND SHALL MEET APPLICABLE SEISMIC EXPOSURE GROUP & PERFORMANCE CATEGORY AS DEFINED PER 2006 IBC.
2. CONTRACTOR SHALL SECURE THE SERVICES OF AN ENGINEER REGISTERED WITH THE STATE OF TENNESSEE TO PROVIDE SEALED AND SIGNED SHOP DRAWINGS OF ALL SUBMITTED SEISMIC SUPPORT SYSTEMS. THE DRAWINGS SHALL SHOW DETAILS OF THE SUBMITTED SYSTEM, LOCATION OF EACH SUPPORT, AND IDENTIFICATION OF SUPPORT TYPE (LONGITUDINAL AND/OR TRANSVERSE).
3. SHOP DRAWINGS SHALL BE SUBMITTED TO THE CODE ENFORCEMENT OFFICE FOR APPROVAL AND TO THE DESIGNER FOR REVIEW.
4. SMACNA SEISMIC RESTRAINT MANUAL, SECOND EDITION, OR LATEST REVISION MAY BE USED AS A GUIDE FOR GENERAL SEISMIC SUPPORT DETAIL AND SUPPORT SPACING RECOMMENDATIONS.



MAX. UNIT WEIGHT	PANEL TYPE	"A"	"B"	"C"	"D"	"E"	"W"
120#	#1	3 5/8"x16 GA. AT 16" O.N.	20"	52"	5 3/4"	4- 5/16" DIAMETER MACHINE SCREWS	16"
300#	#2	3 5/8"x16 GA. AT 16" O.N.	26"	42"	6 1/2"	4- 5/16" DIAMETER MACHINE SCREWS	22"
600#	#3	3 5/8"x16 GA. AT 16" O.N.	32"	40"	8 1/4"	4- 5/16" DIAMETER MACHINE SCREWS	28"
1200#	#4	3 5/8"x16 GA. AT 16" O.N.	44"	28"	9 1/2"	4- 5/16" DIAMETER MACHINE SCREWS	38"

NOTE: DO NOT PENETRATE 1 1/2" CRC WITH SCREWS.

ELECTRICAL PANEL ANCHORAGE DETAIL

SCALE: NO SCALE

GENERAL NOTES FOR BRACING CONDUITS

1. BRACE ALL CONDUITS 2 1/2" DIAMETER AND LARGER, EXCEPTIONS:
 A. BRACE ALL CONDUITS 1 1/4" AND LARGER LOCATED IN MECHANICAL EQUIPMENT ROOMS:
 BRACING REQUIREMENTS FOR 1 1/4", 1 1/2", AND 2" CONDUITS SHALL BE THE SAME AS FOR 2-1/2".
 B. SEISMIC BRACE MAY BE OMITTED:
 (1) WHEN THE TOP OF THE CONDUIT IS SUSPENDED 12" OR LESS FROM THE SUPPORTING STRUCTURAL MEMBER AND THE CONDUIT IS SUSPENDED BY AN INDIVIDUAL HANGER.
 (2) ON ALL CONDUIT 3/4" AND SMALLER.
2. DETAILS SHOWN PROVIDE A LATERAL BRACING SYSTEM, A TYPICAL VERTICAL SUPPORT SYSTEM MUST ABLE BE USED.
 A. VERTICAL CONDUIT: ATTACHMENT - VERTICAL CONDUIT SHALL BE SECURED AT SUFFICIENTLY CLOSE INTERVALS TO KEEP THE CONDUIT IN ALIGNMENT & CARRY THE WEIGHT OF THE CONDUIT & WIRE.
 B. HORIZONTAL CONDUIT: SUPPORTS - HORIZONTAL CONDUIT SHALL BE SUPPORTED AT SUFFICIENTLY CLOSE INTERVALS TO KEEP IN ALIGNMENT AND PREVENT SAGGING.
3. TRANSVERSE BRACING AT 40'-0" OC MAX. UNLESS OTHERWISE NOTED.
4. LONGITUDINAL BRACING AT 80'-0" OC MAX. UNLESS OTHERWISE NOTED.
5. TRANSVERSE BRACING FOR ONE CONDUIT SECTION MAY ALSO ACT AS LONGITUDINAL BRACING FOR THE CONDUIT SECTION CONNECTED PERPENDICULAR TO IT, IF THE BRACING IS INSTALLED WITHIN 24" OF AN ELBOW OF SIMILAR SIZE.
6. A CONDUIT SYSTEM SHALL NOT BE BRACED TO DISSIMILAR PARTS OF BUILDING OR TWO DISSIMILAR BUILDING SYSTEMS THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE, EXAMPLES: WALL AND A ROOF; SOLID CONCRETE WALL AND A METAL DECK WITH LIGHTWEIGHT CONCRETE FILL.
7. PROVIDE LARGE ENOUGH SLEEVES THROUGH WALLS OR FLOORS TO ALLOW FOR ANTICIPATED DIFFERENTIAL MOVEMENTS.
8. PROVIDE FLEXIBILITY IN JOINTS WHERE CONDUITS PASS THROUGH BUILDING SEISMIC OR EXPANSION JOINTS OR WHERE RIGIDLY SUPPORTED CONDUITS CONNECT TO EQUIPMENT WITH VIBRATION ISOLATORS.
9. NO BRACING IS REQUIRED IF THE TOP OF THE CONDUIT IS SUSPENDED 12" OR LESS FROM THE SUPPORTING MEMBER. ALSO, WHERE CONDUIT IS ATTACHED TO THE TOP OF THE BEAM SYSTEM, THERE IS NO REQUIREMENT FOR BRACING.
10. ATTACHMENT TO STRUCTURAL MEMBERS SHALL USE DEVICES INCLUDED IN FEDERAL SPECIFICATION WW-H-171 (MSS SP-69) OR BE WELDED AS APPROVED BY THE STRUCTURAL ENGINEER. BRACES SHALL BE CONNECTED TO THE HANGERS/SUPPORTS FOR CONDUITS, & EQUIPMENT, & NOT TO THE EQUIPMENT ITSELF.

GENERAL NOTES FOR BRACING PIPES

SCALE: NO SCALE

CONDUIT BRACING SCHEDULE								
PIPE SIZE	"ELCEN" (OR EQUAL) HANGER TYPE	BOLTS TO "L" (2)	VERTICAL ANGLE (3)	DIAGONAL ANGLE	LONGITUDINAL DIAGONAL ANGLE(4)	TOP CONNECTION OF DIAGONAL AND LONGITUDINAL "L"s (1)	ROD SIZE	MAX.LENGTH FOR RODS
2 1/2	SEE SPECS	3/8Ø	2x2x16GA	2x2x16GA	2 1/2 x2 1/2 x16GA	TYPE II	1/2 Ø	25"
3	SEE SPECS	3/8Ø	2x2x16GA	2x2x16GA	2 1/2 x2 1/2 x16GA	TYPE II	1/2 Ø	25"
3 1/2	SEE SPECS	3/8Ø	2x2x16GA	2x2x16GA	2 1/2 x2 1/2 x16GA	TYPE III	1/2 Ø	25"
4	SEE SPECS	3/8Ø	2x2x16GA	2x2x16GA	2 1/2 x2 1/2 x16GA	TYPE IV	5/8 Ø	31"

- "L" DENOTES ANGLE
 (1) REFER TO SCHEDULE THIS SHEET FOR TYPICAL CONNECTION TO STRUCTURAL SUPPORTING MEMBERS.
 (2) PLACE STANDARD CUT WASHERS BETWEEN SHEET METAL L's & NUT.
 (3) "VERTICAL ANGLE" IN THE SCHEDULE IS REQUIRED IN ADDITION TO HANGER ROD ONLY WHEN "MAXIMUM LENGTH FOR ROD" IS EXCEEDED.
 (4) FOR LONGITUDINAL BRACE REQUIREMENTS. REFER TO GENERAL NOTES FOR BRACING CONDUITS, THIS SHEET.

CONDUIT BRACING SCHEDULE

SCALE: NO SCALE

GENERAL NOTE:

1. SEISMIC DETAILS APPLY ONLY TO NEW CONSTRUCTION. SEISMIC BRACING SHALL COMPLY WITH THE 1999 STANDARD BUILDING CODE.

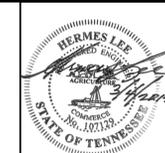
NO.	DATE	DESCRIPTION

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

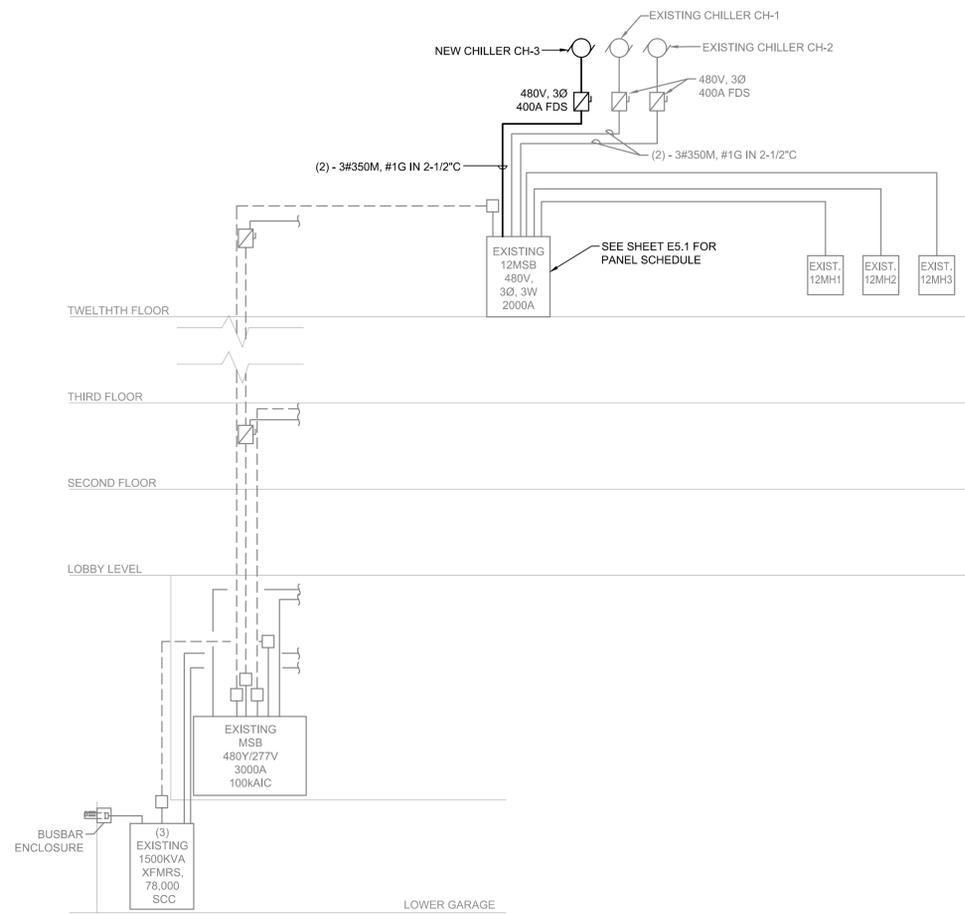
ELECTRICAL SEISMIC DETAILS

DRAWN BY: TV
 DESIGNED BY: HL
 CHECKED BY: HL
 Q.A.Q.C. BY: HL

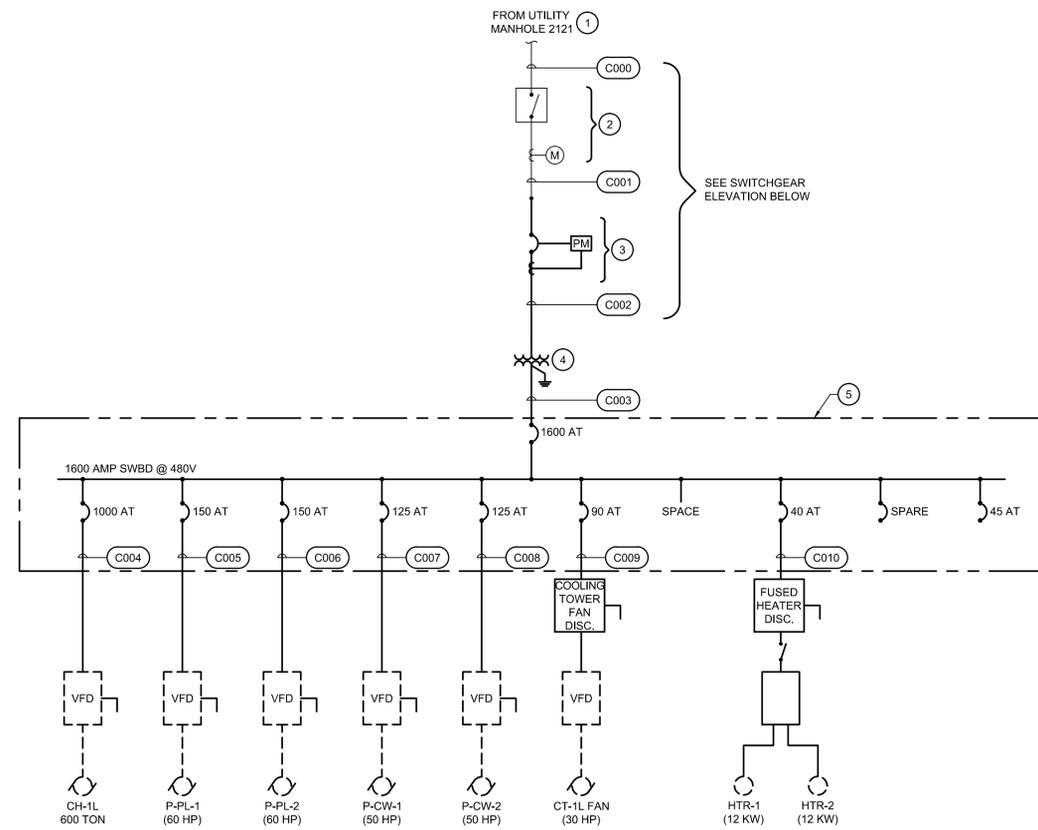


JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

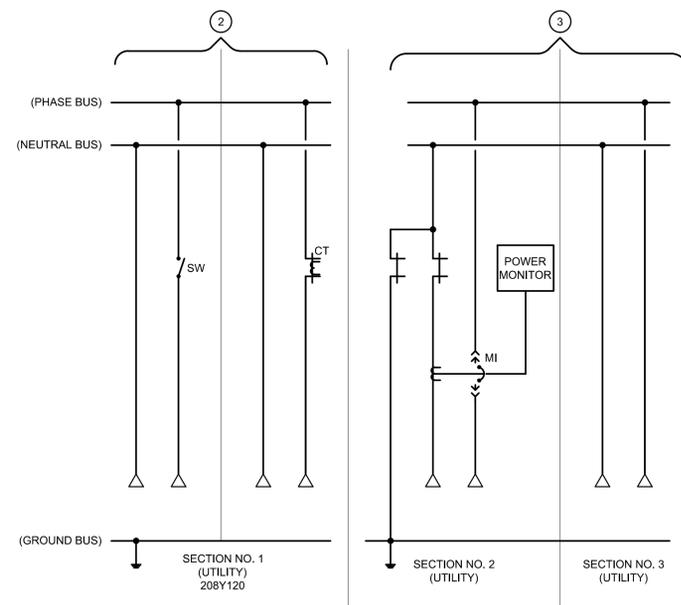
DRAWING NO.: E5.2



1 RISER DIAGRAM - 160 N. MAIN ST.
 NOT TO SCALE



2 SINGLE LINE DIAGRAM - 157 POPLAR AVE.
 NOT TO SCALE



3 SWITCHGEAR ELEVATION - 157 POPLAR AVE.
 NOT TO SCALE

CONDUIT & WIRE SCHEDULE - 157 POPLAR AVE.		
TAG NO.	CABLES & CONDUIT SIZE	DESCRIPTION
C000	8-(4) 500 KCML IN 4" C	UTILITY MH 2121 TO ISOLATION SWITCH
C001	8-(4) 500 KCML IN 4" C	ISOLATION SWITCH TO SERVICE DISCONNECT
C002	8-(4) 500 KCML, 1-400 KCML IN 4" C	SERVICE DISCONNECT TO NEW XFMR
C003	5-(4) 400 KCML, 1-3/0 G IN 3-1/2" C	XFMR TO 480V SWITCHBOARD
C004	SEE SHEET E5.1	480V SWITCHBOARD TO CH-1L VFD
C005	SEE SHEET E5.1	480V SWITCHBOARD TO P-PL-1 VFD
C006	SEE SHEET E5.1	480V SWITCHBOARD TO P-PL-2 VFD
C007	SEE SHEET E5.1	480V SWITCHBOARD TO P-CW-1 VFD
C008	SEE SHEET E5.1	480V SWITCHBOARD TO P-CW-2 VFD
C009	SEE SHEET E5.1	480V SWITCHBOARD TO CT-1L FAN DISCONNECT
C010	SEE SHEET E5.1	480V SWITCHBOARD TO HEATER DISCONNECT

GENERAL NOTES

- SEE SHEET E0.1 FOR GENERAL NOTES & LEGEND
- SEE SHEET E5.1 FOR PANEL SCHEDULES

KEYED NOTES

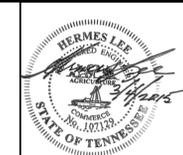
- CONTRACTOR SHALL INSTALL CONDUIT AND CONDUCTORS PER SITE PLAN AND CONDUIT SCHEDULE. ALL WORK IS TO BE COORDINATED WITH MLGW WITH FINAL MOLE CONNECTIONS AND PHASING BY MLGW. NO WORK WITHIN THE VAULT WILL BE CONDUCTED WITHOUT MLGW AUTHORIZATION.
- ISOLATION SWITCH AND METERING CABINET SHALL BE INSTALLED BY CONTRACTOR PER MLGW SPECIFICATIONS WITH PROVISIONS FOR PADLOCKING IN THE CLOSED AS WELL AS OPEN POSITIONS. ISOLATION AND METERING SWITCHGEAR SHALL BE RATED FOR 3000 AMPERES, 208 VOLT THREE (3) PHASE FOUR (4) WIRE EXTERIOR SERVICE IN WEATHER PROOF CABINET. SYSTEM SHORT CIRCUIT RATING SHALL BE 100,000 AIC SYMMETRICAL. STRIP HEATERS SHALL BE INSTALLED WITH THERMOSTAT. THE UNIT ENCLOSURE SHALL BE NEMA 3R NON WALK IN RATED FOR EXTERIOR SERVICE. RODENT BARRIER SHALL BE INCLUDED. BUS SHALL HAVE REMOVABLE LINK FOR UTILITY CT INSTALLATION. COORDINATE WITH MLGW.
- SERVICE ENTRANCE SWITCHGEAR RATED THE SAME AS ABOVE ITEM NO 2 WITH THE EXCEPTION OF BEING SERVICE ENTRANCE RATED. BREAKER SHALL BE 100% RATED 3000 AMPERE WITH ELECTRONIC TRIP UNIT FOR 100,000 AMPS SYMMETRICAL. TRIP UNIT SHALL HAVE LONG TIME, SHORT TIME, INSTANTANEOUS AND GROUND FAULT. POWER METER/MONITOR SHALL BE INSTALLED AND FURNISHED INTEGRAL WITH THE SWITCHGEAR.
- 750 KVA STEP UP TRANSFORMER, 208 V, THREE PHASE, FOUR WIRE PRIMARY/480 VOLT THREE PHASE FOUR WIRE SECONDARY WITH BUSHINGS SUITABLE FOR CONDUCTOR CONNECTIONS AS SHOWN.
- 1600 AMPERE, 480 VOLT THREE PHASE FOUR WIRE DISTRIBUTION PANEL BOARD RATED AT A MINIMUM OF 65,000 AMPS SYMMETRICAL.

DOWNTOWN DISTRICT COOLING LOOP AND UTILITY INFRASTRUCTURE UPGRADE

MEMPHIS TN, 38103

ELECTRICAL SINGLE LINE & RISER DIAGRAMS

DRAWN BY: TV
 DESIGNED BY: HL
 CHECKED BY: HL
 Q.A.Q.C. BY: HL



JOB NO.: 13650760
 PHASE: CD
 DATE: 03-04-15

DRAWING NO.: E6.1