CONTROLS SYSTEM OVERVIEW:
CONTROLS ARE DESIGN/BUILD WITH DESIGN OF THE CONTROL SYSTEM DELEGATED TO THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETELY FUNCTIONAL CONTROL SYSTEM THAT PERFORMS THE SERVICES BELOW. FURNISH ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY FOR A COMPLETE AND OPERATING BUILDING MANAGEMENT SYSTEM (BAS), UTILIZING DIRECT DIGITAL CONTROLS AS SHOWN ON THE DRAWINGS AND AS DESCRIBED HEREIN. ALL CONTROLLERS FURNISHED IN THIS SECTION SHALL COMMUNICATE ON A PEER-TO-PEER BUS OVER AN OPEN PROTOCOL BUS OR IP NETWORK THAT COMPLIES WITH ANSI/ASHRAE STANDARD 135 NATIVE BACNET DEVICES. CONTRACTOR TO PULL POWER REQUIRED FOR CONTROLS FROM SPARE BREAKERS IN THE LIGHTING PANEL.

FRONT END:
CONTROLS SHALL BE INTEGRATED INTO THE EXISTING BUILDING AUTOMATION SYSTEM FRONT-END

GENERAL ITEMS:
- OWNER CONTROL SYSTEM TRAINING AND OWNER DESIRED SYSTEM REPROGRAMMING SHALL BE PROVIDED AT THE FOLLOWING INTERVALS:
  - AFTER B-1 INSTALLATION
  - 3 MONTHS AFTER ALL INSTALLATIONS HAVE BEEN COMPLETED
- INCLUDE 8 HOURS OF REPROGRAMMING TIME DURING THE FIRST YEAR OF OCCUPANCY TO BE USED AT THE OWNER'S DISCRETION.
- PROVIDE ONE YEAR WARRANTY ON PARTS AND LABOR.
- PROVIDE CONTROL'S SUBMITTAL FOR REVIEW BY OWNER AND ENGINEER THAT INCLUDE THE FOLLOWING:
  - NETWORK COMMUNICATIONS DIAGRAM
  - FRONT END GRAPHICS
  - SEQUENCE OF OPERATIONS
  - POINTS LIST
  - SETPOINTS
  - CONTROL PANEL LOCATIONS
- PROVIDE AS-BUILT CONTROL DRAWINGS
  - NETWORK COMMUNICATIONS DIAGRAM
  - FRONT END GRAPHICS
  - SEQUENCE OF OPERATIONS
  - POINTS LIST
  - SETPOINTS
  - POINT-TO-POINT COMMISSIONING REPORT
  - PERFORMANCE VERIFICATION SHEETS
  - CONTROLLER CHECKOUT/CALIBRATION SHEETS
- ANY CONTROL WIRING THAT WILL NOT BE CONCEALED SHALL BE INSTALLED IN CONDUIT
- COORDINATE CONTROL PANEL LOCATION(S) WITH OWNER
- PROVIDE UNINTERRUPTED POWER SUPPLY (UPS) FOR ALL NEW CONTROL PANELS

BOILER:
- B-1 SHALL BE INTEGRATED INTO THE CONTROL SYSTEM.
- PROVIDE ALL SENSORS, CONTROLLERS, VALVES, AND ACTUATORS REQUIRED FOR MONITORING AND CONTROL TO ACHIEVE THE SEQUENCES AND POINTS BELOW.
- BELOW IS A LIST OF REQUIRED CONTROL POINT. ALL POINTS SHALL BE SET UP FOR TRENDING.
  - OUTDOOR AIR TEMPERATURE
  - HEATING HOT WATER SUPPLY SETPOINT (ADJ)
  - HEATING HOT WATER SUPPLY TEMPERATURE
  - HEATING HOT WATER SUPPLY TEMPERATURE (PRIMARY LOOP)
  - HEATING HOT WATER RETURN TEMPERATURE (PRIMARY LOOP)
  - HEATING HOT WATER SUPPLY TEMPERATURE TO BUILDING (SECONDARY LOOP)
  - HEATING HOT WATER RETURN TEMPERATURE FROM BUILDING (SECONDARY LOOP)
  - BOILER ENABLE COMMAND (ON/OFF)
  - BOILER STATE (ON/OFF/ALARM)
  - BOILER FIRING RATE
  - HEATING HOT WATER PUMP COMMAND PER PUMP (ON/OFF/SPEED)
  - HEATING HOT WATER PUMP STATUS PER PUMP (ON/OFF/SPEED)
  - HEATING HOT WATER RUNTIME PER PUMP
  - SECONDARY WATER LOOP DIFFERENTIAL PRESSURE SETPOINT
  - SECONDARY WATER LOOP DIFFERENTIAL PRESSURE
  - ALARM STATUS FOR BOILERS AND PUMPS
  - E-STOP STATUS
- SEQUENCE OF OPERATIONS:
  - HEATING HOT WATER SYSTEM SHALL ACTIVATE WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 60°F (ADJ) OR ANY AHU CALLS FOR HEAT.
  - WHEN THE HEATING HOT WATER SYSTEM IS ACTIVATED ENABLE THE HEATING HOT WATER PUMPS. HEATING HOT WATER PUMPS OPERATE IN DUTY/STANDBY (N+1). RAMP DUTY HEATING HOT WATER PUMP UP AND DOWN TO MAINTAIN THE SECONDARY LOOP DIFFERENTIAL PRESSURE SETPOINT.
  - ROTATE DUTY HHWP TO MAINTAIN RUNTIME. CHANGE OVER DUTY PUMP WHEN THE RUNTIME OF THE DUTY PUMP IS 168 HOURS (ADJ) MORE THAN STANDBY PUMP. IF DUTY PUMP FAILS, ALARM BAS AND SWITCH TO STANDBY PUMP AUTOMATICALLY.
  - START BOILER, CIRCULATOR PUMPS, AND SEQUENCE BOILER (USING INTERNAL BOILER LOGIC) TO MAINTAIN 150°F (ADJ) SECONDARY LOOP HEATING HOT WATER SUPPLY TEMPERATURE.
    - SUPPLY WATER TEMPERATURE SHALL BE RESET BETWEEN 120°F-150°F DEPENDING ON OUTDOOR AIR TEMPERATURE WITH 150°F WATER BEING PROVIDED ANYTIME THE OUTDOOR AIR TEMPERATURE IS BELOW FREEZING.
  - NOTES:
    - WORK WITH TAB CONTRACTOR TO DETERMINE SECONDARY LOOP DIFFERENTIAL PRESSURE SETPOINT DETERMINED DURING HYDRONIC BALANCING. ADD UNEDITABLE NOTE TO THE BOILER PLANT BAS GRAPHIC SHOWING THE DIFFERENTIAL PRESSURE SETPOINT DETERMINED DURING BALANCING.
    - VERIFY E-STOP OPERATION AND E-STOP ALARM AT FRONT END.

GENERAL MECHANICAL NOTES:
1. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE THE DRAWINGS, AND AS REQUIRED BY CODE.
2. DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
3. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATION, AND APPLICABLE CODES AND REGULATIONS.
4. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
5. TESTING, ADJUSTING, AND BALANCING IS REQUIRED FOR ALL NEW SYSTEMS. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL. ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH AABC STANDARDS.
6. CONTRACTOR TO COMPLY WITH ALL LOCAL CODES AND REQUIREMENTS.
7. ALL OUTSIDE AIR INTAKES TO BE A MINIMUM OF 10' FROM ANY MECHANICAL EXHAUST, FLUES, OR PLUMBING VENTS.
8. DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH MOST RECENT SMACNA STANDARDS.
9. SUPPORTS FOR MECHANICAL SYSTEM PIPING MUST MEET THE HORIZONTAL AND VERTICAL SPACING PROVISIONS IN RESPECTIVE MECHANICAL CODE.
10. THESE DRAWINGS REFLECT A SYSTEM DESIGNED AROUND SPECIFIED REFERENCE PRODUCTS, THE SELECTION OF WHICH HAS INFLUENCED THE DESIGNS OF OTHER TRADES. IF SUBSTITUTE MANUFACTURERS, SIZES, OR MODEL NUMBERS ARE BID OR SUBMITTED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL DIFFERENCES PRIOR TO BID, ALL COSTS OF ALL TRADES ASSOCIATED WITH THE SUBSTITUTION SHALL BE INCLUDED IN THE BID.
11. COORDINATION FOR ALL MODIFICATIONS TO EACH DISCIPLINE WHICH RESULT FROM SUBSTITUTION OF EQUIPMENT OR MATERIALS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SUBSTITUTIONS WHICH ARE INSTALLED AND SUBSEQUENTLY ARE PROVEN UNSATISFACTORY BY OWNER AND/OR ENGINEER WITHIN THE WARRANTY PERIOD, SHALL BE REMOVED COMPLETELY BY THE CONTRACTOR AND REPLACED WITH THE ORIGINAL DESIGN OR CORRECTED AS DIRECTED BY THE ENGINEER WITHOUT ADDITIONAL COST TO OWNER.
12. ALL EXPOSED CONTROL WIRING NOT LOCATED WITHIN EQUIPMENT SHALL BE INSTALLED IN CONDUIT.
13. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR

JOB SPECIFIC MECHANCIAL NOTES:
1. HEATING HOT WATER PIPING TO BE TYPE L COPPER PIPING WITH BRAISED, SOLDERED, OR PRESS FITTINGS, OR SCHEDULE 40 BLACK STEEL WITH WELDED OR SCREWED FITTINGS. GROOVED FITTINGS SHALL NOT BE ALLOWED ON HEATING HOT WATER PIPING.
2. HEATING HOT WATER PIPING 1.5" AND SMALLER SHALL BE INSULATED WITH 1" INSULATION.
3. HEATING HOT WATER PIPING OVER 1.5" SHALL BE INSULATED WITH 2" INSULATION.
4. HEATING HOT WATER PUMPS TO BE INSULATED WITH 1" ARMAFLEX CLOSED CELL INSULATION.
5. ALL NEW PIPING SHALL BE CLEARLY LABELED WITH SYSTEM NAME AND FLOW ARROWS.
6. ALL OPENINGS (NEW AND EXISTING) IN THE WALL ENCLOSING THE BOILER ROOM SHALL BE PATCHED AND FIRE STOPPED TO PROVIDE A 1HR RATED PARTITION.
7. CONTRACTOR SHALL NOT DISTURB ANY LOAD BEARING WALLS. CONTACT ENGINEER IF UNITS CANNOT BE INSTALLED WITHOUT DISRUPTION OF LOAD BEARING WALL.

BID NOTES:
1. THE AWARDED CONTRACTOR WILL BE RESPONSIBLE FOR THE ENTIRE SCOPE OF THIS PROJECT WHICH INCLUDES MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, AND PROTECTION OF THE EXISTING BUILDING INTERIOR, EXTERIOR, AND SITE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS AND ASSOCIATED FEES REQUIRED TO PERFORM THE SCOPE OF WORK.
3. THE CONTRACTOR SHALL WORK DIRECTLY WITH THE OWNER TO COORDINATE SCHEDULE, SITE ACCESS, SYSTEM SHUTDOWNS, TEMPORARY HEATING/COOLING/DEHUMIDIFICATION, AND CONTRACT TERMS.
4. THE OWNER SHALL BE RESPONSIBLE FOR REMOVING NON-MECHANICAL AND NON-ELECTRICAL ITEMS FROM MECHANICAL ROOMS PRIOR TO CONSTRUCTION. NOTIFY OWNER 7 DAYS IN ADVANCE OF WHEN ITEMS MUST BE REMOVED.
5. THE OWNER SHALL BE RESPONSIBLE FROM REMOVING ASBESTOS FROM WORK AREAS PRIOR TO CONSTRUCTION. NOTIFY OWNER 14 DAYS IN ADVANCE OF WHEN ITEMS MUST BE REMOVED.

GENERAL ELECTRICAL NOTES:
1. ALL WORK SHALL BE PERFORMED IN STRICT COMPLIANCE WITH LATEST ADOPTED VERSION OF THE NATIONAL ELECTRICAL CODE (NEC) (INCLUDING LOCAL AMENDMENTS), AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES. WHERE CONFLICTS ARISE, THE MOST STRINGENT REQUIREMENT SHALL APPLY.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VISIT THE PROJECT SITE PRIOR TO SUBMITTING BID IN ORDER TO VERIFY THE EXTENT OF THE CONSTRUCTION WORK AND THE ACTUAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. SUBMITTAL OF BID SHALL BE CONSIDERED PROOF THAT THE CONTRACTOR HAS VISITED THE JOB SITE AND IS FAMILIAR WITH THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.
3. CONTRACTOR IS RESPONSIBLE FOR PROCURING ALL NECESSARY PERMITS AND LICENSES REQUIRED FOR WORK. PAY ALL LAWFUL FEES, INCLUDING, BUT NOT LIMITED TO UTILITY DEPOSITS, INSPECTION FEES, AND TEMPORARY AND PERMANENT CONSTRUCTION FEES.
4. CONTRACTOR SHALL COORDINATE INSTALLATION OF ELECTRICAL SYSTEMS WITH OTHER TRADES. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR EXACT LOCATIONS OF MECHANICAL AND PLUMBING EQUIPMENT. FAILURE TO COORDINATE WITH OTHER TRADES SHALL NOT RESULT IN A CHANGE ORDER.
5. SERVICE EQUIPMENT SHALL BE MARKED WITH THE AVAILABLE FAULT CURRENT ON THE PANEL PER NEC 110.24. COORDINATE WITH LOCAL UTILITY.
6. PROVIDE HANDLE TIES ON ALL MULTIWIRE BRANCH CIRCUITS TO MEET THE REQUIREMENTS OF NEC 210.4(B).
7. PROVIDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR (SIZED PER NEC) IN ALL CONDUITS CONTAINING POWER CIRCUITS. CONDUIT SHALL BE SIZED PER NEC BASED ON THWN 600 VOLT COPPER SINGLE CONDUCTORS, PLUS THE EQUIPMENT GROUNDING CONDUCTOR.
8. PROVIDE DEVICE LABELS (STICK ON MYLAR TAPE LABEL/ WITH PANEL AND BRANCH CIRCUIT-1/4" HIGH BLACK LETTER) FOR ALL ELECTRICAL DEVICES.
9. PROVIDE ARC FLASH WARNING LABELS ON ALL REQUIRED EQUIPMENT.
10. UPON COMPLETION OF ELECTRICAL INSTALLATION AND PRIOR TO ENERGIZING THE CIRCUIT:
    A. INSPECT WIRE AND CABLE FOR PHYSICAL DAMAGE.
    B. PERFORM CONTINUITY TEST.
    C. VERIFY PROPER PHASING CONNECTION TO ALL THREE PHASE MOTOR LOADS.
11. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ACCEPTABLE MANUFACTURERS SHALL BE AS INDICATED FOR EQUIPMENT SCHEDULED UNLESS OTHERWISE NOTED. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND EQUIPMENT AND MAKE ALL FINAL CONNECTIONS FOR A COMPLETE AND OPERATIONAL SYSTEM.
12. PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT AND WIRING FROM DISCONNECT SWITCH OR JUNCTION BOX TO EQUIPMENT KNOCKOUT OR ELECTRICAL CONNECTION POINT FOR ALL OUTDOOR OR OTHER WET-LOCATION EQUIPMENT CONNECTIONS.
13. WHERE PROVIDED EQUIPMENT NAMEPLATE PROTECTIVE DEVICE RATING DIFFERS FROM SIZE SPECIFIED, PROVIDE WIRING AND OVERCURRENT DEVICE WITH APPROPRIATE RATING PER NEC.
14. CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS TO ALL EQUIPMENT IN CONFORMANCE WITH EQUIPMENT MANUFACTURER WIRING DIAGRAMS.

OVERALL PROJECT SCOPE:
THE SCOPE OF THIS PROJECT IS TO REPLACE THE BOILER AND TO INSTALL PIPING TO ALLOW FOR A TEMPORARY BOILER TO BE CONNECTED TO THE SYSTEM IN THE CASE OF EMERGENCY.

BOILER PLANT MECHANICAL SCOPE OVERVIEW AND PHASING NOTES:
1. SHUT DOWN SYSTEM AND INSTALL TEES AND VALVES ON PRIMARY BOILER LOOP HEADER FOR INSTALLATION OF TEMPORARY BOILER PIPING AND RESTART BOILER SYSTEM.
2. INSTALL TEMPORARY BOILER PIPING TO EXTERIOR OF BUILDING AND PROVIDE TEMPORARY BOILER IF REQUIRED BY OWNER.
3. REMOVE EXISTING BOILER AND ONE HEATING HOT WATER CIRCULATOR PUMP.
4. EXTEND EXISTING HOUSEKEEPING PAD FOR THE NEW BOILER (B-1) AND INSTALL NEW BOILER AND ACCESSORIES AND CONNECT TO EXISTING PIPING AND VENTING.
5. OPEN THE SYSTEM TO THE NEW BOILER AND START UP NEW BOILER.

ASME CSD-1 CONTROLS AND SAFETY NOTES:
1. BOILER, BOILER CONTROLS, AND BOILER INSTALLATION SHALL COMPLY WITH ASME CSD-1 (VERSION 2018).
2. A DISCONNECTING MEANS CAPABLE OF BEING LOCKED IN THE OPEN POSITION SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION AT THE BOILER SO THAT THE BOILER CAN BE DISCONNECTED FROM ALL SOURCES OF POTENTIAL. THIS DISCONNECTING MEANS SHALL BE AN INTEGRAL PART OF THE BOILER OR ADJACENT TO IT.
3. A MANUALLY OPERATED REMOTE SHUTDOWN SWITCH OR CIRCUIT BREAKER SHALL BE LOCATED JUST OUTSIDE THE BOILER ROOM DOOR AND MARKED FOR EASY SHUTDOWN.
   3.1. CONSIDERATION SHOULD BE GIVEN TO THE TYPE AND LOCATION OF THE REMOTE SHUTDOWN SWITCH TO SAFEGUARD AGAINST TAMPERING. IF THE BOILER ROOM DOOR IS ON THE BUILDING EXTERIOR, THE SWITCH SHOULD BE LOCATED JUST INSIDE THE DOOR. IF THERE IS MORE THAN ONE DOOR TO THE BOILER ROOM, THERE SHOULD BE A REMOTE SHUTDOWN SWITCH LOCATED AT EACH DOOR.
4. ACTIVATION OF THE REMOTE SHUTDOWN SWITCH OR CIRCUIT BREAKER SHALL IMMEDIATELY SHUT OFF THE FUEL OR ENERGY SUPPLY.
5. ALL UNINSULATED LIVE METAL PARTS AND ALL ROTATING OR MOVING PARTS THAT MAY CAUSE INJURY SHALL BE GUARDED TO AVOID ACCIDENTAL CONTACT.
6. THE POWER SUPPLY TO THE ELECTRICAL CONTROL SYSTEM SHALL BE FROM A TWO-WIRE BRANCH CIRCUIT THAT HAS A GROUNDED CONDUCTOR; OTHERWISE, AN ISOLATION TRANSFORMER WITH A TWO-WIRE SECONDARY SHALL BE PROVIDED. WHEN AN ISOLATION TRANSFORMER IS PROVIDED, ONE SIDE OF THE SECONDARY WINDING SHALL BE GROUNDED. CONTROL VOLTAGE SHALL NOT EXCEED 150 NOMINAL VOLTS, LINE TO LINE.
   6.1. ONE SIDE OF ALL COILS SHALL BE ELECTRICALLY LOCATED IN THE GROUNDED SIDE OF THE CIRCUIT. ALL SWITCHES, CONTACTS, AND OVERCURRENT DEVICES SHALL BE ELECTRICALLY LOCATED IN THE UNGROUNDED OR 'HOT' SIDE OF THE CIRCUIT.
   6.2. ALL ELECTRICAL CONTACTS OF EVERY SAFETY DEVICE INSTALLED IN THE SAME CONTROL CIRCUIT SHALL BE ELECTRICALLY CONNECTED IN SERIES.
7. ALL ELECTRICAL COMPONENTS AND DEVICES SHALL HAVE A VOLTAGE RATING COMMENSURATE WITH THE SUPPLY VOLTAGE OF THE CONTROL SYSTEM.
8. ALL ELECTRICAL COMPONENTNS AND DEVICES SHALL BE PROVIDED WITH AN ELECTRICAL ENCLOSURE THAT IS AT LEAST NEMA TYPE 1 (GENERAL PURPOSE). WHERE ELECTRICAL DEVICES WILL BE SUBJECT TO DRIPPING MOISTURE, THE ENCLOSURE SHALL BE AT LEAST NEMA TYPE 2 (DRIPTIGHT).
9. ALL ELECTRICAL CONTROL DEVICES SHALL BE OF A TYPE TESTED AND ACCEPTED BY A NATIONALLY RECOGNIZED TESTING AGENCY.
10. THE DESIGN OF THE CONTROL CIRCUITS SHALL BE SUCH THAT LIMIT AND PRIMARY SAFETY CONTROLS SHALL DIRECTLY OPEN A CIRCUIT THAT FUNCTIONS TO INTERRUPT THE SUPPLY OF FUEL TO COMBUSTION UNITS.
11. AUTOMATIC RESETTING DEVICES, CONTROLS, OR SWITCHES SHALL BE INSTALLED IN ACCORDANCE WITH THE INSTRUCTIONS OF THE COMBUSTION SAFEGUARD CONTROL MANUFACTURER. NO AUTOMATIC RESETTING DEVICE, CONTROL, OR SWITCH SHALL BE INSTALLED IN THE WIRING BETWEEN THE LOAD SIDE (TERMINAL) OF THE PRIMARY OR PROGRAMMING CONTROL AND THE MAIN OR IGNITION FUEL VALVE OR VALVES. THIS DOES NOT PRECLUDE THE INSTALLATION OF MANUALLY OPERATED TEST SWITCHES FOR THE PURPOSES OF TESTING TIGHT CLOSURE OF INDIVIDUAL FUEL FEEDS.

DEMOLITION DEFINITIONS:
- REMOVE: DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF-SITE UNLESS INDICATED TO BE REMOVED AND SALVAGED OR REMOVED AND REINSTALLED.
- REMOVE AND SALVAGE: CAREFULLY DETACH FROM EXISTING CONSTRUCTION, IN A MANNER TO PREVENT DAMAGE, AND DELIVER TO OWNER.
- REMOVE AND REINSTALL: DETACH FROM EXISTING CONSTRUCTION, PREPARE FOR REUSE, AND REINSTALL WHERE INDICATED
- EXISTING TO REMAIN: EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE PERMANENTLY REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, REMOVED AND SALVAGED, OR REMOVED AND REINSTALL.

FIRE ALARM NOTES:
IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MODIFICATIONS TO THE EXISTING FIRE ALARM SYSTEM COMPLIANT WITH NFPA 72 RESULTING IN A COMPLETE AND OPERABLE FIRE ALARM SYSTEM AND IS APPROVED BY THE OWNER AND THE AUTHORITIES HAVING JURISDICTION. FIRE ALARM SCOPE IS LIMITED TO MECHANICAL EQUIPMENT MODIFICATIONS DETAILED IN THESE DRAWINGS. FIRE ALARM CONTRACTOR SHALL SUBMIT FIRE DRAWINGS DESIGNED BY NICET LEVEL IV INDIVIDUAL, EQUIPMENT CUT SHEETS, ETC. PER LOCAL CODE AND NFPA 72 TO LOCAL AUTHORITIES HAVING JURISDICTION AND ENGINEER FOR APPROVAL PRIOR TO ORDERING EQUIPMENT. INCLUDE IN BID ALL COSTS FOR PERMITS AND FEES. DEVICES SHALL BE STANDARD PRODUCT OF SINGLE MANUFACTURER, SHALL DISPLAY THE MANUFACTURER'S NAME ON EACH COMPONENT, AND SHALL BE COMPATIBLE WITH EXISTING SYSTEM. COORDINATE WITH OWNER FOR ACCEPTABLE MODELS AND DESIGN REQUIREMENTS.

ABBREVIATIONS:

ADJ	ADJUSTABLE
BAS	BUILDING AUTOMATION SYSTEM
BLDG	BUILDING
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CW	COLD WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DOM	DOMESTIC
EXIST	EXISTING
HHWR	HEATING HOT WATER RETURN
HHWS	HEATING HOT WATER SUPPLY
TEMP	TEMPORARY
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE

greenacorn
GREEN ACORN LLC
OK COA# 8292
www.GreenAcornLLC.com
1350 S. BOULDER AVE, #950
TULSA, OKLAHOMA 74119
918-629-4291

LICENSED PROFESSIONAL ENGINEER
ALLEN MERK
31032
OKLAHOMA
01.22.2026

NO.	ISSUE LOG	DATE & INITIALS
1	100% CDs	01.22.26

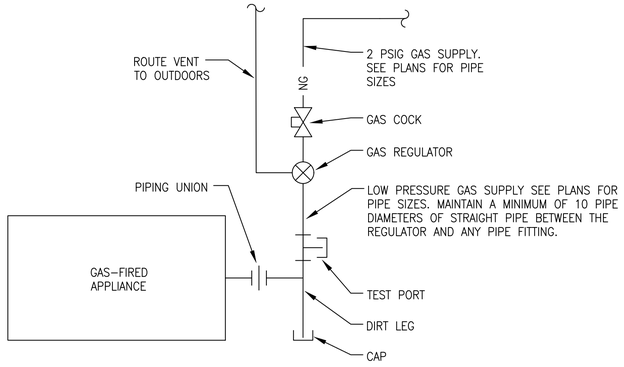
MIDWEST CITY
CITY HALL
BOILER UPGRADES

100 N MIDWEST BLVD
MIDWEST CITY, OK 73110

NOTES, ABBREVIATIONS & SCOPE SUMMARIES

INITIAL DATE:	JOB NO:
01.22.26	3024.04
DRAWN BY: HCS / CHECKED BY: AMM	SHEET: M-1
PRINT DATE: 1/22/2026	SHEET NO: 1 OF 3

FILE NAME: 3024A - MC BOILER UPGRADES.dwg



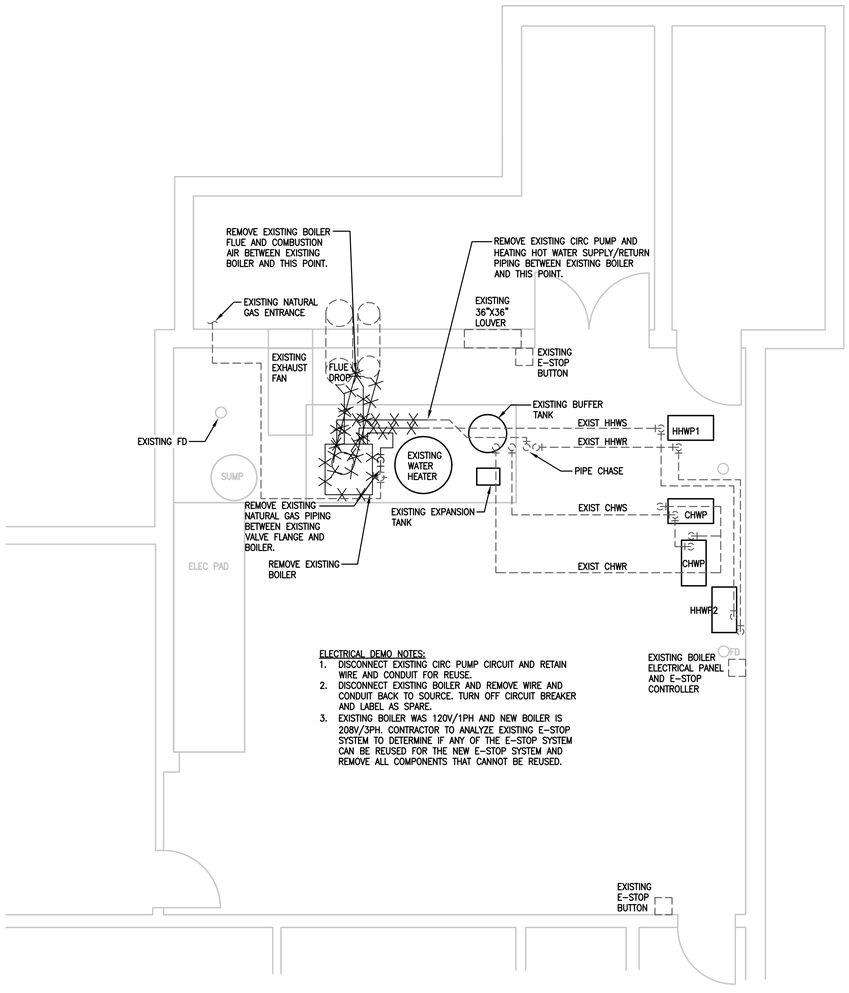
3 - INDOOR GAS FIRED APPLIANCE PIPING DETAIL

SCALE : NTS

HEATING HOT WATER CONDESNING BOILER SCHEDULE

TAG	MANUFACTURER	MODEL	QTY.	HEATING DATA			GPM	EWT	LWT	PUMP ESP	WATER CONN. SIZES		VENT CONN. SIZES		GAS CONN. SIZE	ELECTRICAL DATA		UNIT WT. (lb)	REMARKS
				MBH (in)	MBH (out)	MINIMUM TURNDOWN					Inlet	Outlet	CMB	FLUE		FLA	SERVICE V/PH/HZ		
B-1	RIELLO	AR 3000	1	3000	2883	30:1	160	114	150	4.5 ftH2O	4"	4"	8"	8"	2"	15.5	208/3/60	2315	ALL

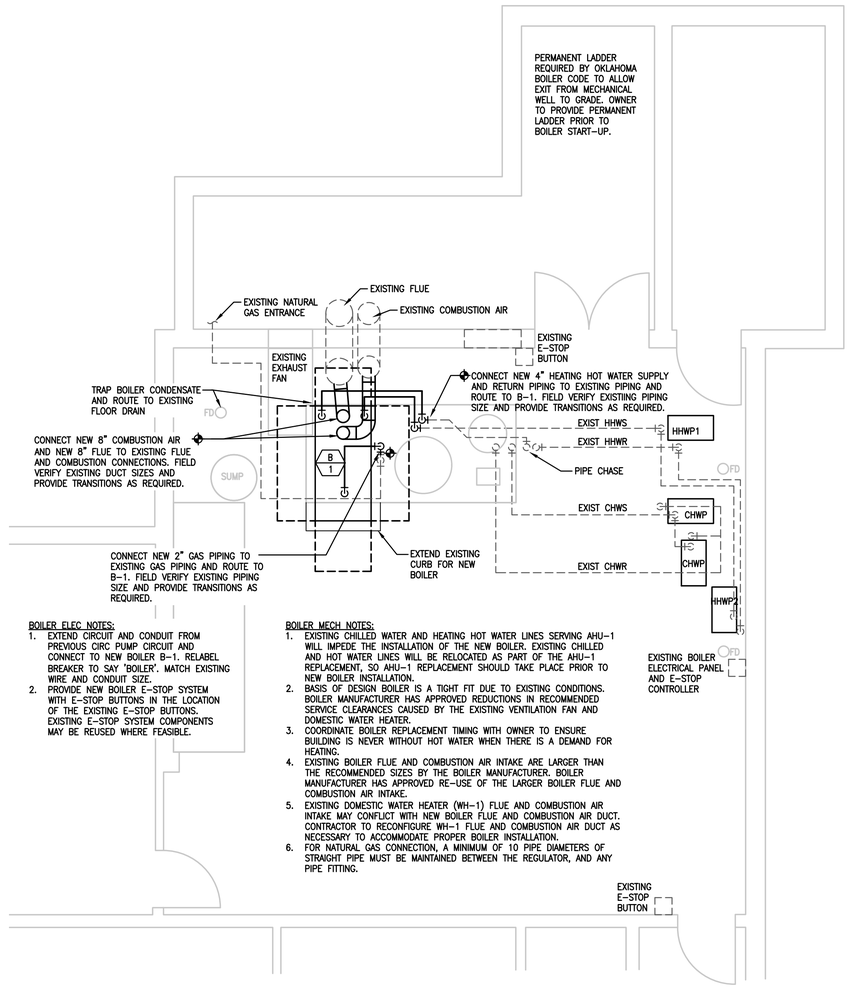
REMARKS:
1. BOILER SHALL HAVE INTERNAL REDUNDANCY BUILT-IN. THIS SHALL INVOLVE MULTIPLE MODULE DESIGN WITH CONTROLS FOR EACH MODULE, CIRCULATION PUMPS FOR EACH MODULE, ISOLATION VALVES FOR EACH MODULE, AND DRAIN VALVES FOR EACH MODULE
2. PROVIDE ALL TEMPERATURE SENSORS AND WELLS REQUIRED FOR PROPER BOILER OPERATION.
3. PROVIDE ALL FLOW SENSORS AND WELLS REQUIRED FOR PROPER HEAT BOILER OPERATION.
4. PROVIDE ELECTRICAL DISCONNECT
5. PROVIDE BACNET CARD
6. INTEGRAL PRIMARY PUMP(S)
7. PROVIDE CONDENSATE PIPING AND CONDENSATE NEUTRALIZATION KIT
8. PROVIDE OUTDOOR AIR TEMPERATURE SENSOR
9. PROVIDE NATURAL GAS SUPPLY FILTER
10. PROVIDE ISOLATION VALVE, NG REGULATOR, DIRT LEG, TEST PORT, AND UNION AT BOILER GAS CONNECTION
11. ASME 'H' STAMPED & ETL LISTED
12. PROVIDE EMERGENCY SHUT-OFF SWITCH AT ALL ENTRANCES TO THE BOILER ROOM
13. PROVIDE ASME RATED PRESSURE RELIEF VALVE. INDIRECTLY DRAIN OUTLET OVER EXISTING FLOOR DRAIN
14. REFER TO ASME CSD-1 NOTES ON SHEET M-1
15. CONTRACTOR TO ANALYZE WATER QUALITY AND TREAT THE HEATING HOT WATER SYSTEM TO MEET THE BOILER MANUFACTURER'S REQUIREMENTS
16. STAINLESS STEEL HEAT EXCHANGERS



ELECTRICAL DEMO NOTES:
1. DISCONNECT EXISTING CIRC PUMP CIRCUIT AND RETAIN WIRE AND CONDUIT FOR REUSE.
2. DISCONNECT EXISTING BOILER AND REMOVE WIRE AND CONDUIT BACK TO SOURCE. TURN OFF CIRCUIT BREAKER AND LABEL AS SPARE.
3. EXISTING BOILER WAS 120V/1PH AND NEW BOILER IS 208V/3PH. CONTRACTOR TO ANALYZE EXISTING E–STOP SYSTEM TO DETERMINE IF ANY OF THE E–STOP SYSTEM CAN BE REUSED FOR THE NEW E–STOP SYSTEM AND REMOVE ALL COMPONENTS THAT CANNOT BE REUSED.

2 - BOILER DEMO PLAN

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



BOILER ELEC NOTES:
1. EXTEND CIRCUIT AND CONDUIT FROM PREVIOUS CIRC PUMP CIRCUIT AND CONNECT TO NEW BOILER B–1. RELABEL BREAKER TO SAY 'BOILER'. MATCH EXISTING WIRE AND CONDUIT SIZE.
2. PROVIDE NEW BOILER E–STOP SYSTEM WITH E–STOP BUTTONS IN THE LOCATION OF THE EXISTING E–STOP BUTTONS. EXISTING E–STOP SYSTEM COMPONENTS MAY BE REUSED WHERE FEASIBLE.

BOILER MECH NOTES:
1. EXISTING CHILLED WATER AND HEATING HOT WATER LINES SERVING AHU–1 WILL IMPEDE THE INSTALLATION OF THE NEW BOILER. EXISTING CHILLED AND HOT WATER LINES WILL BE RELOCATED AS PART OF THE AHU–1 REPLACEMENT, SO AHU–1 REPLACEMENT SHOULD TAKE PLACE PRIOR TO NEW BOILER INSTALLATION.
2. BASIS OF DESIGN BOILER IS A TIGHT FIT DUE TO EXISTING CONDITIONS. BOILER MANUFACTURER HAS APPROVED REDUCTIONS IN RECOMMENDED SERVICE CLEARANCES CAUSED BY THE EXISTING VENTILATION FAN AND DOMESTIC WATER HEATER.
3. COORDINATE BOILER REPLACEMENT TIMING WITH OWNER TO ENSURE BUILDING IS NEVER WITHOUT HOT WATER WHEN THERE IS A DEMAND FOR HEATING.
4. EXISTING BOILER FLUE AND COMBUSTION AIR INTAKE ARE LARGER THAN THE RECOMMENDED SIZES BY THE BOILER MANUFACTURER. BOILER MANUFACTURER HAS APPROVED RE–USE OF THE LARGER BOILER FLUE AND COMBUSTION AIR INTAKE.
5. EXISTING DOMESTIC WATER HEATER (WH–1) FLUE AND COMBUSTION AIR INTAKE MAY CONFLICT WITH NEW BOILER FLUE AND COMBUSTION AIR DUCT. CONTRACTOR TO RECONFIGURE WH–1 FLUE AND COMBUSTION AIR DUCT AS NECESSARY TO ACCOMMODATE PROPER BOILER INSTALLATION.
6. FOR NATURAL GAS CONNECTION, A MINIMUM OF 10 PIPE DIAMETERS OF STRAIGHT PIPE MUST BE MAINTAINED BETWEEN THE REGULATOR, AND ANY PIPE FITTING.

1 - BOILER MECHANICAL PLAN

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

greenacorn
GREEN ACORN LLC
OK COA# 8292
www.GreenAcornLLC.com
1350 S. BOULDER AVE, #950
TULSA, OKLAHOMA 74119
918-629-4291

LICENSED PROFESSIONAL ENGINEER
ALLEN MERK
31032
OKLAHOMA
01.22.2026

NO.	ISSUE LOG	DATE & INITIALS
1	100% CDs	01.22.26

MIDWEST CITY
CITY HALL
BOILER UPGRADES

100 N MIDWEST BLVD
MIDWEST CITY, OK 73110

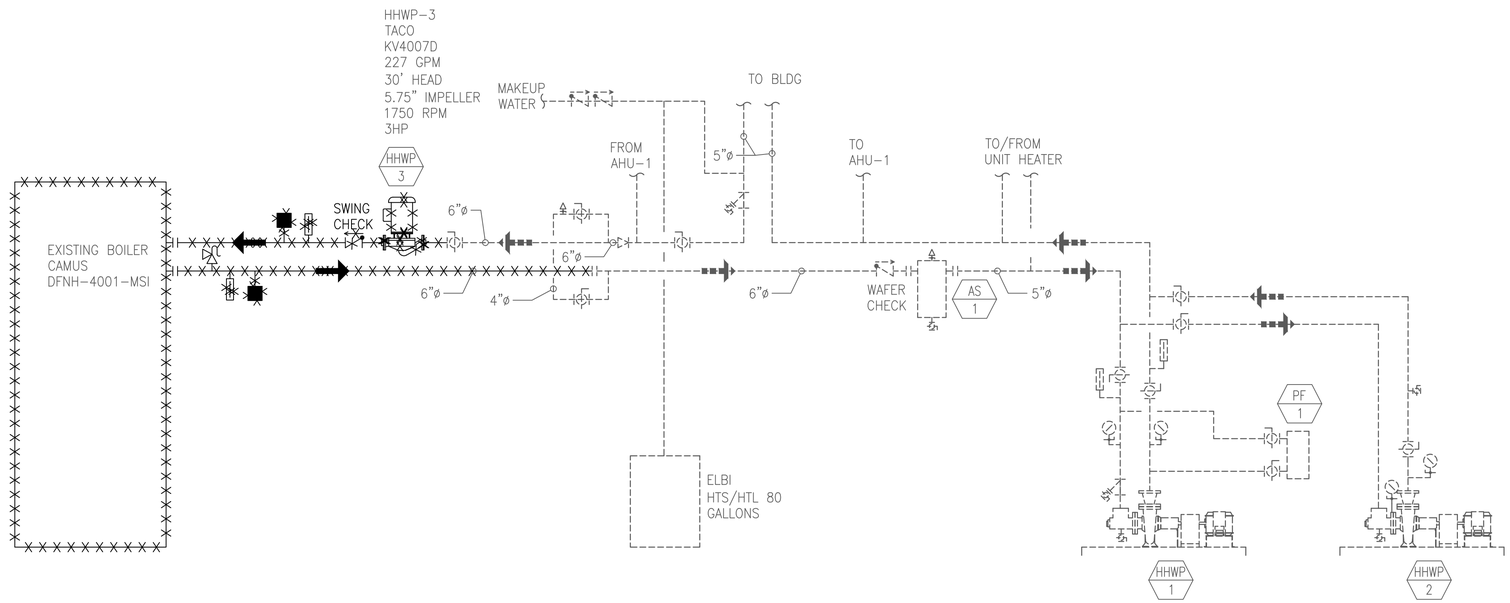
B-1 PLANS & SCHEDULE

INITIAL DATE:	JOB NO:
01.22.26	3024.04
DRAWN BY: HCS / CHECKED BY: AMM	SHEET: M-2
PRINT DATE: 1/22/2026	SHEET NO: 2 OF 3

FILE NAME: 3024.04 - MWC BOILER UPGRADES.dwg

MECHANICAL SYMBOLS

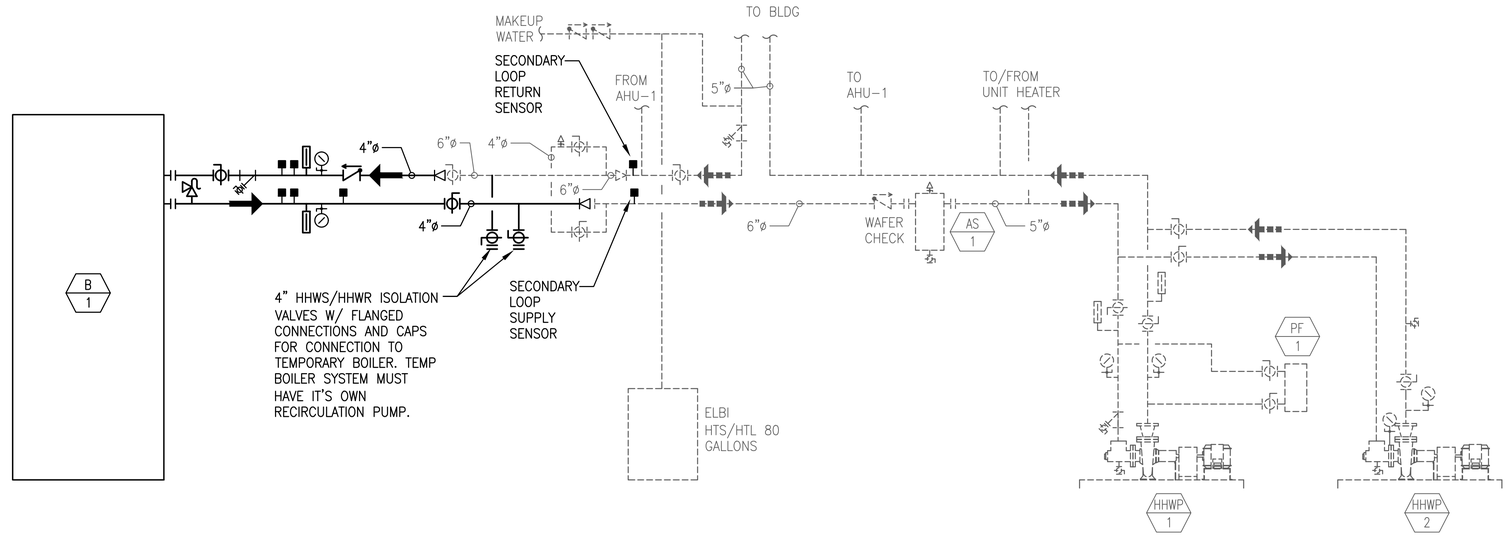
- FULL-PORT ISOLATION VALVE: 2-1/2" AND SMALLER = BALL; 3" AND LARGER = BUTTERFLY
- Y-STRAINER WITH VALVE & HOSE CONNECTION
- THERMOMETER
- CONTROL WELL / TEST PORT
- TRIPLE DUTY VALVE – ISLOATION, CHECK, CIRCUIT SETTER
- REDUCER
- PRESSURE GUAGE
- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- MOTORIZED 3-WAY VALVE
- 2-WAY MOTORIZED CONTROL VALVE
- PUMP – FLOW IN DIRECTION OF ARROW
- CONNECT TO EXISTING
- XX / XX — EQUIPMENT TAG
- CONTINUATION
- FLOW ARROW
- NON-SWING CHECK VALVE – FLOW IN DIRECTION OF ARROW
- CAP
- PRESSURE RELIEF VALVE



2 - BOILER DEMO FLOW DIAGRAM

SCALE : NTS

NORTH



1 - BOILER FLOW DIAGRAM

SCALE : NTS

NORTH

greenacorn

GREEN ACORN LLC
OK COA# 8292
www.GreenAcornLLC.com

1350 S. BOULDER AVE, #950
TULSA, OKLAHOMA 74119
918-629-4291

LICENSED PROFESSIONAL ENGINEER
ALLEN MERK
31032
OKLAHOMA

01.22.2026

NO.	ISSUE LOG	DATE & INITIALS
1	100% CDs	01.22.26

MIDWEST CITY CITY HALL

BOILER UPGRADES

100 N MIDWEST BLVD
MIDWEST CITY, OK 73110

FLOW DIAGRAMS

INITIAL DATE:	JOB NO:
01.22.26	3024.04
DRAWN BY: HCS / CHECKED BY: AMM	SHEET: M-3
PRINT DATE: 1/22/2026	SHEET NO: 3 OF 3

FILE NAME: 3024.04 - MWC BOILER UPGRADES.dwg