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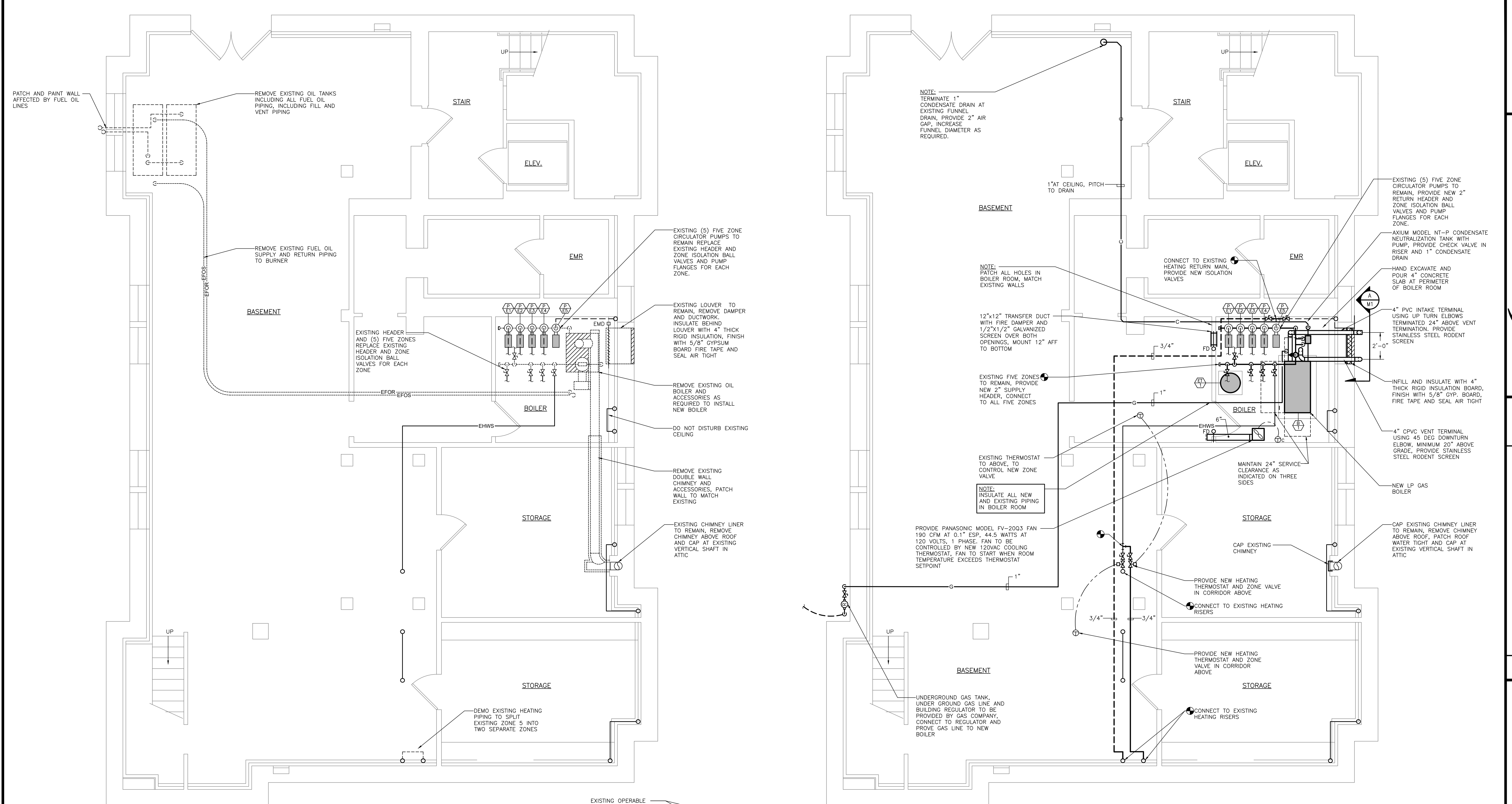


NO.	ISSUED FOR	DATE

WALLINGFORD TOWN HALL  
 WALLINGFORD, VERMONT  
**BOILER REPLACEMENT**  
 MECHANICAL BASEMENT PLAN

PROJ NO: 23118  
 DRAWN: DWD  
 DATE: 06/06/2024

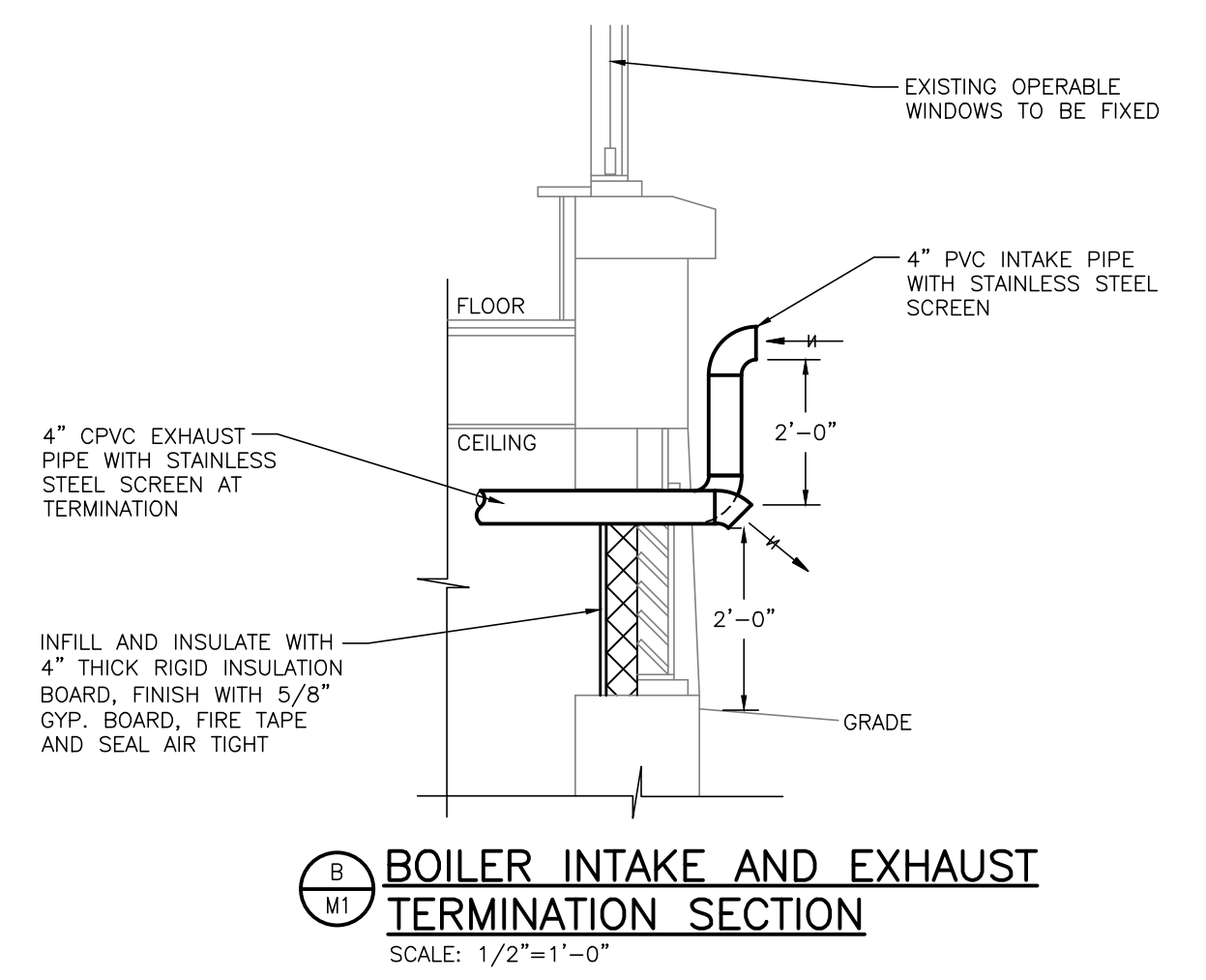
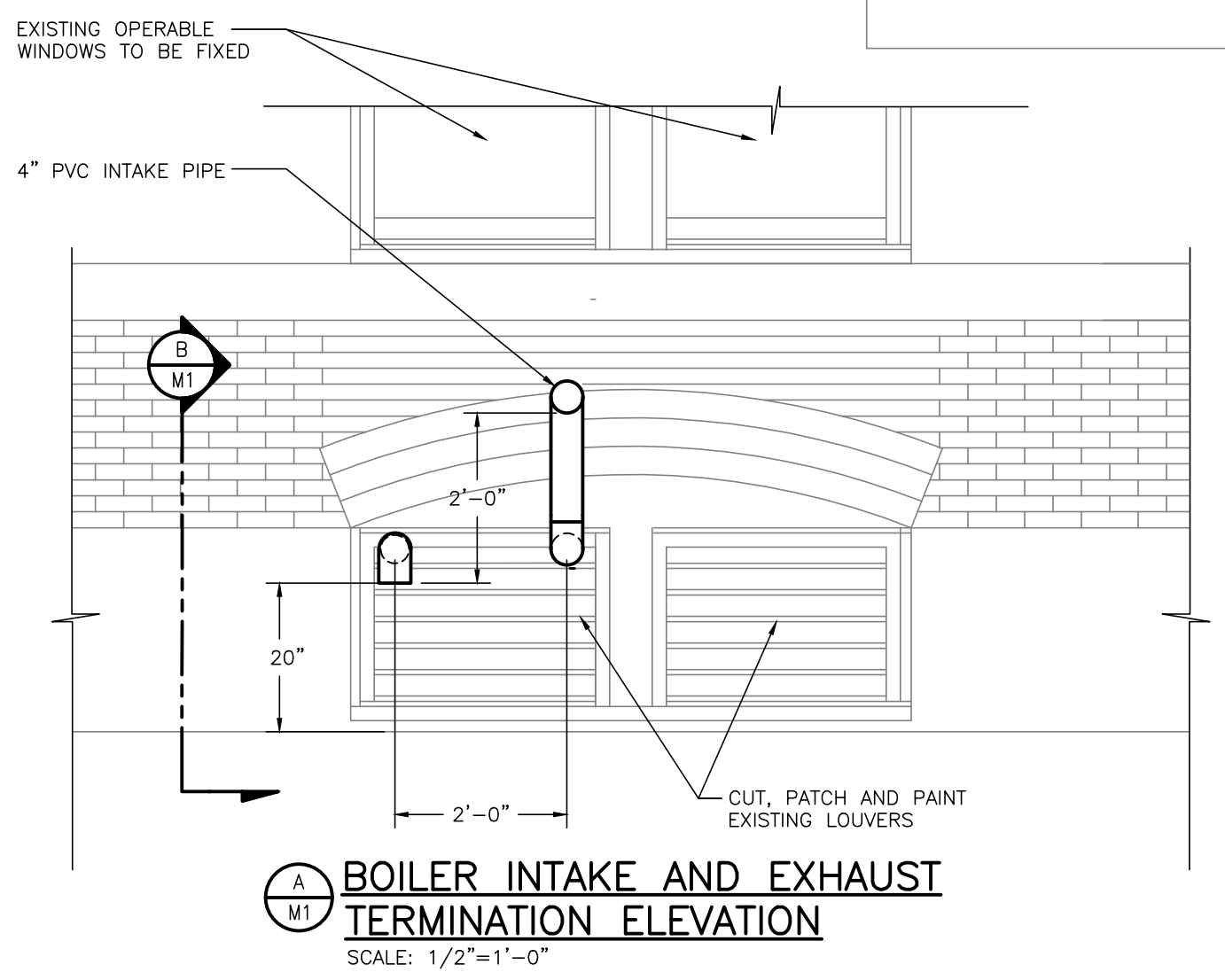
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**M1**



**MECHANICAL BASEMENT DEMOLITION PLAN**  
 SCALE: 1/4"=1'-0"

**MECHANICAL BASEMENT PLAN**  
 SCALE: 1/4"=1'-0"

**ASBESTOS NOTE:**  
 ASBESTOS ABATEMENT, IF REQUIRED, WILL BE PROVIDED BY THE OWNER. DO NOT DISTURB ANY MATERIALS SUSPECTED TO CONTAIN ASBESTOS. NOTIFY THE ENGINEER IMMEDIATELY IF MATERIALS SUSPECTED TO CONTAIN ASBESTOS ARE ENCOUNTERED.



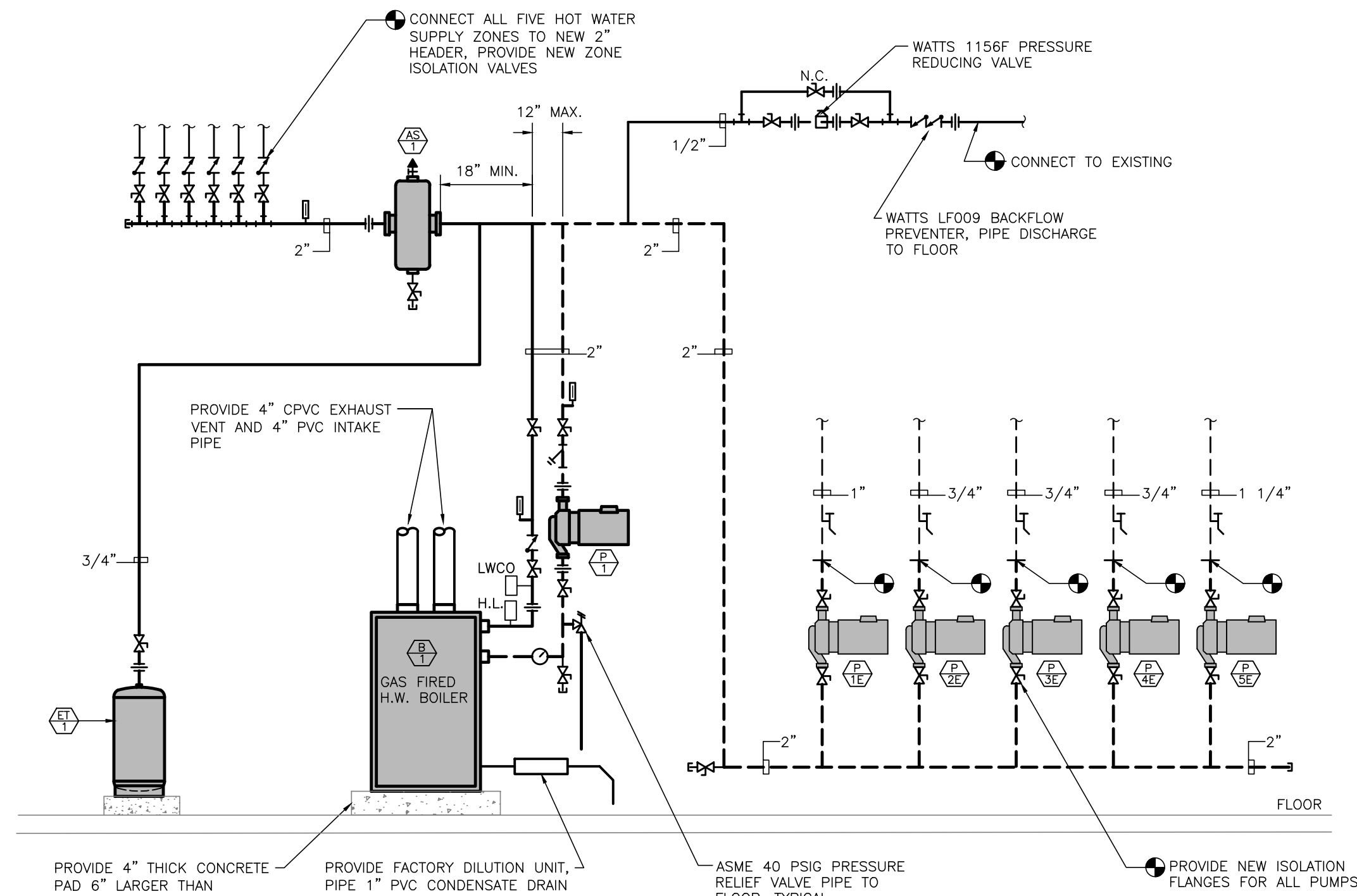


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CONSULTING ENGINEERS  
MECHANICAL - ELECTRICAL



EQUIPMENT LIST	
SP	SPIROTHERM VDT200, SIZE 2"
AT	AMTROL AX-80V ASME 125 PSIG EXPANSION TANK
GP	GRUNDFOS MAGNA3 40-80 GF 40 GPM AT 15 FT. HD., 0.269 HP, 115 VOLT, 1 PHASE

**HEATING SYSTEM WATER TREATMENT**  
BEFORE CONNECTING THE NEW BOILER TO THE EXISTING SYSTEM FLUSH THE SYSTEM THOROUGHLY AND REPEATEDLY IF NECESSARY TO REMOVE IMPURITIES, SEDIMENT AND OTHER CONTAMINANTS.  
TREAT THE WATER IF HARDNESS IS HIGHER THAN 160 PPM OR LESS THAN 50 PPM. TOTAL DISSOLVED SOLIDS MUST NOT EXCEED 450 PPM. USE FERNOX CLEANERS AND CORROSION INHIBITOR

**BOILER PIPING SCHEMATIC**  
NOT TO SCALE

**MECHANICAL LEGEND & ABBREVIATIONS**

- BALL VALVE
- CHECK VALVE
- PIPE STRAINER
- MANUAL RESET HIGH LIMIT
- MANUAL RESET LOW WATER CUT-OFF
- COMBINATION TEMP AND PRESSURE GAUGE
- PRESSURE RELIEF VALVE
- PRESSURE REDUCING VALVE
- THERMOMETER
- EXISTING PIPE RISER TO BE REMOVED
- PIPE SLEEVE
- PIPE UNION
- M.D. MOTORIZED DAMPER, EMD = EXISTING DAMPER
- COOLING THERMOSTAT
- CONNECT TO EXISTING
- LOUVER
- GAS BOILER
- CIRCULATOR PUMP
- EQUIPMENT TYPE  
E=EXISTING TO REMAIN, R = REMOVE,  
ER = EXISTING TO BE RELOCATED
- EXISTING PIPING TO BE REMOVED
- LP GAS PIPING
- LP GAS REGULATOR
- EXISTING FUEL OIL SUPPLY PIPING TO BE REMOVED
- EXISTING FUEL OIL RETURN PIPING TO BE REMOVED

**MATERIAL SPECIFICATIONS**

**PERMITS AND CODES**  
THIS CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES AND PERMITS AND SHALL PAY FOR ALL FEES AND CHARGES FOR THE CONNECTION TO OUTSIDE SERVICES AND USE OF PROPERTY OTHER THAN THE SITE OF THE WORK FOR STORAGE OF MATERIALS OR OTHER PURPOSES. WORK UNDER THIS CONTRACT SHALL BE INSTALLED TO COMPLY STRICTLY WITH LATEST APPLICABLE EDITIONS OF VERMONT ADOPTED BUILDING CODES, BOILER CODE, NATIONAL FIRE PROTECTION ASSOCIATION, ASHRAE GUIDE, SMACNA, NATIONAL ELECTRIC CODE, AND ALL CODES, REGULATIONS AND REQUIREMENTS OF ALL MUNICIPAL, STATE, FEDERAL AND OTHER PUBLIC OR PRIVATE AUTHORITIES WHICH HAVE JURISDICTION. IN EACH CASE, CODES ARE MINIMUM REQUIREMENTS.

**SHOP DRAWINGS**  
SUBMIT SHOP DRAWINGS ON ALL MAJOR ITEMS OF EQUIPMENT AND MATERIALS TO THE ENGINEER FOR APPROVAL. MANUFACTURING OR FABRICATING OF ANY MATERIAL OR THE PERFORMING OF ANY WORK PRIOR TO APPROVAL OF SHOP DRAWINGS WILL BE ENTIRELY AT THE RISK OF THE CONTRACTOR.

**GUARANTEE, SERVICE AND REPLACEMENT**  
EXCEPT AS A LONGER PERIOD MAY BE PROVIDED IN THIS SPECIFICATION, THIS CONTRACTOR SHALL GUARANTEE THE WORK TO THE FULL EXTENT OF THE PROVISION OF THE DRAWINGS, THIS SPECIFICATION AND THE GENERAL CONDITIONS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE ARCHITECT AS EVIDENCED BY THE ARCHITECT'S FINAL CERTIFICATES.

**PIPE HANGERS AND SUPPORTS**  
ALL PIPING SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE BY MEANS OF APPROVED HANGERS AND SUPPORTS. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY INTERMEDIATE SUPPORT STEEL AND THE PROPER HANGING OF ALL PIPING AND EQUIPMENT. CHAINS, STRAP, PERFORATED BAR OR WIRE HANGERS SHALL NOT BE PERMITTED. HANGERS FOR INSULATED STEEL PIPING SHALL BE INSTALLED OUTSIDE OF INSULATION AND PROVIDED WITH INSULATION PROTECTION SADDLES. SADDLE SHALL BE 12" LONG, 1/2" THE CIRCUMFERENCE IN WIDTH, FURNISH AND INSTALL SUFFICIENT HANGERS, SUPPORTS AND MOUNTING DEVICES TO SUPPORT ALL PIPING INSTALLED UNDER THIS CONTRACT WITHOUT SAGGING, WITHOUT INTERFERENCE, WITH COMPLETE DRAINAGE AND SO LOCATED AND ARRANGED AS TO PERMIT FREE EXPANSION AND CONTRACTION OF PIPING. ALL SUPPORT COMPONENTS SHALL CONFORM TO MANUFACTURER'S STANDARDIZATION SOCIETY SPECIFICATION SP-58.

**PIPE SLEEVES AND FIRE STOPPING**  
SLEEVES SHALL BE LARGE ENOUGH TO PERMIT FREE MOVEMENT OF PIPE WHERE EXPANSION AND CONTRACTION OCCUR. PROVIDE U.L. LISTED FIRE STOPPING FOR ALL PENETRATIONS OF FLOORS, WALLS, CEILING, ETC. THE CONTRACTOR SHALL PREPARE AND SUBMIT A COMPLETE DETAILED SUBMITTAL FOR ALL FIRE STOPPING CONDITIONS FOR THE PROJECT. THIS SUBMITTAL SHALL INCLUDE U.L. TEST SHEET FOR THE INSTALLATION AND ALL INSTALLATION INSTRUCTIONS.

**FLOOR, WALL AND CEILING ESCUTCHEONS**  
ESCUTCHEON PLATES SHALL BE INSTALLED ON ALL EXPOSED PIPE PASSING THROUGH WALLS, FLOORS OR CEILING. PLATES SHALL BE AS MANUFACTURED BY RITTER PATTERN AND CASTING CO., 120 WATER STREET, NEW YORK, N.Y. OR APPROVED EQUAL, CHROME-PLATED STEEL PLATES WITH SET SCREW AND CONCEALED HINGE.

**SYSTEMS TESTING**  
UPON COMPLETION OF FABRICATION AND BEFORE ENCLOSING, INSULATING OR CONCEALING IN ANY WAY, ALL PIPING, MAINS AND JOINTS SHALL BE TESTED FOR LEAKS AT ONE AND ONE-HALF THEIR NORMAL WORKING PRESSURES. TEST NEW HYDRONIC HEATING PIPING SYSTEMS HYDRAULICALLY AT 75 PSI TEST PRESSURE. OBSERVE EACH TEST FOR LEAKAGE AT END OF TEST PERIOD. TEST FAILS IF LEAKAGE IS OBSERVED OR IF PRESSURE DROP EXCEEDS 5% OF TEST PRESSURE. MINIMUM TEST PERIOD FOUR (4) HOURS.

**SYSTEM IDENTIFICATION**  
ALL EQUIPMENT SHALL BE IDENTIFIED WITH PERMANENT PHENOLIC NAMEPLATES WITH 1/2" LETTERS. LABEL ALL VALVES WITH 1/2" ROUND BRASS TAG SWITCH BLANK PHENOLIC TAG WITH WHITE LETTERS, SECURED WITH BRASS CHAIN. POST A PERMANENT FRAMED VALVE CHART IN THE BOILER ROOM INCLUDING VALVE NUMBER, LOCATION AND VALVE SERVICE LABEL. ALL PIPING IN BOILER ROOM WITH SETON STYLE "B" WRAP AROUND VINYL PIPE LABELS WITH 1" HIGH LETTERS. LABELS SHALL INCLUDE DIRECTION ARROWS AND ZONES SERVED.

**BOILER/BURNER**  
BASIS OF DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE THERMAL SOLUTIONS AMP MODEL AMP-400 OR COMPARABLE PRODUCT BY BOSCH THERMOTECNOLOGY CORP., IBC, RIELLO OR WEIL-MCLAIN.  
THE BOILER SHALL BE ASSEMBLED, FIRE TESTED AND SHIPPED AS A FACTORY-PACKAGED UNIT, COMPLETE WITH JACKET, GAS MANIFOLD, BURNER AND CONTROLS MOUNTED & WIRED, WITH BOILER CONNECTIONS SPECIFIED IN THIS SECTION.  
THE BOILER SHALL BE CONSTRUCTED IN CONFORMANCE TO ASME SECTION IV, ASME CSD-1 AND ANSI Z21.13/CSA 4.9. THE BOILER SHALL BEAR THE ASME "H" STAMP WITH A MAXIMUM ALLOWABLE WORKING PRESSURE (MAWP) OF 160 PSI. PRESSURE VESSEL SHALL BE SUBJECT TO A HYDROSTATIC PRESSURE TEST OF 240 PSIG AT THE FACTORY.  
THE BOILER SHALL BE AN ULTRA-HIGH EFFICIENCY CONDENSING BOILER WITH A PRESSURE VESSEL, CONSTRUCTED OF 316L STAINLESS STEEL AND OF WATER TUBE DESIGN, WHICH SHALL NOT REQUIRE A REFRACTORY COMBUSTION CHAMBER.  
THE BOILER SHALL BE EQUIPPED WITH AN INTEGRAL PRE-MIX, STAINLESS STEEL FORCED DRAFT BURNER FOR PROPANE INCORPORATING FULL MODULATION WITH 10:1 TURNDOWN. THE BURNER SHALL BE OF HIGH FLAME RETENTION DESIGN AND HAVE A STATIC SWIRL DEVICE TO GET UNIFORM FLAME STABILITY ALL AROUND THE COMBUSTION SURFACE.  
THE BOILER GAS VALVE WILL BE DESIGNED WITH ZERO PRESSURE REGULATION AND EQUIPPED WITH A VARIABLE SPEED BLOWER SYSTEM TO PRECISELY CONTROL THE FUEL/AIR MIXTURE, PROVIDING FULLY MODULATING FIRING RATES FOR MAXIMUM EFFICIENCY.  
WATER, FLUE GAS EXHAUST, COMBUSTION AIR INTAKE, CONDENSATE DRAIN AND INCOMING GAS CONNECTIONS SHALL BE LOCATED IN THE REAR OF THE BOILER. A FACTORY SUPPLIED OVERSIZED ASME PRESSURE RELIEF VALVE SHALL BE PROVIDED WITH THE BOILER. THE FLUE PASSAGES AND COMBUSTION CHAMBER SHALL BE ACCESSIBLE FROM THE FRONT OF THE BOILER FOR CLEANING. THE BOILER SHALL BE PROVIDED WITH A HEAVY DUTY 16 GAUGE STEEL JACKET WITH A RUST RESISTANT POWDER COAT FINISH TO ALLOW FOR SAME-SIZE OR SMALLER MODEL STACKING WITHOUT THE NEED OF A SEPARATE RACK SYSTEM. JACKETS MADE OF PLASTIC OR RESIN MATERIAL SHALL NOT BE ACCEPTABLE. THE BOILER JACKET SHALL CONTAIN AN INTERNAL ELECTRICAL CABINET FOR POWER AND LIMIT CIRCUIT WIRING, PROVIDING A CLEAN FINISHED LOOK WHEN THE JACKET IS INSTALLED. ELECTRICAL CONNECTIONS SHALL BE ACCESSIBLE FROM THE REAR OF THE BOILER ON TWO PRINTED CIRCUIT BOARDS (120VAC HIGH AND 24VAC/50VDC LOW VOLTAGE) WITH FUSED CONNECTIONS FOR PROTECTION AND CLEAR LABELING FOR SIMPLE AND ACCURATE WIRING.  
THE ELECTRICAL COMPONENTS SHALL BE SEPARATED FROM INCOMING COMBUSTION AIR GAS, WHICH MAY CONTAIN EXCESS HUMIDITY, DUST AND OTHER CONTAMINANTS BROUGHT THROUGH DUCTED COMBUSTION AIR. A CONDENSATE TRAP WITH A FLOAT-ACTUATED SHUT-OFF SWITCH SHALL BE SUPPLIED WITH THE BOILER. ELECTRICAL INPUT TO THE BOILER SHALL BE 120V/1PH/60HZ.  
CONTROLS USING PARAMETER MENU SELECTIONS, THE CONTROL SYSTEM SHALL ALLOW THE BOILER TO RESPOND DIRECTLY TO BOILER SUPPLY TEMPERATURE AND SETPOINT TO ESTABLISH A TARGET BOILER FIRING RATE WHILE REMOTE SYSTEM WATER TEMPERATURE IS USED FOR DISPLAY PURPOSES ONLY. THE BOILER'S FUEL FLOW CONTROL VALVE SHALL BE MECHANICALLY LINKED TO THE AIR FLOW CONTROL DEVICE TO ASSURE AN AIR RICH FUEL/AIR RATIO. ALL THE AUTOMATED LOGIC REQUIRED TO ENSURE THAT PRE-PURGE, POST-PURGE, LIGHT-OFF, AND

BURNER MODULATION SHALL BE PROVIDED.  
HOT WATER TEMPERATURE SETPOINT: WHEN THE CONTROLLER IS IN THE LOCAL CONTROL MODE, THE CONTROL SYSTEM SHALL ESTABLISH THE SETPOINT BASED ON THE REMOTE TEMPERATURE SENSOR SHALL BE ADJUSTABLE BY THE OPERATOR.  
FLUSH SYSTEM AND CLEAN WATER SYSTEM AS SPECIFIED ON THE DRAWINGS.  
BOILER LIGHT-OFF/ADJUSTMENT: BOILER UNIT MANUFACTURER SHALL PROVIDE THE SERVICES OF THEIR OWN FACTORY BURNER SERVICE GROUP IN THE FORM OF A BURNER SERVICE TECHNICIAN WHO SHALL ACTUALLY PERFORM THE INITIAL BURNER LIGHT-OFF, FINAL ADJUSTING AND TESTING OF THE BOILER AND CONTROLS IN THE PRESENCE OF THE ENGINEER, AND THE OWNER'S OPERATING PERSONNEL.  
**WARRANTY BOILER SERVICE**  
THE BOILER MANUFACTURER SHALL PROVIDE ONE YEAR OF WARRANTY BOILER SERVICE. THIS REQUIREMENT SHALL NOT BE WAIVED BY THIS CONTRACTOR, NOR SHALL THE RESPONSIBILITY FOR THE WARRANTY SERVICE BE ASSUMED BY ANY OTHER PARTY. BOILER MANUFACTURER SHALL FURNISH ONE YEAR OF WARRANTY SERVICE ON THE BOILER AND CONTROLS TO COMMENCE FROM THE DATE OF FINAL APPROVED LIGHT-OFF. THE WARRANTY SERVICE SHALL BE CONTRACTED FOR THROUGH A LOCAL APPROVED BURNER SERVICE ORGANIZATION WHICH SHALL RESPOND TO ANY AND ALL LEGITIMATE SERVICE CALLS ON A 24-HOUR BASIS AND WILL INCLUDE LABOR AND MATERIALS TO REPLACE ANY PARTS OR CONTROLS WHICH FAIL IN SERVICE AS THE RESULT OF A DEFECT IN MATERIALS OR MANUFACTURE. THIS CONTRACTOR SHALL GUARANTEE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF OWNER ACCEPTANCE AND DATE OF FINAL CERTIFICATE OF PAYMENT.  
**PIPING AND FITTINGS**  
GENERAL: PROVIDE PIPE AND FITTINGS OF THE TYPE, GRADE, SIZE AND WEIGHT INDICATED FOR EACH PIPING SYSTEM AS SHOWN ON THE DRAWINGS AND SPECIFIED HERE. MAIN HYDRONIC HEATING SYSTEM PIPING SHALL BE HYDRONIC HEATING PIPING 2" AND LARGER SHALL BE ASTM A53 SCHEDULE 40 BLACK STEEL PIPE WITH WELDED FITTINGS. PIPING 1 1/2" AND SMALLER SHALL BE TYPE "L" HARD COPPER TUBING WITH WROUGHT COPPER FITTINGS FOR SOLDER FITTING ASSEMBLY. CONDENSATE DRAINAGE PIPING TO BE SCHEDULE 40 PVC WITH SOLVENT WELDED FITTINGS.  
**CIRCULATING PUMPS**  
FURNISH AND INSTALL GRUNDFOS HOT WATER CIRCULATING PUMPS OF SIZE, TYPE AND CAPACITY AS SHOWN ON DRAWINGS. ALL CIRCULATORS SHALL BE MOUNTED IN PIPING AND SUPPORTED TO PREVENT VIBRATION. ISOLATE CIRCULATORS WITH BALL VALVES, CHECK VALVES AND UNIONS OR FLANGES TO PERMIT REMOVAL. POWER WIRING TO ALL CIRCULATING PUMPS WILL BE BY THE ELECTRICAL CONTRACTOR. ALL PUMPS SHALL BE AS MANUFACTURED BY GRUNDFOS. USE SAME MANUFACTURER FOR ALL PUMPS. INCLUDE FACTORY INSTALLED CONTROLS TO ALLOW THE PUMPS TO BE AUTOMATICALLY CONTROLLED TO MAINTAIN A CONSTANT PRESSURE. PUMPS SHALL INCLUDE A CIM CARD WITH BACNET COMPATIBILITY TO ALLOW THE PUMP CONTROLS TO BE INTEGRATED INTO THE BUILDING ENERGY MANAGEMENT SYSTEM IN THE FUTURE.  
PROVIDE NEW ISOLATION FLANGES FOR ALL PUMPS, NEW AND EXISTING.  
**HOT WATER SPECIALTIES**  
AIR VENTS: SHALL BE TACO MODEL 417, MANUAL VENT.  
EXPANSION TANK: MODEL AS SPECIFIED, 125 PSIG ASME CONSTRUCTION WITH LABEL.  
AIR SEPARATOR: SPIROTHERM MODEL AS SPECIFIED.  
**VALVES**  
BALL VALVES: BALL VALVES FOR HEATING SERVICE SHALL BE EQUAL TO WATTS NO. B-6000, BRONZE BODY, 600 LB. W.O.G., CHROME BALL AND STEM, EXTENDED HANDLE. PTFE SEAT AND SEALS, SCREWED ENDS OR B-6001 SWEAT ENDS. 200 LB. W.O.G.  
CHECK VALVES: WATTS SERIES CVS, SOLDER ENDS, SERIES CV SCREWED ENDS, BRONZE BODY, 200 LB. W.O.G.  
DRAIN VALVES: WATTS NO. B-6000, SCREWED ENDS, NO. B-6001 SWEAT ENDS. PROVIDE CAP AND CHAIN, WITH 1/2" I.P.S. TO 3/4" HOSE.  
STRAINERS: FURNISH AND INSTALL STRAINERS WHERE SPECIFIED AND/OR SHOWN ON THE DRAWINGS. STRAINERS SHALL BE WYE TYPE, AS MANUFACTURED BY ARMSTRONG OR APPROVED EQUAL, DESIGNED FOR 125 PSI, WSP. STRAINERS SHALL BE PROVIDED WITH BLOW-DOWN VALVE, WITH CAP AND CHAIN.  
**THERMOMETERS**  
THERMOMETERS SHALL BE H.O. TRERICE CATALOG NO. A40507 OR APPROVED EQUAL, WITH 9" SCALE, ADJUSTABLE ANGLE, AND SEPARABLE SOCKET. RANGES SHALL BE MANUFACTURER'S STANDARD CLOSEST TO THE FOLLOWING:  
**PRESSURE GAUGES**  
FURNISH AND INSTALL PRESSURE GAUGES WHERE SPECIFIED AND/OR SHOWN ON THE DRAWINGS. GAUGES SHALL BE TRERICE NO. 450B WITH 4-1/2" DIAL RANGE AS SHOWN OR APPROVED EQUAL TO U.S. GAGE OR CROSSBY-ASHTON. EACH GAUGE SHALL BE PROVIDED WITH A 1/4" BALL VALVE GAUGE ISOLATION VALVE. GAUGES SHALL BE INSTALLED SO AS TO BE EASILY READ WHILE STANDING ON THE FLOOR. PROVIDE PULSATION DAMPENER.  
**PIPE INSULATION**  
PROVIDE THERMAL INSULATION FOR EXTERIOR SURFACES OF ALL NEW PIPING AND SPECIALTIES AS INDICATED AND AS SPECIFIED. INSULATION SHALL INCLUDE INSULATING MATERIALS AND THEIR APPLICATION, INCLUDING FINAL JACKET, FINISH, METAL BENDS, AND OTHER FINISHES, WEATHER PROTECTION, ETC. INSULATION SHALL BE APPLIED BY EXPERIENCED PIPE COVERERS AS PER BEST TRADE PRACTICE, GUIDED BY MANUFACTURER'S PRINTED INSTRUCTIONS. HYDRONIC HEATING PIPING 1" AND SMALLER SHALL BE INSULATED WITH 1 1/2" THICK FIBERGLASS PRE-FORMED PIPE INSULATION. HYDRONIC PIPING LARGER THAN 1 1/4" SHALL BE INSULATED WITH 2" THICK FIBERGLASS PRE-FORMED PIPE INSULATION.  
**TEMPERATURE CONTROLS**  
THE BOILER SHALL BE CONTROLLED BY THE NEW OPERATING AND FIRING CONTROLS AND SHALL BE ENERGIZED WHENEVER THERE IS A CALL FOR HEAT AND THE OUTDOOR AIR TEMPERATURE IS LESS THAN 65F.  
PROVIDE NEW CONTROLS TO SPLIT THE EXISTING P-S-E PUMP ZONE INTO TWO ZONES. PROVIDE NEW POP-TOP CONTROL VALVES WITH END SWITCHES. THERMOSTAT SHALL OPEN RESPECTIVE ZONE VALVE AND END SWITCH SHALL START PUMP.

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MECHANICAL DETAILS AND SPECIFICATION

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