2025 BOILER REPLACEMENTS
BUILDING "E" MCHENRY
COUNTY COLLEGE

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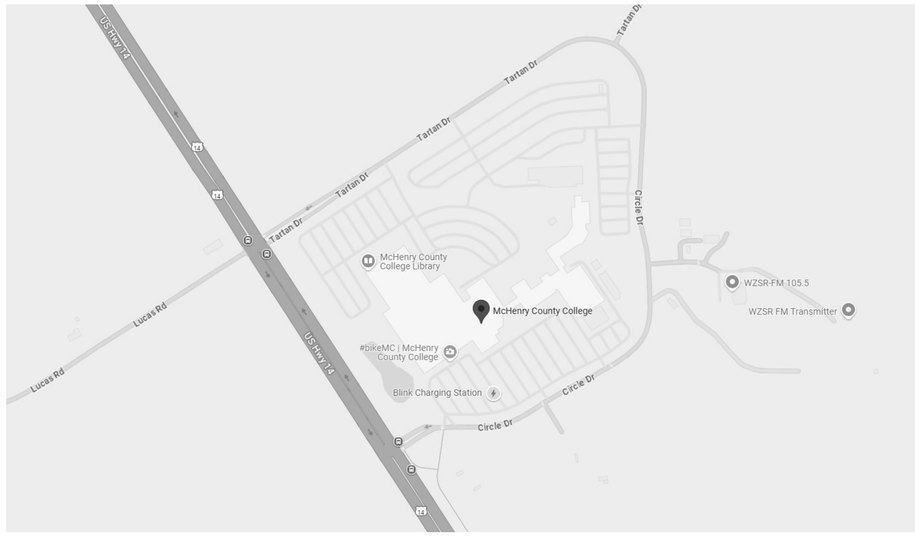

SITE PLAN - MAP: MCHENRY COUNTY COLLEGE

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11/30/2025

2025 BOILER REPLACEMENTS BUILDING 'E' McHENRY COUNTY COLLEGE

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DATE	DESCRIPTION
03/07/25	BID/PERMIT

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Sheet Title
COVER SHEET

PROJ. MGR: Checker
DRAWN BY: Author
CHECKED B Checker

T-1

GENERAL REMODELING NOTES - ALL CONTRACTORS

1. ALL WORK SHOWN ON DRAWINGS SHALL BE CONSIDERED NEW AND IN CONTRACT UNLESS SPECIFICALLY INDICATED OTHERWISE.

2. DRAWINGS ARE GENERALLY DIAGRAMMATIC. ROUTING OF PIPING, DUCTWORK, CONDUITS, RACEWAYS, ETC. AS SHOWN ON DRAWINGS, DOES NOT INTEND TO SHOW EVERY RISE, DROP, OFFSET, FITTING NOR EVERY STRUCTURAL ELEMENT THAT MAY BE ENCOUNTERED DURING THE INSTALLATION OF THIS WORK. EACH CONTRACTOR SHALL MAKE ANY REQUIRED CHANGES FROM THE GENERAL ROUTING SHOWN ON THESE DRAWINGS, SUCH AS OFFSETS, BENDS OR CHANGES IN ELEVATION DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND BUILDING CONSTRUCTION. ALL CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY IN COMPLETION DATE OF THE PROJECT.

3. IT IS INTENDED THAT EQUIPMENT SHALL BE LOCATED SYMMETRICALLY WITH THE ARCHITECTURAL ELEMENTS OF THE BUILDING, NOTWITHSTANDING THE FACT THAT LOCATIONS INDICATED BY THESE DRAWINGS MAY BE DISTORTED FOR CLEARNESS OF PRESENTATION.

4. CONTRACTOR SHALL CHECK DRAWINGS OF OTHER TRADES TO VERIFY THAT SPACES IN WHICH THEIR WORK WILL BE INSTALLED ARE CLEAR OF OBSTRUCTIONS. WORK SHALL BE INSTALLED TO MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITIONS AT ALL POINTS IN THE BUILDING. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, CONTRACTOR SHALL NOTIFY OWNER/ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE INSTALLATION OF THEIR WORK.

5. CONTRACTOR SHALL FURNISH OTHER TRADES ADVANCE INFORMATION AND/OR SHOP DRAWINGS ON LOCATIONS AND SIZES OF PIPING, DUCTWORK, CONDUIT, RACEWAYS, EQUIPMENT, FRAMES, BOXES, SLEEVES AND OPENINGS, ETC. NEEDED FOR THEIR WORK TO PERMIT OTHER TRADES AFFECTED TO INSTALL THEIR WORK PROPERLY AND WITHOUT DELAY.

6. WHERE THERE IS EVIDENCE THAT WORK OF ONE TRADE WILL INTERFERE WITH WORK OF OTHER TRADES, ALL TRADES SHALL MEET ON JOB SITE TO WORK OUT SPACE CONDITIONS AND MAKE SATISFACTORY ADJUSTMENTS TO INSTALLATION OF THE NEW WORK. CONTRACTORS SHALL VERIFY EXACT LOCATIONS OF ALL DEVICES AND EQUIPMENT WITH FIELD CONDITIONS, SHOP DRAWINGS, AND WORK OF OTHER TRADES PRIOR TO ROUGH-IN. EACH CONTRACTOR SHALL BE RESPONSIBLE, AT THEIR OWN EXPENSE, FOR THE REMOVAL AND REINSTALLATION OF ANY PART OF THEIR WORK IF SAME WAS INSTALLED WITHOUT CONSULTING WITH OTHER TRADES BEFORE INSTALLING THEIR WORK.

7. CONTRACTOR SHALL PROVIDE SLEEVES IN BEAMS, FLOORS, COLUMNS AND WALLS AS SHOWN ON THE DRAWINGS, AS REQUIRED BY JOB SITE CONDITIONS, AND/OR AS SPECIFIED, WHEN INSTALLING THEIR WORK. ALL BEAMS AND COLUMNS WHICH ARE REQUIRED TO BE SLEEVED SHALL BE CUT AND REINFORCED AS REQUIRED BY FIELD CONDITIONS AND LOCATIONS AND SIZES SHALL BE CHECKED AND APPROVED BY ARCHITECT BEFORE CONTRACTOR CUTS ANY STRUCTURAL BUILDING MEMBER.

8. THE SEQUENCE FOR THE INSTALLATION OF ALL WORK SHALL BE COORDINATED BETWEEN ALL CONTRACTORS ON THE PROJECT AND IN STRICT ACCORDANCE WITH ARCHITECT/ENGINEER AND OWNERS STIPULATION AS DIRECTED.

9. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL AND STRUCTURAL CONTRACT DRAWINGS (BEFORE SUBMITTING THEIR BIDS) TO FAMILIARIZE THEMSELVES WITH THE EXTENT OF THE GENERAL CONTRACTOR'S WORK, CEILING HEIGHTS AND CLEARANCE FOR INSTALLING THEIR WORK.

10. CONTRACTOR SHALL BE RESPONSIBLE AND PAY FOR ALL CORING, CUTTING, PATCHING, REPAIRING, REFINISHING AND REMOVAL/REPLACEMENT OF NEW OR EXISTING BUILDING CONSTRUCTION REQUIRED TO ACCOMMODATE THE INSTALLATION OR REMOVAL OF THEIR WORK. ALL PATCHING, REPAIRING AND REFINISHING WORK SHALL BE PERFORMED BY THOSE REGULARLY INVOLVED IN THAT TRADE AND SHALL MATCH THE ADJACENT CONSTRUCTION AS CLOSELY AS POSSIBLE. CARE SHALL BE TAKEN SO AS NOT TO DAMAGE ANY EXISTING BUILDING CONSTRUCTION OR ITEMS THAT ARE TO REMAIN. ANY EXISTING FINISHES THAT ARE DAMAGED DURING THE INSTALLATION OF NEW WORK OR REMOVAL OF EXISTING WORK SHALL BE REPAIRED, REPLACED AND PAID FOR BY THE INSTALLING CONTRACTOR, TO THE SATISFACTION OF THE ARCHITECT AND OWNER. REFER TO ARCHITECTURAL DRAWINGS FOR EXISTING BUILDING CONSTRUCTION THAT IS TO REMAIN AND, THEREFORE, SUBJECT TO PATCHING, REPAIRING, REFINISHING, AND REMOVAL/REPLACEMENT.

11. SOME OF THE EXISTING ITEMS AND EQUIPMENT SCHEDULED TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER. ANY ITEMS THAT THE OWNER WANTS TO RETAIN SHALL BE REMOVED CAREFULLY SO AS NOT TO DAMAGE THEM. ALL OTHER ITEMS TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE SITE.

12. CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR OWN CLEAN-UP DURING CONSTRUCTION. IF CONTRACTOR FAILS TO PROVIDE SUCH CLEAN-UP, THE ARCHITECT/ENGINEER WILL DIRECT ANOTHER CONTRACTOR TO PERFORM THE CLEAN-UP AND THE NEGLIGENT CONTRACTOR SHALL PAY THE ASSOCIATED BACK-CHARGES AS DEEMED APPROPRIATE BY THE ARCHITECT/ENGINEER.

13. CONTRACTOR SHALL INSTALL ALL AUXILIARY SUPPORTING STEEL AS REQUIRED FOR THE SUPPORTING OF THEIR PIPING, DUCTWORK, CONDUIT, TANKS, EQUIPMENT, ETC. ALL SUPPORTING STEEL FOR ITEMS ABOVE A SUSPENDED CEILING SHALL BE FROM BUILDING STRUCTURAL MEMBERS ONLY.

14. IT IS MANDATORY THAT THE COMPLETE EXISTING BUILDING REMAIN IN CONTINUOUS AND NON-INTERRUPTED OPERATION DURING REMODELING/ALTERING OF SAID EXISTING BUILDING. THE SPECIFIC AREA(S) BEING REMODELED/ALTERED AT ANY SCHEDULED TIME ARE OBVIOUSLY EXCLUSIVE OF THIS STATEMENT. SERVICES TO EXISTING BUILDING SHALL BE KEPT IN CONTINUOUS OPERATION INCLUDING POWER, SIGNAL SYSTEMS, LIGHTING, TELEPHONE, HEATING, COOLING, VENTILATING, TEMPERATURE CONTROL, SEWERS AND HOT AND COLD WATER. ANY ABSOLUTELY NECESSARY INTERRUPTION OF THESE SERVICES TO ACCOMPLISH CONTRACT WORK SHALL BE ARRANGED WITH THE OWNER A MINIMUM OF TEN (10) WORKING DAYS IN ADVANCE. SUCH INTERRUPTIONS SHALL BE KEPT TO AN ABSOLUTE MINIMUM AS FAR AS TIME INTERVAL IS INVOLVED AND TEMPORARY SERVICES SHALL BE FURNISHED AND INSTALLED UNDER THIS CONTRACT WHERE NECESSARY TO ACCOMPLISH THIS PURPOSE. TEMPORARIES SHALL BE REMOVED BY THE CONTRACTOR ONLY AFTER NEW PERMANENT SERVICES ARE INSTALLED AND FULLY OPERATIONAL.

15. UNLESS INDICATED OTHERWISE, THE ARCHITECT/ENGINEER MAKES NO REPRESENTATION AS TO WHETHER OR NOT ANY HAZARDOUS OR CONTAMINATED MATERIALS (INCLUDING BUT NOT LIMITED TO ASBESTOS, PCB'S, CONTAMINATED SOILS, ETC.) ARE PRESENT WITHIN THE EXISTING BUILDING OR ON THE SITE. WORK SHOWN ON THE DRAWINGS AND/OR INDICATED IN THE SPECIFICATIONS SHALL NOT BE CONSTRUED TO CALL FOR CONTACT WITH ANY OF THESE MATERIALS. IF THESE MATERIALS ARE ENCOUNTERED OR SUSPECTED, THE CONTRACTOR SHALL NOT DISTURB THEM AND SHALL CONTACT THE ARCHITECT/ENGINEER IMMEDIATELY.

16. WHERE WORK CALLED FOR ON THE DRAWINGS OR IN THE SPECIFICATIONS INVOLVES THE REMOVAL OR RELOCATION OF PIPING OR EQUIPMENT CONTAINING REFRIGERANT, ALL REFRIGERANT SHALL BE RECOVERED BY APPROVED METHODS PER EPA REGULATIONS.

17. CONTRACTOR SHALL STORE ALL MATERIALS AND EQUIPMENT SHIPPED TO THE SITE IN A PROTECTED AREA. IF MATERIAL IS STORED OUTSIDE OF THE BUILDING, IT MUST BE STORED OFF THE GROUND A MINIMUM OF SIX INCHES (6") SET ON 6 X 6 PLANKS AND/OR WOOD PALLETS. ALL MATERIAL AND EQUIPMENT MUST BE COMPLETELY COVERED WITH WATERPROOF TARPS OR VISQUIN. ALL PIPING AND DUCTWORK WILL HAVE THE ENDS CLOSED TO KEEP OUT DIRT AND OTHER DEBRIS. NO EQUIPMENT WILL BE ALLOWED TO BE STORED OUTSIDE THE BUILDING ON THE SITE UNLESS IT IS SUPPORTED OFF THE GROUND AND COMPLETELY PROTECTED WITH WEATHERPROOF COVERS.

18. THE DRAWINGS, SCHEDULES AND SPECIFICATIONS HAVE BEEN PREPARED USING ONE MANUFACTURER FOR EACH PIECE OF EQUIPMENT AS THE BASIS FOR DIMENSIONAL DESIGN. IF THE CONTRACTOR PURCHASES EQUIPMENT FROM A SPECIFIED ACCEPTABLE MANUFACTURER, BUT NOT THE SCHEDULED MANUFACTURER USED FOR THE BASE DESIGN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING ALL THE DIMENSIONS OF THE EQUIPMENT TO VERIFY THAT IT WILL FIT IN THE SPACE SHOWN ON THE DRAWINGS. MINOR DEVIATIONS IN DIMENSIONS WILL BE PERMITTED, PROVIDED THE RATINGS MEET THOSE SHOWN ON THE DRAWINGS AND EQUIPMENT WILL PHYSICALLY FIT INTO THE SPACE ALLOCATED WITH SUITABLE ACCESS AROUND EQUIPMENT FOR OPERATION AND MAINTENANCE OF THE EQUIPMENT. WHEN EQUIPMENT SUBMITTED FOR REVIEW DOES NOT MEET THE PHYSICAL SIZE OR ARRANGEMENT OF THAT SCHEDULED AND SPECIFIED, CONTRACTOR SHALL PAY FOR ALL ALTERATIONS REQUIRED TO ACCOMMODATE SUCH EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR WILL ALSO PAY ALL COSTS FOR ADDITIONAL WORK REQUIRED BY OTHER CONTRACTORS, OWNER, ARCHITECT OR ENGINEER TO MAKE CHANGES WHICH WOULD ALLOW THE EQUIPMENT TO FIT IN THE SPACE AND FUNCTION AS INTENDED.

19. CONTRACTOR AND/OR MANUFACTURER SHALL VERIFY THAT THE CHARACTERISTICS OF THE EQUIPMENT SUBMITTED FOR REVIEW MEETS THE CAPACITY AND DUTY SPECIFIED. WHEN EQUIPMENT SUBMITTED FOR REVIEW REQUIRES MODIFICATIONS TO THE WORK OF OTHER CONTRACTORS, SUBMITTING CONTRACTOR SHALL PAY FOR ALL COSTS FOR ADDITIONAL WORK REQUIRED BY OTHER CONTRACTORS, OWNER, ARCHITECT OR ENGINEER TO MAKE CHANGES WHICH WOULD ALLOW THE EQUIPMENT FUNCTION SAFELY AND PROPERLY.

20. CONTRACTOR SHALL FIELD VERIFY THE SIZE OF EXISTING OPENINGS, WINDOWS, DOORS, CORRIDORS, ROOMS, ETC. FOR ACCESS OF THE NEW EQUIPMENT INTO OR REMOVAL OF EXISTING EQUIPMENT FROM THE BUILDING. IF OPENINGS ARE TOO SMALL FOR ACCESS THEN CONTRACTOR SHALL, AT THEIR OWN EXPENSE, PROVIDE NEW OR ENLARGED OPENINGS AND RESTORE SAME TO ORIGINAL SIZE AND CONDITION. CONTRACTOR MAY ELECT TO ORDER THE EQUIPMENT DISASSEMBLED AND/OR WITH SPLIT HOUSING FOR ENTRANCE INTO THE EXISTING SPACE OR BUILDING. CONTRACTOR SHALL REASSEMBLE EQUIPMENT AFTER IT IS IN THE SPACE AT THEIR OWN EXPENSE.

21. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND THEIR ASSOCIATED FEES.

22. CONTRACTOR SHALL SUBMIT DIGITAL COPIES OF SHOP DRAWINGS OF ALL EQUIPMENT, TEMPERATURE CONTROL SYSTEM, ELECTRICAL DEVICES, AND PLUMBING FIXTURES TO ENGINEER FOR APPROVAL PRIOR TO ORDERING ANY ITEMS OR FABRICATING ANY DUCTWORK.

23. CONTRACTOR SHALL PROVIDE OWNER TRAINING ON ALL EQUIPMENT AND BUILDING SYSTEMS PROVIDED/ALTERED BY THEIR WORK. TRAINING SHALL BE ACCOMPLISHED DURING TIME DEDICATED FOR THAT PURPOSE, NOT IN CONJUNCTION WITH SERVICE WORK.

24. AT COMPLETION OF PROJECT, CONTRACTOR SHALL SUBMIT ONE PHYSICAL AND DIGITAL COPIES OF OPERATION AND MAINTENANCE MANUALS FOR ALL WORK PROVIDED BY THEM ON PROJECT. MANUALS SHALL BE CLEARLY ORGANIZED AND CONTAIN COPIES OF APPROVED EQUIPMENT, SHOP DRAWINGS, EQUIPMENT PARTS LISTS, SERVICE CONTACTS, CONTRACTOR AND MANUFACTURER WARRANTEES, AND "AS BUILT" FLOOR PLANS.

25. CONTRACTOR SHALL PROVIDE WARRANTY FOR ALL MATERIAL AND GUARANTEE ALL WORKMANSHIP PROVIDED BY THEM FOR 1 (ONE) YEAR FROM SUBSTANTIAL COMPLETION OF WORK INVOLVED.

26. CONTRACTOR SHALL MAINTAIN A CURRENT CITY OF CRYSTAL LAKE LICENSE THROUGHOUT ALL PHASES OF CONSTRUCTION. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO COORDINATE ALL INSPECTIONS WITH THE CRYSTAL LAKE OFFICIALS.

27. IDENTIFY ALL PIPING AND DUCTWORK WITH PLASTIC LABELS INDICATING CONTENTS AND FLOW DIRECTION. MARKERS TO BE PLACED AT A MAXIMUM OF 50 FT. INTERVALS AT BRANCH CONNECTIONS, AND AT BOTH SIDES OF WALL/FLOOR PENETRATIONS. IDENTIFY VALVES, EQUIPMENT, AND PANELS WITH ENGRAVED 3-LAYER PLASTIC LAMINATED TAGS OR SIGNS.

GENERAL NOTES - HVAC WORK:

1. ALL NEW WORK AND MATERIALS SHALL CONFORM TO CITY OF CRYSTAL LAKE CODE AND McHENRY COUNTY COLLEGE BUILDING STANDARDS.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS AND INSPECTIONS AND PAYING THEIR ASSOCIATED FEES.

3. NOISE AND VIBRATION WILL NOT BE TOLERATED. CONTRACTOR SHALL BID ON FURNISHING EVERY DETAIL TO ASSURE THIS END.

4. PATCH AND REFINISH ALL DAMAGED INSULATED SURFACES OF ALL EXISTING DUCTWORK, PIPING AND ASSOCIATED FITTINGS TO MATCH EXISTING WHERE NEW CONNECTIONS ARE BEING MADE.

5. CONTRACTORS SHALL PROVIDE A ONE YEAR WARRANTY ON ALL MATERIALS, EQUIPMENT AND LABOR FROM DATE OF SUBSTANTIAL COMPLETION OF WORK EXCEPT AS FOLLOWS:
   A. PROVIDE 10 YEAR PARTS AND LABOR WARRANTY FOR BOILER HEAT EXCHANGERS.
   B. THE FLUE AND STACK PIPING SHALL BE WARRANTED AGAINST FUNCTIONAL FAILURE DUE TO DEFECTS IN MATERIAL AND MANUFACTURER'S WORKMANSHIP FOR A PERIOD OF 10 YEARS FROM THE DATE OF DELIVERY.

6. ALL NEW HVAC EQUIPMENT AND COMPONENTS SHALL BE INSTALLED PER THE MANUFACTURER'S INSTRUCTIONS.

7. EXCEPT AS NOTED OTHERWISE, ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK SHALL BE GALVANIZED SHEET METAL WITH SEALED JOINTS CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CURRENT SMACNA MANUAL. SIZES SHOWN ARE INSIDE FACE TO INSIDE FACE.

8. COMBUSTION AIR PIPING SHALL BE SCH. 40 PVC WITH SOLVENT WELDED JOINTS/COUPLINGS OR GALVANIZED SPIRAL SHEET METAL WITH SEALED JOINTS AND INSULATED 2" THICK WITH FLEXIBLE FIBERGLASS INSULATION WITH VAPOR BARRIER JACKET.

9. FLUE PIPING SHALL BE AL29-4C DOUBLE WALL GAS VENT AS MANUFACTURERED BY SCHEBLER, SELKIRK - METALBESTOS, AMPCO, OR METALFAB. THE FACTORY BUILT SYSTEM SHALL BE MADE IN ACCORDANCE WITH NFPA 211. THIS STACK SYSTEM SHALL BE DESIGNED AND INSTALLED TO BE GAS TIGHT. IT SHALL BE UL LISTED TO WITHSTAND UP TO 15" W.C. POSITIVE PRESSURES. THIS SYSTEM SHALL BE DESIGNED TO COMPENSATE FOR ALL FLUE GAS INDUCED THERMAL EXPANSIONS. AIR GAP BETWEEN INNER AND OUTER PIPE SHALL BE 1 INCH THICK. CLEARANCES TO COMBUSTIBLE MATERIALS SHALL BE PER INSTALLATION INSTRUCTIONS. THE JOINT ASSEMBLY SHALL BE A MALE/FEMALE SLIP-TYPE JOINTING WITH MECHANICALLY GASKETED FLANGE TO FLANGE AND V-BAND ASSEMBLY (CAULKED OR SCREWED JOINTS ARE NOT ACCEPTABLE). AN INTERNAL SLEEVE SERVES FOR READILY ALIGNMENT AS WELL AS LONG TERM JOINT SEAL PROTECTION FROM CONDENSATE, WATER AND FLUE GAS TEMPERATURE. THE DOUBLE WALL STACK HAS AN INNER GAS CARRYING PIPE OF 24 GAUGE TYPE AL29-4C. THE OUTER JACKET SHALL BE 24 GAUGE 304 STAINLESS STEEL. THE MATERIALS AND CONSTRUCTION OF THE MODULAR SECTIONS AND ACCESSORIES SHALL BE AS SPECIFIED BY THE TERMS OF THE PRODUCT'S UL LISTING. PITCH FLUE PIPING TOWARD BOILER AS REQUIRED BY FLUE MANUFACTURER'S INSTALLATION INSTRUCTION, BUT NOT LESS THAN 1/4" PER FOOT.

10. THE GAUGES OF IRON FOR DUCTS AND CASINGS AND SIZE OF STRUCTURAL REINFORCING ANGLES FOR DUCTS AND CASING SHALL BE SUCH AS TO PROVIDE ABSOLUTELY AIR TIGHT CONSTRUCTION FREE FROM PULSATION, DEFORMATION, OR VIBRATION AT NORMAL OPERATING PRESSURES.

11. HOT WATER HEATING SUPPLY AND RETURN PIPING SHALL BE SCHEDULE 40 BLACK STEEL WITH WELDED OR SCREWED FITTINGS OR TYPE "L" COPPER WITH SOLDERED OR PRESSED FITTINGS, INSULATED WITH 1 1/2" THICK (1 1/4" AND BELOW) OR 2" THICK (1 1/2" AND ABOVE) FIBERGLASS WITH ALL SERVICE JACKET. PROVIDE DIELECTRIC NIPPLES OR BRASS VALVES BETWEEN DISSIMILAR PIPE MATERIALS.

12. NATURAL GAS PIPING SHALL BE SCHEDULE 40 BLACK AND CONFORM WITH ASTM STANDARDS WELDED FOR PIPE SIZES 2 1/2" AND OVER AND SCREWED FOR PIPE SIZES 2" AND UNDER. WIRE BRUSH CLEAN AND PAINT ALL PIPING AND FITTINGS WITH 2 COATS OF RUST RESISTANT PAINT.

13. ALL PIPING SHALL BE SUSPENDED WITH CLEVIS AND/OR TRAPEZE PIPE HANGERS. INSULATED PIPING SHALL REST ON SHEET METAL INSULATION SHIELDS. (ANCHORS SHALL BE DRILLED INTO EXISTING FLOOR CONSTRUCTION).

14. PITCH ALL SUPPLY AND RETURN WATER LINES TO DRAIN COMPLETELY THROUGH LOWER EQUIPMENT, UNIONS, OR DRAIN VALVES. INSTALL A 1/2" DRAIN VALVE WITH HOSE THREAD OUTLET IN ALL MAIN PIPING RUNS WHICH WOULD NOT BE ABLE TO DRAIN THRU A LOWER PIECE OF EQUIPMENT. PROVIDE MANUAL AIR VENTS IN ALL PIPE DROPS IN DIRECTION OF FLOW.

15. FLUSH, CLEAN, PRESSURE TEST AND CHARGE ALL NEW PIPING SYSTEMS AND EXTENSION TO PIPING SYSTEMS. TESTING SHALL BE MINIMUM 50 PSI HIGHER THAN NORMAL OPERATING PRESSURE OF SYSTEM. CLEANING OF SYSTEM SHALL BE ACCOMPLISHED WITH H-O-H C-312 (OR EQUAL) CHEMICAL SOLUTION MULTIPURPOSE CLEANER UTILIZED IN STRICT ACCORDANCE WITH CHEMICAL TREATMENT SUPPLIER'S INSTRUCTION.

16. ALL HYDRONIC SYSTEMS TO BE PROVIDED WITH H-O-H CS-39 (OR EQUAL) CHEMICAL SOLUTION CORROSION INHIBITOR IN CONCENTRATIONS RECOMMENDED BY AND INSTALLED IN STRICT ACCORDANCE WITH CHEMICAL SUPPLIER'S INSTRUCTION.

17. BUTTERFLY VALVES SHALL BE STOCKHAM, MILWAUKEE, OR NIBCO WITH CAST OR DUCTILE IRON BODY, STAINLESS STEEL STEM, EXTRUDED NECK ALUMINUM-BRONZE DISC, RESILIENT REPLACEMENT EPDM SEATS, 10 POSITION LEVER HANDLE, WAFER OR LUG ENDS.

18. BALL VALVES SHALL BE STOCKHAM, MILWAUKEE, OR NIBCO MSS SP 110, 400 PSI WOG, ONE PIECE BRONZE BODY, CHROME PLATED BRASS BALL, FULL PORT, TEFLON SEATS, BLOW-OUT PROOF STEM, SOLDER ENDS, LEVER HANDLE.

19. ALL CIRCUIT SETTERS SHALL BE BELL AND GOSSETT.

20. PROVIDE GAS SHUT-OFF VALVE AT EACH PIECE OF EQUIPMENT AND PRESSURE REGULATORS WHERE REQUIRED. VENT ALL PRESSURE REGULATORS WITHIN THE BUILDING FULL SIZE TO BUILDING EXTERIOR.

21. BALANCE HOT WATER HEATING SYSTEM TO ACCOMPLISH WATER FLOW SHOWN AT ALL TERMINALS AS SHOWN ON DRAWINGS AND SUBMIT TEST REPORT FOR REVIEW BY OWNER AND ENGINEER.

22. ALL TEMPERATURE CONTROL WORK SHALL MATCH EXISTING TRANE CONTROLS SYSTEM CURRENTLY INSTALLED IN BUILDING.

23. LOW VOLTAGE WIRING SHALL BE U/L LISTED AND PLENUM RATED (LOW SMOKE PRODUCING). WIRING SHALL BE CONCEALED IN WALLS AND MAY BE INSTALLED WITHOUT CONDUIT ABOVE ACCESSIBLE LAY-IN CEILING SPACES ONLY.

GENERAL NOTES - PLUMBING WORK:

GENERAL:

1. ALL WORK SHALL BE INSTALLED AND ALL MATERIALS SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE RULES AND REGULATIONS OF ILLINOIS DEPARTMENT OF PUBLIC HEALTH ILLINOIS PLUMBING CODE 2014 EDITION.
2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO COORDINATE ALL INSPECTIONS WITH THE ILLINOIS DEPARTMENT OF PUBLIC HEALTH STATE PLUMBING INSPECTORS AND THE LOCAL PLUMBING INSPECTOR HAVING JURISDICTION.
3. DRAWINGS ARE GENERALLY DIAGRAMMATIC. ROUTING OF PIPING, ETC., AS SHOWN ON DRAWINGS, DOES NOT INTEND TO SHOW EVERY RISE, DROP, OFFSET, FITTING NOR EVERY STRUCTURAL ELEMENT THAT MAY BE ENCOUNTERED DURING THE INSTALLATION OF THIS WORK. CONTRACTOR SHALL MAKE ANY REQUIRED CHANGES FROM THE GENERAL ROUTING SHOWN ON THESE DRAWINGS, SUCH AS OFFSETS, BENDS OR CHANGES IN ELEVATION DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND BUILDING CONSTRUCTION. ALL CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY IN COMPLETION DATE OF THE PROJECT.
4. STERILIZATION: ALL NEW, ALTERED OR REPAIRED POTABLE WATER PIPING SHALL BE DISINFECTED, STERILIZED AND FLUSHED PER THE REQUIREMENTS OF THE ILLINOIS STATE PLUMBING CODE 2014 EDITION, SECTIONS 890.1180(a) AND 890.1180(b)(3). CONTRACTOR SHALL STERILIZE AND FLUSH ALL WATER PIPING INCLUDING ALL DOMESTIC HOT WATER SUPPLY AND RETURN AND ALL DOMESTIC COLD WATER PIPING. CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY TAPPINGS, VALVE OPENINGS, DRAIN FITTINGS, ETC. AS REQUIRED TO STERILIZE AND FLUSH THE WATER SUPPLY PIPING. DISINFECTING SHALL NOT BE DEEMED COMPLETED UNTIL SATISFACTORY BACTERIOLOGICAL ANALYSIS REPORTS ARE RECEIVED FOR SAMPLES OF WATER COLLECTED AND TESTED FROM THE NEW WATER PIPING SYSTEM BY PLUMBING CONTRACTOR.
5. ALL EXISTING PIPING INFORMATION SHOWN ON THIS DRAWING HAS BEEN OBTAINED FROM OWNER'S EXISTING CONSTRUCTION DOCUMENTS AND LIMITED FIELD SURVEY. EXACT LOCATION OF EXISTING SANITARY/STORM LINES, WATER LINES, VENT LINES, VALVES AND ALL PIPE SIZES SHALL BE FIELD VERIFIED BEFORE STARTING INSTALLATION.

PIPE INSULATION:

1. ALL DOMESTIC COLD WATER AND DOMESTIC HOT WATER SUPPLY/RETURN PIPING SHALL BE INSULATED WITH ASTM C547 FIBERGLASS PIPE INSULATION WITH ASTM C1136 VAPOR BARRIER JACKET COMPLETE WITH PVC FITTING COVERS. ALL COLD WATER PIPING SHALL BE INSULATED WITH 1" THICK INSULATION. ALL DOMESTIC HOT WATER AND RECIRC PIPING 1 1/4" AND SMALLER SHALL BE INSULATED WITH 1" INSULATION. ALL DOMESTIC HOT WATER AND RECIRC PIPING 1 1/2" AND LARGER SHALL BE INSULATED WITH 1 1/2" THICK INSULATION. INSULATE ALL DOMESTIC WATER SUPPLY PIPING TO THE FIXTURE CONNECTION. INSULATE ALL WATER SUPPLY PIPING IN CEILINGS, PLUMBING CHASES AND WALLS.
2. PATCH AND REFINISH ALL DAMAGED INSULATED SURFACES OF ALL EXISTING PLUMBING PIPING AND ASSOCIATED FITTINGS WHERE NEW CONNECTIONS ARE MADE. INCLUDING BUT NOT LIMITED DOMESTIC COLD WATER, HOT WATER SUPPLY/RETURN AND WASTE.

PIPE HANGERS AND SUPPORTS:

1. ALL SANITARY, VENT, STORM, DOMESTIC SUPPLY AND RETURN PIPING SHALL BE SUSPENDED WITH CLEVIS AND/OR TRAPEZE PIPE HANGERS. ALL HORIZONTAL STORM, DOMESTIC SUPPLY AND RETURN PIPING SHALL BE INSULATED AND REST ON SHEET METAL INSULATION SHIELDS. SEE DETAIL ON MECHANICAL/ELECTRICAL COORDINATION DRAWINGS FOR ADDITIONAL INFORMATION. SWIVEL JOINT HANGERS MAY BE USED ONLY ON WASTE AND VENT PIPING WHEN PIPING IS NOT INSULATED. HANGER MATERIAL SHALL BE OF COMPATIBLE MATERIAL TO PIPING MATERIAL TO PREVENT CORROSION. HANGERS SHALL BE SUPPORTED FROM STRUCTURAL MEMBERS ONLY.

VALVES:

1. BALL VALVES SHALL BE MILWAUKEE, NIBCO, STOCKHAM, APOLLO, KITZ, WATTS, OR JOMAR; LEAD FREE NSF-61 CERTIFIED, WITH BRONZE TWO PIECE BODY, STAINLESS STEEL BALL, TEFLON SEATS AND STUFFING BOX RING, LEVER HANDLE, SOLDER ENDS, FULL PORT AND CONFORM TO MSS SP-110. WHEN PRESS FITTINGS ARE USED, VIEGA OR NIBCO SHALL BE AN ACCEPTABLE MANUFACTURER OF BALL VALVES.
2. CHECK VALVES SHALL BE MILWAUKEE, NIBCO, STOCKHAM, APOLLO, KITZ, WATTS, OR JOMAR; LEAD FREE NSF-61 CERTIFIED WITH BRONZE BODY, BRONZE HORIZONTAL SWING DISC AND CONFORM TO MSS SP-80.
3. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL, NOT INVERTED.
4. INSTALL VALVES WITH CLEARANCE FOR INSTALLATION OF INSULATION AND ALLOWING ACCESS.
5. PROVIDE ACCESS TO ALL VALVES AND SYSTEM COMPONENTS REQUIRING ACCESS. ALL PIPING ACCESSORIES AND EQUIPMENT SUCH AS ISOLATION VALVES AND IN-LINE PUMPS SHALL BE INSTALLED AT A REASONABLE HEIGHT AND POSITION IN ORDER TO FACILITATE MAINTENANCE.

SHOP DRAWINGS, SUBMITTALS AND CLOSE OUT DOCUMENTS:

1. CONTRACTOR SHALL SUBMIT ELECTRONIC COPIES IN PDF FORMAT SHOP DRAWINGS OF ALL PIPING, VALVES, PIPE HANGERS, PIPE INSULATION, MISC DEVICES, PUMPS, MIXING VALVES, PLUMBING FIXTURES, ACCESS PANELS, EQUIPMENT, TO ENGINEER FOR APPROVAL PRIOR TO ORDERING ANY ITEMS OR FABRICATING ANY DUCTWORK. SUBMITTALS SHALL BE RETURNED WITHIN TEN BUSINESS DAYS.
2. CONTRACTOR SHALL PROVIDE OWNER TRAINING ON ALL EQUIPMENT AND BUILDING SYSTEMS PROVIDED/ALTERED BY HIS WORK. TRAINING SHALL BE ACCOMPLISHED DURING TIME DEDICATED FOR THAT PURPOSE, NOT IN CONJUNCTION WITH SERVICE WORK.
3. AT COMPLETION OF PROJECT, CONTRACTOR SHALL SUBMIT PDF FORMAT OF OPERATION AND MAINTENANCE MANUALS FOR ALL WORK PROVIDED BY HIM ON PROJECT. MANUALS SHALL BE CLEARLY ORGANIZED AND CONTAIN COPIES OF APPROVED EQUIPMENT, COMPONENT BREAK-DOWN AND PARTS LISTS, MAINTENANCE/CLEANING AND TROUBLESHOOTING MANUALS, SERVICE CONTACTS, CONTRACTOR AND MANUFACTURER WARRANTEES, AND "AS BUILT" FLOOR PLANS INDICATING ALL APPROVED DEVIATIONS AND REVISIONS TO BIDDING DOCUMENTS.

GENERAL NOTES - TEMPERATURE CONTROL

1. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF NATIONAL ELECTRIC CODE AND CITY OF CRYSTAL LAKE BUILDING CODE.

2. BAS LOW VOLTAGE WIRING SHALL BE U/L LISTED, LOW SMOKE PRODUCING, PLENUM RATED. WIRING SHALL BE IN CONDUIT WHERE EXPOSED IN EQUIPMENT ROOMS OR CONCEALED IN WALLS, CHASES, OR ABOVE NON-ACCESSIBLE CEILINGS. LOW VOLTAGE PLENUM RATED WIRING MAY BE INSTALLED WITHOUT CONDUIT ABOVE ACCESSIBLE LAY-IN CEILING SPACES ONLY.

3. CONTRACTOR SHALL REMOVE ALL EXISTING THERMOSTATS, RELAYS, DEVICES, AND CONTROL TUBING/CONDUIT THROUGHOUT THE BUILDING WHICH SERVED EQUIPMENT OR DEVICES REMOVED EITHER IN THE PAST OR AS PART OF THIS PROJECT.

4. CONTROL SYSTEM SHALL BE COMPLETE AS REQUIRED TO PROVIDE SEQUENCES OF OPERATION AND POINTS LIST AS SPECIFIED ELSEWHERE ON THESE DRAWINGS.

5. TEMPERATURE CONTROL CABINETS SHALL HAVE SCHEMATIC DIAGRAM OF SYSTEM MOUNTED ON FACE OF CABINET OR ADJACENT TO CABINET UNDER PLEXIGLAS.

6. ALL BAS DEVICE 120V. POWER WIRING SHALL BE MINIMUM #12 AWG BY BAS CONTRACTOR FROM SPARE CIRCUITS PROVIDED BY ELECTRICAL CONTRACTOR IN LIGHTING PANELS.

7. BAS DEVICE POWER AND CONTROL WIRING SHALL BE IN SEPARATE CONDUIT SYSTEMS. PROVIDE APPROPRIATE FLEXIBLE WHIPS WHERE REQUIRED FOR FINAL CONNECTIONS TO ROTATING EQUIPMENT. ALL CONDUITS SHALL BE SIZED TO PROVIDE MINIMUM 25% SPARE CAPACITY FOR FUTURE USE BASED ON FILL CAPACITIES INDICATED BY NATIONAL ELECTRIC CODE.

8. ALL CONDUIT SHALL BE LOCATED SO AS NOT TO INTERFERE WITH ANY EQUIPMENT SERVICE ACCESS AREAS. CONDUIT FOUND BLOCKING ACCESS AREAS SHALL BE REROUTED AT INSTALLING CONTRACTOR'S EXPENSE.

9. IDENTIFY ALL CONTROL WIRING AND EQUIPMENT. CONTROL WIRE SHALL HAVE TERMINATION IDENTIFICATION ON EACH WIRE FOR EASE OF TRACING.

10. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INTEND TO SHOW APPROXIMATE LOCATIONS OF CERTAIN DEVICES CONTROLLED EQUIPMENT. THEY DO NOT INTEND TO SHOW EVERY SENSOR, CONTROLLER, DEVICE OR CONDUIT THAT MAY BE REQUIRED NOR EVERY STRUCTURAL ELEMENT THAT MAY BE ENCOUNTERED DURING THE INSTALLATION OF THIS WORK. THE CONTRACTOR SHALL CONFIRM ACTUAL LOCATIONS OF CONTROLLED EQUIPMENT AND DESIGN ACTUAL ROUTING OF CONDUITS WHICH SHALL INCLUDE ANY OFFSETS, BENDS OR CHANGES IN ELEVATION REQUIRED DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND BUILDING CONSTRUCTION. ANY CHANGES REQUIRED DUE TO FAILURE TO COORDINATE WITH OTHER TRADES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY IN COMPLETION DATE OF THE PROJECT.

11. BAS CONTRACTOR SHALL REFER TO MECHANICAL CONTRACT DRAWINGS FOR LOCATION, SIZE, WATER AND/OR FLOW RATES, AND OTHER INFORMATION PERTAINING TO FLOW SWITCHES, CONTROL VALVES, OUTSIDE AIR, RECIRC, AND EXHAUST AUTOMATIC CONTROL DAMPERS, AND OTHER AIR AND WATER MONITORING DEVICES WHICH HE SHALL FURNISH AND MAKE FINAL CONNECTIONS THERETO. MECHANICAL CONTRACTOR SHALL PROVIDE ALL WELLS AND OPENINGS FOR THESE ITEMS AND INSTALL THEM IN THE REQUIRED PIPING AND DUCTWORK SYSTEMS.

12. GENERAL REQUIREMENTS:
    A. APPROVED INSTALLING CONTRACTOR: TRANE CHICAGO, 7100 MADISON, WILLOWBROOK, IL 60521, 630-734-3200.
    B. CONTRACTOR TO EXTEND AND MODIFY EXISTING WEB-BASED TRANE SUMMIT SYSTEM TO SERVE ALL NEW EQUIPMENT AND COMPONENTS.
    C. CONTRACTOR SHALL REMOVE ALL EXISTING RELAYS, DEVICES, AND CONTROL CONDUIT THROUGHOUT THE BUILDING WHICH SERVED EQUIPMENT OR DEVICES REMOVED EITHER IN THE PAST OR AS PART OF THIS PROJECT.
    D. CONTRACTOR SHALL PROVIDE ON SITE OWNER TRAINING FOR 2 PEOPLE FOR A TOTAL OF 2 HOURS INITIALLY AND ANOTHER 1/2 DAY (4 HOURS) AT TIMES OF OWNER'S CHOOSING WITHIN THE FIRST YEAR. TRAINING SHALL BE ACCOMPLISHED DURING TIME DEDICATED FOR THAT PURPOSE, NOT IN CONJUNCTION WITH SERVICE WORK.
13. SEQUENCE OF OPERATION: HOT WATER BOILER SYSTEM.
    A. SYSTEM OPERATION SHALL BE CONTROLLED BY BASED ON POSITION OF VIRTUAL HEATING/AUTOMATIC/OFF SWITCH LOCATED ON SYSTEM GRAPHICS PAGE. WHEN IN AUTOMATIC POSITION, SYSTEM SHALL AUTOMATICALLY START BOILER SYSTEM AT 60 DEGREES F. (ADJ.) AND TO DISABLE AT 65 DEGREES F. (ADJ.) AS SENSED BY OUTSIDE AIR TEMPERATURE SENSOR.
    B. IF SYSTEM IS COMMANDED INTO HEATING MODE BY MANUAL OR AUTOMATIC SIGNAL, THE SYSTEM SHALL START AND OPERATE AS FOLLOWS:
        a. STARTING OF SYSTEM SHALL START LEAD HOT WATER BOILER CIRCUALTION PUMP WHICH SHALL REMAIN IN OPERATION TO PROVIDE CONSTANT CIRCULATION IN PRIMARY LOOP. LAG HOT WATER BOILER SHALL BE ENABLED, BUT CIRCULATION PUMP SHALL REMAIN OFF UNTIL LAG BOILER IS CALLED TO FIRE BY BOILER SEQUENCING PANEL.
        b. LEAD BUILDING SYSTEM PUMP SHALL START AND OPERATE CONTINUOUSLY. IF LEAD PUMP FAILS TO START WHEN COMMANDED, BAS SHALL SIGNAL ALARM AND LAG PUMP SHALL START. LEAD/LAG STATUS OF PUMPS SHALL BE ALTERNATED WEEKLY OR BY-WEEKLY SO AS TO EQUALIZE RUN TIME ON PUMPS - CHANGE SHALL BE MADE DURING THE DAYTIME WHEN BUILDING MAINTENANCE STAFF IS ON DUTY. NOTE: CHANGE TO BE BASED ON TIME OF DAY, NOT RUN TIME.
        c. ONCE FLOW THRU SYSTEM HAS BEEN ESTABLISHED, BOILER MANUFACTURER'S SEQUENCING PANEL SHALL BE COMMANDED TO START BOILER SYSTEM. BOILER MANUFACTURER'S SEQUENCING PANEL SHALL OPERATE BOILERS IN MANUFACTURER'S STANDARD SEQUENCE FOR MAXIMUM EFFICIENCY. IF ANY BOILER IS COMMANDED TO START AND FAILS, AN ALARM SHALL BE SENT TO THE BAS THROUGH THE BOILER SYSTEM CONTROLLER.
        d. BOILER MANUFACTURER'S BACnet SEQUENCING CONTROLLER SHALL START/STOP/MODULATE BOILERS AS REQUIRED TO MAINTAIN HIGHEST EFFICIENCY OF SYSTEM WHILE MAINTAINING THE BUILDING LOOP HOT WATER SYSTEM TEMPERATURE SETPOINT (T4). BOILER SEQUENCING CONTROLLER SHALL START ASSOCIATED BOILER CIRCULATION PUMP PRIOR TO FIRING ANY LAG BOILER.
        e. WHEN ANY BOILER STOPS, ITS ASSOC. CIRCVULATION PUMP SHALL CONTINUE TO OPERATE FOR 4 MINUTES (ADJ.) BEFORE CLOSING.
        f. IF SYSTEM IS COMMANDED OFF, LEAD SYSTEM PUMP SHALL OPERATE FOR 10 MINS (ADJ.) BEFORE STOPPING.
    C. BUILDING LOOP HOT WATER SUPPLY TEMPERATURE SHALL BE LINEARLY MODULATED FROM 180 DEGREES F (ADJ.) AT 0 DEGREES F (ADJ.) OUTSIDE AIR TEMPERATURE TO 120 DEGREES F (ADJ.) AT 65 DEGREES (ADJ.) OUTSIDE AIR TEMPERATURE. TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE NEW O.A. SENSOR ON SHADED NORTHERN FACE OF BUILDING IF NO O.A. SENSOR CURRENTLY EXISTS.
    D. INPUT/OUTPUT SCHEDULE (MINIMUM DDC POINTS REQUIRED.)

a.	HEATING/AUTOMATIC SYSTEM ENABLE/DISABLE	VIRTUAL SWITCH
b.	AUTOMATIC SYSTEM DISABLE TEMPERATURE	AO OR SOFTWARE
c.	AUTOMATIC SYSTEM ENABLE TEMPERATURE	AO OR SOFTWARE
d.	BOILER LOOP RETURN WATER TEMPERATURE (T2)	AI
e.	BOILER LOOP SUPPLY WATER TEMPERATURE (T3)	AI
f.	BUILDING LOOP SUPPLY TEMPERATURE SETPOINT	AO OR SOFTWARE
g.	BUILDING LOOP RETURN WATER TEMPERATURE (T4)	AI
h.	BUILDING LOOP SUPPLY WATER TEMPERATURE (T5)	AI
i.	BOILER CIRCULATION PUMP BCP-1 START/STOP	DO
j.	BOILER CIRCULATION PUMP BCP-1 STATUS	DI
k.	BOILER CIRCULATION PUMP BCP-2 START/STOP	DO
l.	BOILER CIRCULATION PUMP BCP-2 STATUS	DI
m.	HOT WATER PUMP HWP-1 START/STOP	DO
n.	HOT WATER PUMP HWP-1 STATUS	DI
o.	HOT WATER PUMP HWP-2 START/STOP	DO
p.	HOT WATER PUMP HWP-2 STATUS	DI
q.	OUTSIDE AIR TEMPERATURE (T1)	AI
r.	MAPPING OF ALL AVAILABLE POINTS AVAILABLE THRU BOILER SEQUENCER COMMUNICATION INTERFACE. MINIMUM REQ'D: BOILER STATUS, BOILER BURNER STATUS, BOILER DISCHARGE TEMPERATURE, ALARMS	DO,DI,AO,AI
	COMPUTER GRAPHIC DISPLAY OF SYSTEM	--

GENERAL NOTES - ELECTRICAL WORK

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND SHALL CONFORM TO LOCAL AMENDMENTS.

2. PROVIDE ALL PERMITS AND INSPECTION FEES.

3. THIS CONTRACTOR SHALL LEAVE SPACE BROOM CLEAN.

4. MINIMUM SIZE CONDUIT SHALL BE 3/4" EMT, PROVIDE IMC FOR CONDUITS EXPOSED TO WET OR DAMP LOCATIONS. EMT FITTINGS SHALL BE COMPRESSION TYPE. IMC SHALL HAVE THREADED CONNECTIONS. TRANSITION TO LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL CONNECTION (MAXIMUM LAST 6 FEET) OF CONDUCTORS SERVING EQUIPMENT SUBJECT TO VIBRATION.

5. MINIMUM SIZE CONDUCTOR SHALL BE #12 THHN, OR THWN WHERE REQUIRED, WITH #14 USED FOR CONTROL WIRING. CONDUCTOR MATERIAL SHALL BE COPPER ONLY.

6. PROVIDE SEPARATE, INSULATED EQUIPMENT GROUNDING CONDUCTOR WITHIN EACH FEEDER AND BRANCH CIRCUIT RACEWAY. TERMINATE EACH END ON SUITABLE LUG, BUS, OR BUSHING.

7. BRANCH CIRCUIT CONDUCTORS FOR 20 AMP RECEPTACLES AND LIGHTING CIRCUITS SHALL BE ADJUSTED FOR VOLTAGE DROP:

A.	120/208V:	0-75' -	#12AWG MINIMUM
		75'-150' -	#10AWG MINIMUM
		150'-225' -	#8AWG MINIMUM
B.	277/480V:	0-100' -	#12AWG MINIMUM
		100'-200' -	#10AWG MINIMUM
		200'-300' -	#8AWG MINIMUM

8. CONDUCTOR SIZES #14 AWG, #12 AWG, AND #10 AWG SHALL BE SOLID. CONDUCTOR SIZES #8 AWG AND LARGER SHALL BE STRANDED. ALL CONDUCTORS SHALL BE COLOR CODED.

9. THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY CUTTING AND PATCHING INCLUDING SLEEVES AND INSERTS. PENETRATIONS THROUGH WALLS AND FLOORS SHALL BE PROPERLY SEALED AND TREATED TO MAINTAIN THE FIRE STOPPING RATING OF THE WALLS, FLOORS, AND CEILINGS.

10. BEFORE SUBMITTING THEIR BID, THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE TO ASCERTAIN ALL WORK INVOLVED IN THE PROJECT.

11. THIS CONTRACTOR SHALL COORDINATE THEIR WORK WITH OTHER CONTRACTORS ON THE PROJECT.

12. THIS CONTRACTOR SHALL MAKE NECESSARY MODIFICATIONS AND ADJUSTMENTS TO ALL ELECTRICAL ITEMS AND EQUIPMENT AS MAY BE REQUIRED BY THIS WORK.

13. ALL ELECTRICAL EQUIPMENT MUST MAINTAIN WORKING CLEARANCES AS REQUIRED BY NEC.

14. FLEXIBLE RACEWAY SYSTEMS SHALL NOT BE USED TO PENETRATE ROOFS, FLOORS, OR AIR/MOISTURE BARRIERS.

15. SWITCHES SHALL BE OF THE HEAVY DUTY GRADE, 120/277 VOLT, FLUSH TOGGLE TYPE RATED AT 20 AMPERES AND UL APPROVED. ALL SWITCHES SHALL HAVE POLES AS REQUIRED AND SHALL BE SIMILAR TO PASS & SEYMOUR #PS20AC1.

16. DURING THE COURSE OF INVESTIGATION AND DEMOLITION, IF IT IS DETERMINED THAT IT MAY BE FEASIBLE TO UTILIZE EXISTING MATERIALS FOR BRANCH CIRCUITS AND FEEDERS, CONTRACTOR SHALL NOTIFY ENGINEER FOR APPROVAL PRIOR TO PERFORMING ANY WORK.

17. REFER TO MECHANICAL AND PLUMBING SHEETS FOR ADDITIONAL EQUIPMENT INFORMATION.

18. PROVIDE PULL BOX(ES) BETWEEN PULL POINTS AS REQUIRED TO COMPLY WITH NEC 344.26 SUCH THAT THERE SHALL NOT BE MORE THAN THE EQUIVALENT OF FOUR QUARTER BENDS (360 DEGREE TOTAL) BETWEEN PULL POINTS.

19. SPECIAL ATTENTION SHALL BE PAID TO ALL CONDUIT ROUTING IN OPEN CEILING SPACE FOR AESTHETIC PURPOSES. ALL EXPOSED CONDUITS SHALL BE ROUTED PERPENDICULAR AND PARALLEL TO BUILDING LINES AND TIGHT TO CEILING/STRUCTURAL CORNERS.

KEITH G. CHRISTIAN
62-062128
EXPIRES 11/30/2025

2025 BOILER REPLACEMENTS BUILDING 'E' McHENRY COUNTY COLLEGE

8900 NORTHWEST HWY #14
CRYSTAL LAKE, IL 60012

DATE	DESCRIPTION
03/07/25	BID/PERMIT

Mechanical - Electrical Engineers
1216 Tower Road
Schaumburg, Illinois 60173
847.882.2010
Fax 847.882.2201
20/10 ENGINEERING GROUP LLC

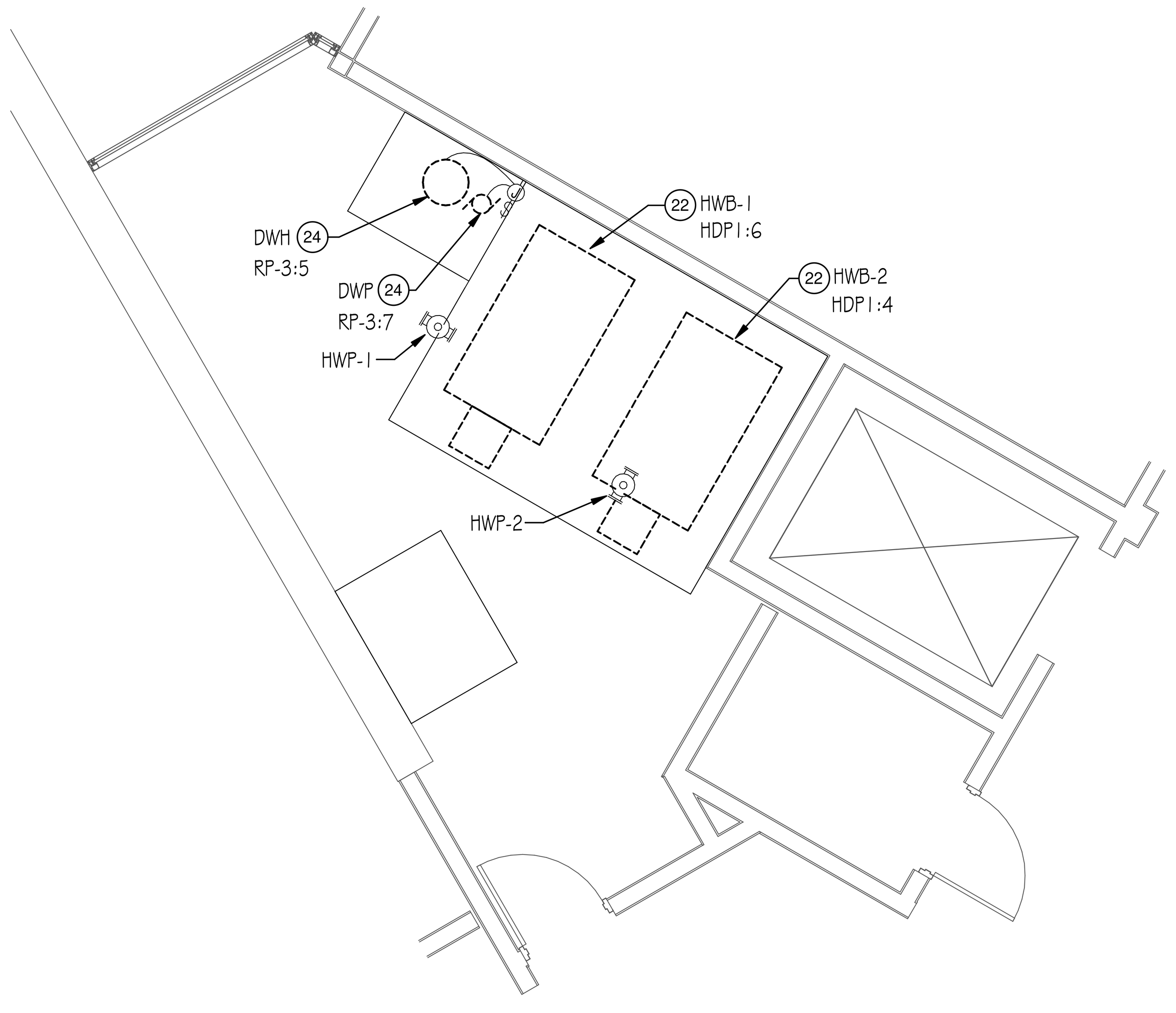
Sheet Title
MECHANICAL/
ELECTRICAL
SPECIFICATIONS

PROJ. MGR: Checker
DRAWN BY: Author
CHECKED BY: Checker

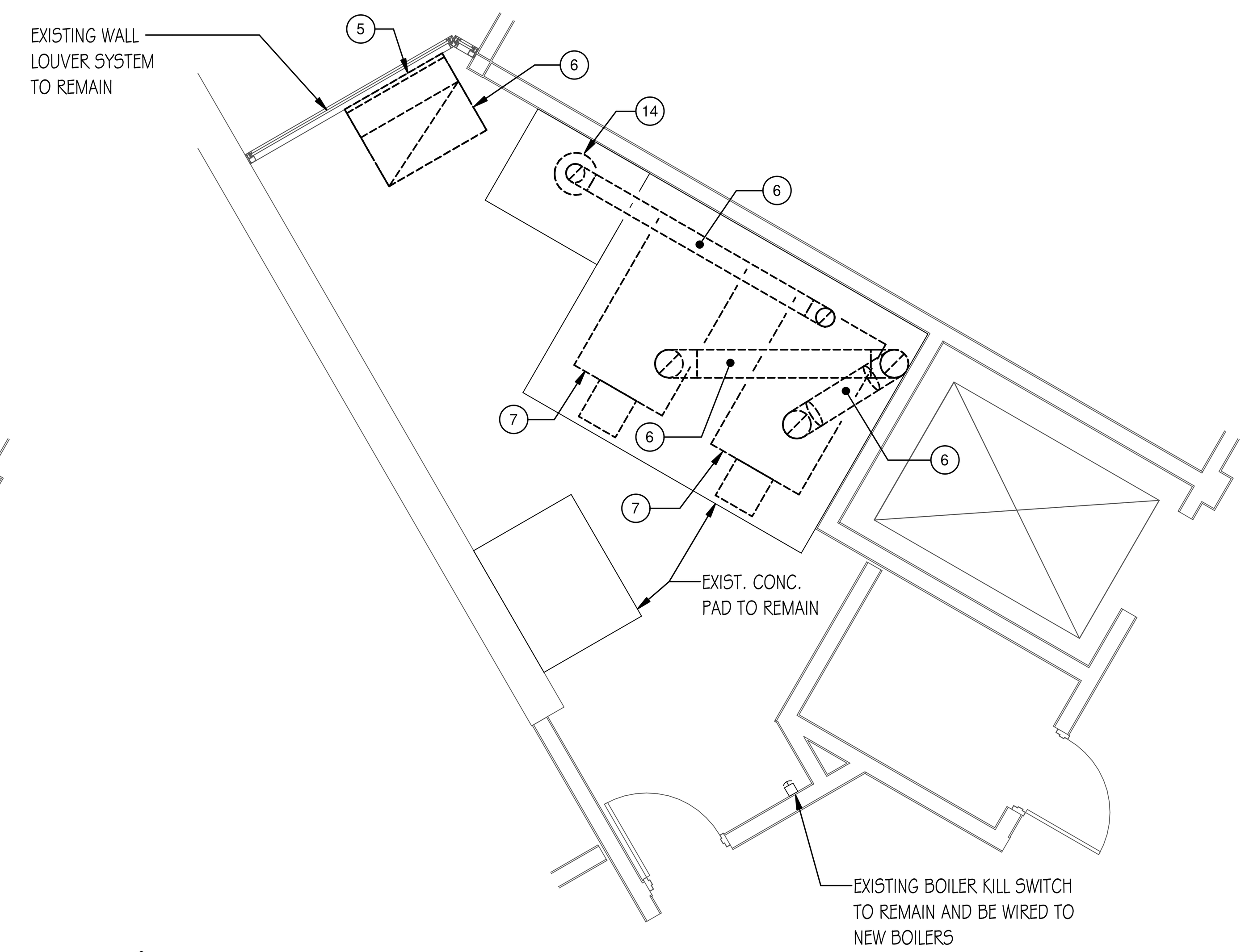
ME-1

DRAWING NOTES

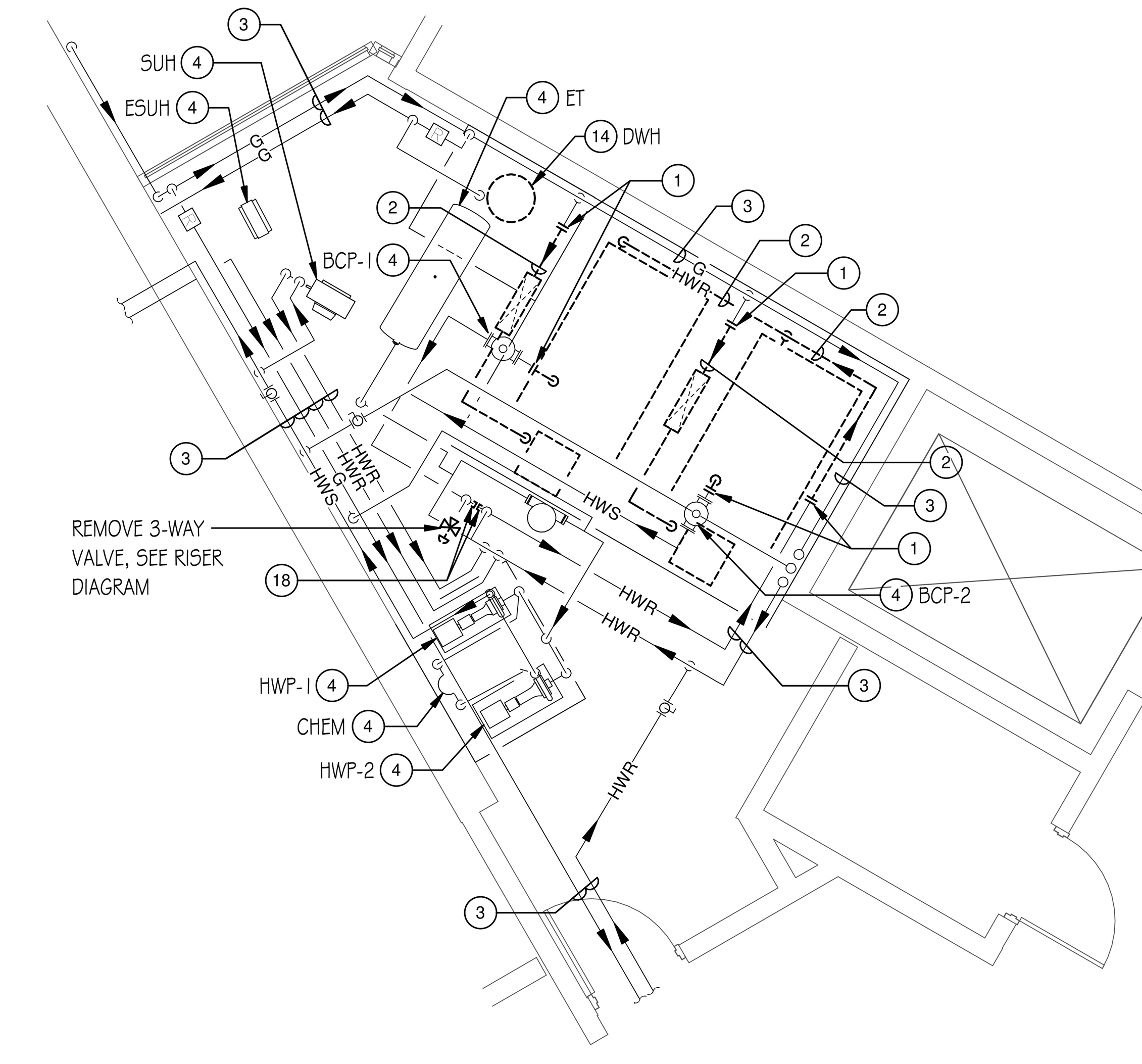
1 NEW CONNECTION TO BE MADE AT THIS LOCATION. REMOVE ALL PIPING, VALVING, HANGERS, INSULATION, ETC. SHOWN DASHED BEYOND THIS POINT.
2 REMOVE ALL PIPING, VALVING, HANGERS, INSULATION, ETC. SHOWN DASHED.
3 EXISTING PIPING AND VALVING TO REMAIN.
4 EXISTING HVAC EQUIPMENT TO REMAIN.
5 PROVIDE DOUBLE WALL PANEL INSULATED 2" THICK WITH R-14 RIGID BOARD INSULATION AT INTERIOR SIDE OF LOUVER. PAINT SIDE VISIBLE THRU LOUVER FLAT BLACK AND SEAL WEATHER TIGHT.
6 REMOVE ALL DUCTWORK, DIFFUSERS, REGISTERS, HANGERS, INSULATION, ETC. SHOWN DASHED.
7 REMOVE BOILER AND ALL ASSOCIATED PIPING, VALVING, FLUE, BREECHING, AND CONTROLS.
8 TERMINATE DUCT OF SIZE INDICATED THRU WALL WITH WALL HOOD OF COLOR/FINISH TO MATCH ADJACENT CONSTRUCTION AND NECK SIZE TO MATCH CONNECTED DUCTWORK. HOOD TO BE FURNISHED WITHOUT BACKDRAFT DAMPER AND WITH BIRDSCREEN.
9 DOUBLE WALL FLUE WITH 6" AL29-4C INNER LINING AND 304SS OUTER JACKET WITH GASKETED JOINTS.
10 FLUE UP THRU FLOOR AND ROOF TO TERMINATE WITH RAIN HOOD.
11 8"Ø PVC OR INSULATED SHEET METAL COMBUSTION AIR DUCTWORK.
12 BALANCE PUMP TO FLOW RATE INDICATED.
13 MAKE NEW CONNECTION TO EXISTING PIPING AT THIS LOCATION.
14 REMOVE EXISTING GAS FIRED WATER HEATER, DWH TO BE REPLACED AT SAME LOCATION PER NEW WORK PLAN. DISCONNECT AND REMOVE ASSOCIATED IN-LINE RECIRC PUMP. DISCONNECT AND REMOVE ASSOCIATED CW/HW/HWC PIPING BACK TO A POINT WHERE IT CAN BE EXTENDED TO NEW WATER HEATER PER NEW WORK PLAN.
15 PROVIDE NEW GAS FIRED WATER HEATER (DWH-1), TYPE AS INDICATED. EXTEND EXISTING CW/HW,HWC PIPING TO NEW WATER HEATER, FIELD VERIFY AND MATCH EXISTING PIPE SIZES. EXTEND WATER SUPPLY PIPING TO NEW CONNECTION POINTS OF NEW WATER HEATER. PROVIDE NEW EXPANSION TANK (DWET-1) AND IN-LINE RECIRC PUMP (DWP-1), REFER TO DETAIL FOR PIPING CONFIGURATION. PROVIDE NEW AQUASTAT TO CONTROL PUMP ON/OFF.
16 MODIFY EXISTING GAS PIPING AS REQUIRED TO MAKE NEW CONNECTION TO DOMESTIC WATER HEATER.
17 MAKE FINAL FULL SIZE CONNECTION TO GAS FIRED EQUIPMENT WITH MIN. 6" DIRT LEG.
18 CAP EXISTING PIPE AT LOCATION SHOWN AND REMOVE ALL PIPING, VALVING, HANGERS, INSULATION, ETC. SHOWN DASHED BEYOND THIS POINT.
19 FULL SIZE OF EXISTING GAS PIPING.
20 4"Ø CPVC COMBUSTION AIR PIPING.
21 4"Ø CPVC FLUE PIPING.
22 ELECTRICALLY DISCONNECT EXISTING BOILER FOR REMOVAL BY OTHERS. REMOVE ANY ASSOCIATED FIRE ALARM DEVICES, DISCONNECT SWITCHES, STARTERS, AND ALL CONDUITS AND CONDUCTORS BETWEEN UNIT AND PANEL. LEAVE SWITCH AT 'OFF' POSITION AND INDICATE AS "SPARE".
23 RECONNECT NEW BOILER TO EXISTING SWITCH PREVIOUSLY SERVING REMOVED BOILER IN SIMILAR LOCATION. PROVIDE 4 #12 AND 1 #12 IN 3/4"C. PROVIDE TOGGLE DISCONNECT SWITCH WITHIN SIGHT OF BOILER. VERIFY CIRCUIT IN FIELD.
24 ELECTRICALLY DISCONNECT EXISTING EQUIPMENT FOR REMOVAL. EXISTING TOGGLE SWITCH, CONDUITS, AND CONDUCTORS SHALL REMAIN TO FEED NEW MECHANICAL EQUIPMENT.
25 RECONNECT NEW UNIT TO EXISTING CIRCUIT PREVIOUSLY SERVING REMOVED EQUIPMENT. EXTEND/MODIFY EXISTING RACEWAY AND CONDUCTORS AS REQUIRED. VERIFY CIRCUIT IN FIELD.



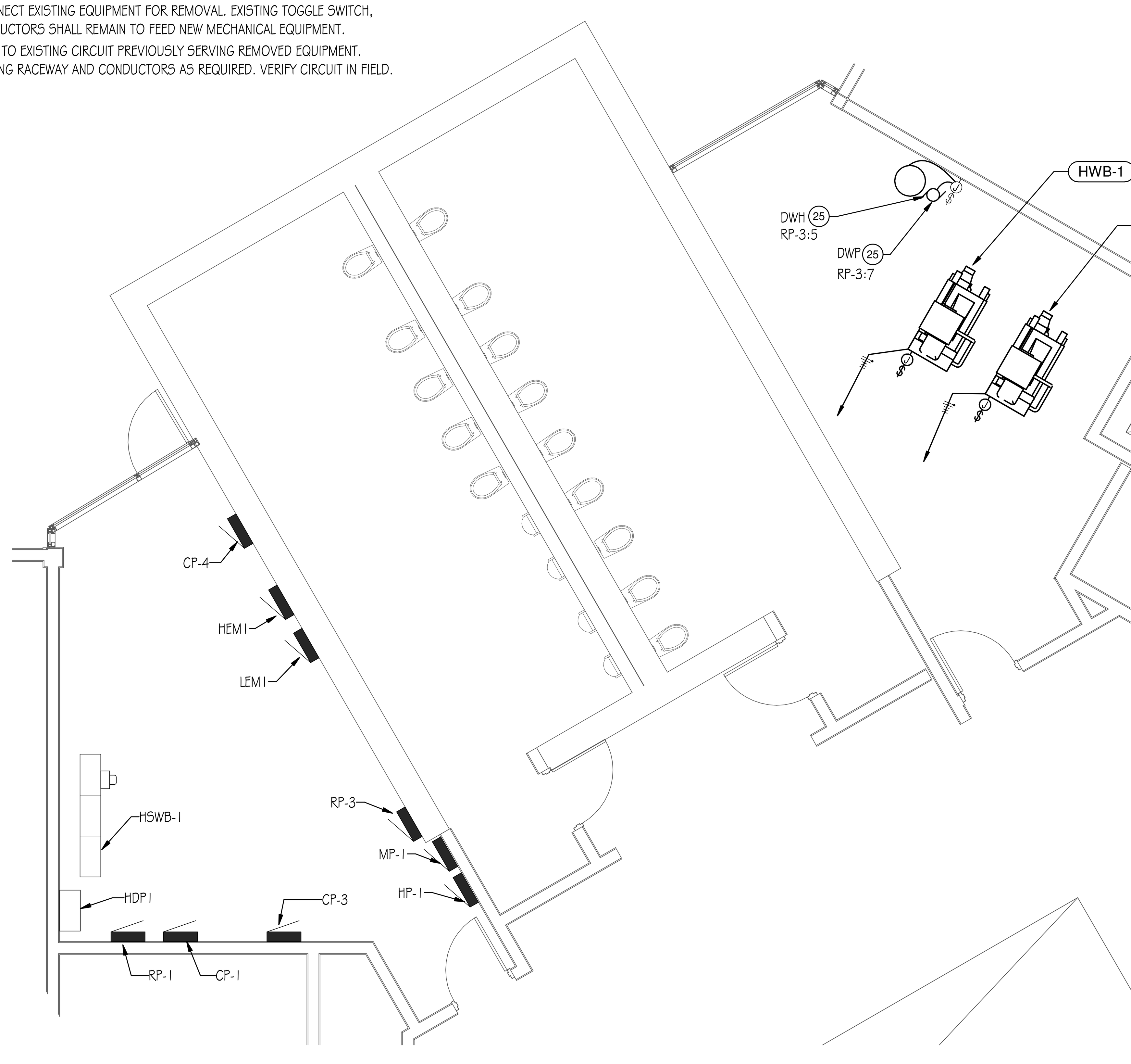
5 BOILER ROOM ELECTRICAL DEMOLITION PLAN
1/4" = 1'-0"



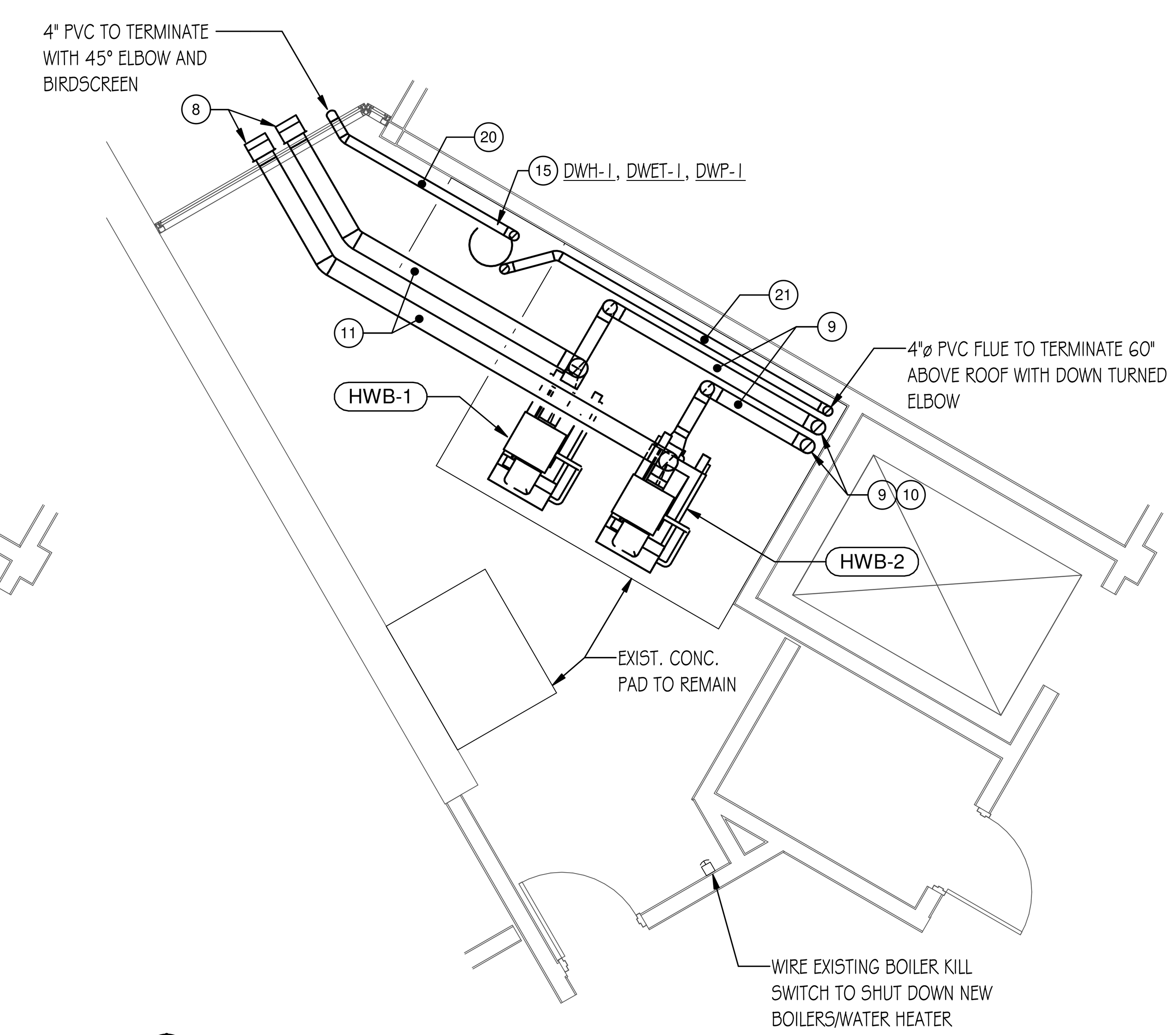
1 BOILER ROOM VENTILATION DEMOLITION PLAN
1/4" = 1'-0"



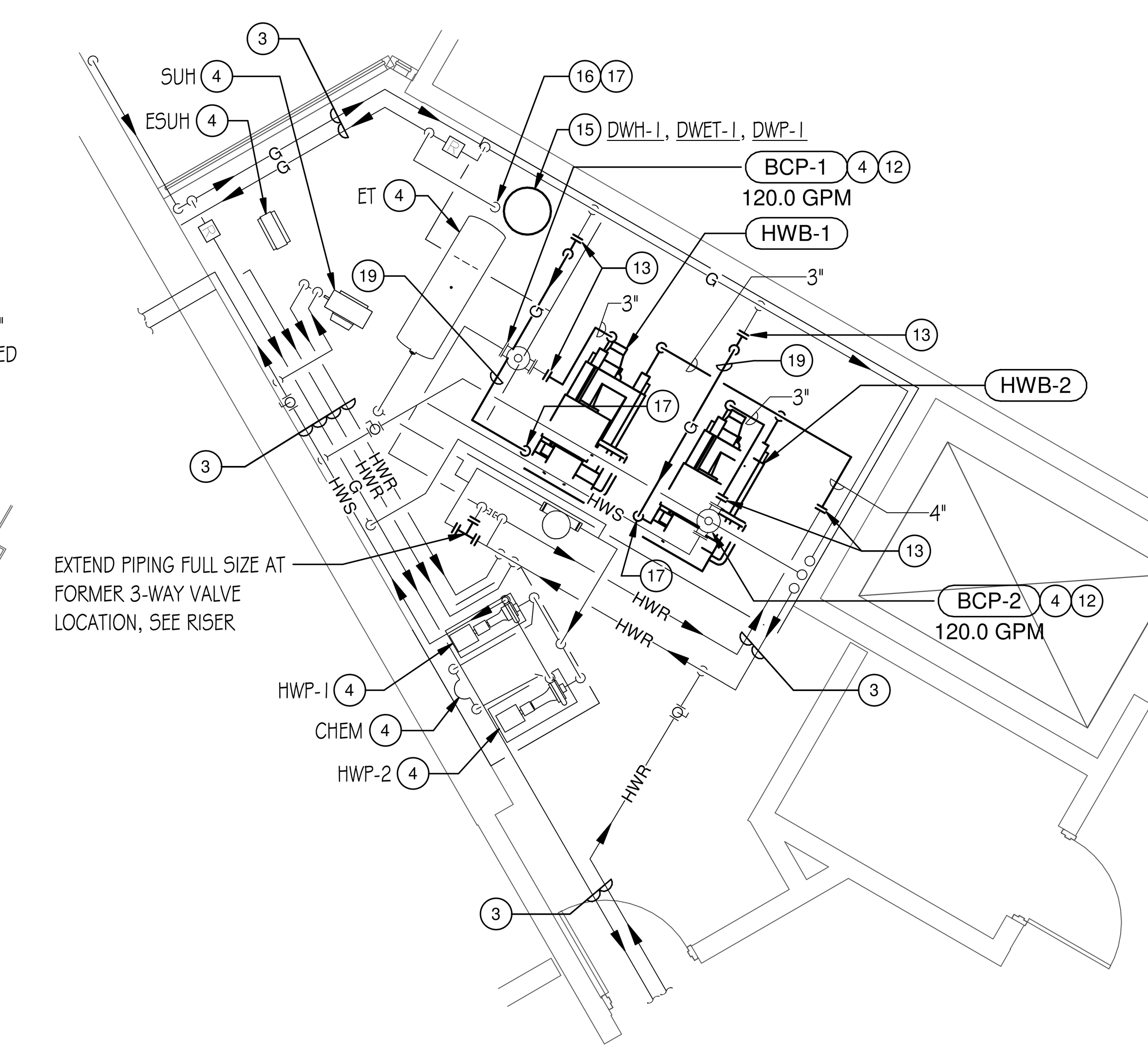
3 BOILER ROOM PIPING DEMOLITION PLAN
1/4" = 1'-0"



6 BOILER ROOM ELECTRICAL PLAN
1/4" = 1'-0"



2 BOILER ROOM VENTILATION PLAN
1/4" = 1'-0"



4 BOILER ROOM PIPING PLAN
1/4" = 1'-0"

2025 BOILER REPLACEMENTS BUILDING 'E' McHENRY COUNTY COLLEGE

8900 NORTHWEST HWY #14
CRYSTAL LAKE, IL 60012

DATE	DESCRIPTION
03/07/25	BID/PERMIT

Mechanical - Electrical Engineers
1216 Tower Road
Schaumburg, Illinois 60173
847.882.2010
Fax 847.882.2201
2010 ENGINEERING GROUP LLC

Sheet Title
MECHANICAL/ ELECTRICAL FLOOR PLANS

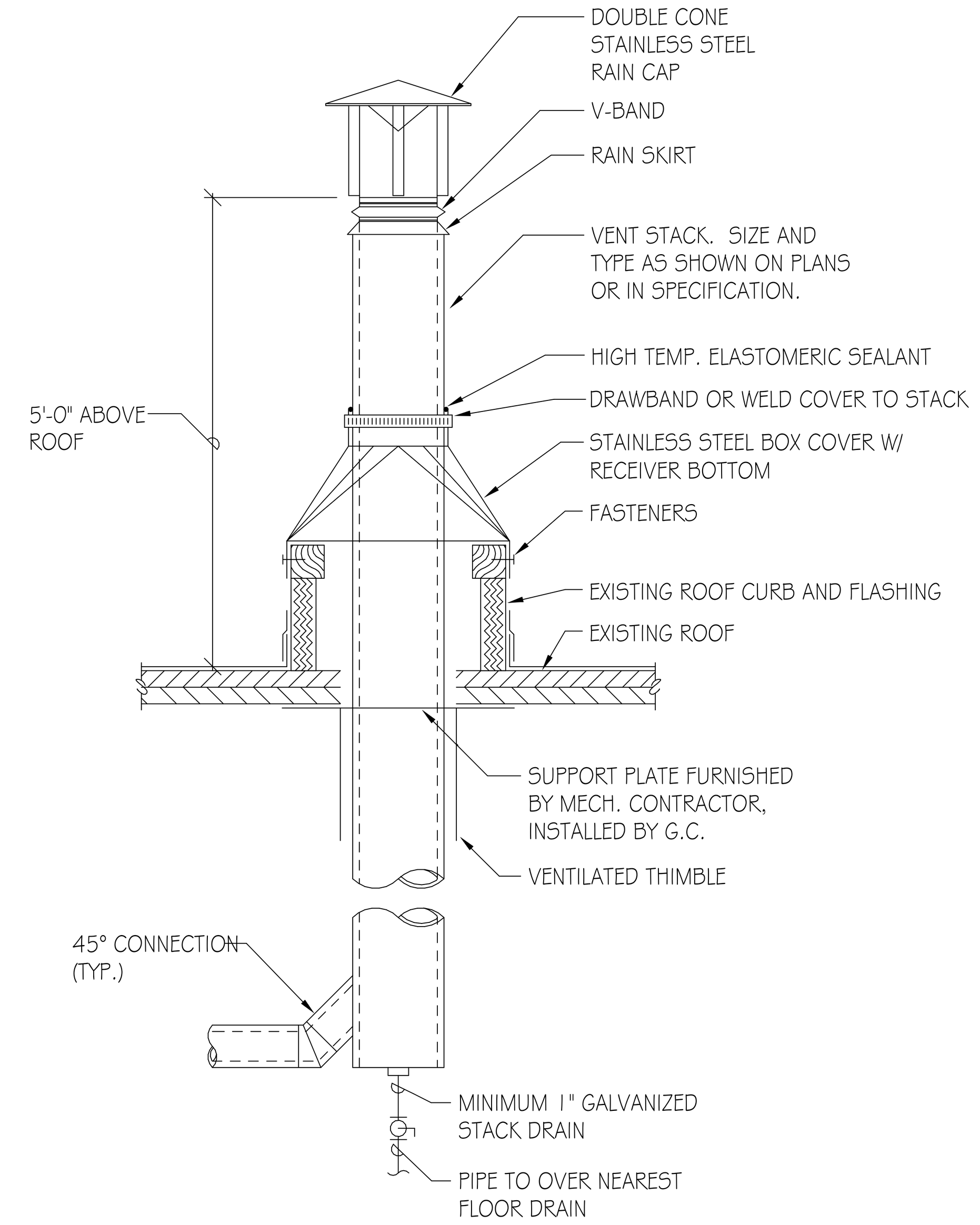
PROJ. MGR: Checker
DRAWN BY: Author
CHECKED B: Checker

ME-2

HVAC SYMBOLS AND ABBREVIATIONS

AS	AIR SEPARATOR
BAS	BUILDING AUTOMATION SYSTEM
BCP	BOILER CIRCULATING PUMP
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CFM	CUBIC FEET PER MINUTE
D	DRAIN LINE
DB	DRY BULB
DN.	DOWN
ET	EXPANSION TANK
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HWB	HOT WATER BOILER
HWP	HOT WATER CIRCULATING PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LWT	LEAVING WATER TEMPERATURE
MCA	MINIMUM CIRCUIT AMPS
MOCP	MAXIMUM OVERCURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
PH	PHASE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
RPM	REVOLUTIONS PER MINUTE
TYP.	TYPICAL
W.C.	WATER COLUMN
WG	WATER GAUGE
WL	WALL LOUVER

Symbol	Description
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
G	NATURAL GAS
D	DRAIN LINE
	CHECK VALVE
	BALL VALVE (2" & SMALLER) BUTTERFLY VALVE (2 1/2" & LARGER)
	3 WAY CONTROL VALVE
	SQUARE HEAD COCK
	CIRCUIT BALANCING VALVE W/BALANCING PORTS (8" AND UNDER) CIRCUIT FLOW INDICATOR W/BALANCING PORTS AND MEMORY STOP BUTTERFLY VALVE FOR BALANCING (10" AND ABOVE)
	PRESSURE RELIEF VALVE (PIPE TO FLOOR DRAIN)
	DRAIN VALVE WITH HOSE THREADED OUTLET
	PIPE EXPANSION JOINT
	PIPE ANCHOR
	PIPE FLEXIBLE CONNECTION
	PIPE UNION (OR FLANGES IF 2 1/2" OR LARGER PIPE)
	PRESSURE GAUGE AND NEEDLE VALVE
FS	FLOW SWITCH (WITH THREAD OR WELD-O-LET)
	THERMOMETER (WITH PIPE WELL)
	PRESSURE/TEMPERATURE PLUG WITH CAP
	STRAINER
	STRAINER WITH BLOWDOWN VALVE
	DIRECTION OF FLOW
PITCH	PITCH OF PIPE (DOWN)
	PIPE ELBOW (TURNED UP)
	PIPE ELBOW (TURNED DOWN)
	PIPE TEE DOWN (DROP)
	PIPE TEE UP
	PIPE TEE UP OR ANGLE
	PIPE TEE DOWN OR ANGLE
NC	NEW CONNECTION
R	GAS PRESSURE REGULATOR
ø	ROUND
- - - - - - -	PIPING, DUCTWORK, OR EQUIPMENT TO BE REMOVED
	FLEXIBLE DUCT CONNECTION
	MANUAL SINGLE BLADE OR OPPOSED BLADE DAMPER
	MOTOR OPERATED DAMPER
	AIR FLOW
12x24	DUCT SIZE FREE AREA (1ST FIGURE, SIDE OF DUCT SHOWN)
	CROSS-SECTION OF SUPPLY OR OUTSIDE AIR INTAKE DUCT
	CROSS-SECTION OF RETURN OR EXHAUST DUCT
	SQUARE OR RECTANGLE DUCT TRANSITION
	SQUARE OR RECTANGLE TO ROUND DUCT TRANSITION
XXX-1	EQUIPMENT TAG

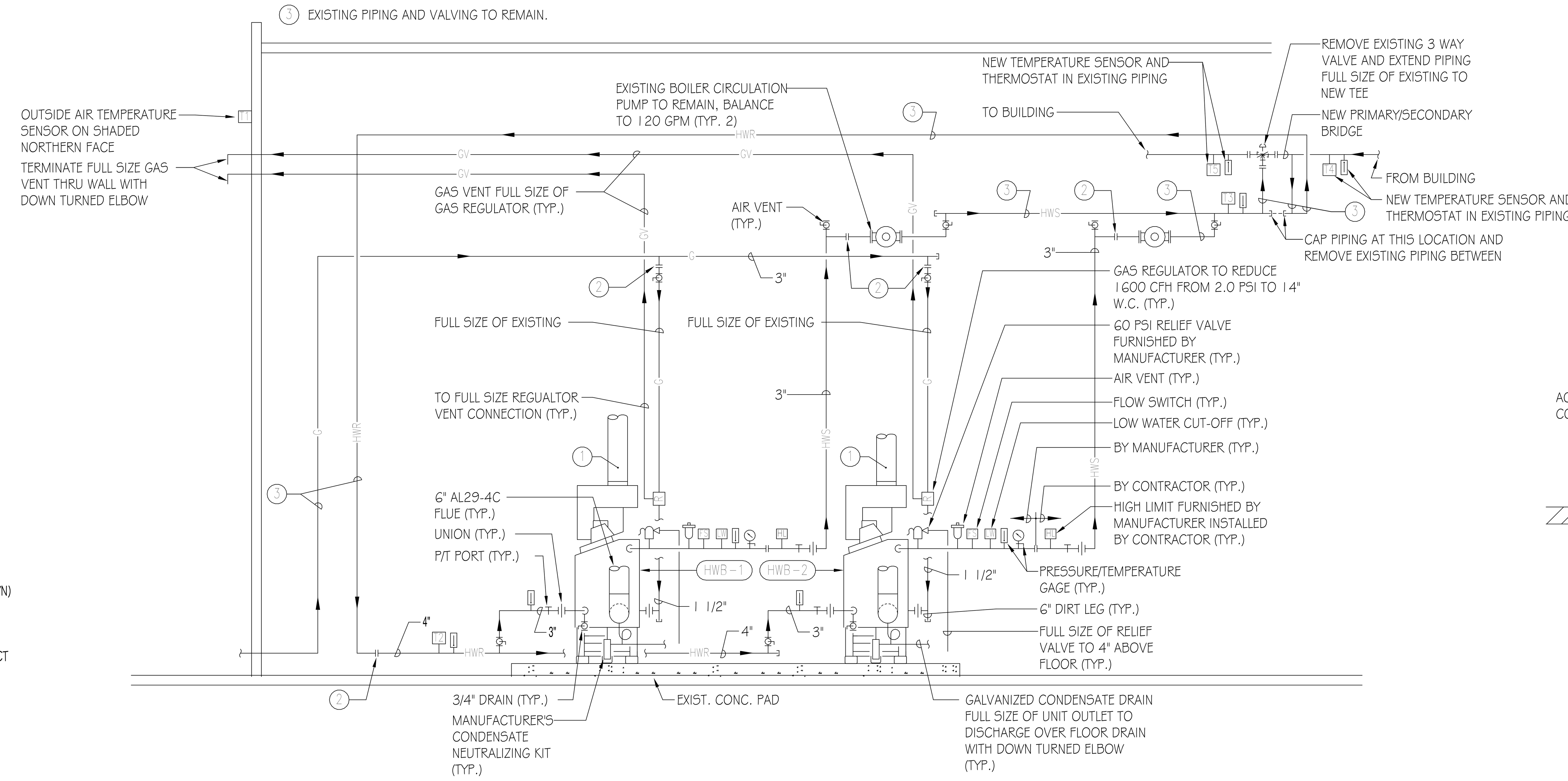


FLUE STACK THRU ROOF DETAIL

NO SCALE

DRAWING NOTES: (TYPICAL FOR THIS DRAWING ONLY)

1. 8" PVC OR INSULATED SHEET METAL COMBUSTION AIR.
2. MAKE NEW CONNECTION TO EXISTING PIPING AT THIS LOCATION.
3. EXISTING PIPING AND VALVING TO REMAIN.



SCHEMATIC DIAGRAM OF CONNECTIONS TO CENTRAL HEATING PLANT EQUIPMENT

NO SCALE

DOMESTIC WATER HEATER SCHEDULE														
EQUIPMENT TAG	LOCATION	MANUFACTURER	MODEL	TYPE	INPUT (BTU/H)	TANK VOLUME (GALLONS)	EFFICIENCY (%)	GPH 100° TEMP. RISE	VENT DIA. (IN.)	BURNER TYPE	BURNER ELECTRICAL AMPS	BURNER ELECTRICAL PHASE	BURNER ELECTRICAL VOLT	NOTES
DWH-1	MECH ROOM	A.O. SMITH	BTH-120	GLASS LINED TANK TYPE	120,000	60	95	138	4"	SEALED COMBUSTION	5.7	1	120	1,2

NOTES:
1. OTHER ACCEPTABLE MANUFACTURERS: BRADFORD WHITE.
2. PROVIDE A.O. SMITH CONDENSATION NEUTRALIZATION KIT AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

PLUMBING PUMP SCHEDULE													
EQUIPMENT TAG	LOCATION	SERVICE	MANUFACTURER	MODEL	TYPE	GPM	HEAD (FT.)	RPM	FLANGE SIZE	MOTOR HP	MOTOR PHASE	MOTOR VOLT	NOTES
DWP-1	MECH ROOM	120° DOMESTIC HOT WATER RECIRCULATION	BELL & GOSSETT	SERIES PR	INLINE, ALL BRONZE	3.0	15	1725	3/4	1/6	1	120	1,2

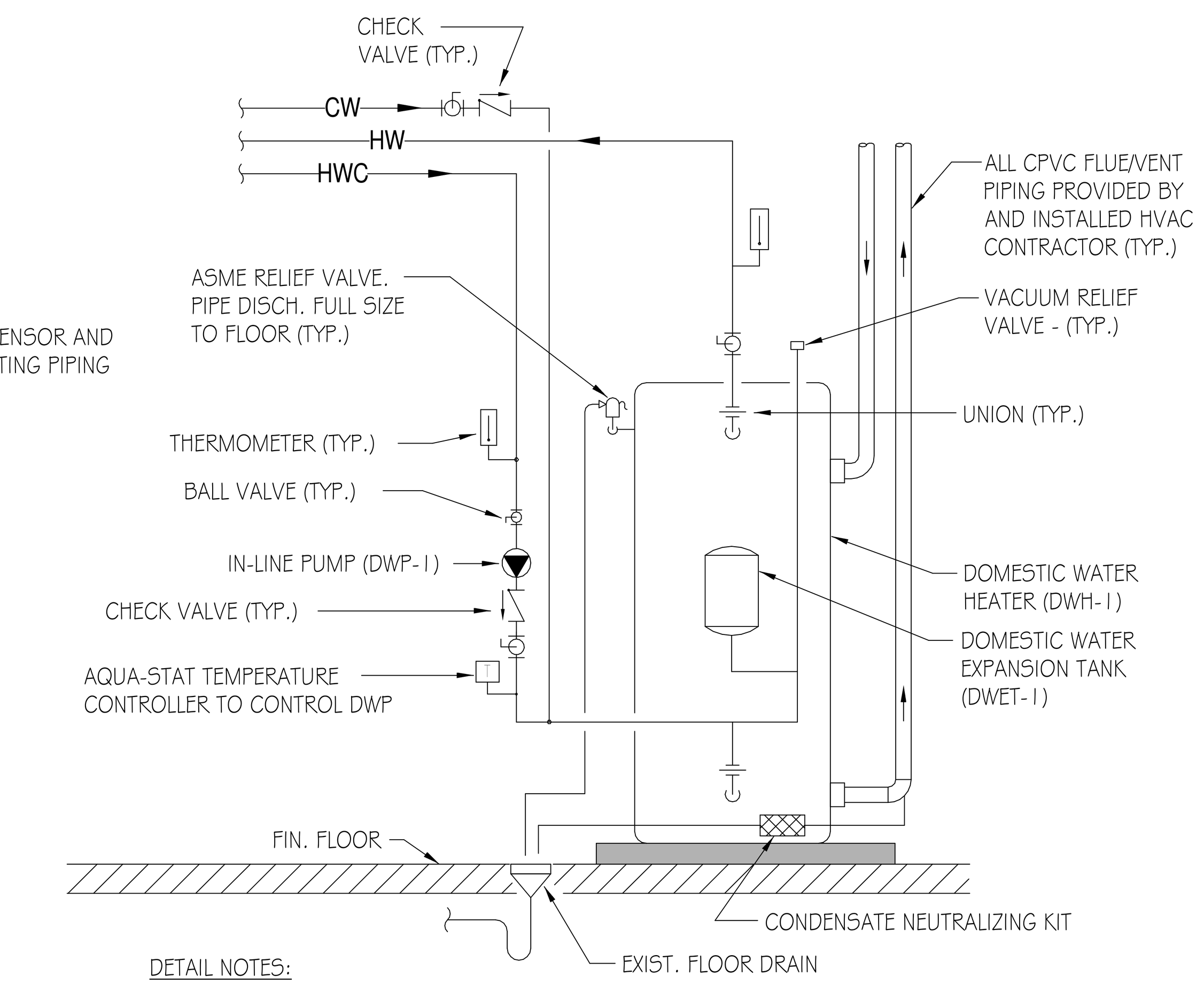
NOTES
1. OTHER ACCEPTABLE MANUFACTURERS: NONE.
2. PROVIDE 120V. AQUASTAT TO CONTROL PUMP ON/OFF, HONEYWELL MODEL L6006C, ADJUSTABLE TEMPERATURE AND 5 DEGREE TEMP DIFFERENCE.

DOMESTIC WATER EXPANSION TANK SCHEDULE								
EQUIPMENT TAG	LOCATION	SERVICE	MANUFACTURER	MODEL	TYPE	CAPACITY	CONN. SIZE	NOTES
DWET-1	MECH ROOM	DWH-1	WESSELS	T-5	BLADDER	1.3 GAL. ACCEPT./ 2.1 GAL. TANK	3/4"	1,2,3

1. OTHER ACCEPTABLE MANUFACTURERS: AMTROL, WATTS, A.O. SMITH
2. TANK TO BE SPECIFICALLY FOR USE IN POTABLE WATER SYSTEMS.
3. BLADDER SHALL BE MADE OF BUTYL RUBBER.

EQUIPMENT SCHEDULE:

HWB-1, HWB-2: HYDROTHERM MODEL 'KN-16' (NO SUBSTITUTION) HOT WATER BOILER WITH 1,600 MBH HEATING INPUT. BOILER TO OPERATE AT 480V/3PH. PROVIDE CSD-1 BURNER AND CONTROLS, FLOW SWITCH, HIGH LIMIT SWITCH, LOW WATER CUT OFF, AIR VENT, CONDENSATE NEUTRALIZING CARTRIDGE, 60 PSI RELIEF VALVE, AND BAS INTERFACE COMPATIBLE WITH EXISTING TRANE SUMMIT BAS SYSTEM.



DETAIL NOTES:

1. CONTRACTOR SHALL PROVIDE ALL REQUIRED BALANCING OF DOMESTIC HOT WATER RECIRCULATION SYSTEM TO MAINTAIN LOOP TEMPERATURE OF 120 DEGREES.
2. CONTRACTOR SHALL PROVIDE DRAIN PIPING FROM ALL PRESSURE RELIEF VALVES AND EQUIPMENT DRAINS TO NEARBY FLOOR DRAINS, EACH DRAIN SHALL BE ROUTED INDEPENDENTLY AND A PROPER MATERIAL SHALL BE USED WITH AN ACCEPTABLE TEMPERATURE RATING.
3. PROVIDE WATER HEATER MANUFACTURERS CONCENTRIC VENT KIT AND CONDENSATE NEUTRALIZING KIT WITH WATER HEATER FOR INSTALLATION BY HVAC CONTRACTOR. ALL FLUE AND VENT PIPING SHALL BE CPVC AND PROVIDED AND INSTALLED BY HVAC CONTRACTOR. REFER TO HVAC DRAWINGS FOR GAS PIPING AND FLUE PIPING.

DOMESTIC WATER HEATER DETAIL

NO SCALE

KEITH G. CHRISTIAN 62-062128 REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS EXPIRES 11/30/2025

2025 BOILER REPLACEMENTS BUILDING 'E' McHENRY COUNTY COLLEGE

8900 NORTHWEST HWY #14
CRYSTAL LAKE, IL 60012

DATE	DESCRIPTION
03/07/25	BID/PERMIT

Mechanical - Electrical Engineers
1216 Tower Road
Schaumburg, Illinois 60173
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20/10 ENGINEERING GROUP LLC

Sheet Title
MECH./ ELEC. NOTES, DETAILS AND SCHEDULES

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