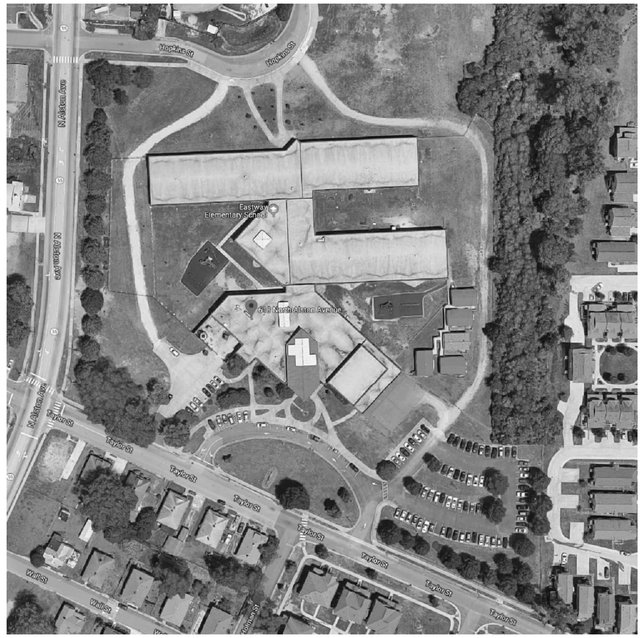
# EASTWAY ELEMENTARY CHILLER REPLACEMENT




SEAL BELOW:

NORTH CAROLINA PROFESSIONAL SEAL 23900 ENGINEER DERRICK E. GILES

9/4/18

EASTWAY ELEMENTARY SCHOOL

610 N. ALSTON AVE., DURHAM, NC 27701

PROJECT #: 120-08 - BID DOCUMENTS

**SEPTEMBER 4, 2018**

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SAMR YOUR CHOICE ENGINEERING

SHEET INDEX

**MECHANICAL GENERAL NOTES:**

1. CONTRACTOR IS REQUIRED TO ATTAIN A COPY OF THE ENTIRE DRAWINGS SET AND SPECIFICATIONS. CONTRACTOR SHALL STUDY AND UNDERSTAND THE SCOPE OF ALL CONTRACTOR'S WORK IN ADDITION TO HIS OWN.
2. MATERIALS, EQUIPMENT, AND INSTALLATIONS SHALL COMPLY WITH ALL REQUIREMENTS OF THE PLANS AND SPECIFICATIONS.
3. ALL EQUIPMENT PLACEMENT, DUCT ROUTING, AND PIPING LAYOUTS ARE GENERALLY DIAGRAMMATIC. IN BIDDING THE PROJECT, THE CONTRACTOR IS ATTESTING THAT THEY UNDERSTAND THERE WILL BE CONFLICTS NOT NECESSARILY SHOWN ON THE PLANS OR THAT MAY DEVELOP FROM THE CONSTRUCTION PROCESS, AND THAT THEY WILL BE RESPONSIBLE FOR COORDINATING THESE CONFLICTS AND ADJUSTING THE MECHANICAL, ELECTRICAL, AND PLUMBING SYSTEMS ACCORDINGLY BY REROUTING, RESIZING, AND RESELECTING SYSTEMS.
4. ALL SIZING AND COMPONENTS ARE GENERALLY DIAGRAMMATIC. MANUFACTURER SIZES MAY HAVE CHANGED IN THE PROCESS OF DESIGN OR SIZES MAY VARY DEPENDING ON THE ACTUAL MANUFACTURER SUBMITTED. IN DESIGNING THE BUILDING, ALL COMPONENTS MAY NOT BE EXPOSED AND NOT ACCOUNTED FOR BY THE ENGINEER. IN BIDDING THE PROJECT, THE CONTRACTOR UNDERSTANDS THAT THESE INTERFERENCES OR CONFLICTS EXIST AND SHALL BE RESPONSIBLE TO ADJUST ACCORDINGLY. MAINTAIN SAME SIZE EQUIPMENT AND COMPONENTS WHENEVER POSSIBLE.
5. IF ANY UNUSUAL CIRCUMSTANCES ARE IDENTIFIED, IMMEDIATELY INFORM THE ENGINEER. STOP WORK IF THE UNUSUAL CIRCUMSTANCE IS DEEMED DANGEROUS OR MAY COST SIGNIFICANT CHANGES.
6. CONTRACTOR MAY REQUEST RESIZING OF DUCT TO ACCOMMODATE ACTUAL FIELD CONDITIONS
7. CONTRACTOR MAY REQUEST TO UTILIZE RECTANGULAR IN LIEU OF ROUND, OR VICE VERSA, TO ACCOMMODATE SPACE CONDITIONS.
8. MAINTAIN A DUCT ASPECT RATIO BETWEEN 1:1 TO 2:1. IF LARGER ASPECT RATIO IS TO BE USED, THEN CROSS BRACING SHALL BE REQUIRED PER THE CURRENT SMACNA STANDARDS.
9. ALL DUCTWORK SHOWN ON PLANS ARE FREE FLOW AREA (DOES NOT INCLUDE DUCT AND INSULATION THICKNESS). ASSUME A MINIMUM OF 2" THICKNESS, OR THICKNESS OF ACTUAL COMPONENTS, WHEN PLANNING ROUTING.
10. SUPPLY AND RETURN DUCTWORK SHALL BE MINIMUM 24 GAUGE.
11. ALL DUCTWORK JOINTS SHALL BE STANDING SEAM CONNECTIONS UNLESS SHOWN OTHERWISE.
12. A MINIMUM OF TWO LAYERS OF MASTIC SHALL BE APPLIED TO ALL JOINTS. WIDTH SHALL EXTEND 1/2" ON EACH SIDE OF JOINT. MASTIC SHALL BE THICK ENOUGH SO THAT NO SHEET METAL SHALL BE VISIBLE THROUGH THE MASTIC.
13. DUCTWORK SHALL BE EXTERNALLY WRAPPED WITH 1-1/2" FIBERGLASS WRAP INSULATION WITH FOIL SCKRIM KRAFT JACKET, AND ALL INSULATION JOINTS AND OPEN ENDS OF FIBERGLASS SHALL BE DUCT TAPED, UNLESS SHOWN OTHERWISE.
14. REFRIGERANT PIPING (GAS AND LIQUID) SHALL BE WRAPPED WITH MINIMUM 1/2" ARMAFLEX INSULATION UNLESS SHOWN OTHERWISE. DUCT TAPE ALL JOINTS. ALL DISHWASHER EXHAUST DUCT SHALL BE STAINLESS STEEL.
15. PRIMARY AND SECONDARY CONDENSATE PIPING SHALL BE MINIMUM 3/4" OR AS SHOWN ON PLANS. CONDENSATE PIPING SHALL BE HARD COPPER WHEN ROUTED IN PLENUM, EXPOSED, OR AS DEEMED BY LOCAL INSPECTOR. PVC IS ACCEPTABLE FOR OTHER APPLICATIONS. INSULATE WITH MINIMUM 1/2" ARMAFLEX WHEN ROUTED ABOVE CEILING OCCUPIED SPACES AND WITHIN WALLS OF OCCUPIED SPACES.
16. ALL MATERIALS, INCLUDING, DUCTWORK AND PIPING, SHALL BE STORED IN COVERED AREAS SO THAT IT IS NOT EXPOSED TO MUD, DIRT, MOISTURE, AND OTHER CONTAMINANTS. CONTRACTOR SHALL KEEP IN PROCESS CONSTRUCTION CLEAN AND FREE OF CONTAMINANTS. ENGINEER RESERVES THE RIGHT TO REJECT ANY DUCTWORK THAT IS DEEMED TO BE CONTAMINATED.
17. INSULATION SHALL BE PROPERLY PROTECTED SO THAT IT IS NOT EXPOSED TO MOISTURE, MUD, DIRT, OR CONTAMINANTS. ENGINEER RESERVES THE RIGHT TO REJECT ANY INSULATION THAT IS DEEMED TO BE CONTAMINATED.
18. AREA MUST BE DRIED-IN BEFORE ANY DUCT IS INSTALLED.
19. INSTALL DUCT PER CURRENT SMACNA STANDARDS.
20. CONTRACTOR, WHETHER SHOWN ON PLANS OR NOT, SHALL INSTALL FIRE AND/OR SMOKE DAMPERS ON ALL FIRE AND/OR SMOKE WALLS TO MATCH FIRE RATING.
21. WHETHER SHOWN OR NOT, PROVIDE ACCESS DOORS FOR ALL FIRE DAMPERS.
22. PROVIDE ACCESS DOORS ON THE BUILDING COMPONENTS TO ACCESS ALL EQUIPMENT THAT REQUIRE ACCESS (VAV BOXES, DAMPERS, ETC.).
23. ALL ELBOWS ARE TO BE SMACNA SMOOTH RADIUS TYPE. MITERED, RECTANGULAR, OR SHORT RADIUS ELBOWS SHALL BE PER ENGINEER PERMISSION.
24. ALL BRANCH DUCTS SHALL BE 45 DEGREE ENTRY TYPE.
25. UNLESS SPECIFICALLY NOTED, ALL THERMOSTATS SHALL BE MOUNTED AT SAME HEIGHT (BOTTOM) AS THE LIGHT SWITCH AND LOCATED NO FURTHER THAN 12 INCHES (HORIZONTALLY) FROM THE NEAREST LIGHT SWITCH.
26. PROVIDE MINIMUM 1/2" NEOPRENE HANGER ISOLATORS AT ALL SUPPORTS OF SUSPENDED EQUIPMENT WITH ROTATING OR MOVING PARTS.
27. PROVIDE MINIMUM HOUSEKEEPING PAD THAT IS 6" LARGER ON ALL SIDES OF ALL FLOOR MOUNTED EQUIPMENT. THE PAD SHALL BE MINIMUM 4" THICK CONCRETE.
28. ALL DUCTWORK PENETRATIONS SHALL BE PROVIDED WITH SHEET METAL SLEEVE TO MATCH DUCTWORK.
29. ALL EXPOSED COMPONENTS SHALL BE PAINTGRIP AND PAINTED TO MATCH BUILDING COMPONENTS OR AS REQUIRED BY THE ARCHITECT OR OWNER.
30. LOCATE ALL ROOF MOUNTED EQUIPMENT A MINIMUM OF 10'-0" FROM ROOF EDGE. CONTRACTOR SHOULD HAVE VERIFIED AVAILABILITY OF CLEARANCE PRIOR TO BIDDING. IF NOT INSTALLED 10'-0" FROM EDGE, CONTRACTOR SHALL INSTALL MAINTENANCE RAILING AT ROOF EDGE AT HIS OWN COST PER LOCAL AUTHORITY REQUIREMENTS.
31. WHETHER SHOWN OR NOT OR OTHERWISE NOTED, ALL EXPOSED DUCTWORK SHALL BE DOUBLE WALL SPIRAL DUCT (MINIMUM 22 GAUGE GALVANIZED STEEL) WITH MINIMUM 1" FIBERGLASS INSULATION SANDWICHED BETWEEN THE DUCT WALLS. EXTERNAL DUCT SHALL BE PAINTGRIP AND PAINTED PER ARCHITECT/OWNER
32. DUCT MOUNTED EXPOSED AIR DISTRIBUTION DEVICES SHALL BE FACTORY KYNAR FINISH. COLOR PER ARCHITECT/OWNER.
33. PROVIDE TRAPEZE SUPPORTS PER DETAIL FOR ALL DUCT WIDER THAN 18 INCHES WIDE OR EXCEEDING AN ASPECT RATIO OF 2. FOR DUCTS SMALLER THAN 18 INCHES WIDE OR LESS THAN AN ASPECT RATIO OF 2, PROVIDE TRAPEZE SUPPORT OR STRAP HANGERS. PROVIDE MINIMUM 1" WIDE 22 GAUGE GALVANIZED STEEL BAND STRAP SUPPORT A MINIMUM OF EVERY 10 FEET OF DUCT. PROVIDE HANGER STRAP DUCT CONNECTOR (MINIMUM 2 SHEET METAL SCREWS ON SIDE AND 2 SHEET METAL SCREWS ON BOTTOM), MINIMUM 3/8" HANGER ROD, AND JOIST CLAMP. APPLY MASTIC TO ALL SCREW PENETRATIONS. PROVIDE UNISTRUT OR C-CHANNEL SPANNERS BETWEEN JOISTS.
34. PROVIDE MINIMUM RED TAB WITH NUMBER TO ALL HIDDEN COMPONENTS ABOVE CEILINGS, WALLS, FLOOR, ETC.. PROVIDE THE OWNER WITH A TYPED SUMMARY OF THE NUMBERS ON THE TAB DESIGNATING THE EQUIPMENT HIDDEN.
35. IN INSTALLING THE EQUIPMENT, ADJUST LOCATION SO AS TO ALLOW MINIMUM CLEARANCES REQUIRED BY CODE AND MANUFACTURER.
36. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES, LAWS AND REGULATIONS AND IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
37. PROVIDE EQUIPMENT SUBMITTALS TO DESIGNER FOR APPROVAL ON ALL TAGGED OR SCHEDULED EQUIPMENT PRIOR TO INSTALLATION. APPROVAL OF SUBMITTAL SHALL NOT BE THE CAUSE OF SUBSEQUENT CONFLICTS OR CHANGE ORDERS.
38. REMOVE ALL DEMOLISHED MATERIALS, TRASH AND DEBRIS FROM THE SITE. ALL MATERIALS SHALL BE DISPOSED OF IN A LAWFUL MANNER.
39. CONTRACTOR SHALL VERIFY PRIOR TO INSTALLATION THAT INSTALLED EQUIPMENT WILL OPERATE ON EXISTING UTILITY SERVICES UNLESS OTHERWISE NOTED.
40. VERIFY STRUCTURAL CAPACITY OF ROOF PRIOR TO INSTALLATION OR ANY ROOFTOP EQUIPMENT.
41. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ROOF CURBS FOR INSTALLED EQUIPMENT.
42. CLEAN ALL CONDUITS, HANGERS, SUPPORTS, PANELS, DEVICES, LIGHTS, ETC. AND LEAVE READY FOR USE OR PAINTING.
43. TOUCH UP ALL DAMAGED AND SCRATCHED SURFACES ON FACTORY FINISHED EQUIPMENT AND MATERIALS WITH PAINT OF SAME TYPE AND COLOR.
44. DEPARTURES AND/OR DEVIATIONS FROM THE SPECIFICATIONS OR EQUIPMENT SCHEDULES SHALL BE REQUESTED IN WRITING BY THE CONTRACTOR FROM THE ENGINEER AND NO SUCH DEPARTURES AND/OR DEVIATIONS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.
45. WORKMANSHIP SHALL BE OF THE HIGHEST GRADE, PERFORMED BY MECHANICS SKILLED IN THE INSTALLATION OF THIS TYPE OF WORK AND LICENSED BY THE PROPER AUTHORITIES TO PERFORM THE WORK.
46. FIRESTOP ALL OPENINGS AT FIRE WALL PENETRATIONS.
47. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR THE ARCHITECT.
48. CONTRACTOR SHALL PROVIDE TESTING AND BALANCING SERVICES FOR AIR AND WATER SYSTEMS AS PART OF THE SCOPE OF WORK. PROVIDE A TYPEWRITTEN TEST AND BALANCE REPORT BOUND IN A FOLDER TO THE ENGINEER UPON COMPLETION OF CONSTRUCTION. CONTRACTOR SHALL BE REQUIRED TO ACHIEVE ALL AIRFLOWS LISTED ON THE PLANS.

## MECHANICAL SYMBOLS

NOTE: SYMBOLS SHOWN ON THIS SHEET AND NOT ON THE DRAWINGS DO NOT APPLY TO THIS PROJECT. ADDITIONAL SYMBOLS MAY BE SHOWN ON PROJECT DRAWINGS.

### GENERAL

| | | |
|---|---|---|
| ADJ | - | ADJUSTABLE |
| AFF | - | ABOVE FINISHED FLOOR |
| AL | - | ALUMINUM |
| ALT | - | ALTERNATE |
| AP | - | ACCESS PANEL |
| BOD | - | BOTTOM OF DUCT |
| BOP | - | BOTTOM OF PIPE |
| BTU | - | BRITISH THERMAL UNIT |
| BTUH | - | BRITISH THERMAL UNITS PER HOUR |
| CA | - | COMBUSTION AIR |
| CAV | - | CONSTANT AIR VOLUME |
| CFCI | - | CONTRACTOR FURNISHED, CONTRACTOR INSTALLED |
| CFM | - | CUBIC FEET PER MINUTE |
| CL | - | CENTERLINE |
| CLG | - | CEILING |
| COND | - | CONDENSATE/CONDENSER |
| COP | - | CENTER OF PIPE |
| CS | - | CARBON STEEL |
| CU | - | COPPER |
| DB | - | DRY BULB |
| DDC | - | DIRECT DIGITAL CONTROL |
| DX | - | DIRECT EXPANSION |
| EA | - | EXHAUST AIR |
| EAT | - | ENTERING AIR TEMPERATURE |
| EC | - | ELECTRICAL CONTRACTOR |
| EDR | - | EQUIVALENT DIRECT RADIATION |
| EL | - | ELEVATION |
| ESP | - | EXTERNAL STATIC PRESSURE |
| ETR | - | EXISTING TO REMAIN |
| EWT | - | ENTERING WATER TEMPERATURE |
| EXH | - | EXHAUST |
| FA | - | FRESH AIR INTAKE/ FIELD ADJUSTABLE |
| FAT | - | FINAL AIR TEMPERATURE |
| FC | - | FAIL CLOSED |
| FE | - | FUME HOOD EXHAUST |
| FLA | - | FULL LOAD AMPS |
| FLR | - | FLOOR |
| FO | - | FAIL OPEN |
| FPI | - | FINS PER INCH |
| FPM | - | FEET PER MINUTE |
| FPS | - | FEET PER SECOND |
| FTG | - | FOOTING |
| GA | - | GAUGE |
| GC | - | GENERAL CONTRACTOR |
| GE | - | GENERAL EXHAUST |
| GPM | - | GALLONS PER MINUTE |
| GS | - | GALVANIZED STEEL |
| HP | - | HORSE POWER/HIGH POINT |
| IA | - | INSTRUMENT AIR |
| IE | - | INVERT ELEVATION |
| KO | - | KNOCK-OUT |
| LAT | - | LEAVING AIR TEMPERATURE |
| LP | - | LOW POINT |
| LWT | - | LEAVING WATER TEMPERATURE |
| MBH | - | THOUSANDS OF BTU PER HOUR |
| MC | - | MECHANICAL CONTRACTOR |
| MEP | - | MECHANICAL, ELECTRICAL AND PIPING |
| MER | - | MECHANICAL EQUIPMENT ROOM |
| NA | - | NOT APPLICABLE |
| NC | - | NORMALLY CLOSED |
| NIC | - | NOT IN CONTRACT |
| NO | - | NORMALLY OPEN |
| NPS | - | NOMINAL PIPE SIZE |
| NPT | - | NATIONAL PIPE THREAD |
| NTS | - | NOT TO SCALE |
| OA | - | OUTSIDE AIR |
| OC | - | ON CENTER |
| OED | - | OPEN END DUCT |
| OFCI | - | OWNER FURNISHED, CONTRACTOR INSTALLED |
| OFOI | - | OWNER FURNISHED, OWNER INSTALLED |
| OV | - | OUTLET VELOCITY |
| PA | - | PLANT AIR |
| PC | - | PLUMBING CONTRACTOR |
| PCF | - | POUNDS PER CUBIC FOOT |
| PD | - | PRESSURE DROP |
| PH | - | PHASE |
| PP | - | POLYPROPYLENE |
| PSF | - | POUNDS PER SQUARE FOOT |
| PSI | - | POUNDS PER SQUARE INCH |
| PSIA | - | POUNDS PER SQUARE INCH ABSOLUTE |
| PSIG | - | POUNDS PER SQUARE INCH GAUGE |
| PVC | - | POLYVINYL CHLORIDE |
| RA | - | RETURN AIR |
| RPM | - | REVOLUTIONS PER MINUTE |
| SA | - | SUPPLY AIR |
| SCH | - | SCHEDULE |
| SOG | - | SLAB ON GRADE |
| SP | - | STATIC PRESSURE |
| SS | - | STAINLESS STEEL |
| TA | - | TRANSFER AIR |
| TBR | - | TO BE REMOVED |
| TC | - | TEMPERATURE CONTROL |
| TOB | - | TOP OF BEAM |
| TOD | - | TOP OF DUCT/TOP OF DECK |
| TOJ | - | TOP OF JOIST |
| TOP | - | TOP OF PIPE |
| TOS | - | TOP OF SLAB |
| TSP | - | TOTAL STATIC PRESSURE |
| TYP | - | TYPICAL |
| V | - | VOLTS |
| VAV | - | VARIABLE AIR VOLUME |
| VP | - | VELOCITY PRESSURE |
| VTR | - | VENT THRU ROOF |
| WB | - | WET BULB |
| WC | - | WATER COLUMN |
| WG | - | WATER GAUGE |
| X | - | EXISTING |

### EQUIPMENT

| | | |
|---|---|---|
| AC | - | AIR CONDITIONING UNIT/ AIR COMPRESSOR |
| ACC | - | AIR COOLED CONDENSER |
| ACCU | - | AIR COOLED CONDENSING UNIT |
| ACU | - | AIR CONDITIONING UNIT |
| AHU | - | AIR HANDLING UNIT |
| AMD | - | AIR MIXING DEVICE |
| AR | - | AIR RECEIVER |
| AS | - | AIR SEPARATOR |
| AT | - | AIR TERMINAL DEVICE |
| B | - | BOILER |
| BBS | - | BOILER BLOWDOWN SEPARATOR |
| BFS | - | BOILER FEEDWATER SYSTEM |
| BH | - | BOOSTER HUMIDIFIER |
| BT | - | BATHTUB |
| C | - | CONVECTOR |
| CC | - | COOLING COIL |
| CH | - | CHILLER |
| CP | - | CONDENSATE PUMP/ CONTROL PANEL |
| CS | - | CLINICAL SINK |
| CT | - | COOLING TOWER |
| CUH | - | CABINET UNIT HEATER |
| CV | - | CONVERTOR |
| D | - | DAMPER |
| DC | - | DUST COLLECTOR |
| DH | - | DEHUMIDIFIER |
| DS | - | DOWNSPOUT |
| EF | - | EXHAUST FAN |
| EH | - | EXHAUST HOOD/ ELECTRIC HEATER |
| EJ | - | EXPANSION JOINT |
| ET | - | EXPANSION TANK |
| EV | - | EXHAUST VALVE |
| F | - | FILTER |
| FCO | - | FLOOR CLEANOUT |
| FCU | - | FAN COIL UNIT |
| FD | - | FLOOR DRAIN |
| FOP | - | FUEL OIL PUMP |
| FOT | - | FUEL OIL TANK |
| FR | - | FIN TUBE RADIATION |
| FT | - | FLASH TANK |
| FU | - | FURNACE |
| TP | - | TRAP PRIMER |
| H | - | HUMIDIFIER |
| HB | - | HOSE BIBB |
| HC | - | HEATING COIL |
| HP | - | HEAT PUMP |
| HRD | - | HEAT RECOVERY COIL |
| HR | - | HOSE REEL |
| HRD | - | HEAT RECLAIM DEVICE |
| HT | - | HEAT TRACE |
| HX | - | HEAT EXCHANGER |
| IH | - | INTAKE HOOD |
| JS | - | JANITOR SINK |
| LAV | - | LAVATORY |
| MCC | - | MOTOR CONTROL CENTER |
| P | - | PUMP |
| PP | - | PLUMBING PUMP |
| RAH | - | ROOFTOP AIR HANDLING UNIT |
| RC | - | REHEAT COIL |
| RCP | - | RADIANT CEILING PANEL |
| REF | - | ROOF EXHAUST FAN |
| RF | - | RETURN FAN |
| RH | - | RELIEF HOOD |
| SAD | - | SOUND ATTENUATING DEVICE |
| SD | - | SUCTION DIFFUSER |
| SF | - | SUPPLY FAN |
| SH | - | SHOWER |
| SR | - | SERVICE RECEPTOR |
| ST | - | STORAGE TANK/STEAM TRAP |
| T | - | TANK |
| TD | - | TRENCH DRAIN |
| TP | - | TRAP PRIMER |
| TXV | - | THERMAL EXPANSION VALVE |
| UH | - | UNIT HEATER |
| UR | - | URINAL |
| UST | - | UNDERGROUND STORAGE TANK |
| UV | - | UNIT VENTILATOR |
| V | - | VALVE |
| VFD | - | VARIABLE FREQUENCY DRIVE |
| WC | - | WATER CLOSET |
| WCC | - | WATER COOLED CONDENSER |
| WCO | - | WALL CLEANOUT |
| WF | - | WATER FILTER |
| WH | - | WATER HEATER |
| YCO | - | YARD CLEANOUT |

### SPECIAL DESIGNATION

- P-1 — EQUIPMENT (PUMP INDICATED)
- 2-M1 — DETAIL REFERENCE (TOP=DETAIL NO., BOTTOM=DRAWING NO. SHOWN ON)
- 2 — SPECIALTY ITEMS (I.E. GAUGE FILTER, ETC.)
- A/15B-6 OR 15B-6 — DETAIL REFERENCE (TOP= DETAIL NO., BOTTOM=SHEET NO. IN DETAIL MANUAL)
- REFER HV-1 — PLAN CONTINUATION REFERENCE
- 1 — REVISION REFERENCE
- 3 — PLAN NOTES REFERENCE

### PIPING SYSTEMS

| | |
|---|---|
| CHS | CHILLED WATER SUPPLY |
| CHR | CHILLED WATER RETURN |
| CWS | CONDENSER WATER SUPPLY |
| CWR | CONDENSER WATER RETURN |
| DTWS | DUAL TEMPERATURE WATER SUPPLY |
| DTWR | DUAL TEMPERATURE WATER RETURN |
| | DOMESTIC COLD WATER |
| | DOMESTIC HOT WATER |
| | DOMESTIC HOT WATER RETURN |
| F | FIRE LINE |
| NP | NON-POTABLE WATER |
| SD | STORM |
| V | VENT |
| S | WASTE OR SOIL LINE |

### PIPING

| | |
|---|---|
| SINGLE / DOUBLE | ELBOW DOWN |
| | ELBOW UP |
| | BOTTOM CONNECTION (45/DEG OR 90/DEG) |
| | TOP CONNECTION (45/DEG OR 90/DEG) |
| D / D | 45/DEG PIPE RISE(R) (DROP(D) |
| N/A | TEE (REFER TOSPECIFICATION FOR SIDE, TOP OR BOTTOM TEE) |
| | EXISTING PIPING TO BE REMOVED |

### VALVES

| | |
|---|---|
| | BUTTERFLY VALVE |
| | GATE VALVE |
| | GLOBE VALVE |
| | BALL VALVE |
| | SHUTOFF VALVE (BUTTERFLY VALVE FOR 2 1/2" AND LARGER. BALL VALVE FOR 2" AND SMALLER) |
| | ECCENTRIC PLUG VALVE |
| | BALANCING VALVE |
| | THERMAL EXPANSION VALVE |
| | SWING CHECK VALVE |
| | SPRING CHECK VALVE |
| | TRIPLE DUTY VALVE |
| | DRAIN VALVE |
| | LOCKSHIELD GATE VALVE |
| | PRESSURE REDUCING VALVE (PRV) BACKPRESSURE REGULATOR (BPR) |
| | REDUCED PRESSURE BACKFLOW PREVENTER (RPBP) |
| | PRESSURE RELIEF OR SAFETY VALVE |
| | 2-WAY CONTROL VALVE |
| | 3-WAY CONTROL VALVE |
| | BUTTERFLY CONTROL VALVE |
| | GAS VALVE OR PLUG VALVE |

### PIPING SPECIALTIES

| | | | |
|---|---|---|---|
| | PIPELINE STRAINER | | PRESSURE SWITCH OR VACUUM SWITCH |
| | DUPLEX STRAINER | | FLOW SWITCH |
| | BASKET STRAINER | | AUTOMATIC AIR VENT |
| | FLANGE | | MANUAL AIR VENT |
| | UNION | | THERMOSTATIC AIR VENT |
| | 2" AND SMALLER, CAP OR PLUG / 2 1/2" AND LARGER, BLIND FLANGE | | VACUUM BREAKER |
| | THERMOMETER | | GAUGE CONNECTION (WITH VALVE) |
| | THERMOMETER WELL | | |
| | FLOW SENSING DEVICE | | PRESSURE GAUGE (WITH VALVE) |
| | TEST PLUG (PRESSURE/TEMP.) | | DIRECTION OF FLOW |
| | CONCENTRIC REDUCER | | PIPE GUIDE |
| | ECCENTRIC REDUCER | | PIPE SLEEVE |
| | DIRECTION OF PITCH (DOWN) | | ANCHOR |
| | PIPE FLEXIBLE CONNECTION | WH | WALL HYDRANT (WH) |
| | WATER PIPING CONNECTION | HB | HOSE BIBB (HB) |
| | MECHANICAL SHOCKSTOP | | |
| FHC | FIRE HOSE CABINET (FHC) | FD | FLOOR DRAIN (FD) |
| FVC | FIRE VALVE CABINET (FVC) | RD | ROOF DRAIN (RD) |
| STP | FIRE STANDPIPE (STP) | HD | HUB DRAIN (HD) |
| | FIXTURE WASTE TRAP | CO | CLEANOUT (CO) |
| | P-TRAP | | SOIL, STORM, OR WASTE PIPE PLUG |
| | FLOW METER | | |

### MISCELLANEOUS

| | |
|---|---|
| | POINT OF NEW CONNECTION TO EXISTING |
| | EQUIPMENT, PIPING, DUCTWORK, ETC. TO BE REMOVED |
| | VIBRATION ISOLATOR |
| | NEW CONSTRUCTION |
| | EXISTING CONDITION |
| | 1 HR RATED FIRE PARTITION |
| | 1 HR RATED FIRE BARRIER |

### HVAC SYMBOLS

| | |
|---|---|
| | LIGHT LINE DENOTES EXISTING EQUIPMENT |
| | DENOTES EQUIPMENT TO BE REMOVED |
| | HEAVY LINE DENOTES PIPING, EQUIPMENT AND MATERIAL FURNISHED AND INSTALLED UNDER THIS CONTRACT |
| | ELBOW UP |
| | ELBOW DOWN |
| | TEE DOWN |
| | TEE UP |
| | PIPE CAP |
| | CENTERLINE |
| | FIRE SMOKE DAMPER |
| | FIRE DAMPER |
| VD | VOLUME DAMPER |
| T | THERMOSTAT |
| T | TEMPERATURE SENSOR |
| H | HUMIDISTAT |
| S | SMOKE DETECTOR |
| | PROPELLER FAN |
| | CONNECTION POINT BETWEEN CONTRACT AND EXISTING |
| | DISCONNECTION OF EXISTING |
| D 1 / A101 | DETAIL, SECTION AND ELEVATION SYMBOL FOR PLANS |
| S 1 / A101 | SECTION, DETAIL, ELEVATION CALLOUT |
| 24"X24" | DUCT, DIRECTION OF FLOW, SIZE |
| | DUCT SECTION, SUPPLY |
| | DUCT SECTION, RETURN |
| | DROP (D) CHANGE OF ELEVATION RISE (R) |
| FC | FLEXIBLE CONNECTION |
| T | TURNING VANES |
| | DUCT ELBOW UP |
| | DUCT ELBOW DN |
| | SUPPLY DIFFUSER OR REGISTER |
| | RETURN, EXHAUST REGISTER OR GRILLE |
| | FOUR WAY BLOW SUPPLY DIFFUSER |
| | THREE WAY BLOW SUPPLY DIFFUSER |
| | TWO WAY BLOW SUPPLY DIFFUSER |
| | ONE WAY BLOW SUPPLY DIFFUSER |
| | DUCTWORK WITH ACOUSTICAL LINING DUCT DIMENSIONS ARE NET FREE AREA. |
| | MOTORIZED DAMPER |
| | FIRE DAMPER |
| VD | VOLUME DAMPER (MANUAL) |
| | LOUVERED DOOR |
| | UNDERCUT DOOR |


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PROJECT #:

SEAL BELOW:

NORTH CAROLINA PROFESSIONAL SEAL 23900 ENGINEER DERRICK E. GILES — 9/4/18

DURHAM PUBLIC SCHOOLS

DURHAM PUBLIC SCHOOLS
2011 HAMLIN ROAD
DURHAM, NC 27704

PROJECT:

EASTWAY ELEMENTARY CHILLER REPLACEMENT

EASTWAY ELEMENTARY SCHOOL

610 N. ALSTON AVE.,
DURHAM, NC 27701

PROJECT #: 120-08

PHASE:
BID DOCUMENTS

DATE: 9/4/18

REV #: 0

SCALE: NONE

DRAWN BY:

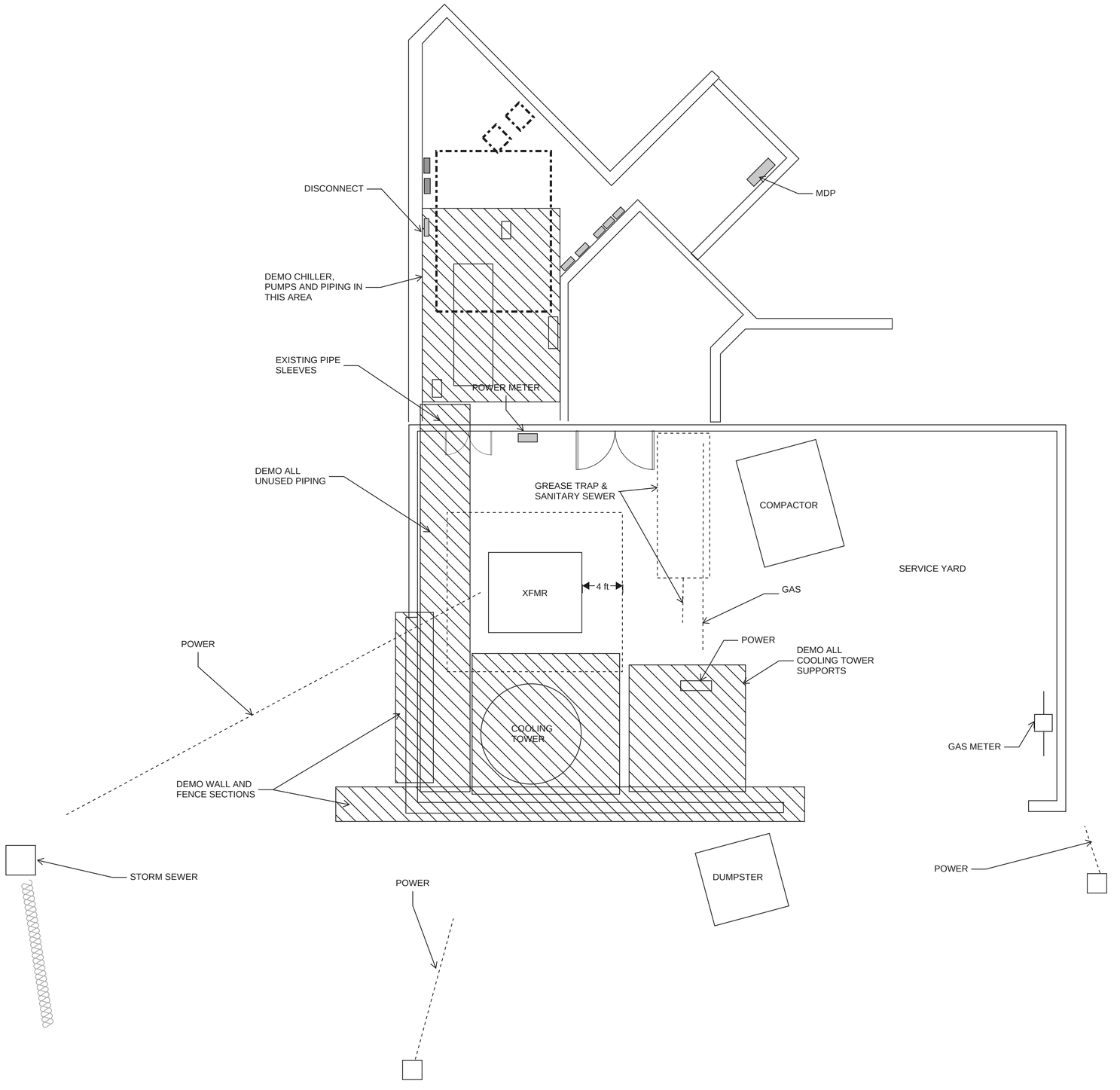
CHECKED BY:

SHEET TITLE

GENERAL NOTES

SHEET #

G - 1




DEMOLITION NOTES:

GENERAL:

G1. CONTRACTOR SHALL SUBMIT SITE AND EQUIPMENT SHOP DRAWINGS FOR APPROVAL PRIOR TO CONSTRUCTION
G2. SEAL ALL WALL PENETRATIONS
G3. CONTRACTOR SHALL PERFORM UNDERGROUND LOCATING AND COORDINATE WITH ENGINEER, UTILITY AND OWNER.

MECHANICAL:

M1. DEMO CHILLER AND PUMPS
M2. DEMO INTERIOR AND EXTERIOR PIPING
M3. DEMO CONCRETE PADS. ANCHORING BOLTS SHALL BE GROUND FLAT TO FLOOR.
M4. CAPTURE AND RETURN ALL REFRIGERANT TO THE OWNER IN APPROVED CONTAINERS.

ELECTRICAL:

E1. DEMO ELECTRICAL EQUIPMENT, CONTROLS CONDUCTORS AND CONDUIT ASSOCIATED WITH REMOVED EQUIPMENT

PLUMBING:

P1. DEMO MAKEUP WATER PIPING. PROVIDE SHUTOFF VALVE AND REMOVEABLE CAP.

SITE:

S1. DEMO MASONRY WALL TO BELOW GRADE IN AREAS SHOWN. DEMO FENCING.

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SCALE: 3/16" = 1'

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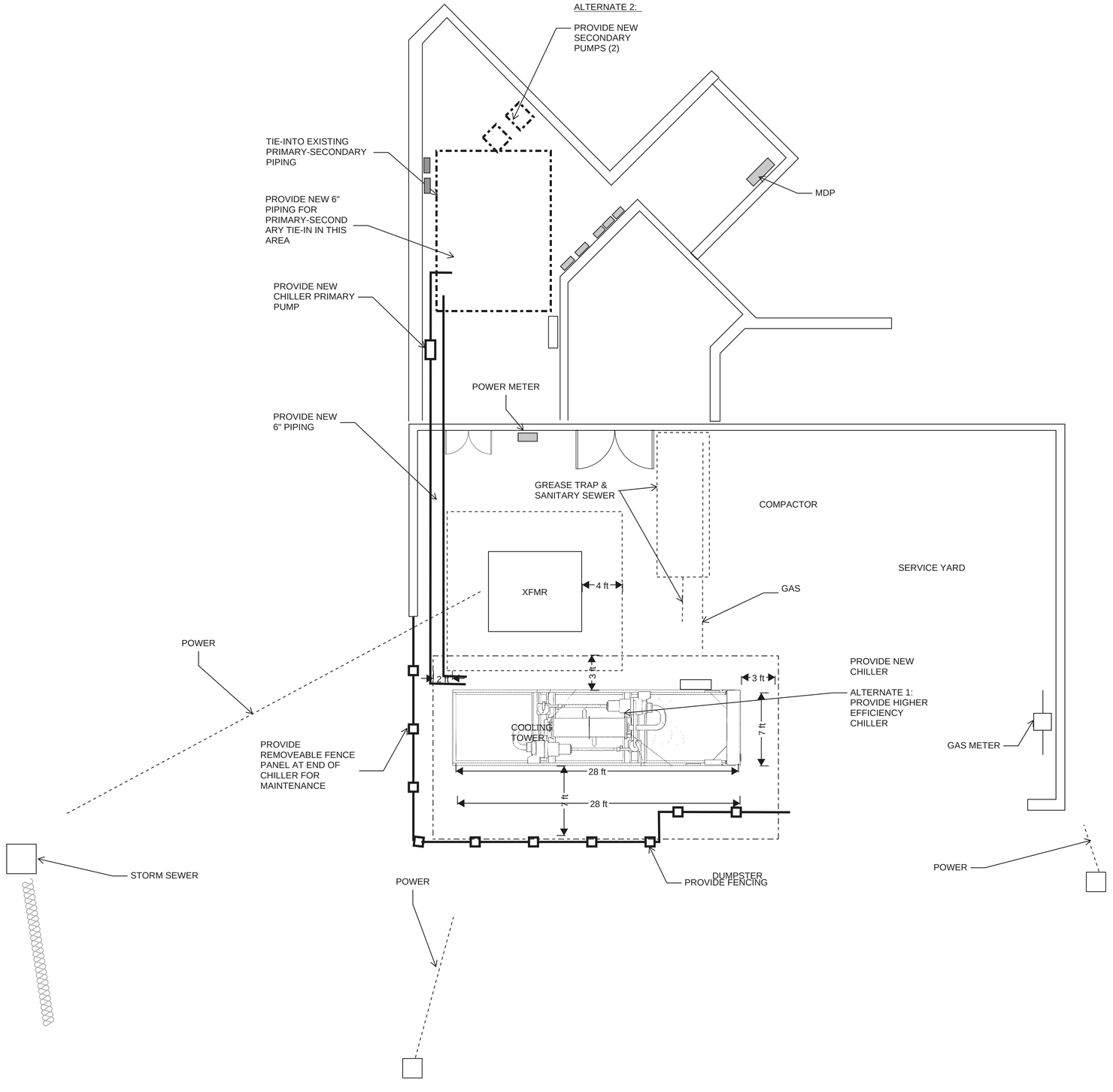
SHEET TITLE

MECHANICAL & ELECTRICAL DEMO

SHEET #

**M -1**




NEW WORK NOTES:

GENERAL:

G1. CONTRACTOR SHALL SUBMIT SITE AND EQUIPMENT SHOP DRAWINGS PRIOR TO CONSTRUCTION
G2. SEAL ALL WALL PENETRATIONS
G3. ALL MECHANICAL AND ELECTRICAL HANGERS, RODS AND FASTENERS SHALL BE GALVANIZED.
G4. CONTRACTOR SHALL FURNISH POWER UTILITY REBATE DOCUMENTATION TO OWNER
G5. CONTRACTOR SHALL SECURE AN APPROPRIATE PERIMETER AROUND CONSTRUCTION SITE DURING DEMOLITION TO LIMIT DUST EXPOSURE TO BUILDING OCCUPANTS.

MECHANICAL

M1. PROVIDE NEW CHILLER AND PUMPS
M2. INSULATE ALL NEW PIPING AND EQUIPMENT. PROVIDE ALUMINUM JACKET FOR ALL EXTERIOR PIPING INSULATION. PROVIDE FABRIC JACKET FOR INTERIOR INSULATION.
M3. PROVIDE NEW PRIMARY CHIILED WATER PIPING FROM COMMON TIE-IN TO CHILLER.
M4. PROVIDE NEW PRESSURE AND TEMPERATURE GAGES
M5. CHILLER PAD: 8" 3000 PSI CONCRETE, EXTENDING 4" BEYOND CHILLER FOOTPRINT. #4 REBARS SPACED 12" IN EACH DIRECTION, 4" DEEP IN PAD ON 4" STONE BASE. FINISHED LEVEL SHALL BE 4" MIN ABOVE GRADE. TURNDOWN EDGES OF CONCRETE PAD.
M6. NOT USED
M7. CLEAN AND INSPECT ALL CW SYSTEM STRAINERS IN MECHANICAL ROOM AND BLOW DOWN AIR SEPARATOR PRIOR TO SYSTEM START. FLUSH AND CLEAN ALL NEW PIPING.
M8. PROVIDE 6" CHILLER EMERGENCY PIPING TIE-IN CONNECTIONS WITH LUG TYPE BUTTERFLY INSOLATION VALVES AND BLIND FLANGES.
M9. PROVIDE CHILLER FACTORY NEOPRENE VIBRATION ISOLATION MOUNTS UNDER CHILLER SUPPORT FRAME PER MANUFACTURER'S RECOMMENDATIONS.
M10. PROVIDE NEW HEAT TRACING WITH LED INDICATORS ON ALL EXTERIOR PIPING
M11. PROVIDE 6" FLOW STRAINER FOR CHILLER

ELECTRICAL

E1. PROVIDE NEW 600 A CIRCUIT BREAKER WITH MOUNTING HARDWARE IN MDP.
E2. PROVIDE NEW CHILLER MAIN POWER SUPPLY. POWER TO CHILLER IS BOTTOM FED. BURY PVC CONDUIT IN SERVICE YARD. PROVIDE FLEX CONNECTIONS TO CHILLER. 600A FRAME BREAKER, 30KA AIC, 2 SETS OF 500 MCM; 90 F, THWN COPPER, 4" RIGID METAL CONDUIT. PROVIDE 600 A SAFETY DISCONNECT SWITCH IN SERVICE YARD.
E3. PROVIDE NEW 20 A CIRCUIT FOR CHILLER HEATERS
E4. PROVIDE NEW 20 A CIRCUIT, GFCI BREAKER, CONDUIT AND CONDUCTORS FOR HEAT TAPE
E5. PROVIDE NEW 20 A CIRCUIT, BREAKER, CONDUCTORS AND CONDUIT FOR CHILLER CONTROLS POWER
E6. PROVIDE NEW 20A CIRCUIT, GFCI BREAKER, CONDUIT AND CONDUCTORS FOR CHILLER WEATHERPROOF CONVENIENCE RECEPTACLE.
E5. INSTALL PER NEC REQUIREMENTS AND MANUFACTURER'S INSTRUCTIONS
E7. PROVIDE NEW PANEL SCHEDULE FOR ALL ELECTRICAL PANELS WITH NEW CIRCUITS

SITE

S1. PROVIDE NEW 10' METAL FENCING IN AREAS SHOWN. PAINT ENTIRE FENCE.
S2. GRADE MECHANICAL YARD FOR POSITIVE DRAINAGE.

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SCALE: 3/16" = 1'

DRAWN BY:

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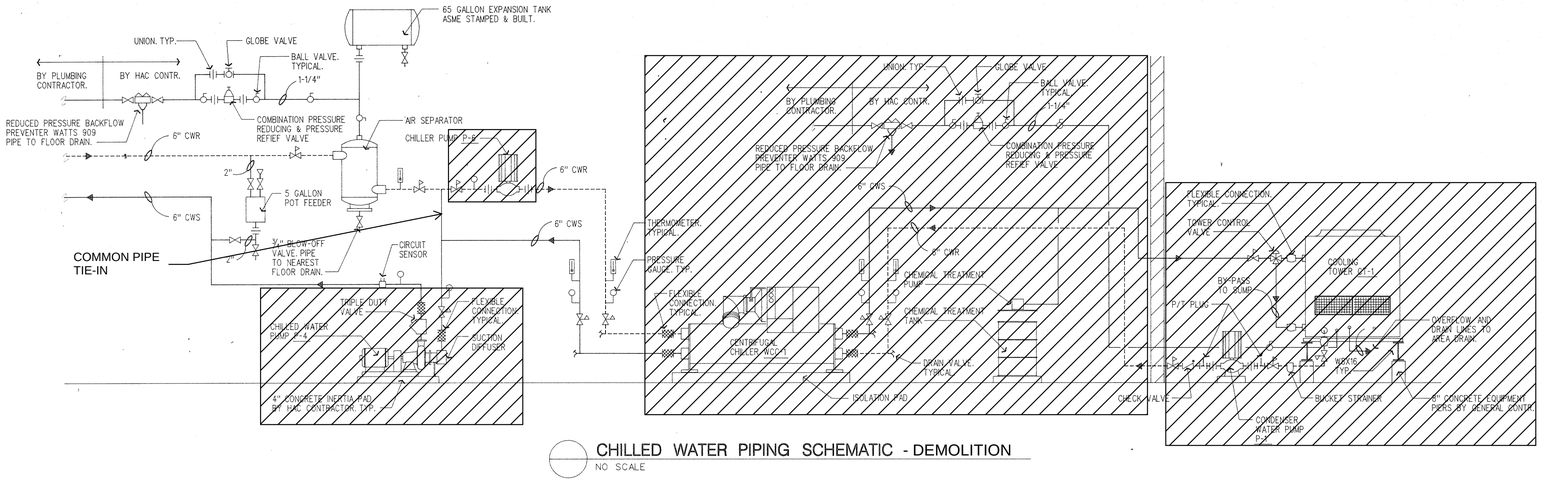
SHEET TITLE

MECHANICAL & ELECTRICAL NEW WORK

SHEET #

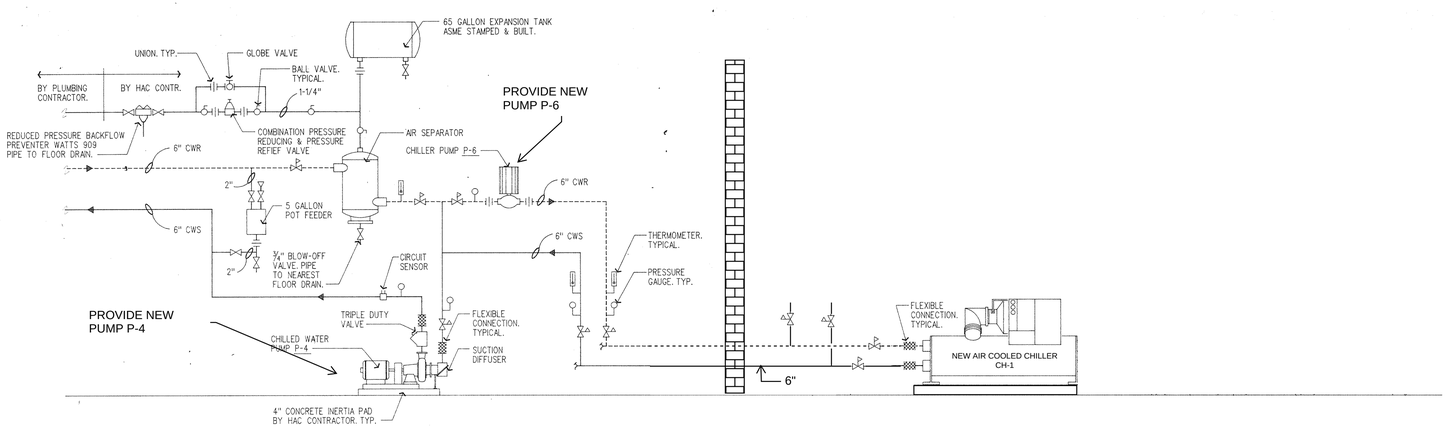
**M - 2**




CHILLED WATER PIPING SCHEMATIC - DEMOLITION
NO SCALE

DEMOLITION NOTES

1. DEMO CHILLER, COOLING TOWER, PUMPS AND EQUIPMENT PADS AND FOUNDATIONS.
2. DEMO CONDENSER PIPING FROM COMMON PIPE CONNECTION TO EXISTING CHILLER




CHILLED WATER PIPING SCHEMATIC - NEW WORK
NO SCALE

NEW WORK NOTES

1. PROVIDE NEW AIR COOLED CHILLER, PUMPS P-4 AND P-6 WITH NEW EQUIPMENT PADS AND ASSOCIATED ISOLATION AND CHECK VALVES.
2. PROVIDE FLEX CONNECTIONS ON ALL INSTALLED EQUIPMENT
3.PROVIDE NEW PRESSURE AND TEMPERATURE INDICATORS IN ALL LOCATIONS SHOWN
4. PROVIDE SERVICE DRAIN AND AIR VENTS FOR MAINTENANCE. PROVIDE 2" MINIMUM DRAIN TO SANITARY SEWER
5. PROVIDE CHILLER PIPING CONNECTON TYPE PER MANUFACTURERS INSTRUCTIONS
6. PROVIDE SHUT OF VALVES IN GAUGES FOR ISOLATION WHEN NOT IN USE.
7. INSTALL HEAT TAPE ON ALL EXTERIOR PIPING.
8. PROVIDE NEW 6" CHILLED WATER PIPING FROM COMMON PIPE TIE-IN TO NEW CHILLER ON EXISTING PIPE RACK.
9. PROVIDE 6" BACK UP CHILLED WATER CONNECTIONS AND VALVING.

CONTROLS:

ALL CHILLER CONTROLS SHALL BE PROVIDED BY ECS. CONTROLS SHALL INCLUDE COMPLETE INTEGRATION OF SYSTEMS FROM CHILLER BACNET INTERFACE THROUGH CONTROLS FRONT END OPERATOR IINTERFACE PER DPS STANDARDS.

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SCALE: NONE

DRAWN BY:

CHECKED BY:

SHEET TITLE

PIPING FLOW SCHEMATICS & CONTROLS

SHEET #

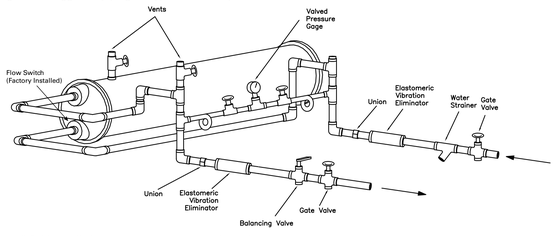
**M - 3**

| AIR COOLED CHILLER SCHEDULE | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GENERAL | | | | | | EVAP. | | | | | COND. | ELECTRICAL | | | | | |
| MARK | MFG | MODEL | NOM. CAP. (TONS) | MAX KW | STEPS | EER | FLOW (GPM) | PD (FT H2O) | EWT (F) | LWT (F) | EAT (DB F) | PHASES | FREQ | VOLTS | MCA | MOCP (A) | REMARKS |
| CH-1 | TRANE | RTAC-300 HE | 300 | 354 | | 10.47 | 769 | 18 | 54.0 | 44.0 | 95.0 | 3 | 60 | 460 | 592 | 700 | |
| CH-1A | TRANE | RTAE-300 | 300 | 309 | | 11.66 | 769 | 18 | 54.0 | 44.0 | 95.0 | 3 | 60 | 460 | 531 | 700 | |
| PROVIDE WITH FACTORY MOUNTED COIL GUARDS.<br>NO SUBSTITUTIONS BY MANUFACTURERS NOT LISTED IN SPECIFICATIONS<br>CAPACITY BASED ON 95 F AIR ENTERING CONDENSER AND .00025 FOULING FACTOR<br>PROVIDE FACTORY MOUNTED CONTROL PANEL WITH BACNET COMMUNICATIONS CARD | | | | | | | | | | | | | | | | | |

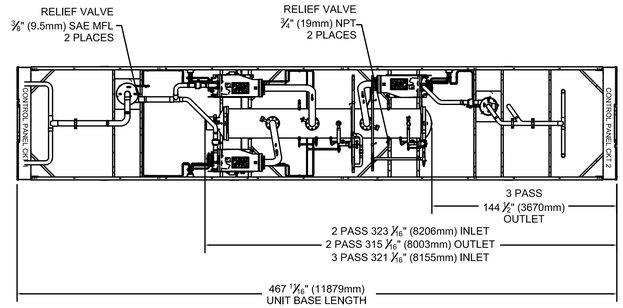
| PUMP SCHEDULE | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GENERAL | | | | | | CIRCULATING FLUID | | | | | MOTOR | | | | | | |
| TAG | MFG | MODEL | SERVICE | LOCATION | TYPE | GPM | HEAD (FT) | FLUID | TEMP (F) | SP. GR. | EFF (%) | HP | VOLTS | PH | RPM | REMARKS | |
| P-4 | B&G | SERIES 1510 5BC | CW SECONDARY | MECH/BOILER ROOM D15 | BASE MTD. CENTRIF. | 769.1 | 80 | WATER | 44.0 | 1.0 | 78.5 | 25 | 460 | 3 | 1750 | | |
| P-6 | B&G | SERIES 80 6 X 6 X 7 | CW PRIMARY | MECH/BOILER ROOM D15 | INLINE CENTRIF. | 769.1 | 44 | WATER | 44.0 | 1.0 | 80.5 | 7.5 | 460 | 3 | 1750 | | |
| ALL MOTORS SHALL BE GOULD E-PLUS OR EQUAL (HIGH EFFICIENCY). | | | | | | | | | | | | | | | | | |

## Water Pressure Gauges

**Figure 28. Suggested piping for typical RTAC evaporator**



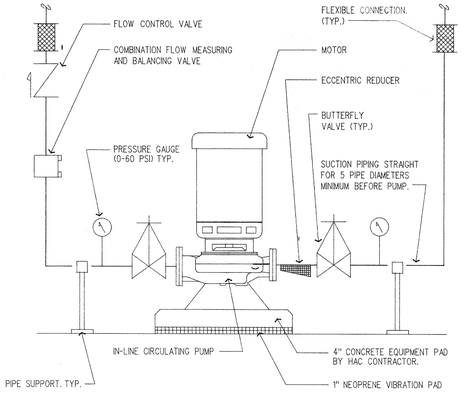

Install field-supplied pressure components as shown in Figure 28, p. 53. Locate pressure gauges or taps in a straight run of pipe; avoid placement near elbows, etc. Be sure to install the gauges at the same elevation on each shell if the shells have opposite-end water connections.




TOP PLAN VIEW
(WITH COIL BOX REMOVED)




SIDE VIEW




INLINE CIRCULATING PUMP DETAIL
NO SCALE

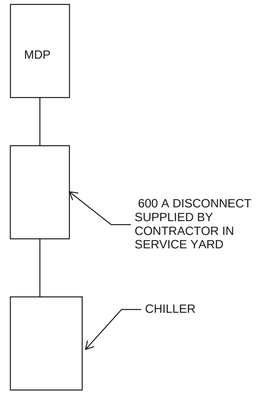
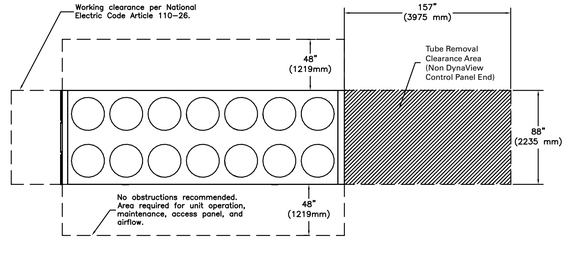



**Figure 7. Recommended unit clearances — 30 to 45 foot bases**





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SCHEDULES & DETAILS

SHEET #

**M - 4**